

West Main Street Reconstruction
Project #96-2

DESIGN DATA					
Traffic	Average Daily				Est. Max. Hr.
Current	SEE BELOW	Pass.	SEE BELOW	Trucks 4% OF AADT	SEE BELOW
Forecast	SEE BELOW	Pass.	SEE BELOW	Trucks 4% OF AADT	SEE BELOW
Minimum Sight Dist. for:	Design Speed 35 MPH				10% OF AADT
Stopping	250'	Bridges Hs 20			
Safe Passing					
Passing for Marking					

JOB# 17

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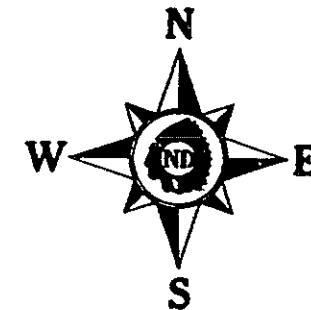
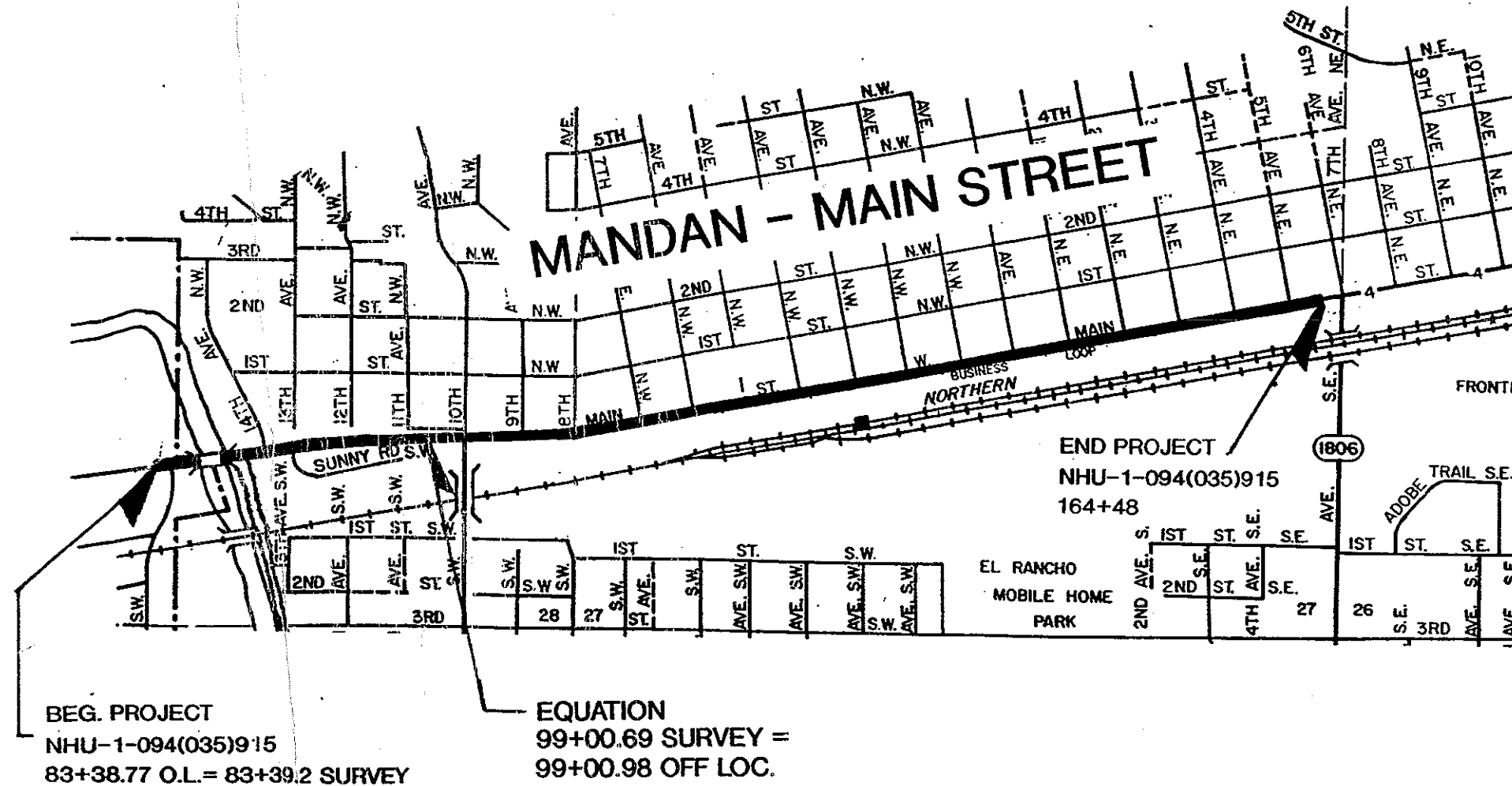
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

MORTON COUNTY
NHU-STNU-1-094(035)915
RECONSTRUCTION, GRADING, SURFACING, SEWER, STRUCTURE,
LANDSCAPING, SIGNALS, LIGHTING, SIGNING, MARKING, & INCIDENTALS.

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota Department of Transportation September 1992; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

LENGTH OF PROJECT	
MILES GROSS	MILES NET
1.536	1.536



	AADT	
	1993	2013
6 Ave NE to 3rd Ave NE	18,800	28,900
3rd Ave NE to Collins Ave	18,300	28,100
Collins Ave to 1st Ave NW	14,200	21,800
1st Ave NW to 3rd Ave NW	13,000	20,000
3rd Ave NW to 4th Ave NW	11,300	17,400
4th Ave NW to 6th Ave NW	10,200	15,600
6th Ave NW to 10th Ave NW	8,100	12,400
10th Ave NW to Heart River Br.	3,200	4,900

BEG. PROJECT
NHU-1-094(035)915
83+38.77 O.L. = 83+39.2 SURVEY

EQUATION
99+00.69 SURVEY =
99+00.98 OFF LOC.

PAVING SECTION _____
URBAN SECTION *Nicholas A. Anderson*
TRAFFIC SECTION *Gregory St. Jacques*
RURAL SECTION _____
RECOMMEND APPROVAL *12/14/95*
DESIGN ENGINEER *Daniel K. Oster*

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR DATE

APPROVED DATE *12/14/95*
Ray Zink
DIRECTOR OF HIGHWAYS
AND ENGINEERING
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION



SYMBOLS

STATE & NATIONAL LINES		BUILDINGS	
COUNTY LINE		TELEGRAPH LINES	
TOWNSHIP & RANGE LINES		TELEPHONE LINES	
SECTION LINE		POWER LINES	
QUARTER SECTION LINE		CULVERTS (in Place)	
SECTION CORNER		CULVERTS (Install)	
QUARTER SECTION CORNER		CONCRETE BOX CULVERTS (Install)	
OLD RIGHT OF WAY LINE		BRIDGES (Install)	
NEW RIGHT OF WAY LINE		CONCRETE CURB	
GRADE LINE		CONCRETE CURB AND GUTTER	
CENTERLINE OF CONSTRUCTION		CONCRETE WALK	
RAILROAD RIGHT OF WAY LINE		CATCH BASIN (Existing)	
CITY OR VILLAGE CORPORATE LIMITS		CATCH BASIN (New)	
PROPERTY LINE		MANHOLE (Existing)	
EASEMENT LINE		MANHOLE (New)	
FENCES		CURB INLET (Existing)	
SNOW FENCE		CURB INLET (New)	
DRAINAGE		GROUND MOUNTED SIGNS	
WATERS EDGE		OVERHEAD SIGNS	
MARSH OR SWAMP		HYDRANT	
RIPRAP		LIGHT STANDARDS	
DRAINAGE DITCH		TRAFFIC SIGNALS (Plan & Profile Sheets)	
APPROACH		HIGH MAST LIGHTING ASSEMBLY	
TRAVELED WAY		GROUND ELEVATION	
RAILROADS		GRADE	
GUARD RAIL		CENTERLINE	
GUIDE POSTS		SECTION LINE	
DELINEATORS		DEFLECTION ANGLE (Delta)	
HEDGES AND TREES		SOD OR JUTE MESH	
INTERCHANGE		POLES TO BE MOVED	
HIGHWAY GRADE SEPARATION-NO CONNECTION		POLES TO BE LOWERED	
OTHER BRIDGE		CONCRETE FOUNDATION	
SERVICE ROAD		CONDUIT	
TERMINATED CROSS-ROAD		CONDUCTOR	
		CONCRETE PULL BOX	
		FEED POINT	
		250 WATT LIGHT STANDARDS	
		400 WATT LIGHT STANDARDS	
		700 WATT LIGHT STANDARDS	
		1000 WATT LIGHT STANDARDS	
		FLASHING BEACON	
		TRAFFIC SIGNAL-MAST ARM MOUNTED	
		TRAFFIC SIGNAL-POST MOUNTED	
		SIGNAL HEAD	
		PEDESTRIAN PUSHBUTTON POST	
		TRAFFIC SIGNAL CONTROLLER	
		FEED POINT - PAD MOUNTED	

ABBREVIATIONS

Aggr	Aggregate	M L	Main Line
Ahd	Ahead	N R	North Roadway
Alt	Alternate	Off Loc	Office Location
Approx	Approximate or Approximately	O to O	Out to Out
Appr	Approach	P & P	Plan and Profile
Asph Cem or A C	Asphalt Cement	P C	Point of Curvature
Asph Conc.	Asphaltic Concrete	P C C	Point of Compound Curve
Bit	Bituminous or Bitumen	P C C Pvm't	Portland Cement Concrete Pavement
Bk	Back	P D	Private Drive
B M	Bench Mark	Pen	Penetration
Bldg.	Building	Perf	Perforated
Br	Bridge	P I	Point of Intersection
C A E S.	Corrugated Aluminum End Section	P O C	Point on Curve
C A P	Corrugated Aluminum Pipe	P O T	Point on Tangent
C B	Catch Basin	P P	Power Pole
C & G	Curb and Gutter	P R C	Point of Reverse Curvature
Ch Bk	Channel Block	Pref	Preformed
Ch Ch	Channel Change	P S D	Passing Sight Distance
C I	Curb Inlet	P T	Point of Tangency
C I P	Cast Iron Pipe	P V C	Polyvinyl Chloride Sewer Pipe
Cl	Class	Quant	Quantity or Quantities
C. S. E. S.	Corrugated Steel End Section	R	Radius
C. S. P.	Corrugated Steel Pipe	R or Rge	Range
CMS	Cationic Medium Setting	RC	Rapid Curing
Comp	Compression	RCE S	Reinforced Concrete End Section
Const	Construction	R C P	Reinforced Concrete Pipe
Conc	Concrete	R C P S	Reinforced Concrete Pipe Sewer
Cont. Reinf Conc Pvm't	Continuously Reinforced Concrete Pavement	Rd	Road
Contn	Continuation	Rdbd	Roadbed
Crn	Crown	Rdwy	Roadway
CRS	Cationic Rapid Setting	Refi	Reflatorized
Crse	Course	R R	Railroad
C. S.	Curve to Spiral	Rt	Right
C. to C.	Center to Center	R/W	Right of Way
C. Y	Cubic Yard	Salv	Salvage
D	Degree of Curvature	San	Sanitary
D-Load	Dead Load	S C	Spiral to Curve
D. B	Ditch Block	SC	Slow Curing
Def	Deformed	Sd	Spiral Deflection Angle
Del	Deliver	S D	Sight Distance
D G	Ditch Grade	S E	Superelevation
El. or Elev	Elevation	Sec	Section
Ellipt	Elliptical	Sec Line Appr	Section Line Approach
Emb	Embankment	Sep	Separation
Emul.	Emulsified	Serv	Service
Engr	Engineer	Sgr Prep	Subgrade Preparation
Eq	Equation	Shldr	Shoulder
E R	East Roadway	SP	Special Provision
E S	End Section	S P P	Structural Plate Pipe
Eamt	Easement	S P P A	Structural Plate Pipe Arch
Exc	Excavation	S R	South Roadway
Exp.	Expansion	SS	Slow Setting or Supplement Specification
F D	Field Drive	S S D	Stopping Sight Distance
Found	Foundation	S T	Spiral to Tangent
F P	Fence Post	Sta.	Station
Furn	Furnish	Std.	Standard
Ga	Gage or Gauge	Std. Specs.	Standard Specifications
Gr	Gravel	Struct.	Structure
Grd	Graded	Surf	Surface or Surfacing
G V	Gate Valve	Surv	Survey
Hcl	Helical	S W	Sidewalk
Hyd	Hydrant	S Y	Square Yard
Ident	Identification	T	Tangent Length (circular curve)
Inchg	Interchange	T or Tap	Township
I M	Iron Monument	Tel	Telephone
Inst	Install	Temp	Temporary
Inter	Intersection	T P	Telephone Pole
Inv	Invert	Tr	Traffic
Jt	Joint	Trans	Transverse or Transition
L	Length of Curve	Trtd	Treated
Lc	Length of Spiral	Ts	Tangent Length (curve with spirals)
Levg	Leveling	T S	Tangent to Spiral
L F	Linear or Lineal Foot	U S C & G S	United States Coast and Geodetic Survey
Liq	Liquid	V C	Vertical Curve
Long	Longitudinal	V C P	Vitrified Clay Pipe
L P	Light Pole	W M	Water Main
Li	Left	W M V	Water Main Valve
"M"	One Thousand	W R	West Roadway
Matl	Material	Wrng	Warning
Max	Maximum	W S V	Water Service Valve
MC	Medium Curing	X-Sec	Cross Section
M H	Manhole	Xc	Spiral Coordinate
Min	Minimum	Yc	Spiral Coordinate

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*Landscaping
Beautification*

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LIST OF STANDARD DRAWINGS
LOCATED IN THE BACK OF THE PLANS

STANDARD
NO.

D-550-1 Standard Anchorage Units
D-550-2 Longitudinal Joint Details
D-550-3 Transverse Contraction Joint Details
D-550-5 Transverse Construction Joint
D-622-1 Pile Splice Details
D-704-1 Attenuation Device
D-704-2 Traffic Control Coring Hot Bit. Pavement
D-704-8 Breakaway System for Construction Zone Signs
D-704-9, 10, 11, & 12 Construction Sign Details
D-704-13 Barricade Details
D-704-14 Construction Sign and Barricade Assembly Details
D-704-15 Construction Sign and Barricade Location Details
D-704-16 Typical Construction Signal Layout
D-704-17 Sign Layout For One-Lane Closure Two-Lane Roadway
D-706-1 Type C Field Laboratory
D-708-2 Temporary Erosion and Siltation Controls
D-714-1 Reinforced Concrete Pipe Culverts and End
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D-714-4 Corrugated Steel Pipe Culverts and End Sections
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D-714-22 Concrete Pipe Ties
D-722-1 Inlet - Type 1
D-722-1A Inlet - Catch Basin
D-722-1B Inlet - Special
D-722-1D Inlet - Saddle Base
D-722-2 Inlet - Type 2
D-722-4 Sanitary Manhole
D-722-5 Manhole Details
D-724-1 Water Works
D-748-1 Valley Gutter and Curb and Gutter
D-748-3 Precast Concrete Curb Sections
D-748-9 Portable Precast Concrete Median Barrier (Temporary Usage)
D-750-1 Concrete Driveway (Urban)
D-750-2 Sidewalks and Curb Ramps
D-754-23 Assembly Details
D-754-24 Mounting Details Perforated Tube
D-754-26, 27, 28, 29, 31, & 41 Sign Punching, Stringer, and Support
Location Details for Regulatory, Warning, and Guide Signs
D-754-47, 48, 49 & 50 Sign Punching, Stringer, and Support Location
Details for Variable Length Signs

STANDARD
NO.

D-754-53 Sign Punching, Stringer, and Support Location
Details Route Marker Signs
D-754-76 Street Name Sign Assembly Details
D-754-80 Light Standard, Signal Standard, and Span Wire Mounted Sign
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D-762-1 Pavement Marking Message Details
D-762-4 Pavement Marking
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D-764-2 Modified Eccentric Loader Terminal
D-764-2A Diaphragm Buffered & Strut & Yoke Detail
D-764-3 W-Beam Guardrail at Bridge Ends (General Layout
and Details Flared Guardrail Section)
D-764-5 W-Beam Guardrail at Bridge Ends
D-764-6 Guardrail at Bridge Ends (40 mph Design Length of
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D-900-1 Bridge Bench Marks

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NOTES

100 Cross sections for this project are available for inspection at the
014 Design Division, North Dakota Department of Transportation, 608 East
Boulevard Avenue, Bismarck, North Dakota 58505-0700 and also at the
North Dakota Department of Transportation District Office in Bismarck.

100 WEEKLY PLANNING/REPORTING MEETING:

021 A. Purpose of Weekly Meeting.

1. The contractor shall organize the weekly meeting to coordinate the efforts between subcontractors, utilities, local authorities, and others.

B. Contractor's Project Manager/Superintendent: Planning and Reporting.

1. The contractor will be responsible for sending a knowledgeable representative to conduct a weekly Reporting/Planning meeting. It will be the contractor's responsibility to prepare minutes for each meeting and to make the appropriate distribution of the minutes.
2. The contractor will be required to provide a written schedule of the next week's work and a tentative schedule of the following week.
3. Reporting/Planning meeting will include discussion of problems encountered during the current week; information of interest to local authorities, subcontractors, utilities, and next week's prospective schedule.
4. The contractor shall organize the weekly meeting contacting interested agencies. These agencies include, but are not limited to, the following:
 - a. North Dakota Department of Transportation
 - b. City Engineer's representative.
 - c. Police department.
 - d. Fire department.
 - e. Ambulance service.
 - f. Telephone Co.
 - g. Power Co.
 - h. Cable T.V.
 - i. Gas Co.
 - j. Railroad Co.
 - k. Subcontractors.
 - l. Chamber of Commerce.

100 DETOURS: The contractor shall maintain the streets used as detours
060 and repair areas damaged by the detoured traffic. Upon completion of
the project, the contractor shall restore the streets to a condition at
least equal to that which existed at the time traffic was routed over
them. Work shall be as deemed necessary by the engineer. The repair
and maintenance of the detours will be paid for in accordance with
Section 107.05 B of the Standard Specifications - Haul Roads.
Necessary route markers will be furnished by the Department of
Transportation and erected and maintained by the contractor as an
incidental item.

100 PUBLIC RELATIONS COORDINATOR: The contractor shall provide a public
P01 relations and information coordinator. The coordinator should not be
the project superintendent or construction foreman. The coordinator
should be knowledgeable in construction operations, be able to develop
effective media releases, possess written and verbal communication
skills, and be able to organize productive meetings.

The public relations coordinator will be responsible for providing the following:

1. Organize, schedule, and conduct the weekly planning and reporting meetings (plan note 100-021).
2. Advise Tom Little, city of Mandan, 667-3225, of forthcoming construction activities in regard to street closures and traffic detour routes so that city police, emergency services, schools, and other pertinent city agencies may be notified.
3. Provide news releases and necessary drawings to the local media, including TV, radio, and newsprint prior to and during construction, to inform the public on construction activities and schedules, street closures, width or height restrictions to traffic, and traffic detour routes. News releases on construction activities shall be updated on a timely basis (minimum two-week update).
4. News media interviews.
5. The public relations coordinator's name, work address, and work telephone number shall be made available so that the coordinator may address public questions.
6. Work directly with property owners and businesses affected by construction activities. The coordinator must have sufficient knowledge and authority to resolve property owner and business concerns regarding scheduling, maintaining access, and construction operations.

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100/PO1 (Cont)

All costs associated with the public relations coordinator shall be incidental to the price bid for other items.

100 COORDINATION OF WORK: NDDOT Project NHU-1-094(039)916, Mandan
 PO2 Main Street, from Hwy. 1806 (6th Street NE) to Twin City Drive is under construction concurrent with this project. It shall be the contractor's responsibility to coordinate his activities, schedule, and traffic-control delineation with the above stated project.

100 HISTORICAL DISTRICT: The area between 4th Avenue NW and
 PO3 1st Avenue NE, including the intersections, is a historical district. In this district, the contractor will be required to salvage and reuse manhole covers and castings. Also, the glass blocks in the sidewalk in front of the Ben Franklin Store shall be left in place. The contractor shall use care when removing the sidewalk around the glass block area so as not to break or damage the blocks. All work items associated with items described above shall be included in the unit price bid for other items. This work is an environmental commitment.

100 NOISE RESTRICTIONS: The contractor shall be required to consult the
 PO4 Mandan city government regarding noise ordinances prior to the start of construction activities.

100 No construction activities will be allowed on July 2, 3, 4, or 5.
 PO5 Trenches shall be filled in or surrounded by safety fence, and all hazards shall be removed from the construction area on these dates. The area from 6th Avenue NW to Collins Avenue shall have all construction equipment removed and shall have no trenches remaining on these dates. All costs for labor, equipment, and materials necessary to perform this work shall be included in the price bid for other items.

100 MISCELLANEOUS SURFACING: 1,250 tons of hot bituminous pavement -
 PO6 Class 27, and 400 SY of 6 In. non-reinforced concrete pavement Class AE have been provided in the quantities and shall be used where construction abuts existing asphalt such as parking lots, traffic control detours, driveways, etc., at the property line. The property line patches shall be a minimum of 6" thick. Ordinary compaction for the HBP will be required. The Gradation Payment Schedule and the pay factor for Bitumen Content Deviation shall not be used. The exact locations and quantities shall be determined in the field by the engineer.

105 UNDERGROUND UTILITIES: The contractor shall notify the local
 030 utility companies prior to the beginning of construction, so they may determine the location of all utilities in the project area. Subcutting or scarifying over utility lines may be eliminated if, in the opinion of the engineer, a hazardous situation exists. Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the contractor, upon request to the engineer.

105 PAVEMENT SWEEPING: The contractor shall sweep new pavements before
 110 opening to traffic and for final acceptance. For this sweeping, the contractor shall furnish and utilize a vacuum type sweeper to control the dust. All costs connected with this work shall be included in the price bid for other items.

105 TREES, SHRUBS, AND NATIVE GRASSES: The contractor shall exercise
 130 care in his construction operations to ensure that trees, shrubs, and native grasses within the right of way and outside the construction area are not disturbed.

110 This project is subject to the conditions of Section 404
 100 Nationwide Permit No. 23. The following special conditions, if applicable, must be met:

1. The activity will not significantly disrupt the movement of those species of aquatic life indigenous to the water body (unless the primary purpose of the fill is to impound water).
2. No discharge of dredge or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts.
3. Any structure or fill authorized will be properly maintained.
4. No activity may cause more than a minimal adverse effect on navigation.
5. Discharge of dredge or fill material or equipment movement in wetland areas shall be avoided to the maximum extent practicable.
6. Discharge of dredge or fill material into breeding areas for migratory waterfowl shall be avoided to the maximum extent practicable.
7. All temporary fills shall be removed in their entirety.

200 SHRINKAGE: 20 percent additional volume in yardage computed by the
 010 end area method is allowed for shrinkage in earth embankment.

200 Removal of inlets and manholes shall consist of removing the
 048 casting, rings, barrel, base, plugging or capping of existing lines, and backfilling to grade. All labor, equipment, materials, and disposal of items involved in the removal shall be included in the price bid for "Removal of Inlets" or "Removal of Manholes".

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200 PAVEMENT REMOVAL: All concrete and pavements paid for as removal
060 shall be deducted from the excavation quantity.

202 CULVERTS: All culvert sections removed on this project shall become
P01 the property of the contractor.

202 REMOVE AND SALVAGE BITUMINOUS SURFACING: The bituminous material to
P02 be removed from the mainline, cross streets, and shoulders may be removed by milling or with tracked or wheeled front end loaders. The salvaged bituminous material shall be hauled to the stockpile site, weighed, and stockpiled. The unit price bid for "Remove and Salvage Bituminous Surfacing" shall be considered full compensation for removing, loading, hauling, and stockpiling salvaged bituminous materials.

202 MEDIAN REMOVAL: The median located adjacent to 6th Avenue NE on the
P03 west side of the intersection shall be removed prior to the set up of any traffic-control devices in the area of this intersection. The removal shall be accomplished by sawing full depth at the outer edge of the gutter line and removing the curb, gutter, and median concrete. The void in the pavement shall be brought up to grade with 8 inches of concrete and Class 5 aggregate. The inlet located along the median at 163+48 Lt. shall be adjusted consistent with the method described in Note 722 P02.

When the need to delineate traffic across this median area no longer exists, a 6" high concrete curb-median combination shall be installed at the median location shown on the plans. The median nose shall be shaped as shown on the detail. The curb-median combination shall be held in place with metal pins. The location of the pins, as well as their method of installation, shall be designated by the engineer. Payment for all labor and equipment necessary to bring the existing median area up to grade shall be made at the unit price bid for "8" Non-Reinf. Conc. Pgmt. CL AE," SY. Pavement for all labor and equipment necessary to place the curb and median pavement shall be made at the unit price bid for "Conc. Median Paving" SY.

202 CONCRETE REMOVAL: Concrete 6 inches thick and under shall be removed
P04 by the price bid for "Removal of Concrete," SY. Concrete over 6 inches thick shall be removed by the price bid for "Removal of Concrete Pavement," SY.

202 EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL: The possibility exists
P05 that contaminated soil might be encountered during excavation activities on this project. If contaminated material is encountered, the contractor shall notify the City Engineer, Tom Little (667-3225), the engineer; and Gary Berreth (328-5166), Division of Waste Management, and the State Health Department, at least five days in advance of the removal of contaminated soil. The engineer will determine the excavation limits of contaminated soil to be removed.

202/P05 (Cont)

The contractor shall clear "Application to Land Treat Petroleum Contaminated Soil" with the State Health Department before any excavation of contaminated soil. The contractor shall provide written certification to the engineer that contaminated soil has been treated by methods approved by the State Health Department. All costs for labor, materials, and equipment to excavate, haul, and process this material shall be paid for as specified in Section 104.03 D of the Standard Specifications.

202 REMOVAL OF STRUCTURES AND OBSTRUCTIONS: This work consists of
P06 completely removing the structure located at Sta 102+56.72-36.08 Lt and abandoning the structure at Sta 144+23-51.5 Rt. Abandoning the structure at Sta 144+23-51.5 Rt consists of removing and disposing the vault casting and cover, plugging the waterlines, lowering the walls of the vault by means approved by the field engineer, and filling in the vault in such a way that allows the designed parking lot to be built over the structure.

202 COMMON EXCAVATION - TYPE A: Plan quantities shall be paid for the by
P07 bid item "Common Excavation - Type A."

203 COMPACTION AND MOISTURE CONTROL: Compaction control Type A shall be
P01 used throughout this project, Std. Spec. 203.02 G. Maximum density and optimum moisture content will be 85 percent of AASHTO T-180.

203 SUBCUT EXCAVATION: This project requires subcut from Sta. 111+00
P02 to Sta. 162+00. See subcut data sheet for exact location and depth of subcut.

Subcut shall be in accordance with section 203.02C of the Standard Specifications. Subcut depth shall be below the existing grade line. The subcut void is to be backfilled with Class 3 granular material up to the elevation that will accommodate the 8" of dense graded base material. The subcut has been included in the quantities and shall be paid for as "Common Excavation-Type A."

203 SIGN BASES: The sign bases located at 117+88.92-43.32' Lt. and
P03 118+72.32-46.93' Lt. shall have their bases removed. Removal of these sign bases shall be considered incidental to the price bid for "Common Excavation - Type A."

300 AGGREGATE BASE COURSE, CL 5: 750 tons of aggregate base course have
P01 been provided in the plans for maintaining access. It shall be used as specified by the engineer.

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302 P01 DENSE GRADED BASE COURSE: Salvaged bituminous material and salvaged concrete shall be used to produce the dense graded base course. The salvaged bituminous and concrete material shall be processed to a maximum size of one and one-half (1.5) inches with 90 to 100 percent passing the one-inch (1) sieve. The dense graded base course shall consist of a blend of the salvaged bituminous/concrete material and Class 5 aggregate, such that the bituminous material shall not constitute more than 50 percent of the blended material by weight. All costs to size the salvaged bituminous/concrete material, blend the salvaged bituminous/concrete material with the Class 5 aggregate, place the salvaged bituminous/concrete material on the roadway and compact it shall be included in the price bid for "Salvaged Base Course," Ton. The fines remaining after processing the PCC concrete for the stabilized drainable base shall be used in the dense graded base. Blending material on the roadway will not be allowed.

Payment of Class 3 and Class 5 material will be measured and paid for by the ton of Class 3 and Class 5 material placed on the roadway. All costs for producing, hauling, blending, placing and compacting the Class 3 and Class 5 material shall be included in the price bid for "Aggregate Base Course-Class 3" and "Aggregate Base Course-Class 5."

304 P01 STABILIZED DRAINABLE BASE: The contractor shall use Portland cement as the stabilizing agent to stabilize the base course. One hundred percent of the aggregate used to produce the Portland cement stabilized base shall come from crushing of the existing concrete, pavement, driveways, sidewalks, and curb and gutter. Payment for crushing, screening, producing, hauling, and placing the Portland cement stabilized base course shall be made at the unit price bid for "Permeable Stabilized Base Course" SY. Permeable non-stabilized base course will be allowed to be used at leaveout locations. The engineer shall approve each location. All cost for screening, producing, hauling, and placing the permeable non-stabilized base course will be made at the unit price bid for "Permeable Stabilized Base Course" SY. No construction traffic will be allowed on the non-stabilized base course except that which is required for installation.

The limits of the permeable stable base course shall be one foot behind the back of the curb and gutter adjacent to the main line and straight across the intersections. Twelve inches of dense graded base shall be used in the intersection areas.

408 P01 HOT BITUMINOUS PAVEMENT: The hot bituminous pavement shall be compacted in accordance with Section 408.04.I.2 (ordinary compaction) of the Standard Specifications.

Section 408.05 of the Standard Specifications is hereby deleted and acceptance of material shall be in accordance with Section 105.07 of the Standard Specifications.

408 P01 Hot bituminous shall be laid in approximately equal lifts not to exceed 3 inches.

550 P01 CONCRETE PROTECTION: Adjacent PCC Pavement shall be protected during the application of all bituminous and asphalt materials to prevent any discoloration of the pavement. Failure to comply will result in the contractor having to clean the pavement at the contractor's own expense. The PCC Pavement slab shall not be used as a table for stockpiling, mixing, or drying of any material.

550 P01 CONTRACTION JOINT SEAL: Contraction joints that encompass a significant dogleg may have silicone seal substituted for the preformed compression joint seal. The engineer will determine the locations that that silicone seal will be allowed. All costs shall be included in the price bid for "Preformed Compression Joint Seal - 9/16 In."

560 P01 REMOVAL OF CONCRETE PAVEMENT: All concrete pavement indicated for removal that is broken in place shall be broken with a resonant-type pavement breaker to minimize vibration to adjacent property. Small, isolated areas of concrete pavement may be broken by other means if approved by the engineer.

All concrete pavement that is removed shall be salvaged, hauled to the stockpile site, weighed, and stockpiled. The unit price bid for "Removal of Concrete Pavement" shall be considered full compensation for removing, loading, hauling, weighing, and stockpiling of the salvaged concrete pavement.

704 TRAFFIC CONTROL:

015 A. The contractor shall provide a qualified traffic maintenance person with the following minimum qualifications:

1. This person shall:

- a. Have completed a course of study based on the MUTCD and furnish proof.
- b. Be familiar with the contents and intentions contained within the MUTCD and the NDDOT Specifications.

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- c. Have previous experience working with maintenance and protection of traffic.
 - d. Be competent to supervise personnel in traffic maintenance operations.
2. Duties:
- a. To provide traffic control as required by the plans, Standard Specifications, Special Provisions, and MUTCD.
 - b. The traffic control person shall provide documentation of each day's inspection results and remedial activities.
3. All costs associated with the above requirements shall be included in the price bid for the traffic control items.

704 PRECAST CONCRETE MEDIAN BARRIERS (STATE FURNISHED): The number of
200 precast concrete median barriers required on the project shall be 53 ten-foot units. The contractor shall obtain the barriers from the Fargo District storage yard at Casselton. Upon completion of the project, all barriers shall remain the property of the state and the contractor shall return them to the Fargo District storage yard at Casselton. Any barriers that become damaged during handling, transportation, placing, or during use, shall be replaced at the contractor's expense. The cost of obtaining, transporting, installing, moving, and maintaining the portable precast concrete median barriers shall be included in the price bid for "Precast Concrete Median Barrier (State Furnished)."

704 BARRIER MARKERS: The contractor shall furnish, install, and remove
210 barrier markers as specified on Standard D-748-9. The cost of furnishing, installing, and removing barrier markers shall be included in the price bid for "Precast Concrete Median Barriers (State Furnished)."

704 TRAFFIC CONTROL: This project is proposed to be completed in two major
P01 phases. The first phase is the north half of the roadway and the second phase is the south half. The contractor will be required to maintain access to all adjacent property owners at all times. The method used to maintain access shall be left to the contractor to work out with the property owners. The engineer will have to approve all methods for maintaining access for property owners.

Prior to setting up the traffic-control devices on Phase 1, between the Heart River Bridge and 10th Avenue NW, some temporary surfacing will be required along the south shoulder. This surfacing should be enough to ensure two 11-foot driving lanes. Also, between 8th Avenue NW and 2nd Avenue NE on Phase 1, some temporary surfacing will be required.

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Prior to placement of this surfacing the curb and gutter and some of the sidewalk along the south side will have to be removed from some locations. (See traffic-control layouts.) Also, the manholes and inlets within the area of the temporary surfacing will need to be adjusted so as to accommodate traffic over them. See Note 722/P02 for details on these adjustments. The temporary surfacing should be placed so as to enhance drainage toward the existing drainage structures located in the middle of the delineated driving lane.

Phase 2 will require some temporary surfacing between Sta. 108+50 and 115+25. The curb and gutter on the north should not be put into place here until after the completion of Phase 2 construction so as to accommodate the traffic being carried here. (See traffic-control layouts.)

All temporary surfacing shall consist of 6 inches of Class 5 aggregate and 4 inches of Class 27 HBP and be paid for as specified in Note 408/P01.

708 TOPSOIL FOR SEEDING: Upon completion of the grading operations,
P01 topsoil shall be spread evenly over the areas to be seeded or sodded. 200 CY of "Topsoil" has been provided and shall be used in the areas to be seeded or sodded where there is a shortage of existing topsoil. Topsoil shall consist of loose, friable, loamy topsoil free of excess acid, alkali, and objectionable amounts of sod. Topsoil shall have demonstrated the growth of healthy crops or grasses. The quantity shown is advisory only and the actual amount shall be determined in the field. A minimum of 4 inches shall be used for seeding in urban areas. Payment shall be made at the unit price bid for "Topsoil for Seeding," CY and shall be full compensation for all labor, equipment, and materials to properly complete all work related to the topsoil.

714 ADJUST WATER AND SEWER LINES: The exact depth of the existing
020 water and sewer lines under the roadway is unknown. If it is determined in the field that adjustment or relocation of these lines is necessary to facilitate the new construction, such work shall be done in accordance with Section 109.04 of the Standard Specifications, "Extra Work."

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714 CONTROLLED DENSITY BACKFILL: Controlled density backfill shall be placed in trenches as shown on the Utility Backfill Detail. The properties of the backfill shall be a blend of cement, water, pozzolanic materials, and fillers. The material shall be fluid on placement to flow around and fill voids around pipes in the backfill area. The material shall be able to support normal loads after six hours and shall have a compressive strength in the range of 75 psi to 125 psi at 28 days. The material shall be such that it lends itself to easy removal with a tractor backhoe. If the mix design shown is used, no further testing will be required. The mix designs yield approximately one cubic yard of flowable mortar.

MIX DESIGN

Cement	100 lbs
Fly Ash	300 lbs
Fine Aggr	2600 lbs
Water	70 gals

Measurement and Payment: Controlled density backfill will not be measured separately but shall be included in the price bid for "Storm Drain."

714 UNDERDRAINS: All underdrain pipe not terminating in a manhole or P02 inlet shall be capped. All bends required to make connections into manhole or inlets shall be included in price bid for "Edgedrain Pipe, Permeable Base."

722 MANHOLE CASTING: All new and existing manholes shall have the P01 standard manhole casting. The casting shall be installed as shown on the standard drawing. At new manhole locations, the manhole casting shall be included in the bid price for "Manholes." At existing manhole locations, the new casting, the casting removal, adjustment, and installation shall be included in the bid price for "Adjust Manhole."

In the historical district (see note 100/P03), all existing manhole covers and castings shall be salvaged and reused. If, in the opinion of the engineer, an existing cover or casting is unsuitable for reuse, a replacement shall be obtained from this project outside the historical district. This is an environmental commitment. All costs included in salvaging and reusing manhole castings and covers shall be included in the price bid for "Adjust Manhole." All castings that lie within the roadway shall be placed 1/8" below the pavement surface.

722 TRAFFIC-CONTROL STRUCTURE ADJUSTMENT: The following structures will P02 need to be adjusted to accommodate traffic control during Phase 1:

- Inlet at 120+87.17-31.72' Rt
- Curb inlet at 125+47.86-30.23' Rt
- Manhole at 125+96.74-31.79' Rt
- Curb inlet at 128+72.26-29.66' Rt
- Inlet at 129+29.58-32.16' Rt
- Manhole at 129+81.41-31.29' Rt
- Inlet at 130+18.72-31.31' Rt
- Curb inlet at 136+96.75-28.66' Rt
- Curb inlet at 140+87.32-28.39' Rt
- Curb inlet at 144+71.43-29.41' Rt

Curb inlet adjustment will consist of the removal of the curb box from the casting and leaving the grate in place. If an inlet casting is encountered that doesn't have a removable curb box, its curb box can be removed by sawing or cutting with a cutting torch. The void left on the surface of the casting by the removal of the box shall be covered by a method approved by the engineer as capable of carrying traffic.

Payment for the adjustment of these inlets and manholes will be made at the unit price bid for "Adjust Manhole," EA or "Adjust Inlet" EA. If a structure in the list above is shown on the plans to remain upon completion of the project, it shall have a second adjustment paid for separately to accommodate its adjustment back to final grade.

722 INLETS and MANHOLES: All inlets and manholes on this project have a P03 minimum 4 foot riser. The bottom of the inlet or manhole shall be filled with concrete up to the elevation that will accommodate the lowest invert elevation. All costs to accomplish this work will be paid for at the unit price bid for the respective inlet or manhole items.

724 STORM DRAINS: At several locations, the new sewer is to be P01 installed into an existing manhole, inlet barrel, or truckline. The cost of cutting into these structures and grouting the sewer leads shall be included in the price bid for other items.

724 GATE VALVES: Payment for gate valves shall be full compensation for P02 installing gate valves and incidentals including, but not limited to, the valve box. Adjustment of the valve box to final grade shall also be included in the price bid for "Gate Valve."

748 CURB RAMPS: Curb ramps shall be placed at all intersections of the P01 sidewalk and street. The type of curb ramp to be used at each intersection will be determined by the engineer in the field.

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748 CURB ENDS: On street returns and other locations where the new
020 curb and gutter ends and does not abut existing curb and gutter, the end two (2) feet of the curb shall be tapered from 6" in height to 0". A 1/2" premolded expansion joint which is full depth and the same shape as the curb and gutter shall be installed just ahead of the taper. An 18" tie bar shall be installed across the joint.

748 CURB AND GUTTER: Curb and gutter on this project shall be Type I as
P01 shown on Standard Drawing D-748-1 except that curb and gutter adjacent to concrete pavement shall be poured at the same depth as the pavement.

750 SIDEWALK: Contraction joints shall be constructed so as to divide
030 the sidewalk into square slabs the greatest horizontal dimension of which shall not exceed six (6) feet. Expansion joints shall be placed at intervals not to exceed fifty (50) feet. All sidewalks shall have a (3/8") deformed reinforcing bar placed transversely on either side of any and all contraction and expansion joints. The bar shall be six (6) inches shorter than the width of the slab and placed accurately at 1/2 the depth of the slab. The cost of the joints and reinforcing steel shall be incidental to the sidewalk.

750 SIDEWALK/DRIVEWAY BASE COURSE: The contractor shall place 4" of
P01 Class 5 aggregate beneath all sidewalk and driveway locations. All costs for the 4" Class 5 aggregate are to be included in the price bid for the respective sidewalk and driveway bid items. All driveways for this project will be poured at six (6) inches thick, unless specified to be 8" thick.

Minor excavation may be required at the curb and gutter, sidewalk, and driveway repair locations. Any excavation required shall be included in the price bid for the respective sidewalk and driveway bid items. Also, the cost of sawing concrete, curb and gutter, sidewalks and driveways at removal locations shall be included in the price bid for the respective bid items.

750 SIDEWALK CONSTRUCTION: Saw cuts have been provided in the plans so
P02 that sidewalk adjacent to buildings can be left in place during construction activities. The contractor shall leave in place four feet of store-front sidewalk on the north side of the street and three feet of store-front sidewalk on the south side of the street. The contractor will be required to maintain these existing portions of sidewalk until such time that they can be removed and reconstructed without hindering pedestrian traffic during normal business hours.

750 The existing sidewalk located at Four Seasons Floral and
P03 Gifts (322 W. Main) is heated. The contractor will be required to contact Mrs. Carolyn Larson (Work 701-663-0555, Home 701-663-8593) to work out the details for the removal and replacement of the sidewalk

750/P03 (Cont)
heating elements. All costs associated with the replacement of the elements will be between the contractor and Mrs. Larson and not part of the project costs.

750 The businesses along this project that have a metal pipe set into
P04 their existing sidewalk for a flag holder shall have the pipe replaced when the new sidewalk is poured. Businesses that do not have this flag holder existing shall have it added to the sidewalk in front of their property. All costs for this work shall be included in the price bid for "Sidewalk" SY.

754 SIGN SUPPORTS: The sign support "Steel Galvanized Posts - Square
050 Tube Perforated" were designed using a minimum yield strength of 42,000 psi and the design requirements of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals." The wind speed of 75 mph was used. The contractor may choose other types of square telescoping steel post in lieu of the ones specified but the contractor must provide equivalent strength posts and meet the FHWA yielding support requirements. The square telescoping steel post shall have all holes punched completely. All metal shall be removed from the punched holes.

762 PREFORMED PATTERNED PAVEMENT MARKING - LINES AND MESSAGE (GROOVED):
025 The contractor shall mill or saw the pavement in the areas where plans call for preformed patterned pavement markings (grooved). The milling or saw depth shall be 40 mils deep and the same width and length of lines and the same area as the messages. After the groove has been completed, the loose material shall be removed from the groove using air pressure. Upon completion of cleaning the groove, the preformed patterned pavement marking shall be installed as specified by the manufacturer. The cost of grooving, cleaning, furnishing, and installing the pavement markings shall be included in the price bid for "Preformed Patterned Pavement Marking - Various Widths of Lines and Messages Grooved."

762 PAVEMENT MARKING: The following pavement marking--painted lines have
P01 been added to the quantities for marking, if the contractor is unable to place permanent pavement marking because of weather restraints shown in the specifications in the late fall. The painted markings shall be placed in such a manner that they will not be under plastic pavement markings, except where grooved markings are specified, the markings shall be placed on the same location because grooving will be done when permanent pavement markings are installed.

Pavement Marking Painted 4 Inch Lines	16,229 LF
Pavement Marking Painted 6 Inch Lines	3,154 LF
Pavement Marking Painted 8 Inch Lines	1,269 LF
Pavement Marking Painted 24 Inch Lines	686 LF
Pavement Marking Painted Message	363 SF

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770 OVERHEAD LINES CLEARANCE: Minimum horizontal and vertical
001 clearance between light and/or signal standards and power lines shall
be as shown for the following power line voltages:

<u>Power Line Voltage</u>	<u>Horizontal Clearance</u>	<u>Vertical Clearance</u>
0-15,000	5'	6'
15,000-50,000	5'	7'
50,000 Plus	5'+0.033' per KV Over 50 KV	7'+0.033' per KV Over 50 KV

770 BREAKAWAY LIGHT STANDARD: The breakaway light standards shall be
027 of the davit type and designed for 6' mast arms and shall be
galvanized. The bases shall be of the breakaway type. The shaft
length shall be 42' from the top of the foundation to the bottom of the
luminaire for those light standards mounted off the graded roadway
shoulders. Light standards mounted behind curb and gutter shall have
shaft length of 40' from the top of the foundation to the bottom of the
luminaire.

770 MULTIPLE UNDERGROUND CABLE: The plans call for using Multiple
645 Underground Cable and Conduit in various locations. In lieu of the
Multiple Underground Cable, the contractor may furnish and install
rigid conduit and single RHW conductors of the same size as shown in
the plans for the Multiple Underground Cable.

The conduit size shall be as specified in the National Electric Code.
If the contractor chooses to use the conduit and single conductors, the
cost to furnish, install, and trench the conduit and pull the
conductors shall be paid for at the contract price bid for Multiple
Underground Cable as shown in the plans.

770 LUMINAIRES: The high-pressure sodium vapor luminaires shall be
700 internal ballast-constant wattage, 120x240 voltage, operated on
240 volts.

770 H.P. SODIUM VAPOR LUMINAIRES: The H.P. Sodium Vapor Luminaires -
710 150 watt, shall operate on 240 volts and be furnished with a lamp
operating on 55 volts.

770 LIGHT STANDARDS: The light standards shall be of the davit type
P01 and designed for 6' or 10' mast arms as shown in the plans and shall be
galvanized. The base shall be of the anchor type where breakaway-type
bases are not called for in the plans.

770 REMOVE STREET LIGHT LUMINAIRE: The item remove street light
P02 luminaire shall consist of removing the existing luminaires from their
present locations. The contractor shall arrange with the local utility
company to have the circuits disconnected from the source of live

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power. The conductor leading to the luminaire shall be disconnected.
The luminaire shall be removed without damage to the luminaire or
wiring. The removed luminaires shall be loaded, hauled, and stored at
the Mandan maintenance shop as designated by the Mandan city engineer.
The contractor shall be responsible for any damage to the luminaire and
shall replace, at the contractor's expense, any damaged luminaires.
The removed luminaires shall be the

property of the city. The item remove street light luminaire will be
measured by the "Number of Luminaires Removed." The quantities
measured will be paid for at the contract price and shall be full
compensation for all labor, equipment, and material necessary to
complete the removal and storage.

770 REMOVE LIGHT STANDARD: The removed light standards shall be loaded,
P03 hauled, and stored at the Mandan maintenance shop as designated by the
Mandan city engineer. The removed light standards shall become the
property of the city.

770 TEMPORARY LIGHTING SYSTEM: The item "Temporary Lighting System"
P04 shall consist of furnishing, installing and removing wood poles, guys,
mast arms, luminaires, conductors, and feed point as shown in the plans

Wood poles shall be Class II and treated in accordance with Section 846
of the Standard Specifications. Wood pole holes shall be backfilled
with granular material approved by the engineer and tamped in layers so
that it is firmly set. After erection, poles shall be plumb.

Mast arms shall be the size shown on the plans and shall have a tenon
adapter for receiving the luminaire.

Feed point and conductors shall meet the requirements of section 896 of
the Standard Specifications.

Aerial cable shall have two neoprene or polyethylene insulated
conductors twisted around a base messenger cable. The messenger is to
provide mechanical support of the cable.

Preassembled aluminum aerial cable conductor shall be of the AWG size
shown on the plans and shall meet the requirements of ASTM B-230 or
B-262 and shall be stranded Class B meeting the requirements of B-231
or B-400.

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Messenger conductor (supporting conductor, not neutral) shall be of the AWG size shown on the plans and shall meet the requirement of ASTM B-232 consisting of (6) aluminum strands and one galvanized (or zinc) coated steel strand concentrically stranded together.

Except as modified herein, the cable shall be in conformance with the requirement of ICEA Standard Publication S-19-81, "Rubber Insulated Wire Cable;" ICEA Standard Publication S-61-402, "Thermoplastic Insulated Wire and Cable;" and ICEA Standard Publication S-66-524, "Cross-linked Thermosetting Polyethylene Insulation Wire and Cable rated 0 through 600 volts."

The temporary lighting system shall be operating before the existing lights are not operational.

Where the plans call for cable trench, the underground conductors shall be buried six inches underground.

The wood pole mast arms and luminaires at Sta 145+95-42' Rt and 147+67-42' Rt are mounted on existing utility company poles. The contractor shall furnish the necessary mast arms, luminaires, aerial cable and mounting hardware for these two poles and contact Al Peterson of MDU (701-224-5831) 72 hours prior to installation. MDU shall install the items on these poles.

The contractor shall be responsible for obtaining the electrical source to operate the temporary lighting systems. The contractor shall make arrangements with the utilities or provide portable generators for the electric services. The contractor shall be responsible for all costs of providing for the electrical sources and any costs required to operate and maintain the temporary lighting systems.

Temporary lighting system shall be removed when lighting is no longer required. The removed equipment and material shall become the property of the contractor.

The item "Temporary Lighting System" shall be measured by the number shown in the plans. All costs for material, equipment, labor, electrical power, maintenance, and removal shall be included in the price bid for the item "Temporary Lighting System."

770 P05 RELOCATE LIGHT STANDARD: New internal wiring and fuse connector kits shall be provided for each light standard relocated.

Internal wiring shall meet the requirement of the ND Standard Specification section 895.03.B.1. Fuse Kits section 895.08.

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The relocated light standards shall be painted. The existing light standards shall have the paint and the red lead undercoat removed prior to repainting. The removal of the existing paint shall meet all the environmental requirements as specified in SP-176(92).

Internal wiring, fuse connector kits, and painting shall not be measured for payment but shall be included in the price bid for the item "Relocate Light Standard."

770 P06 LIGHT STANDARDS--REMOVED AND RELOCATED: The light standards removed and relocated from the area between 6th Avenue NW and 1st Avenue NE shall be examined for damage by the field engineer. The undamaged light standards shall be relocated. If the light standards to be relocated are damaged, the engineer will choose a light standard similar to the damaged light standard from the removed light standards. This is an environmental commitment. Those damaged shall not be salvaged but shall be disposed of outside the right of way by the contractor. All cost of disposing of damaged light standards shall be included in the price bid for removal.

772 008 EXISTING PLANS: As-built plans of existing traffic signal system (Project No. F-RRS-1-006(005)066 and F-1-094(002)915) are available for inspection at the North Dakota Department of Transportation, Bismarck district office.

772 230 MICROLOOP PROBE: The item Microloop (single or double) probe set shall consist of furnishing and installing the microloop probes at the locations shown in the plans.

The microloop probe shall be a small, cylindrical, passive transducer of earth's vertical magnetic field intensity into inductance. It transforms changes in magnetic field intensity into inductance changes which can be sensed by loop detector units. Probes shall fit vertically in 1" holes and lead-in cable in 3/8" saw slot or in sand in the roadway base. Microloop probes can be connected in series with other microloop probes or conventional wire loops. The microloop probe shall operate under the following parameters: Earth's Vertical Magnetic Field (0.2 to 1.0 oersted), Inductance (20 microhenries to 25 microhenries per probe plus 20 microhenries per 100' of wire), DC Resistance (0.5 ohms per probe plus 3.2 ohms per 100' of wire) Transducer Gain (typically 3.5 microhenries per oersted at 0.4 OE ambient vertical field intensity), and Sensitivity with 2 probes (7.0 microhenries per oersted at 0.4 OE ambient vertical field intensity). The microloop probes shall operate at a temperature range of -35°F to +165°F (-37°C to +74°C) and at humidity of 0 to 100%. The microloop probes shall detect all motorized vehicles.

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The item microloop (single-double) probes shall be measured by the number of single or double probes sets installed. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment, saw slot, conductors from probe to pull box, and materials to complete the installation of the microloops.

772 INTERCONNECT CABLE: Interconnect cable shall not be spliced.
240

The interconnect cable shall be a type PCP cable for direct burial and feature a double jacketed with copper tape corrugated shield between jackets. The inner polyethylene jacket shall provide high dielectric strength between core and electrical ground, plus maximum gas and water tightness as needed for the severe condition of direct burial. The shield and outer jacket, together, shall provide environmental protection for the cable, assuring long, dependable operation.

The conductors shall be uncoated annealed copper conductors size 19 AWG, 6 twisted pair, of voice-carrier quality, insulation consisting of virgin, high density, stabilized polyethylene. The shield type PCP shall have a .005-inch copper tape applied longitudinally with an overlap and corrugated.

The cable shall be assembled with insulated conductors twisted to minimize coupling and attenuate crosstalk. The core covering shall be non-hygroscopic, high dielectric strength tape.

The item, "Interconnect Cable," will be measured by the linear foot. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment, and materials necessary to complete the installation of the interconnect cable.

772 PAINT: The traffic signal system components shall be painted in
P01 accordance with the following:

- Transformer base - green
- Mast arm - green
- Signal head mounting hardware - green
- Shaft - green
- Signal housing - green
- Pedestrian pushbutton post - green
- Pedestrian pushbutton housing - green

The color green shall be 14066 of Federal Standard No. 595.

772 RELOCATE TRAFFIC SIGNAL HEAD AT 10TH AVENUE NW AND MAIN STREET: The
P02 item "Relocate Traffic Signal Head" shall consist of removing the traffic signal head from its present location and reinstalling said traffic signal head at a new location designated on the plans.

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The contractor shall arrange with the power company to have the circuits disconnected from the source of live power.

Conductor leading to the traffic signal head shall be disconnected. The traffic signal head shall then be removed from its present location without damage to the traffic signal head or signal pole.

The contractor shall provide new mounting hardware.

The traffic signal head shall then be placed in its new location.

The existing programmed signal heads to be relocated shall be reprogrammed by the contractor.

The relocated signal heads shall be painted. Cost to be incidental to relocated traffic signal heads. The item "Relocate Traffic Signal Head" shall be measured by the number of traffic signal heads relocated. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment reprogramming the programmable heads, and materials necessary to complete the relocation of the traffic signal head.

772 RELOCATE SIGNAL STANDARD AT 10TH AVENUE NW AND MAIN STREET (Type IV or
P03 Combination): The item "Relocate Signal Standard" shall consist of removing the standard from the existing location and installing the standard at the location designated on the plans.

The contractor shall arrange with the local utility company to have the signal circuits disconnected from the source of live power at the feed point and disconnect the wires leading to the signal head and terminal blocks. The contractor shall provide new anchor bolts the required size and length as shown in the plans.

The standard shall be plumbed using shims or leveling nuts. Anchor bolts shall be securely tightened. Properly installed anchor bolts shall have a minimum of two threads exposed above the nuts. Mast arms shall be perpendicular to the centerline of the roadway they are for. The existing foundations shall be removed. If, in the opinion of the engineer, they will not interfere with other construction, they shall be cut off and buried one foot below the ground line and the surface restored to match the surrounding area. The contractor shall be responsible for any damage to the standard, mast arms, luminaire extension, signal heads, luminaires, and fuses and shall replace any damaged equipment at no cost to the state.

The signal standards shall be painted. Cost to be incidental to relocated signal standards.

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The item "Relocate Signal Standard" will be measured by the number relocated and shall include the removal, transporting, and installing the signal standard.

772 P04 TRAFFIC SIGNAL--10TH AVENUE WEST: At location shown in the plan, the conductors shall be disconnected and existing conductor pulled back into the existing pull box. The cost of these conductors shall not be bid separately but shall be included in the price bid for other items.

772 P05 CONTROLLER MONITORING UNIT AND/OR COMMUNICATION MODULE: The pre-timed controller shall be provided with a communication hookup which provides a duplex data link with a central control computer. The communications hookup shall be IBM PC compatible.

A controller monitoring unit and/or communication module shall be installed in the controller. The monitor unit shall be installed and connected to the controller and conflict monitor so as to monitor conflict monitor flash, pre-emption status, cabinet door open, intersection display, and detector diagnostics. The unit shall be capable of providing a traffic map and of up loading and down loading information into the controller from a PC, central control computer or a laptop in the field, or a telephone line.

The controller monitoring unit and/or communications module shall be capable of initiating contact by dial-up telephone line, either directly from a PC, central control computer or a laptop, or through a system master controller with a PC central control computer to report failure conditions when they occur with computer in the monitor mode. Other events shall be logged and reported at preset intervals or on command from a central control computer or laptop computer.

The controller monitoring unit and/or communications module shall be capable of operating at an isolated intersection with an interconnect cable or a telephone link to a central control computer or a laptop computer. In the future, the unit shall be operated through a systems master controller by interconnect cable or telephone link from a central control computer.

The contractor shall notify the local telephone company to have the telephone lines installed and all necessary connections made, when the controller is ready to be placed into operation.

The cost of furnishing and installing the communications module and/or the controller monitoring unit, the telephone line, and connections shall not be bid separately, but shall be included in the price bid for the pre-timed controller. The contractor shall be responsible for the telephone service until final acceptance of the traffic signal system.

772 P06 FIRE STATION EMERGENCY VEHICLE SWITCHES: The fire station emergency vehicle switches shall be installed in the fire station at Collins Avenue and 1st Avenue NW in accordance with the Plans. The switches shall be installed in or on a metal junction box where wiring connections shall be made. Each switch or push button shall be connected to a separate pair of conductor which shall run to a timer in the controller cabinet. When the Westbound push button is triggered the timer shall be activated and the emergency vehicle pre-emption phase Southbound on Collins Avenue and Westbound on 1st Avenue NW shall begin its cycle. When the Eastbound push button is triggered the timer shall be activated and the emergency vehicle pre-emption phase Southbound on Collins Avenue shall begin its cycle. The timer shall keep the pre-emption phase selector on for the period set on the timer. When the timer has timed out, control shall be turned over to the intersection controller.

The timer setting shall be determined by trial runs with the fire station equipment. The contractor shall inform the Fire Chief when the equipment is installed and ready for time settings. The Fire Chief will then make arrangements to make the runs and determine the required settings. These runs shall be made during peak hour traffic. The contractor shall place the trial settings in the timer and the Fire Chief shall make some additional runs to fine tune the time settings.

The timer shall be a solid state digital timer providing timing to hold the pre-empted phase from 0 to 5 minutes minimum and settable in one (1) second increments maximum. The setting shall be made by thumb-wheels or pin. The input voltage shall be obtained from the 120 VAC 60 Hz cabinet voltage. The output voltage shall be as required by the Emergency Vehicle Pre-Emption Unit. The cost of conductor, conduit, conduit boxes, junction vox, push buttons, timers, equipment and labor shall be included in the price bid for the "Emergency Vehicle Pre-Emption Unit."

772 P07 PULL BOX: The pull box shall be constructed of polymer concrete.

772 P08 INTERCHANGEABLE: All new controllers shall be compatible with the existing controllers at Twin City Drive and Mandan Avenue intersections.

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772 P09 CENTRAL CONTROL SOFTWARE: Software, including the latest available versions of appropriate operating system software, shall be provided for the central control computer and portable control computer to provide for all central control functions. System software shall not be copy protected, and the licensing agreement shall permit the city of Mandan to make any reasonable number of copies as needed for operation, monitoring, training, and demonstration by either the city of Mandan or the North Dakota Department of Transportation provided that such use be restricted to the Mandan traffic signal system. One original and one backup copy of the software shall be provided on compatible diskettes for each control computer.

1. Communications interface. The central control software shall provide for communication with system master controllers and NEMA controller monitoring units, using standard telephone lines and dial-up procedures. It shall be possible to initiate contact either automatically from a system master controller or NEMA controller monitoring unit, or from the central control computer on a preprogrammed or operator command basis.
2. System Reports. The central control software shall enable the reception and recording of all data required to be reported by system master controllers, local system controllers, NEMA controller monitoring units, and remote control units including tabulation and output in a readily understandable format, complete with titles and labels, to a monitor or printer; and provide for disk storage of the information. This data shall include system status reports from each system master and local controller, NEMA controller monitor and remote control unit indicating control patterns in use, when the control pattern was implemented, mode of operation, controllers on line, event and failure reports, and system and intersection detector status.
3. Intersection Graphics Display. The central control software shall provide capability to display simulated operation of each intersection including phasing, overlaps, pedestrian phasing, detector activity and status and any failure or even reports. If available with the system supplied, capability shall also be provided to display a zone map depicting simultaneously the status and green indications at each system controller intersection under the control of a single system master controller. These graphic intersection displays and zone maps shall be a simulation of actual events with a delay of not more than five seconds.

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4. System Master Control Programs. The central control software shall provide for storage of a complete system master controller program in internal memory with capability for editing and comparison to programs in use at system master controllers without affecting or modifying programs stored on disk. The central control software shall provide for storage of any number of system master control programs on disk, with capability to readily transfer programs to internal memory or to system master controllers. Safeguards shall be provided to ensure against accidental changes.
5. User Interface. Operation of the central control software shall provide a user friendly, menu driven interface with the operator providing for minimal keystrokes for selection of desired functions and files. Instructions and prompts shall be in plain English or, where appropriate, commonly accepted traffic engineering terminology.
6. Documentation. Complete documentation of all software operations and functions shall be included, including detailed operating instructions, explanations of all special codes, functions and options, and documentation of common error conditions and recover procedures. Operating system or other software included with the system shall include all manuals and other documentation normally provided by the vendors of the software.
7. Updates. Any updates or modifications made to controller or central control software prior to the end of the 180-day start-up period shall be provided to the city of Mandan at no additional cost. Essentially, new software or major revisions substantially altering basic operations, or requiring significant additional or different equipment, shall not be considered as updates.
8. Training. The contractor shall provide 40 hours of formal training for up to 10 persons in the operation and maintenance of the traffic control system and components. The trainer shall be a qualified traffic engineer or engineering technician thoroughly familiar with both the equipment supplied and traffic signal control methods. Manuals and instructional materials shall be provided for 10 persons. Instruction shall be provided in several short sessions rather than one continuous session, with no more than 12 hours of instruction during any one work week. To the extent possible, instruction shall emphasize hands-on work with actual components rather than classroom lectures. When necessary, the city of Mandan will provide suitable training facilities. Training may begin at any time after the central control computer and at least one system master controller and associated local system controllers are in operation, and shall be completed prior to the end of the 180-day start-up period.

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772 SYSTEM MASTER CONTROLLER: The system master controller shall be a
P10 microprocessor-based unit capable of supervising and monitoring
24 local system controllers, transferring data to and from these local
system controllers and the central control computer, and storing
timing, event logs, and detector data. It shall be capable of
selecting appropriate traffic control patterns based on preprogrammed
traffic conditions, or time of day and day of week or year, or in
response to commands entered at the system master controller or the
central control computer.

772 INTERIM SIGNAL CONTROLLER: 6th Avenue NW, 3rd Avenue NW, 1st Avenue NW
P11 and Collins Avenue. The contractor may furnish pre-timed controllers
and time-base coordinators and cabinets for the above-captioned
locations or remove and relocate the existing cabinet, controller and
time-base coordinator and other equipment and install on the interim
signal poles where shown in the plans. If the contractor chooses to
use the existing equipment designated above, the contractor shall
provide a police officer and necessary equipment for flagging traffic
at these locations at his own expense. All cost for removing,
reinstalling, furnishing and police officer flagger, and other
equipment shall be included in the price bid for "Interim Traffic
Signal."

772 REMOVAL OF TRAFFIC SIGNAL SYSTEM: Mast arm and signal standards that
P12 are removed shall be labeled in such a way as to identify the signal
standard and mast arm as a set. The cost of labeling the signal
standard and mast arm shall be included in the price bid for "Removal
of Traffic Signal System."

772 INTERIM TRAFFIC SIGNALS: The item "Interim Traffic Signals" shall
P13 consist of furnishing and installing wood poles, guys, span wire,
signal heads, conductors, and feed point as shown in the plans.

The span-wire mounted traffic-signal control-cable quantities include
6 feet at each location of the span-wire mounted signal heads where the
heads are to be relocated as a part of the traffic control. The
additional conductor shall be wrapped and folded around the span wire
at the location of the future installation of an interim signal head.

The contractor shall be responsible for obtaining the electrical source
necessary to operate the interim traffic signals. The contractor shall
make the necessary arrangements with the utilities to provide for the
electric services.

The contractor shall be responsible for all costs required to operate
and maintain the interim traffic signals until the new signals are in
operation.

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The contractor shall remove the interim traffic signal system when the
permanent signals are in operation. All materials furnished by the
contractor for the interim traffic signal system shall remain the
property of the contractor. This item shall not be bid separately but
shall be included in the price bid for "Interim Traffic Signal System."

The item "Interim Traffic Signal" shall be measured by the number
installed and in operation. All material, equipment, labor, and
electrical power shall be included in the lump sum bid to perform this
work.

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
103	100	CONTRACT BOND	L SUM	0.89		0.11	1
107	100	RAILWAY PROTECTION INSURANCE	L SUM	1			1
201	330	CLEARING & GRUBBING	L SUM	1			1
201	386	REMOVAL OF TREES 24IN	EA	3			3
202	97	REMOVAL OF STRUCTURES & OBSTRUCTIONS	L SUM	1			1
202	111	REMOVAL OF CONCRETE	L SUM	1			1
202	112	REMOVAL OF CONCRETE	SY	10289		122	10411
202	114	REMOVAL OF CONCRETE PAVEMENT	SY			1050	1050
202	119	SAW CONCRETE	LF	7382			7382
202	121	REMOVE AND SALVAGE BITUMINOUS SURFACING	TON	3624			3624
202	129	REMOVAL OF CURB	LF	630			630
202	130	REMOVAL OF CURB AND GUTTER	LF	11225		144	11369
202	137	REMOVAL OF PAVEMENT	SY			380	380
202	153	SAW BITUMINOUS SURFACING (FULL DEPTH)	LF	2245			2245
202	210	REMOVAL OF MANHOLES	EA	6			6
202	230	REMOVAL OF INLETS	EA	38			38
203	101	COMMON EXCAVATION - TYPE A	CY	30585			30585
203	109	TOPSOIL	CY	1574			1574
210	101	CLASS 1 EXCAVATION	L SUM	1			1
210	111	CLASS 2 EXCAVATION	L SUM	1			1
210	198	SELECT BACKFILL	TON	250			250
210	201	FOUNDATION PREPARATION	EA	1			1
216	100	WATER	M GAL	1143			1143
302	100	SALVAGED BASE COURSE	TON	12518			12518

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
302	113	AGGREGATE BASE COURSE - CLASS 3	TON	11546			11546
302	120	AGGREGATE BASE COURSE - CLASS 5	TON	10658			10658
304	1000	PERMEABLE STABILIZED BASE COURSE	SY	42271			42271
401	100	MC70 OR 250 LIQUID ASPHALT	GAL	10943			10943
401	152	SS1H OR CSS1H EMULSIFIED ASPHALT	GAL	135			135
406	320	120-150 ASPHALT CEMENT	TON	123			123
408	176	HOT BITUMINOUS PAVEMENT CL 27	TON	2125			2125
408	320	120-150 ASPHALT CEMENT	TON			10	10
408	9650	HBP CL27 SUBBASE PRIME TACK	TON			150	150
550	105	6IN NON-REINF CONCRETE PAVEMENT CL AE	SY	400			400
550	112	8 IN. NON-REINFORCED CONCRETE PAVEMENT - CLASS AE	SY	2267			2267
550	118	10 IN. NON-REINFORCED CONCRETE PAVEMENT - CLASS AE	SY	39801			39801
550	215	CONCRETE BRIDGE APPROACH SLAB	SY	236			236
550	240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	227			227
550	424	DOWEL BARS	EA	229			229
550	710	10IN CONC PVMT REPAIR-FULL DEPTH-DOWELED	SY			1050	1050
550	809	PREFORMED ELASTOMERIC COMPRESS JT SEAL 9/16IN	LF	28058			28058
550	958	LONGITUDINAL JOINT SILICONE SEAL	LF	9481			9481
550	959	CONTRACTION JOINT SILICONE SEAL	LF	227			227
560	1590	REMOVAL OF CONCRETE PAVEMENT	SY	34153			34153
602	130	CLASS AAE-3 CONCRETE	CY	220			220
602	1130	CLASS AE-3 CONCRETE	CY	217			217
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1441			1441
612	115	REINFORCING STEEL-GRADE 60	LBS	29019			29019

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	CITY FUNDS ONLY	TOTAL
612	116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	50239			50239
616	5890	STRUCTURAL STEEL	L SUM	1			1
622	20	STEEL PILING HP 10 X 42	LF	2100			2100
624	123	PEDESTRIAN RAILING	LF	323			323
624	124	PEDESTRIAN FENCE	LF	323			323
626	100	COFFERDAM	EA	2			2
630	100	SAND BLASTING & PAINTING	L SUM	1			1
630	9000	CONTAINMENT SYSTEM	L SUM	1			1
650	699	CLASS 1A OVERLAY	SY	345			345
650	700	CLASS 1 OVERLAY	SY	1094			1094
650	701	CLASS II OVERLAY	SY	219			219
650	702	CLASS III OVERLAY	SY	55			55
650	703	CLASS IIA OVERLAY	LF	394			394
702	100	MOBILIZATION	L SUM	0.89		0.11	1
704	100	FLAGGING	MHR	1200			1200
704	104	OBLITERATION OF PAVEMENT MARKING	SF	500			500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	5948			5948
704	1037	ATTENUATION DEVICE TYPE B-35	EA	2			2
704	1051	TYPE II BARRICADE	EA	46			46
704	1052	TYPE III BARRICADE	EA	51			51
704	1060	DELINEATOR DRUMS	EA	514			514
704	1065	TRAFFIC CONES	EA	50			50
704	1067	TUBULAR MARKERS	EA	50			50
704	1072	FLEXIBLE DELINEATORS	EA	357			357

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
704	1086	SEQUENCING ARROW PANEL TYPE B	EA	2			2
704	3510	PRECAST CONCRETE MED. BARRIER - STATE FURNISHED	EA	53			53
706	300	FIELD LABORATORY-TYPE C	EA	1			1
708	1020	RIPRAP-LOOSE ROCK	CY	15			15
708	1310	EROSION CHECKS	LF	300			300
708	1350	SEDIMENT CONTROL FENCING	LF	840			840
708	2240	SEEDING-TYPE B-CL II	ACRE	1.4			1.4
708	3020	TOPSOIL FOR SEEDING	CY	200			200
708	4000	SODDING	SY	1000			1000
708	5700	WOOD EXCELSIOR FIBERMAT	SY	1717			1717
709	402	GEOTEXTILE FABRIC TYPE S2	SY	33239			33239
714	115	PIPE,CONC.REINF.12IN. CL.III-STORM DRAIN	LF	14			14
714	120	PIPE C R 12IN CL III-STORM DRAIN 45DEG BEND	EA	1			1
714	206	PIPE C R 15IN CL III STORM DRAIN 7.5DEG BEND	EA	1			1
714	210	PIPE CONC.REINF.15IN. CL-III STORM DRAIN	LF	1314			1314
714	315	PIPE,CONC.REINF.18IN. CL.III-STORM DRAIN	LF	70			70
714	620	PIPE,CONC.REINF.24IN. CL.III-STORM DRAIN	LF	574			574
714	1110	PIPE CONC REINF 48IN CL III-STORM DRAIN	LF	16			16
714	1111	PIPE C R 48IN CL III STORM DRAIN 7.5DEG BEND	EA	6			6
714	1212	PIPE CONC REINF 54IN CL-III STORM DRAIN	LF	1643			1643
714	2111	PIPE CONC REINF ARCH 29IN X 18IN-CL III S DRAIN	TON	292			292
714	3050	END SECT,CONC.REINF. 54 IN.	EA	1			1
714	4090	PIPE,CONDUIT 12IN.	LF	46			46
714	7040	SANITARY SEWER SERVICE CONNECTION	EA			2	2

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	CITY FUNDS ONLY	TOTAL
714	7168	PIPE PVC 24IN SEWER	LF			991	991
714	9695	EDGEDRAIN PERMEABLE BASE	LF	12695			12695
722	100	MANHOLE 48 IN.	EA	3			3
722	110	MANHOLE 60 IN.	EA	3			3
722	120	MANHOLE 72IN	EA	1			1
722	130	MANHOLE 84 IN.	EA	5			5
722	300	MANHOLE SANITARY	EA			6	6
722	315	MANHOLE CASTING	EA	3			3
722	1100	MANHOLE RISER 48 IN.	LF	15.59			15.59
722	1110	MANHOLE RISER 60 IN.	LF	12.00			12.00
722	1120	MANHOLE RISER 72IN	LF	8.01			8.01
722	1130	MANHOLE RISER 84 IN.	LF	47.52			47.52
722	2500	MANHOLE SPECIAL	EA	1			1
722	3291	ABANDON SANITARY SEWER MANHOLE	EA			3	3
722	3460	CASTING,INLET,TYPE 2	EA	1			1
722	3470	CASTING CATCH BASIN-TYPE A	EA	1			1
722	3500	INLET - TYPE 1	EA	6			6
722	3510	INLET - TYPE 2	EA	22			22
722	3520	INLET-TYPE 2, DOUBLE	EA	10			10
722	3600	INLET - SADDLE BASE, TYPE 1	EA	2			2
722	3610	INLET - SADDLE BASE, TYPE 2	EA	3			3
722	3611	INLET-SADDLE BASE-TYPE 2 DOUBLE	EA	1			1
722	3761	INLET SPECIAL-TYPE 2 60IN	EA	3			3
722	6160	ADJUST INLET	EA	8			8

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722	6200	ADJUST MANHOLE	EA	34			34
724	210	FITTINGS-DUCTILE IRON	LBS			9206	9206
724	300	GATE VALVE & BOX 6IN	EA			25	25
724	310	GATE VALVE & BOX 8IN	EA			11	11
724	315	GATE VALVE & BOX 10IN	EA			1	1
724	320	12IN GATE VALVE & BOX	EA			13	13
724	400	HYDRANT-INSTALL 6IN	EA			17	17
724	426	HYDRANT EXTENSION	LF			17	17
724	430	REMOVE HYDRANT	EA			13	13
724	579	TAPPING SLEEVE 20IN X 12IN & ONE 12IN VALVE BOX	EA			2	2
724	605	1 1/2IN COPPER WATER SERVICE LINE	LF			1919	1919
724	607	WATER SERVICE PIPE 2IN COPPER	LF			358	358
724	810	WATERMAIN 6IN PVC	LF			977	977
724	830	WATERMAIN 8IN PVC	LF			627	627
724	840	WATERMAIN 10IN PVC	LF			50	50
724	850	WATERMAIN 12IN PVC	LF			5223	5223
724	907	CURB STOP & BOX 1 1/2IN	EA			86	86
724	910	CURB STOP & BOX 2IN	EA			8	8
724	958	WATER SERVICE CONNECTION 1 1/2IN	EA			86	86
724	960	WATER SERVICE CONNECTION 2IN	EA			8	8
724	6013	ABANDON VALVE BOX	EA			25	25
724	8100	TAPPING CROSS 16IN X 12IN & TWO 12IN VALVES	EA			1	1
744	100	POLYSTYRENE INSULATION BOARD	BD FT			256	256
748	120	CURB & GUTTER MOUNTABLE-TYPE I	LF	59			59

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
748	140	CURB & GUTTER TYPE I	LF	13834		144	13978
748	540	CURB	LF	217			217
748	1020	VALLEY GUTTER 36 IN.	SY	32			32
748	1030	VALLEY GUTTER 72 IN	SY	478			478
750	100	SIDEWALK CONCRETE	SY	10366		122	10488
750	200	CONCRETE MEDIAN PAVING	SY	46			46
750	1010	DRIVEWAY CONC.HIGH EARLY STRENGTH	SY	1226			1226
750	1025	DRIVEWAY CONC 8IN HIGH EARLY STRENGTH	SY	557			557
752	910	SAFETY FENCE	LF	3000			3000
752	922	FENCE REMOVE & RESET	LF	226			226
754	116	FLAT SHEET FOR SIGNS-TYPE 2 REFL SHEETING	SF	808			808
754	117	FLAT SHEET FOR SIGNS-TYPE 3A REFL SHEETING	SF	129			129
754	206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	1415			1415
754	292	OVERHEAD SIGN STR 76FT TRUSS	EA	1			1
754	538	EXTRU ALUM SIGN PANEL-TYPE 2 REFLECTIVE SHEETING	SF	66			66
754	592	RESET SIGN PANEL	EA	11			11
754	593	RESET SIGN SUPPORT	EA	12			12
754	1100	CLASS AE CONCRETE-SIGN FOUNDATIONS	CY	14			14
762	103	PVMT MK PAINTED MESSAGE	SF	363.000			363.00
762	122	PREFORMED PATTERNED PVMT MK MESSAGE-GROOVED	SF	363			363
762	420	SHORT TERM 4IN LINE TYPE R	LF	13936			13936
762	426	SHORT TERM 24IN LINE TYPE R	LF	65			65
762	430	SHORT TERM 4IN LINE TYPE NR	LF	29014			29014
762	1104	PVMT MK PAINTED 4IN LINE	LF	18566			18566

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SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
762	1106	PVMT MK PAINTED 6IN LINE	LF	3154.000			3154.00
762	1108	PVMT MK PAINTED 8IN LINE	LF	1269.000			1269.00
762	1124	PVMT MK PAINTED 24IN LINE	LF	709			709
762	1140	PVMT MK PAINTED CURB TOP & FACE	LF	90			90
762	1204	PLASTIC PVMT MK FILM 4IN LINE	LF	1506			1506
762	1206	PLASTIC PVMT MK FILM 6IN LINE	LF	122			122
762	1224	PLASTIC PVMT MK FILM 24IN LINE	LF	32			32
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	14993			14993
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED	LF	3032			3032
762	1309	PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	LF	1269			1269
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	654			654
764	131	W-BEAM GUARDRAIL	LF	158			158
764	139	W-BEAM G R-FLARED END TREAT & TRANSITION	EA	4			4
770	20	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	57			57
770	60	CONCRETE FOUNDATION-FEED POINT-TYPE B	EA	1			1
770	100	PULL BOX	EA	4			4
770	210	CABLE TRENCH-TYPE I	LF	667			667
770	220	CABLE TRENCH-TYPE II	LF	1582			1582
770	330	2IN DIAMETER RIGID CONDUIT	LF	11709			11709
770	350	3IN DIAMETER RIGID CONDUIT	LF	301			301
770	445	MULTIPLE UNDERGROUND CABLE 3NO6 STYLE USE	LF	2517			2517
770	504	UNDERGROUND CONDUCTOR NO4-TYPE RHW	LF	9346		4673	14019
770	505	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	18952		6219	25171
770	506	UNDERGROUND CONDUCTOR NO8-TYPE RHW	LF	450			450

ESTIMATED QUANTITIES

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	25

SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
770	605	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	14149			14149
770	705	FEED POINT-TYPE II-POLE MOUNTED	EA	1			1
770	715	FEED POINT-TYPE IV-POLE MOUNTED	EA	1			1
770	730	FEED POINT-TYPE I-PAD MOUNTED	EA	1			1
770	1076	LT STD 6FT MA 40FT MT HT	EA	6			6
770	1176	LT STD 10FT MA 40FT MT HT	EA	1			1
770	1376	LT STD 6FT MA 40FT MT HT FESTOON	EA	14			14
770	1476	LT STD 10FT MA 40FT MT HT FESTOON	EA	3			3
770	1678	LT STD 6FT MA 42FT POLE BREAKAWAY	EA	2			2
770	2276	LT STD TWIN 6FT MA 40FT MT HT	EA	2			2
770	4120	HP SODIUM VAPOR LUMINAIRE-150 WATT	EA	13			13
770	4130	HP SODIUM VAPOR LUMINAIRE-200 WATT	EA	45			45
770	4140	HP SODIUM VAPOR LUMINAIRE-250 WATT	EA	6			6
770	4501	TEMPORARY LIGHTING SYSTEM	EA	1			1
770	4540	RELOCATE LIGHT STANDARD	EA	30			30
770	4542	RELOCATE LUMINAIRE	EA	1			1
770	4560	REMOVE LIGHT STANDARD	EA	31			31
770	4570	REMOVE STREET LIGHT LUMINAIRE	EA	26			26
770	4573	REMOVE WOOD POLE LIGHT STANDARD	EA	7			7
770	4590	REMOVE FEED POINT	EA	3			3
772	20	CONCRETE FOUNDATION-TRAFFIC SIGNALS	EA	21			21
772	100	PULL BOX	EA	14			14
772	200	1IN DIAMETER RIGID CONDUIT	LF	501			501
772	240	2IN DIAMETER RIGID CONDUIT	LF	4853			4853

ESTIMATED QUANTITIES

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	26

SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
772	260	2.5IN DIAMETER RIGID CONDUIT	LF	374			374
772	280	3.5IN DIAMETER RIGID CONDUIT	LF	95			95
772	300	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	2240			2240
772	310	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	1120			1120
772	330	LOOP LEAD-IN CONDUCTOR	LF	154			154
772	364	MICROLOOP DOUBLE PROBE SET	EA	4			4
772	400	NO12 AWG 2 CONDUCTOR CABLE	LF	408			408
772	401	NO12 AWG 3 CONDUCTOR CABLE	LF	336			336
772	403	NO12 AWG 5 CONDUCTOR CABLE	LF	909			909
772	410	NO12 AWG 12 CONDUCTOR CABLE	LF	1948			1948
772	450	INTERCONNECT CABLE	LF	2237			2237
772	600	TYPE I SIGNAL STANDARD	EA	3			3
772	624	TYPE IV SIGNAL STD 24FT MA	EA	1			1
772	626	TYPE IV SIGNAL STD 26FT MA	EA	2			2
772	628	TYPE IV SIGNAL STD 28FT MA	EA	1			1
772	632	TYPE IV SIGNAL STD 32FT MA	EA	1			1
772	800	COMBO 10FT MA SIG & LT STD-TYPE A	EA	1			1
772	880	COMBO 18FT MA SIG & LT STD-TYPE A	EA	1			1
772	902	COMBO 20FT MA SIG & LT STD-TYPE C	EA	1			1
772	922	COMBO 22FT MA SIG & LT STD-TYPE C	EA	1			1
772	950	COMBO 25FT MA SIG & LT STD-TYPE A	EA	2			2
772	960	COMBO 26FT MA SIG & LT STD-TYPE A	EA	2			2
772	1062	COMBO 36FT MA SIG & LT STD-TYPE C	EA	1			1
772	1810	1-WAY 3 SEC HEAD W/12 IN LENSES-POST MOUNTED	EA	14			14

ESTIMATED QUANTITIES

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	27

SPEC CODE		DESCRIPTION	UNIT	NHU-1-094(035)915	STNU-1-094(035)915	DISTRICT 39 PROJECT 96-2 CITY FUNDS ONLY	TOTAL
772	1812	1-WAY 3 SEC HEAD W/12 IN LENSES-MA MOUNTED	EA	14			14
772	2000	1-WAY 2 SEC HEAD PED SIGNAL-POST MOUNTED	EA	28			28
772	2215	PEDESTRIAN PUSHBUTTON & SIGN	EA	2			2
772	2310	PRE-TIMED CONTROLLER W/FIRE PRE-EMPTION	EA	4			4
772	2329	PRE-TIMED MASTER CONTROLLER	EA	1			1
772	2610	EMERGENCY VEHICLE PRE-EMPTION UNIT	EA	5			5
772	2800	INTERIM TRAFFIC SIGNALS	EA	6			6
772	2940	REVISE CONCRETE FOUNDATIONS	EA	1			1
772	3021	RELOCATE MA SIGNAL HEAD	EA	1			1
772	3050	RELOCATE COMBINATION LIGHT & SIGNAL STANDARD	EA	1			1
772	3125	REMOVE TRAFFIC SIGNAL SYSTEM	EA	4			4
772	3160	REMOVE CONCRETE PULL BOX	EA	1			1
910	910	GROUT 24IN RCP SEWER	LF			916	916
930	3000	BRIDGE BENCH MARKS	SET	1			1
930	8680	EXPANSION JOINT STRIP SEAL	LF	53			53
930	9630	PIER REPAIR	L SUM	1			1
950	100	TRAINEE	MHR	2000			2000
970	25	LANDSCAPE ENHANCEMENT PROJECT	LSUM		1		1
990	100	CRITICAL PATH METHOD SCHEDULE	L SUM	1			1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	28

BASIS OF ESTIMATE

WATER FOR COMPACTION: 10 GAL per CY of Embankment
 20 GAL per CY of C1 3 & C1 5 Aggregate
 40 GAL per CY of Salvaged Base Course

WATER FOR DUST PALLIATIVE: 300 M GAL have been added for use as post a palliative.

SURFACING ITEMS: Aggregate Base Course - C1 3 @ 1.875 TONS/CY
 Aggregate Base Course - C1 5 @ 1.875 TONS/CY
 Salvaged Base Course C1 5 @ 1.875 TONS/CY
 Permeable Stabilized Base Recycled Concrete Aggregate @ 1.75 TONS/CY
 Hot Bituminous Pavement-C1 27 @ 2.0 TONS/CY
 120-150 Asphalt Cement @ 5.8% of HBP
 SS-1h or CSS-1h Emuls. Asph. for Tack @ 0.05 GAL/SY/Lift
 MC-70 or 250 Liquid Asph. for Prime @ 0.25 GAL/SY

SODDING

1000 SY of sod have been added to the quantities to be place as directed by the engineer.

SEEDING

1.4 acres of seeding Type B Class II have been added to the quantities to be placed as directed by the field engineer.

SPECIAL PROVISIONS

- SP-174(92) Bridge Paint - Lead Paint Removal & Containment
- SP-176(92) Light Standard Paint - Lead Paint Removal & Containment
- SP-180(92) Critical Path Method Schedule
- SP-181(92) Partnering
- SP-182(92) Landscaping Enhancement Project
- SP-187(92) Contract Time for Completion

EASEMENT TIE IN SURFACING

928 tons of Class 27 hot bituminous pavement and 400 SY 6 In. non-reinforced concrete pavement Class AE have been added to the quantities to be placed as directed by the field engineer. (See note 100/P06.)

MISCELLANEOUS TRAFFIC CONTROL QUANTITIES*

Hot Bituminous Pavement C1 27	322 TONS
Remove and Salvage Bituminous Pavement	302 TONS
Saw Concrete (Curb and Gutter Removal)	3,575 LF

*See traffic control sheets and Note 100/P06

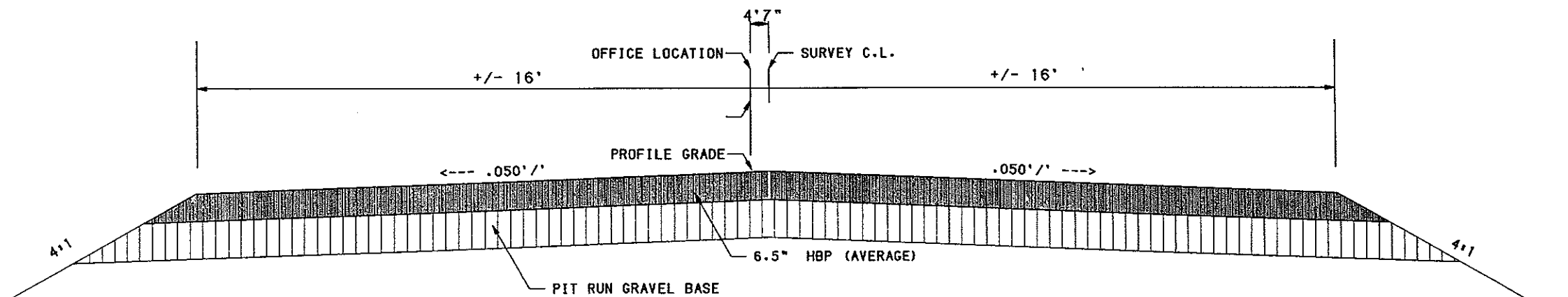
EDGEDRAIN PERMEABLE BASE

Edgedrain permeable base is to be placed under the curb and gutter, parallel to the flow line. (See pavement edgedrain inlet connection detail.) Edgedrain will be laid continuously through intersections along the edge of permeable base paving.

Sta 87+69.90 to 101+54.5 Rt & Lt	2,769.2 LF
Sta 109+05 to 157+00 Lt	4,795.0 LF
Sta 109+05 to 160+36 Rt	5,131.0 LF
Total	12, 695.2 LF

EXISTING TYPICAL SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	29



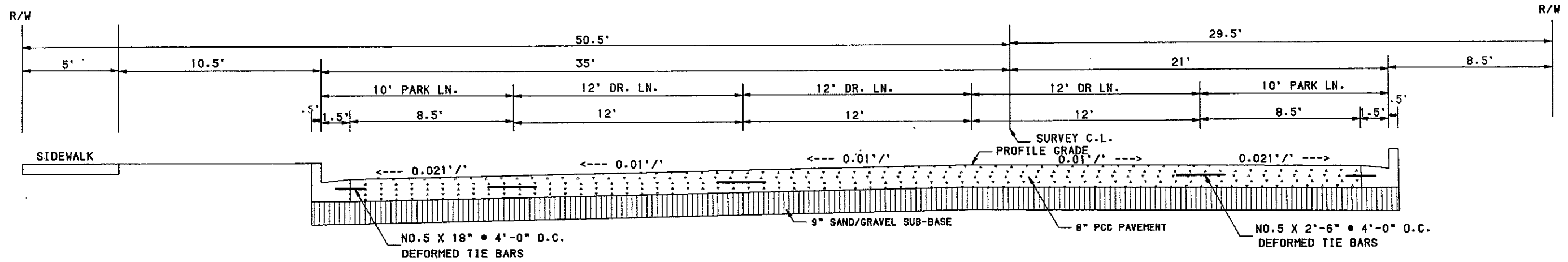
HEART RIVER BRIDGE TO 10TH AVE NW (HWY 6)

PROJECT LOCATION
TYPICAL SECTIONS

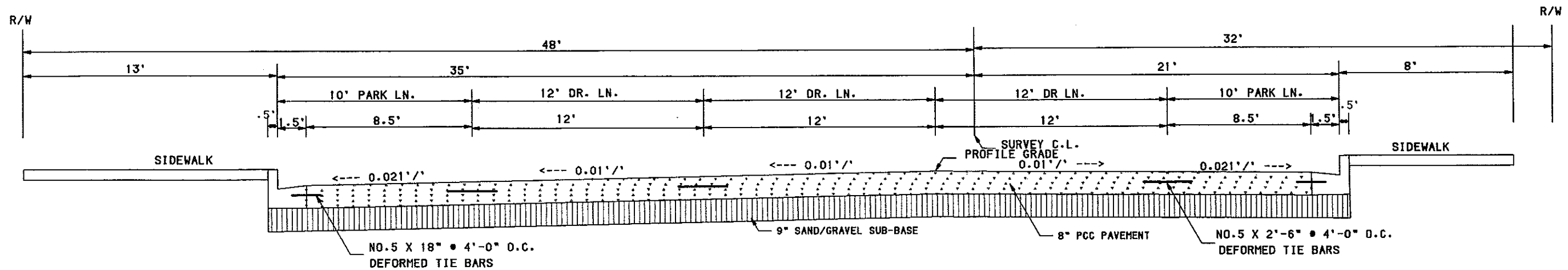
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EXTYP1.GRF

EXISTING TYPICAL SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	30



10TH AVE NW TO 8TH AVE NW

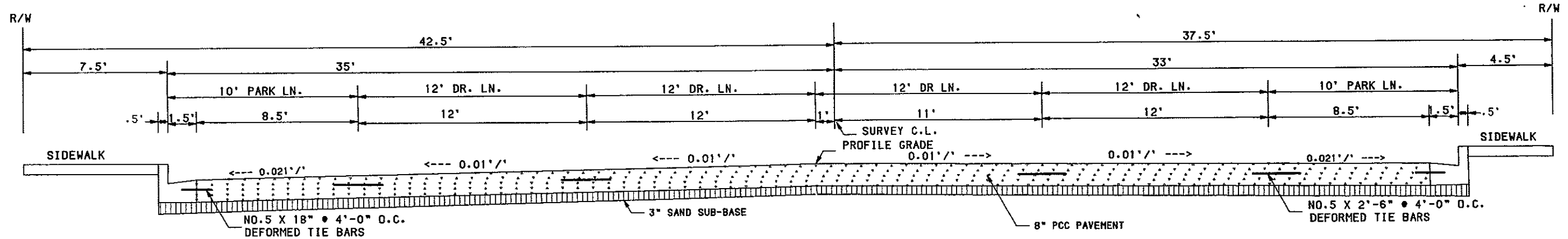
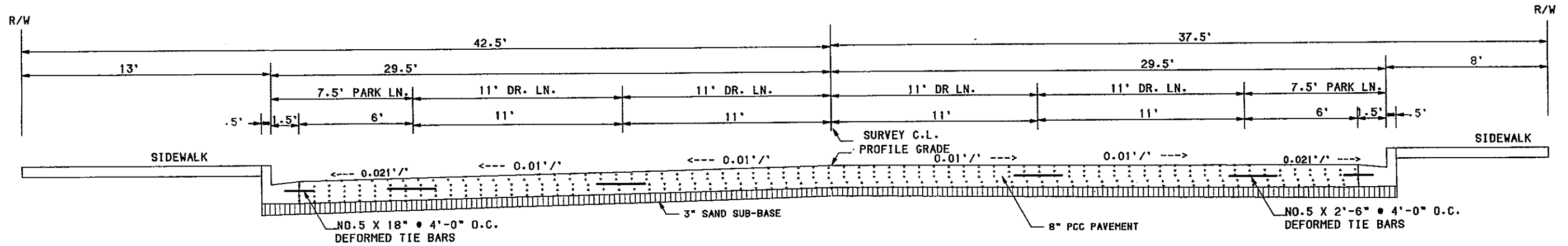


8TH AVE NW TO 6TH AVE NW

PROJECT LOCATION
TYPICAL SECTIONS
FILE:
EXTYP2.GRF

EXISTING TYPICAL SECTIONS

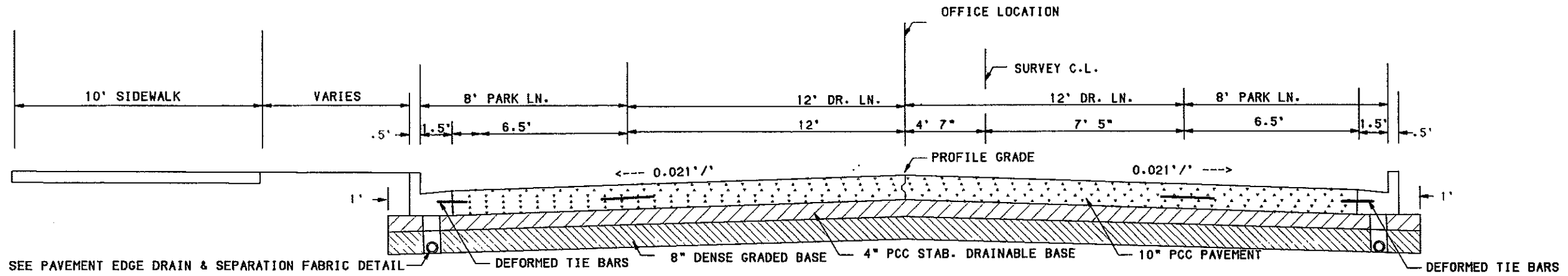
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	31



PROJECT LOCATION
TYPICAL SECTIONS
FILE:
EXTYP3.GRF

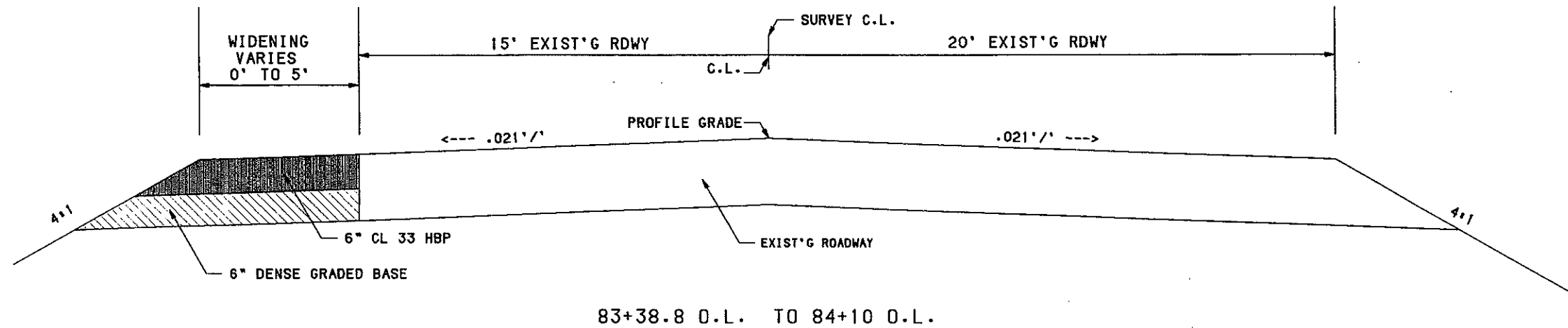
TYPICAL SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	32



87+69.9 O.L. TO 101+54.5
HEART RIVER BRIDGE TO 10TH AVE NW

NOTE: SEE STD. DRAWING D-550-2 FOR TIE BAR SIZE & SPACING.

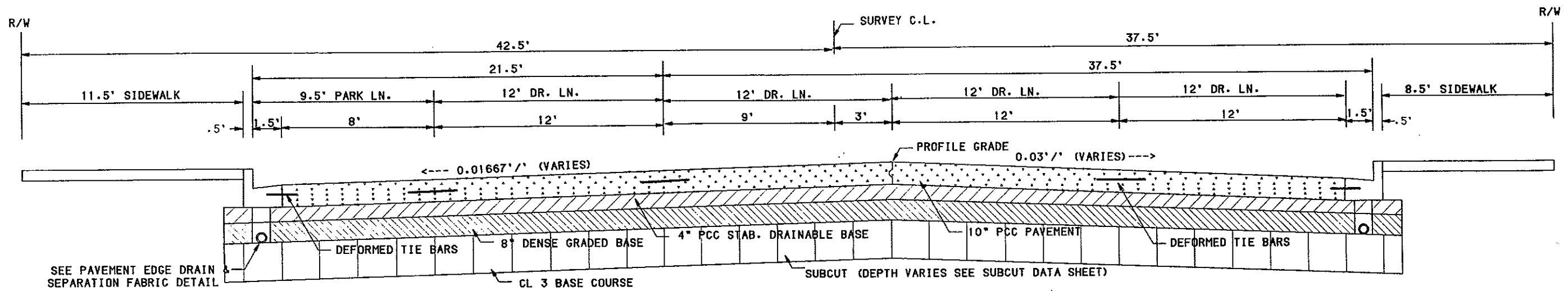


83+38.8 O.L. TO 84+10 O.L.

PROJECT LOCATION
TYPICAL SECTIONS
FILE:
NEWTYPI.GRF

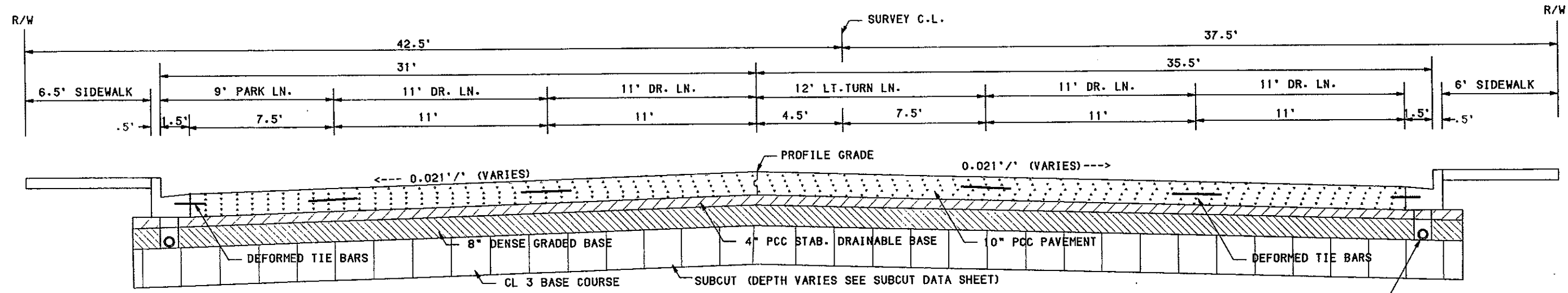
TYPICAL SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	33



109+05 TO 149+25
8TH AVE NW TO 2ND AVE NE

NOTE: SEE STD. DRAWING D-550-2 FOR TIE BAR SIZE & SPACING.



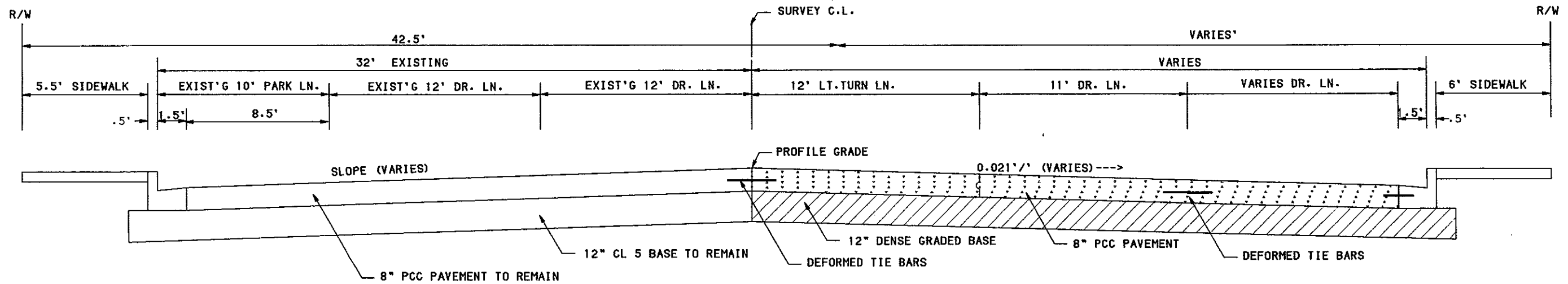
149+25 TO 159+20
2ND AVE NE TO 5TH AVE NE

SEE PAVEMENT EDGE DRAIN & SEPARATION FABRIC DETAIL

PROJECT LOCATION
TYPICAL SECTIONS
FILE: NEWTYP2.GRF

TYPICAL SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	34

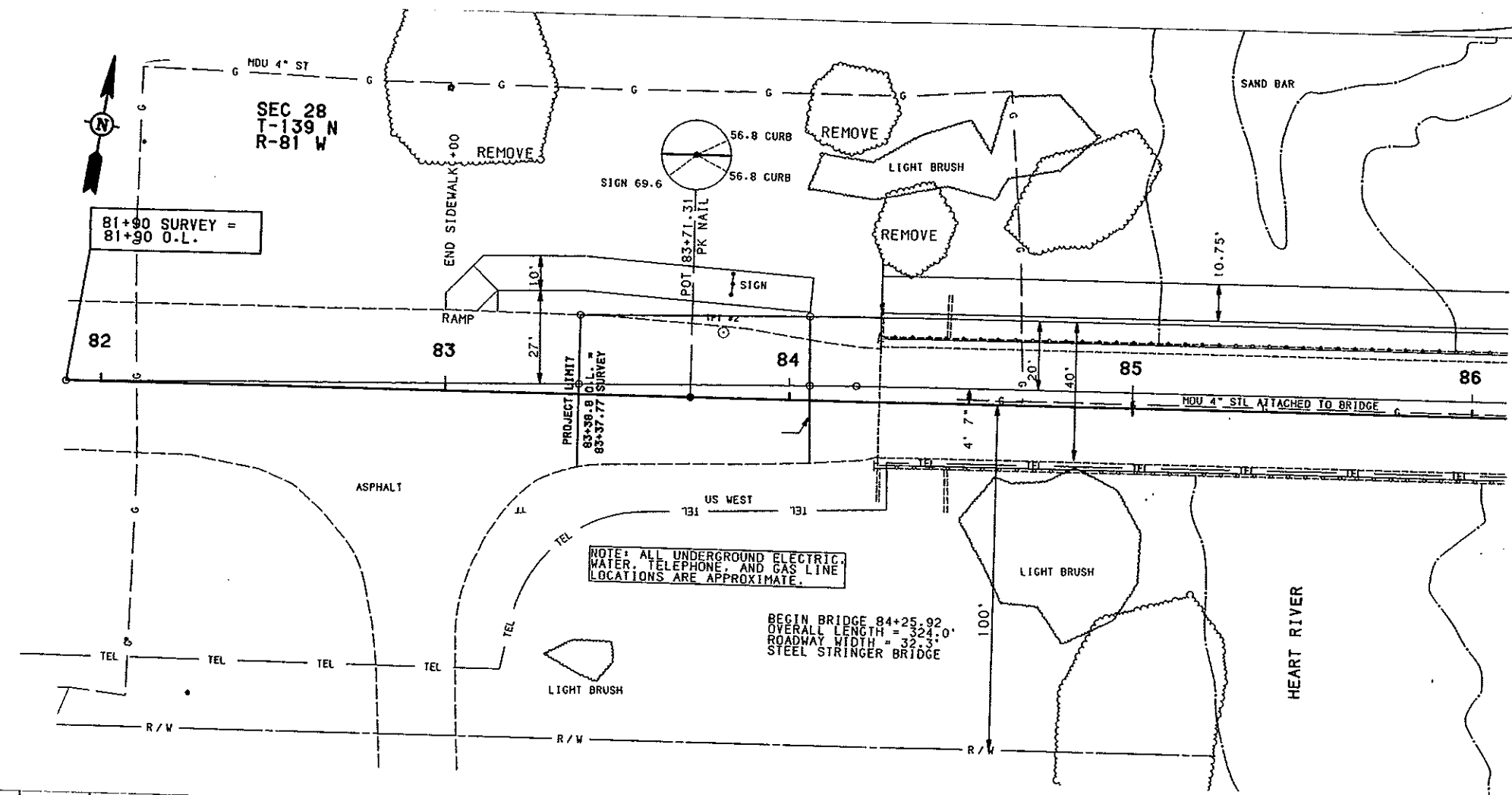


159+20 TO 162+94
5TH AVE NE TO 6TH AVE NE

NOTE: SEE STD. DRAWING D-550-2 FOR TIE BAR SIZE & SPACING.

PROJECT LOCATION
TYPICAL SECTIONS

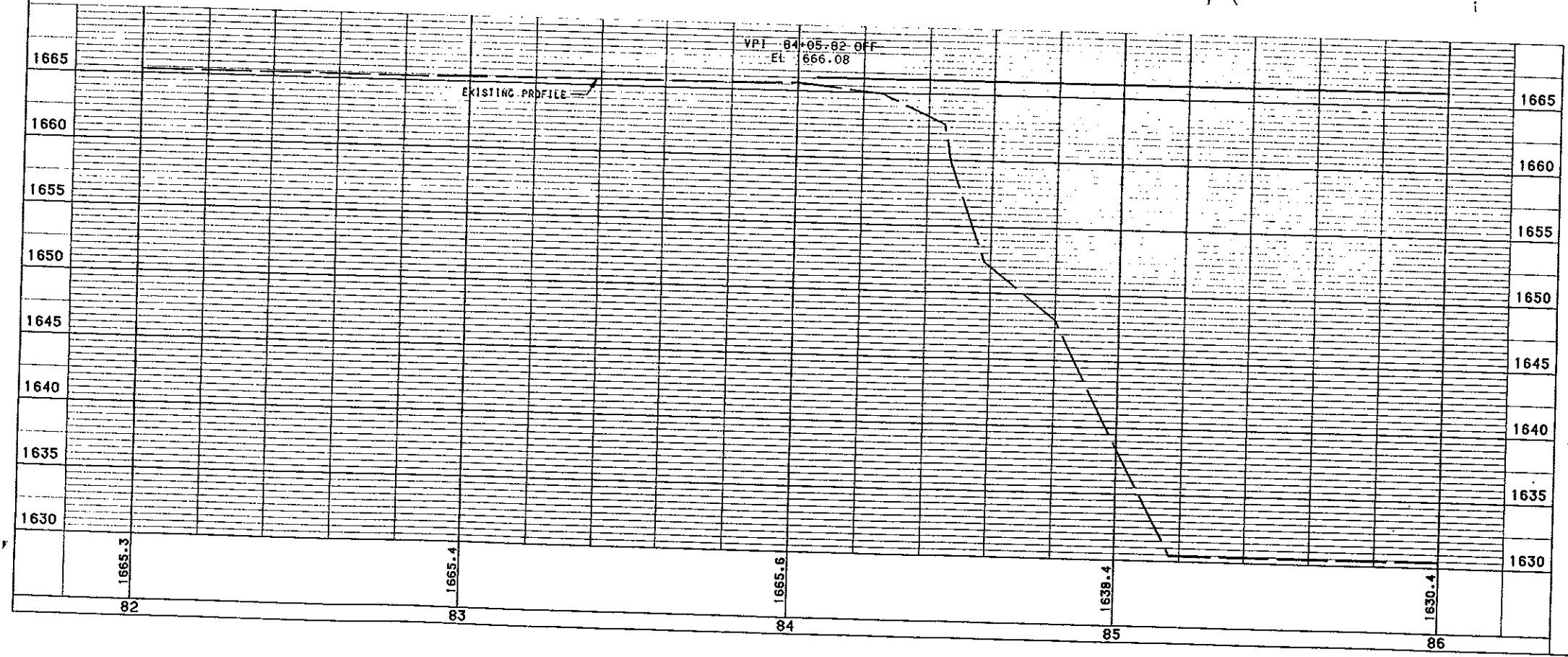
FILE:
NEWTYP3.GRF



- REMOVAL OF TREES - 24 INCHES
 - 83+00 90 LT 1 EA.
 - 84+14 83 LT 1 EA.
 - 84+34 50 LT 1 EA.
- REMOVE AND SALVAGE BITUMINOUS SURFACING
 - 84+05.82 to 84+25.99 26.3 TONS
- SAW BITUMINOUS SURFACING (FULL DEPTH)
 - approach slab area 35 L.F.T.
- HOT BITUMINOUS PAVEMENT CL 27.
 - widening taper 83+38.8 to 84+05.8 7.5 TONS

NOTE: ALL UNDERGROUND ELECTRIC, WATER, TELEPHONE, AND GAS LINE LOCATIONS ARE APPROXIMATE.

BEGIN BRIDGE 84+25.92
 OVERALL LENGTH = 324.0'
 ROADWAY WIDTH = 32.3'
 STEEL STRINGER BRIDGE



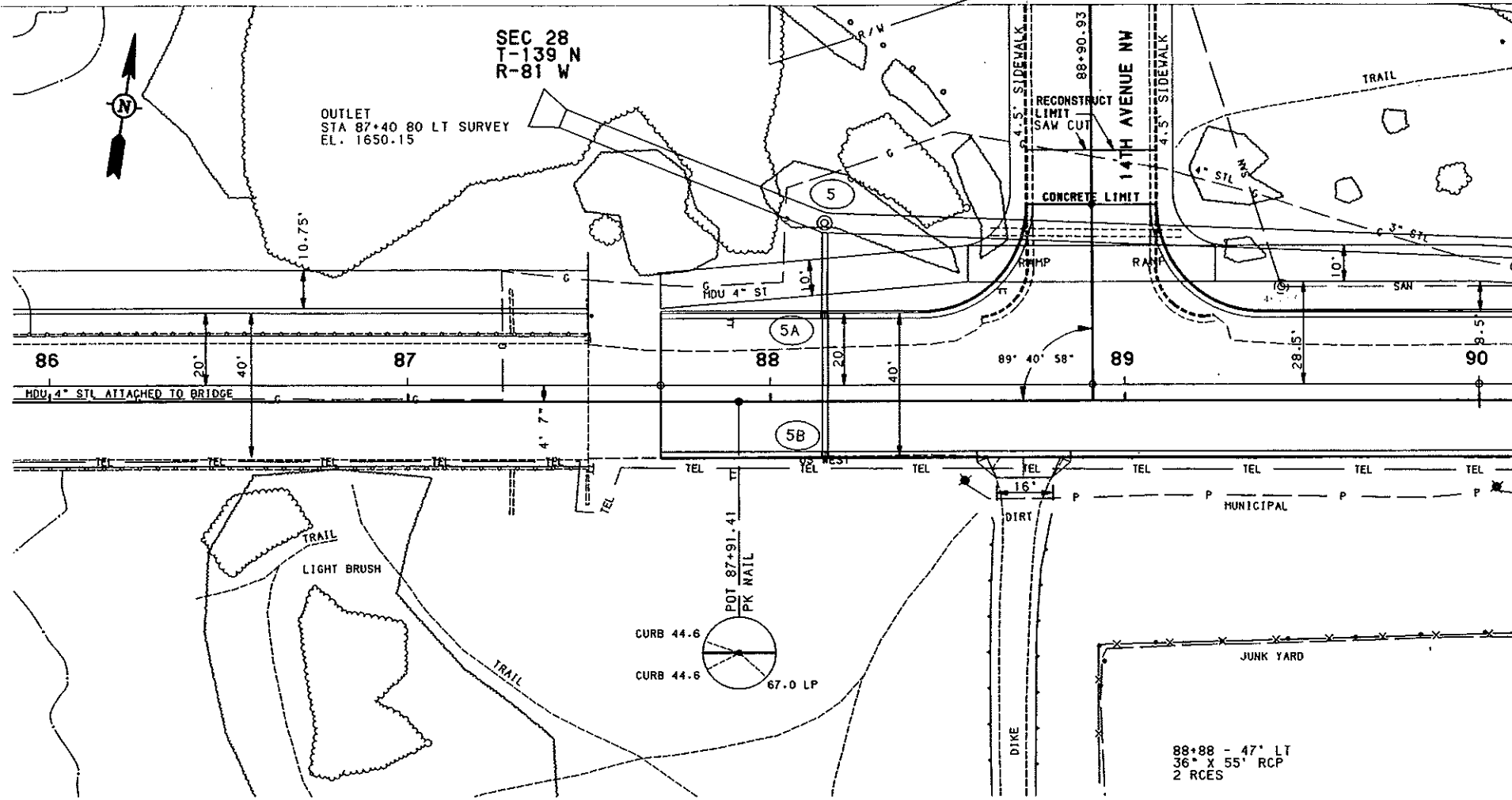
BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
K	REBAR BY SIGN	81+83 - 27' RT	1663.82
-	-	-	-

MANDAN-WEST MAIN STREET
 STA. 82+00 TO 86+00

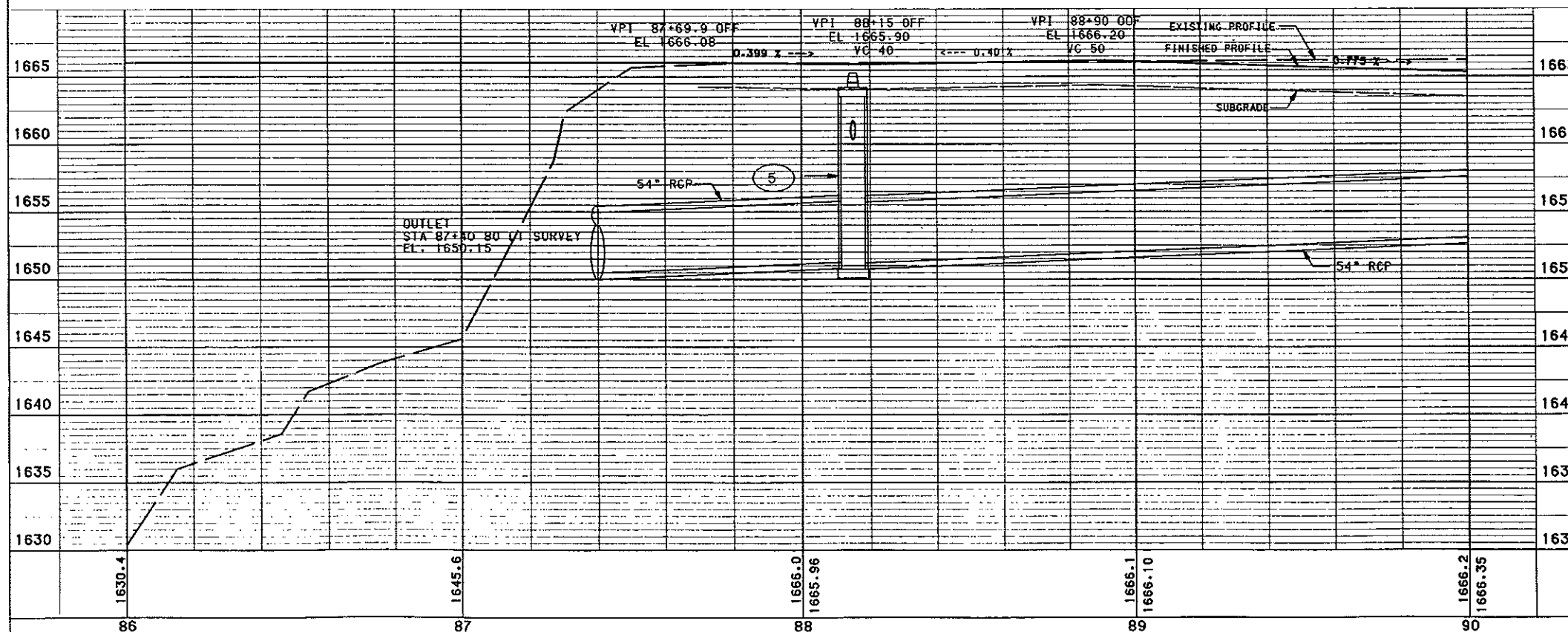
FILE# PP082-86.GRF

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	36



- SAW CONCRETE
14th ave NW tie-in curb and gutter 4 L.FT.
- REMOVE AND SALVAGE BITUMINOUS SURFACING
end of bridge to 90+00 including intersection 370.3 TONS
- REMOVAL OF CURB AND GUTTER
14th ave NW tie-in 120 L.FT.
- SAW BITUMINOUS SURFACING (FULL DEPTH)
14th ave tie-in 33 L.FT.
- RIPRAP
87+40 80 LT survey* 15 SY.
* includes salvaging and placing existing riprap.
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
(5B) to (5A) 38 L.FT.
(5A) to (5) 22 L.FT.
- PIPE, CONC. REINF. 54 IN. CLASS-3 STORM DRAIN
(4) to (5) 234 L.FT.
(5) to outfall 76 L.FT.
- END SEC. CONC REINF. 54 IN.
87+40 80 LT survey* 1 EA.
*(includes grate for reinf. conc. end. sec. 54')
- MANHOLE 84 IN.
(5) 1 EA.
- MANHOLE RISER 84 IN.
(5) 12.97 FT.
- INLET - TYPE I
(5A) 1 EA.
(5B) 1 EA.



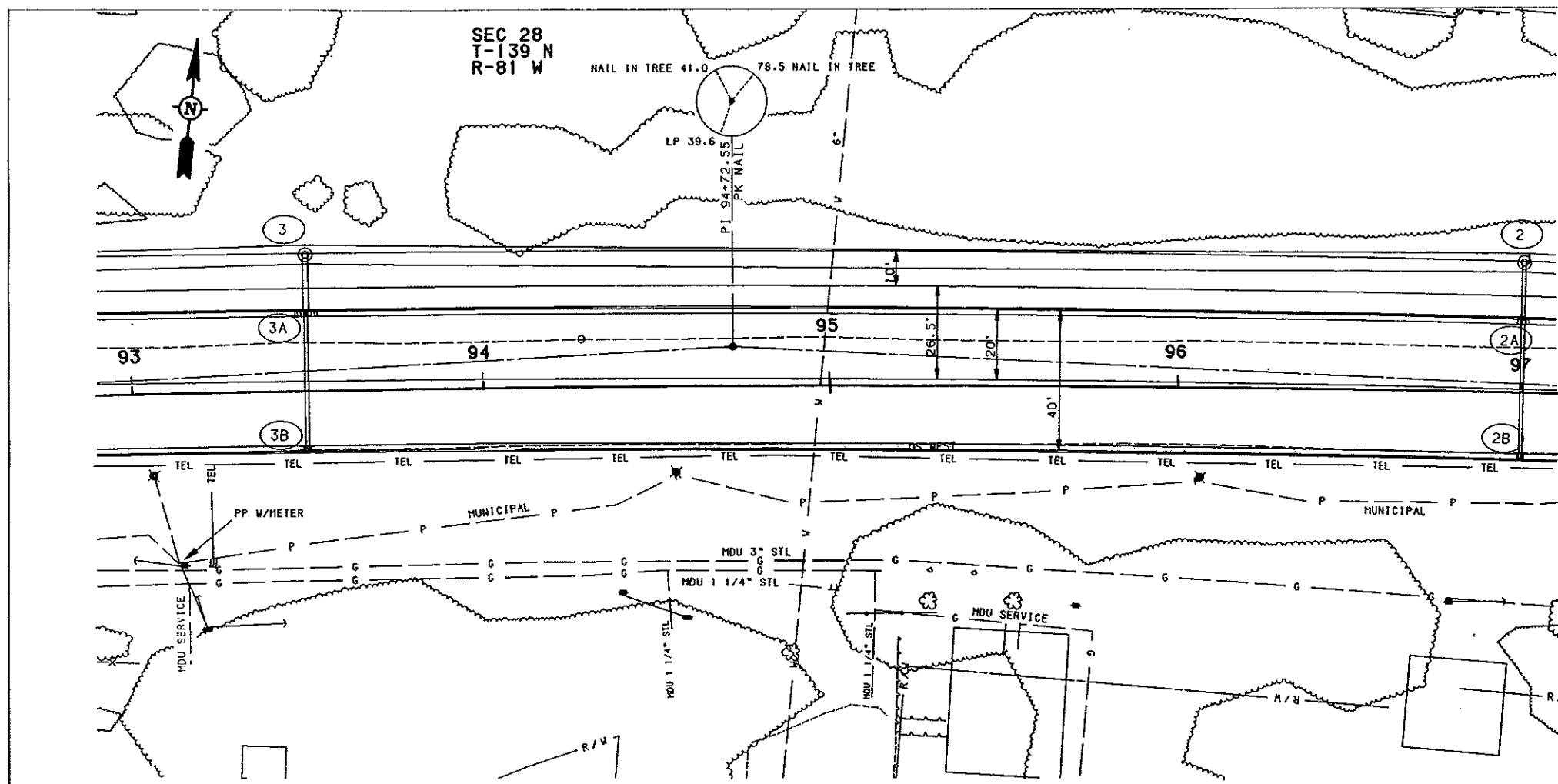
BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
J	CHISELED SQUARE ON CURB	87+50 - 16' LT	1666.76
-	-	-	-

MANDAN-WEST MAIN STREET
STA. 86+00 TO 90+00

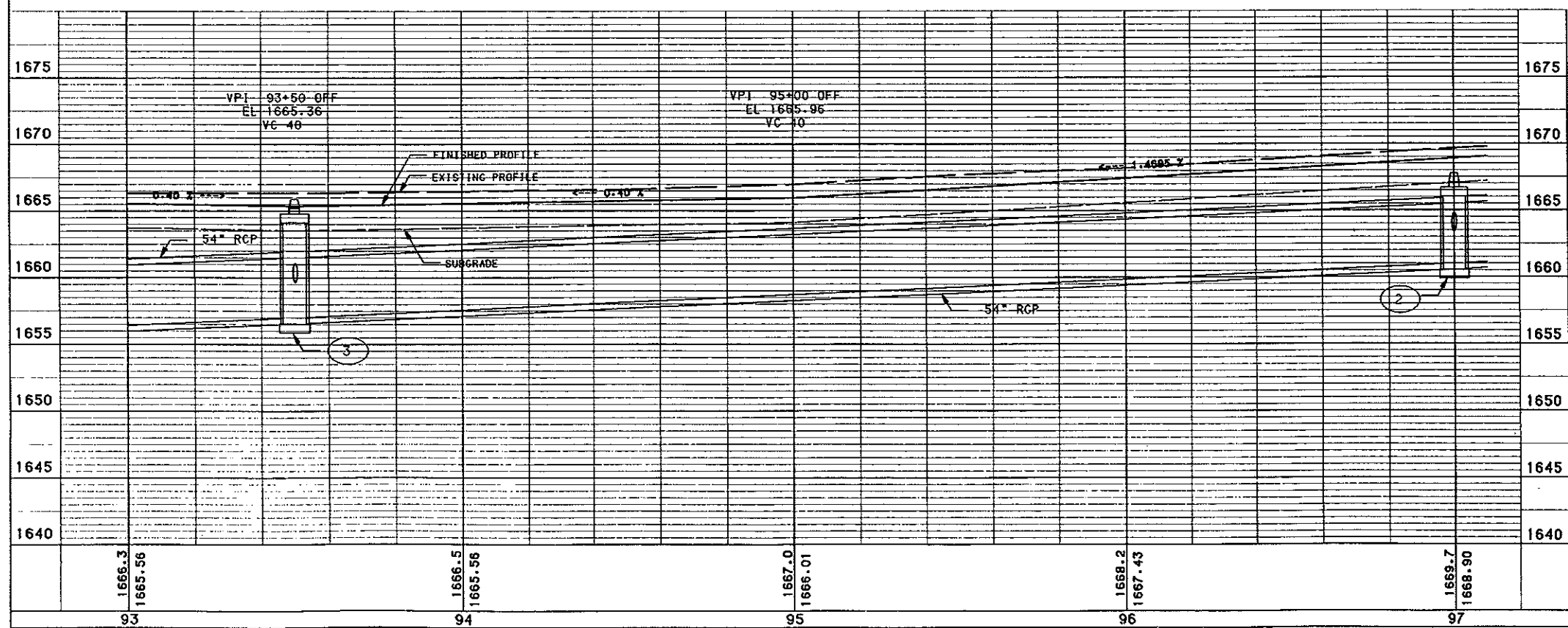
FILE: PP086-90.GRF

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	38



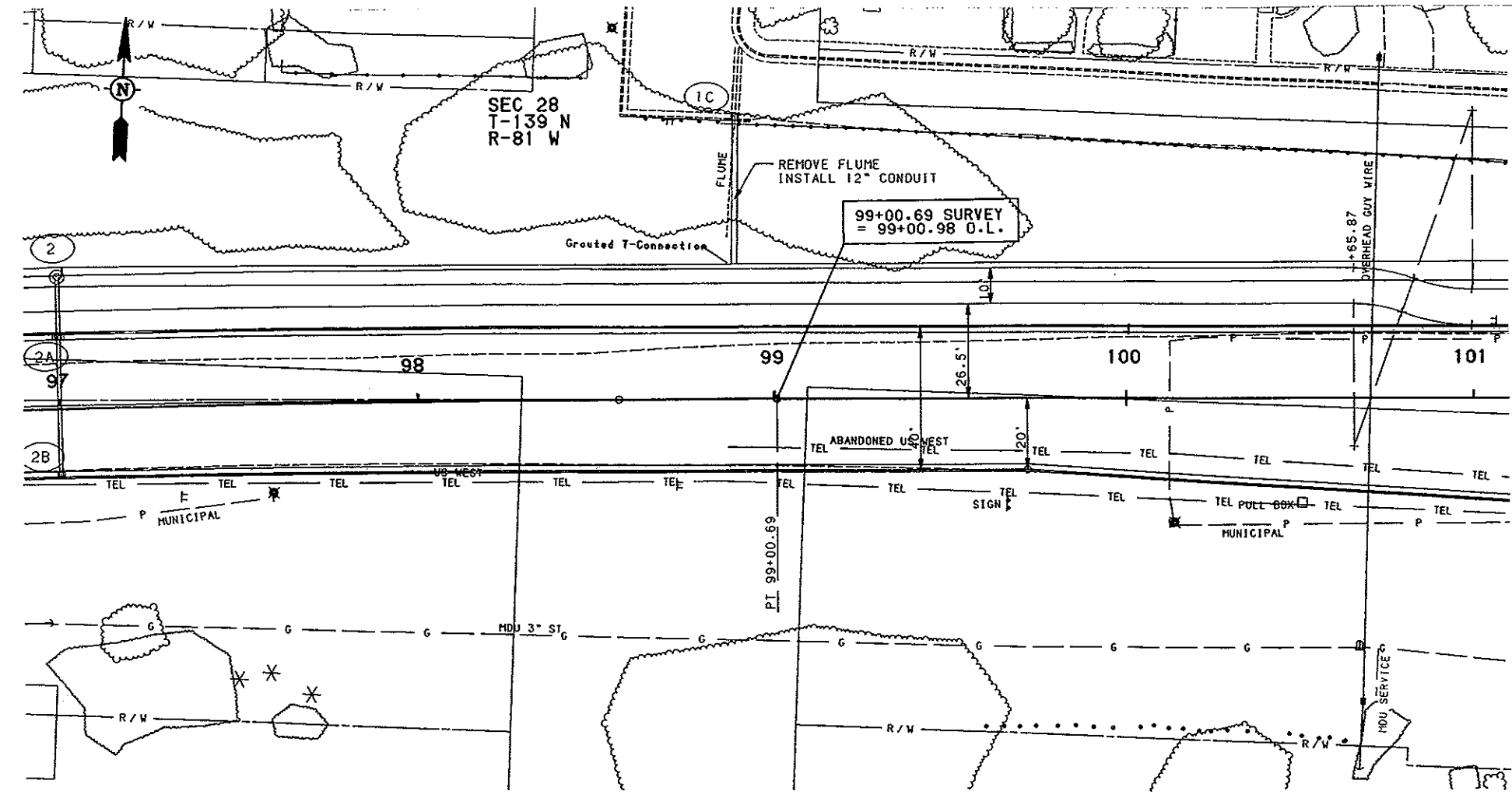
- REMOVE AND SALVAGE BITUMINOUS SURFACING
93+00 to 97+00 451.4 TONS
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
(3B) to (3A) 38 L.F.T.
- PIPE, CONC. REINF. 18 IN. CLASS-3 STORM DRAIN
(3A) to (3) 14 L.F.T.
- PIPE, CONC. REINF. 54 IN. CLASS-3 STORM DRAIN
(2) to (3) 350 L.F.T.
- MANHOLE 84 IN.
(3) 1 EA.
- MANHOLE RISER 84 IN.
(3) 7.60 FT.
- INLET - TYPE 1
(3B) 1 EA.
- INLET - TYPE 2, DOUBLE
(3A) 1 EA.



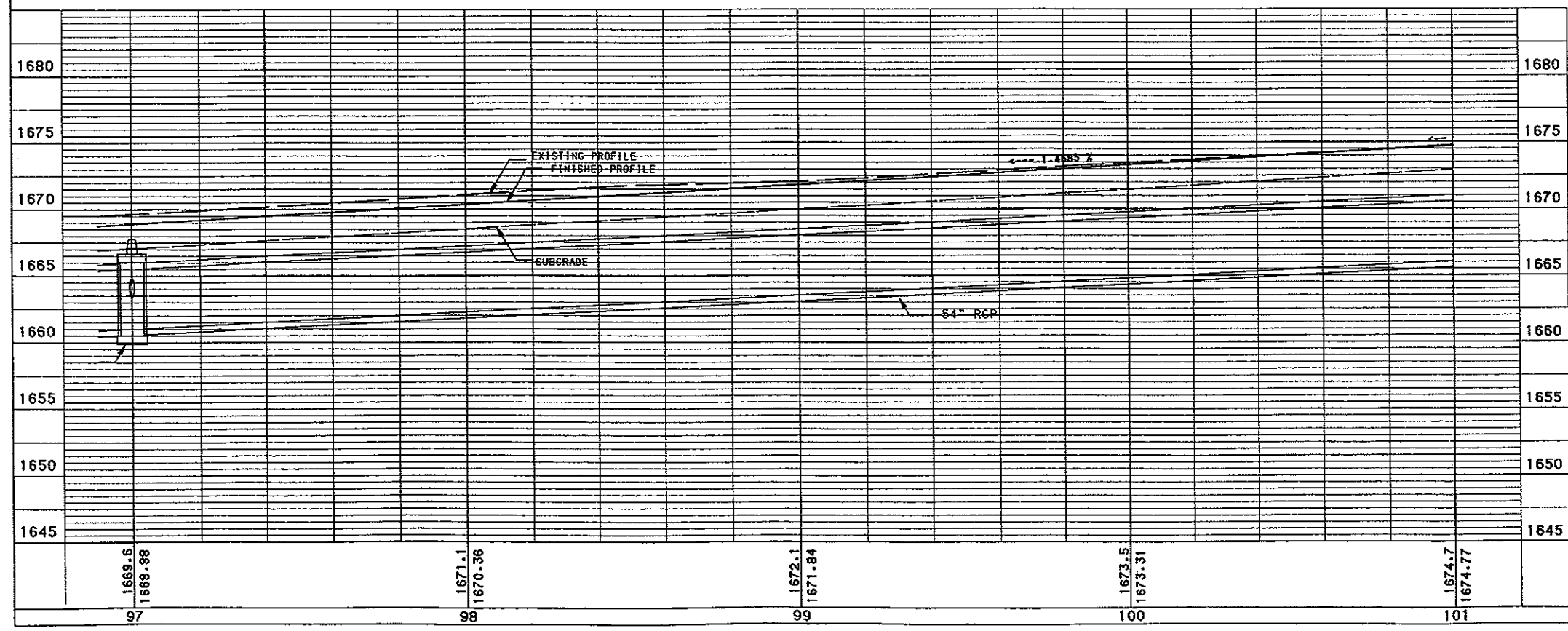
BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-

MANDAN-WEST MAIN STREET
STA. 93+00 TO 97+00

FILE: PP093-97.GRF	0 20 40 60 SCALE IN FEET
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- REMOVE AND SALVAGE BITUMINOUS SURFACING
97+00 to 101+00 527.1 TONS
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 (2B) to (2A) 38 L.FT.
 (2A) to (2) 14 L.FT.
- PIPE, CONC. REINF. 54 IN. CLASS-3 STORM DRAIN
 (1) to (2) 556 L.FT.
 includes section for 12" conduit connection 98+89.37 LT
 includes section for 15" RCP connection 101+30.5 31 LT
- PIPE CONDUIT 12 IN.
 (1C) to 54" trunk line 46 L.FT.
- MANHOLE 84 IN.
 (2) 1 EA
- MANHOLE RISER 84 IN.
 (2) 7.05 FT
- INLET - TYPE 1
 (1C) 1 EA
 (2B) 1 EA
- INLET - TYPE 2
 (2A) 1 EA
- CURB & GUTTER - TYPE 1
 used for installing inlet (1C) 10 L.FT.
- SAW CONCRETE
 used for installing inlet (1C) 2 L.FT.

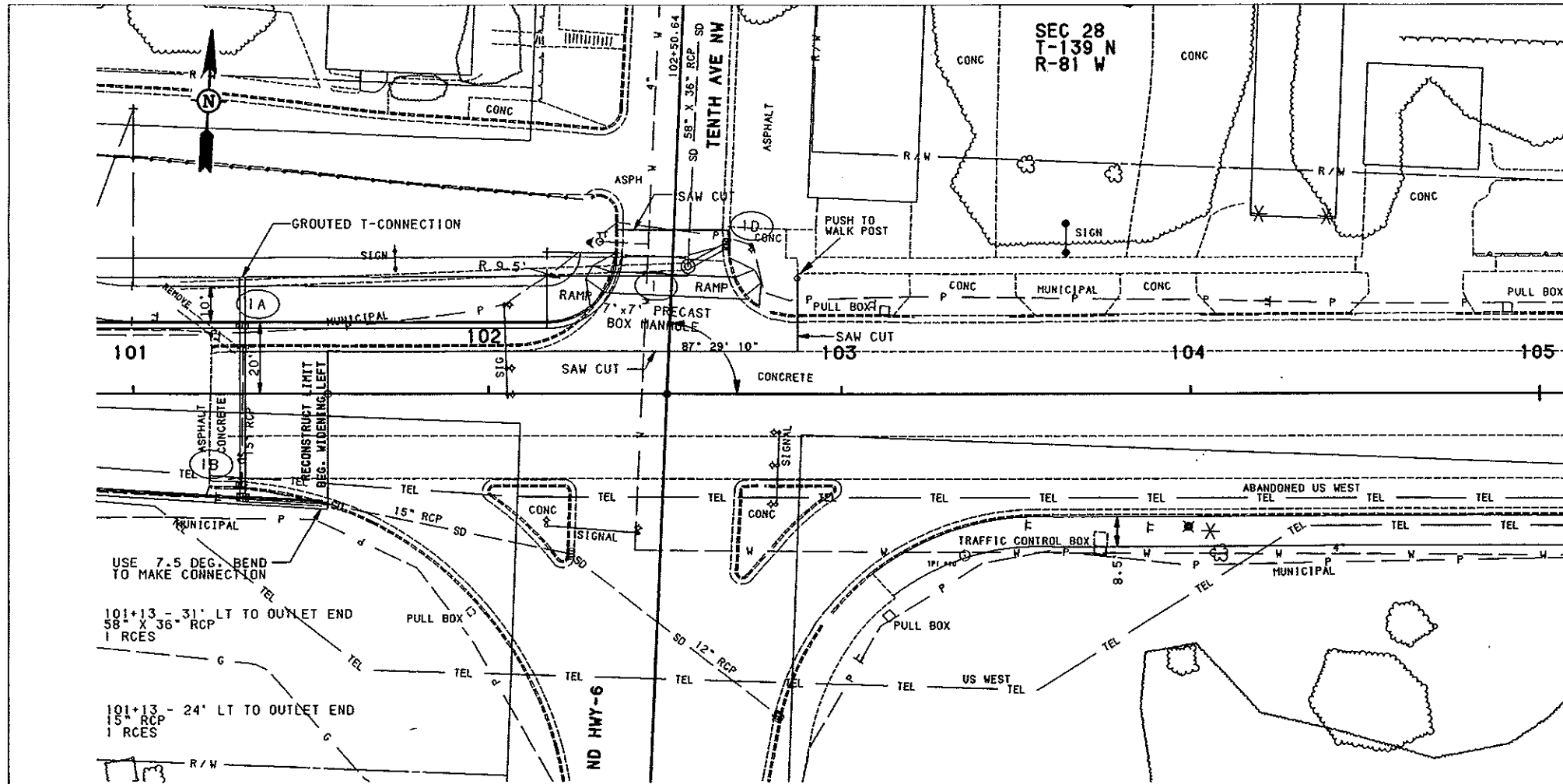


BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
H	REBAR NORTH OF LP	97+59 - 24' RT	1669.08
-	-	-	-

MANDAN-WEST MAIN STREET
STA. 97+00 TO 101+00

FILE: PPO97-101.GRF	0 20 40 60 SCALE IN FEET
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FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	40



REMOVAL OF STRUCTURES AND OBSTRUCTIONS
102+56.72 36.08 LT 1 L SUM.

REMOVAL OF CONCRETE
10th ave intersection NE pedestrian ramp 20 SY

SAW CONCRETE
101+54.5 RT and LT 43 L.FT.
101+54.5 to 102+87.92 LT 133 L.FT.
102+87.92 LT 18 L.FT.
10th ave NW curb and gutter 4 L.FT.

REMOVE AND SALVAGE BITUMINOUS SURFACING
101+00 to 101+22 38.9 TONS

REMOVAL OF CURB AND GUTTER
SW quadrant 35 L.FT.
NW quadrant 125 L.FT.
NE pedestrian ramp area 40 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
10th ave NW tie-in 32 L.FT.

REMOVAL OF INLETS
101+30.21 26.24 RT 1 EA.
101+30.67 13.38 LT 1 EA.
102+68.26 43.30 LT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
101+00 to 105+00 135 SY.

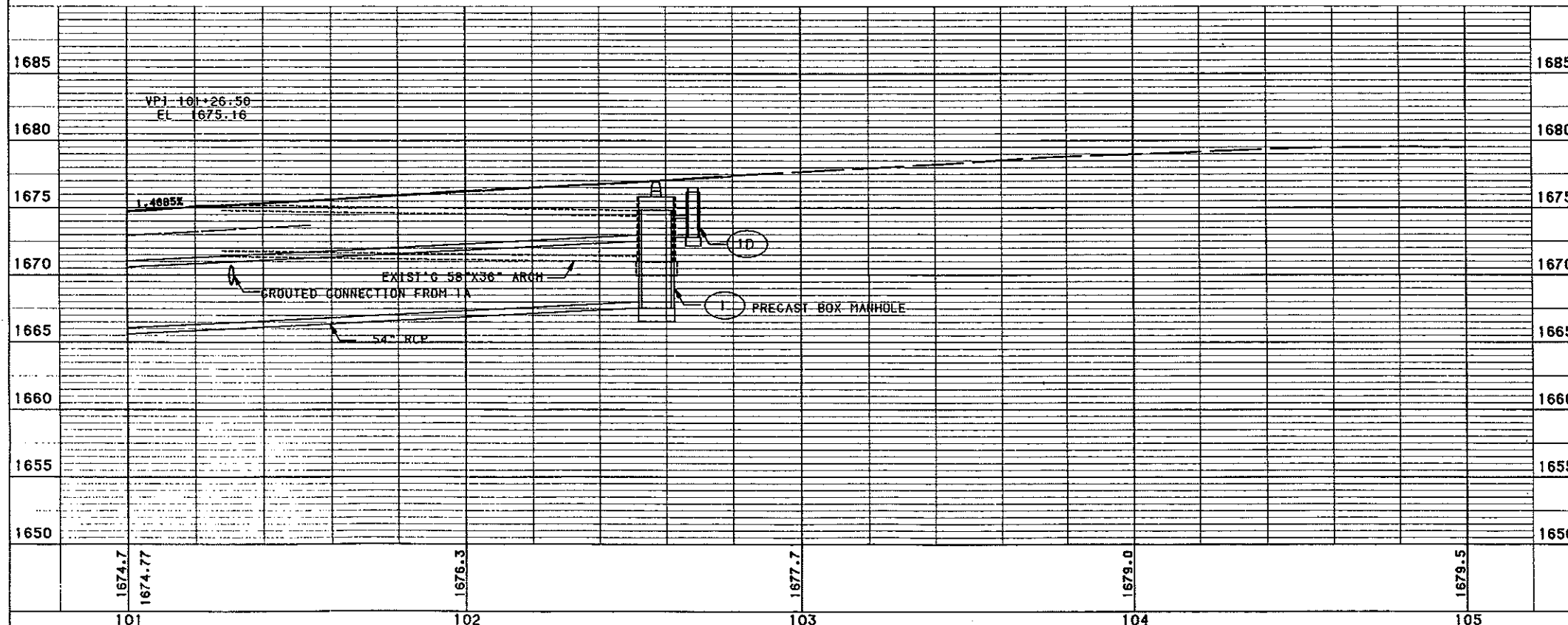
PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
SE existing pipe to (1B) 20 L.FT.
(1B) to (1A) 48 L.FT.
(1A) to 54" TRUNKLINE 14 L.FT.
(1D) to (1E) 12 L.FT.

PIPE, CONC. REINF. 15 IN. CLASS-3 S.D. 7.5 DEG. BEND.
SE existing pipe junction 1 EA

PIPE, CONC. REINF. 54 IN. CLASS-3 STORM DRAIN
(1E) to (1) 132 L.FT.

MANHOLE SPECIAL - SEE DETAIL
(1) 1 EA.

INLET - TYPE 2
(1A) 1 EA.
(1B) 1 EA.
(1D) 1 EA.



PIPE, CONC. REINF. 15 IN. CLASS-3 S.D. 7.5 DEG. BEND.
SE existing pipe junction 1 EA

PIPE, CONC. REINF. 54 IN. CLASS-3 STORM DRAIN
(1E) to (1) 132 L.FT.

MANHOLE SPECIAL - SEE DETAIL
(1) 1 EA.

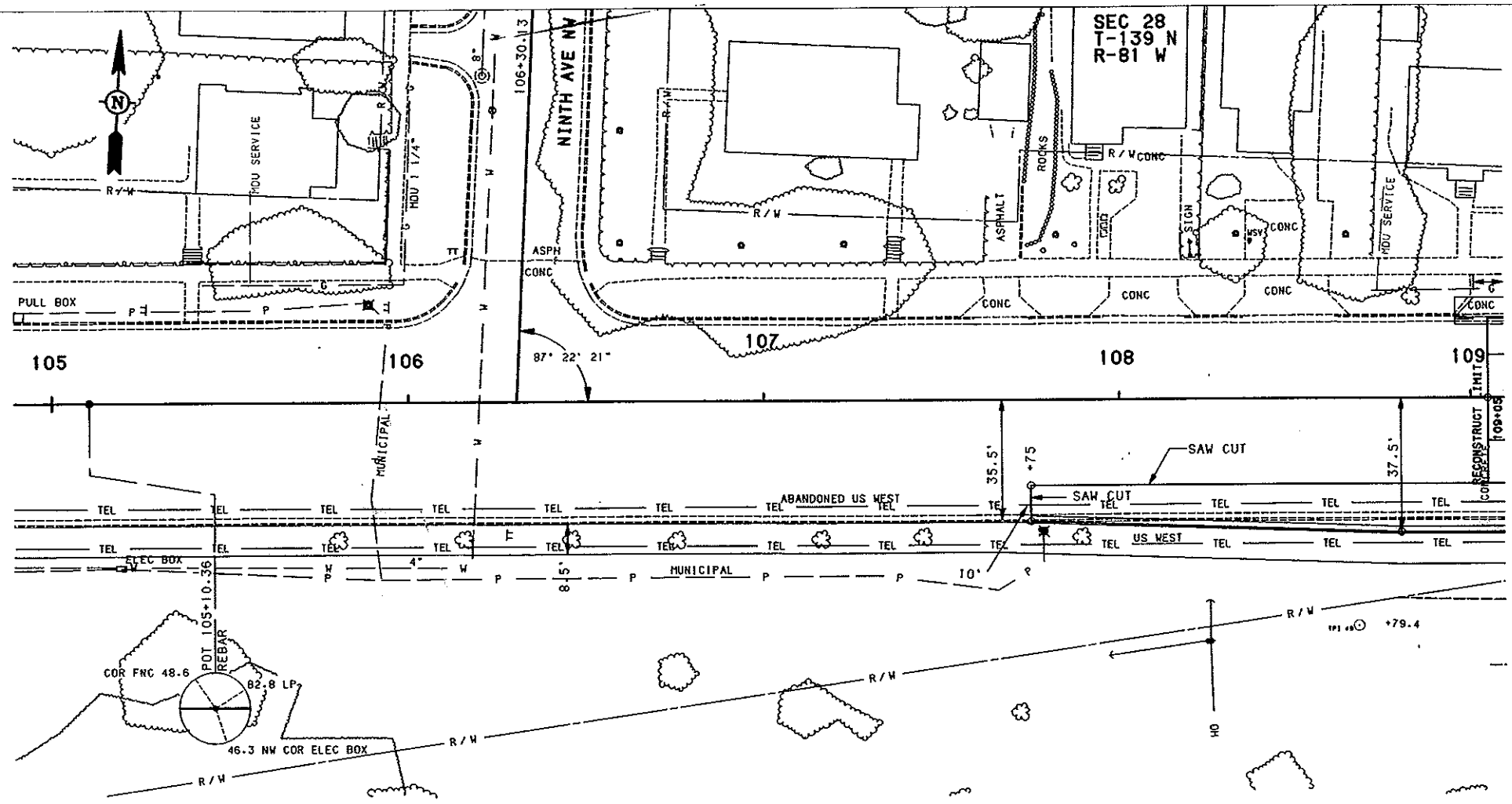
INLET - TYPE 2
(1A) 1 EA.
(1B) 1 EA.
(1D) 1 EA.

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
G	TOP OF FH	102+28 - 43' LT	1679.71
F	BRIDGE BM	104+09 - 46' RT	1679.77

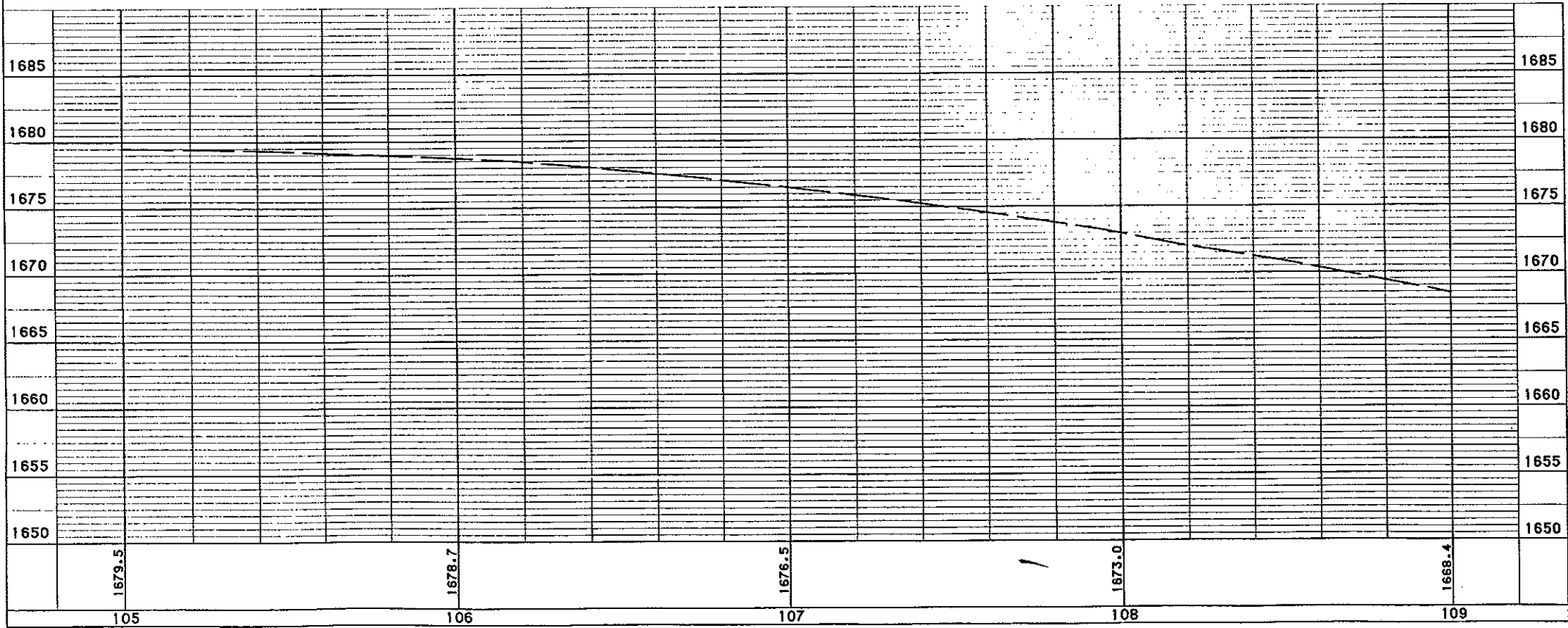
MANDAN-WEST MAIN STREET
STA. 101+00 TO 105+00

FILE: PP101-105.GRF

SCALE 1/4" = 1' 0"

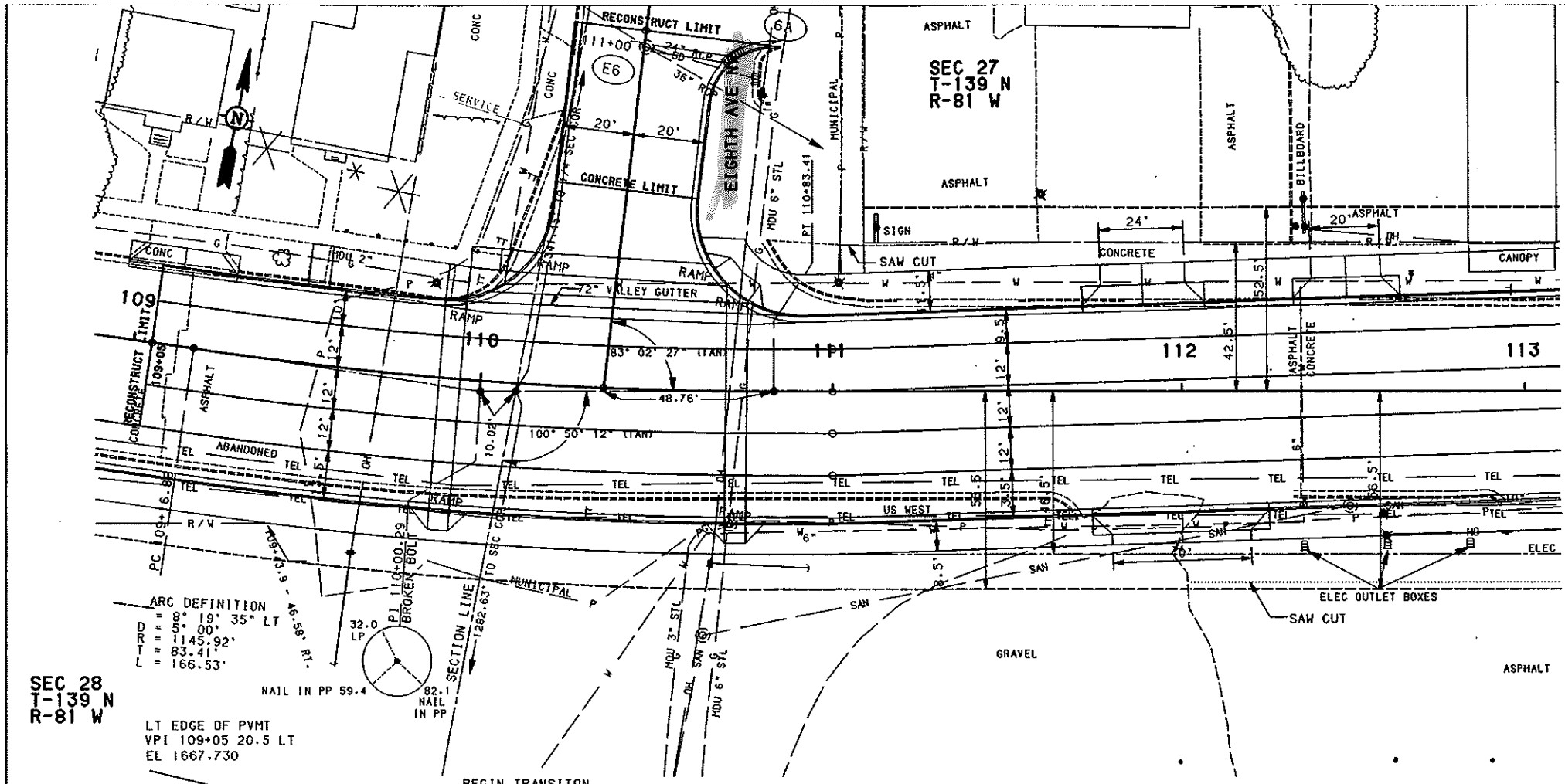


SAW CONCRETE
 107+75 RT 10 L.FT.
 107+75 to 109+05 RT 130 L.FT.
 REMOVAL OF CURB AND GUTTER
 107+75 to 109+00 RT 125 L.FT.
 REMOVAL OF CONCRETE PAVEMENT
 lane widening 135 SY.



BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-
MANDAN-WEST MAIN STREET STA. 105+00 TO 109+00			
FILE:	PP105-109.GRF		
		 SCALE IN FEET	

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	42



REMOVAL OF CONCRETE	
NW quadrant	42 SY.
NE quadrant	373 SY.
SAW CONCRETE	
109+05 LT and RT	47 L.FT.
8th ave NW curb and gutter	2 L.FT.
NW. 8th ave sidewalk	7 L.FT.
REMOVE AND SALVAGE BITUMINOUS SURFACING	
traffic pavement est. at 6.5" thick	837.7 TONS
SW. quadrant businesses est. at 4" thick	41.6 TONS
REMOVAL OF CURB AND GUTTER	
NW quadrant	190 L.FT.
NE quadrant	250 L.FT.
South	290 L.FT.
SAW BITUMINOUS SURFACING (FULL DEPTH)	
S. businesses	100 L.FT.
REMOVAL OF INLETS	
110+78.18 88.84 LT	1 EA.
REMOVAL OF CONCRETE PAVEMENT	
109+05 to 109+12	55 SY.
112+35 to 113+00	429 SY.
PIPE, CONC. REINF. 24 IN. CLASS-3 STORM DRAIN	
6A to E6	20 L.FT.
INLET - TYPE 2. DOUBLE	
6A	1 EA.
ADJUST MANHOLE	
110+43.88 97.43 LT	1 EA.
110+70.5 38 RT	1 EA.
112+48 33.5 RT	1 EA.

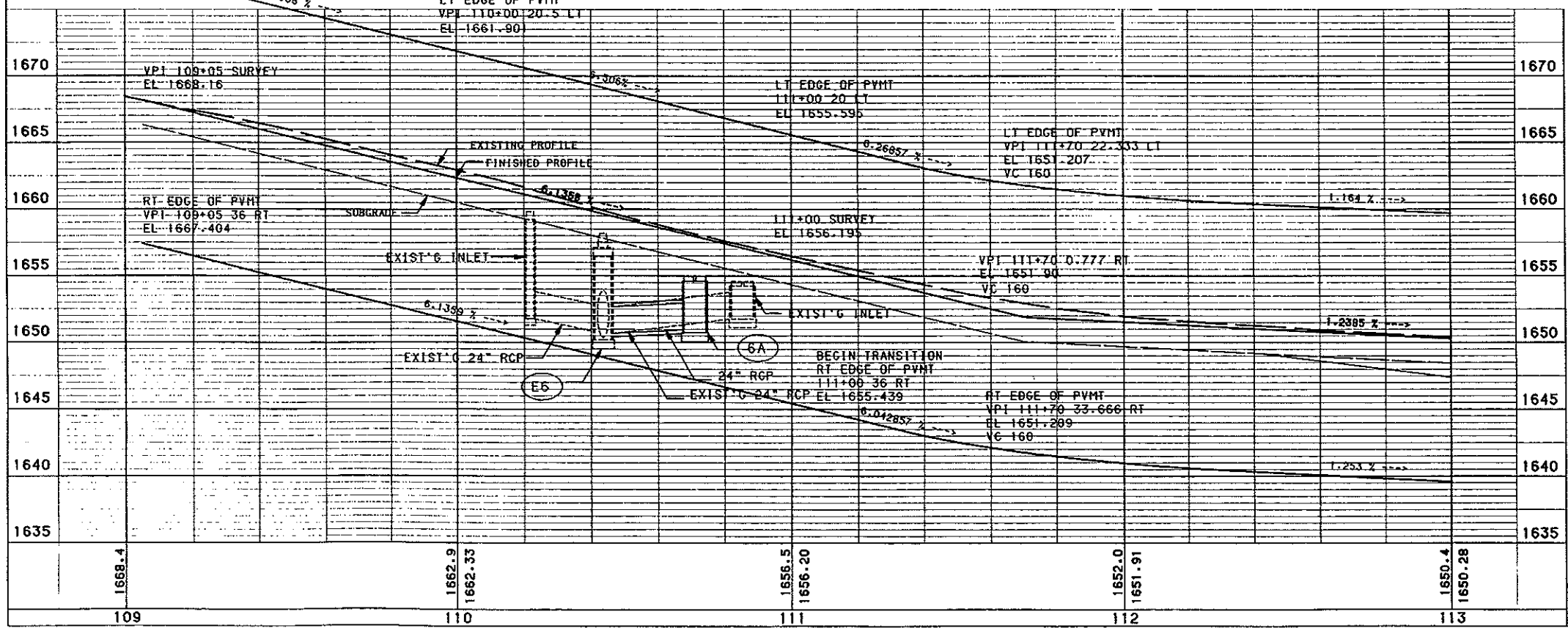
SEC 28
T-139 N
R-81 W

LT EDGE OF PVMT
VPI 109+05 20.5 LT
EL 1667.730

ARC DEFINITION
D = 8' 19' 35" LT
R = 5' 00"
L = 1145.92'
L = 83.41'
L = 166.53'

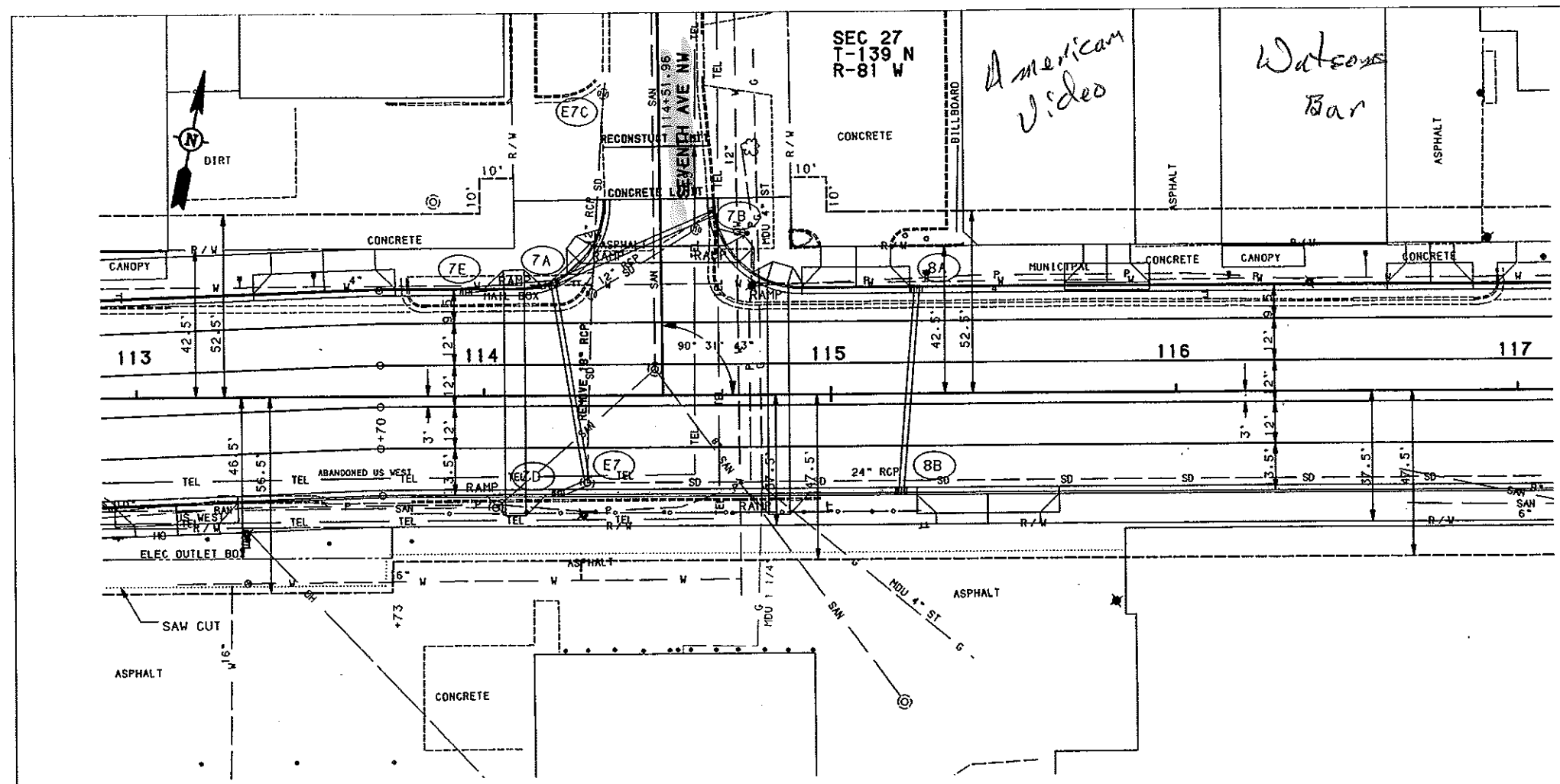
HAIL IN PP 59.4
HAIL IN PP

BEGIN TRANSITION
LT EDGE OF PVMT
VPI 110+00 20.5 LT
EL 1661.90



BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
E	REBAR	110+02 - 30' LT	1662.08
-	-	-	-
MANDAN-WEST MAIN STREET STA. 109+00 TO 113+00			
FILE:	PP109-113.GRF	 SCALE IN FEET	

52.5
+3
-24
-9.5
5 ft 3 in
-3 1/2 in



REMOVAL OF CONCRETE
 NW quadrant 267 SY.
 NE quadrant 417 SY.
 7th ave NW tie-in 50 SY.
 * (may include areas with asphalt overlay)

SAW CONCRETE
 N businesses 150 L.F.T.
 7th ave NW curb and gutter 4 L.F.T.

REMOVE AND SALVAGE BITUMINOUS SURFACING
 S businesses est. at 4" 81.8 TON.

REMOVAL OF CURB AND GUTTER
 S quadrant 200 L.F.T.
 NW quadrant 160 L.F.T.
 NE quadrant 290 L.F.T.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 S businesses 280 L.F.T.
 7th ave NW tie-in 30 L.F.T.

REMOVAL OF INLETS
 114+31 30 LT 1 EA.
 114+62 47 LT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 113+00 to 117+00 2489 SY.
 7th ave NW 118 SY.

PIPE, CONC. REINF. 12 IN. CLASS-3 STORM DRAIN
 NE existing pipe to (7A) 14 L.F.T.

PIPE, CONC. REINF. 12 IN. CL-3 SD. 45 DEG BEND
 existing pipe connection to (7A) 1 EA.

PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 (7B) to (7A) 48 L.F.T.
 (7E) to (7A) 24 L.F.T.
 (7D) to (E7) 6 L.F.T.
 (8A) to (8B) 56 L.F.T.

PIPE, CONC. REINF. 18 IN. CLASS-3 STORM DRAIN
 (7A) to (E7) 56 L.F.T.

MANHOLE CASTING
 114+30 25 RT 1 EA.

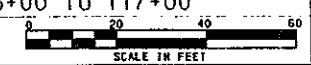
INLET - TYPE 2
 (7E) 1 EA.
 (7D) 1 EA.
 (7B) 1 EA.
 (8A) 1 EA.

INLET - SPECIAL, TYPE 2 - 60 IN.
 (7A) 1 EA.
 (8B) 1 EA.

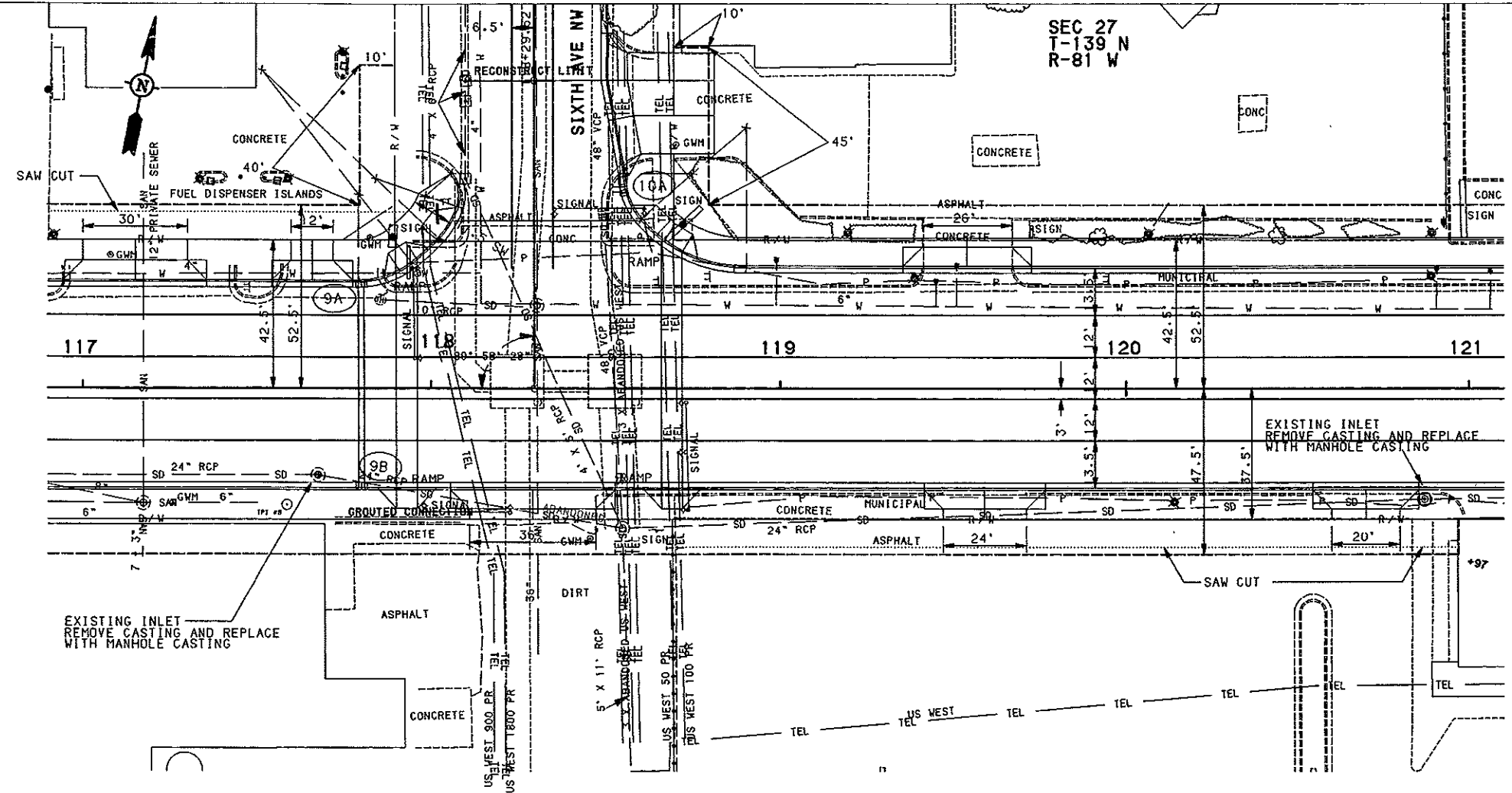
ADJUST MANHOLE
 114+03.3 32.3 RT 1 EA.
 114+30 25 RT 1 EA.
 114+50 8 LT 1 EA.

Station	Profile Description	Grade	Profile Description	Grade	Profile Description	Station
1660	END TRANSITION LT EDGE OF PVMT VPI 113+70 29 LT EL 1648.875	0.5671 %	LT EDGE OF PVMT VPI 115+25 29 LT EL 1648.0 VC 40	0.40 %	LT EDGE OF PVMT VPI 116+50 29 LT EL 1648.5 VC 30	1660
1655						1655
1650	VPI 113+70 3 RT EL 1649.425 VC 40	0.40 %	VPI 115+25 3 RT EL 1648.803 VC 40	0.5176 %	VPI 116+50 3 RT EL 1649.45 VC 40	1650
1645						1645
1640	END TRANSITION RT EDGE OF PVMT VPI 113+70 27 RT EL 1648.703	0.40 %	RT EDGE OF PVMT VPI 115+25 27 RT EL 1648.083 VC 40	0.584 %	RT EDGE OF PVMT VPI 116+50 27 RT EL 1648.813 VC 40	1640
1635						1635
1630						1630
1625						1625
113	1650.4 1650.29		1649.2 1648.90		1648.9 1649.19	117

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
D	TOP OF FH	114+76 - 46' LT	1650.78
MANDAN-WEST MAIN STREET STA. 113+00 TO 117+00			
FILE:	PP113-117.GRF		



SEC 27
T-139 N
R-81 W



REMOVAL OF CONCRETE
 NW quadrant 233 SY.
 NE quadrant 430 SY.
 South 188 SY.

SAW CONCRETE
 N businesses 115 L.FT.
 6th ave curb and gutter 4 L.FT.
 S businesses 8 L.FT.

REMOVE AND SALVAGE BITUMINOUS SURFACING
 6th ave NW est. at 6" 238.5 TONS
 S. businesses est. at 4" 35.6 TONS

REMOVAL OF CURB AND GUTTER
 NW quadrant 80 L.FT.
 NE quadrant 320 L.FT.
 South 290 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 S. businesses 230 L.FT.

REMOVAL OF INLETS
 117+85 25 LT 1 EA.
 118+50 50 LT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 117+00 to 121+00 2053 SY.

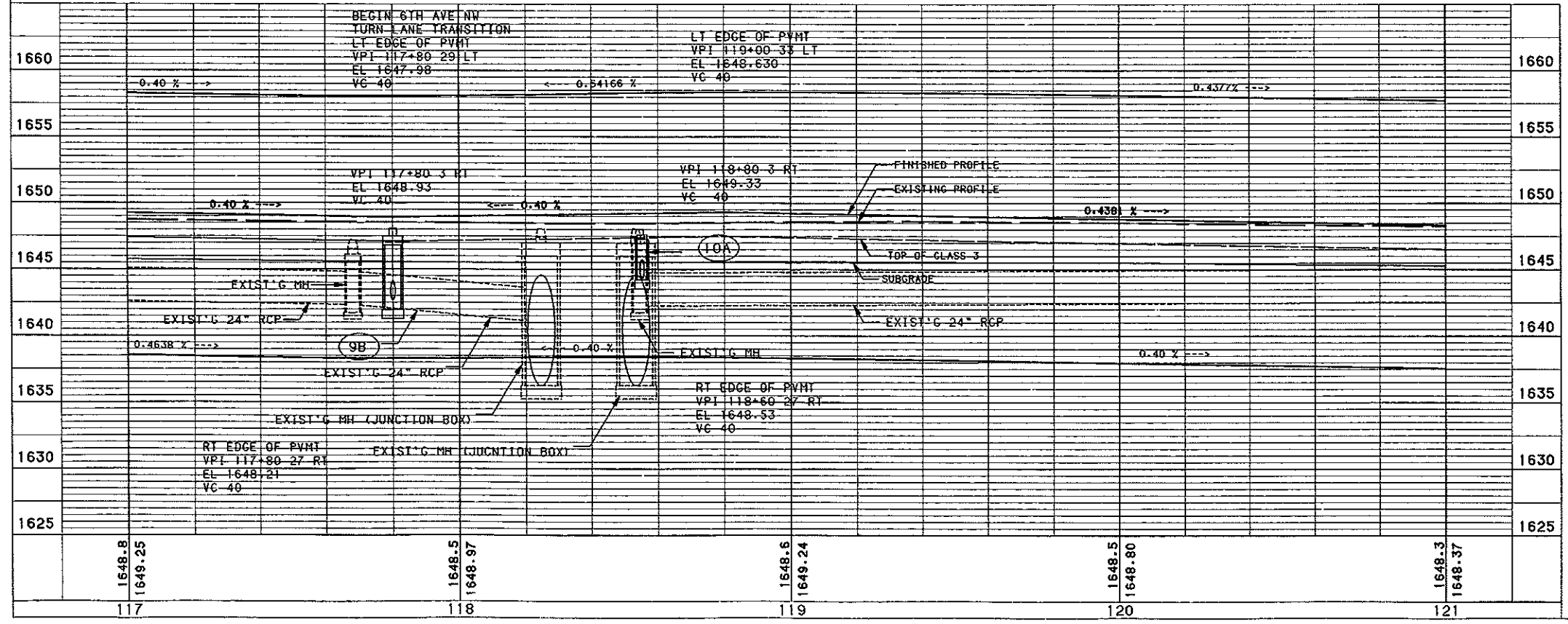
PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 9A to 9B 58 L.FT.
 10A to 4'x6' RCBC 4 L.FT.

MANHOLE CASTING
 117+68 25 RT 1 EA.
 120+87.17 31.72 RT 1 EA.

INLET - TYPE 2
 9A 1 EA.
 10A 1 EA.

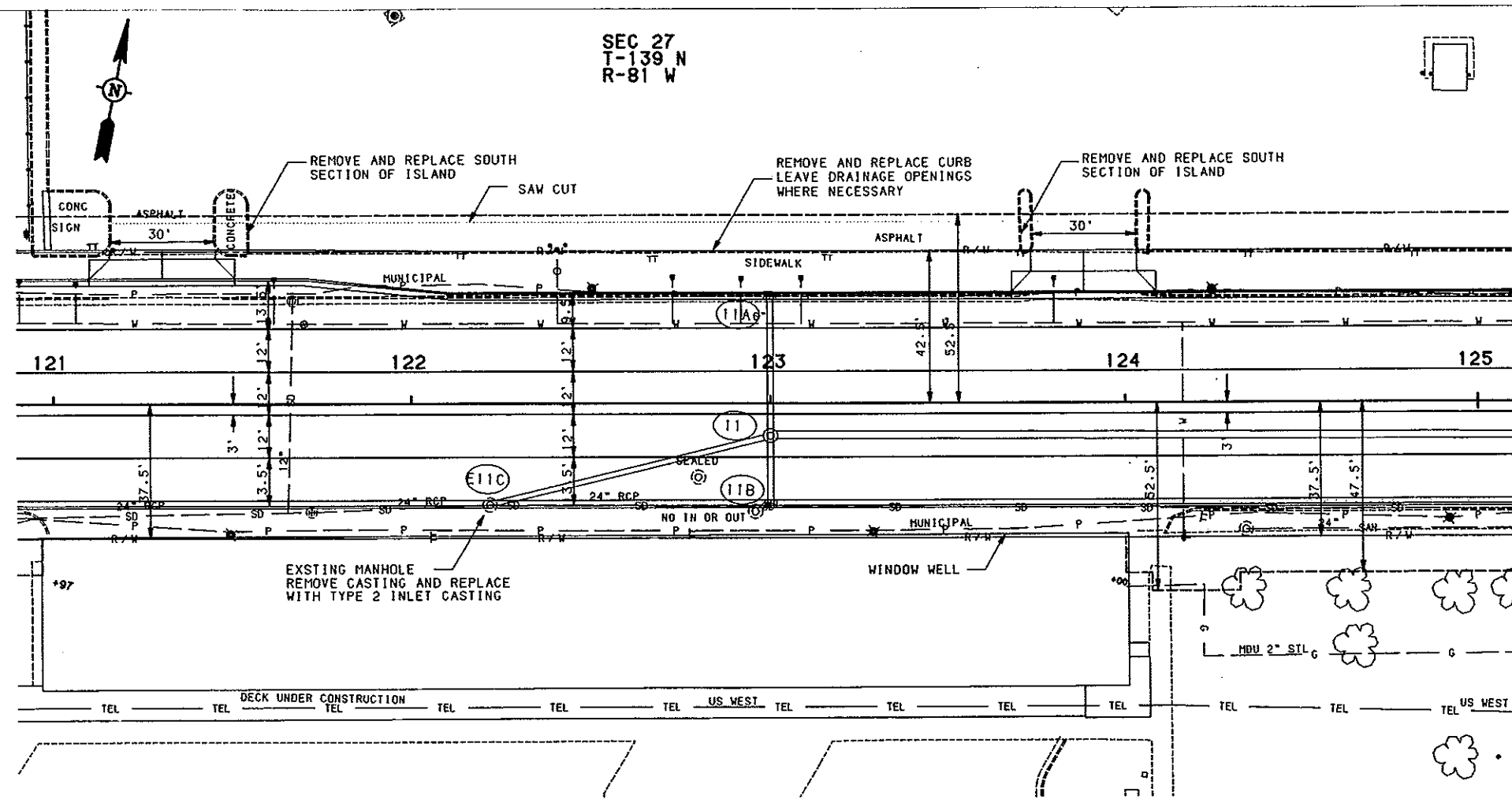
INLET - SPECIAL, TYPE 2 - 60 IN.
 9B 1 EA.

ADJUST MANHOLE
 117+17 32.8 RT 1 EA.
 117+68 25 RT 1 EA.
 118+54.4 40 RT 1 EA.
 118+53 CL 1 EA.
 118+25 CL 1 EA.
 120+87.17 31.72 RT * 2 EA.
 *(FIRST ADJUST USING INLET CASTING, SECOND ADJUST USING MANHOLE CASTING)



BENCH MARKS			
			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
C	TOP OF FH	118+05 - 145' LT	1651.48
-	-	-	-
MANDAN-WEST MAIN STREET STA. 117+00 TO 121+00			
FILE#	PP117-121.GRF		
 SCALE IN FEET			

SEC 27
T-139 N
R-81 W



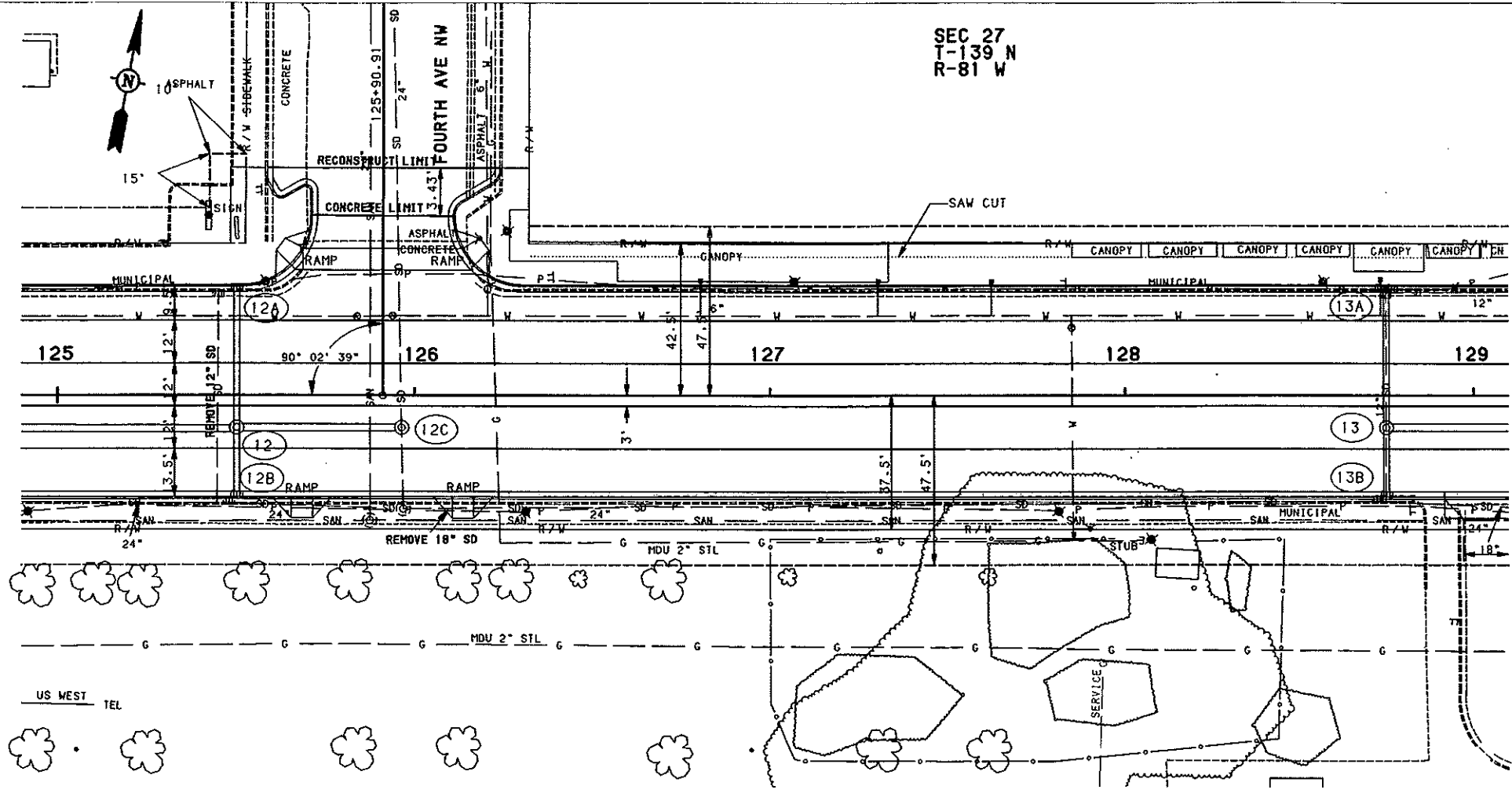
- REMOVAL OF CONCRETE
 - North 566 SY.
 - South 48 SY.
- SAW CONCRETE
 - N. businesses parking islands 14 L.FT.
- REMOVE AND SALVAGE BITUMINOUS SURFACING
 - N businesses est. at 4" thick 44 TONS
- REMOVAL OF CURB
 - N businesses 121+55 to 123+70 215 L.FT.
- REMOVAL OF CURB AND GUTTER
 - North 400 L.FT.
 - South 90 L.FT.
- SAW BITUMINOUS SURFACING (FULL DEPTH)
 - N businesses 275 L.FT.
- REMOVAL OF MANHOLES
 - 122+80 20 RT 1 EA.
 - 122+96 30 RT 1 EA.
- REMOVAL OF INLETS
 - 121+67 28.5 LT 1 EA.
 - 121+72 30 RT 1 EA.
- REMOVAL OF CONCRETE PAVEMENT
 - 121+00 to 125+00 2766 SY.
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 - (11A) to (11) 38 L.FT.
 - (11B) to (11) 18 L.FT.
- PIPE, CONC. REINF. 24 IN. CLASS-3 STORM DRAIN
 - (E11C) to (11) 74 L.FT.
- PIPE, CONC. REINF. ARCH 29 IN. x 18 IN. CLASS-3 SD.
 - (11) to (12) 248 L.FT.
- MANHOLE 60 IN.
 - (11) 1 EA.
- MANHOLE RISER 60 IN.
 - (11) 4.0 FT.
- CASTING, INLET, TYPE 2
 - (E11C) 1 EA.
- INLET - TYPE 2
 - (11A) 1 EA.
 - (11B) 1 EA.
- ADJUST MANHOLE
 - (E11C) 1 EA.
 - 124+34 35.3 RT 1 EA.

1655	0.355 %	0.40 %	PARALLEL LT EDGE OF PVMT = 0.544' FROM CROWN PROFILE	1655
1650	LT EDGE OF PVMT 121+70 33 LT EL 1647.448	LT EDGE OF PVMT 122+10 29 T EL 1647.306	LT EDGE OF PVMT VPI 123+00 29 T EL 1646.946 VC 40	1650
1645	0.4381 %	0.40 %	VPI 123+00 3 RT EL 1647.49 VC 40	1645
1640	EXIST'G 24" RCP	EXIST'G 24" RCP	EXIST'G 24" RCP	1640
1635	0.40 %	0.40 %	RT EDGE OF PVMT VPI 123+00 27 RT EL 1646.77 VC 40	1635
1630			PARALLEL RT EDGE OF PVMT = 0.720' FROM CROWN PROFILE	1630
1625				1625
1620				1620
1648.3	1648.37	1648.1	1648.0	1647.3
121	122	123	124	125

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
B	TOP OF FH	122+40 - 42' LT	1650.57
MANDAN-WEST MAIN STREET STA. 121+00 TO 125+00			
FILE:	PP121-125-GRF		

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	46

SEC 27
T-139 N
R-81 W



REMOVAL OF CONCRETE
 NW quadrant 106 SY.
 NE quadrant 418 SY.
 South 267 SY.
 4th ave NW tie-in 112.9 SY.*
 *(may include areas with asphalt overlay)

SAW CONCRETE
 temp. access to N businesses 280 L.FT.
 4th ave NW curb and gutter 4 L.FT.

REMOVAL OF CURB AND GUTTER
 NW quadrant 90 L.FT.
 NE quadrant 320 L.FT.
 South 400 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 4th ave tie-in 60 L.FT.

REMOVAL OF MANHOLES
 125+96.74 31.79 RT 1 EA.

REMOVAL OF INLETS
 125+46 28 LT 1 EA.
 125+47.86 30.23 RT 1 EA.
 128+72.26 29.66 RT 1 EA.
 128+74.5 28 LT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 125+00 to 129+00 2568 SY.

PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 (12A) to (12) 38 L.FT.
 (12B) to (12) 18 L.FT.
 (13A) to (13) 38 L.FT.
 (13B) to (13) 18 L.FT.

PIPE, CONC. REINF. ARCH 29 IN. x 18 IN. CLASS-3 SD.
 (12) to (12C) 44 L.FT.

MANHOLE 48 IN.
 (13) 1 EA.

MANHOLE 60 IN.
 (12) 1 EA.
 (12C) 1 EA.

MANHOLE RISER 48 IN.
 (13) 4.31 FT.

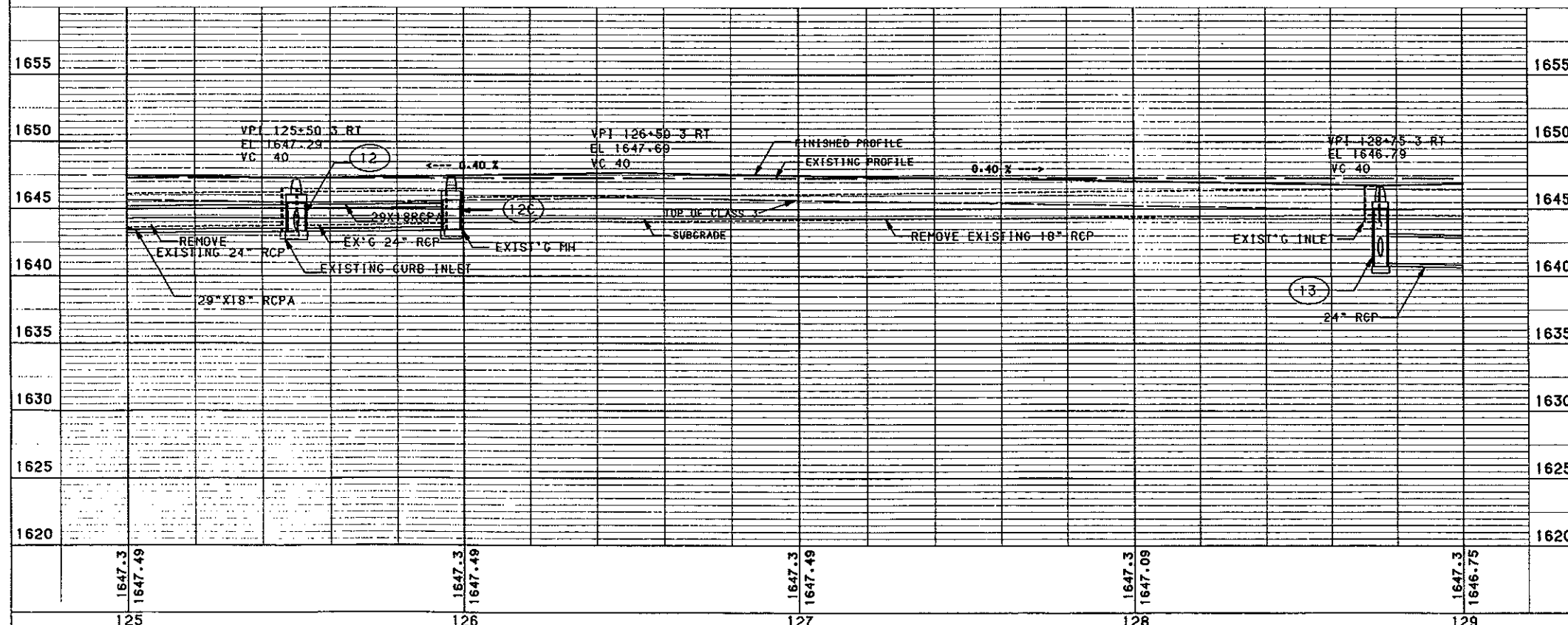
MANHOLE RISER 60 IN.
 (12) 4.0 FT.
 (12C) 4.0 FT.

INLET - TYPE 2
 (12A) 1 EA.
 (12B) 1 EA.
 (13B) 1 EA.

INLET - TYPE 2, DOUBLE
 (13A) 1 EA.

ADJUST INLET
 125+47.86 30.23 RT 1 EA.
 128+72.26 29.66 RT 1 EA.

ADJUST MANHOLE
 125+87 35.3 RT 1 EA.
 125+96.74 31.79 RT 1 EA.

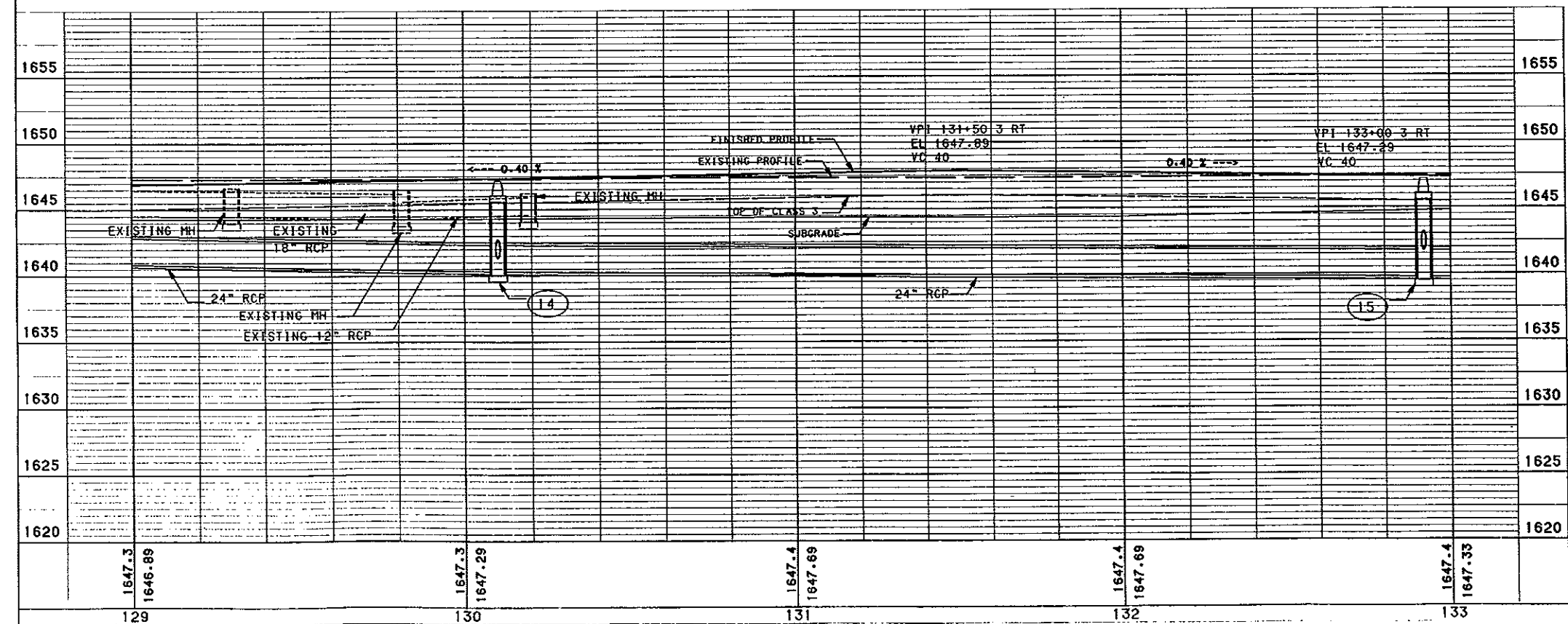
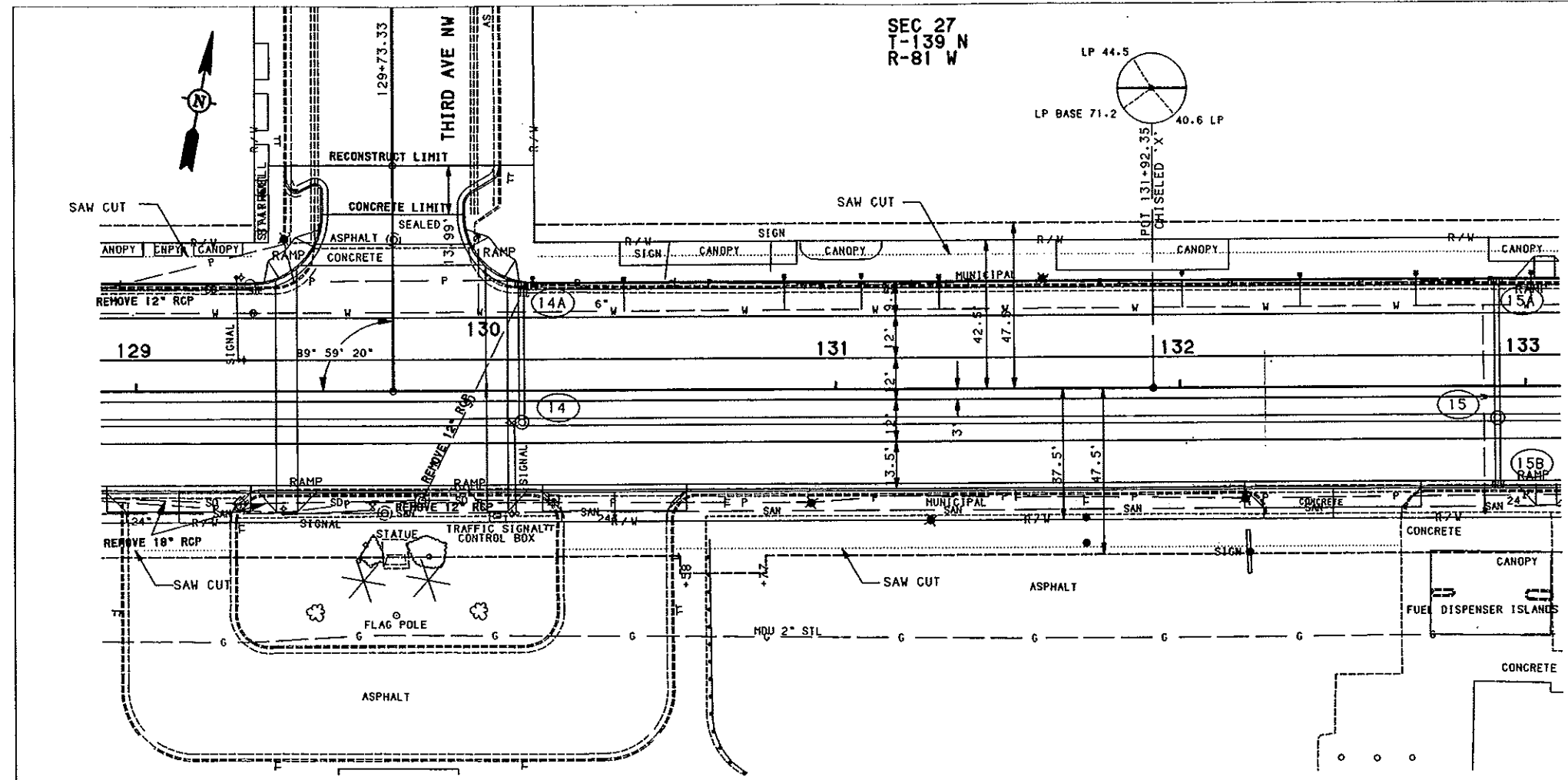


BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
A	TOP OF FH	127+90 - 37' RT	1649.77
-	-	-	-

MANDAN-WEST MAIN STREET
 STA. 125+00 TO 129+00

FILE: PP125-129.GRF

SCALE IN FEET



REMOVAL OF CONCRETE
 NW quadrant 87 SY.
 NE quadrant 445 SY.
 South 274 SY.
 3rd ave NW tie-in 151.6 SY.*
 *(may include areas with asphalt overlay)

SAW CONCRETE
 temp access to N businesses 350 L.F.T.
 S businesses 40 L.F.T.
 3rd ave NW curb and gutter 4 L.F.T.

REMOVE AND SALVAGE BITUMINOUS SURFACING
 S businesses est. thickness 4" 46 TONS

REMOVAL OF CURB AND GUTTER
 South 400 L.F.T.
 North 430 L.F.T.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 3rd ave NW tie-in 60 L.F.T.

REMOVAL OF MANHOLES
 129+81.41 31.29 RT 1 EA.

REMOVAL OF INLETS
 129+34.28 LT 1 EA.
 129+29.58 32.16 RT 1 EA.
 130+11.29 LT 1 EA.
 130+18.72 31.31 RT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 129+00 to 133+00 2555 SY.

PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 (14A) to (14) 38 L.F.T.
 (15A) to (15) 18 L.F.T.
 (15B) to (15) 18 L.F.T.

PIPE, CONC. REINF. 24 IN. CLASS-3 STORM DRAIN
 (13) to (14) 134 L.F.T.
 (14) to (15) 280 L.F.T.

MANHOLE 48 IN.
 (14) 1 EA.
 (15) 1 EA.

MANHOLE RISER 48 IN.
 (14) 5.21 FT.
 (15) 6.07 FT.

INLET - TYPE 2
 (15A) 1 EA.
 (15B) 1 EA.

INLET - TYPE 2, DOUBLE
 (14A) 1 EA.

ADJUST INLET
 129+29.58 32.16 RT 1 EA.
 130+18.72 31.31 RT 1 EA.

ADJUST MANHOLE
 129+81.41 31.29 RT 1 EA.
 129+74.43 LT 1 EA.*
 *(identify, to be removed if not needed)

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-

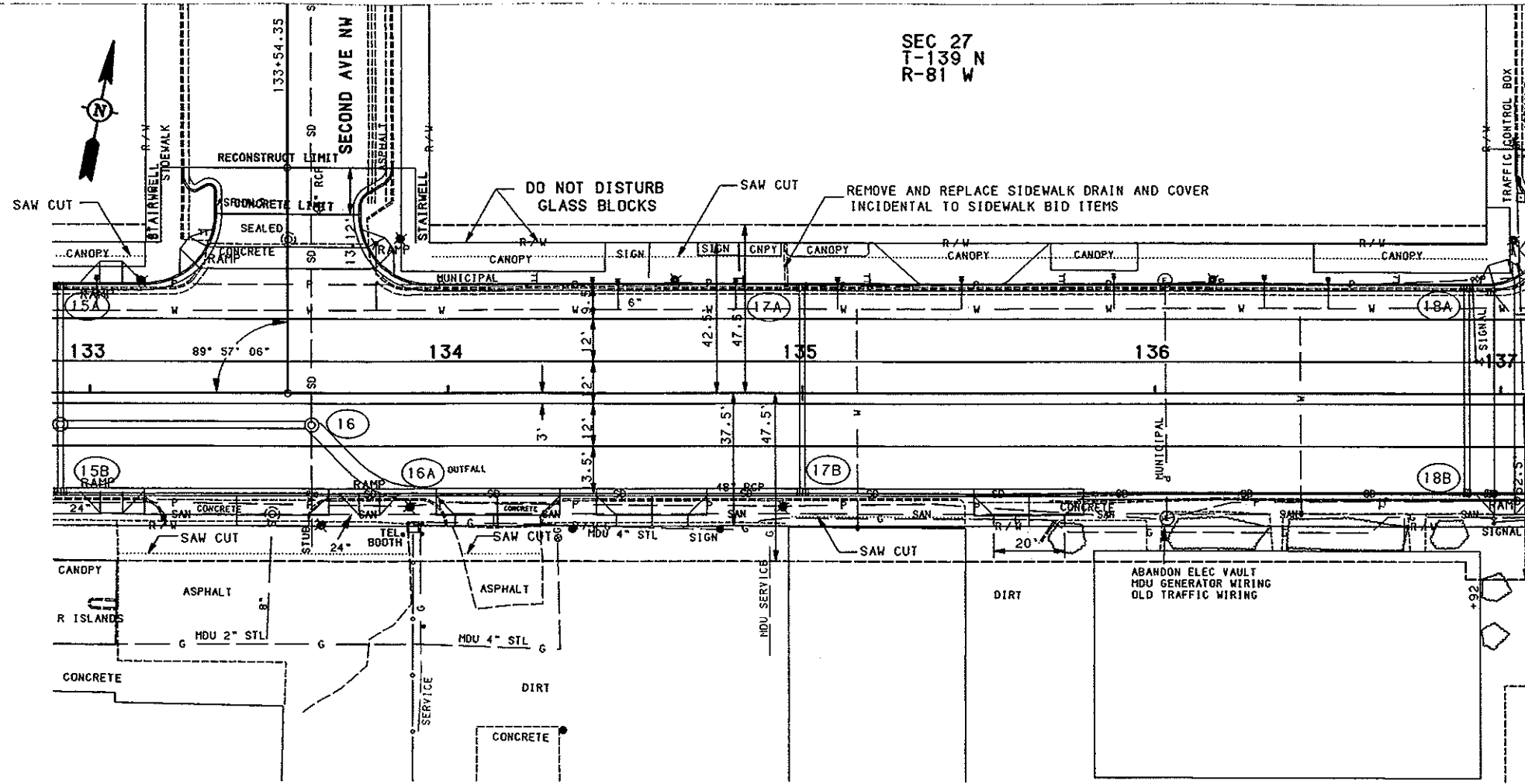
MANDAN-WEST MAIN STREET
 STA. 129+00 TO 133+00

FILE: PP129-133.GRF

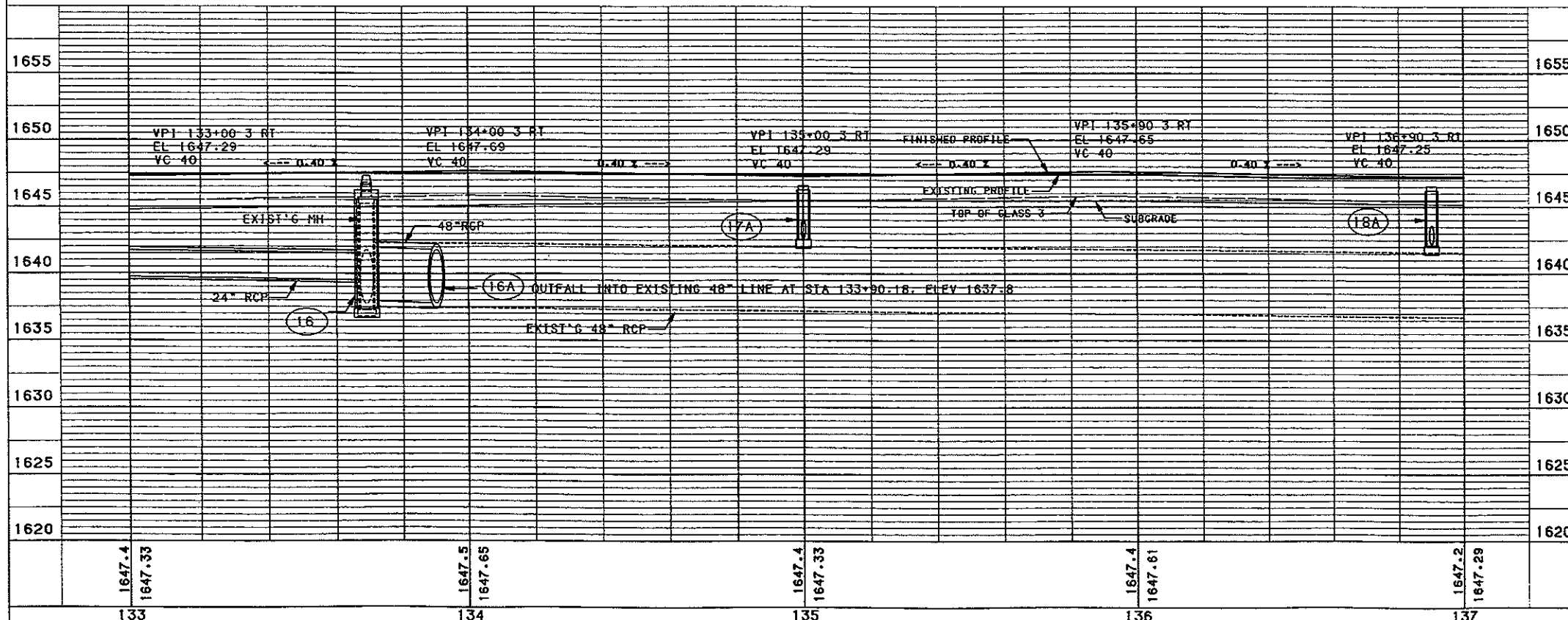
SCALE 1" = 40'

SEC 27
T-139 N
R-81 W

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	48



- REMOVAL OF CONCRETE**
 - NW quadrant 62 SY.
 - NE quadrant 255 SY.
 - South 273 SY.
- SAW CONCRETE**
 - temp. access to N businesses 340 L.FT.
 - temp. access to S businesses 50 L.FT.
 - 2nd ave NW curb and gutter 4 L.FT.
- REMOVE AND SALVAGE BITUMINOUS SURFACING**
2nd ave NW 28.1 TONS
- REMOVAL OF CURB AND GUTTER**
 - North 440 L.FT.
 - South 400 L.FT.
- SAW BITUMINOUS SURFACING (FULL DEPTH)**
 - 2nd ave. tie-in 55 L.FT.
 - S businesses 80 L.FT.
- REMOVAL OF MANHOLES**
 - 136+03.5 35 RT* 1 EA.
 - 136+03 31.3 LT* 1 EA.
 - *(ELECTRICAL VAULT)
- REMOVAL OF INLETS**
 - 133+61 29 RT 1 EA.
 - 136+96.75 28.66 RT 1 EA.
 - 136+97 29 LT 1 EA.
- REMOVAL OF CONCRETE PAVEMENT**
133+00 to 137+00 2589 SY.
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN**
 - (17A) to (17B) 58 L.FT.
 - (18A) to (18B) 58 L.FT.
- PIPE, CONC. REINF. 24 IN. CLASS-3 STORM DRAIN**
(15) to (16) 66 L.FT.
- PIPE, CONC. REINF. 48 IN. CLASS-3 STORM DRAIN**
(16) to (16A) outfall 16 L.FT.
- PIPE, CONC. REINF. 48 IN. CL-3 SD. 7.5 DEG. BEND**
(16A) outfall connection 6 EA.
- MANHOLE 72 IN.**
(16) 1 EA.
- MANHOLE RISER 72 IN.**
(16) 8.01 FT.
- INLET - TYPE 2**
 - (17A) 1 EA.
 - (18A) 1 EA.
- INLET - SADDLE BASE, TYPE 1**
18B 1 EA.
- INLET - SADDLE BASE, TYPE 2**
(17B) 1 EA.
- ADJUST INLET**
136+96.75 28.66 RT 1 EA.
- ADJUST MANHOLE**
 - 133+50 35 RT 1 EA.
 - 133+55 43 LT. 1 EA.*
 - *(Identify, to be removed if not needed)

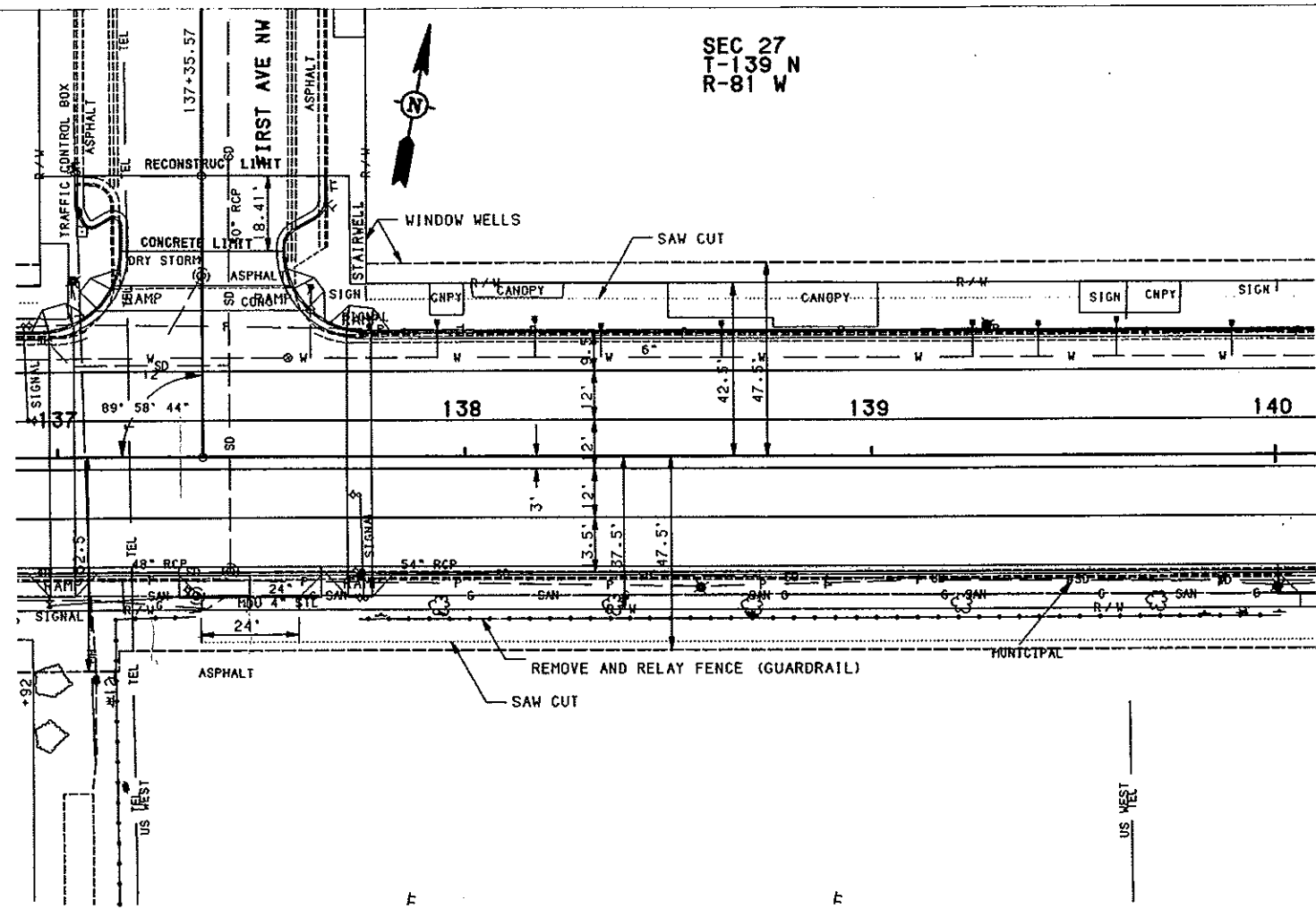


BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
4	TOP OF FH	133+78 - 42' LT	1649.68
-	-	-	-

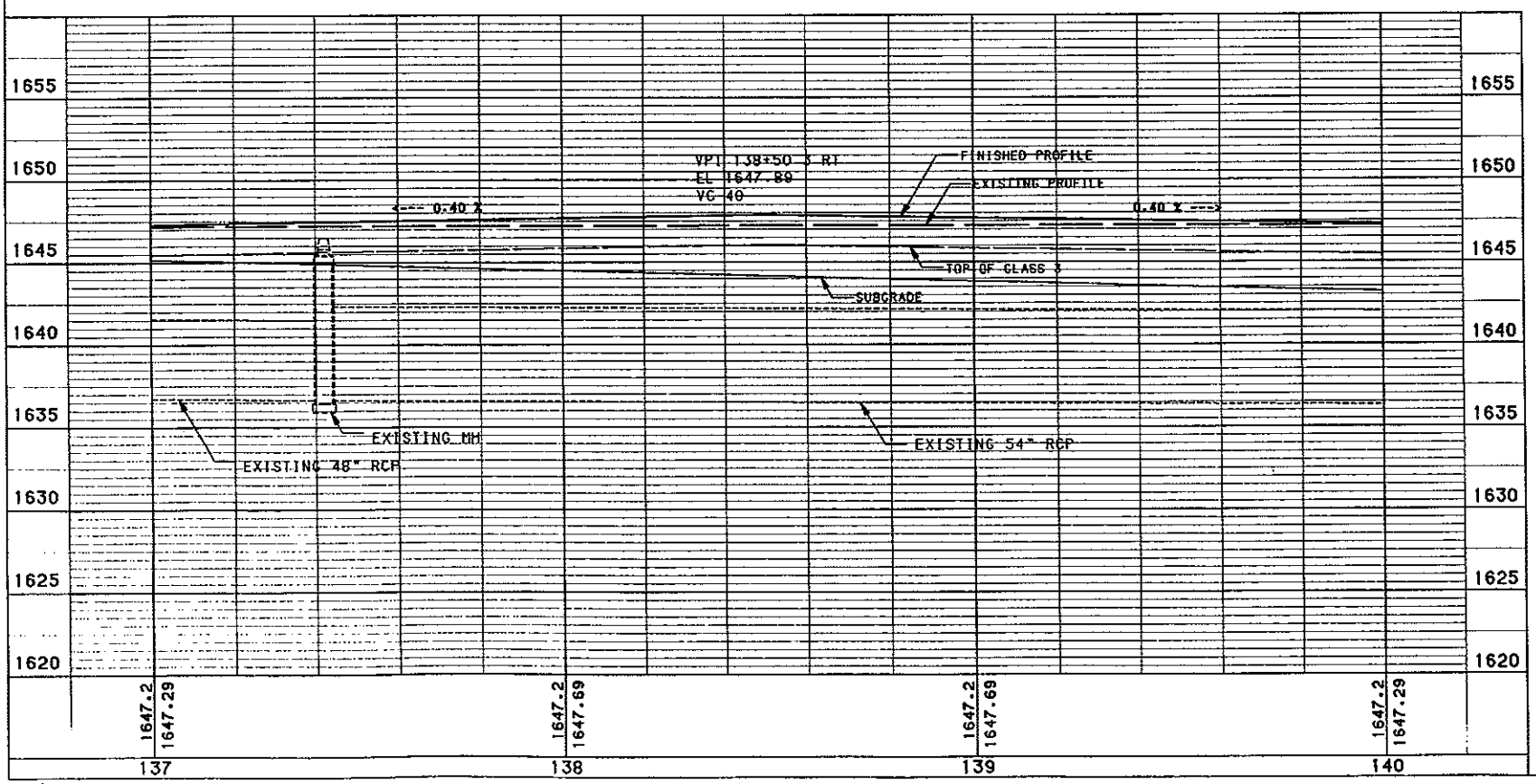
MANDAN-WEST MAIN STREET
STA. 133+00 TO 137+00

FILE: PP133-137.GRF	<p>SCALE IN FEET</p>
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SEC 27
T-139 N
R-81 W



- REMOVAL OF CONCRETE**
 - NW quadrant 62 SY.
 - NE quadrant 255 SY.
 - South 273 SY.
 - FENCE REMOVE AND RESET**
 - 137+74 to 140+01 RT 227 L.F.T.
 - SAW CONCRETE**
 - temp access to N businesses 340 L.F.T.
 - 2nd. ave NW curb and gutter 4 L.F.T.
 - REMOVE AND SALVAGE BITUMINOUS SURFACING**
 - 2nd. ave NW est. at 4" 28.1 TONS
 - S businesses parking est at 4" 54 TONS
 - REMOVAL OF CURB AND GUTTER**
 - South 300 L.F.T.
 - North 350 L.F.T.
 - SAW BITUMINOUS SURFACING (FULL DEPTH)**
 - 1st ave tie in 60 L.F.T.
 - S businesses 290 L.F.T.
 - REMOVAL OF CONCRETE PAVEMENT**
 - 137+00 to 140+00 2489 SY.
 - 1st ave NW 74 SY.
 - ADJUST MANHOLE**
 - 137+34 34.4 RT 1 EA.
 - 137+35 44 LT 1 EA.*
 - 137+42 28 RT 1 EA.
- * (identify, to be removed if not needed)



BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
5	TOP OF FH	137+62 - 42' LT	1650.02
-	-	-	-

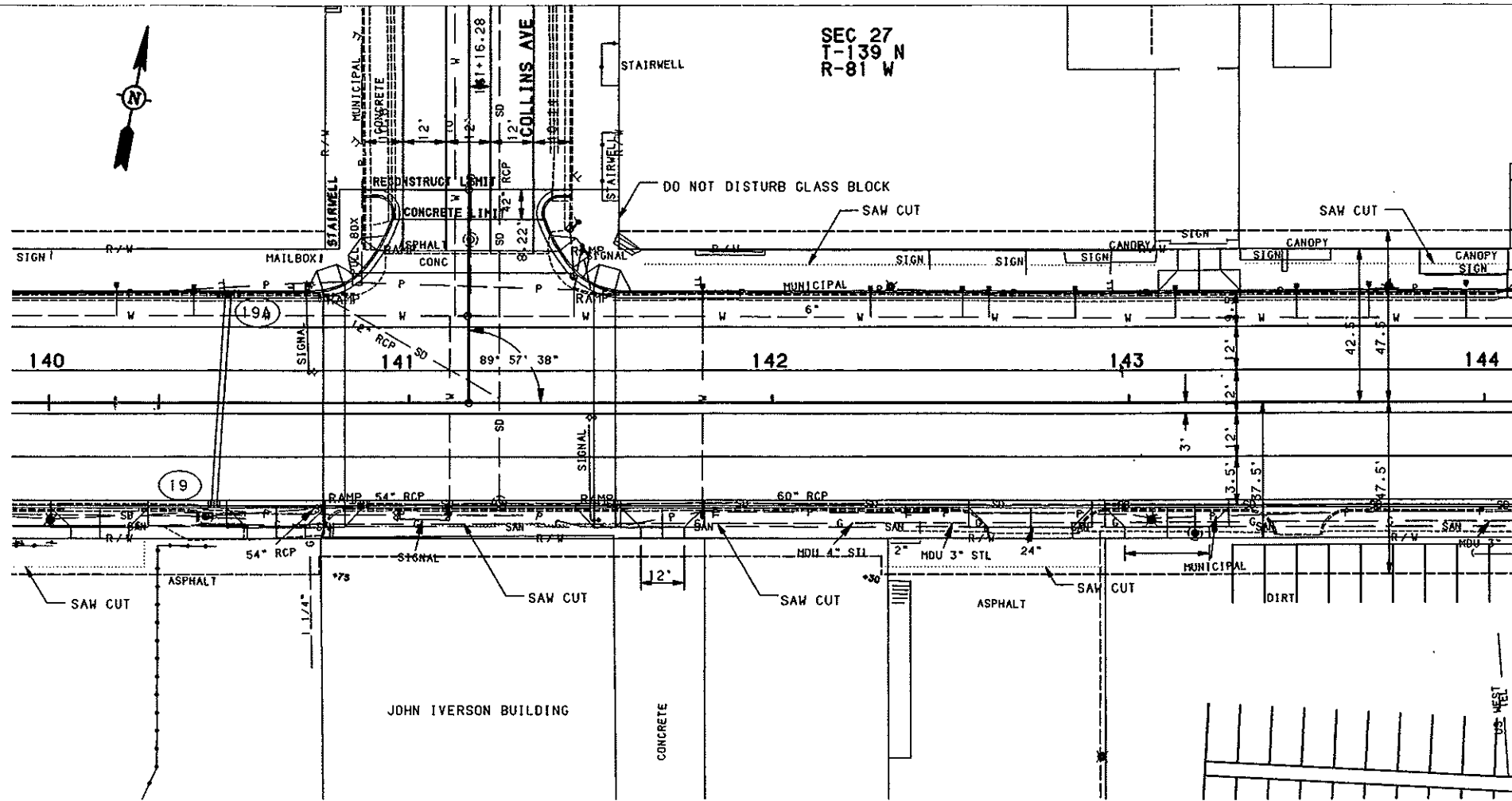
MANDAN-WEST MAIN STREET
STA. 137+00 TO 140+00

FILE: PP137-140.GRF

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	50

SEC 27
T-139 N
R-81 W



REMOVAL OF CONCRETE
 NW quadrant 148 SY.
 NE quadrant 334 SY.
 South 280 SY.

SAW CONCRETE
 temp access to N businesses 240 L.FT.
 temp access to S businesses 130 L.FT.
 Collins curb and gutter 4 L.FT.
 S businesses 130 L.FT.

REMOVE AND SALVAGE BITUMINOUS SURFACING
 S businesses 54 TONS

REMOVAL OF CURB AND GUTTER
 North 400 L.FT.
 South 410 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 S. businesses 200 L.FT.
 Collins tie-in 55 L.FT.

REMOVAL OF INLETS
 140+44 32 RT 1 EA.
 140+76 29 LT 1 EA.
 140+87.32 28.39 RT 1 EA.
 143+19 36 RT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 140+00 to 144+00 2489 SY.
 Collins ave. 64 SY.

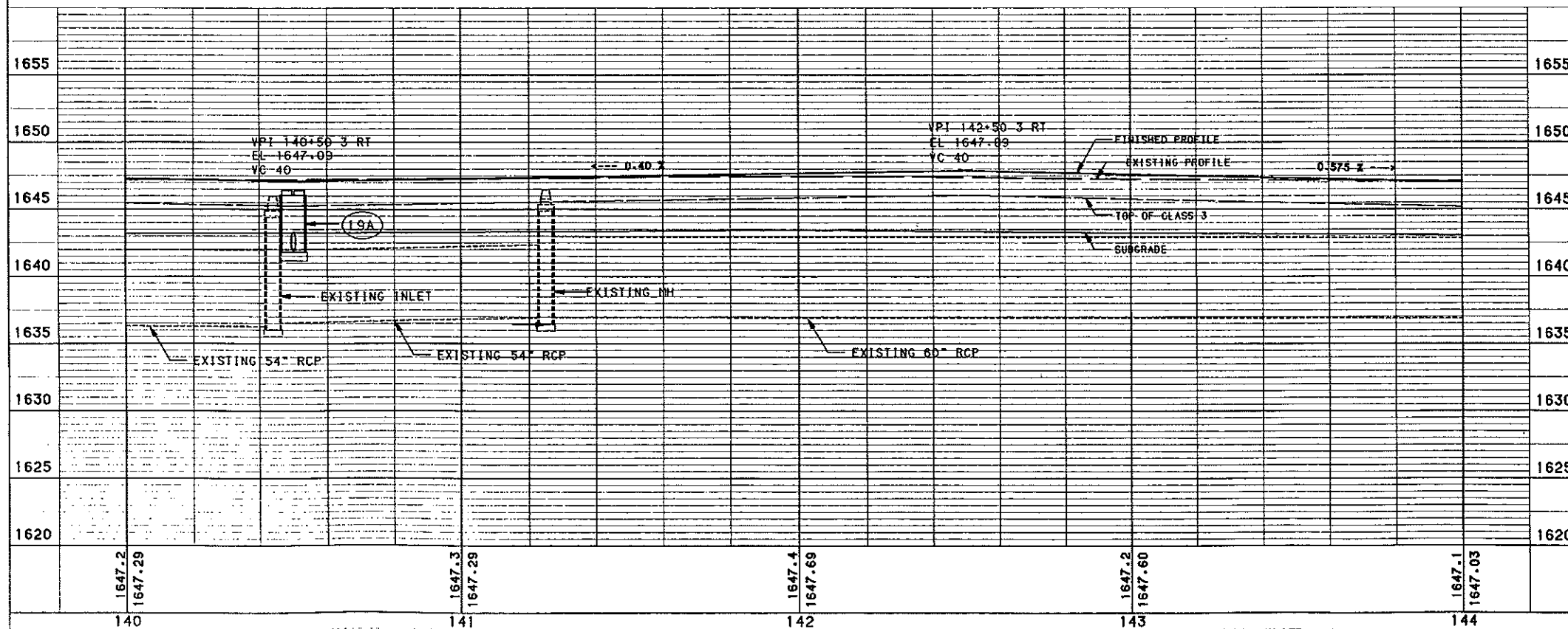
PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 (19A) to (19) 58 L.FT.

MANHOLE 84 IN.
 (19) 1 EA.

MANHOLE RISER 84 IN.
 (19) 9.40 FT.

INLET - TYPE 2, DOUBLE
 (19A) 1 EA.

ADJUST MANHOLE
 141+17 42 LT 1 EA.*
 141+25 28 RT 1 EA.
 *(identify, to be removed if not needed)



BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
6	TOP OF FH	141+47 - 50' LT	1649.71
-	-	-	-

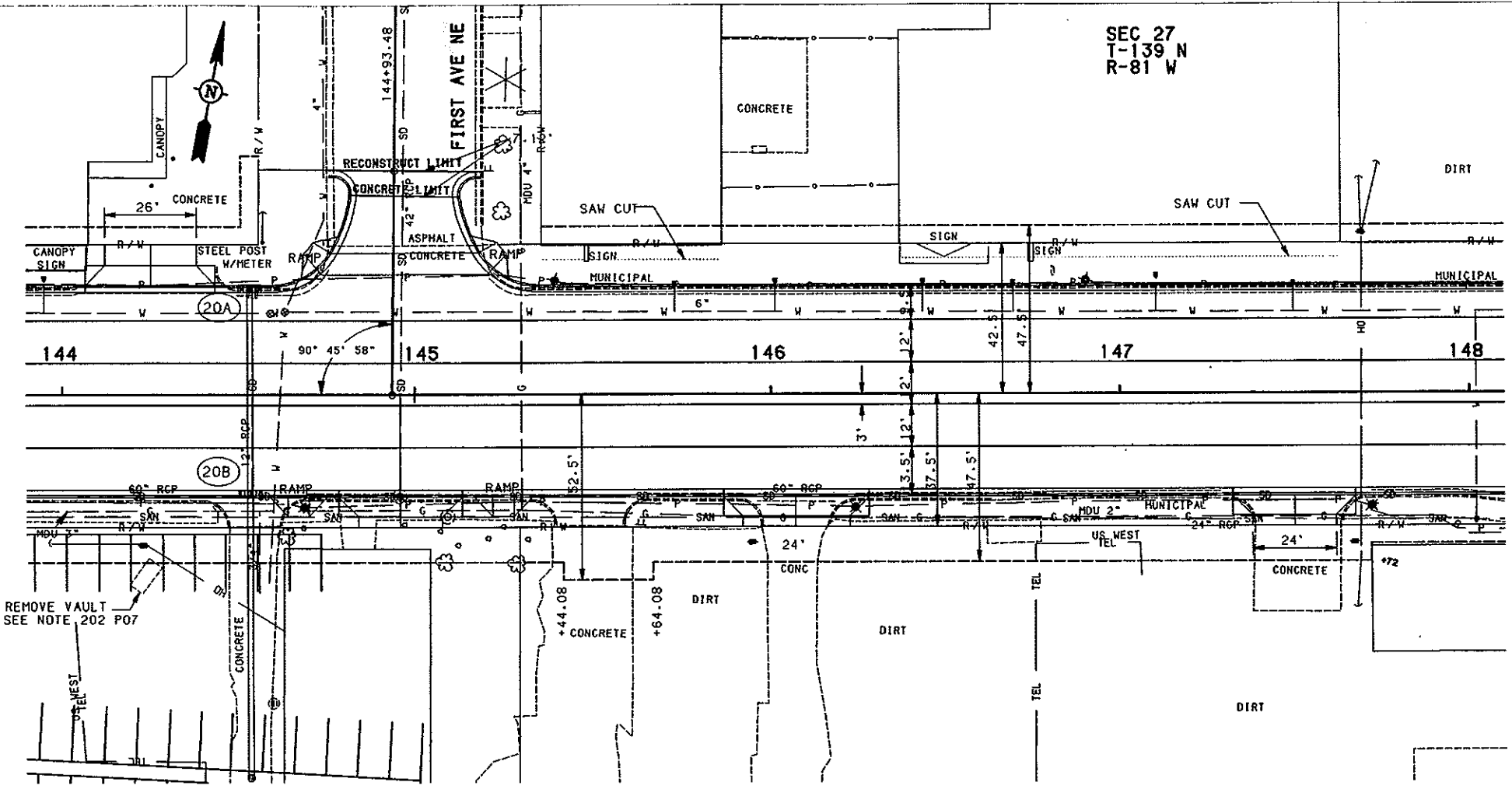
MANDAN-WEST MAIN STREET
 STA. 140+00 TO 144+00

FILE: PP140-144.GRF

SCALE 1" = 40'

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	51

SEC 27
T-139 N
R-81 W



REMOVAL OF CONCRETE
 NW quadrant 145 SY.
 NE quadrant 382 SY.
 South 334 SY.
 1st ave NE tie-in 99.1 SY.*
 *(may include areas with asphalt overlay)

SAW CONCRETE
 temp access to N businesses 170 L.FT.
 N businesses 65 L.FT.
 S. businesses 35 L.FT.
 1st NE curb and gutter 4 L.FT.

REMOVAL OF CURB AND GUTTER
 North 430 L.FT.
 South 400 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 1st ave NE 40 L.FT.

REMOVAL OF INLETS
 144+54 28.5 LT 1 EA.
 144+71.43 29.41 RT 1 EA.
 144+59.61 87.47 RT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 144+00 to 148+00 2489 SY.
 1st ave NE 71 SY.

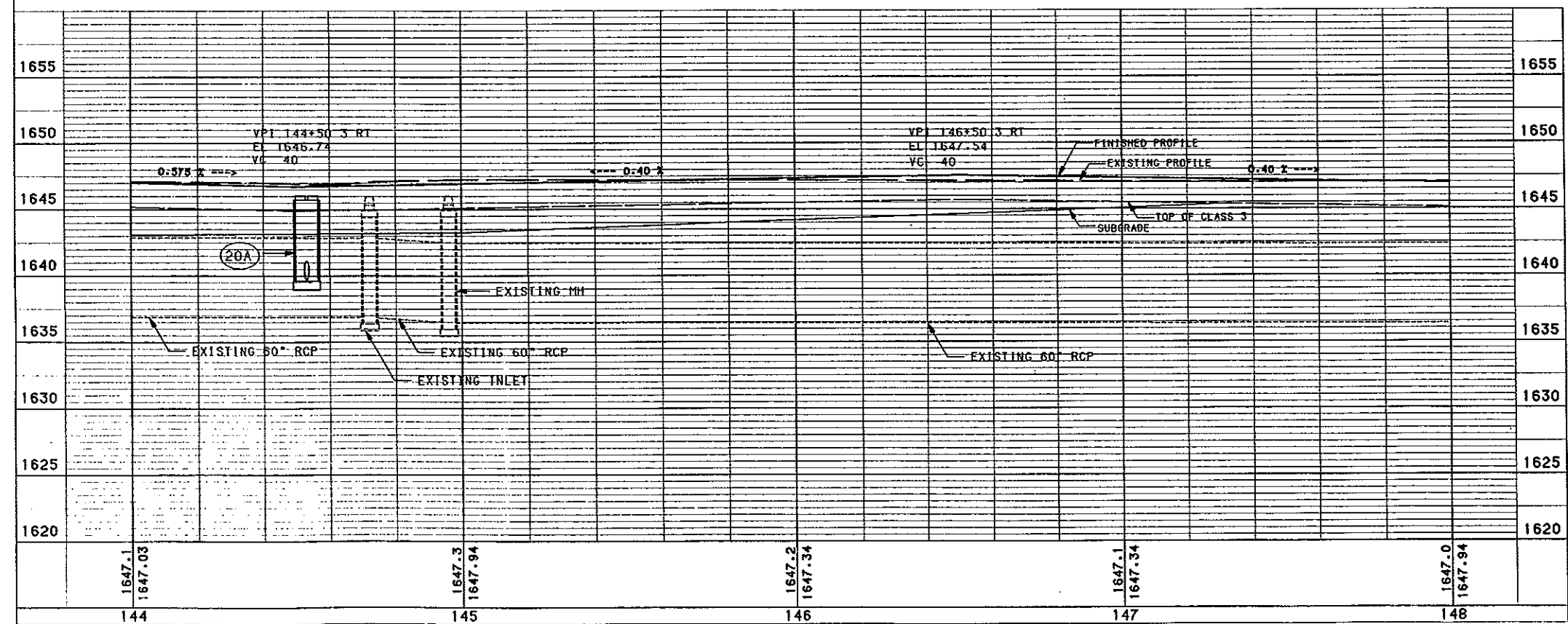
PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 20A to 20B 56 L.FT.

INLET - TYPE 2. DOUBLE
 20A 1 EA.

INLET - SADDLE BASE, TYPE 2 DOUBLE
 20B 1 EA.

ADJUST INLET
 144+71.43 79.41 RT 1 EA.

ADJUST MANHOLE
 144+96 28.5 RT 1 EA.
 145+09 34.7 RT 1 EA.

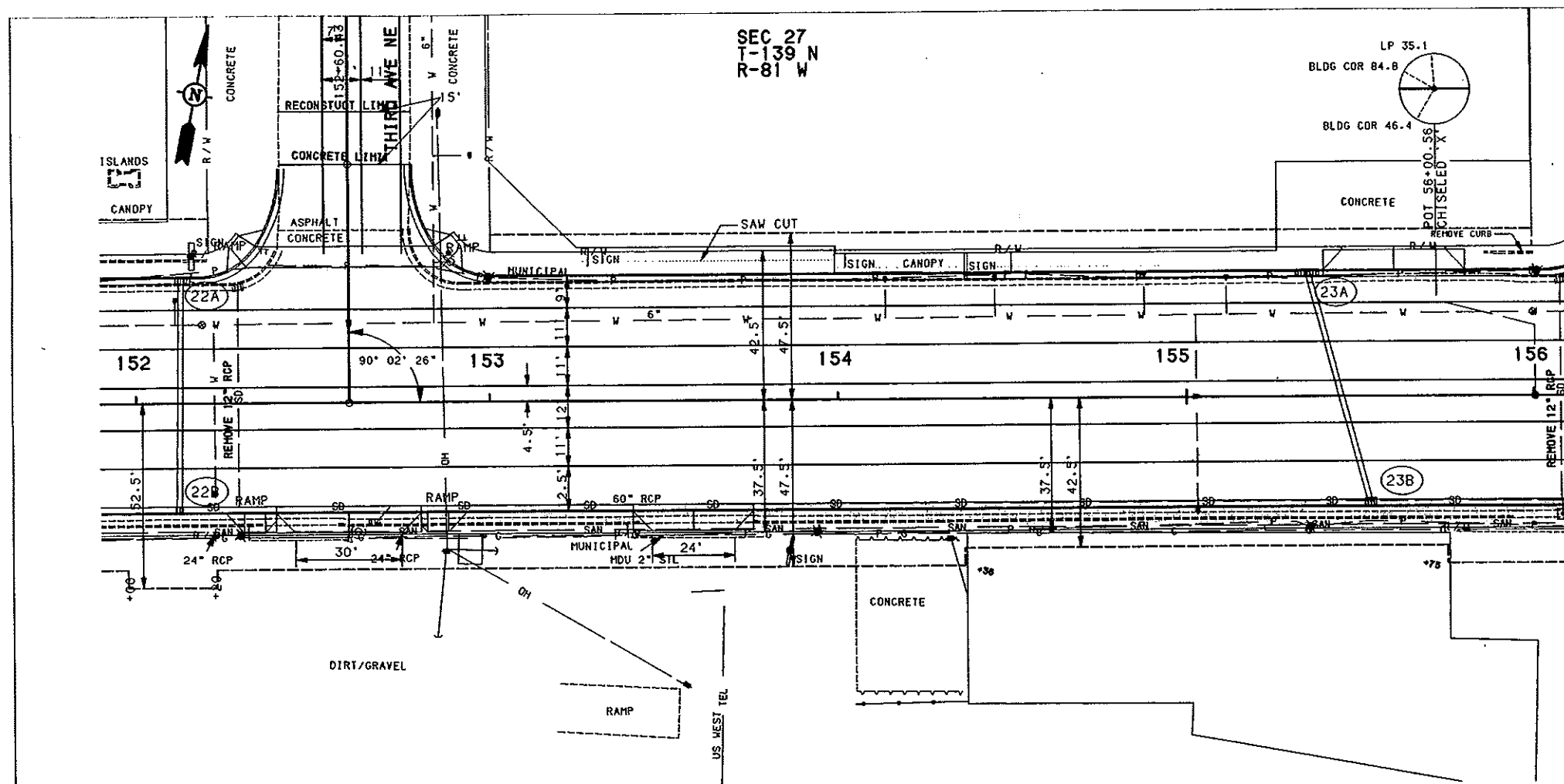


BENCH MARKS			
NO.	DESCRIPTION	LOCATION	NGVD-29 ELEV.
-	-	-	-
-	-	-	-

MANDAN-WEST MAIN
STA. 144+00 TO 148+00

FILE: PP144-148.GRF

SCALE IN FEET



REMOVAL OF CONCRETE
 NW quadrant 42 SY.
 NE quadrant 375 SY.
 South 32 SY.
 3rd ave Ne tie-in 139.8 SY.*
 *(may include areas with asphalt overlay)

SAW CONCRETE
 temp access to N. businesses 220 L.FT.
 N. businesses 70 L.FT.
 3rd ave NE curb and gutter 4 L.FT.

REMOVAL OF CURB
 N businesses 15 L.FT.

REMOVAL OF CURB AND GUTTER
 North 450 L.FT.
 South 400 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)
 3rd ave NE tie-in 35 L.FT.

REMOVAL OF INLETS
 152+29 32.5 LT 1 EA.
 152+67.5 34 RT 1 EA.

REMOVAL OF CONCRETE PAVEMENT
 152+00 to 156+00 2889 SY.
 3rd ave NE 71 SY.

PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
 22A to 22B 66 L.FT.
 23A to 23B 66 L.FT.

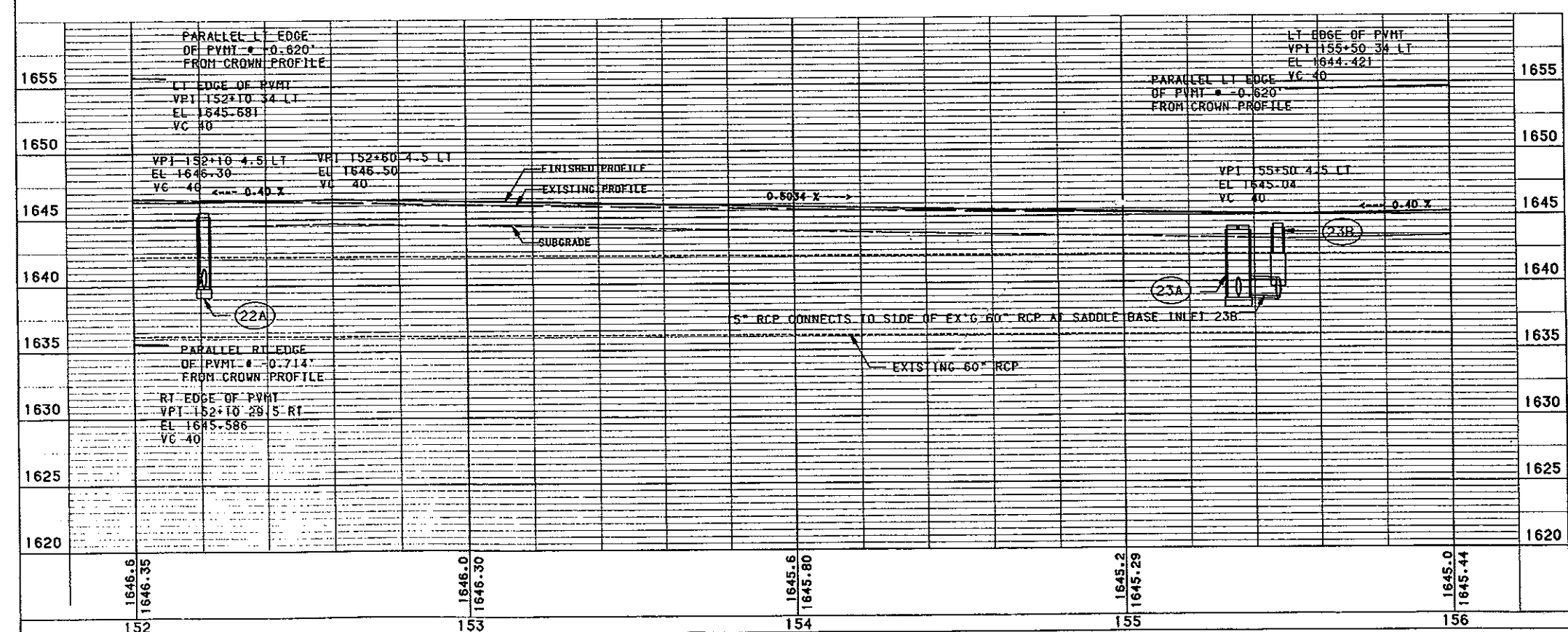
INLET - TYPE 2
 22A 1 EA.

INLET - TYPE 2, DOUBLE
 23A 1 EA.

INLET - SADDLE BASE, TYPE 1
 22B 1 EA.

INLET - SADDLE BASE, TYPE 2
 23B 1 EA.

ADJUST MANHOLE
 152+63 36.4 RT 1 EA.



BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-

MANDAN-WEST MAIN STREET
 STA. 152+00 TO 156+00

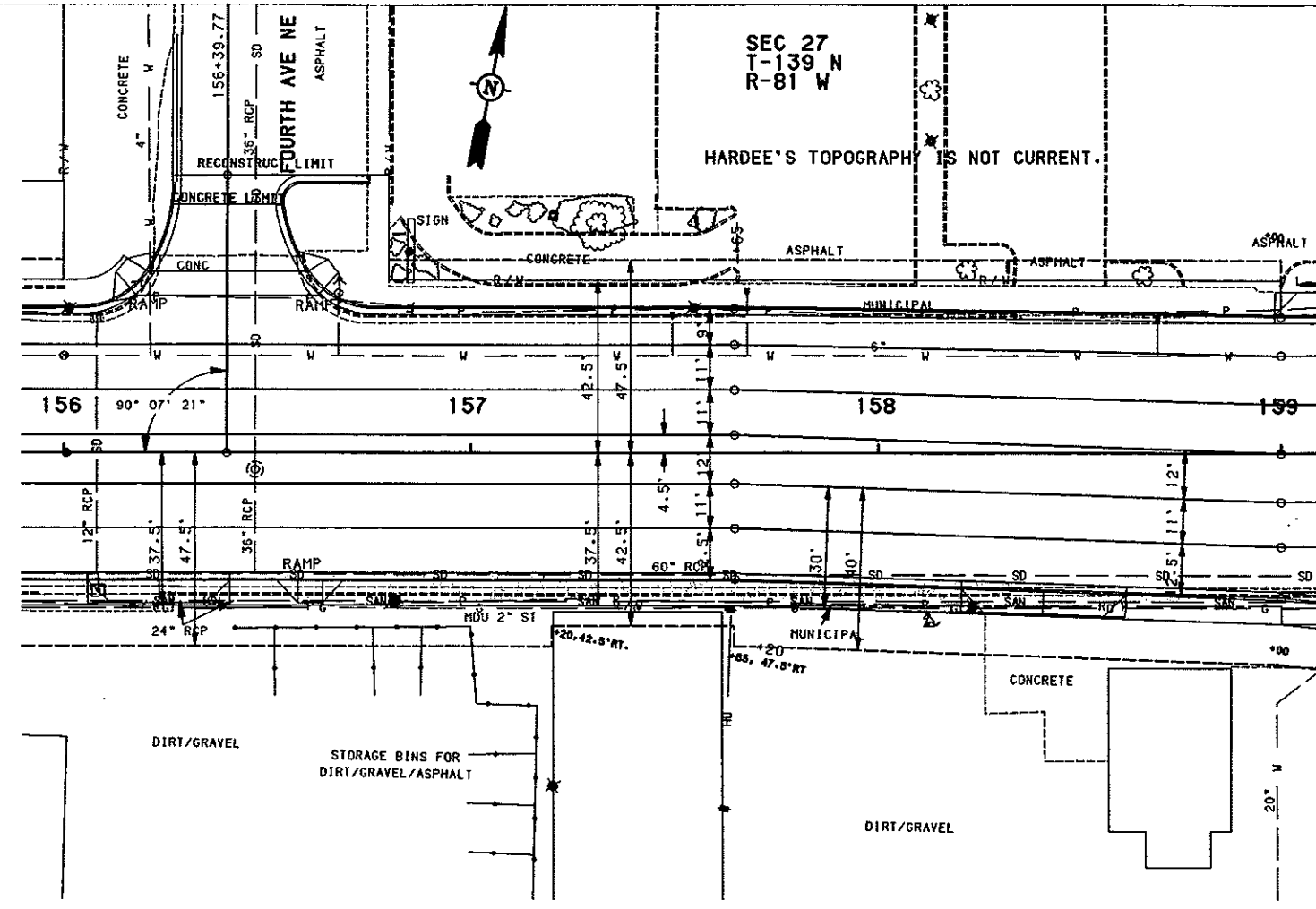
FILE: PP152-156.GRF

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	54

SEC 27
T-139 N
R-81 W

HARDEE'S TOPOGRAPHY IS NOT CURRENT.



REMOVAL OF CONCRETE

NW quadrant	42 SY.
NE quadrant	375 SY.
South	32 SY.

SAW CONCRETE

S businesses	70 L.FT.
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REMOVE AND SALVAGE BITUMINOUS SURFACING

4th ave NE	25.7 TONS
------------	-----------

REMOVAL OF CURB AND GUTTER

North	430 L.FT.
South	400 L.FT.

SAW BITUMINOUS SURFACING (FULL DEPTH)

4th ave NE tie-in	50 L.FT.
-------------------	----------

REMOVAL OF INLETS

156+08 34 RT	1 EA.
156+08 33 LT	1 EA.

REMOVAL OF CONCRETE PAVEMENT

156+00 to 159+00	2889 SY.
4th ave NE	61 SY.

ADJUST MANHOLE

156+36.10 36.45 RT	1 EA.
156+46.79 4.12 RT	1 EA.

1655				LT EDGE OF PVMT VPI 157+00 34 LT EL 1645.10 VC 40	BEGIN TRANSITION 157+65 34 LT EL 1644.84 0.40 %	MATCH EXISTING LT EDGE OF PVMT VPI 159+00 31 LT EL 1644.30	1655
1650							1650
1645				VPI 157+00 4.5 LT EL 1645.54 VC 40	157+65 4.5 LT EL 1645.367	VPI 159+00 SURVEY EL 1644.80	1645
1640							1640
1635				RT EDGE OF PVMT VPI 157+00 29.5 RT EL 1644.926 VC 40	RT EDGE OF PVMT VPI 157+65 29.5 RT EL 1644.639 VC 40	RT EDGE OF PVMT VPI 159+00 36 RT EL 1644.041	1635
1630				PARALLEL RT EDGE OF PVMT +0.714' FROM CROWN PROFILE	EXISTING 50% RCP		1630
1625							1625
1620							1620
	1645.0 1645.24	1645.1 1645.60	1645.0 1645.22	1644.7 1644.80			
	156	157	158	159			

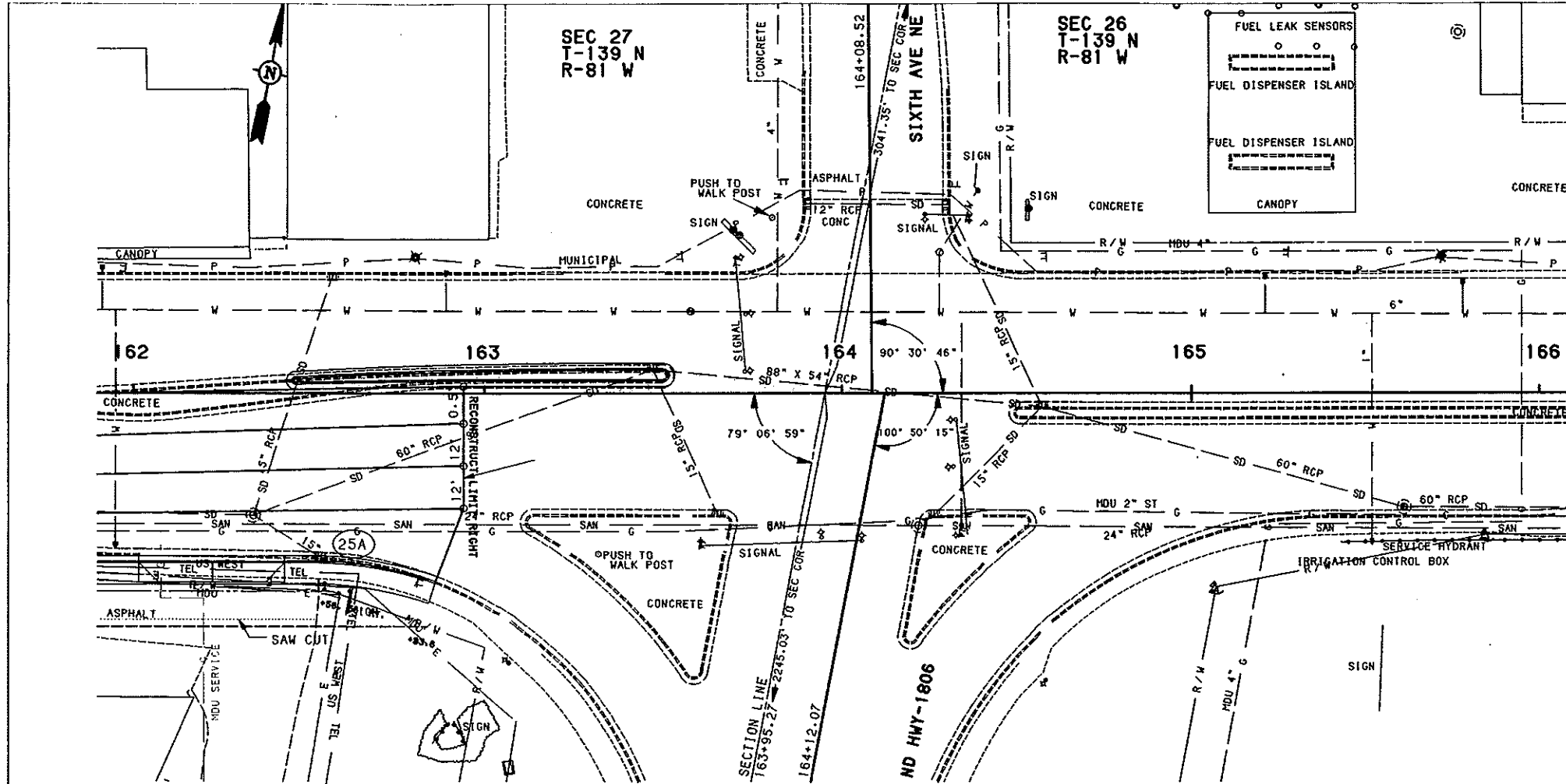
BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
8	TOP OF FH	156+68 - 42' LT	1648.15
-	-	-	-

MANDAN-WEST MAIN STREET
STA. 156+00 TO 159+00

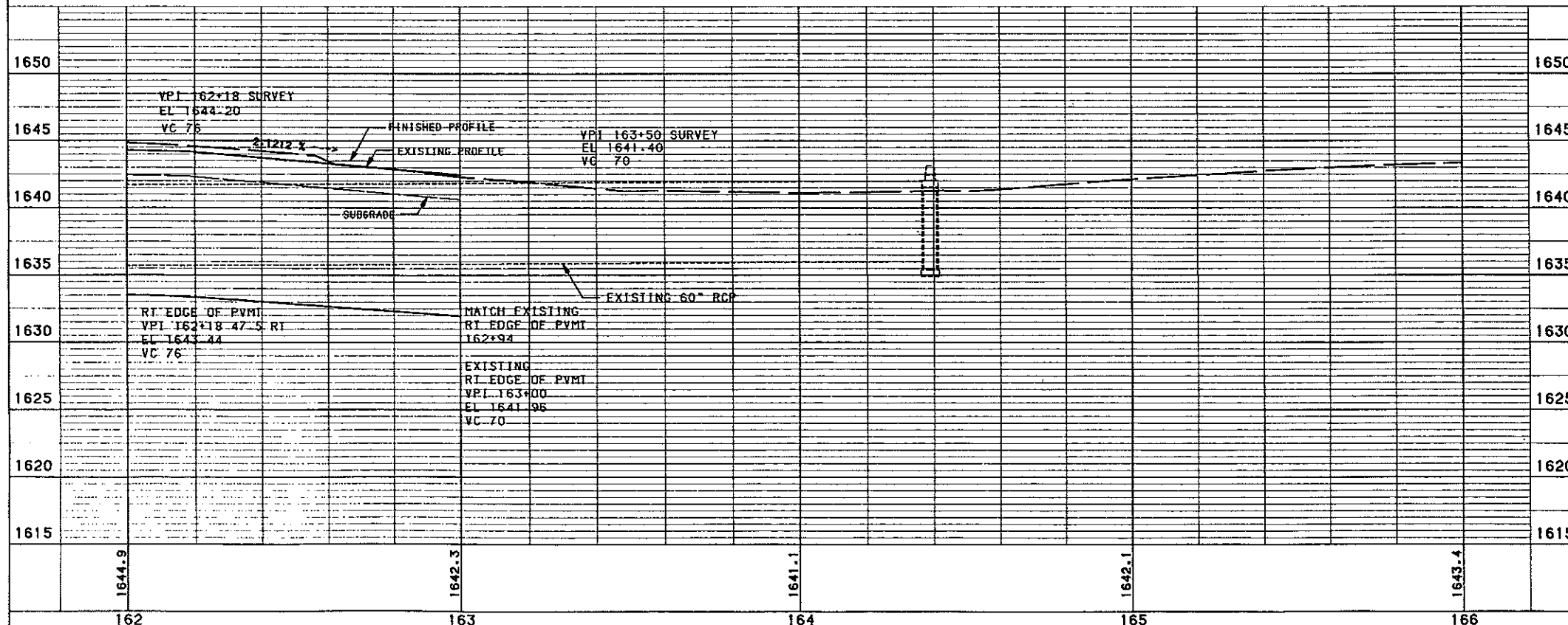
FILE: PP156-159.GRF

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	56



- REMOVAL OF CONCRETE**
- South island section 57 SY.
- island section 66 SY.
- SAW CONCRETE**
- Main St. tie-in 270 L.F.T.
- REMOVE AND SALVAGE BITUMINOUS SURFACING**
- S businesses 6 TONS
- REMOVAL OF CURB AND GUTTER**
- island section 310 L.F.T.
- South 90 L.F.T.
- SAW BITUMINOUS SURFACING (FULL DEPTH)**
- S businesses 60 L.F.T.
- REMOVAL OF INLETS**
- 162+53.06 47.41 RT 1 EA.
- REMOVAL OF CONCRETE PAVEMENT**
- 162+00 to 162+94 449 SY.
- PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN**
- (25A) to existing pipe 4 L.F.T.
- INLET - TYPE 2**
- (25A) 1 EA.
- ADJUST INLET**
- 163+46.96 6.71 LT 2 EA.*
- * (adjusted twice for traffic control)



BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
10	TOP OF FH	164+38 - 56' LT	1646.77
-	-	-	-

MANDAN-MAIN STREET
STA. 162+00 TO 166+00

FILE: PP162-166.GRF	<p>SCALE IN FEET</p>
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SEC 27
T-139 N
R-81 W

PARKING LOT PLAN

QUANTITIES

REMOVAL OF INLETS
144+59.61 87.47 RT 1 EA.

HOT BITUMINOUS PAVEMENT CL. 27
parking lot as shown, depth 3" 606.0 TON.

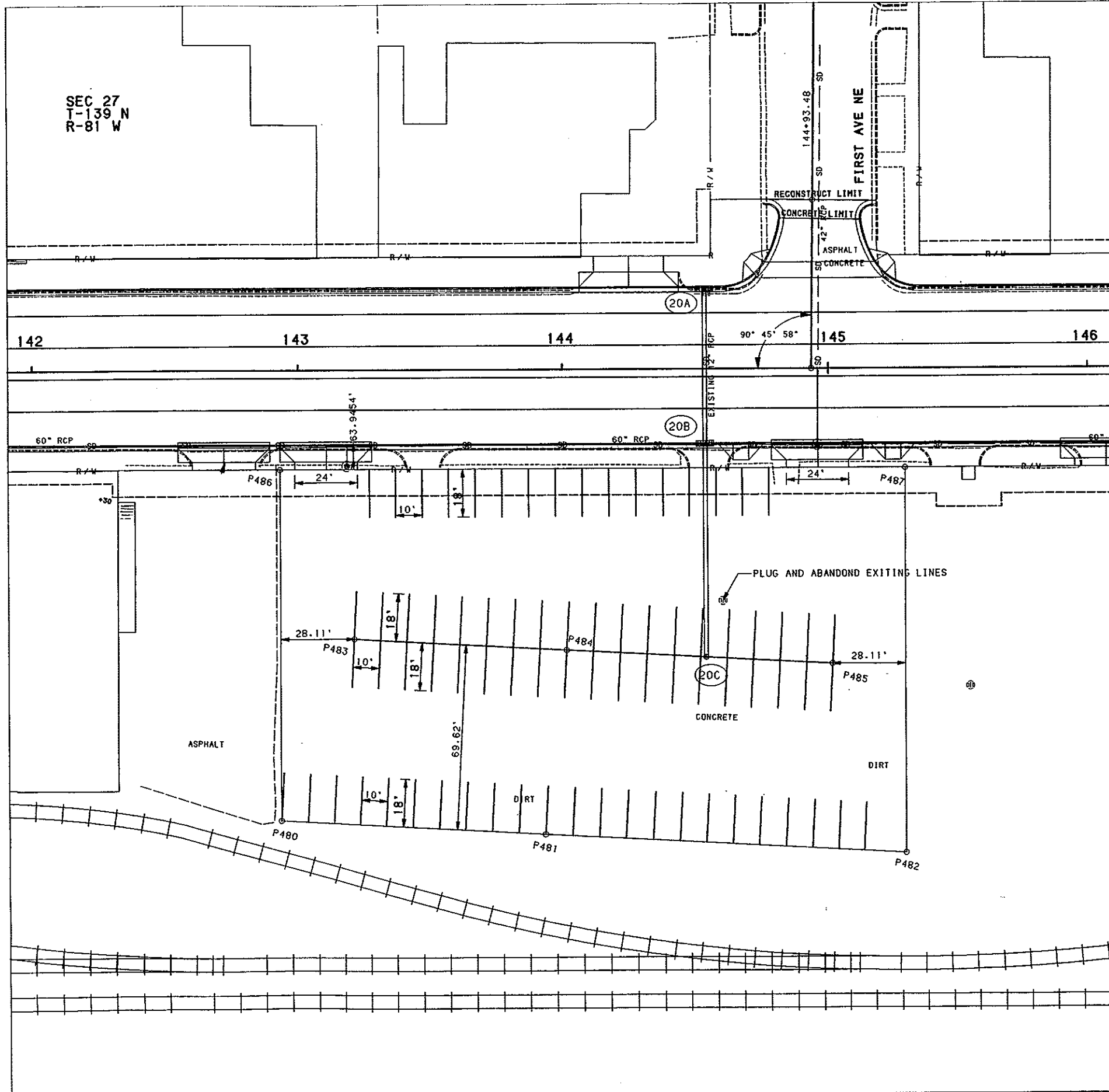
8" DENSE GRADED BASE TO BE USED UNDER PARKING LOT
QUANTITY SHOWN IN GRANULAR BASE SUMMARY SHEET

INLET CATCH BASIN, TYPE A
20C 1 EA.

PIPE, CONC. REINF. 15 IN. CLASS-3 STORM DRAIN
20C to 20B 78 L.F.T.

LAYOUT ALIGNMENT DATA

POINT	EASTING	NORTHIC	ELEVATION	STATION	ALIGNMENT
P480	15636.771	11615.177	1648.0	142+93.12	169.69 RT SURVEY
P481	15735.801	11629.037	1646.6	143+92.97	175.12 RT SURVEY
P482	15870.524	11647.894	1647.2	145+28.81	182.50 RT SURVEY
P483	15651.300	11687.505	1648.2	143+21.28	101.50 RT SURVEY
P484	15730.532	11698.593	1646.4	144+01.17	105.85 RT SURVEY
P485	15829.533	11712.451	1646.4	145+00.98	111.27 RT SURVEY
P486	15611.476	11744.832	-	142+93.21	37.50 RT SURVEY
P487	15843.236	11790.305	-	145+29.39	37.50 RT SURVEY



MANDAN-WEST MAIN STREET
CITY'S OVERFLOW PARKING

COORDINATE AND CURVE DATA (PRELIMINARY SURVEY)

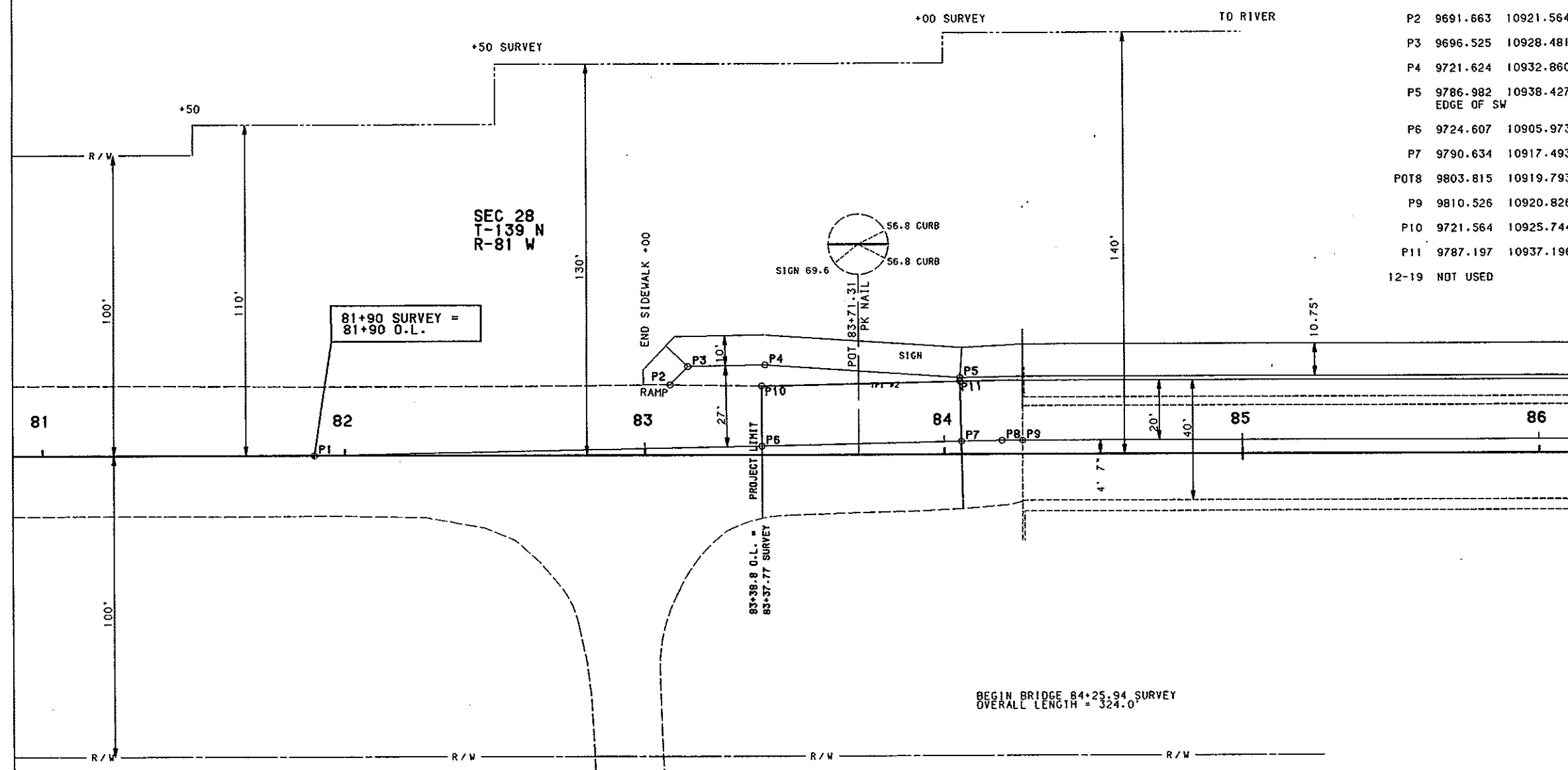
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	58

HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA			SURVEY CONTROL POINTS			
PT	STATION	NORTHING	EASTING			DESC. SEC-TWP-RGE	NORTHING	EASTING	TPI #	NORTHING	EASTING	ELEVATION
MAIN STREET ALIGNMENT				CURVE #1		NW COR SEC 27-139-81	15119.556	12367.756	TP11	10000.000	10000.000	
¹⁰⁰ POT	74+13.72	10762.289	8810.780	ARC DEFINITION		W 1/4 COR SEC 27-139-81	12492.287	12376.593	TP12	10928.129	9763.269	
¹⁰¹ POT	83+71.31	10907.990	9757.271	I = 5° 59' 58" RT		SW COR SEC 27-139-81	9868.230	12387.650	TP13	11541.837	10177.378	
¹⁰² POT	87+91.41	10971.905	10172.470	D = 0° 42'		N 1/4 COR SEC 27-139-81	15173.380	15020.648	TP14	11519.452	10666.967	
¹⁰³ PC	90+43.62	11010.274	10421.713	R = 8185.11'		NE COR SEC 27-139-81	15226.972	17656.793	TP15	11519.450	11798.801	
¹⁰⁴ PI#1	94+72.55	11075.533	10845.644	T = 428.92'		SE COR SEC 27-139-81	9940.629	17674.768	TP16	11555.289	12543.737	
¹⁰⁵ PT	99+00.69	11096.127	11274.075	L = 857.07'		SE COR SEC 26-139-81	9992.140	23030.442	TP17	11716.478	13129.824	
¹⁰⁶ POT	105+10.36	11125.398	11883.043						TP18	11261.983	13123.406	
¹⁰⁷ PC	109+16.88	11144.915	12289.094	CURVE #2								
¹⁰⁸ PI#2	110+00.29	11148.920	12372.411	ARC DEFINITION								
¹⁰⁹ PT	110+83.41	11164.948	12454.269	I = 8° 19' 35" LT								
¹¹⁰ POT	131+92.35	11570.190	14523.908	D = 5° 00'								
¹¹¹ POT	156+00.56	12032.937	16887.240	R = 1145.92'								
¹¹² POT	173+14.55	12362.286	18569.285	T = 83.41'								
¹¹³ PI	188+31.73	12653.819	20058.192	L = 166.53'								
¹¹⁴ END	196+19.60	12804.495	20831.520									
N. ROADWAY ALIGNMENT				CURVE #1 (RECORD)								
NORTH ROADWAY ALIGNMENT				CURVE #1 (RECORD)								
BEG	188+31.73	12666.579	20055.706	CHORD DEFINITION								
PC	196+19.58	12817.252	20829.017	I = 38° 17' 00" RT								
PI#1	207+56.03	13034.591	21944.487	D = 1° 45'								
PT	218+07.28	12514.105	22954.737	R = 3274.17'								
				T = 1136.43'								
				L = 2187.62'								
SOUTH ROADWAY ALIGNMENT				CURVE #1 (RECORD)								
BEG	188+31.73	12631.243	20062.590	CHORD DEFINITION								
TS	195+81.08	12774.553	20798.106	I = 43° 02' 20" RT								
SC	197+81.08	12809.366	20995.028	D = 3° 00' 2-200' SP								
PI#1	204+34.55	12937.777	21635.836	R = 1910.08'								
CS	210+15.87	12588.366	22188.137	SC = 3° 00'								
ST	212+15.87	12485.331	22359.525	Yc = 199.95'								
				Xc = 3.49'								
				TS = 853.47'								
				L = 1234.77'								

NOTES: METRIC UNITS INITIALIZING BENCH MARK Z 15 ELEV 1654.288 ASSUMED COORDINATES
 ENGLISH UNITS NAD-83 NAVD-88 ND COORD SYSTEM OF '83 ----- ZONE

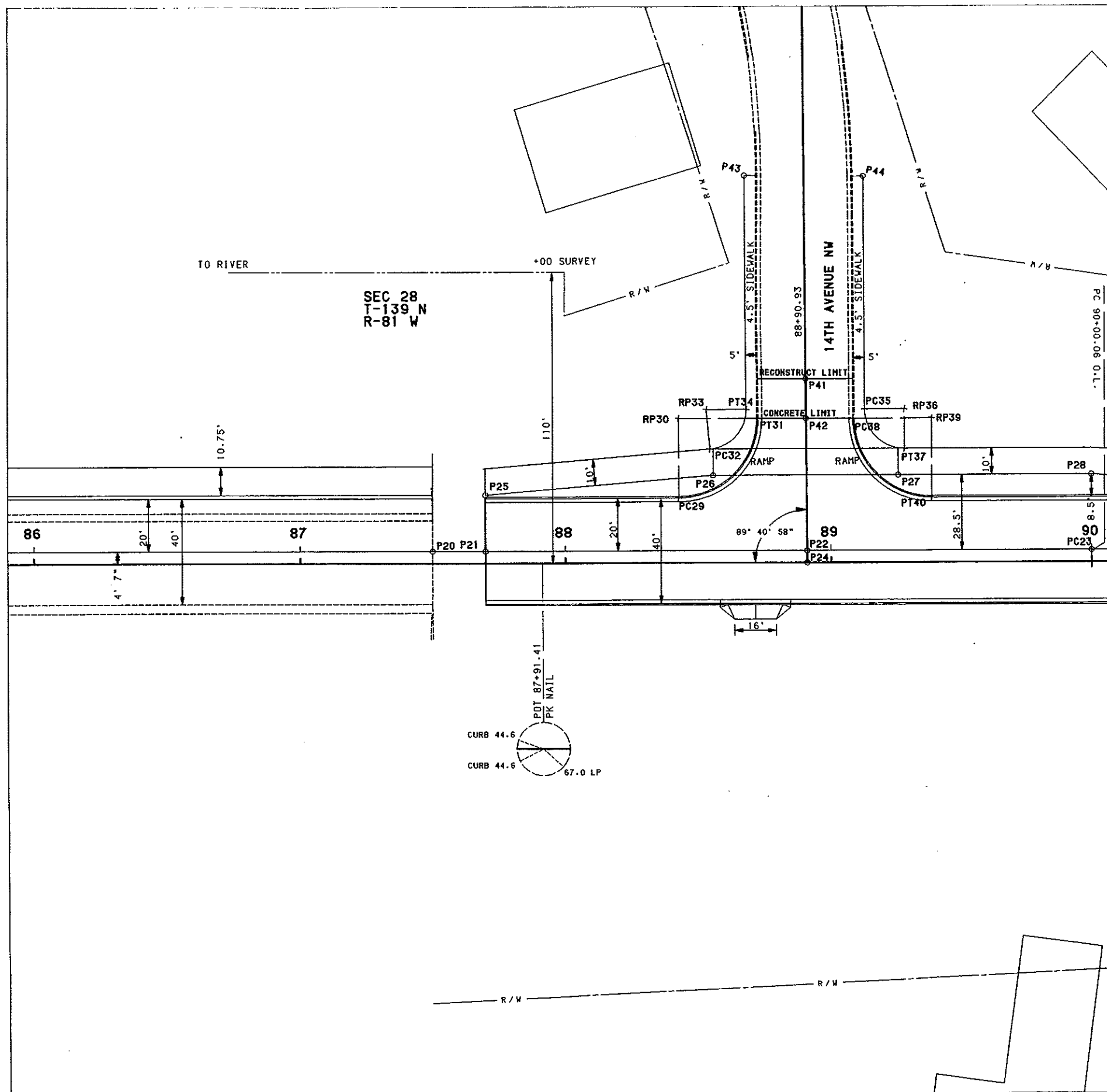
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
POT1	9578.026	10880.398	81+90.00 CL	MAIN
			81+90.00 CL	OFF LOC
P2	9691.663	10921.564	83+09.02 21.02 LT	OFF LOC
P3	9696.525	10928.481	83+15.00 27.00 LT	OFF LOC
P4	9721.624	10932.860	83+40.48 27.00 LT	OFF LOC
P5	9786.982	10938.427	84+05.82 21.25 LT	OFF LOC
			EDGE OF SW	
P6	9724.607	10905.973	83+38.80 CL	OFF LOC
P7	9790.634	10917.493	84+05.82 CL	OFF LOC
POT8	9803.815	10919.793	84+19.20 CL	OFF LOC
P9	9810.526	10920.826	84+25.99 CL	OFF LOC
P10	9721.564	10925.744	83+39.20 20.0 LT	OFF LOC
P11	9787.197	10937.196	84+05.82 20.0 LT	OFF LOC
12-19			NOT USED	



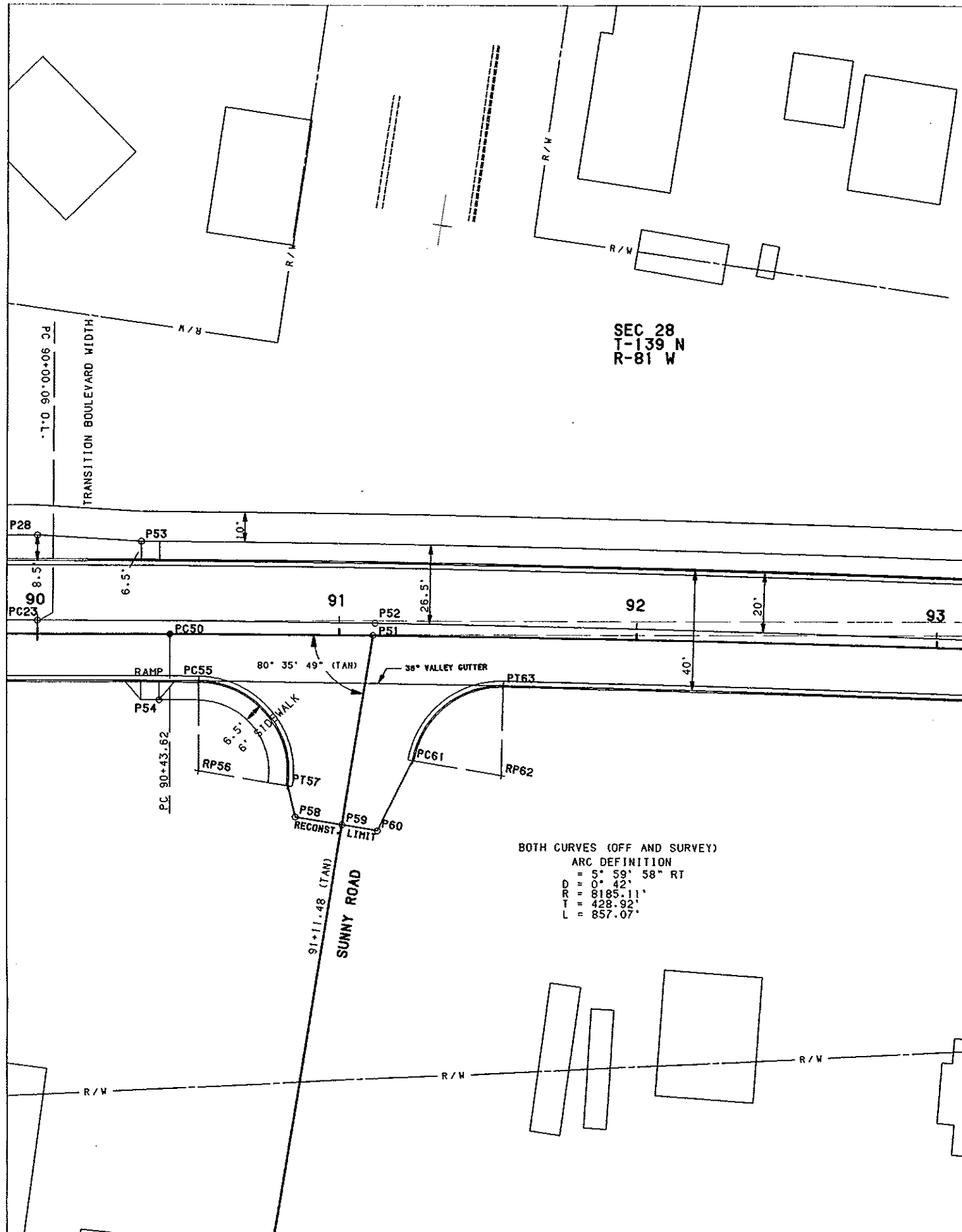
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P20	10130.616	10970.100	87+49.85 CL	OFF LOC
P21	10150.432	10973.151	87+69.90 CL	OFF LOC
P22	10270.075	10991.568	88+90.95 CL	OFF LOC
PC23	10377.916	11008.169	90+00.06 CL	OFF LOC
P24	10270.797	10987.042	88+90.98	4.583 RT OFF LOC
P25	10147.199	10994.153	87+69.90	21.25 LT OFF LOC
				EDGE OF SW
P26	10230.362	11014.291	88+55.16	28.5 LT OFF LOC
P27	10300.213	11025.043	89+25.83	28.5 LT OFF LOC
P28	10373.580	11036.337	90+00.06	28.5 LT OFF LOC
PC29	10218.883	11003.923	88+42.24	20.0 LT OFF LOC
RP30	10214.319	11033.574	88+42.24	50.0 LT OFF LOC
PT31	10243.978	11038.086	88+72.24	49.947 LT OFF LOC
				RADIUS 30'
PC32	10227.696	11023.934	88+53.99	38.437 LT OFF LOC
RP33	10224.166	11038.513	88+52.72	53.383 LT OFF LOC
PT34	10238.981	11040.863	88+67.72	53.452 LT OFF LOC
				RADIUS 15'
PC35	10283.976	11047.806	89+13.25	53.468 LT OFF LOC
RP36	10298.796	11050.120	89+28.25	53.5 LT OFF LOC
PT37	10301.078	11035.295	89+28.25	38.5 LT OFF LOC
				RADIUS 15'
PC38	10280.076	11043.609	89+08.75	49.913 LT OFF LOC
RP39	10309.713	11048.259	89+38.75	50.0 LT OFF LOC
PT40	10314.278	11018.609	89+38.75	20.0 LT OFF LOC
				RADIUS 30'
P41	10259.840	11055.687	88+90.59	64.93 LT OFF LOC
P42	10262.205	11040.875	88+90.68	49.93 LT OFF LOC
P43	10225.172	11127.920	88+67.32	141.596 LT OFF LOC
P44	10270.428	11134.597	89+13.06	141.310 LT OFF LOC
45-49	NOT USED			



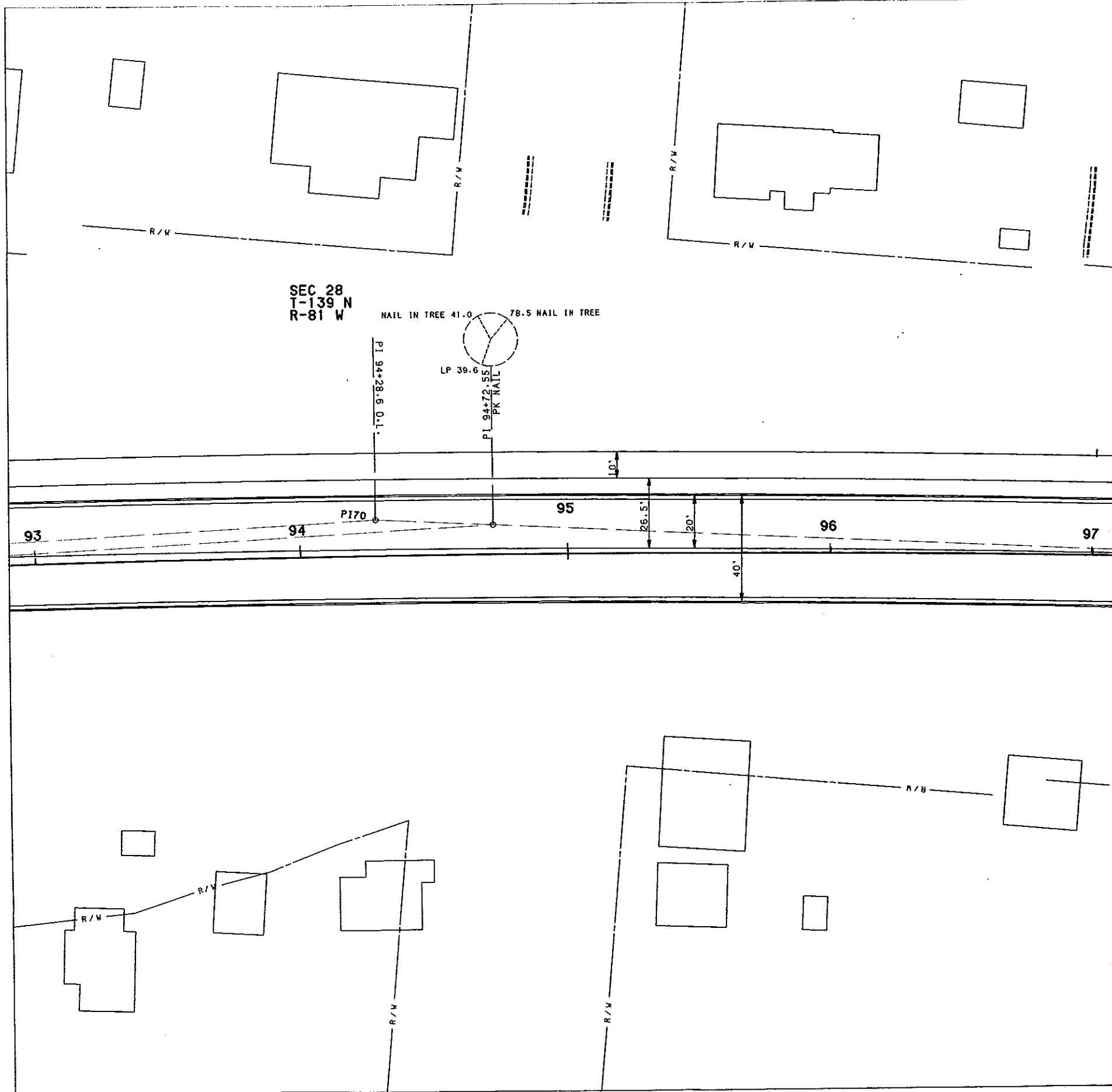
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
PC50	10421.713	11010.274	90+43.69	4.467 RT OFF LOC SURVEY
			90+43.62	CL
P51	10488.777	11020.314	91+11.54	4.105 RT OFF LOC SURVEY
			91+11.44	CL
P52	10488.824	11024.465	91+12.16	CL OFF LOC
P53	10407.747	11039.501	90+34.20	26.5 LT OFF LOC
P54	10421.552	10987.974	90+40.25	26.5 LT OFF LOC
PC55	10433.626	10996.334	90+53.45	20.0 LT OFF LOC
RP56	10438.190	10966.683	90+53.65	50.0 LT OFF LOC
PT57	10468.188	10966.342	90+83.48	54.652 LT OFF LOC
				RADIUS 30'
P58	10472.163	10956.467	90+86.03	64.992 LT OFF LOC
P59	10488.049	10956.286	91+01.86	67.408 LT OFF LOC
P60	10500.230	10956.148	91+14.01	69.239 LT OFF LOC
PC61	10508.333	10981.133	91+25.25	45.607 LT OFF LOC
RP62	10538.331	10980.792	91+55.40	50.0 LT OFF LOC
PT63	10534.330	11010.524	91+55.40	20.0 LT OFF LOC
				RADIUS 30'
64-69				NDT USED



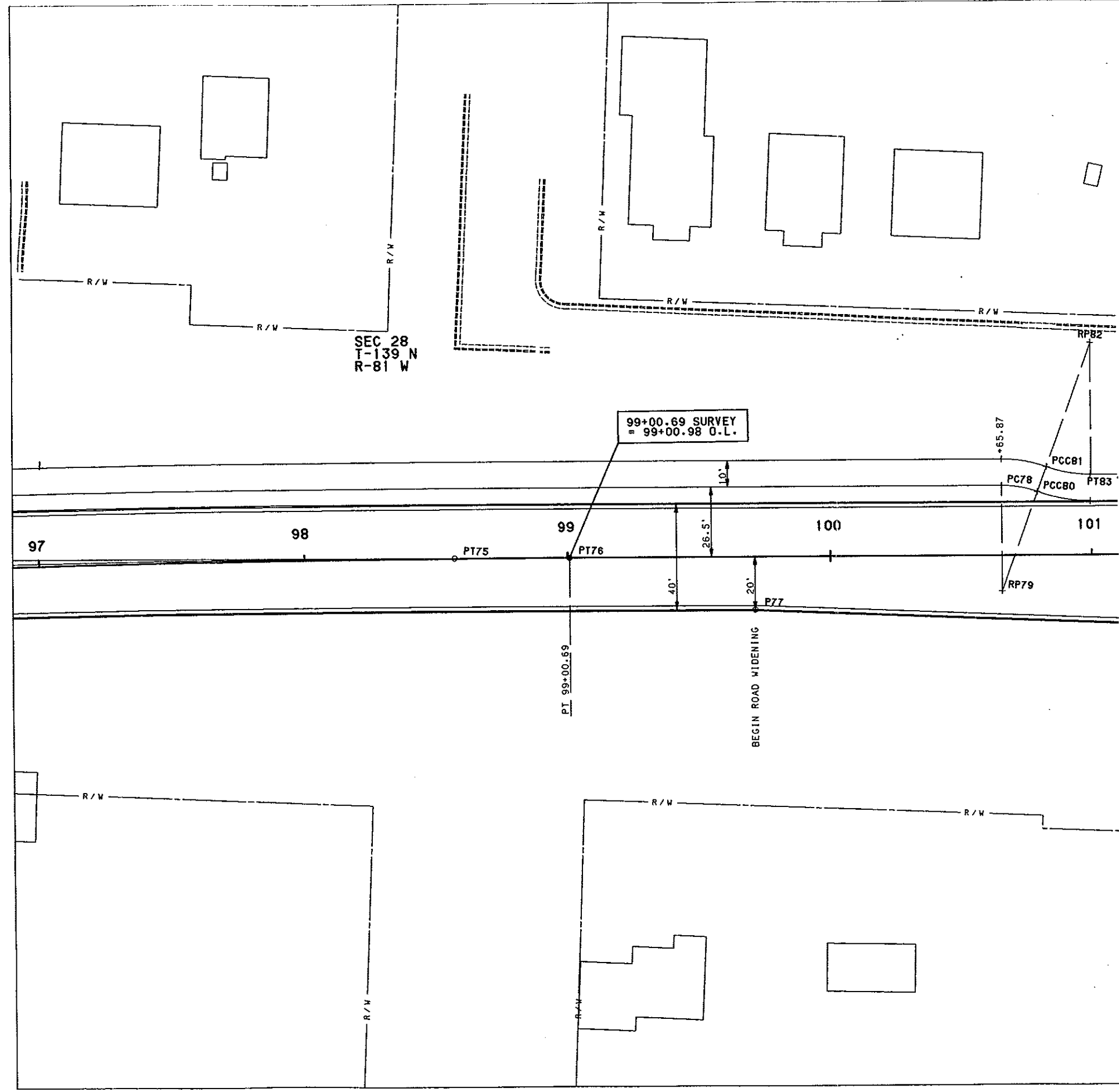
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P170	10801.811	11073.423	94+28.60	11.232 LT OFF LOC
RP	2918.351	11623.253		OFF CURVE
P171	11075.529	10845.614	94+72.31	9.051 LT OFF LOC
RP	2920.452	11667.050		SURVEY CURVE
72-74	NOT USED			



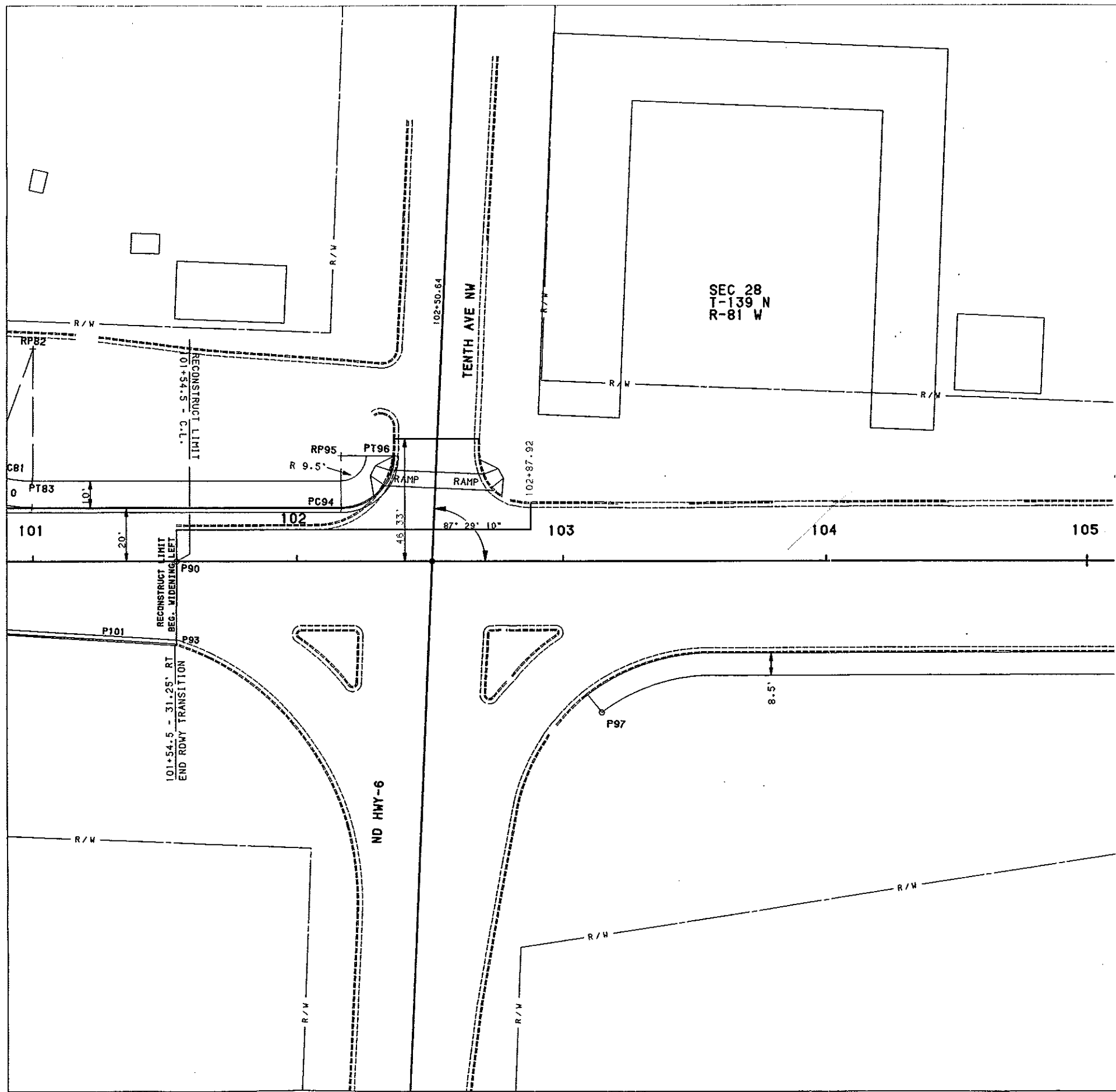
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
PT75	11230.268	11094.021	98+57.12 CL	OFF LOC
PT76	11274.075	11096.127	99+00.98 CL 99+00.69 CL	OFF LOC SURVEY
P77	11345.510	11079.537	99+71.25	20.0 RT SURVEY
PC78	11437.800	11130.526	100+65.88	26.5 LT SURVEY
RP79	11439.721	11090.572	100+65.88	13.5 RT SURVEY
PCC80	11451.550	11128.784	100+79.53	24.099 LT SURVEY
RADIUS 40'				
PCC81	11454.502	11138.337	100+82.94	33.5 LT SURVEY
RP82	11469.289	11186.101	101+00.0	80.5 LT SURVEY
PT83	11471.689	11136.159	100+99.63	30.5 LT SURVEY
84-89	NOT USED			



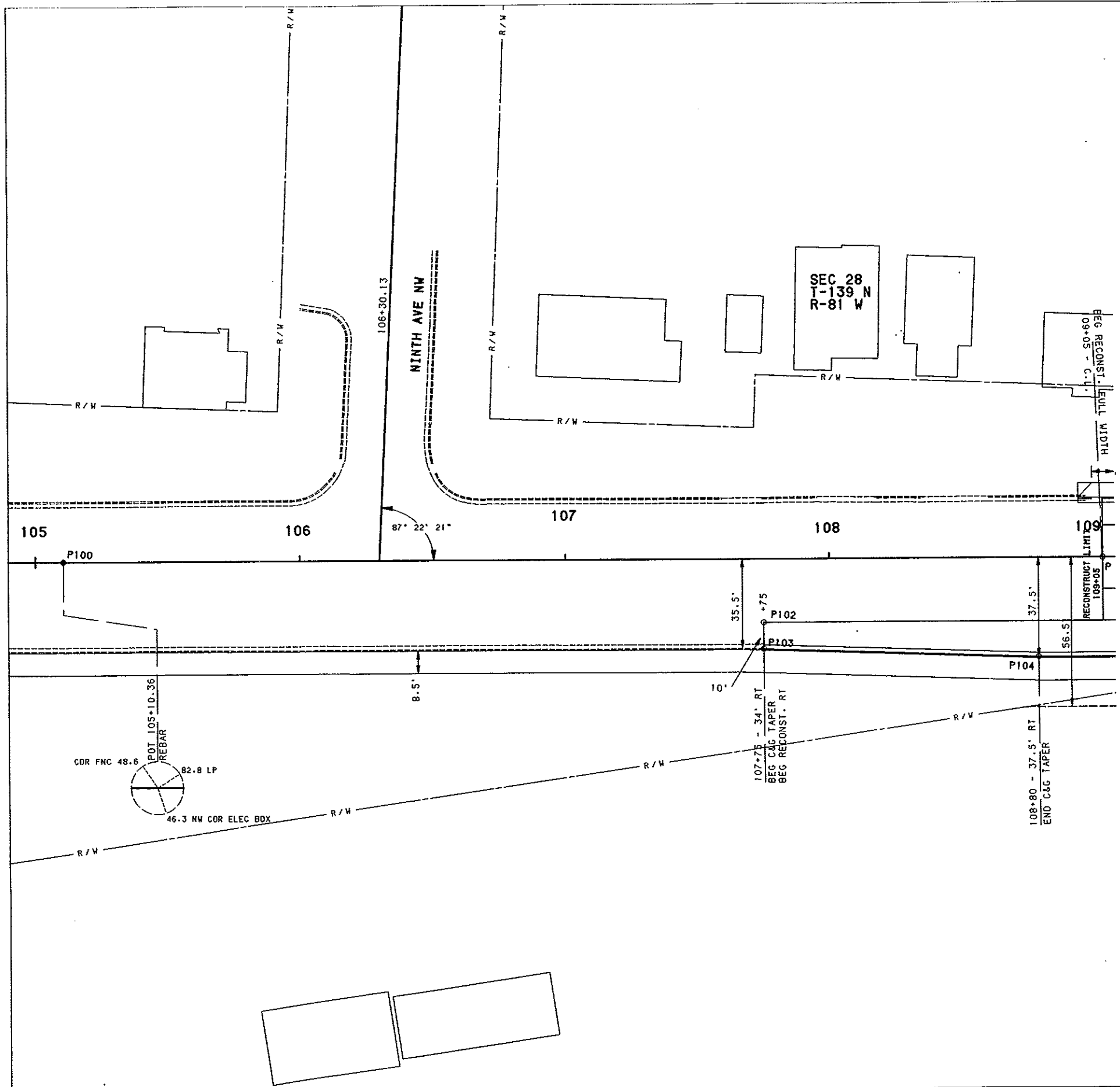
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P90	11527.592	11108.313	101+54.50 CL	SURVEY
P93	11529.120	11077.200	101+54.50 31.248 RT	SURVEY
PC94	11588.672	11131.272	102+16.61 20.0 LT	SURVEY
RP95	11587.711	11151.249	102+16.61 40.0 LT	SURVEY
PT96	11607.694	11152.085	102+36.61 39.876 LT	SURVEY
RADIUS 20'				
P97	11690.160	11058.913	103+14.51 57.147 RT	SURVEY
91.92.98-99 NOT USED				



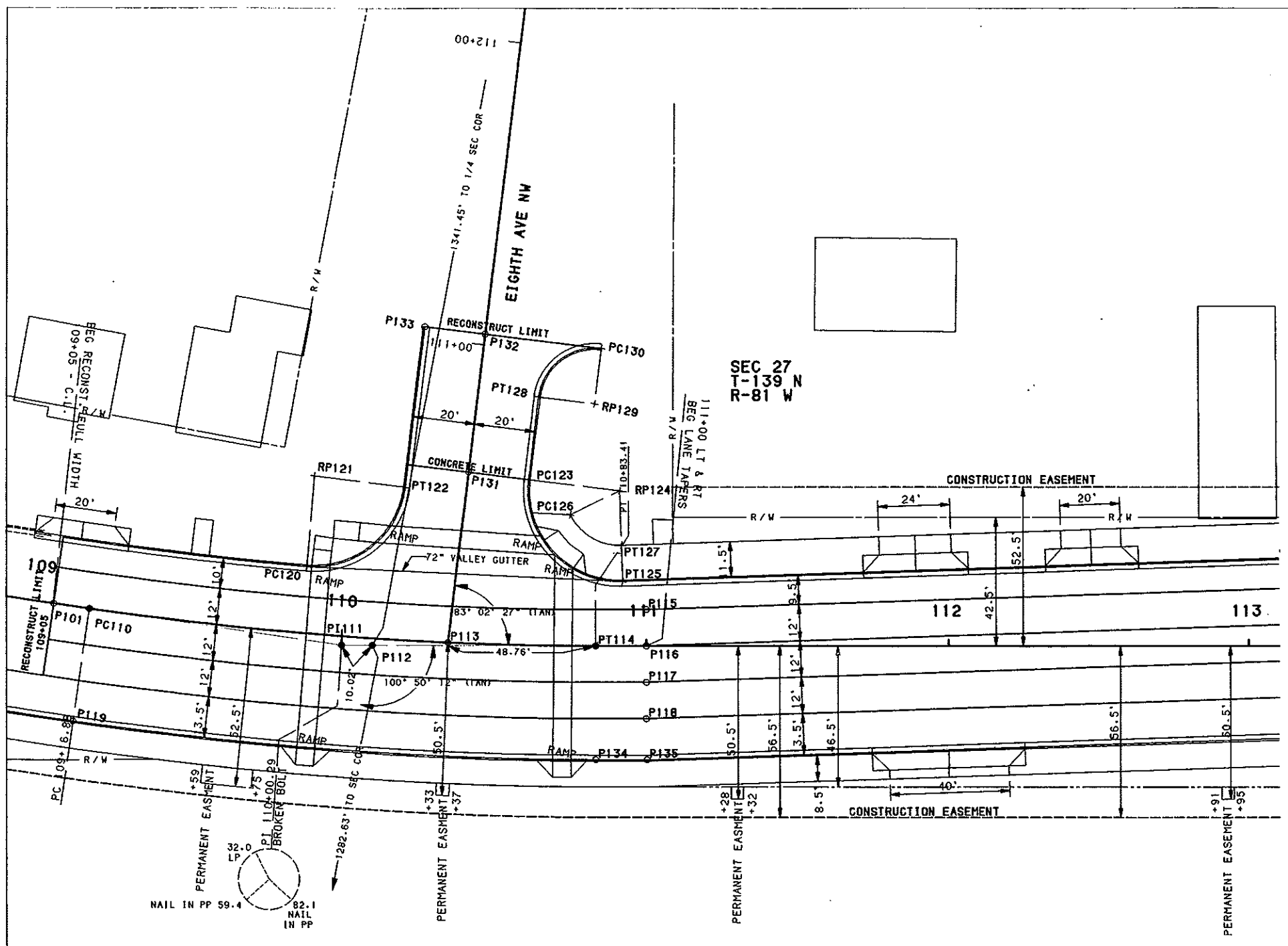
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P100	11883.043	11125.398	105+10.36	CL SURVEY
P101	12277.226	11144.345	109+05.0	CL SURVEY
P102	12148.528	11114.131	107+75.0	24.0 RT SURVEY
P103	12148.994	11104.440	107+75.0	34.0 RT SURVEY
P104	12254.055	11105.688	108+80.0	37.5 RT SURVEY
105-109 NOT USED				



ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
PC110	12289.094	11144.915	109+16.88	CL SURVEY
P1111	12372.408	11148.920	110+00.15	3.031 RT SURVEY
PT114	12454.269	11164.948	110+83.41	CL SURVEY
RADIUS 1145.916'				
P113	12406.340	11156.615	110+34.76	CL SURVEY
			110+01.04	CL 8TH NW
P112	12382.245	11150.846	110+10.12	2.347 RT SURVEY
P115	12468.242	11179.911	111+00.00	12.0 LT SURVEY
P116	12470.546	11168.135	111+00.00	CL SURVEY
P117	12472.852	11156.358	111+00.00	12.0 RT SURVEY
P118	12475.157	11144.581	111+00.00	24.0 RT SURVEY
P119	12290.894	11107.459	109+16.88	37.5 RT SURVEY
PC120	12356.197	11172.247	109+86.60	22.0 LT SURVEY
RP121	12352.937	11202.069	110+20.23	48.891 LT 8TH NW
			109+86.60	52.0 LT SURVEY
			110+50.21	50.0 LT 8TH NW
PT122	12382.859	11204.224	110+17.96	50.48 LT SURVEY
			110+50.21	20.0 LT 8TH NW
RADIUS 30'				
PC123	12422.218	11214.580	110+60.40	54.646 LT SURVEY
			110+57.71	20.0 RT 8TH NW
RP124	12452.140	11216.735	110+91.28	51.231 LT SURVEY
			110+57.71	50.0 RT 8TH NW
PT125	12458.770	11187.991	110+92.28	21.248 LT SURVEY
			110+28.07	54.626 RT 8TH NW
RADIUS 30'				
PC126	12437.822	11205.828	110+74.80	43.248 LT SURVEY
			110+47.86	34.935 RT 8TH NW
PT127	12456.186	11199.197	110+91.88	33.243 LT SURVEY
			110+39.93	52.776 RT 8TH NW
RADIUS 18'				
PT128	12420.248	11241.937	110+63.39	81.929 LT SURVEY
			110+85.14	20.0 RT 8TH NW
RP129	12438.611	11243.259	110+83.07	79.861 LT SURVEY
			110+85.14	38.411 LT 8TH NW
PC130	12437.288	11261.622	110+85.33	98.136 LT SURVEY
			111+03.55	38.41 LT 8TH NW
RADIUS 18.411'				
P131	12402.269	11213.144	110+39.47	56.489 LT SURVEY
			110+57.72	CL 8TH NW
P132	12398.977	11258.863	110+43.65	102.161 LT SURVEY
			111+03.55	CL 8TH NW
P133	12379.028	11257.426	110+21.74	103.703 LT SURVEY
			111+03.55	20.0 RT 8TH NW
P134	12461.475	11128.147	110+83.41	37.50 RT SURVEY
P135	12478.025	11131.388	111+00.28	37.50 RT SURVEY
136-139 NOT USED				



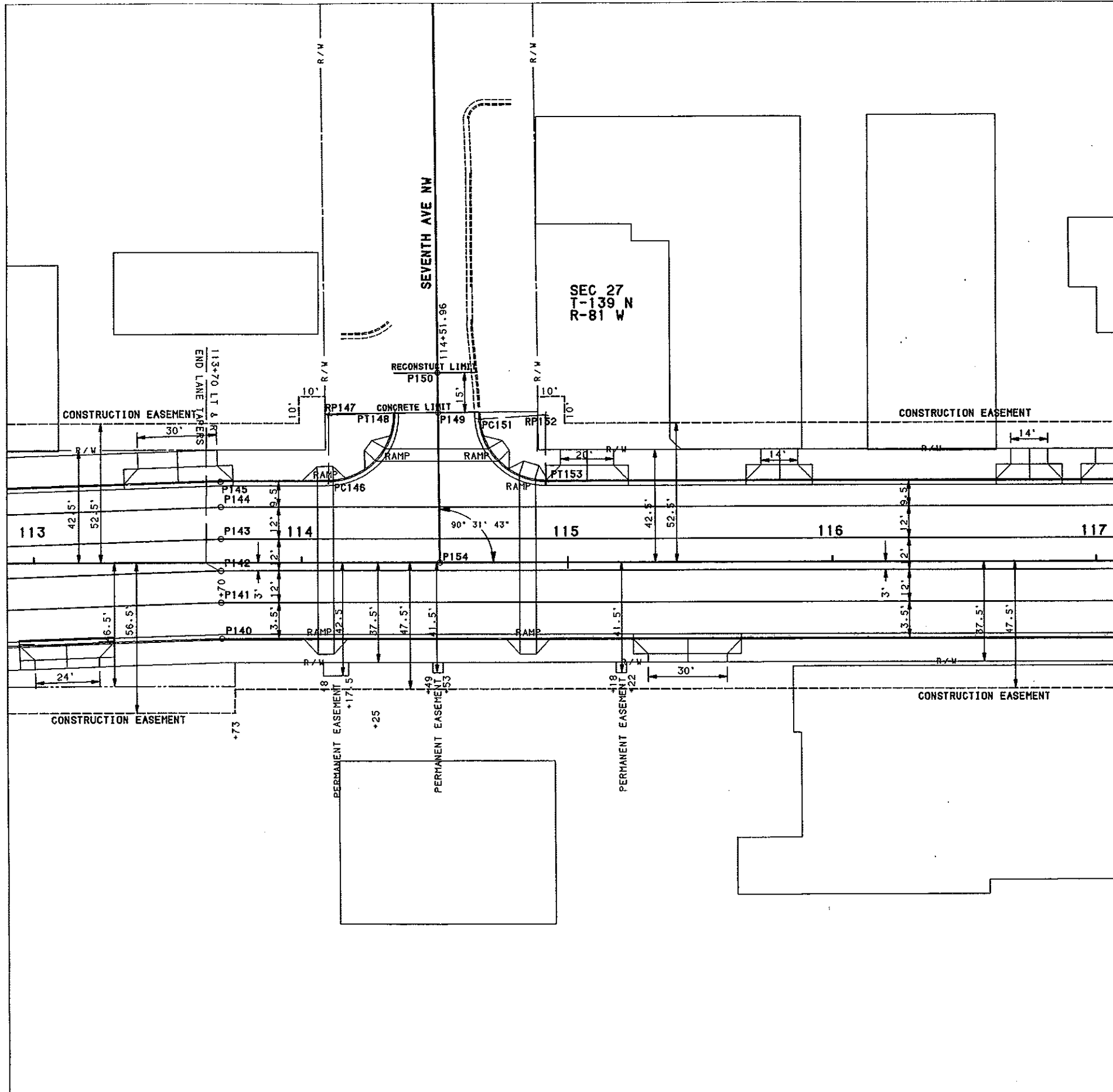
ARC DEFINITION
D = 8° 19' 35" LT
R = 95.00'
T = 1145.92'
L = 83.41'
L = 166.53'

SEC 28
R-81 W

ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P140	12741.234	11192.097	113+70.25	28.5 RT SURVEY
P141	12738.396	11205.297	113+70.00	15.0 RT SURVEY
P142	12736.091	11217.073	113+70.00	3.0 RT SURVEY
P143	12733.786	11228.849	113+70.00	9.0 LT SURVEY
P144	12731.481	11240.625	113+70.00	12.0 LT SURVEY
P145	12729.415	11250.411	113+69.86	30.5 LT SURVEY
PC146	12769.073	11258.176	114+10.27	30.5 LT SURVEY
RP147	12764.365	11282.219	114+10.26	55.5 LT SURVEY
PT148	12788.738	11287.782	114+35.25	56.276 LT SURVEY
RADIUS 25'				
P149	12804.591	11291.039	114+51.44	56.426 LT SURVEY
P150	12801.573	11305.732	114+51.30	71.425 LT SURVEY
PC151	12820.161	11291.681	114+66.84	54.064 LT SURVEY
RP152	12844.379	11297.886	114+91.80	55.5 LT SURVEY
PT153	12849.183	11273.352	114+91.80	30.5 LT SURVEY
RADIUS 25'				
P154	12815.945	11235.765	114+51.958	CL SURVEY

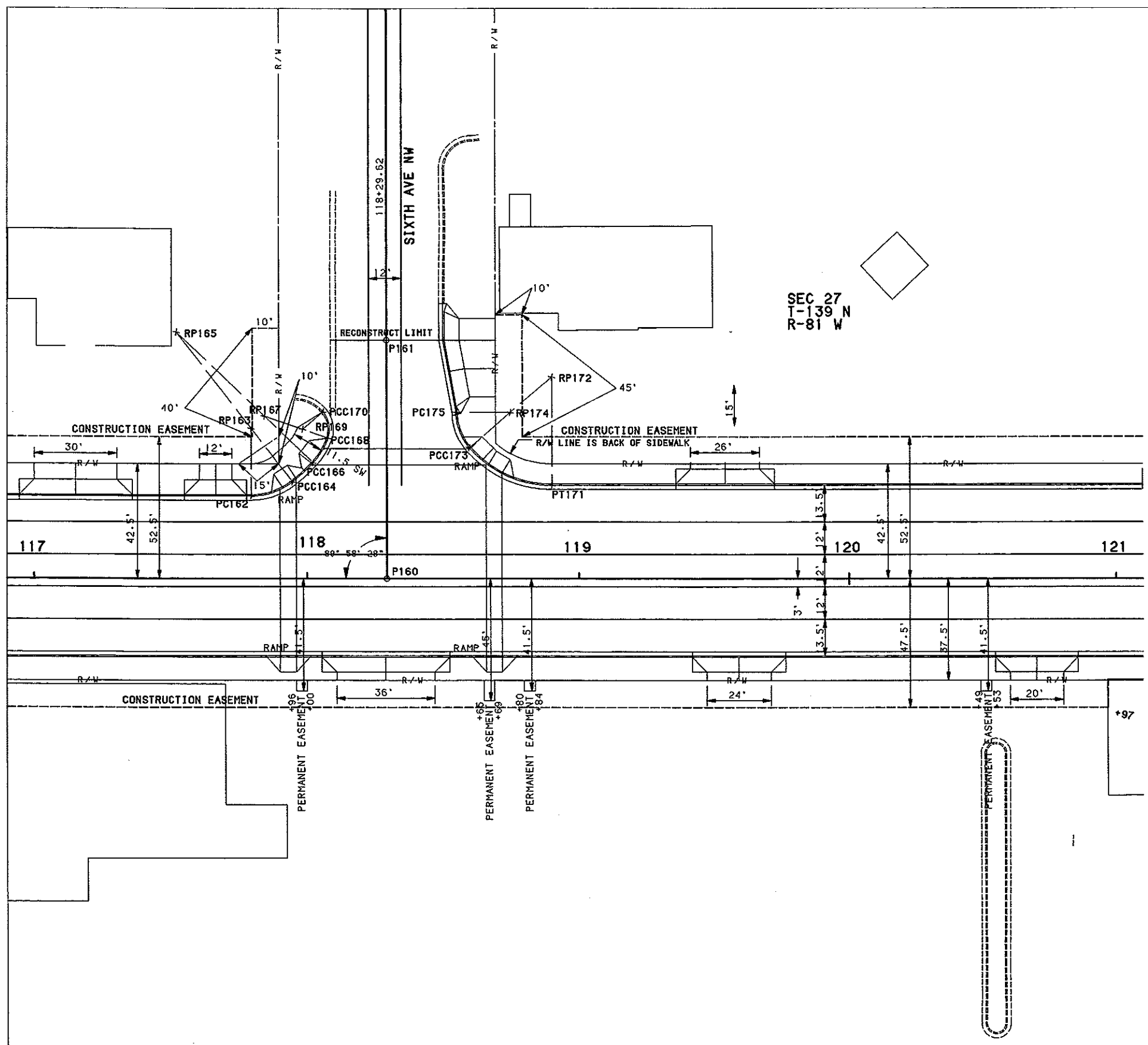
155-159 NOT USED



ALIGNMENT LAYOUT DATA

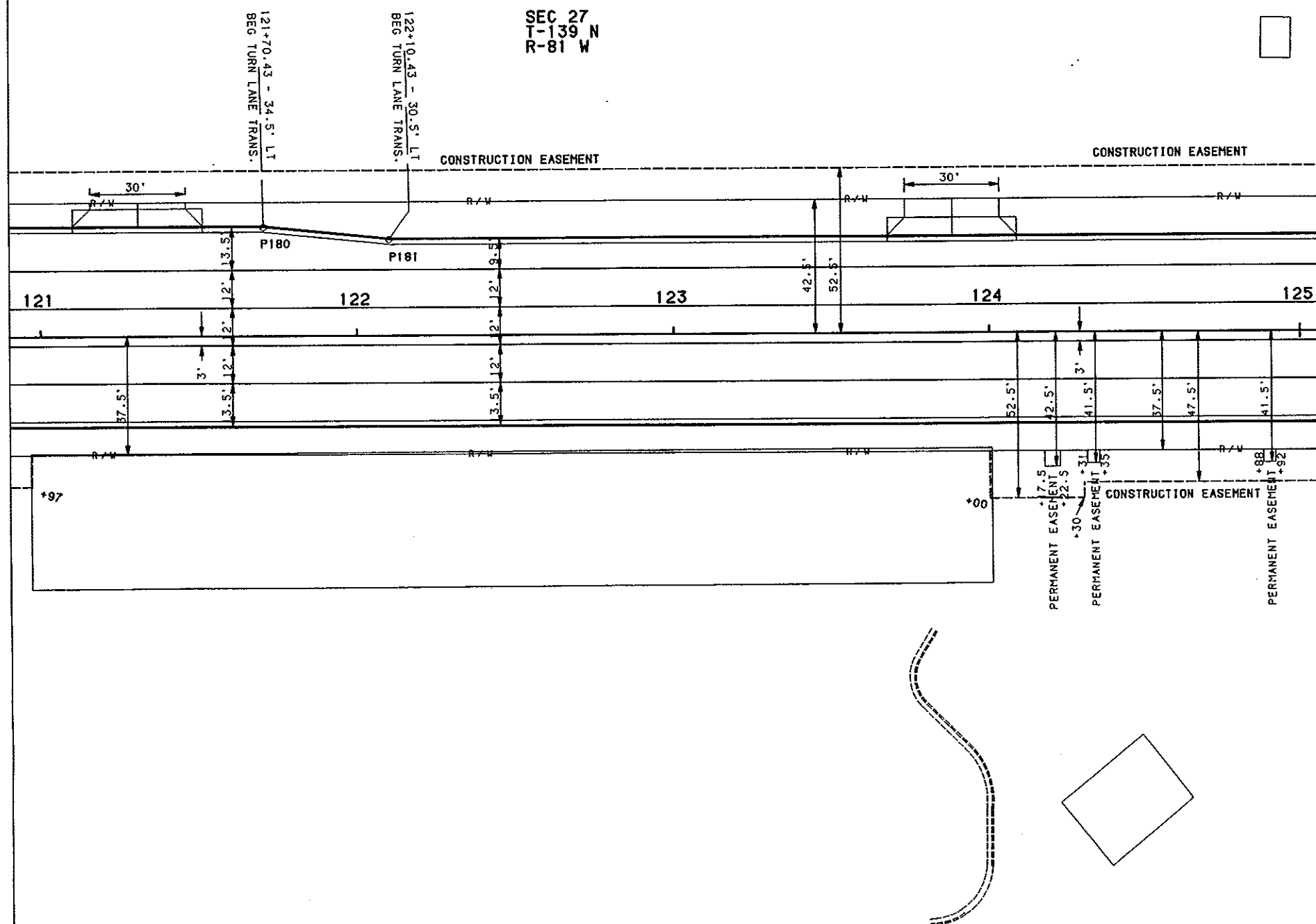
POINT	EASTING	NORTHING	STATION	ALIGNMENT
P160	13186.565	11308.334	118+29.62	CL SURVEY
P161	13169.617	11394.687	118+29.58	88.0 LT SURVEY
PC162	13131.257	11328.582	117+79.23	30.5 LT SURVEY
RP163	13126.453	11353.117	117+79.23	55.5 LT SURVEY
				RADIUS 25'
PCC164	13145.320	11336.714	117+94.59	35.777 LT SURVEY
RP165	13092.493	11382.642	117+51.57	91.0 LT SURVEY
				RADIUS 70'
PCC166	13151.587	11345.119	118+02.36	42.821 LT SURVEY
RP167	13130.482	11358.520	117+84.22	60.028 LT SURVEY
				RADIUS 25'
PCC168	13155.253	11355.144	118+07.88	51.955 LT SURVEY
RP169	13145.345	11356.494	117+98.42	55.184 LT SURVEY
PCC170	13151.560	11364.329	118+06.02	61.678 LT SURVEY
				RADIUS 10'
PT171	13238.781	11353.712	118+90.24	35.5 LT SURVEY
RP172	13231.745	11393.094	118+90.24	75.5 LT SURVEY
				RADIUS 40'
PCC173	13207.330	11362.043	118+59.94	48.392 LT SURVEY
RP174	13219.383	11377.372	118+75.09	61.446 LT SURVEY
PC175	13199.758	11373.520	118+55.09	61.437 LT SURVEY
				RADIUS 20'

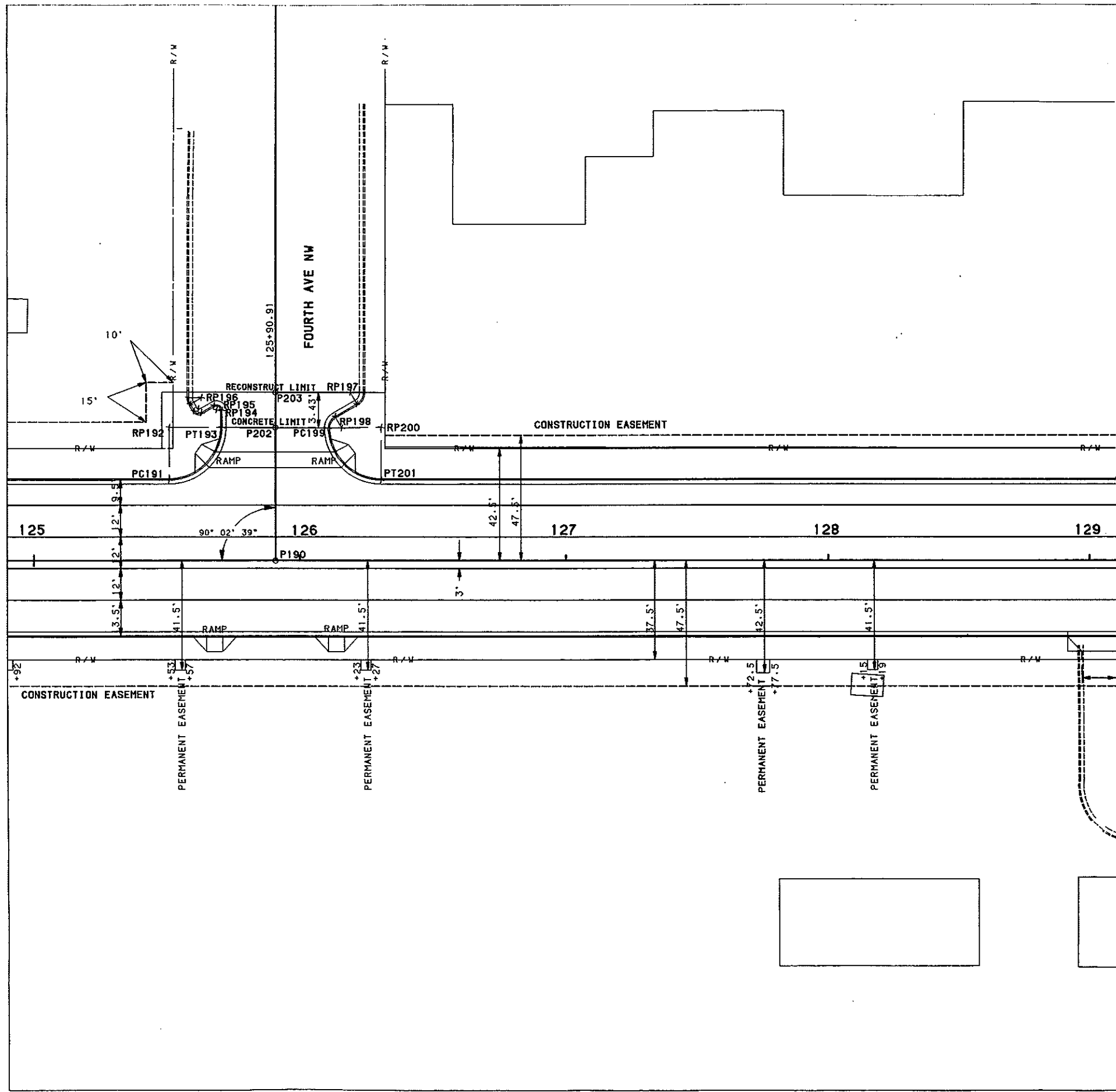
176-179 NOT USED



ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P180	13514.399	11407.679	121+70.43	34.5 LT ALIGNMENT
P181	13554.421	11411.440	122+10.43	30.5 LT ALIGNMENT
182-189 NOT USED				



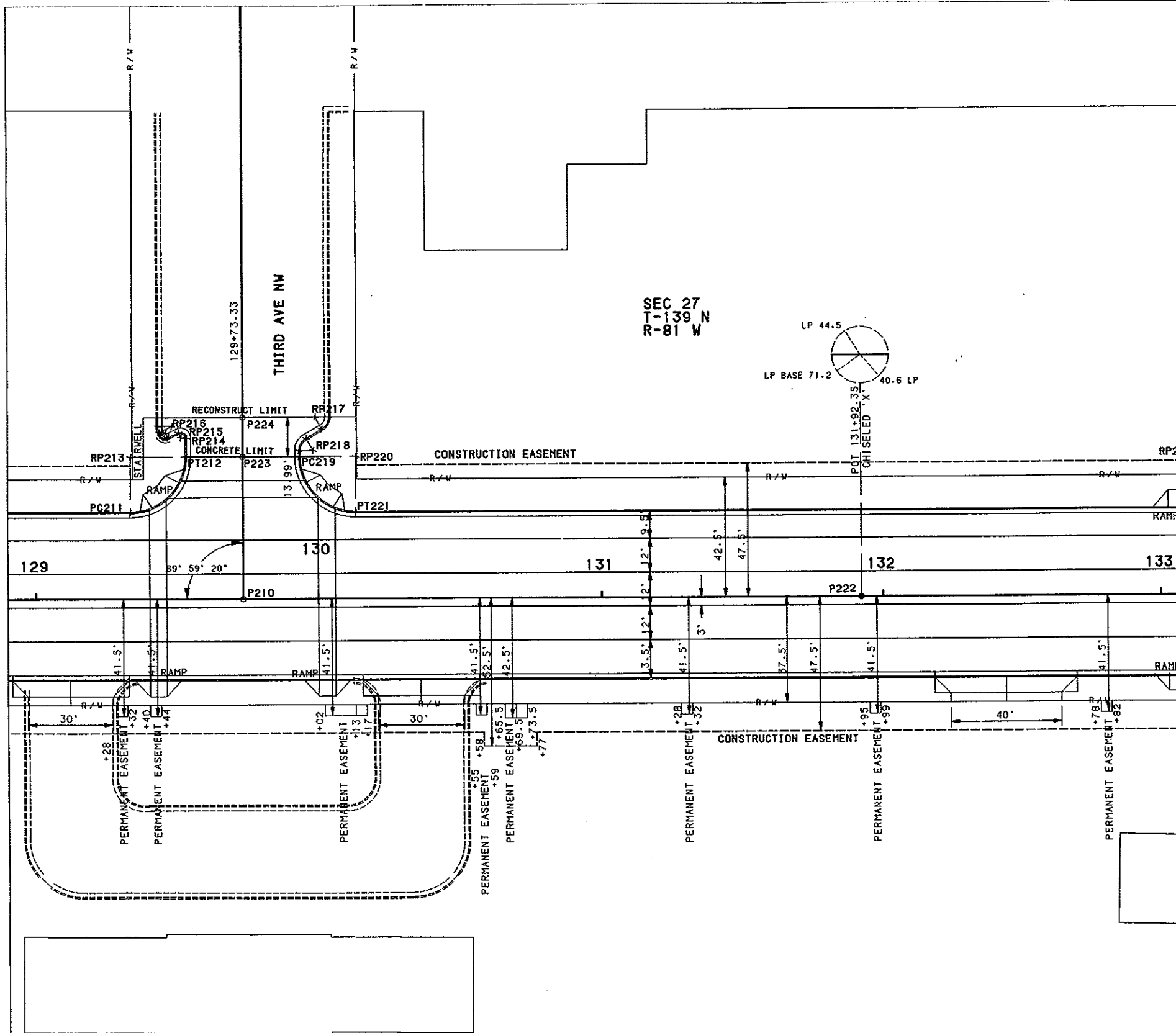


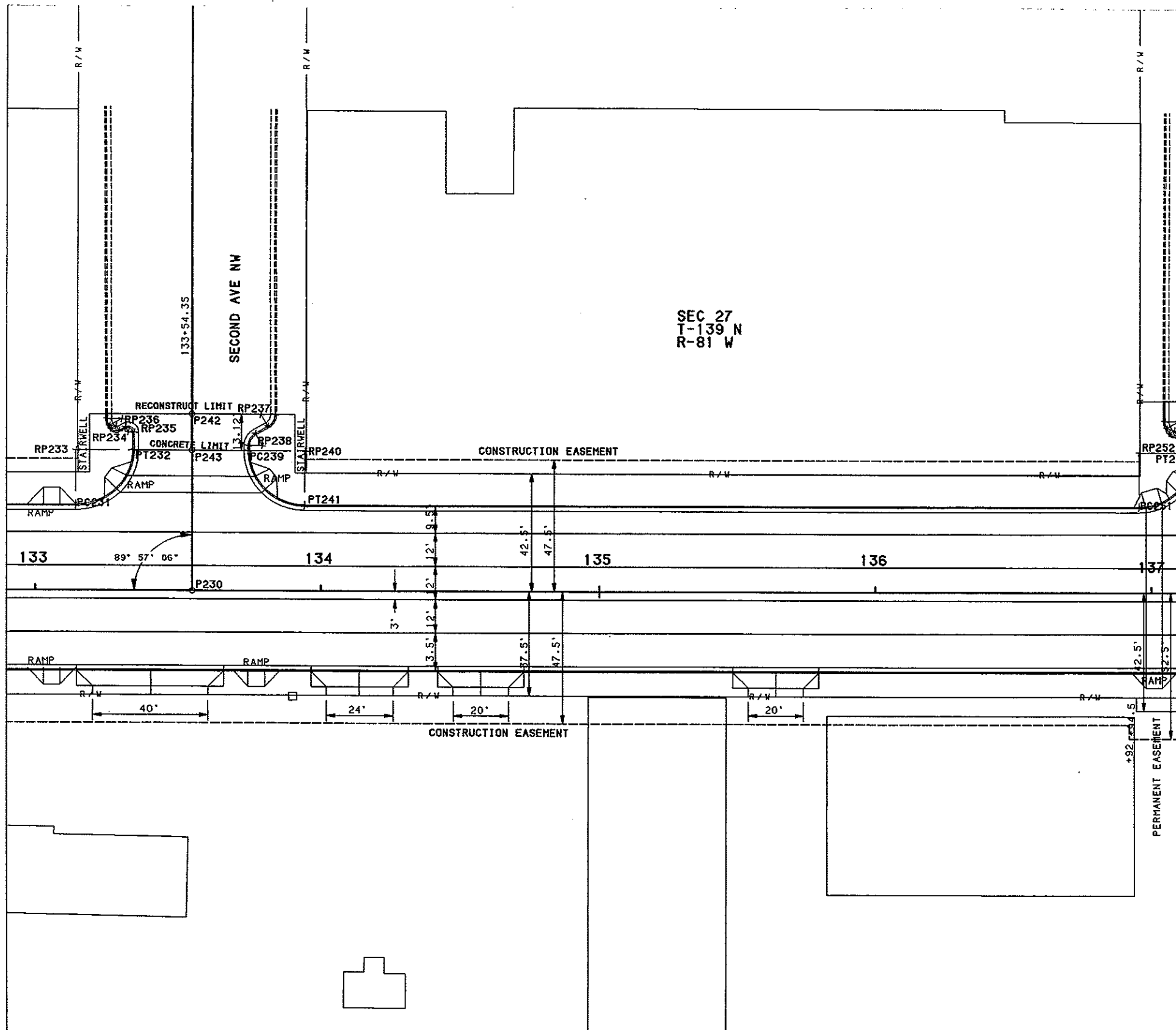
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P190	13933.671	11454.619	125+90.91	CL SURVEY
PC191	13888.594	11476.871	125+50.95	30.5 LT SURVEY
RP192	13884.751	11496.498	125+50.95	50.5 LT SURVEY
PT193	13904.381	11500.326	125+70.95	50.483 LT SURVEY
RADIUS 20'				
RP194	13901.167	11506.358	125+68.95	57.021 LT SURVEY
RADIUS 2'				
RP195	13894.370	11505.745	125+62.16	57.725 LT SURVEY
RADIUS 2'				
RP196	13894.724	11509.907	125+63.31	61.741 LT SURVEY
RADIUS 5'				
RP197	13949.226	11522.564	126+19.23	63.69 LT SURVEY
RADIUS 5'				
RP198	13948.585	11508.750	126+15.95	50.256 LT SURVEY
RADIUS 5'				
PC199	13943.678	11507.794	126+10.95	50.261 LT SURVEY
RP200	13963.260	11511.872	126+30.95	50.5 LT SURVEY
PT201	13967.103	11492.244	126+30.95	30.5 LT SURVEY
RADIUS 20'				
P202	13924.030	11504.060	125+90.95	50.372 LT SURVEY
P203	13921.475	11517.160	125+90.96	63.719 LT SURVEY
204-209 NOT USED				

ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P210	14308.963	11528.102	129+73.33	CL SURVEY
PC211	14263.838	11550.346	129+33.32	30.5 LT SURVEY
PT212	14279.621	11573.822	129+53.32	50.5 LT SURVEY
RP213	14259.994	11569.974	129+33.32	50.50 LT SURVEY
RADIUS 20'				
RP214	14276.348	11580.117	129+51.31	57.312 LT SURVEY
RADIUS 2'				
RP215	14270.653	11580.838	129+45.86	59.114 LT SURVEY
RADIUS 2'				
RP216	14272.392	11583.516	129+48.08	61.408 LT SURVEY
RADIUS 5'				
RP217	14321.669	11596.352	129+98.91	64.536 LT SURVEY
RADIUS 5'				
RP218	14323.372	11584.569	129+98.32	52.646 LT SURVEY
RADIUS 5'				
PC219	14318.878	11581.499	129+93.32	50.5 LT SURVEY
RP220	14338.505	11585.345	130+13.32	50.5 LT SURVEY
PT221	14342.348	11565.718	130+13.32	30.5 LT SURVEY
RADIUS 20'				
P222	14523.908	11570.190	131+92.35	CL SURVEY
P223	14299.249	11577.660	129+73.32	50.5 LT SURVEY
P224	14296.561	11591.377	129+73.31	64.479 LT SURVEY
225-229 NOT USED				





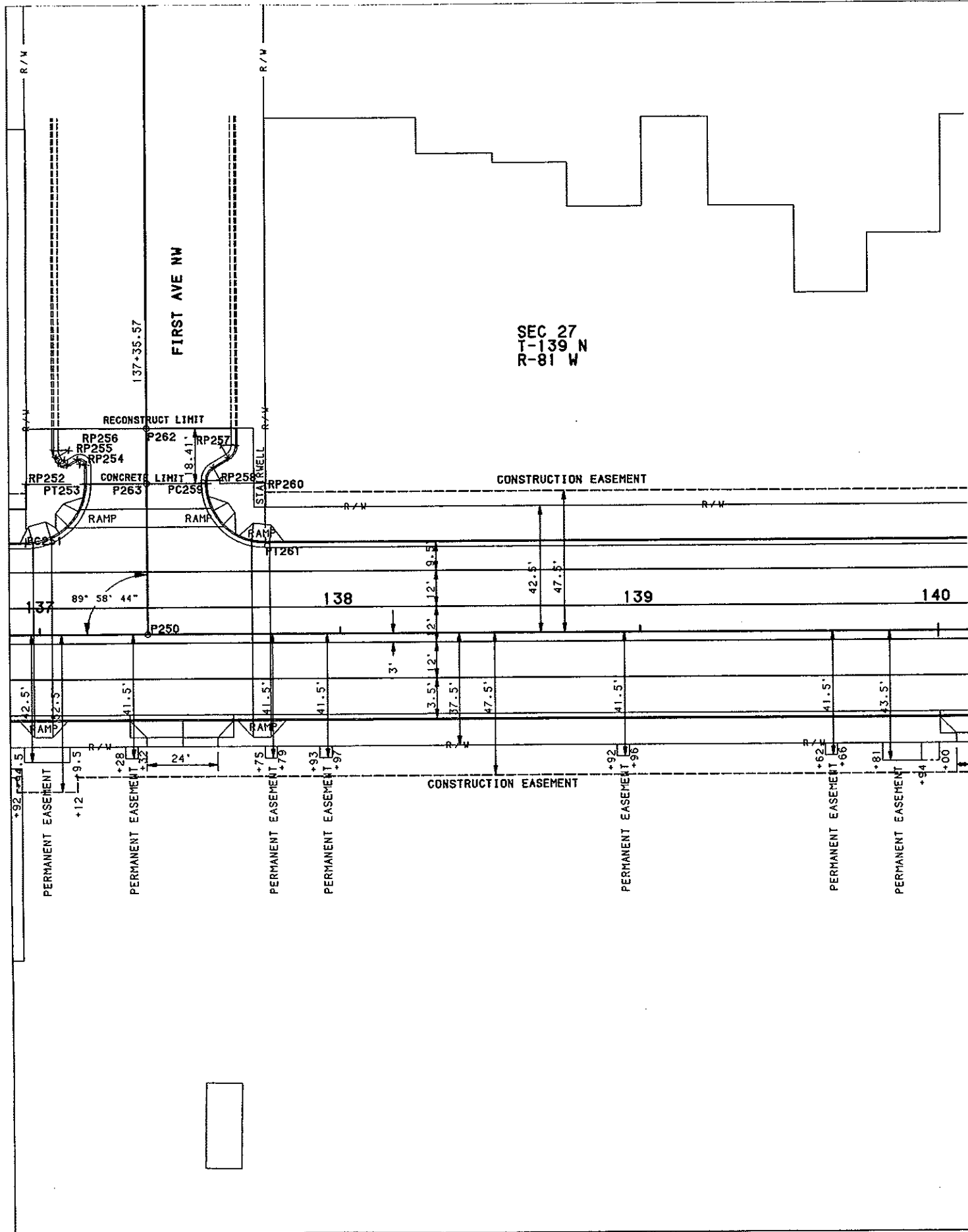
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P230	14682.884	11601.317	133+54.35	CL SURVEY
PC231	14637.727	11623.555	133+14.31	30.5 LT SURVEY
PT232	14653.508	11647.041	133+34.31	50.516 LT SURVEY
RP233	14633.884	11643.182	133+14.31	50.5 LT SURVEY
				RADIUS 20'
RP234	14650.284	11653.069	133+32.30	57.052 LT SURVEY
				RADIUS 2'
RP235	14645.758	11654.428	133+28.12	59.255 LT SURVEY
				RADIUS 2'
RP236	14647.203	11657.334	133+30.10	61.829 LT SURVEY
				RADIUS 5'
RP237	14694.639	11668.430	133+78.78	63.603 LT SURVEY
				RADIUS 5'
RP238	14697.315	11657.490	133+79.30	52.353 LT SURVEY
				RADIUS 5'
PC239	14692.769	11654.694	133+74.31	50.483 LT SURVEY
RP240	14712.393	11658.554	133+94.31	50.5 LT SURVEY
PT241	14716.141	11639.418	133+94.13	30.5 LT SURVEY
				RADIUS 20'
P242	14670.612	11663.715	133+54.29	63.593 LT SURVEY
P243	14673.139	11650.868	133+54.31	50.5 LT SURVEY

244-249 NOT USED

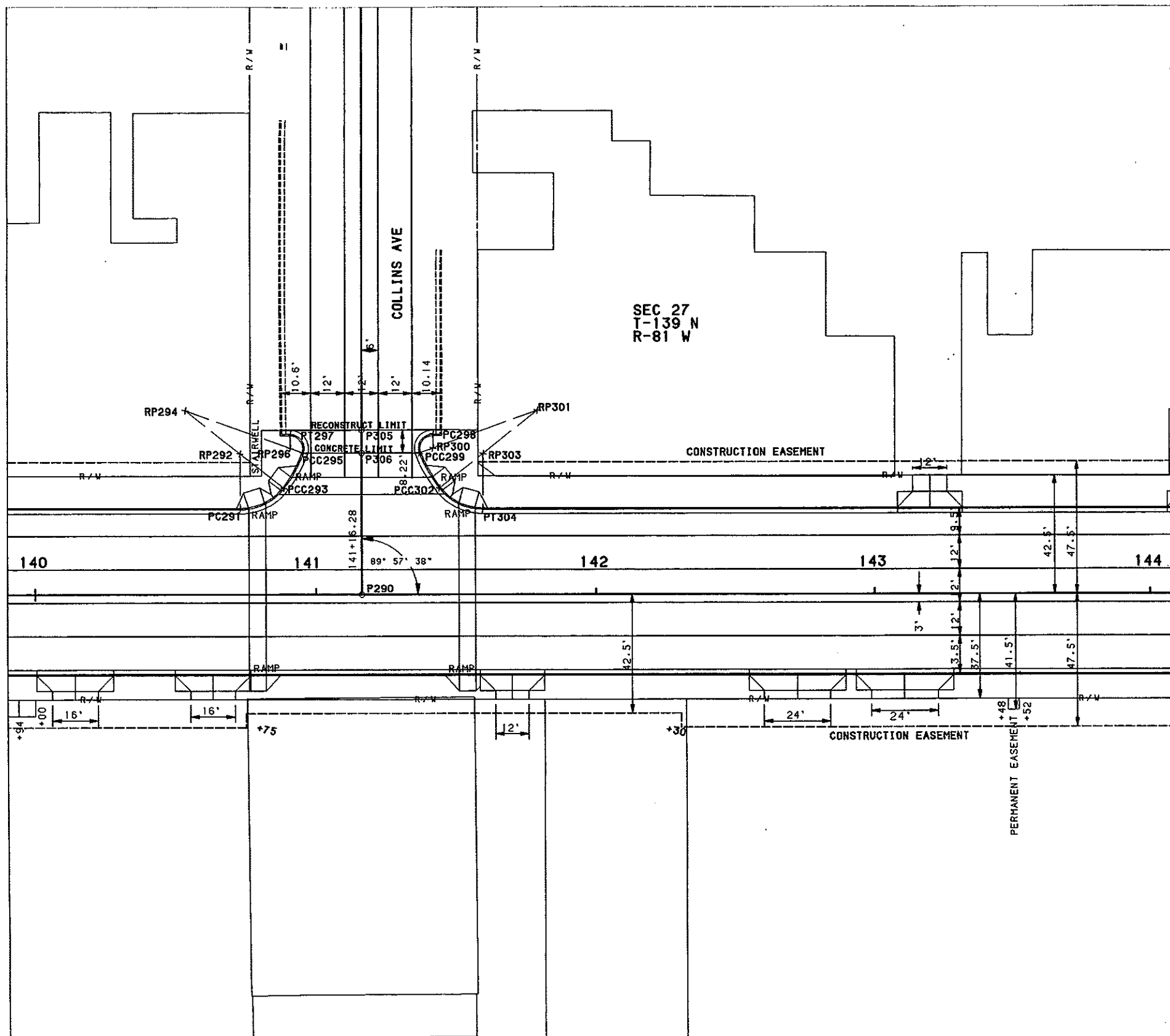
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P250	15057.006	11674.572	137+35.57	CL SURVEY
PC251	15011.872	11696.813	136+95.56	30.5 LT SURVEY
RP252	15008.029	11716.440	136+95.56	50.5 LT SURVEY
PT253	15027.655	11720.290	137+15.56	50.507 LT SURVEY
RADIUS 20'				
RP254	15024.434	11726.319	137+13.55	57.042 LT SURVEY
RADIUS 2'				
RP255	15018.980	11726.869	137+08.31	58.630 LT SURVEY
RADIUS 2'				
RP256	15019.913	11730.363	137+09.89	61.879 LT SURVEY
RADIUS 5'				
RP257	15069.743	11741.519	137+60.94	63.253 LT SURVEY
RADIUS 5'				
RP258	15071.629	11729.893	137+60.55	51.481 LT SURVEY
RADIUS 5'				
PC259	15066.912	11727.963	137+55.55	51.482 LT SURVEY
RP260	15086.539	11731.813	137+75.56	50.5 LT SURVEY
PT261	15090.382	11712.185	137+75.56	30.5 LT SURVEY
RADIUS 20'				
P262	15043.732	11742.231	137+35.55	68.949 LT SURVEY
P263	15047.284	11724.127	137+35.56	50.5 LT SURVEY
264-289 NOT USED				



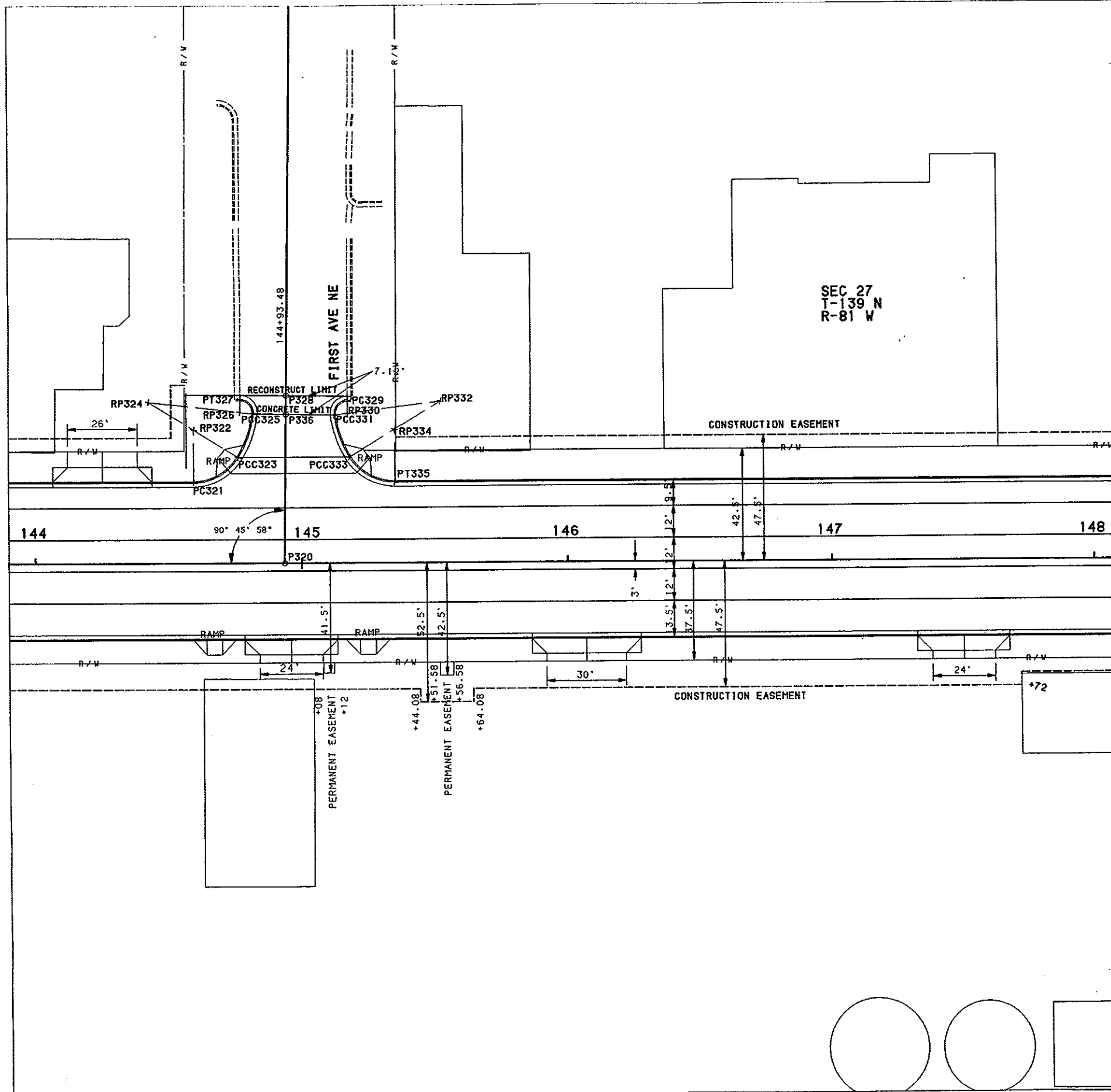
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
P290	15430.618	11747.726	141+16.28 CL	SURVEY
PC291	15382.224	11769.330	140+72.94 30.5 LT	SURVEY
RP292	15378.381	11788.957	140+72.94 50.5 LT	SURVEY
RADIUS 20'				
PCC293	15396.163	11779.803	140+88.63 38.1 LT	SURVEY
RP294	15356.154	11800.399	140+53.33 66.0 LT	SURVEY
RADIUS 45'				
PCC295	15400.630	11793.561	140+95.66 50.743 LT	SURVEY
RP296	15395.689	11794.321	140+90.96 52.439 LT	SURVEY
PC297	15394.725	11799.226	140+90.95 57.438 LT	SURVEY
RADIUS 5'				
PC298	15444.528	11809.017	141+41.71 57.476 LT	SURVEY
PCC299	15441.171	11801.542	141+36.98 50.786 LT	SURVEY
RP300	15445.464	11804.105	141+41.68 52.476 LT	SURVEY
RADIUS 5'				
RP301	15479.807	11824.611	141+79.33 66.0 LT	SURVEY
RADIUS 45'				
PCC302	15450.522	11790.444	141+44.02 38.098 LT	SURVEY
RP303	15463.538	11805.629	141+59.71 50.5 LT	SURVEY
PT304	15467.381	11786.002	141+59.71 30.5 LT	SURVEY
RADIUS 20'				
P305	15419.326	11805.609	141+16.32 58.974 LT	SURVEY
P306	15420.898	11797.551	141+16.32 50.764 LT	SURVEY
307-319 NOT USED				



ALIGNMENT LAYOUT DATA

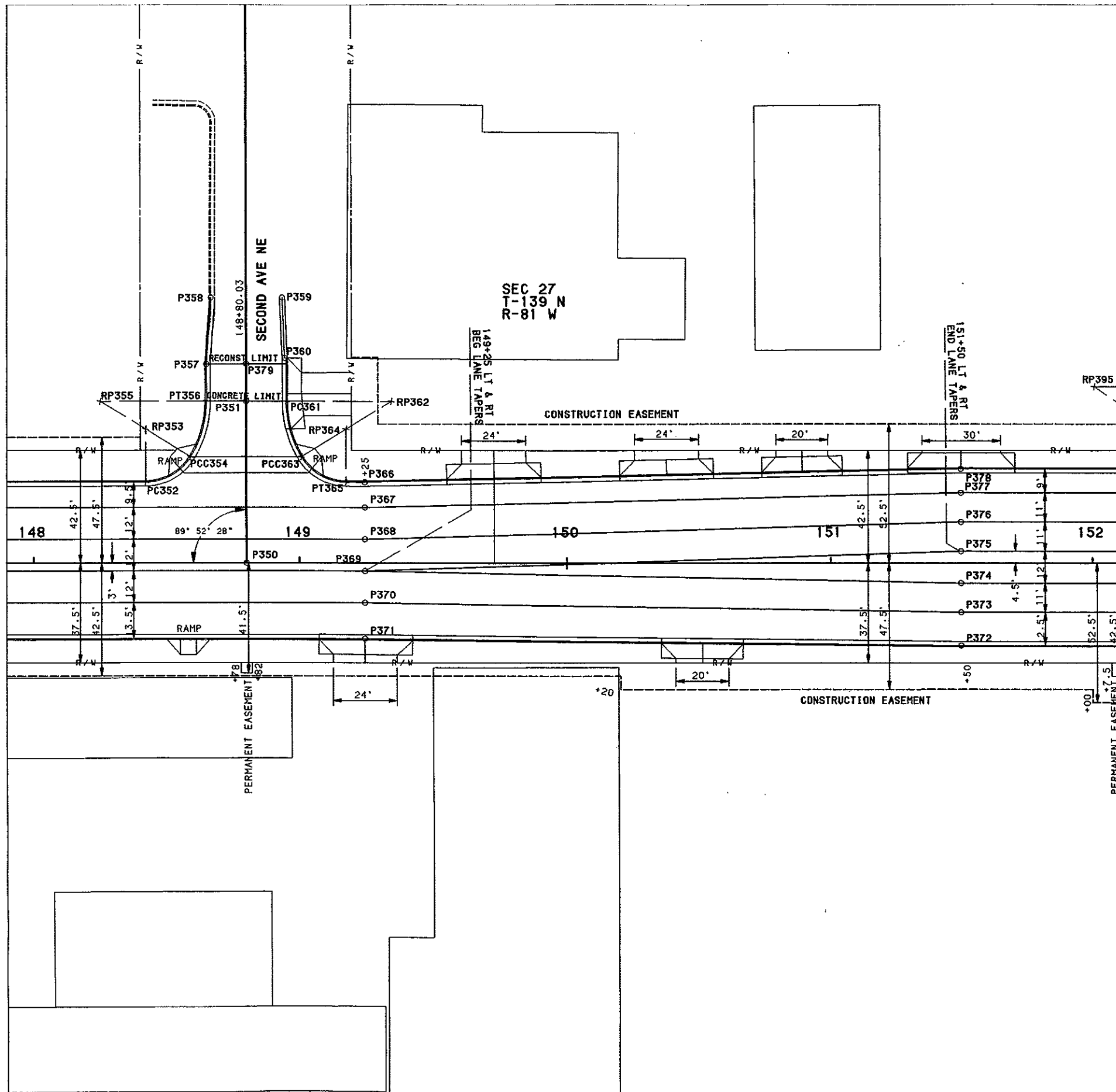
POINT	EASTING	NORTHING	STATION		ALIGNMENT
P320	15800.787	11820.206	144+93.48	CL	SURVEY
PC321	15761.397	11843.572	144+59.31	30.5 LT	SURVEY
RP322	15757.554	11863.199	144+59.31	50.5 LT	SURVEY
				RADIUS 20'	
PCC323	15776.276	11856.165	144+76.33	40.0 LT	SURVEY
RP324	15738.831	11870.233	144+42.29	61.0 LT	SURVEY
				RADIUS 40'	
PCC325	15778.707	11873.389	144+82.03	56.435 LT	SURVEY
RP326	15773.722	11872.995	144+77.06	57.006 LT	SURVEY
PT327	15772.827	11877.915	144+77.13	62.006 LT	SURVEY
				RADIUS 5'	
P328	15789.459	11882.465	144+94.33	63.276 LT	SURVEY
PC329	15812.621	11885.226	145+17.59	61.534 LT	SURVEY
RP330	15813.581	11880.319	145+17.59	56.534 LT	SURVEY
				RADIUS 5'	
PCC331	15808.837	11878.740	145+12.63	55.896 LT	SURVEY
RP332	15846.790	11891.371	145+52.30	61.0 LT	SURVEY
				RADIUS 40'	
PCC333	15817.415	11864.220	145+18.25	40.0 LT	SURVEY
RP334	15832.103	11877.796	145+35.28	50.5 LT	SURVEY
PT335	15835.946	11858.169	145+35.28	30.5 LT	SURVEY
				RADIUS 20'	
P336	15790.722	11875.523	144+94.23	56.22 LT	SURVEY
337-349 NOT USED					



ALIGNMENT LAYOUT DATA

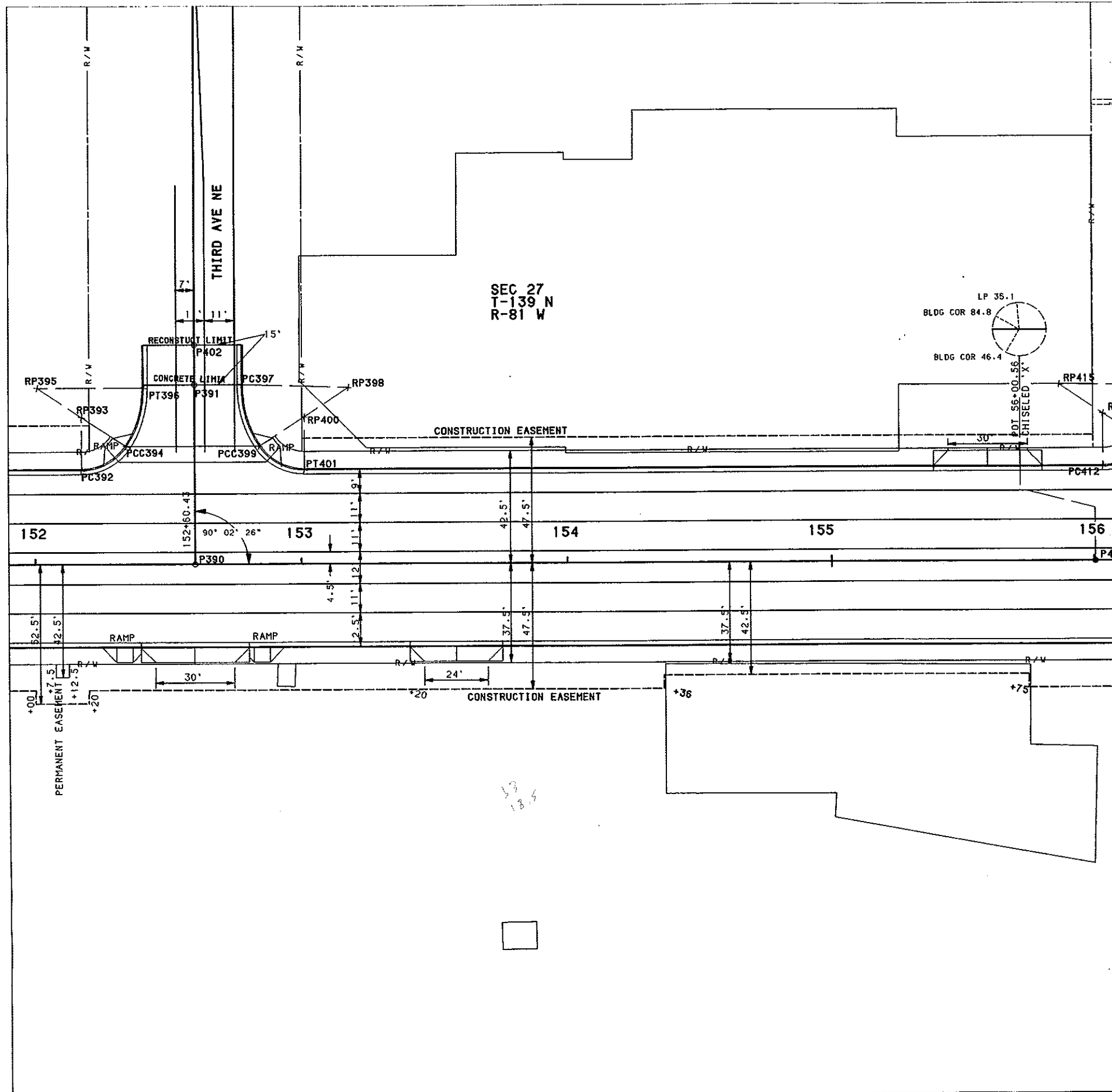
POINT	EASTING	NORTHING	STATION	ALIGNMENT
P350	16180.131	11894.483	148+80.03 CL	SURVEY
P351	16168.278	11954.320	148+79.89 61.0 LT	SURVEY
PC352	16136.868	11917.090	148+41.91 30.5 LT	SURVEY
RP353	16133.025	11936.717	148+41.91 50.5 LT	SURVEY
RADIUS 20'				
PCC354	16151.747	11929.682	148+58.93 40.0 LT	SURVEY
RP355	16114.303	11943.752	148+24.89 61.0 LT	SURVEY
PT356	16153.541	11951.524	148+64.89 61.088 LT	SURVEY
RADIUS 40'				
P357	16150.844	11965.139	148+64.86 74.967 LT	SURVEY
P358	16147.799	11990.021	148+66.65 99.971 LT	SURVEY
P359	16173.908	11995.173	148+93.27 100.01 LT	SURVEY
P360	16178.376	11972.819	148+94.27 77.216 LT	SURVEY
PC361	16183.016	11957.116	148+94.89 60.912 LT	SURVEY
RP362	16222.254	11964.888	149+34.89 61.0 LT	SURVEY
RADIUS 40'				
PCC363	16192.874	11937.735	149+00.85 40.0 LT	SURVEY
RP364	16207.567	11951.312	149+17.87 50.5 LT	SURVEY
PT365	16211.410	11931.685	149+17.87 30.5 LT	SURVEY
RADIUS 20'				
P366	16218.311	11933.546	149+25.00 30.5 LT	SURVEY
P367	16220.232	11923.734	149+25.00 21.0 LT	SURVEY
P368	16222.538	11911.957	149+25.00 9.0 LT	SURVEY
P369	16224.843	11900.181	149+25.00 3.0 RT	SURVEY
P370	16227.149	11888.405	149+25.00 15.0 RT	SURVEY
P371	16229.743	11875.157	149+25.00 28.5 RT	SURVEY
P372	16451.031	11915.938	151+50.00 31.0 RT	SURVEY
P373	16448.629	11928.204	151+50.00 18.5 RT	SURVEY
P374	16446.515	11938.999	151+50.00 7.5 RT	SURVEY
P375	16444.209	11950.775	151+50.00 4.5 LT	SURVEY
P376	16442.095	11961.571	151+50.00 15.5 LT	SURVEY
P377	16439.981	11972.365	151+50.00 26.5 LT	SURVEY
P378	16438.252	11981.197	151+50.00 35.5 LT	SURVEY
P379	16165.558	11968.055	148+79.86 75.0 LT	SURVEY

380-389 NOT USED

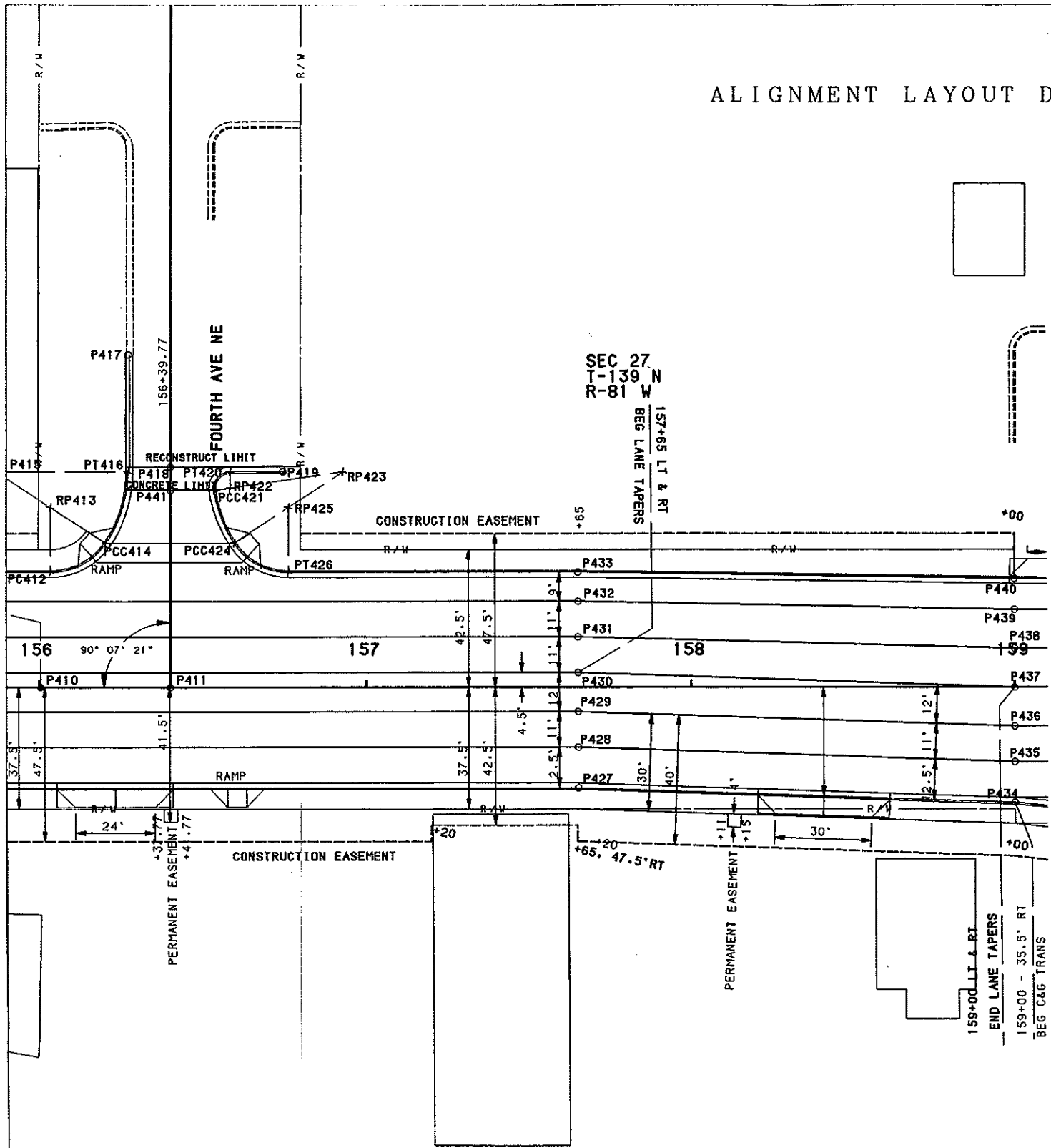


ALIGNMENT LAYOUT DATA

POINTS	EASTING	NORTHING	STATION	ALIGNMENTS
P390	16553.444	11967.578	152+60.43	CL SURVEY
P391	16540.390	12033.998	152+60.38	67.69 LT SURVEY
PC392	16504.531	11994.175	152+17.54	35.5 LT SURVEY
RP393	16500.689	12013.802	152+17.54	55.5 LT SURVEY
				RADIUS 20'
PCC394	16519.194	12006.215	152+34.24	44.5 LT SURVEY
RP395	16482.184	12021.388	152+00.84	66.5 LT SURVEY
PT396	16521.211	12030.228	152+40.84	66.554 LT SURVEY
				RADIUS 40'
PC397	16557.637	12037.388	152+77.96	67.703 LT SURVEY
RP398	16597.105	12043.890	153+17.94	66.5 LT SURVEY
				RADIUS 40'
PCC399	16568.906	12016.230	152+84.53	44.5 LT SURVEY
RP400	16582.827	12029.885	153+01.24	55.5 LT SURVEY
PT401	16586.670	12010.258	153+01.24	35.5 LT SURVEY
				RADIUS 20'
P402	16537.497	12048.716	152+60.37	82.69 LT SURVEY
403-409 NOT USED				



ALIGNMENT LAYOUT DATA

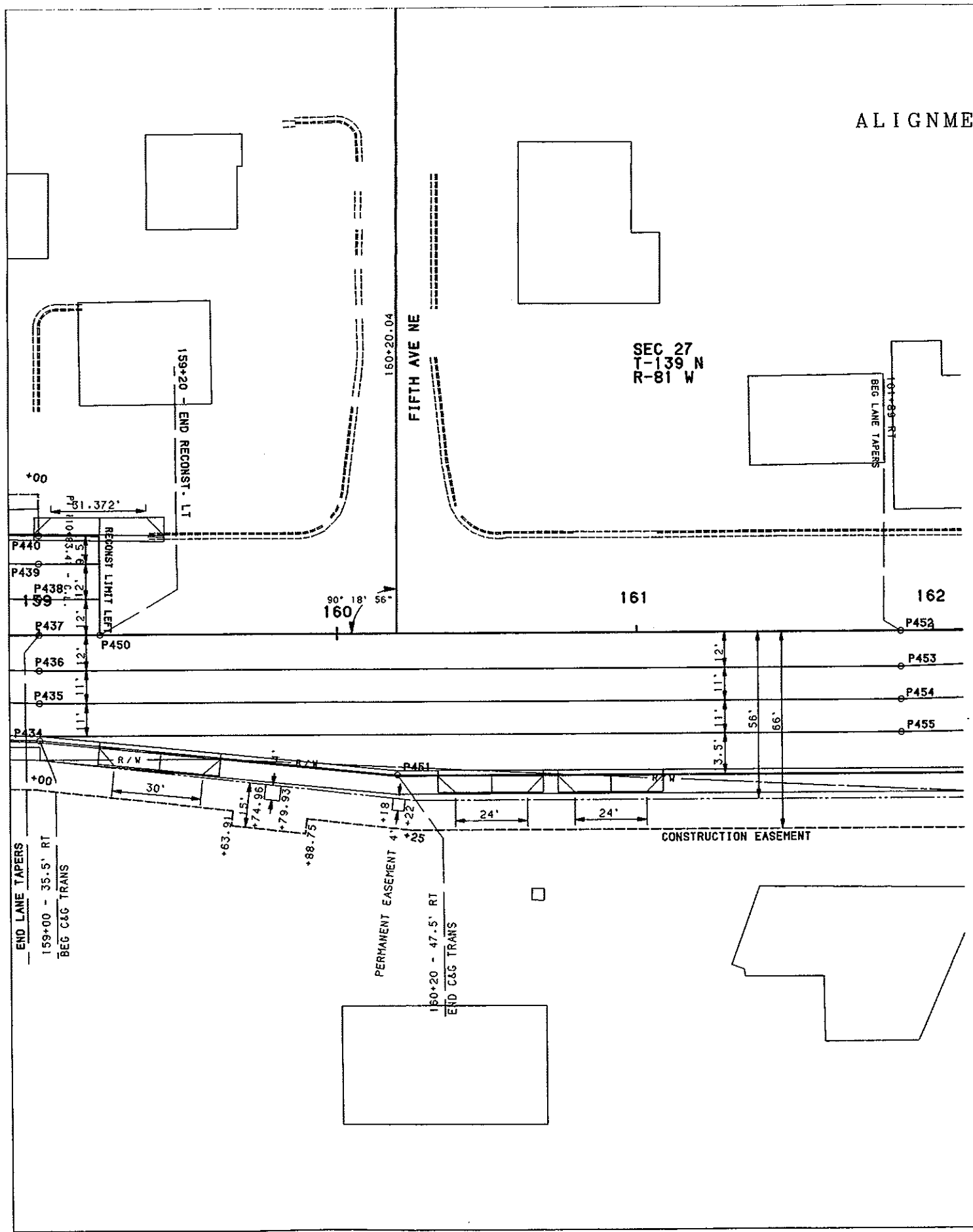


POINT	EASTING	NORTHING	STATION	ALIGNMENT
P410	16887.240	12032.937	156+00.56	CL SURVEY
P411	16925.716	12040.470	156+39.77	CL SURVEY
PC412	16883.414	12068.362	156+03.62	35.5 LT SURVEY
RP413	16879.571	12087.989	156+03.62	55.5 LT SURVEY
RADIUS 20'				
PCC414	16898.077	12080.404	156+20.32	44.501 LT SURVEY
RP415	16861.065	12095.574	155+86.91	66.5 LT SURVEY
PT416	16900.336	12103.176	156+26.91	66.414 LT SURVEY
RADIUS 40'				
P417	16893.645	12138.764	156+27.18	102.625 LT SURVEY
P418	16912.792	12107.231	156+39.91	68.0 LT SURVEY
P419	16947.019	12112.420	156+74.50	66.515 LT SURVEY
PC420	16931.088	12109.354	156+58.28	66.568 LT SURVEY
PCC421	16927.309	12102.802	156+53.31	60.864 LT SURVEY
RP422	16932.032	12104.444	156+58.26	61.568 LT SURVEY
RADIUS 5'				
RP423	16965.090	12115.942	156+92.91	66.5 LT SURVEY
PCC424	16936.533	12087.934	156+59.50	44.5 LT SURVEY
RADIUS 40'				
RP425	16950.811	12101.938	156+76.21	55.5 LT SURVEY
PT426	16954.654	12082.311	156+76.21	35.5 LT SURVEY
RADIUS 20'				
P427	17054.570	12034.112	157+65.00	31.0 RT SURVEY
P428	17052.168	12046.379	157+65.00	18.5 RT SURVEY
P429	17050.054	12057.174	157+65.00	7.5 RT SURVEY
P430	17047.748	12068.950	157+65.00	4.5 LT SURVEY
P431	17045.634	12079.745	157+65.00	15.5 LT SURVEY
P432	17043.521	12090.540	157+65.00	26.5 LT SURVEY
P433	17041.791	12099.372	157+65.00	35.5 LT SURVEY
P434	17187.918	12055.636	159+00.00	35.5 RT SURVEY
P435	17185.517	12067.903	159+00.00	23.0 RT SURVEY
P436	17183.403	12078.698	159+00.00	12.0 RT SURVEY
P437	17181.097	12090.475	159+00.00	CL SURVEY
P438	17178.791	12102.251	159+00.00	12.0 LT SURVEY
P439	17176.486	12114.027	159+00.00	24.0 LT SURVEY
P440	17174.661	12123.347	159+00.00	33.5 LT SURVEY
P441	16914.143	12100.254	156+39.90	60.893 LT SURVEY

442-449 NOT USED

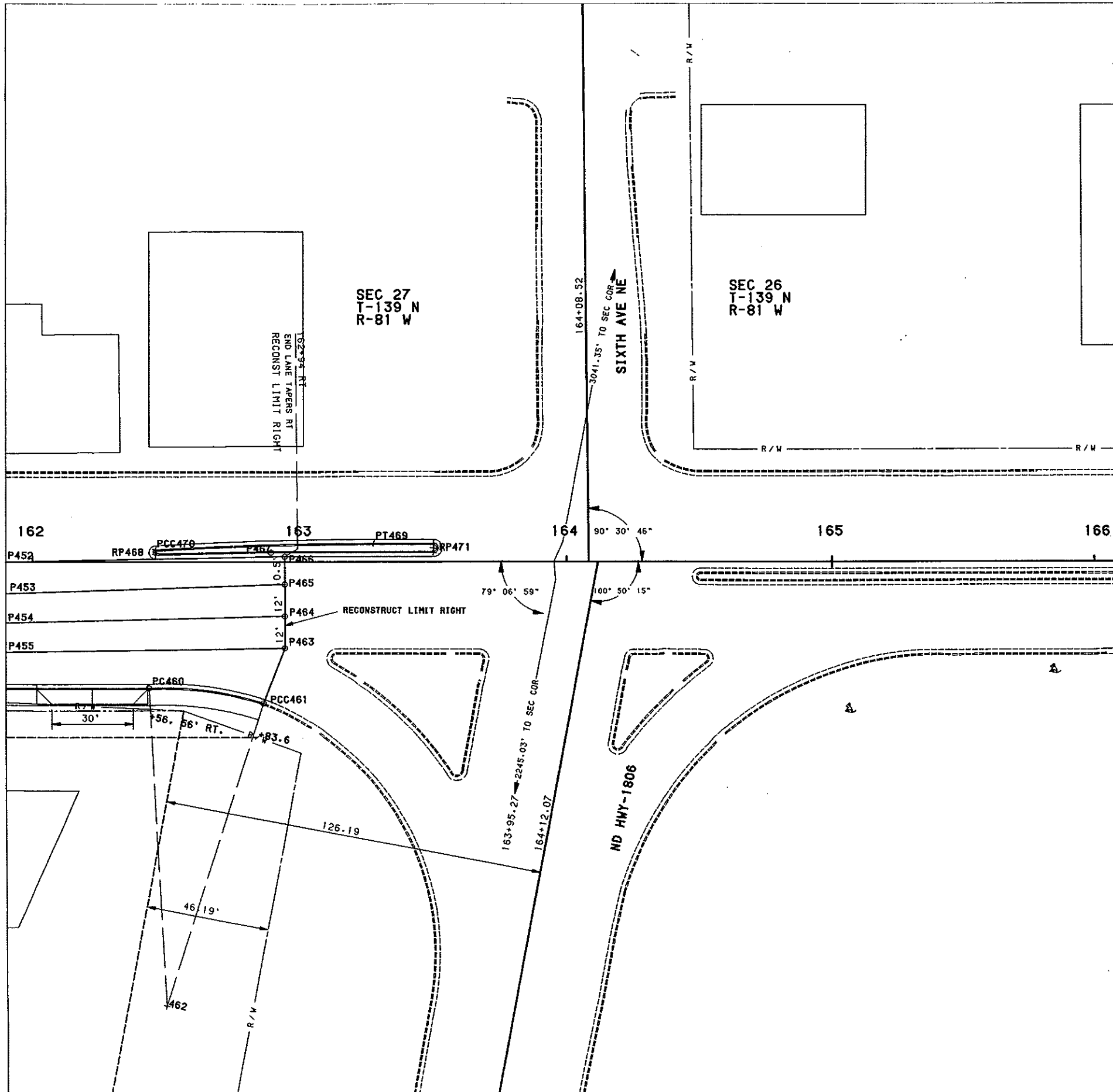
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTING	STATION	ALIGNMENT
P450	17200.724	12094.318	159+20.00 CL	SURVEY
P451	17307.988	12066.919	160+20.00 47.5 RT	SURVEY
P452	17465.692	12146.199	161+89.00 CL	SURVEY
P453	17467.018	12134.231	161+89.00 12.0 LT	SURVEY
P454	17469.131	12123.436	161+89.00 23.0 LT	SURVEY
P455	17471.244	12112.641	161+89.00 34.0 LT	SURVEY
456-459 NOT USED				



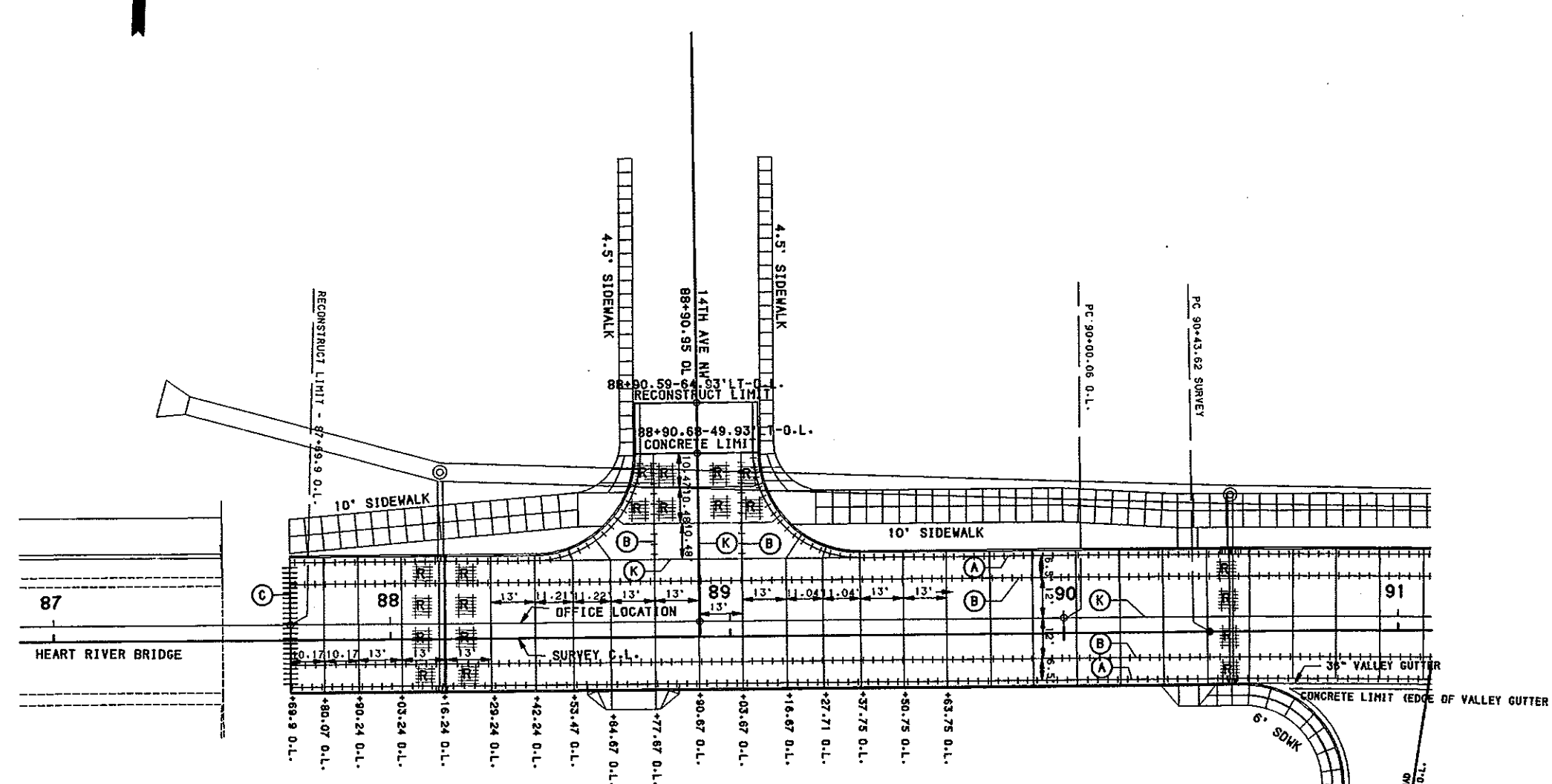
ALIGNMENT LAYOUT DATA

POINT	EASTING	NORTHING	STATION	ALIGNMENT
PC460	17526.833	12109.770	162+43.00	47.5 RT SURVEY
PCC461	17570.187	12112.423	162+86.06	53.226 RT SURVEY
RP462	17555.677	11993.972	162+49.06	166.681 RT SURVEY
RADIUS 119.336'				
P463	17573.999	12134.290	162+94.00	32.5 RT SURVEY
P464	17571.694	12146.066	162+94.00	20.5 RT SURVEY
P465	17569.389	12157.843	162+94.00	8.5 RT SURVEY
P466	17567.371	12168.147	162+94.00	2.0 LT SURVEY
P467	17562.064	12168.636	162+88.89	3.5 LT SURVEY
RP468	17519.549	12160.447	162+45.59	3.633 LT SURVEY
RADIUS 1'				
PT469	17599.315	12179.496	163+27.53	7.0 LT SURVEY
PCC470	17519.300	12161.416	162+45.53	4.632 LT SURVEY
RADIUS 1419.223'				
RP471	17621.458	12182.050	163+49.75	5.252 LT SURVEY
RADIUS 5'				



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	81



HOT BITUMINOUS PAVEMENT CL. 27	
14TH AVE NW INTERSECTION	20.28 TON
SUNNY ROAD APPROACH	75.77 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE	
14TH AVE NW INTERSECTION	164.35 SY
87+69.9 O.L. TO 91+00 O.L.	1357.10 SY
DOWELED CONTRACTION JOINT ASSEMBLY	
87+89.9 O.L. - LT. & RT.	37.0 LF
DOWEL BARS	
87+89.9 O.L. - LT. & RT.	24 EA
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
87+69.9 O.L. TO 91+00 O.L.	1065.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
87+89.9 O.L. TO 91+00 O.L.	457.0 LF
CONTRACTION JOINT SILICONE SEAL	
87+89.9 O.L. LT. & RT.	37.0 LF
CURB & GUTTER - TYPE I	
87+89.9 O.L. TO 91+00 O.L.- LEFT	367.8 LF
87+89.9 O.L. TO 91+00 O.L.- RIGHT	335.6 LF
VALLEY GUTTER - 36 IN.	
SUNNY ROAD	31.6 SY
SIDEWALK CONCRETE	
87+89.9 O.L. TO 91+00 O.L.-LEFT	378.5 SY
87+89.9 O.L. TO 91+00 O.L.-RIGHT	45.2 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH	
88+71.03 RT. - 16' TYPE I	13.8 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2"X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4"X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 87+00 TO 91+00
FILE: PAYELAY1.GRF



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	82

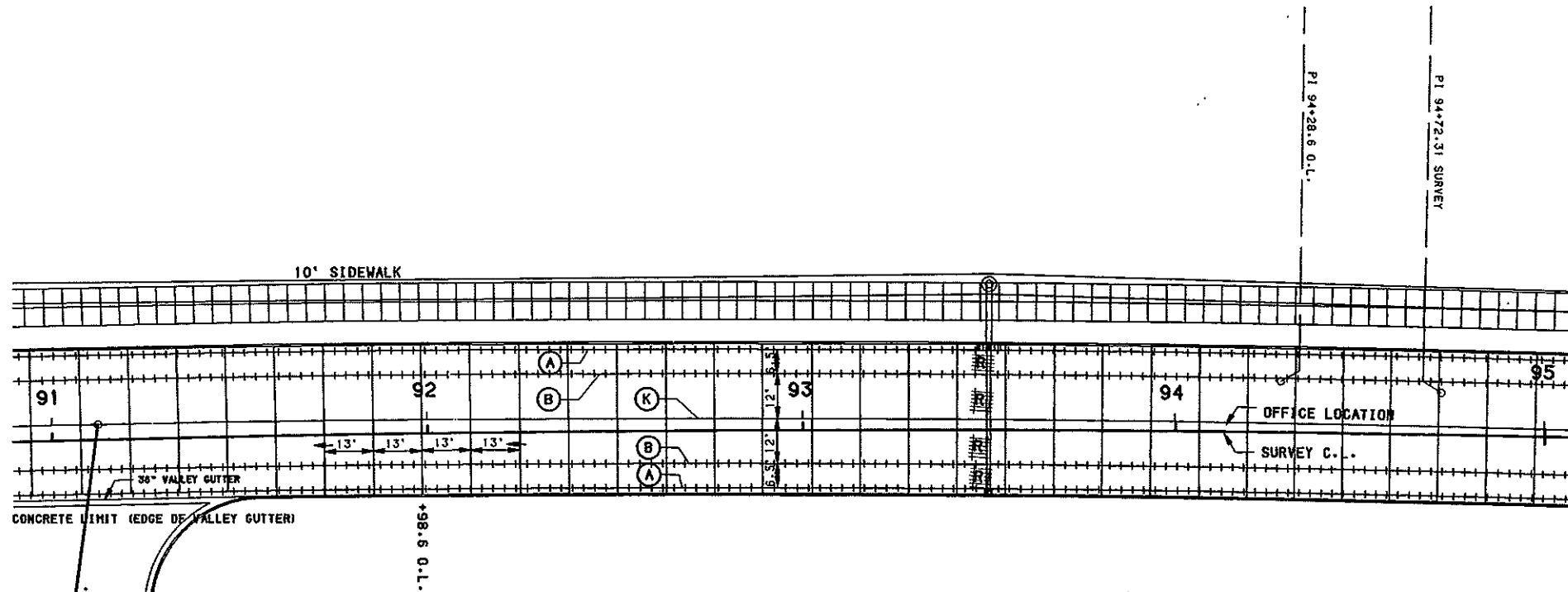
10 IN. NON-REINF. CONC. PVMT. CL. AE
91+00 O.L. TO 95+00 O.L. 1644.4 SY

PREFORMED COMP. JOINT SEAL - 9/16 IN.
91+00 O.L. TO 95+00 O.L. 1147.0 LF

LONGITUDINAL JOINT SILICONE SEAL
91+00 O.L. TO 95+00 O.L. 400.0 LF

CURB & GUTTER - TYPE 1
91+00 O.L. TO 95+00 O.L. - LEFT 400.0 LF
91+00 O.L. TO 95+00 O.L. - RIGHT 397.1 LF

SIDEWALK CONCRETE
91+00 O.L. TO 95+00 O.L. - LEFT 444.5 SY



- ▨ PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT Poured SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
PRICE BID FOR CONCRETE PAVEMENT.

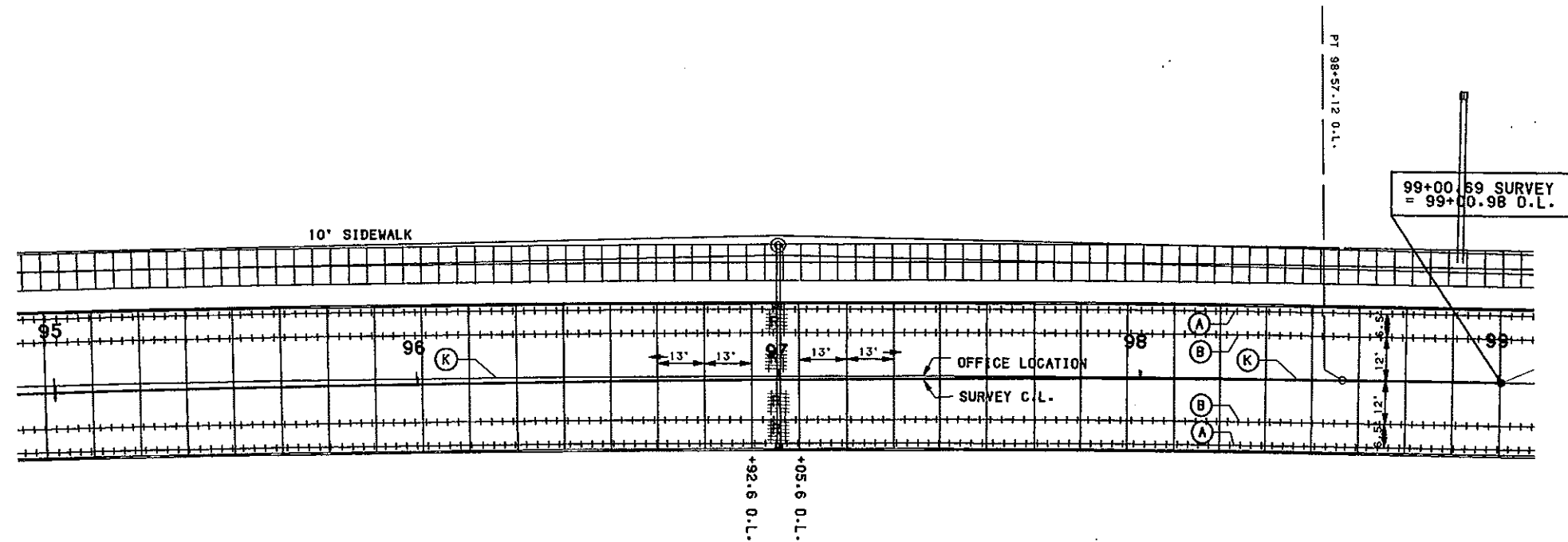
PROJECT LOCATION STATION 91+00 TO 95+00
FILE: PAVELAY1.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	83



<u>10 IN. NON-REINF. CONC. PYMT. CL. AE</u>	
95+00 O.L. TO 99+00 O.L.	1644.4 SY
<u>PREFORMED COMP. JOINT SEAL - 9/16 IN.</u>	
95+00 O.L. TO 99+00 O.L.	1110.0 LF
<u>LONGITUDINAL JOINT SILICONE SEAL</u>	
95+00 O.L. TO 99+00 O.L.	400.0 LF
<u>CURB & GUTTER - TYPE J</u>	
95+00 O.L. TO 99+00 O.L. - LEFT	400.0 LF
95+00 O.L. TO 99+00 O.L. - RIGHT	400.0 LF
<u>SIDEWALK CONCRETE</u>	
95+00 O.L. TO 99+00 O.L. - LEFT	444.5 SY



- RE PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION STATION 95+00 TO 99+00 FILE: PAVELAY1.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	84

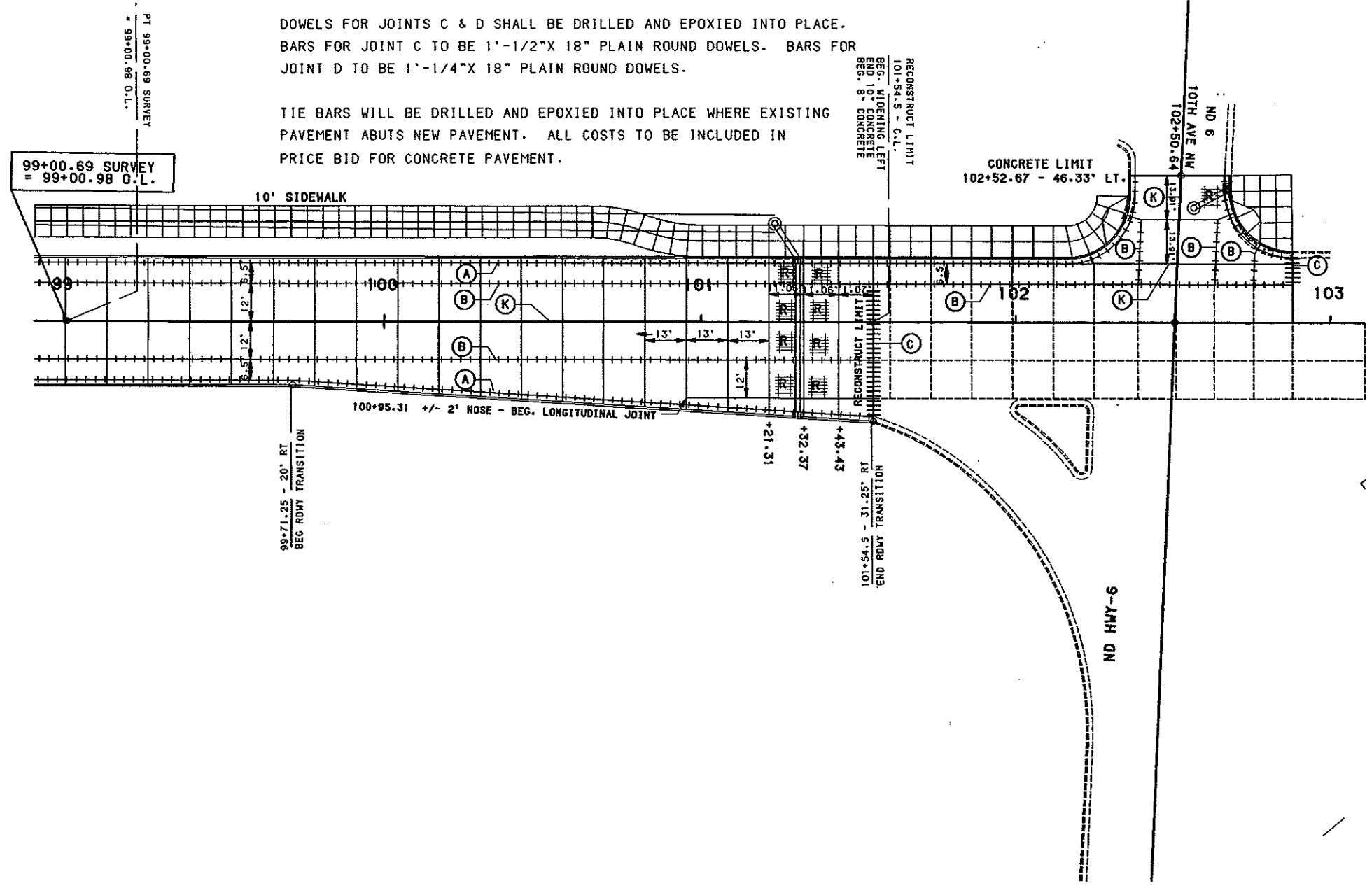
- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

8 IN. NON-REINF. CONC. PVMT. CL. AE	
101+54.5 TO 103+00	131.56 SY
10 IN. NON-REINF. CONC. PVMT. CL. AE	
99+00 TO 101+54.5	1145.50 SY
DOWELED CONTRACTION JOINT ASSEMBLY	
101+54.5 - LT. & RT.	41.75 LF
102+87.92 - LT.	8.50 LF
DOWEL BARS	
101+54.5 & 102+87.92 -LT.&RT.	32 EA
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
99+00 TO 103+00	809.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
99+00 TO 103+00	255.0 LF
CONTRACTION JOINT SILICONE SEAL	
101+54.5 - LT. & RT.	41.75 LF
102+87.92 - LT.	8.50 LF
CURB & GUTTER - TYPE I	
99+00 TO 103+00 - LEFT	349.3 LF
99+00 TO 103+00 - RIGHT	264.2 LF
SIDEWALK CONCRETE	
99+00 TO 103+00 - LEFT	375.1 SY

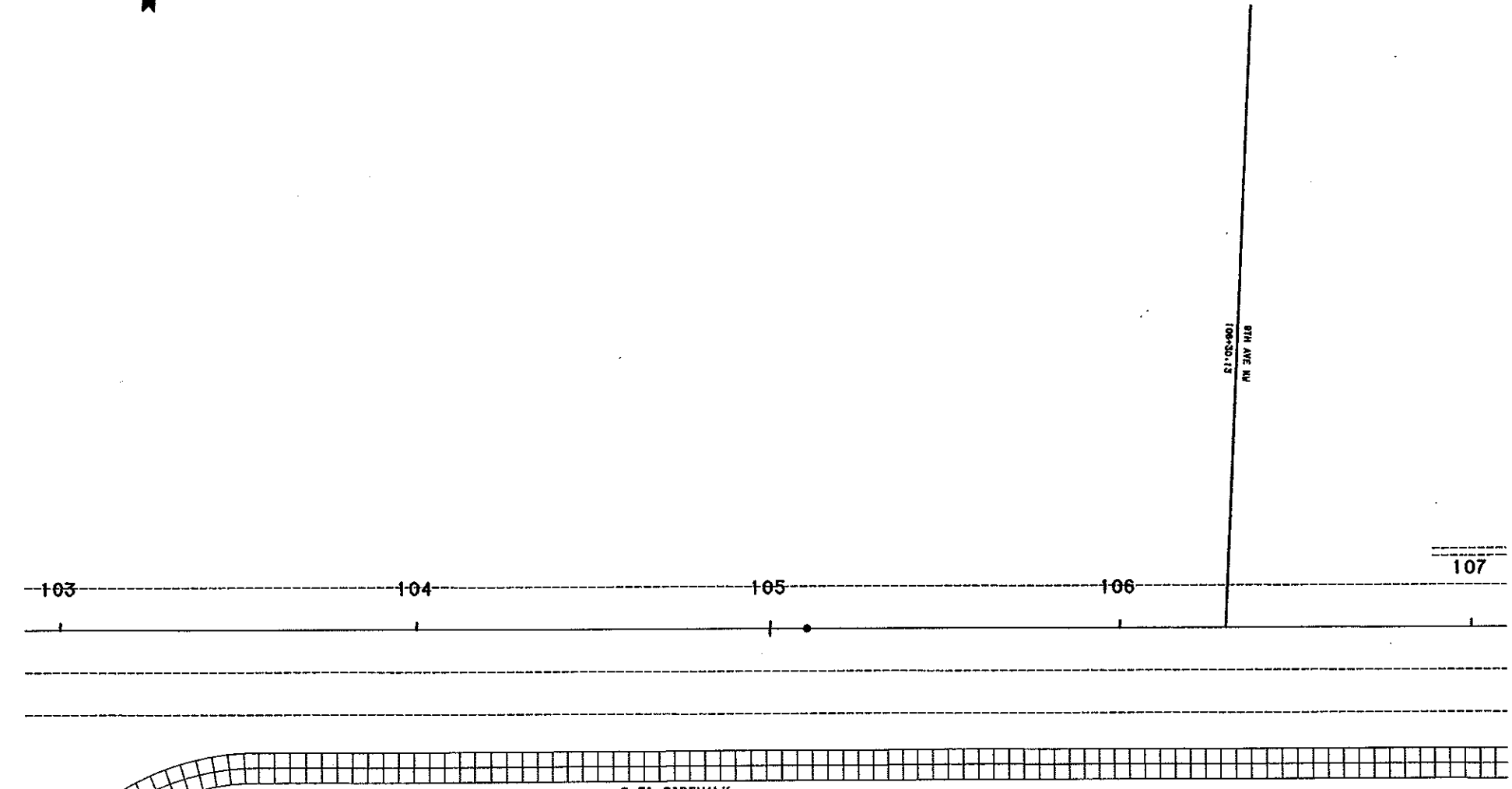


PROJECT LOCATION	
STATION 99+00 TO 103+00	
FILE:	PAVELAY1.GRF

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	85

PAVEMENT DETAILS

SIDEWALK CONCRETE
 103+00 TO 107+00 - RIGHT 371.4 SY



- ▣ PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" ϕ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDISTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
 STATION 103+00 TO 107+00
 FILE:
 PAVELAY2.GRF



PAVEMENT DETAILS

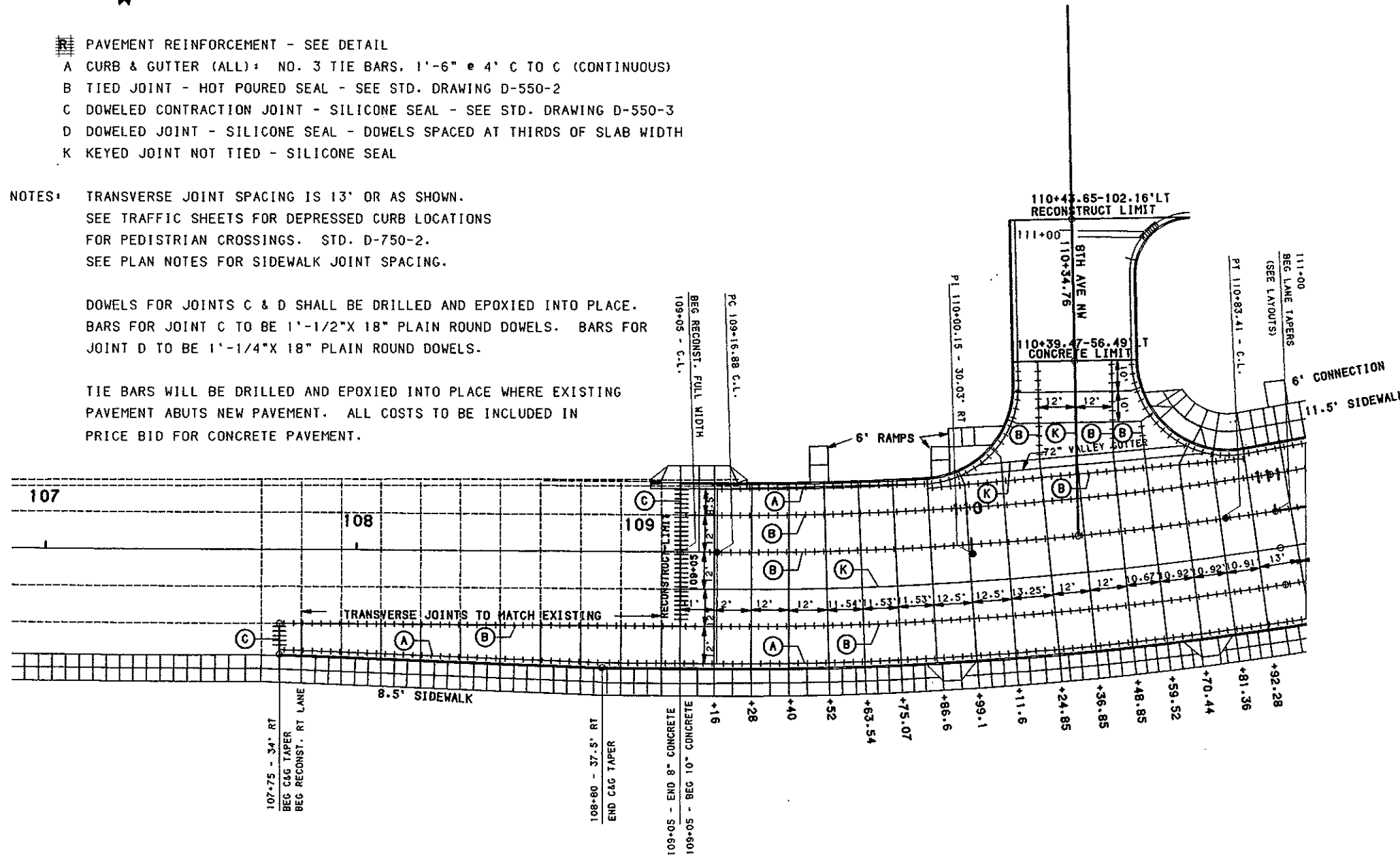
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	86

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
 - B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
 - C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
 - D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
 - K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE. BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.



HOT BITUMINOUS PAVEMENT CL. 27
 8TH AVE NW INTERSECTION 65.1 TON

8 IN. NON-REINF. CONC. PVMT. CL. AE
 107+75 TO 109+05 150.00 SY

10 IN. NON-REINF. CONC. PVMT. CL. AE
 8TH AVE NW INTERSECTION 193.32 SY
 107+00 TO 111+00 1224.16 SY

DOWELED CONTRACTION JOINT ASSEMBLY
 107+75 - RIGHT 8.5 LF
 109+05 - LEFT & RIGHT 44.5 LF

DOWEL BARS
 107+75 5 EA
 100+05 30 EA

PREFORMED COMP. JOINT SEAL - 9/16 IN.
 107+00 TO 111+00 358.0 LF

LONGITUDINAL JOINT SILICONE SEAL
 107+00 TO 111+00 1180.0 LF

CONTRACTION JOINT SILICONE SEAL
 107+75 - RIGHT 8.5 LF
 109+05 - LEFT & RIGHT 44.5 LF

CURB & GUTTER - TYPE I
 107+00 TO 111+00- LEFT 298.4 LF
 107+00 TO 111+00- RIGHT 330.7 LF

VALLEY GUTTER - 72 IN.
 8TH AVE NW 54.7 SY

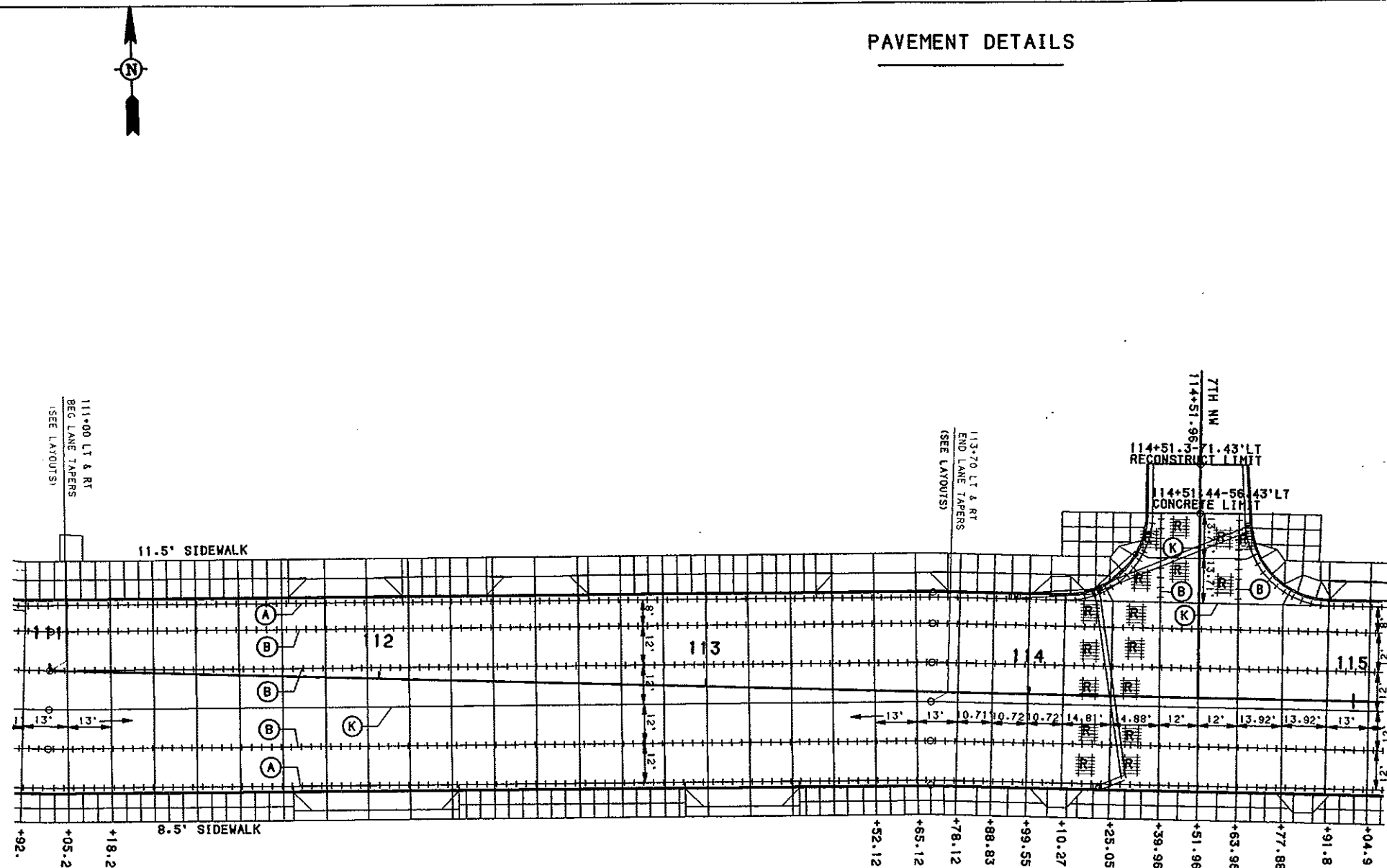
SIDEWALK CONCRETE
 107+00 TO 111+00 - RIGHT 377.8 SY
 107+00 TO 111+00 - LEFT 85.1 SY

DRIVEWAY CONC. HIGH EARLY STRENGTH
 109+11 LT. - 20' TYPE I 18.9 SY

PROJECT LOCATION
 STATION 107+00 TO 111+00
 FILE:
 PAVELAY2.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	87



HOT BITUMINOUS PAVEMENT CL. 27
7TH AVE NW INTERSECTION 15.3 TON

10 IN. NON-REINF. CONC. PYMT. CL. AE
7TH AVE NW INTERSECTION 120.48 SY
111+00 TO 115+00 2488.89 SY

PREFORMED COMP. JOINT SEAL - 9/16 IN.
111+00 TO 115+00 1778.0 LF

LONGITUDINAL JOINT SILICONE SEAL
111+00 TO 115+00 508.0 LF

CURB & GUTTER - TYPE I
111+00 TO 115+00 - LEFT 373.2 LF
111+00 TO 115+00 - RIGHT 400.0 LF

SIDEWALK CONCRETE
111+00 TO 115+00 - LEFT 364.3 SY
111+00 TO 115+00 - RIGHT 296.6 SY

DRIVEWAY CONC. HIGH EARLY STRENGTH
111+89.17 LT. - 24' TYPE 2 44.7 SY
112+48.11 LT. - 20' TYPE 2 39.6 SY
113+53.99 LT. - 30' TYPE 2 52.4 SY
113+13 RT. - 24' TYPE 2 33.0 SY

DRIVE CONC. - 8 IN. HIGH EARLY STRENGTH
112+00 RT. - 40' TYPE 2 48.2 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" e 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

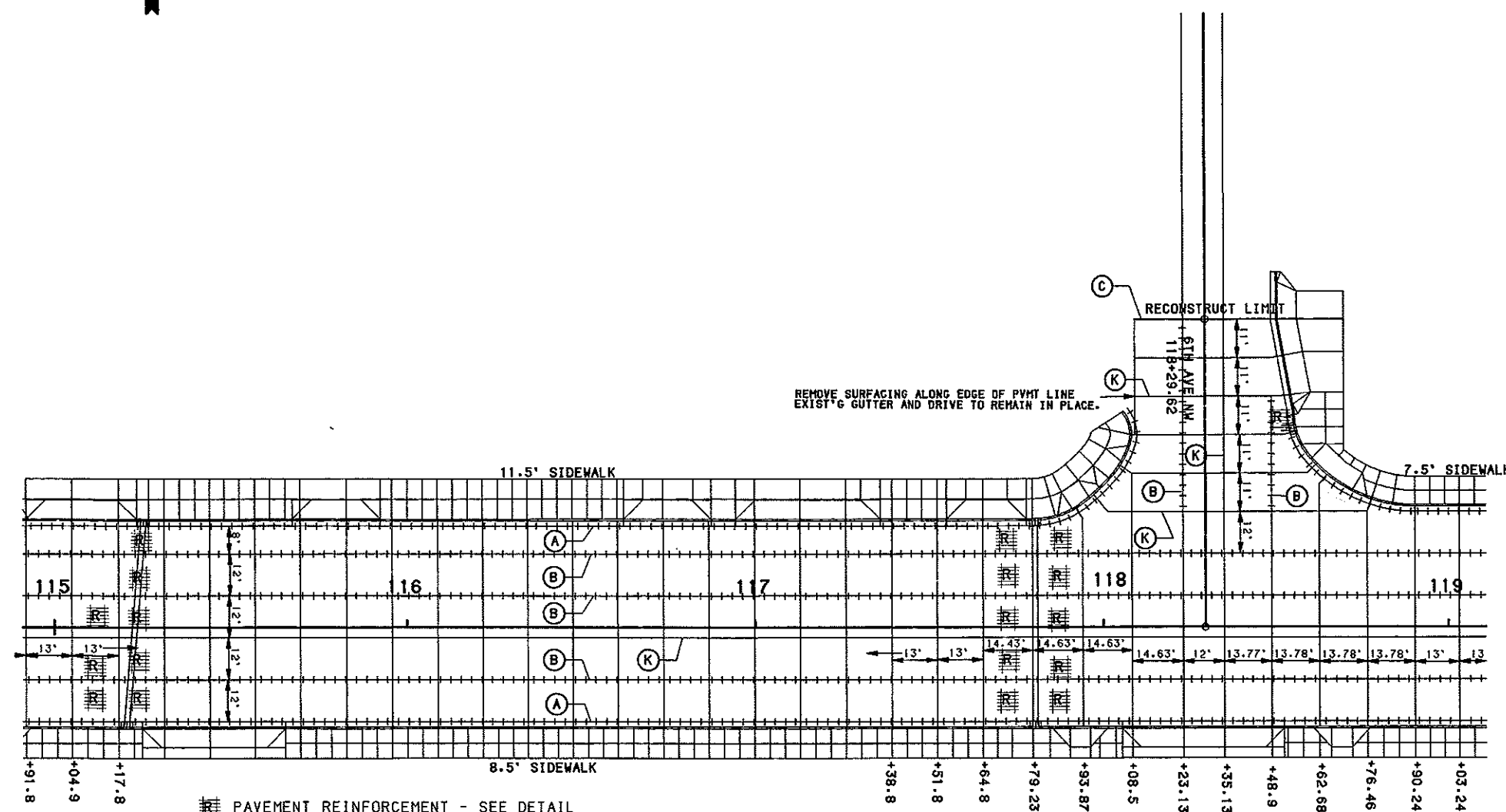
TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 111+00 TO 115+00
FILE:
PAVELAY2.GRF



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	88



10 IN. NON-REINF. CONC. PVMT. CL. AE	
6TH AVE NW INTERSECTION	323.26 SY
115+00 TO 119+00	2521.10 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
115+00 TO 119+00	1894.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
115+00 TO 119+00	577.0 LF
CURB & GUTTER - TYPE I	
115+00 TO 119+00 - LEFT	412.2 LF
115+00 TO 119+00 - RIGHT	400.0 LF
SIDEWALK CONCRETE	
115+00 TO 119+00 - LEFT	259.9 SY
115+00 TO 119+00 - RIGHT	294.7 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH	
115+07.43 LT. - 20' TYPE 2	39.6 SY
115+45 RT. - 30' TYPE 2	38.7 SY
115+80 LT. - 14' TYPE 2	31.9 SY
117+15 LT. - 30' TYPE 2	52.4 SY
117+66 LT. - 12' TYPE 2	29.4 SY
117+75 LT. - 14' TYPE 2	31.9 SY
118+34 RT. - 36' TYPE 2	44.4 SY
118+52.33-76.51' LT. - 29.22' TYPE 2	45.5 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

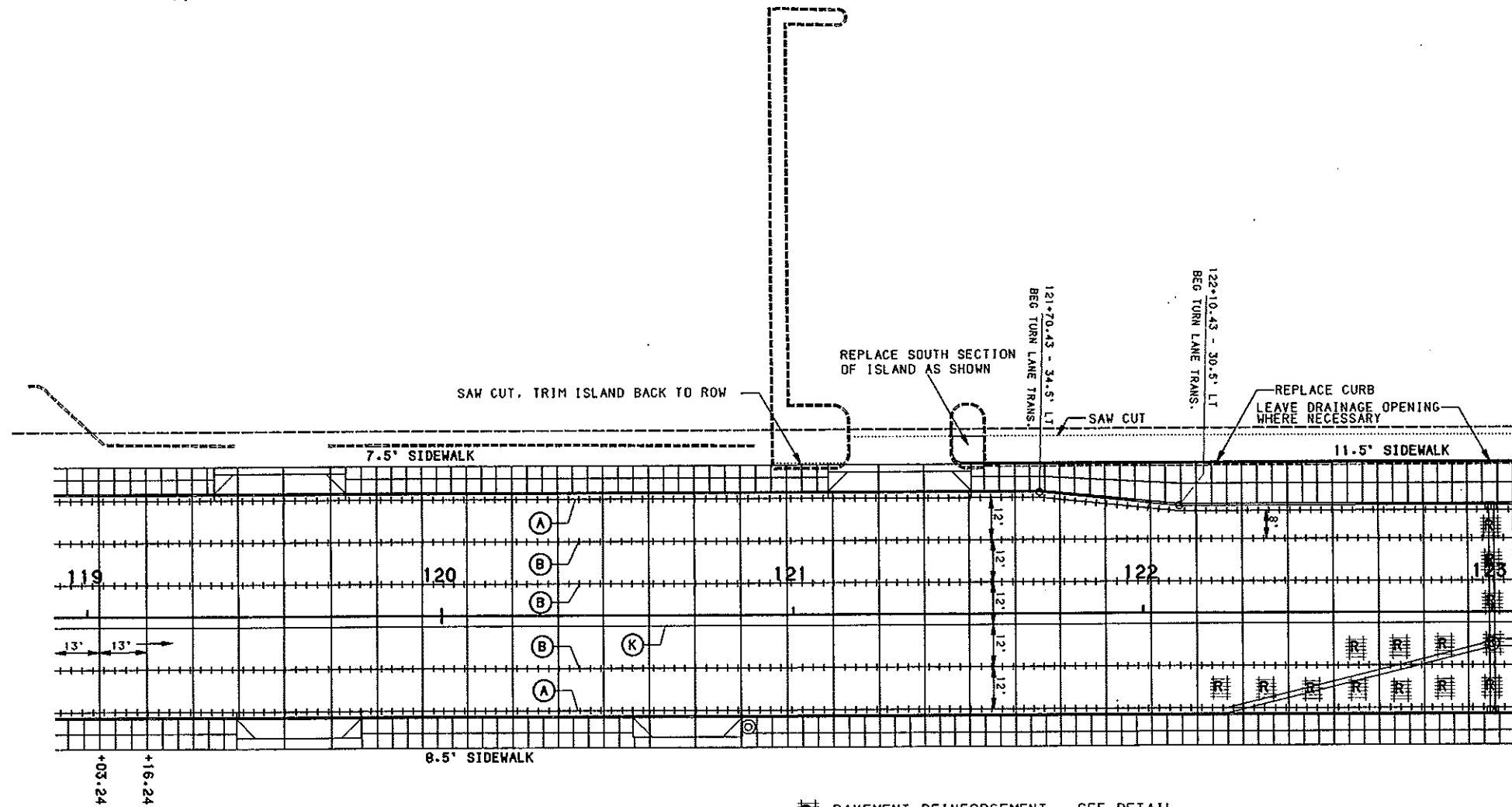
NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 115+00 TO 119+00
FILE: PAVELAY2-GRF

PAVEMENT DETAILS



10 IN. NON-REINF. CONC. PVMT. CL. AE
119+00 to 123+00 2617.97 SY

PREFORMED COMP. JOINT SEAL - 9/16 IN.
119+00 TO 123+00 1826.0 LF

LONGITUDINAL JOINT SILICONE SEAL
119+00 TO 123+00 400.0 LF

CURB & GUTTER - TYPE I
119+00 TO 123+00 - LEFT 400.2 LF
111+00 TO 123+00 - RIGHT 400.0 LF

SIDEWALK CONCRETE
119+00 TO 123+00 - LEFT 313.9 SY
119+00 TO 123+00 - RIGHT 315.5 SY

CONCRETE MEDIAN PAVING
121+68 45 LT. 7.2 SY

CURB
121+54.5 to 123+00 42.5 LT. 145.5 L.FT.

DRIVEWAY CONC. HIGH EARLY STRENGTH
119+54 LT. - 26' TYPE 2 30.8 SY
120+72 RT. - 20' TYPE 2 29.3 SY
121+30.5 LT. - 30' TYPE 2 34.2 SY

DRIVEWAY CONCRETE-8 IN. HIGH EARLY STRENGTH
119+59 RT. - 24' TYPE 2 33.0 SY

- ▨ PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" ϕ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
FOR PEDISTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

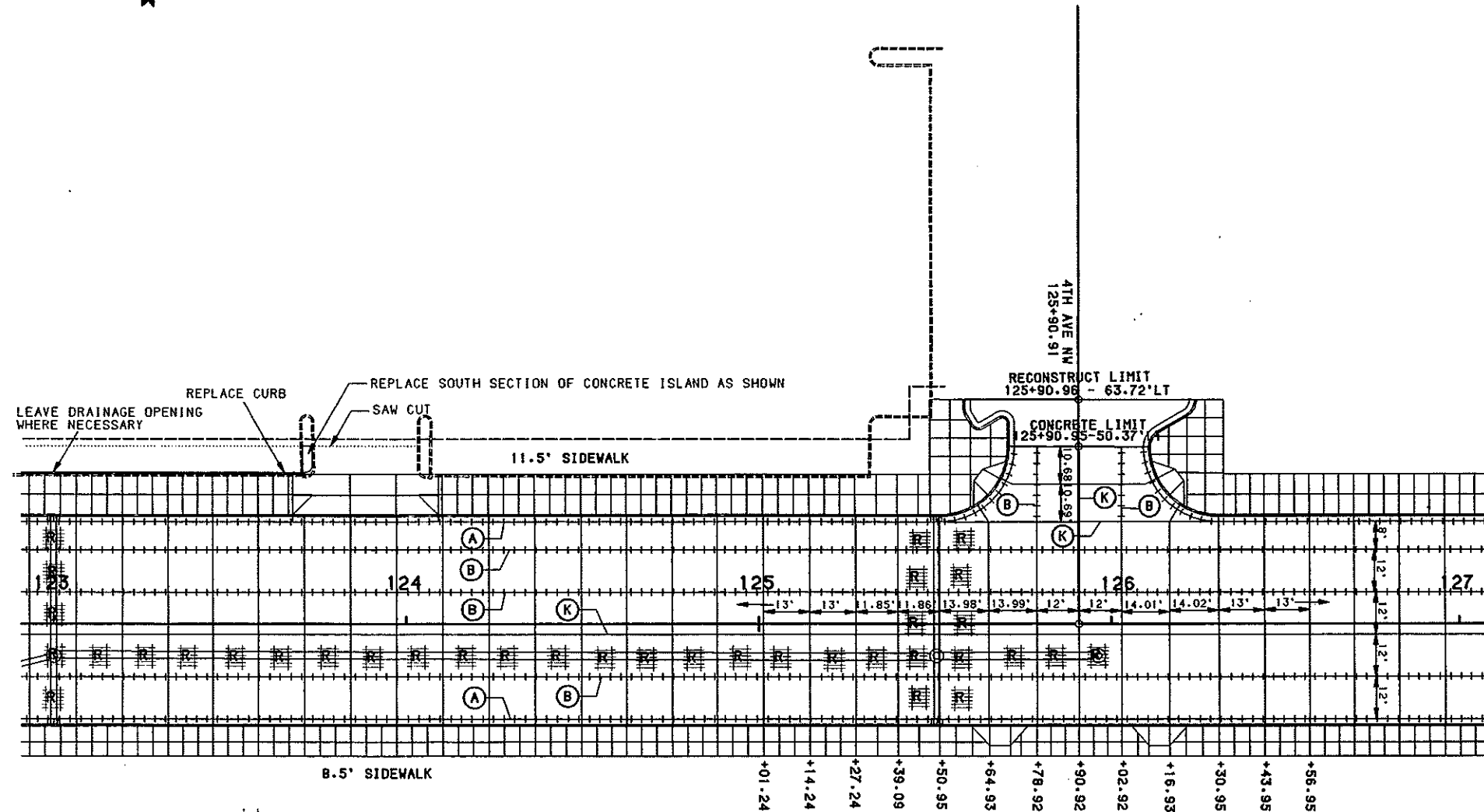
TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 119+00 TO 123+00
FILE:
PAVELAY3.GRF



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	90



- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" x 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

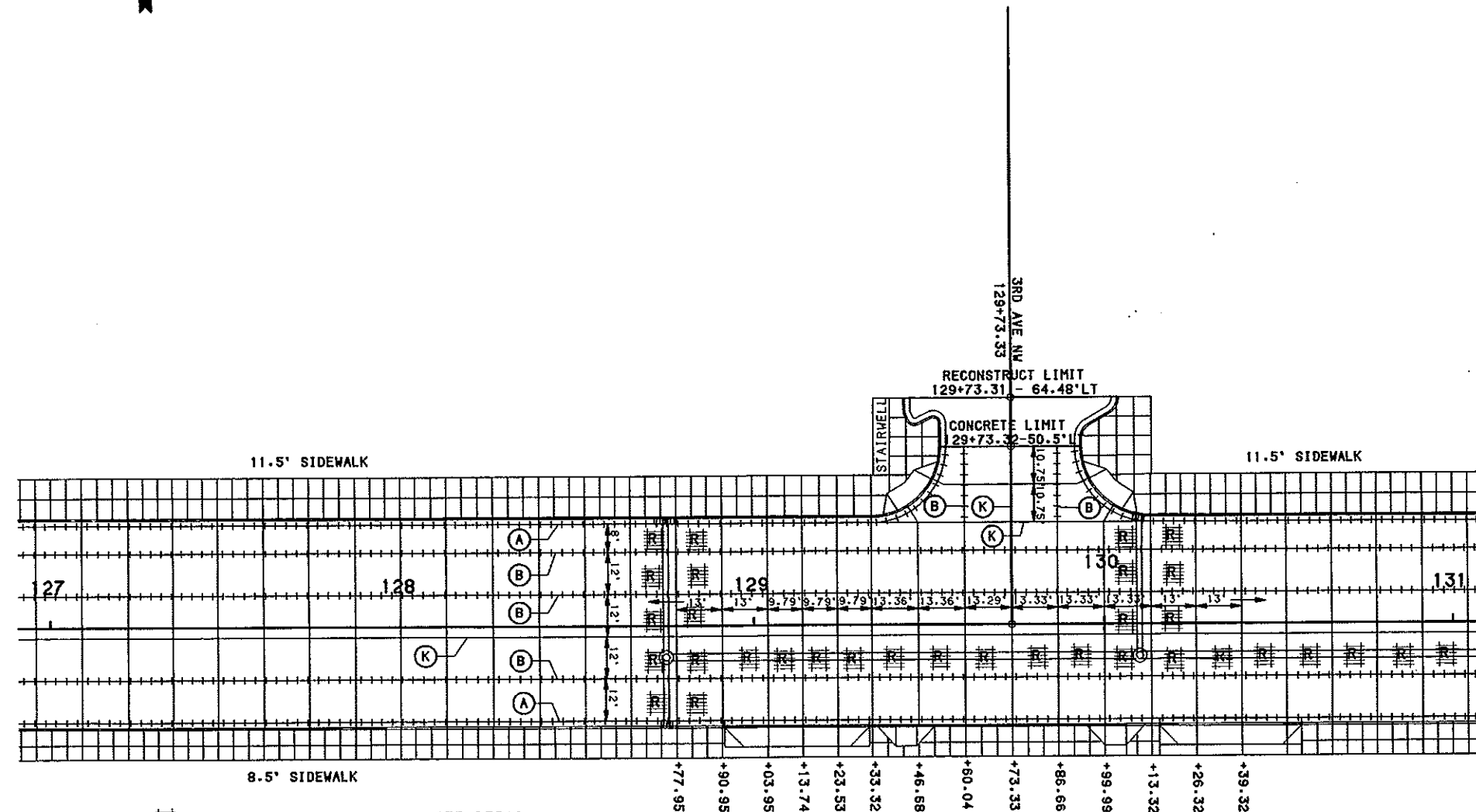
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" x 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" x 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

HOT BITUMINOUS PAVEMENT CL. 27	
4TH AVE NW INTERSECTION	25.72 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE	
4TH AVE NW INTERSECTION	109.87 SY
123+00 TO 127+00	2488.89 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
123+00 TO 127+00	1785.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
123+00 TO 127+00	500.0 LF
CURB & GUTTER - TYPE I	
123+00 TO 127+00 - LEFT	429.5 LF
123+00 TO 127+00 - RIGHT	400.0 LF
SIDEWALK CONCRETE	
123+00 TO 127+00 - LEFT	466.8 SY
123+00 TO 127+00 - RIGHT	377.8 SY
CONCRETE MEDIAN PAVING	
123+74 45 LT	2.3 SY
CURB	
123+00 TO 123+71 42.5 LT	71 LF
DRIVEWAY CONC. HIGH EARLY STRENGTH	
123+88.5 LT. - 30' TYPE 2	52.4 SY

PROJECT LOCATION
 STATION 123+00 TO 127+00
 FILE:
 PAVELAY3.GRF

PAVEMENT DETAILS



- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
FOR PEDISTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
PRICE BID FOR CONCRETE PAVEMENT.

HOT BITUMINOUS PAVEMENT CL. 27
3rd AVE NW INTERSECTION 23.88 TON

10 IN. NON-REINF. CONC. PVMT. CL. AE
3rd AVE NW INTERSECTION 110.41 SY
127+00 TO 131+00 2488.89 SY

PREFORMED COMP. JOINT SEAL - 9/16 IN.
127+00 TO 131+00 1785.0 LF

LONGITUDINAL JOINT SILICONE SEAL
127+00 TO 131+00 500.0 LF

CURB & GUTTER - TYPE I
127+00 TO 131+00 - LEFT 423.1 LF
127+00 TO 131+00 - RIGHT 400.0 LF

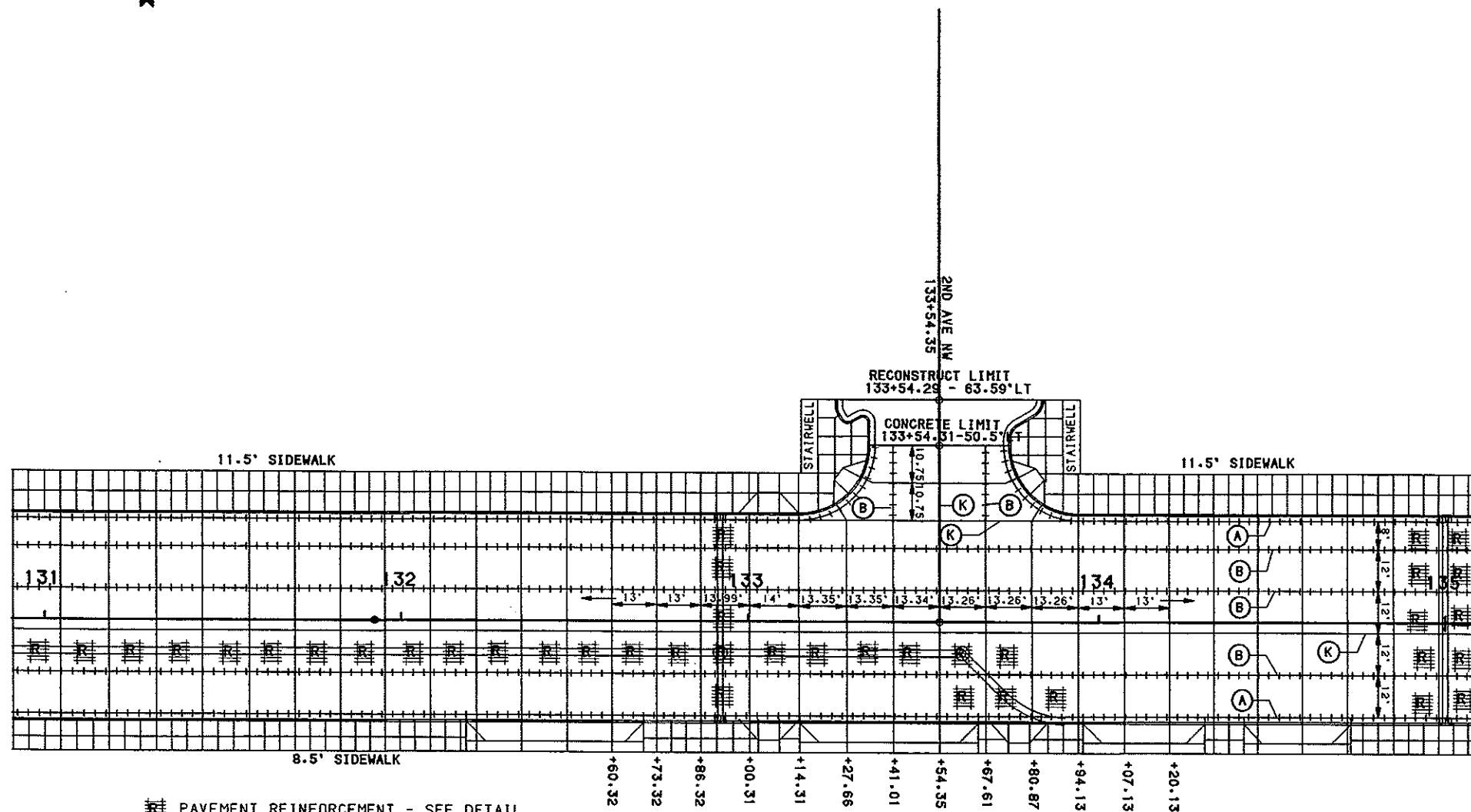
SIDEWALK CONCRETE
127+00 TO 131+00 - LEFT 507.7 SY
127+00 TO 131+00 - RIGHT 300.4 SY

DRIVEWAY CONC. HIGH EARLY STRENGTH
129+12 RT. - 30' TYPE 2 38.7 SY
130+36 RT. - 30' TYPE 2 38.7 SY



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	92



- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

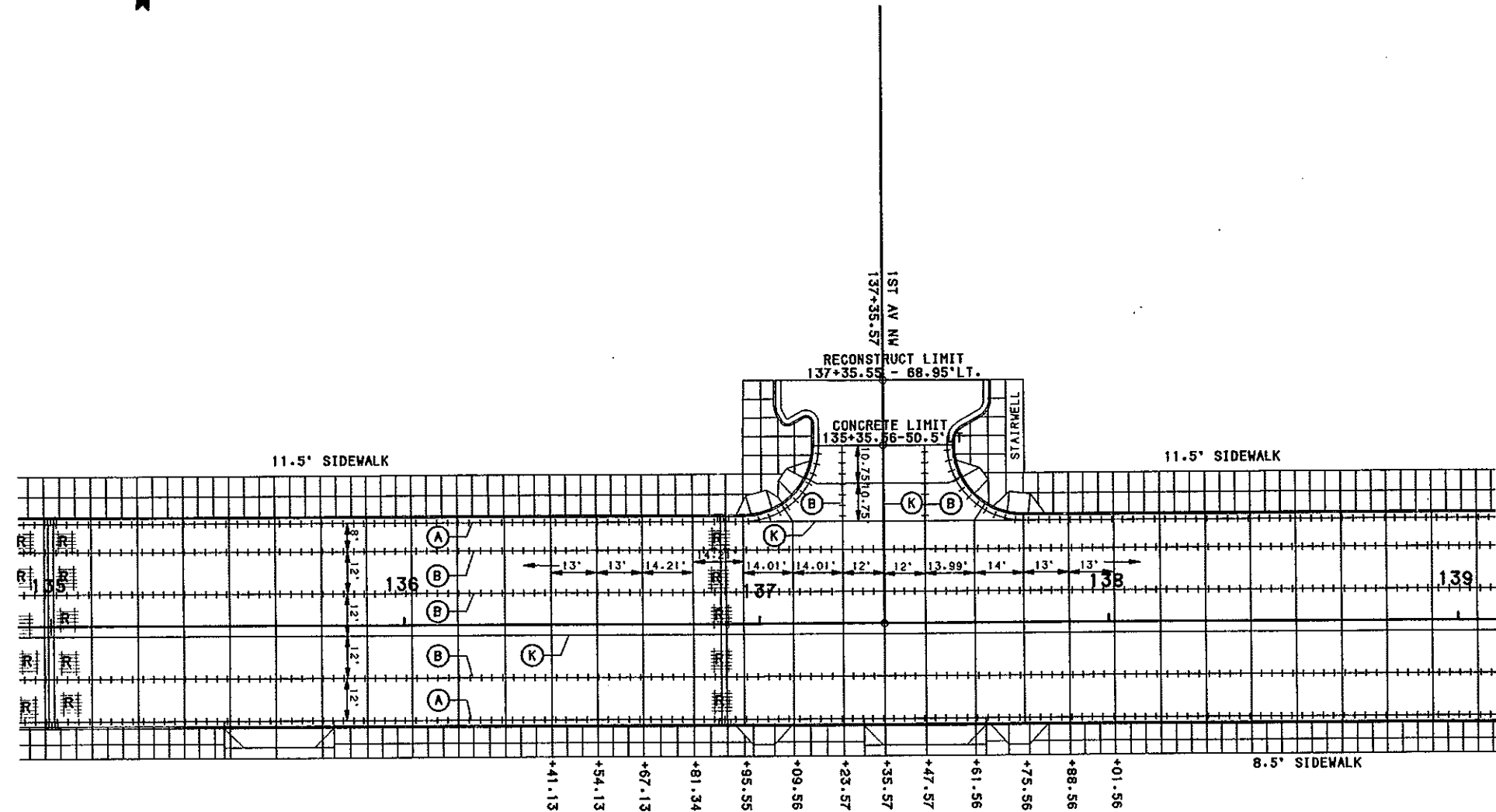
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE. BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.

HOT BITUMINOUS PAVEMENT CL. 27	
2ND AVE NW INTERSECTION	22.0 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE	
2ND AVE NW INTERSECTION	110.43 SY
131+00 TO 135+00	2488.89 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
131+00 TO 135+00	1785.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
131+00 TO 135+00	500.0 LF
CURB & GUTTER - TYPE I	
131+00 TO 135+00 - LEFT	420.5 LF
131+00 TO 135+00 - RIGHT	400.0 LF
SIDEWALK CONCRETE	
131+00 TO 135+00 - LEFT	502.9 SY
131+00 TO 135+00 - RIGHT	219.1 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH	
134+14 RT. - 24' TYPE 2	33.0 SY
134+57.5 RT. - 20' TYPE 2	29.3 SY
DRIVE CONC. - 8 IN. HIGH EARLY STRENGTH	
132+44 RT. - 40' TYPE 2	48.2 SY
133+40 RT. - 40' TYPE 2	48.2 SY

PROJECT LOCATION
STATION 131+00 TO 135+00
FILE: PAVELAY3.GRF

PAVEMENT DETAILS



HOT BITUMINOUS PAVEMENT CL. 27		
1ST AVE NW INTERSECTION		24.8 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE		
1ST AVE NW INTERSECTION		117.60 SY
135+00 TO 139+00		2488.89 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.		
135+00 TO 139+00		1729.0 LF
LONGITUDINAL JOINT SILICONE SEAL		
135+00 TO 139+00		500.0 LF
CURB & GUTTER - TYPE I		
135+00 TO 139+00 - LEFT		432.5 LF
135+00 TO 139+00 - RIGHT		400.0 LF
SIDEWALK CONCRETE		
135+00 TO 139+00 - LEFT		521.4 SY
135+00 TO 139+00 - RIGHT		315.5 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH		
135+64	RT. - 20' TYPE 2	29.3 SY
137+55	RT. - 24' TYPE 2	33.0 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" e 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

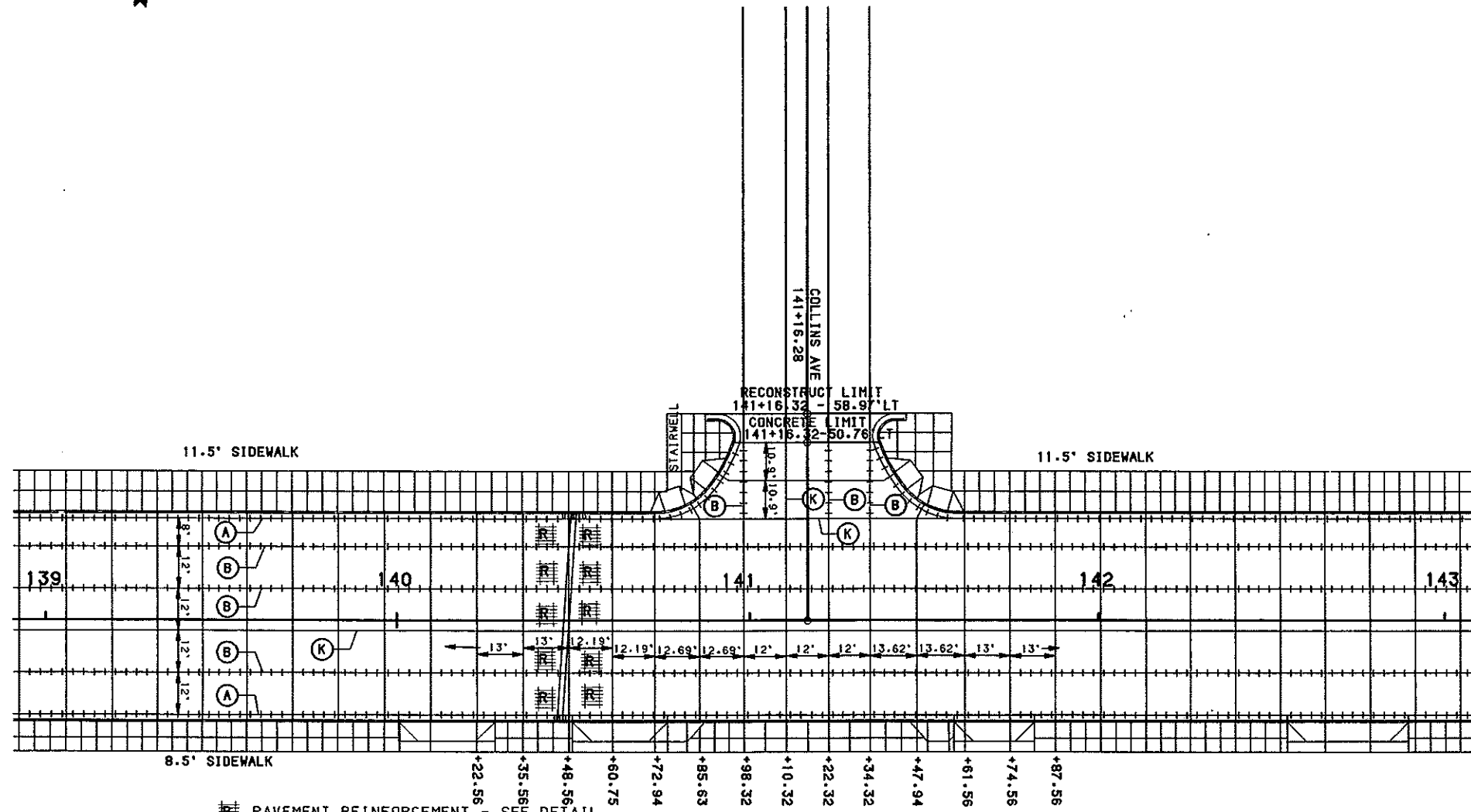
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.



PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	94



HOT BITUMINOUS PAVEMENT CL. 27		
COLLINS AVE INTERSECTION		13.78 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE		
COLLINS AVE INTERSECTION		126.67 SY
139+00 TO 143+00		2488.89 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.		
139+00 TO 143+00		1792.0 LF
LONGITUDINAL JOINT SILICONE SEAL		
139+00 TO 143+00		507.0 LF
CURB & GUTTER - TYPE I		
139+00 TO 143+00 - LEFT		403.6 LF
139+00 TO 143+00 - RIGHT		400.0 LF
SIDEWALK CONCRETE		
139+00 TO 143+00 - LEFT		489.7 SY
111+00 TO 115+00 - RIGHT		272.1 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH		
140+14	RT. - 16' TYPE 2	25.5 SY
140+63	RT. - 16' TYPE 2	25.5 SY
141+70	RT. - 12' TYPE 2	21.7 SY
142+72	RT. - 24' TYPE 2	33.0 SY

- ▨ PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

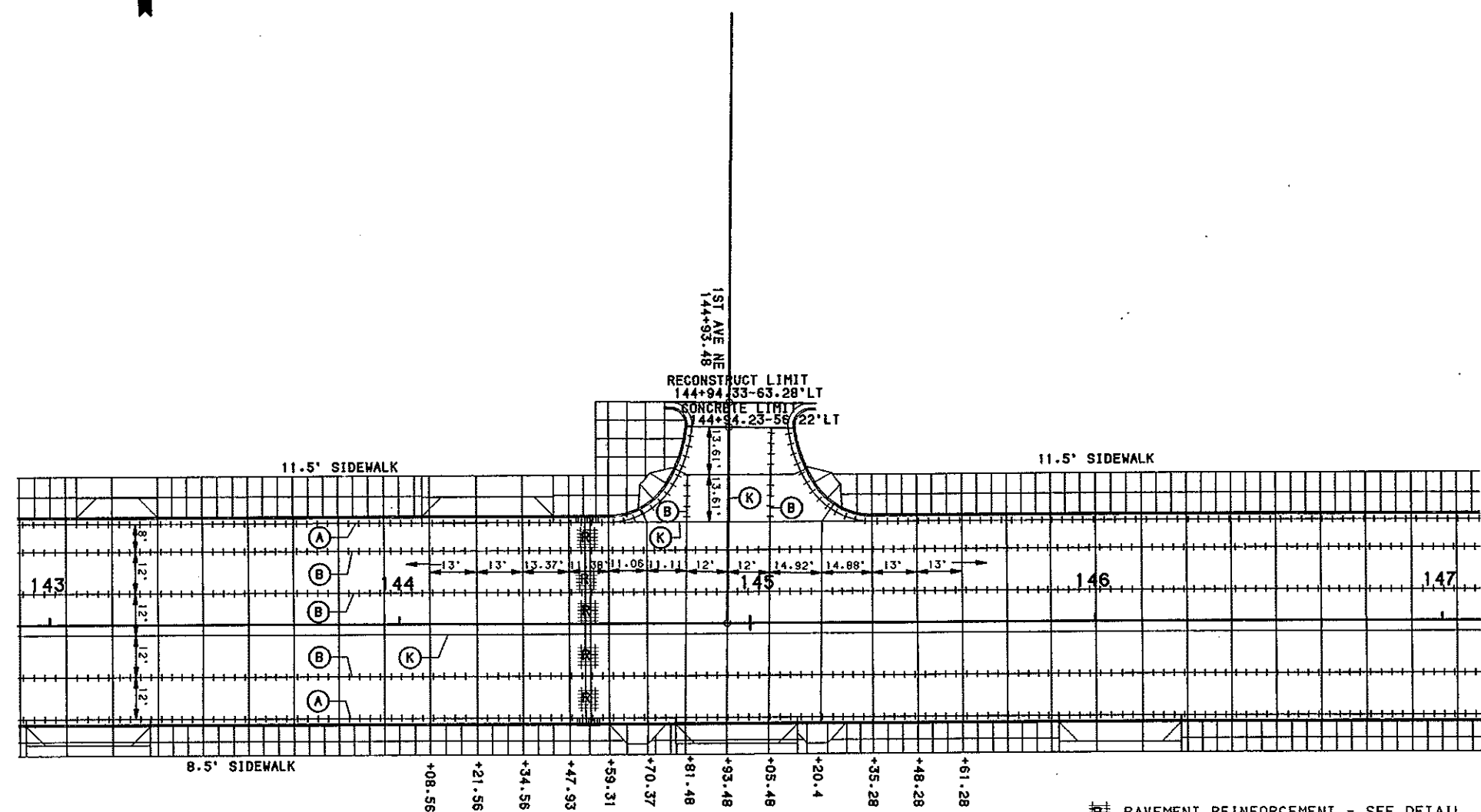
NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2"X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4"X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION STATION 139+00 TO 143+00
FILE: PAVELAY4.GRF

PAVEMENT DETAILS



- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" ϕ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

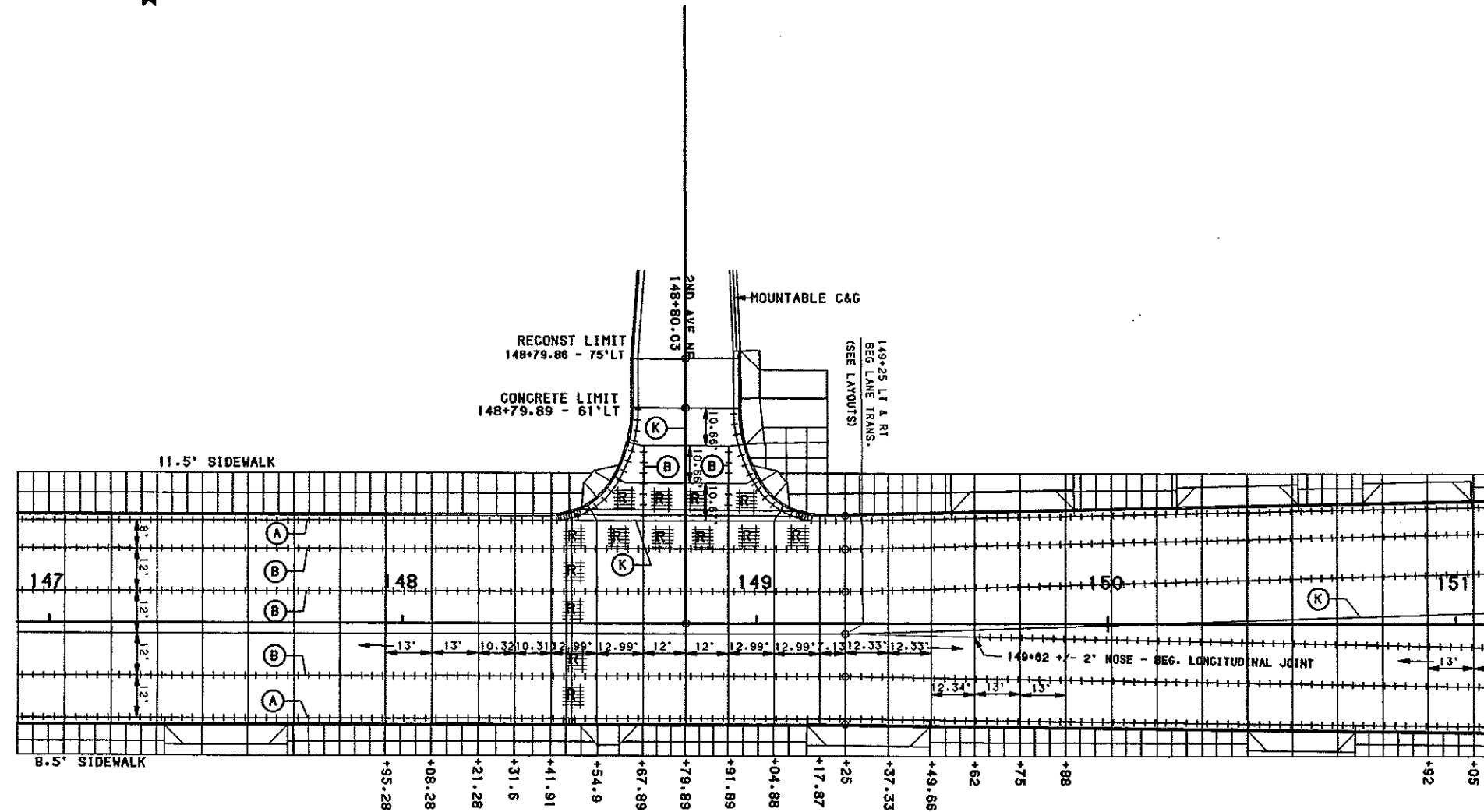
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE. BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
 STATION 143+00 TO 147+00
 FILE:
 PAVELAY4.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	96



HOT BITUMINOUS PAVEMENT CL. 27	
2ND AVE NE INTERSECTION	15.56 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE	
2ND AVE NE INTERSECTION	135.0 SY
147+00 TO 151+00	2545.60 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
147+00 TO 151+00	1850.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
147+00 TO 151+00	508.0 LF
CURB & GUTTER - TYPE I	
147+00 TO 151+00 - LEFT	473.3 LF
147+00 TO 151+00 - RIGHT	400.1 LF
MOUNTABLE CURB & GUTTER - TYPE I	
2ND AVE NE	22.8 LF
SIDEWALK CONCRETE	
147+00 TO 151+00 - LEFT	335.4 SY
147+00 TO 151+00 - RIGHT	266.4 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH	
148+95.39-63.72' LT.-16' TYPE 2	55.2 SY
149+73 -24' LT.-24' TYPE 2	29.0 SY
DRIVE CONC.-8 IN. HIGH EARLY STRENGTH	
147+50 RT. - 24' TYPE 2	33.0 SY
149+25 RT. - 24' TYPE 2	33.0 SY
150+37.26 LT. - 24' TYPE 2	27.3 SY
150+50.67 RT. - 20' TYPE 2	25.3 SY
150+88.99 LT. - 20' TYPE 2	24.2 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" ϕ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

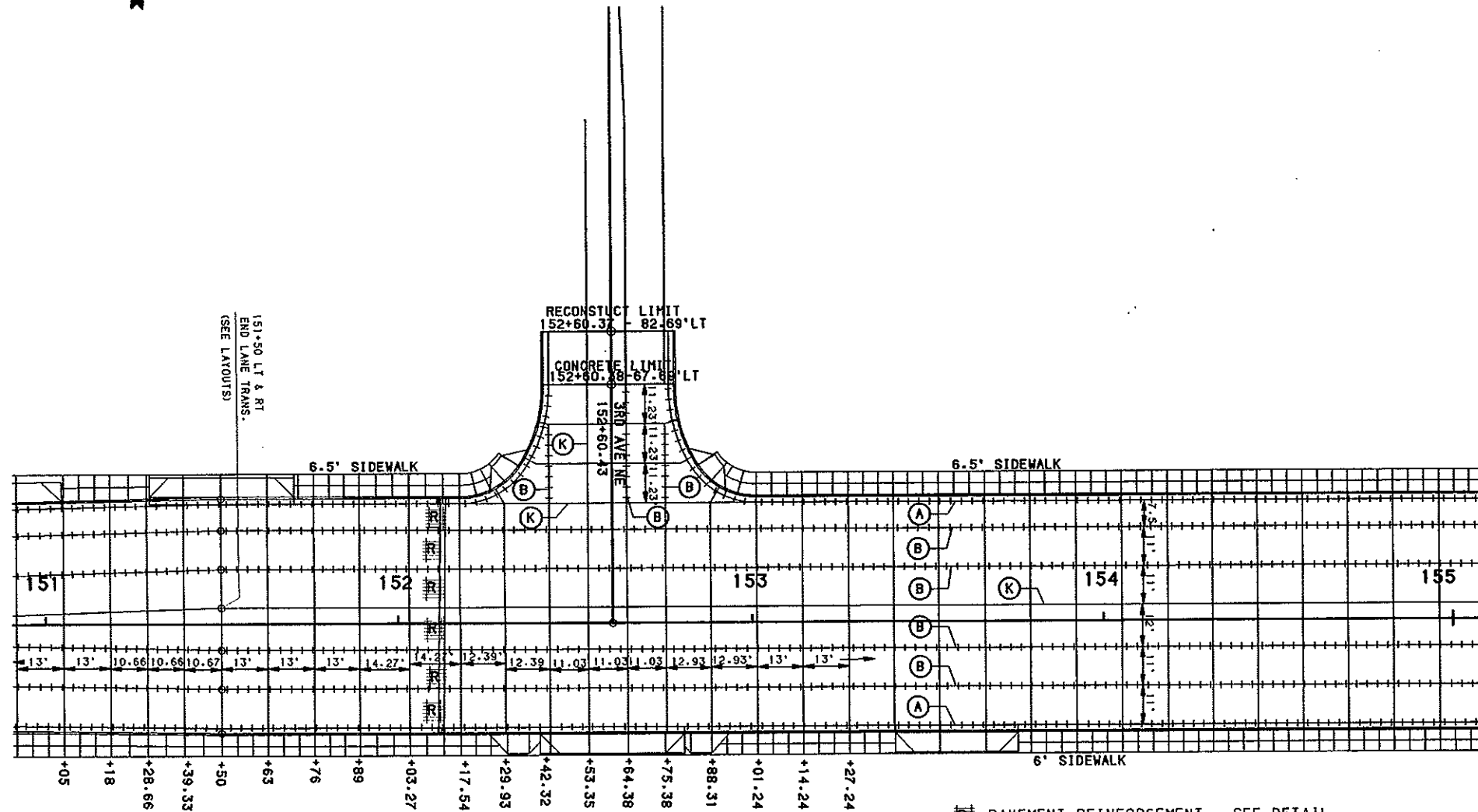
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE. BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
 STATION 147+00 TO 151+00
 FILE:
 PAVELAY4.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	97



HOT BITUMINOUS PAVEMENT CL. 27
3RD AVE NE INTERSECTION 18.96 TON

10 IN. NON-REINF. CONC. PYMT. CL. AE
3RD AVE NE INTERSECTION 165.33 SY
151+00 TO 155+00 2817.59 SY

PREFORMED COMP. JOINT SEAL - 9/16 IN.
151+00 TO 155+00 2000.0 LF

LONGITUDINAL JOINT SILICONE SEAL
151+00 TO 155+00 517.0 LF

CURB & GUTTER - TYPE I
151+00 TO 155+00 - LEFT 434.8 LF
151+00 TO 155+00 - RIGHT 400.0 LF

SIDEWALK CONCRETE
151+00 TO 155+00 - LEFT 228.3 SY
151+00 TO 155+00 - RIGHT 215.3 SY

DRIVEWAY CONC. - 8 IN. HIGH EARLY STRENGTH
151+50 LT. - 30' TYPE 2 30.0 SY
152+60 RT. - 24' TYPE 2 29.6 SY
153+58 RT. - 24' TYPE 2 23.3 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

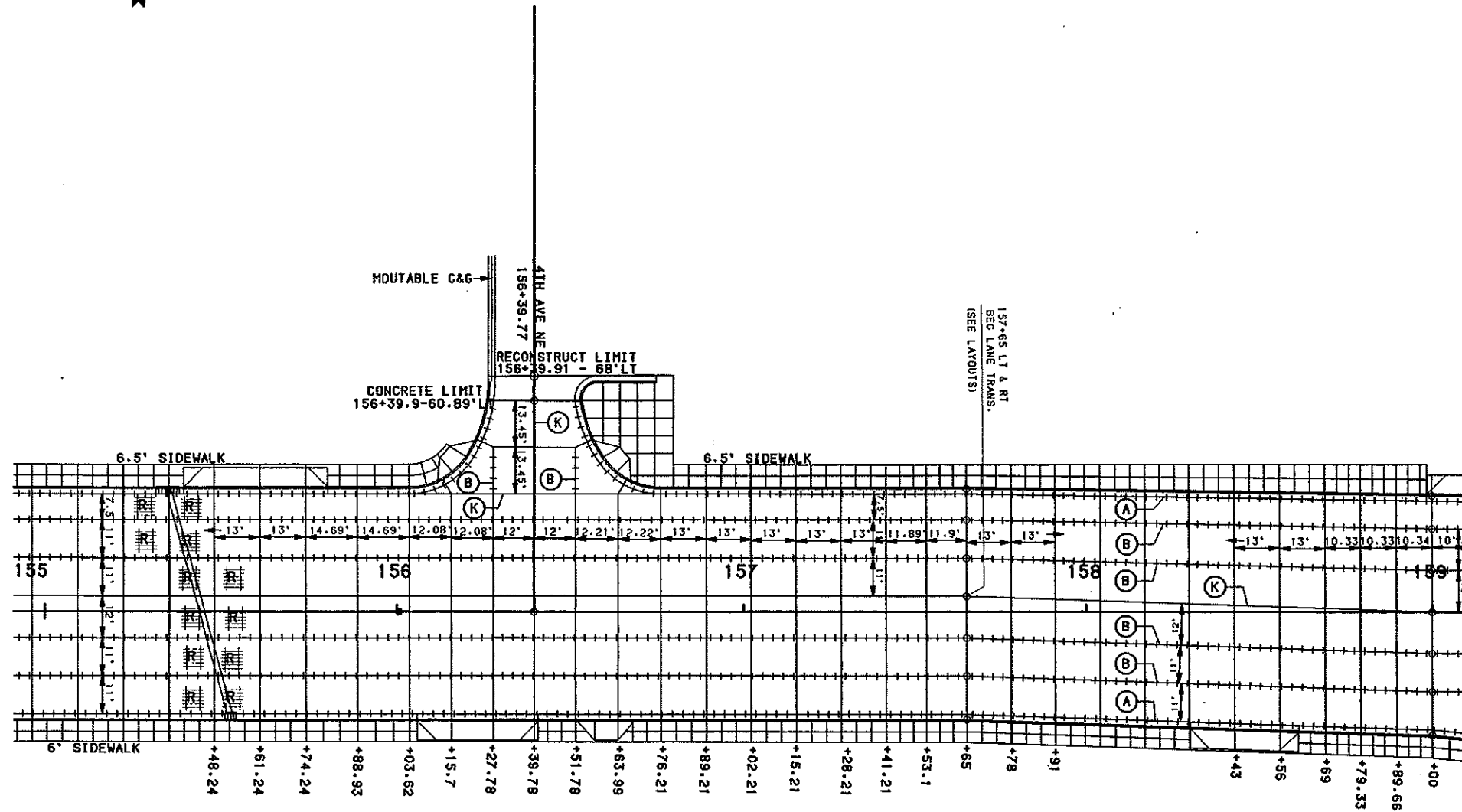
DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 151+00 TO 155+00
FILE:
PAVELAYS.GRF

PAVEMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	98



HOT BITUMINOUS PAVEMENT CL. 27	
4TH AVE NE INTERSECTION	7.33 TON
10 IN. NON-REINF. CONC. PVMT. CL. AE	
4TH AVE NE INTERSECTION	107.47 SY
155+00 TO 159+00	2822.22 SY
PREFORMED COMP. JOINT SEAL - 9/16 IN.	
155+00 TO 159+00	2081.0 LF
LONGITUDINAL JOINT SILICONE SEAL	
155+00 TO 159+00	498.0 LF
CURB & GUTTER - TYPE I	
155+00 TO 159+00 - LEFT	451.6 LF
155+00 TO 159+00 - RIGHT	400.0 LF
MOUNTABLE CURB & GUTTER - TYPE I	
4TH AVE NE	36.2 LF
SIDEWALK CONCRETE	
155+00 TO 159+00 - LEFT	249.9 SY
155+00 TO 159+00 - RIGHT	222.7 SY
DRIVEWAY CONC. HIGH EARLY STRENGTH	
158+40.88 RT. - 30' TYPE 2	27.3 SY
DRIVE CONC. - 8 IN. HIGH EARLY STRENGTH	
155+60 LT. - 30' TYPE 2	29.6 SY
156+23 RT. - 24' TYPE 2	23.3 SY

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" x 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT Poured SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
 SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS
 FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
 SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
 BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR
 JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING
 PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN
 PRICE BID FOR CONCRETE PAVEMENT.

PROJECT LOCATION
STATION 155+00 TO 159+00
FILE:
PAVELAYS.GRF

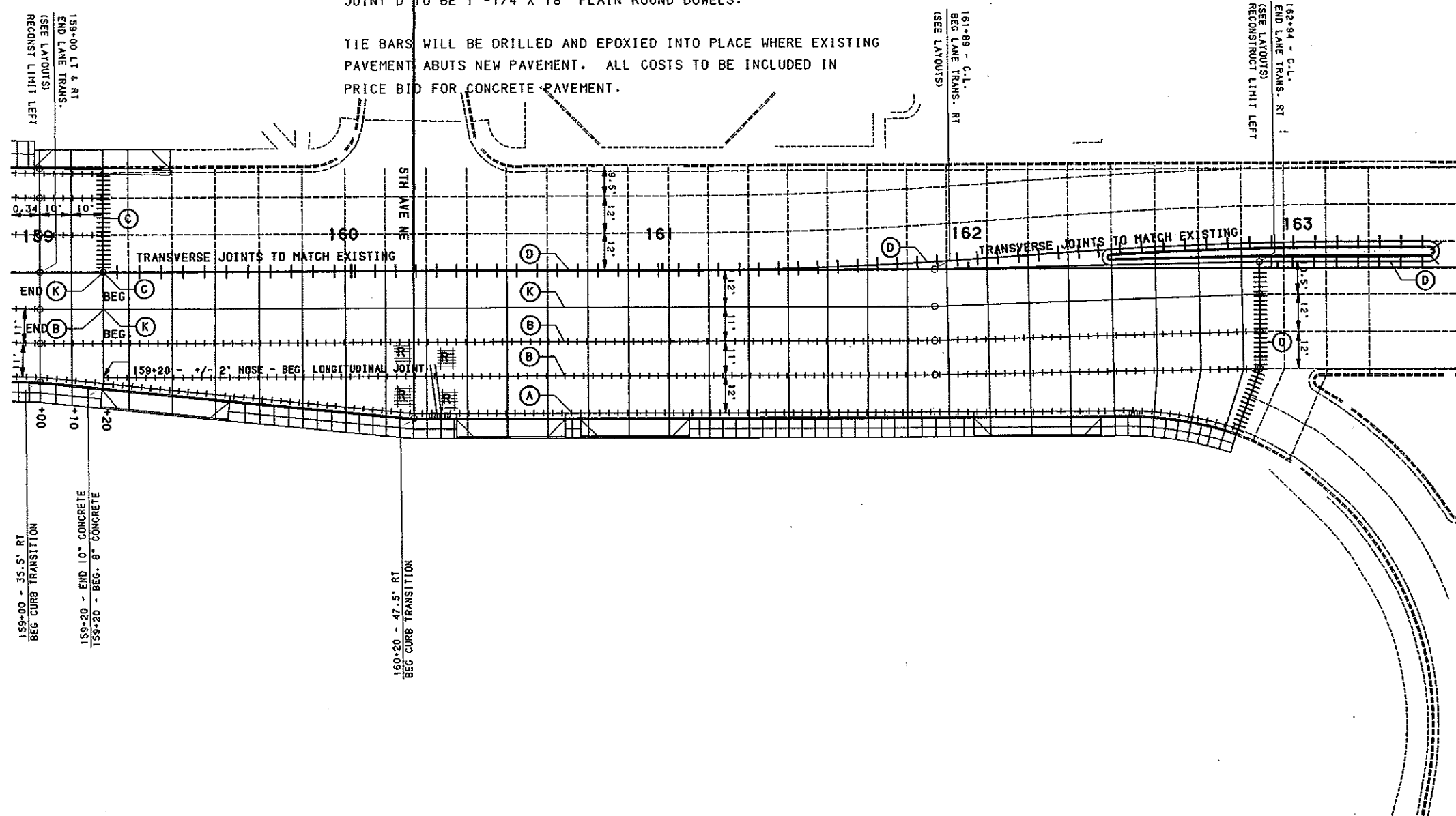
PAVEMENT DETAILS

- PAVEMENT REINFORCEMENT - SEE DETAIL
- A CURB & GUTTER (ALL): NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- B TIED JOINT - HOT POURED SEAL - SEE STD. DRAWING D-550-2
- C DOWELED CONTRACTION JOINT - SILICONE SEAL - SEE STD. DRAWING D-550-3
- D DOWELED JOINT - SILICONE SEAL - DOWELS SPACED AT THIRDS OF SLAB WIDTH
- K KEYED JOINT NOT TIED - SILICONE SEAL

NOTES: TRANSVERSE JOINT SPACING IS 13' OR AS SHOWN.
SEE TRAFFIC SHEETS FOR DEPRESSED CURB LOCATIONS FOR PEDESTRIAN CROSSINGS. STD. D-750-2.
SEE PLAN NOTES FOR SIDEWALK JOINT SPACING.

DOWELS FOR JOINTS C & D SHALL BE DRILLED AND EPOXIED INTO PLACE.
BARS FOR JOINT C TO BE 1'-1/2" X 18" PLAIN ROUND DOWELS. BARS FOR JOINT D TO BE 1'-1/4" X 18" PLAIN ROUND DOWELS.

TIE BARS WILL BE DRILLED AND EPOXIED INTO PLACE WHERE EXISTING PAVEMENT ABUTS NEW PAVEMENT. ALL COSTS TO BE INCLUDED IN PRICE BID FOR CONCRETE PAVEMENT.



8 IN. NON-REINF. CONC. PVMT. CL. AE
159+20 TO 162+94 1985.51 SY

10 IN. NON-REINF. CONC. PVMT. CL. AE
159+00 TO 159+20 141.41 SY

DOWELED CONTRACTION JOINT ASSEMBLY
159+20 LT. 32.0 LF
162+94 RT. 55.0 LF

DOWEL BARS
159+20 LT. 21.0 EA
162+94 RT. 43.0 EA
JOINT D 74.0 EA

PREFORMED COMP. JOINT SEAL - 9/16 IN.
159+00 TO 162+94 1496.0 LF

LONGITUDINAL JOINT SILICONE SEAL
159+00 TO 162+94 774.0 LF

CONTRACTION JOINT SILICONE SEAL
159+20 LT. 32.0 LF
162+94 RT. 55.0 LF

CURB & GUTTER - TYPE I
159+00 TO 159+20 - LEFT 20.0 LF
159+00 TO 162+94 - RIGHT 387.3 LF

SIDEWALK CONCRETE
159+00 TO 162+94 - RIGHT 183.7 SY

CONCRETE MEDIAN PAVING
RAISED ISLAND 36.1 SY

DRIVEWAY CONC. HIGH EARLY STRENGTH
159+20 LT. - 32' TYPE 2 26.3 SY

DRIVE CONC. - 8 IN. HIGH EARLY STRENGTH
159+39.95 RT. - 30' TYPE 2 27.3 SY
160+51 RT. - 24' TYPE 2 23.3 SY
160+91 RT. - 24' TYPE 2 23.3 SY
160+91 RT. - 30' TYPE 2 27.3 SY

PROJECT LOCATION
STATION 159+00 TO 163+00
FILE:
PAVELAY5.GRF

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DRAINAGE SUMMARY

MH No. **1** 7' x 7' BOX MH.
 Sta. 102+57 36 LT
 Top Elev. 1676.92
 Base Elev. 1667.54
 Invert Elev. 1668.00
 Riser 9.38 FT

36x58 In. RCP N 1671.48
 15 In. RCP E 1672.88
 54 In. RCP W 1668.00

Inlet No. **1A**
 Type. Inlet - Type 2
 Grate Style. V
 Sta. 10130.50 19.5 RT
 Grate Elev. 1674.65
 Base Elev. 1670.32
 Invert Elev. 1671.18
 'H' Dist. 4.00 FT
 Outfall North to Connection in 54" pipe
 Outlet Elev. 1669.40

Inlet No. **1B**
 Type. Inlet - Type 2
 Grate Style. V
 Sta. 101+30.50 29.775 LT
 Grate Elev. 1674.51
 Base Elev. 1670.18
 Invert Elev. 1671.38
 'H' Dist. 4.00 FT

Inlet No. **1C**
 Type. Inlet - Type 1
 Grate Style. D
 Sta. 98+89.41 79.17 LT (11th St NW)
 Grate Elev. 1690 approximate
 Base Elev. 1685.41
 Invert Elev. 1685.58
 'H' Dist. 4.00 FT
 Outfall South to Connection in 54" pipe

Inlet No. **1D**
 Type. Inlet - Type 2
 Grate Style. D
 Sta. 102+68.26 43.30 LT
 Grate Elev. 1676.51
 Base Elev. 1672.18
 Invert Elev. 1672.37
 'H' Dist. 4.00 FT

MH No. **2** 84 In.
 Sta. 97+00 - 36.17' LT O.L.
 Top Elev. 1669.35
 Base Elev. 1660.54
 Invert Elev. 1661.00
 Riser 7.05 Ft
 15 In. RCP S 1663.47
 54 In. RCP E 1661.00
 54 In. RCP W 1661.00

Inlet No. **2A**
 Type. Inlet - Type 2
 Grate Style. V
 Sta. 97+00 - 19.5' LT O.L.
 Grate Elev. 1668.33
 Base Elev. 1663.36
 Invert Elev. 1663.55
 'H' Dist. 4.64 FT

Inlet No. **2B**
 Type. Inlet - Type 1
 Grate Style. V
 Sta. 97+00 - 19.5' RT O.L.
 Grate Elev. 1668.41
 Base Elev. 1663.61
 Invert Elev. 1663.80
 'H' Dist. 4.21 FT

MH No. **3** 84 In.
 Sta. 93+50 - 36.17' LT O.L.
 Top Elev. 1665.90
 Base Elev. 1656.54
 Invert Elev. 1657.00
 Riser 7.60 Ft

18 In. RCP S 1659.75
 54 In. RCP E 1657.00
 54 In. RCP W 1657.00

Inlet No. **3A**
 Type. Inlet - Type 2 - Double
 Grate Style. DR/DL
 Sta. 93+50 - 19.5' LT O.L.
 Grate Elev. 1664.83
 Base Elev. 1659.63
 Invert Elev. 1659.84
 'H' Dist. 4.87 FT

Inlet No. **3B**
 Type. Inlet - Type 1
 Grate Style. D
 Sta. 93+50 19.5 RT
 Grate Elev. 1664.90
 Base Elev. 1659.81
 Invert Elev. 1660.00
 'H' Dist. 4.50 FT

MH No. **4** 84 In.
 Sta. 90+58 - 36.17' LT O.L.
 Top Elev. 1665.50
 Base Elev. 1653.24
 Invert Elev. 1653.70
 Riser 10.50 Ft

15 In. RCP S 1657.60
 54 In. RCP E 1653.70
 54 In. RCP W 1653.70

Inlet No. **4A**
 Type. Inlet - Type 2
 Grate Style. D
 Sta. 90+58 - 19.5' LT O.L.
 Grate Elev. 1664.46
 Base Elev. 1657.51
 Invert Elev. 1657.70
 'H' Dist. 6.62 FT

Inlet No. **4B**
 Type. Inlet - Type 1
 Grate Style. D
 Sta. 90+58 - 19.5' RT O.L.
 Grate Elev. 1664.56
 Base Elev. 1659.81
 Invert Elev. 1660.00
 'H' Dist. 4.16 FT

MH No. **5** 84 In.
 Sta. 88+15-45 LT
 Top Elev. 1665.27
 Base Elev. 1646.94
 Invert Elev. 1651.00
 Riser 12.97 Ft
 15 In. RCP S 1660.40
 54 In. RCP E 1651.00
 54 In. RCP W 1651.00

Heart River Outfall
 End Section with Trash Guard
 Sta. 87+40-80 LT
 54 In. RCP W 1650.15

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DRAINAGE SUMMARY

Inlet No. (5A)
 Type. Inlet - Type 1
 Grate Style. . . . D
 Sta. 88+15-19.5 LT
 Grate Elev. . . . 1665.47
 Base Elev. . . . 1660.41
 Invert Elev. . . . 1660.60
 'H' Dist. . . . 4.47 FT

Inlet No. (5B)
 Type. Inlet - Type 1
 Grate Style. . . . D
 Sta. 88+15-19.5 RT
 Grate Elev. . . . 1665.47
 Base Elev. . . . 1660.81
 Invert Elev. . . . 1661.00
 'H' Dist. . . . 4.07 FT

MH No. (Existing 6 -) 48 In.
 Sta. . . . 110+43.88 97.44 LT
 Top Elev. . . . 1655.55
 Base Elev. . . . 1648.54
 Invert Elev. . . . 1646.99
 Riser 6.93 Ft
 □-----
 24 In. RCP NW 1648.89
 36 In. RCP SE 1646.99
 24 In. RCP E 1648.79

Inlet No. (6A)
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 110+71.06 - 95.18' LT
 Grate Elev. . . . 1654.96
 Base Elev. . . . 1650.63
 Invert Elev. . . . 1651.00
 'H' Dist. . . . 4.00 FT

Inlet No. (7E)
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 113+95 30.0 LT
 Grate Elev. . . . 1648.55
 Base Elev. . . . 1643.91
 Invert Elev. . . . 1644.10
 'H' Dist. . . . 4.31 FT

MH No. (Existing 7 -) 48 In.
 Sta. . . . 114+29.51 25.05 RT
 Top Elev. . . . 1648.43
 Base Elev. . . . 1643.49
 Invert Elev. . . . 1643.74
 Riser 3.48 Ft
 □-----
 15 In. RCP W 1643.74
 18 In. RCP N 1643.74
 24 In. RCP E 1643.74

Inlet No. (7A)
 Type. Inlet - Special, Type 2 - 60 In.
 Grate Style. . . . V
 Sta. 114+20.08
 Grate Elev. . . . 1648.39
 Base Elev. . . . 1643.39
 Invert Elev. . . . 1643.94
 'H' Dist. . . . 4.00 FT

Inlet No. (7B)
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 114+66.5 52.32 LT
 Grate Elev. . . . 1648.15
 Base Elev. . . . 1643.82
 Invert Elev. . . . 1644.14
 'H' Dist. . . . 4.00 FT

Inlet No. (7D)
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 114+21 28 RT
 Grate Elev. . . . 1648.32
 Base Elev. . . . 1643.71
 Invert Elev. . . . 1643.90
 'H' Dist. . . . 4.28 FT

Inlet No. (8A)
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 115+25 30 LT
 Grate Elev. . . . 1647.95
 Base Elev. . . . 1643.62
 Invert Elev. . . . 1644.14
 'H' Dist. . . . 4.00 FT

Inlet No. (8B)
 Type. Inlet - Special, Type 2 -60 In.
 Grate Style. . . . DR/DL
 Sta. 115+20 28 RT
 Grate Elev. . . . 1647.86
 Base Elev. . . . 1642.86
 Invert Elev. . . . 1643.37
 'H' Dist. . . . 4.00 FT

Inlet No. (9A)
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 117+80 30.01 LT
 Grate Elev. . . . 1647.85
 Base Elev. . . . 1642.78
 Invert Elev. . . . 1642.97
 'H' Dist. . . . 4.74 FT

Inlet No. (9B)
 Type. Inlet - Special, Type 2 -60 In.
 Grate Style. . . . D
 Sta. 117+80-28 RT
 Grate Elev. . . . 1648.07
 Base Elev. . . . 1641.95
 Invert Elev. . . . 1642.20
 'H' Dist. . . . 5.03 FT

Inlet No. (10A)
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 118+55.12-56.8 LT
 Grate Elev. . . . 1647.60
 Base Elev. . . . 1643.27
 Invert Elev. . . . 1644.40
 'H' Dist. . . . 4.00 FT
 Outlet East Into 4'x6' RCBC @ 1644.33

MH No. (11) 60 In.
 Sta. . . . 123+00-9 RT
 Top Elev. . . . 1647.35
 Base Elev. . . . 1641.59
 Invert Elev. . . . 1643.02
 Riser 4.00 Ft
 □-----
 15 In. RCP S 1643.02
 18 X 29 In. ARCH RCP E 1643.02
 24 In. RCP W 1643.02
 15 In. RCP N 1643.02

Inlet No. (11A)
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 123+00 30 LT
 Grate Elev. . . . 1646.80
 Base Elev. . . . 1642.47
 Invert Elev. . . . 1643.17
 'H' Dist. . . . 4.00 FT

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Inlet No. **11B**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 123+00 28.0 LT
 Grate Elev. . . . 1646.63
 Base Elev. . . . 1642.30
 Invert Elev. . . . 1643.12
 'H' Dist. . . . 4.00 FT

MH No. **12 -** 60 In.
 Sta. . . . 125+50-9 RT
 Top Elev. . . . 1647.15
 Base Elev. . . . 1641.81
 Invert Elev. . . . 1643.56
 Riser 4.00 Ft
 □-----
 18 x 29 In. ARCH RCP W 1643.56
 15 In. RCP N 1643.56
 15 In. RCP S 1643.56

Inlet No. **12A**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 125+50 30.0 LT
 Grate Elev. . . . 1646.60
 Base Elev. . . . 1642.27
 Invert Elev. . . . 1643.70
 'H' Dist. . . . 4.00 FT

Inlet No. **12B**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 125+50-28 RT
 Grate Elev. . . . 1646.43
 Base Elev. . . . 1642.10
 Invert Elev. . . . 1643.66
 'H' Dist. . . . 4.00 FT

MH No. **12C -** 60 In.
 Sta. . . . 125+96.29-9 RT
 Top Elev. . . . 1647.30
 Base Elev. . . . 1641.67
 Invert Elev. . . . 1643.67
 Riser 4.00 Ft
 □-----
 24 In. RCP N 1643.97
 18 x 29 In. ARCH RCP W 1643.67

MH No. **13 -** 48 In.
 Sta. . . . 128+75 - 9' RT.
 Top Elev. . . . 1646.65
 Base Elev. . . . 1640.75
 Invert Elev. . . . 1641.00
 Riser 4.31 Ft
 □-----
 15 In. RCP S 1641.57
 15 In. RCP N 1641.57
 24 In. RCP E 1641.00

Inlet No. **13A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 128+75 - 30' LT
 Grate Elev. . . . 1646.10
 Base Elev. . . . 1641.61
 Invert Elev. . . . 1641.80
 'H' Dist. . . . 4.16 FT

Inlet No. **13B**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 128+75 - 28' RT
 Grate Elev. . . . 1645.93
 Base Elev. . . . 1641.51
 Invert Elev. . . . 1641.70
 'H' Dist. . . . 4.09 FT

MH No. **14 -** 48 In.
 Sta. . . . 130+10 9 RT
 Top Elev. . . . 1647.15
 Base Elev. . . . 1640.35
 Invert Elev. . . . 1640.60
 Riser 5.21 Ft
 □-----
 15 In. RCP N 1641.40
 24 In. RCP W 1640.60
 24 In. RCP E 1640.60

Inlet No. **14A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 130+09.85 - 30.3' LT
 Grate Elev. . . . 1646.56
 Base Elev. . . . 1641.37
 Invert Elev. . . . 1641.56
 'H' Dist. . . . 4.86 FT

MH No. **15 -** 48 In.
 Sta. . . . 132+92 - 9' RT
 Top Elev. . . . 1647.15
 Base Elev. . . . 1639.50
 Invert Elev. . . . 1639.75
 Riser 6.07 Ft
 □-----
 15 In. RCP S 1641.90
 15 In. RCP N 1641.80
 24 In. RCP E 1639.75
 24 In. RCP W 1639.75

Inlet No. **15A**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 132+92 30 LT
 Grate Elev. . . . 1646.61
 Base Elev. . . . 1641.81
 Invert Elev. . . . 1642.00
 'H' Dist. . . . 4.47 FT

Inlet No. **15B**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 132+92 - 28' RT
 Grate Elev. . . . 1646.43
 Base Elev. . . . 1641.81
 Invert Elev. . . . 1642.00
 'H' Dist. . . . 4.29 FT

MH No. **16 -** 72 In.
 Sta. . . . 133+68.89-9 RT
 Top Elev. . . . 1647.35
 Base Elev. . . . 1637.58
 Invert Elev. . . . 1638.00
 Riser 8.01 Ft
 □-----
 24 In. RCP W 1639.52
 48 In. RCP SE 1638.00
 48 In. RCP N 1638.00

Inlet No. **17A**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 135+00 - 30' LT
 Grate Elev. . . . 1646.60
 Base Elev. . . . 1642.27
 Invert Elev. . . . 1642.75
 'H' Dist. . . . 4.00 FT
 Outlet South into 48" RCP @1642.61

Inlet No. **17B**
 Type. Inlet - Saddle Base, Type 2
 Grate Style. . . . D
 Sta. 135+00 - 28' RT
 Grate Elev. . . . 1646.43
 Base Elev. . . . 1642.61
 Invert Elev. . . . 1637.48
 'H' Dist. . . . 3.49 FT

DRAINAGE SUMMARY

Inlet No. **18A**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 136+90 - 30' LT
 Grate Elev. . . . 1646.55
 Base Elev. . . . 1642.11
 Invert Elev. . . 1642.30
 'H' Dist. . . . 4.11 FT
 Outlet South into 48" RCP @1642.17

Inlet No. **18B**
 Type. Inlet - Saddle Base, Type 1
 Grate Style. . . . D
 Sta. 136+90 - 28' RT
 Grate Elev. . . . 1646.48
 Base Elev. . . . 1642.17
 Invert Elev. . . 1637.04
 'H' Dist. . . . 3.72 FT

MH No. **19** - 84 In.
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 140+46 - 28' RT
 Grate Elev. . . . 1646.23
 Base Elev. . . . 1636.08
 Invert Elev. . . 1636.54
 Measurements Include 5" Clearance
 Riser 9.40 Ft

□-----
 15 In. RCP N 1641.70
 54 In. RCP E 1636.54
 54 In. RCP W 1636.54

Inlet No. **19A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 140+50 - 30' LT
 Grate Elev. . . . 1646.40
 Base Elev. . . . 1641.81
 Invert Elev. . . 1642.00
 'H' Dist. . . . 4.26 FT

Inlet No. **20A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 144+53 - 30' LT
 Grate Elev. . . . 1646.06
 Base Elev. . . . 1639.61
 Invert Elev. . . 1639.80
 'H' Dist. . . . 6.12 FT
 Outlet South into 60" RCP @1639.37

Inlet No. **20B**
 Type. Inlet - Saddle Base, Type 2
 Grate Style. . . . DR/DL
 Sta. 144+53 - 28' RT
 Grate Elev. . . . 1645.89
 Base Elev. . . . 1642.78
 Invert Elev. . . 1636.52
 'H' Dist. . . . 2.78 FT

Inlet No. **20C**
 Type. Inlet - Catch Basin
 Grate Style. . . . Type A
 Sta. 144+53.2 - 108.7' RT
 Grate Elev. . . . 1646.20
 Base Elev. . . . 1641.03
 Invert Elev. . . 1641.22
 'H' Dist. . . . 4.00 FT

Inlet No. **21A**
 Type. Inlet - Type 1
 Grate Style. . . . D
 Sta. 149+12.88 - 30.61' LT
 Grate Elev. . . . 1646.36
 Base Elev. . . . 1639.81
 Invert Elev. . . 1640.00
 'H' Dist. . . . 5.96 FT

Inlet No. **21B**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 148+47 - 30.68' LT
 Grate Elev. . . . 1646.02
 Base Elev. . . . 1639.31
 Invert Elev. . . 1639.50
 'H' Dist. . . . 6.38 FT
 Outlet South into 60" RCP @1639.07

Inlet No. **21C**
 Type. Inlet - Saddle Base, Type 2
 Grate Style. . . . DR/DL
 Sta. 148+47 - 28' RT
 Grate Elev. . . . 1645.88
 Base Elev. . . . 1642.54
 Invert Elev. . . 1936.22
 'H' Dist. . . . 3.01 FT

Inlet No. **22A**
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 152+12 35 LT
 Grate Elev. . . . 1645.55
 Base Elev. . . . 1639.81
 Invert Elev. . . 1640.00
 'H' Dist. . . . 5.41 FT
 Outlet South into 60" RCP @1638.57

Inlet No. **22B**
 Type. Inlet - Saddle Base, Type 1
 Grate Style. . . . D
 Sta. 152+12.07
 Grate Elev. . . . 1645.45
 Base Elev. . . . 1642.27
 Invert Elev. . . 1635.95
 'H' Dist. . . . 2.59 FT

Inlet No. **23A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 155+35 - 35' LT
 Grate Elev. . . . 1644.29
 Base Elev. . . . 1638.71
 Invert Elev. . . 1638.90
 'H' Dist. . . . 5.25 FT
 Outlet South into 60" RCP @1638.80

Inlet No. **23B**
 Type. Inlet - Saddle Base, Type 2
 Grate Style. . . . D
 Sta. 155+47.21 - 30.5' RT
 Grate Elev. . . . 1644.19
 Base Elev. . . . 1642.04
 Invert Elev. . . 1635.72
 'H' Dist. . . . 1.82 FT

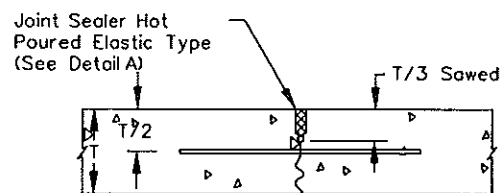
MH No. **Existing 24** - 96 In.
 Sta. 160+25.92 - 30.39' RT
 Top Elev. . . . 1645.00
 Base Elev. . . . 1634.88
 Invert Elev. . . 1635.38
 Riser 8.03 Ft
 □-----
 15 In. RCP S 1638.90
 60 In. RCP E 1635.38
 60 In. RCP W 1635.38

Inlet No. **24A**
 Type. Inlet - Type 2 - Double
 Grate Style. . . . DR/DL
 Sta. 160+28 - 47' RT
 Grate Elev. . . . 1643.32
 Base Elev. . . . 1638.81
 Invert Elev. . . 1639.00
 'H' Dist. . . . 4.18 FT

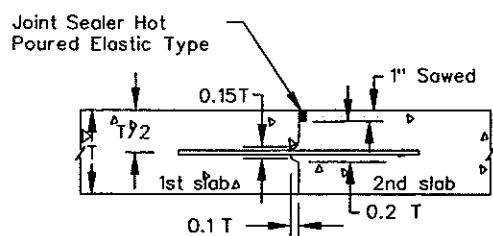
JOINT DETAILS

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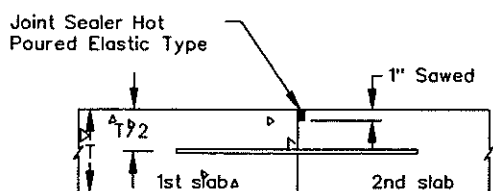
TIED JOINTS
(With Hot Poured Elastic Seal)



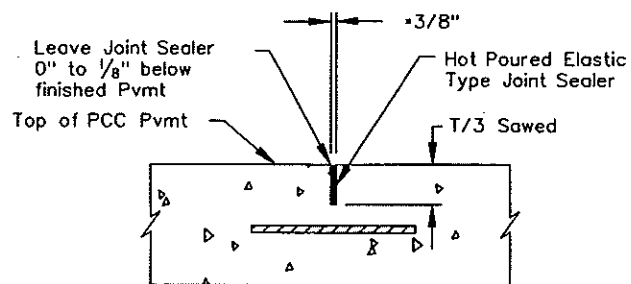
SAWED LONGITUDINAL JOINT
(Tied)



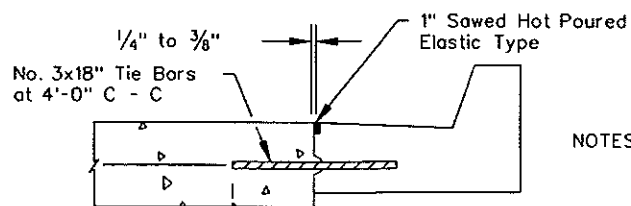
LONGITUDINAL CONSTRUCTION JOINT
(Keyed Tied Joint)



LONGITUDINAL CONSTRUCTION JOINT
(Tied Butt Joint)



HOT POUR ELASTIC SEAL
DETAIL A

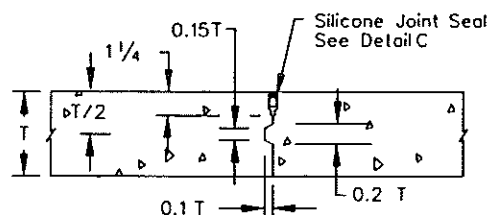


CURB & GUTTER JOINT INSTALLATION

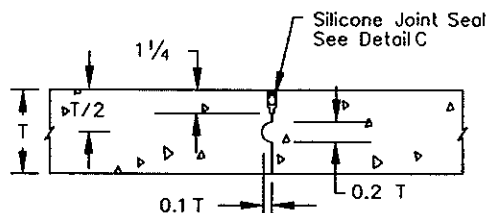
NOTES:

- T = Thickness of PCC Pvmnt
- *Width requirement for top 1" only, bottom bottom portion of sawcut may be narrower.
- ① The hot pour elastic type joint sealer shall be in accordance to Std. Specification 826.02.A.2.

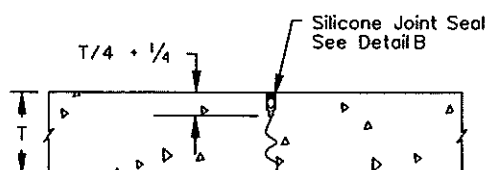
UNTIED JOINTS
(With Silicone Seal)



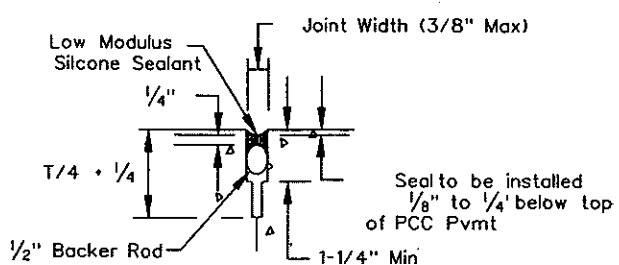
KEYED LONGITUDINAL JOINT
(Trapezoidal)



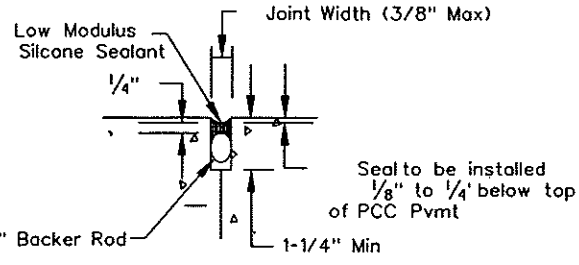
KEYED LONGITUDINAL JOINT
(Half-Round)



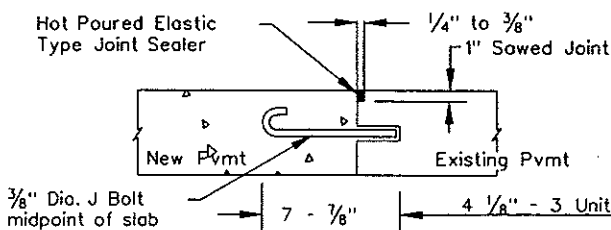
SAWED LONGITUDINAL JOINT



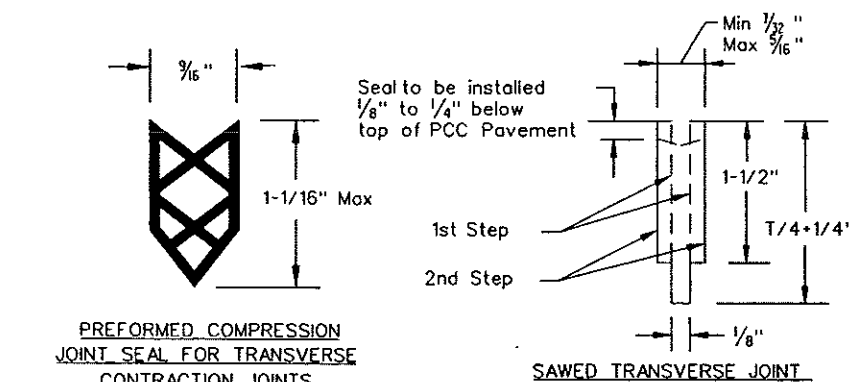
SILICONE JOINT SEAL
DETAIL B



SILICONE JOINT SEAL
DETAIL C



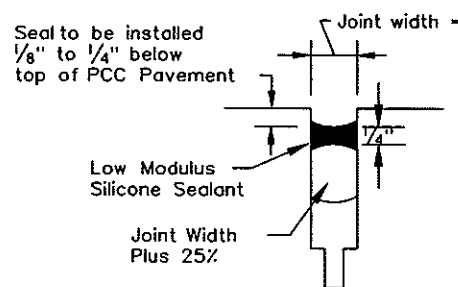
J BOLT INSTALLATION
(See Std. Drawing D-550-1)



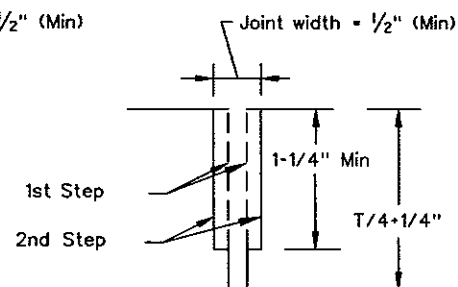
PREFORMED COMPRESSION
JOINT SEAL FOR TRANSVERSE
CONTRACTION JOINTS

PREFORMED COMPRESSION SEAL

Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer. No preformed compression joint seals with fewer than 5 cells shall be approved.

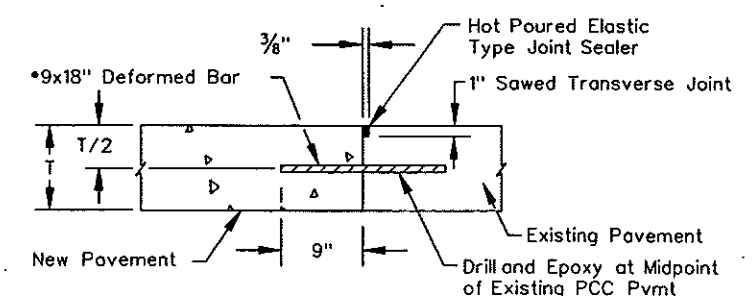


TRANSVERSE JOINT SEAL



SILICONE SEAL

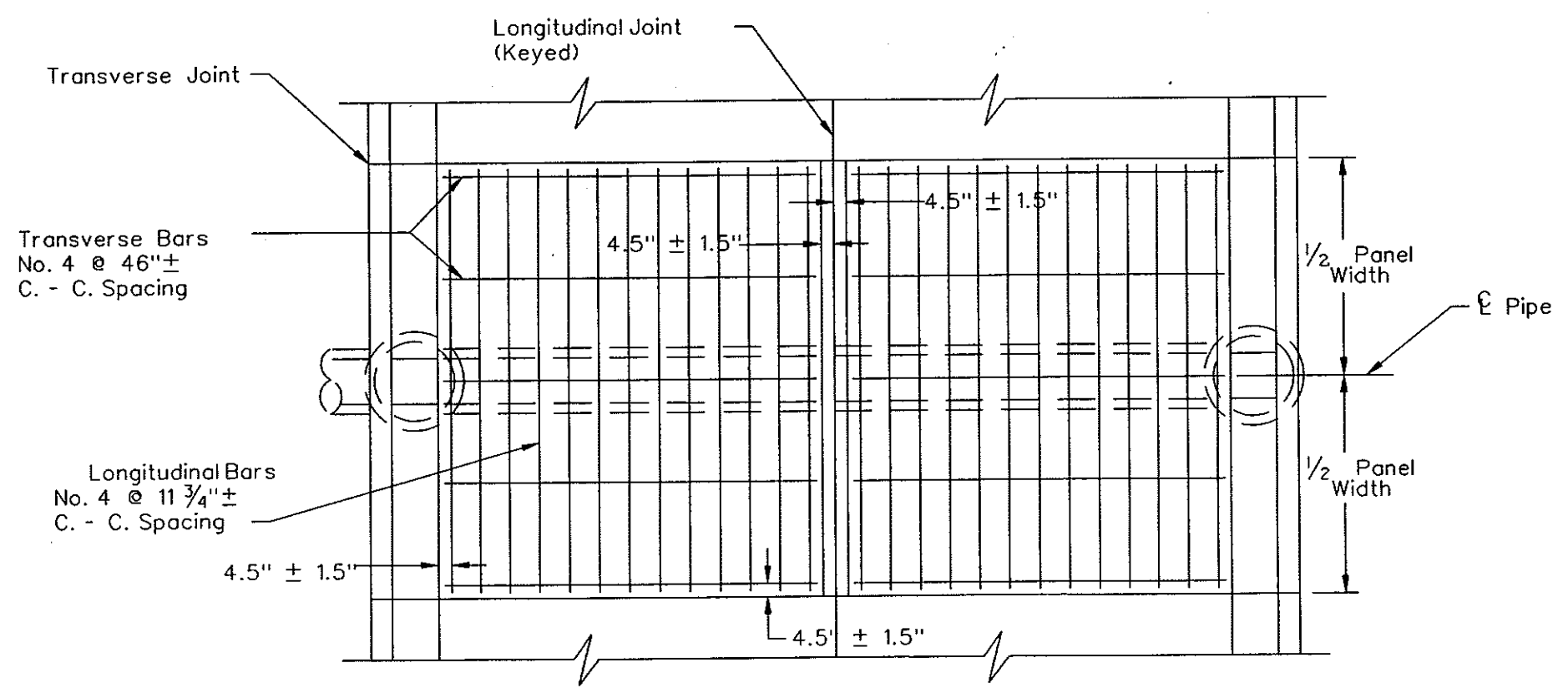
SAWED TRANSVERSE JOINT



DEFORMED BAR INSTALLATION
(Spaced at 2'-0" C to C)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU--1-094(035)915	105

PAVEMENT REINFORCING DETAIL

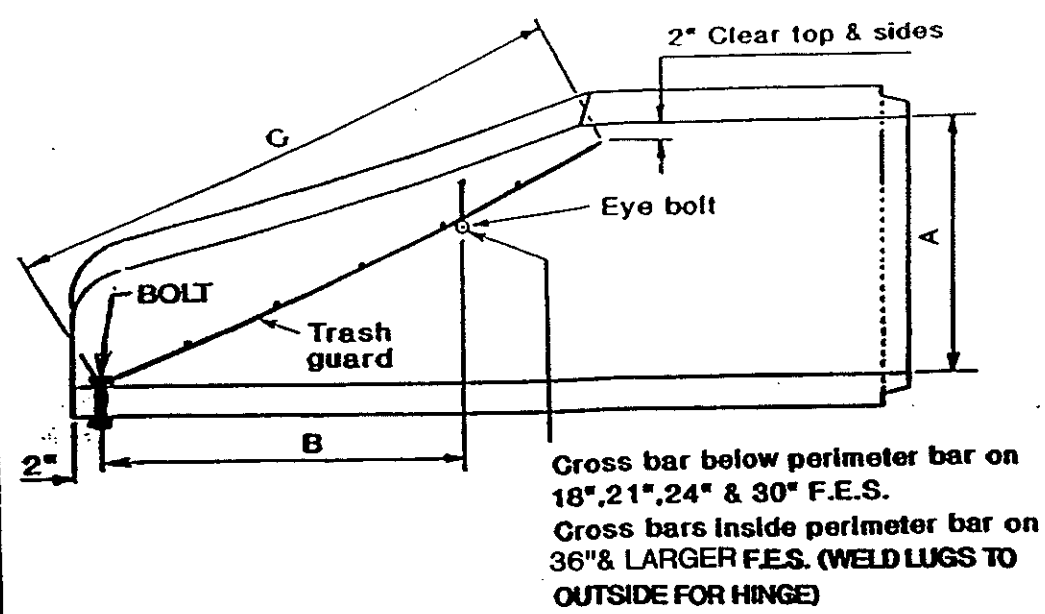


TYPICAL REINF. CONC. ROADWAY PANEL WITH REINF. STEEL

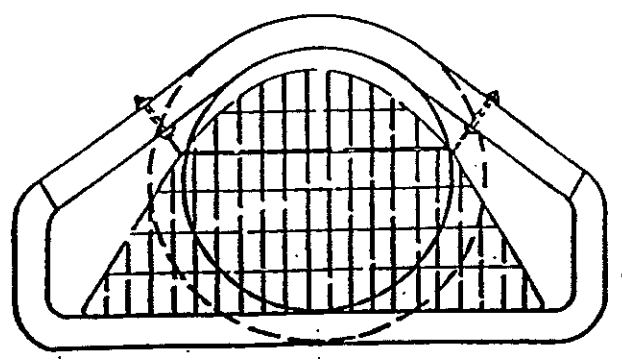
- NOTES:
1. Place reinforcing bars at mid depth of pavement
 2. A 1.0' min. lap at the longitudinal centerline joint shall be used when the joint is tied.
 3. The complete panel shall be reinforced if any part of the panel lays within 5' of the pipe centerline.
 4. All costs to be included in the price bid for concrete pavement.

TRASH GUARD DETAIL FOR FLARED END SECTION

FEDERAL REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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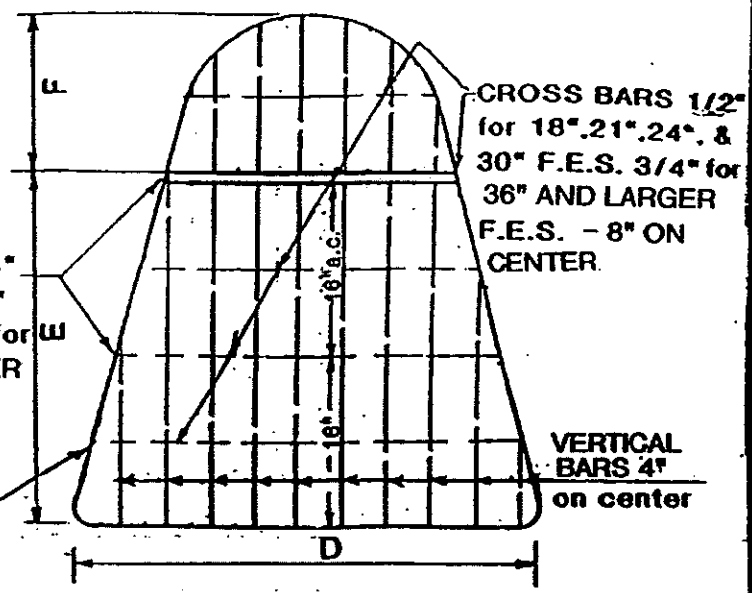
SECTION A-A



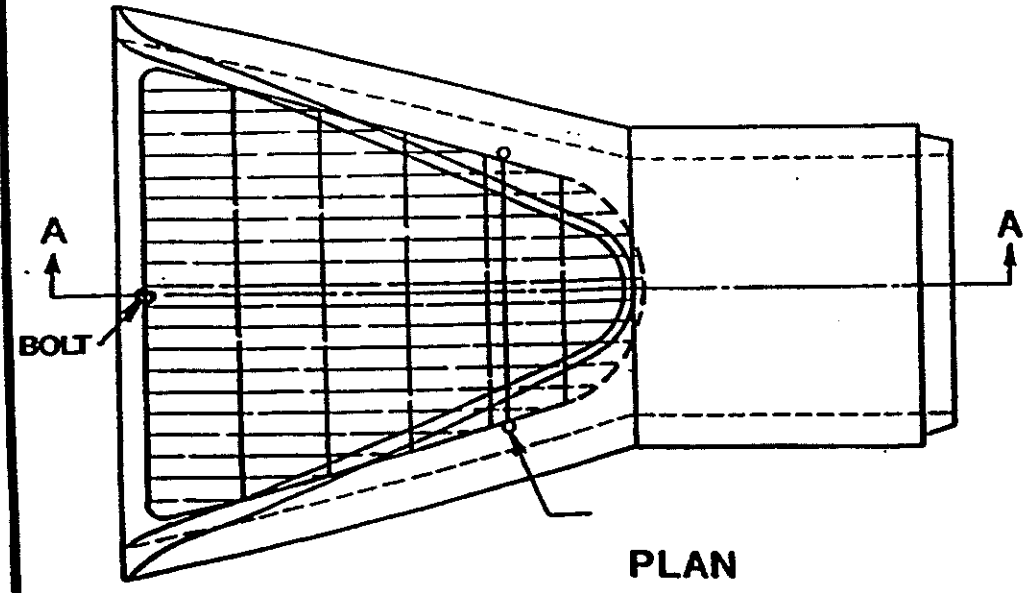
FRONT VIEW

Additional 3/4" cross bars 16" o.c. as req'd. for 36" AND LARGER F.E.S.

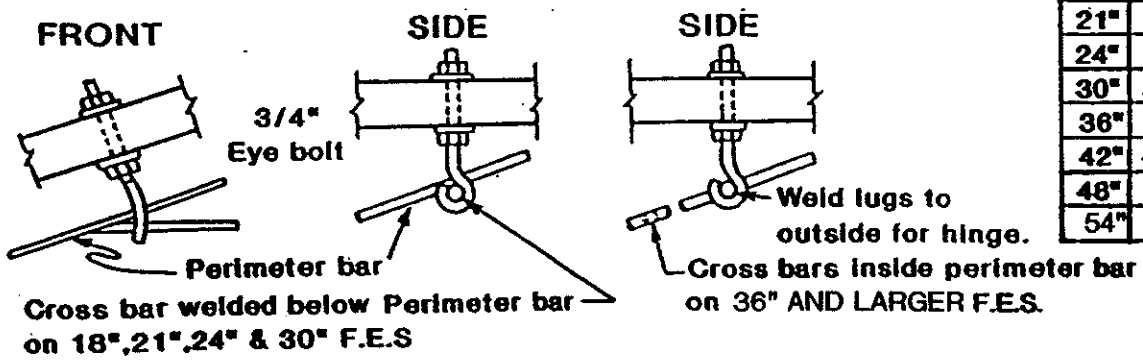
PERIMETER BARS 1/2" for 18", 21", 24" & 30" F.E.S. 3/4" for 36" AND LARGER F.E.S.



TRASH GUARD



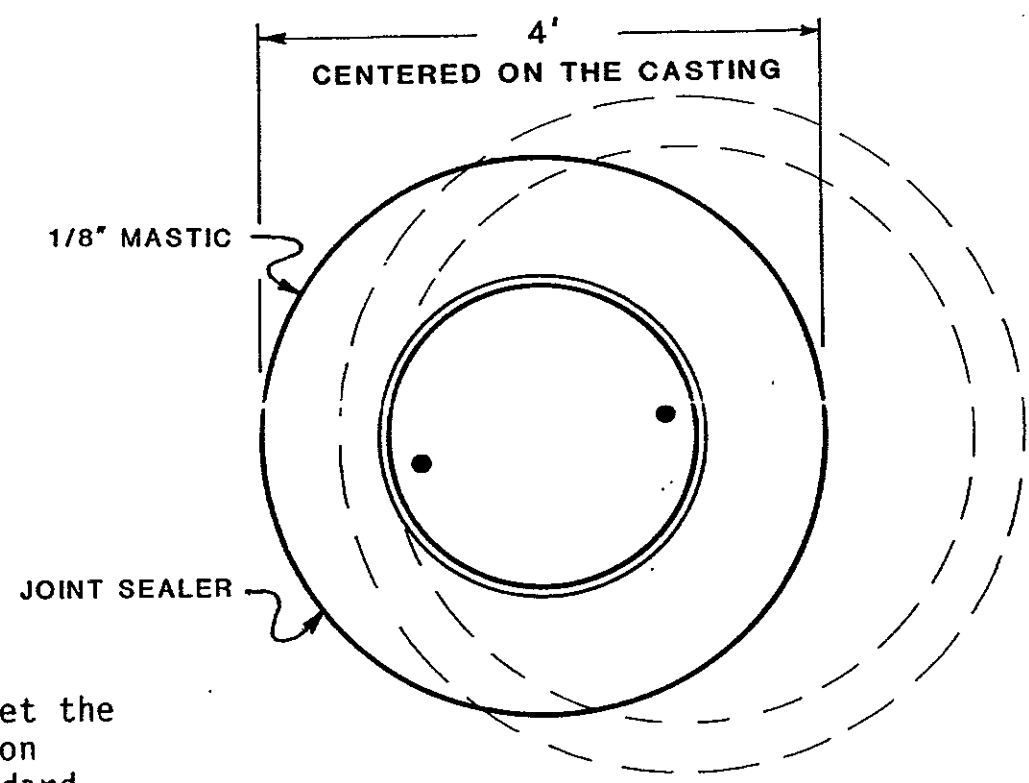
PLAN



ANCHOR DETAILS

A	B	C	D	E	F	VERTICAL BAR SIZE
18"	19"	31"	27"	22"	9"	#4
21"	26"	41"	32"	29"	12"	#4
24"	30"	49"	38"	34"	15"	#4
30"	38"	61"	48"	43"	18"	#5
36"	44"	72"	60"	50"	22"	#5
42"	45"	75"	65"	53"	22"	#5
48"	50"	86"	70"	60"	26"	#6
54"	48"	88"	78"	64"	24"	#6

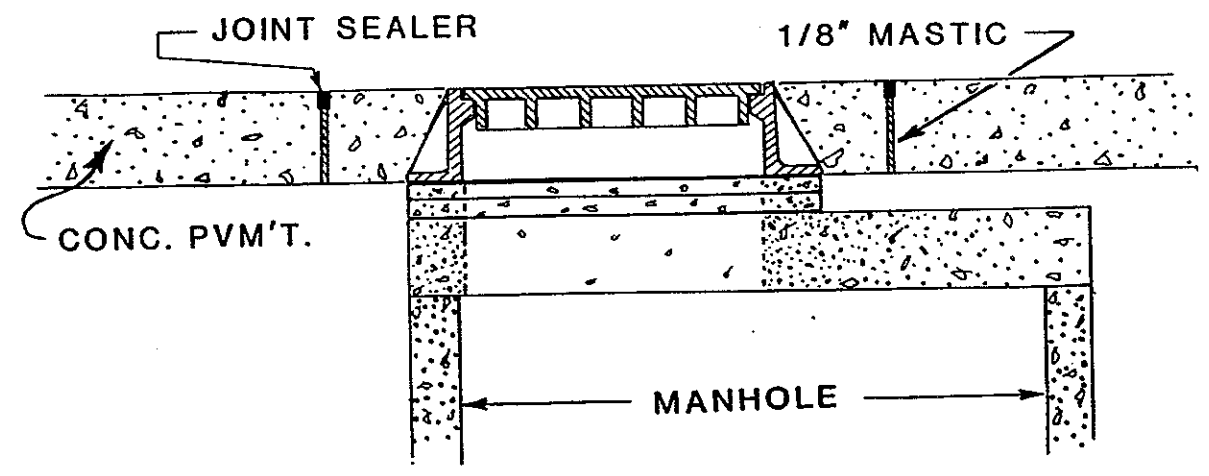
NOTE:
 Dimensions of trash guard are approximate only and are to be verified by the concrete pipe supplier.
 All metal parts are to be given 2 (two) coats of aluminum paint.
 The cost of the trash guard in place is to be included in the price bid for flared end section.



(Joint Sealer shall meet the requirements of Section 826.02 A2 of the Standard Specifications.)

NOTE:

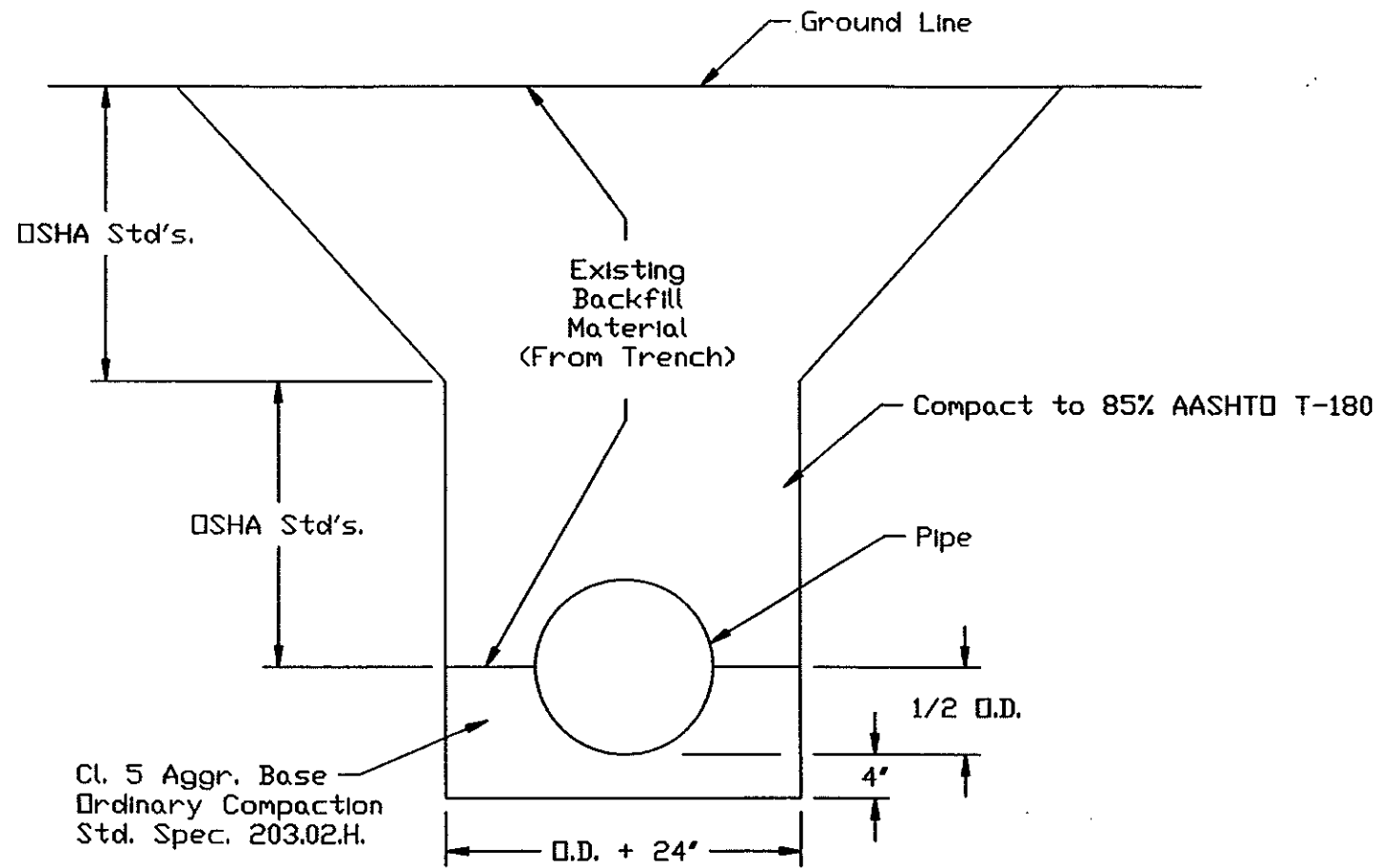
A manhole blockout shall be installed at all locations where a new or existing manhole is located in the new P.C.C. Pavement. The cost of installing the manhole blockout as shown shall be included in the price bid for "Adjust Manholes " for Existing Manholes & Incidental to the Price Bid for New Manholes.



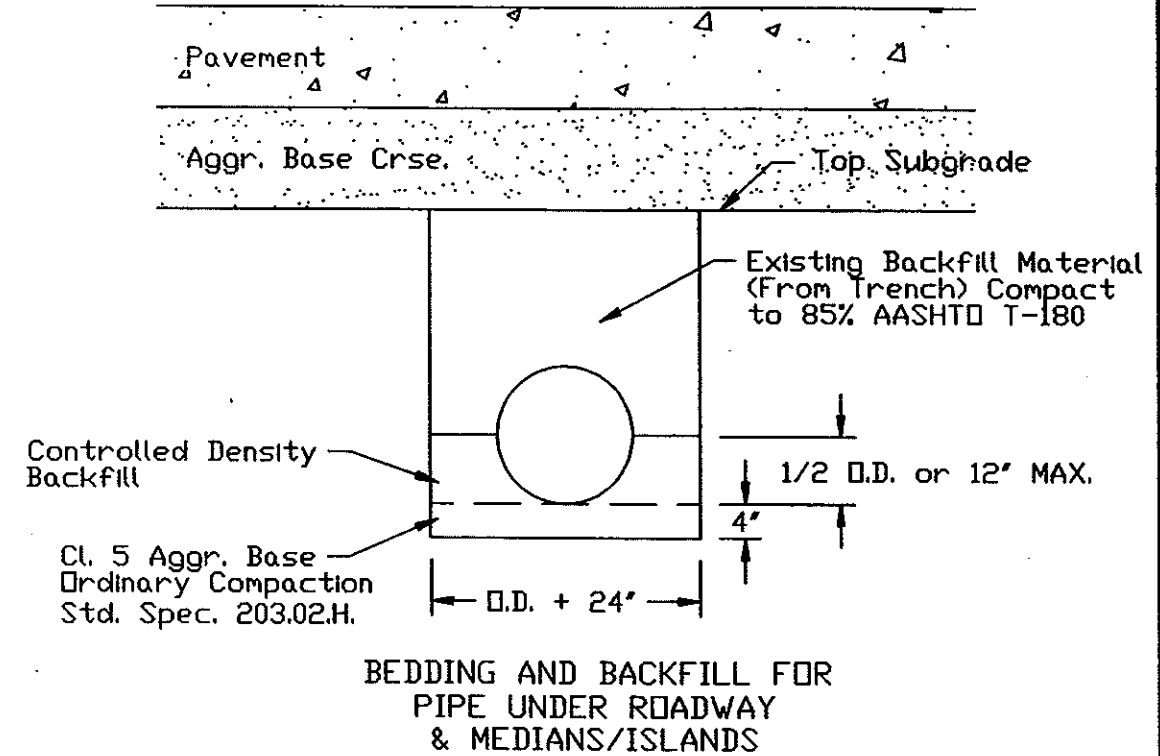
**MANHOLE BLOCKOUT
DETAILS
(ROUND)**

PIPE BACKFILL DETAIL STORMDRAIN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	108



BEDDING AND BACKFILL FOR
PIPE NOT UNDER ROADWAY

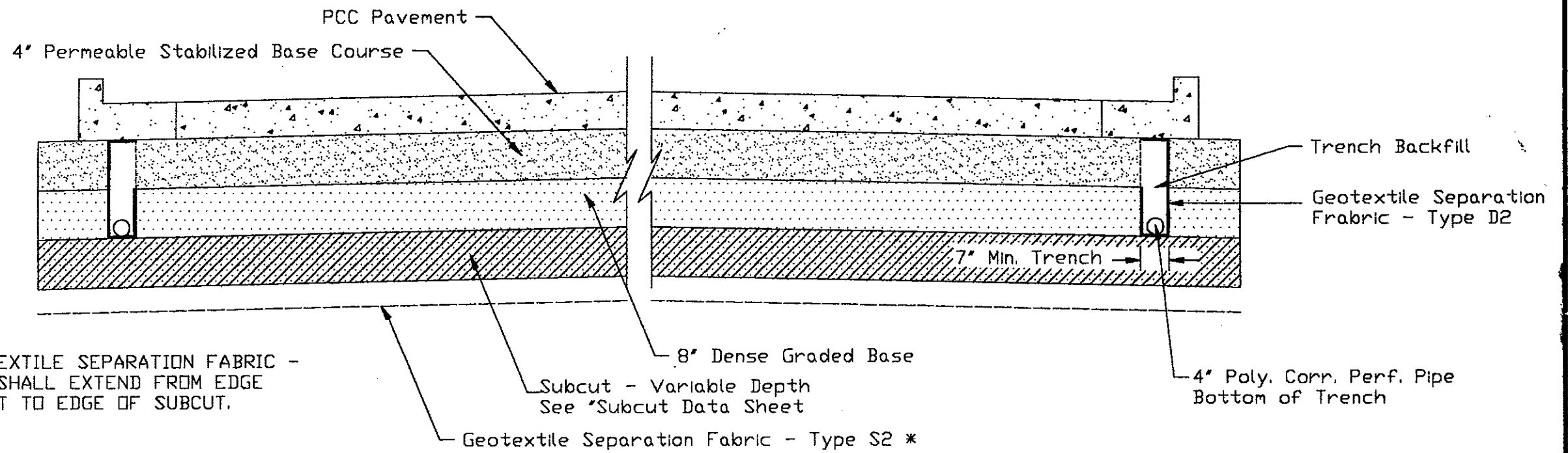


NOTES:

- ① The cost for all backfill materials shall be included in the price bid for the pipe.
- ② Unless otherwise shown in the plans all costs for the disposal of all excess trench excavation shall be included in the price bid for the pipe. The excess trench excavation shall be disposed of outside the right of way.
- ③ See Plan Note 714-P01 "CONTROL DENSITY BACKFILL"

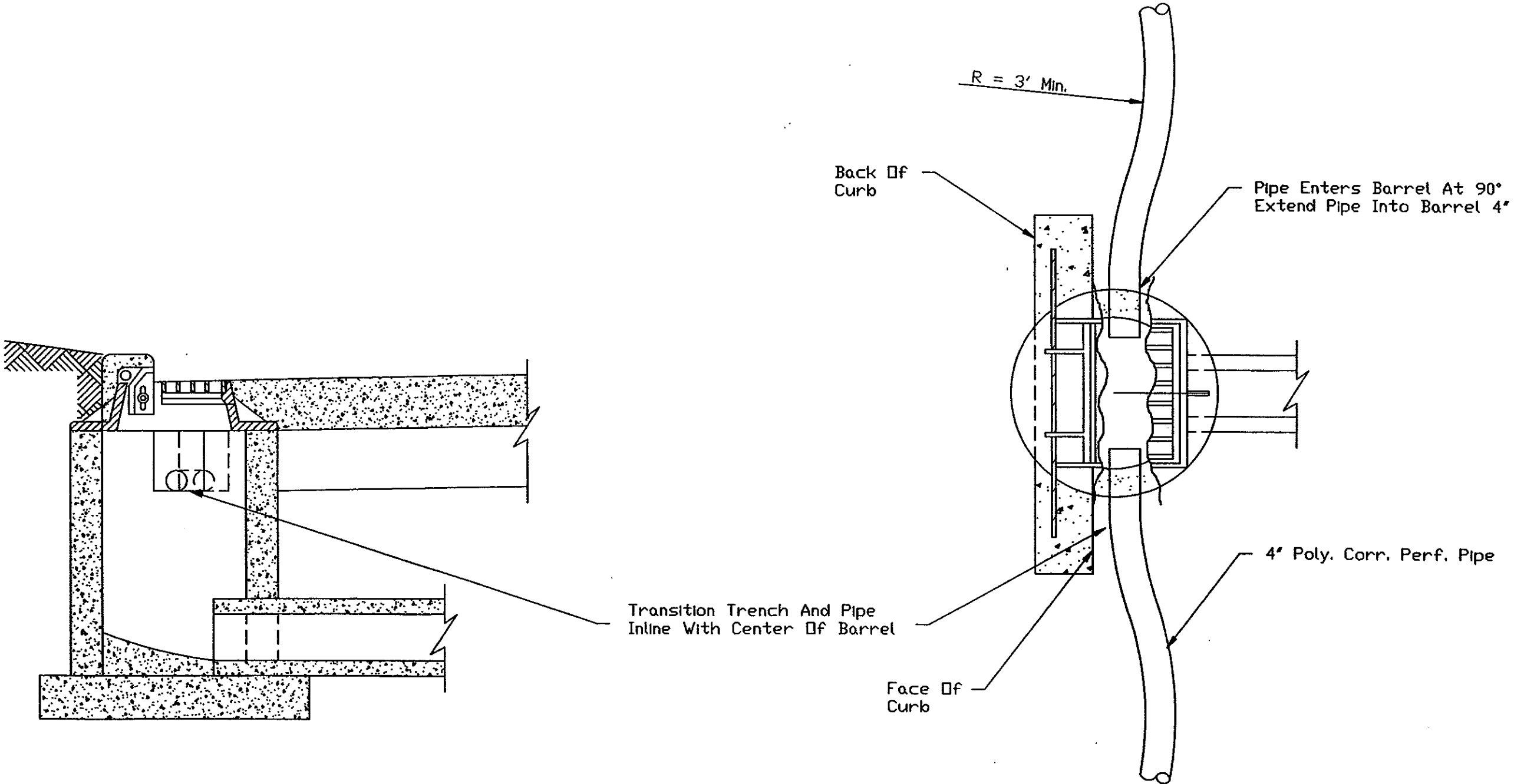
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	109

PAVEMENT EDGE DRAIN & SEPARATION FABRIC DETAIL



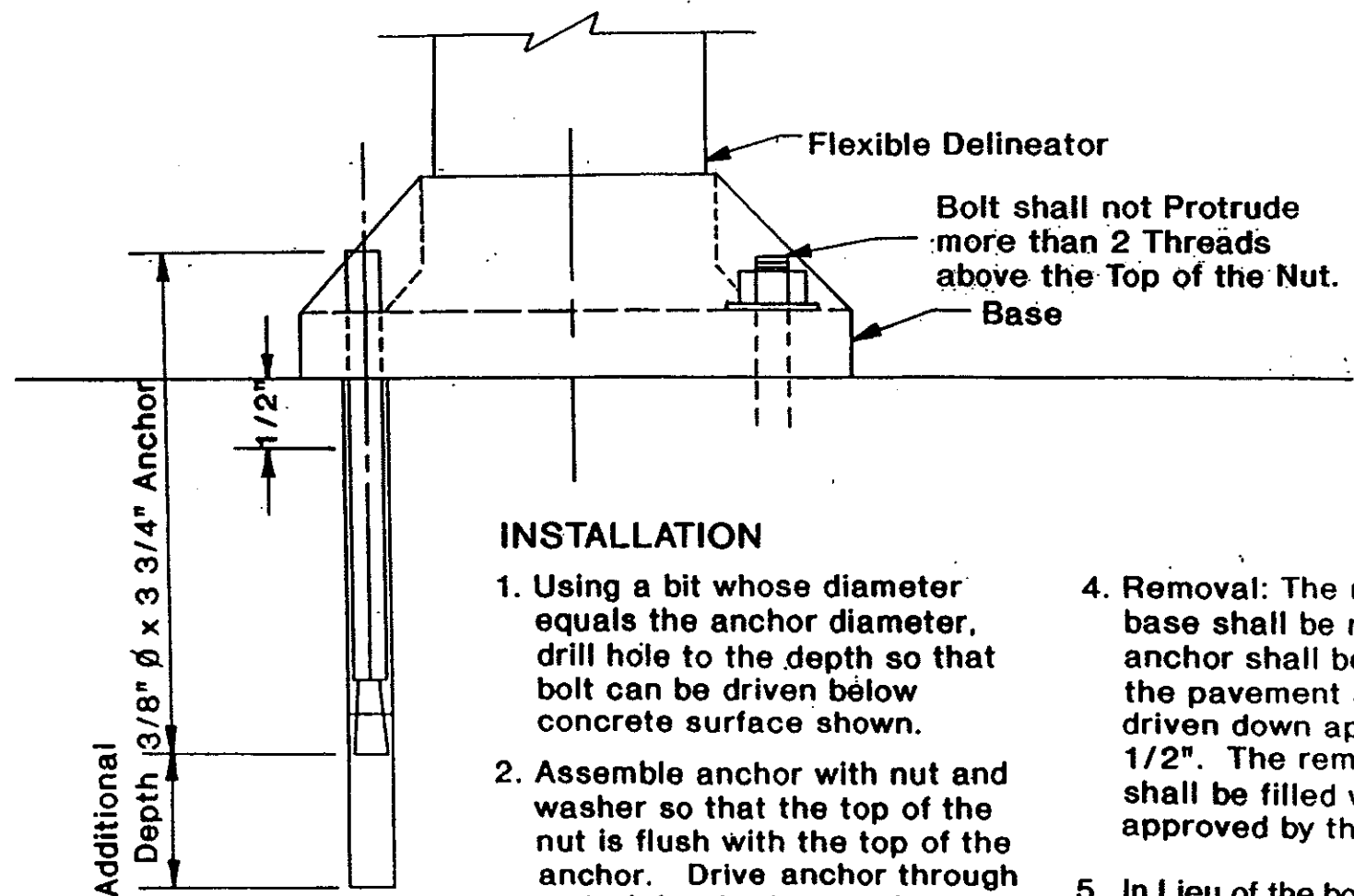
PAVEMENT EDGE DRAIN
INLET CONNECTION DETAIL

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	110



FLEXIBLE DELINEATOR DETAIL

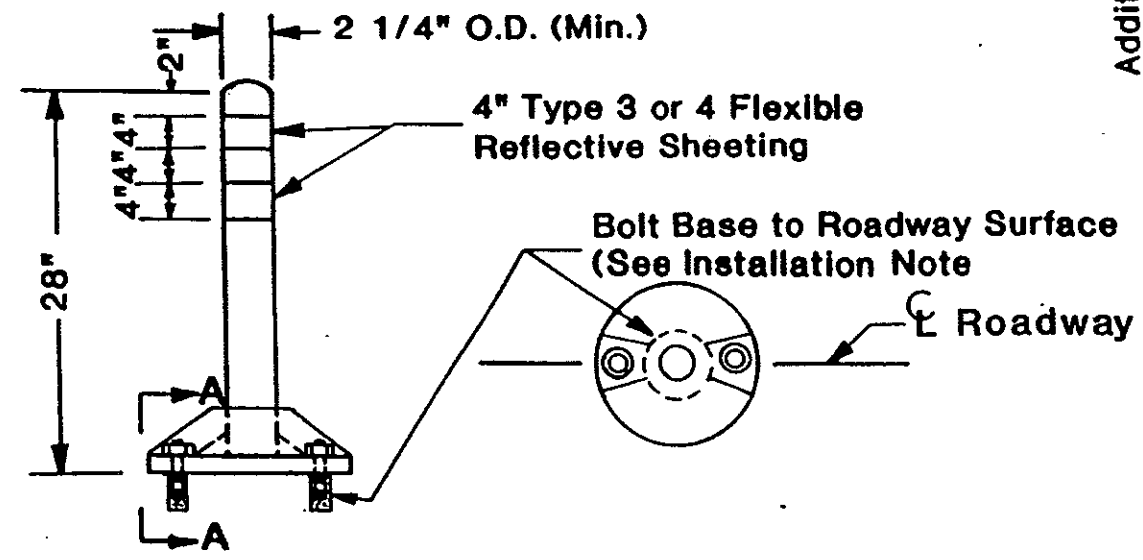
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	111



INSTALLATION

1. Using a bit whose diameter equals the anchor diameter, drill hole to the depth so that bolt can be driven below concrete surface shown.
2. Assemble anchor with nut and washer so that the top of the nut is flush with the top of the anchor. Drive anchor through material to be fastened so washer is flush with surface of material.
3. Expand anchor by tightening nut 3 to 5 turns.
4. Removal: The nut washer and base shall be removed. The anchor shall be cut off near the pavement and the anchor driven down approximately 1/2". The remaining hole shall be filled with an epoxy approved by the Engineer.
5. In Lieu of the bolted down base the contractor may use Bulyl Pad HB Fuller Pt. No. EP7171 (Grey) or equal.

The anchor shall be galvanized steel.



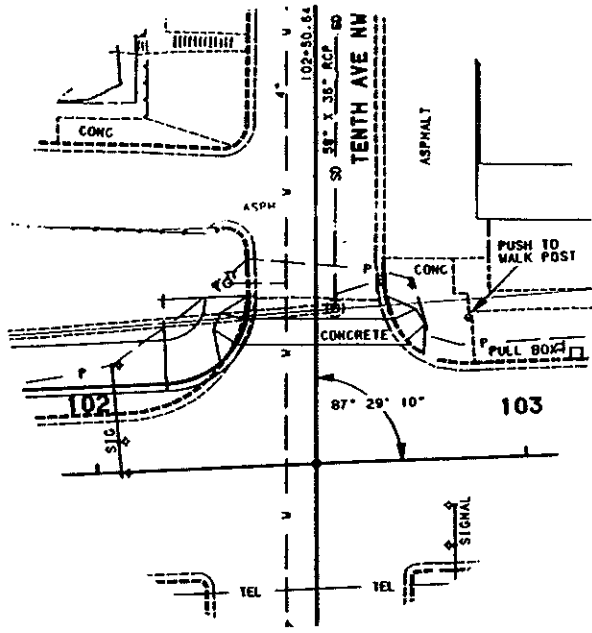
FLEXIBLE DELINEATOR DETAILS

FLEXIBLE DELINEATOR DETAIL

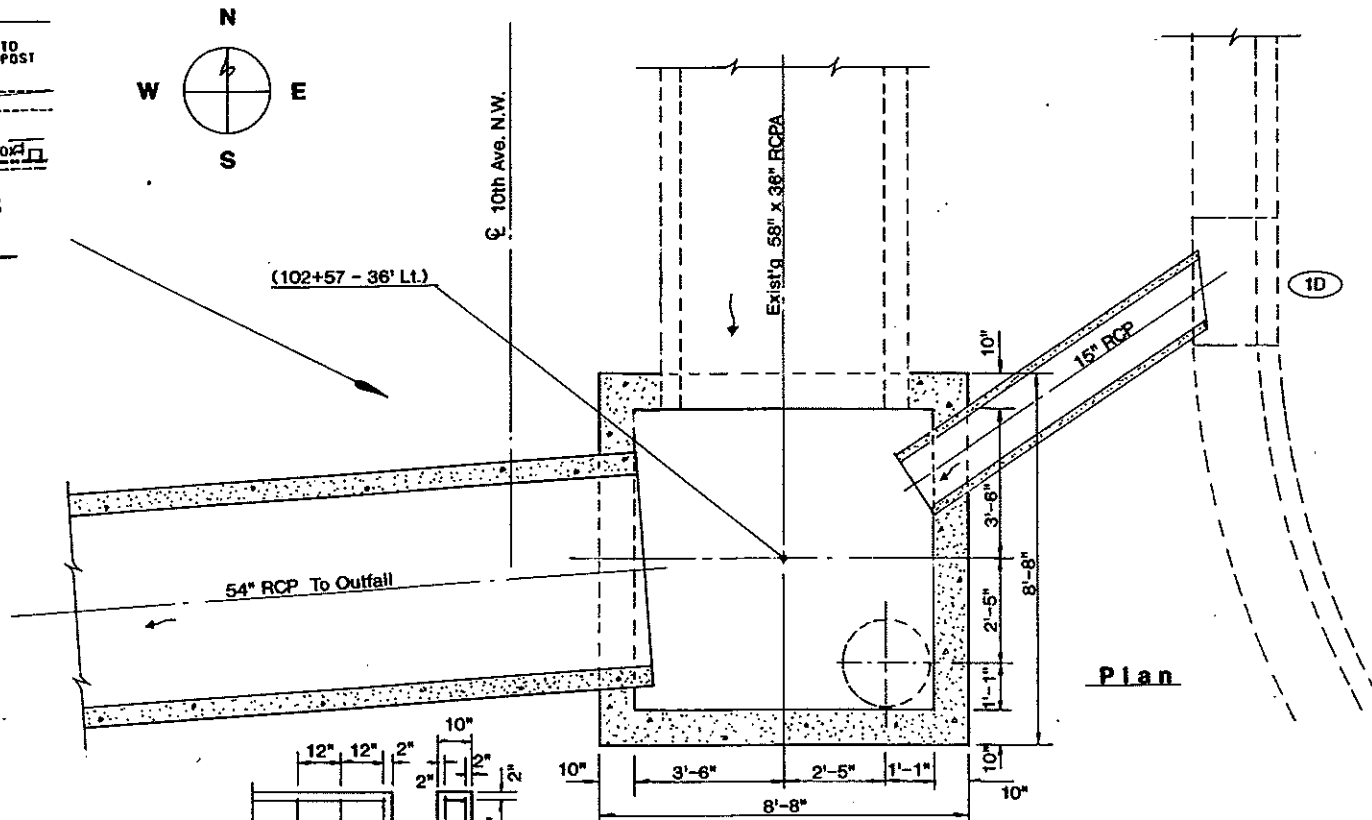
Manhole - Special

(102+57 - 36' Lt.)

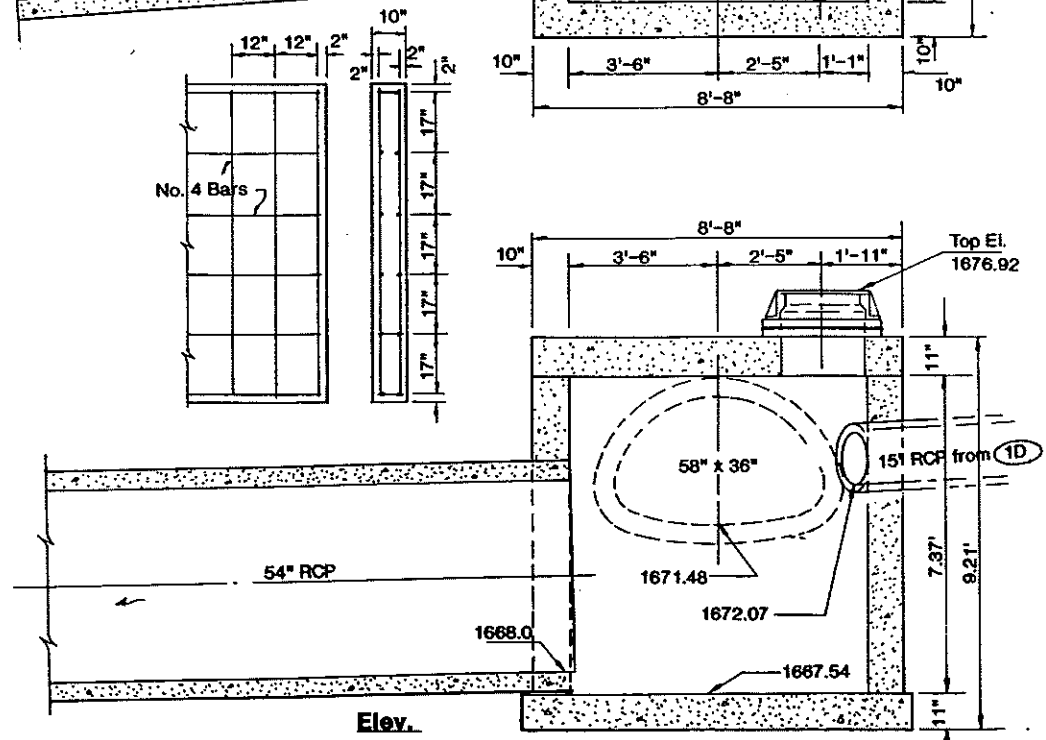
FWSA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)9	15 1/2



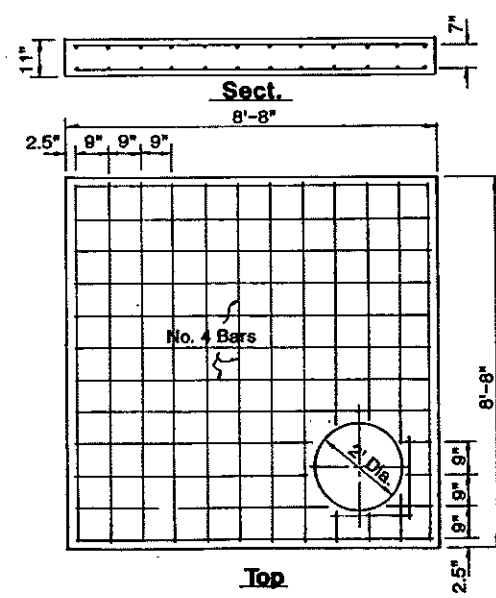
Plan



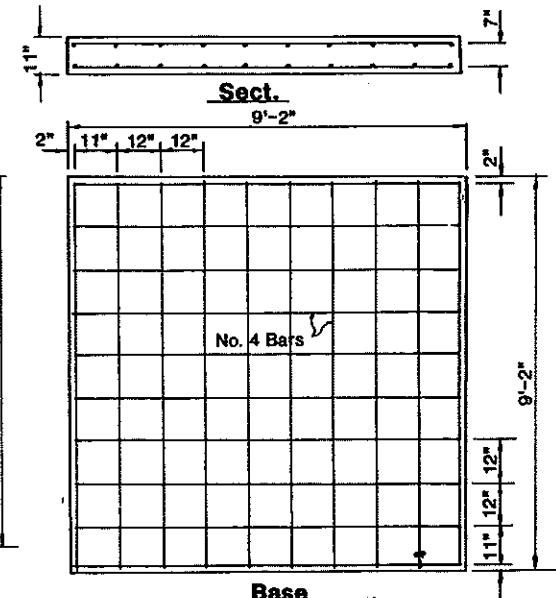
Plan



Elev.



Top



Base

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	113

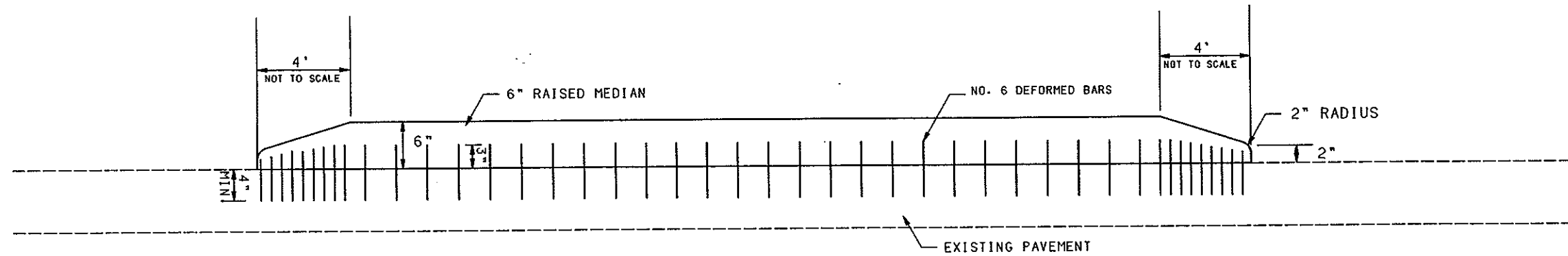
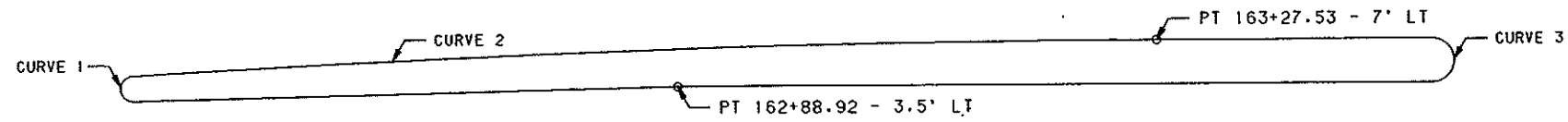
MEDIAN PAVING DETAIL

SEE ALIGNMENT LAYOUTS FOR COORDINATE DATA

CURVE 1
 DEL = 179.945°
 D = 5726.824'
 R = 1'
 T = 2066.451'
 L = 3.142'

CURVE 2
 DEL = 3.312°
 D = 4.037'
 R = 1419.223'
 T = 41.033'
 L = 82.044'

CURVE 3
 DEL = 180.038°
 D = 3274.855°
 R = 1.75'
 T = 5218.107'
 L = 5.498'



NOTES: RAISED MEDIAN TO BE PINNED IN PLACE WITH NO. 6 DEFORMED TIE BARS. BARS TO BE DRILLED AND EPOXIED INTO EXISTING PAVEMENT AT A DEPTH OF NOT LESS THAN 4" DEEP. BARS TO STICK UP INTO RAISED PORTION OF MEDIAN A MINIMUM OF 1/2 THE MEDIAN HEIGHT. THE EXACT NUMBER AND LOCATION OF BARS SHALL BE AS DESIGNATED BY THE ENGINEER. PAYMENT FOR ALL LABOR EQUIPMENT AND MATERIALS TO SATISFACTORILY INSTALL AND PIN THE RAISED MEDIAN IN PLACE SHALL BE MADE AT THE UNIT PRICE BID FOR "CONCRETE MEDIAN PAVING", SY.

SCALE: 1"=16" VERT
 SCALE: 1"=40' HORZ
 FILE: MEDIAN.GRF

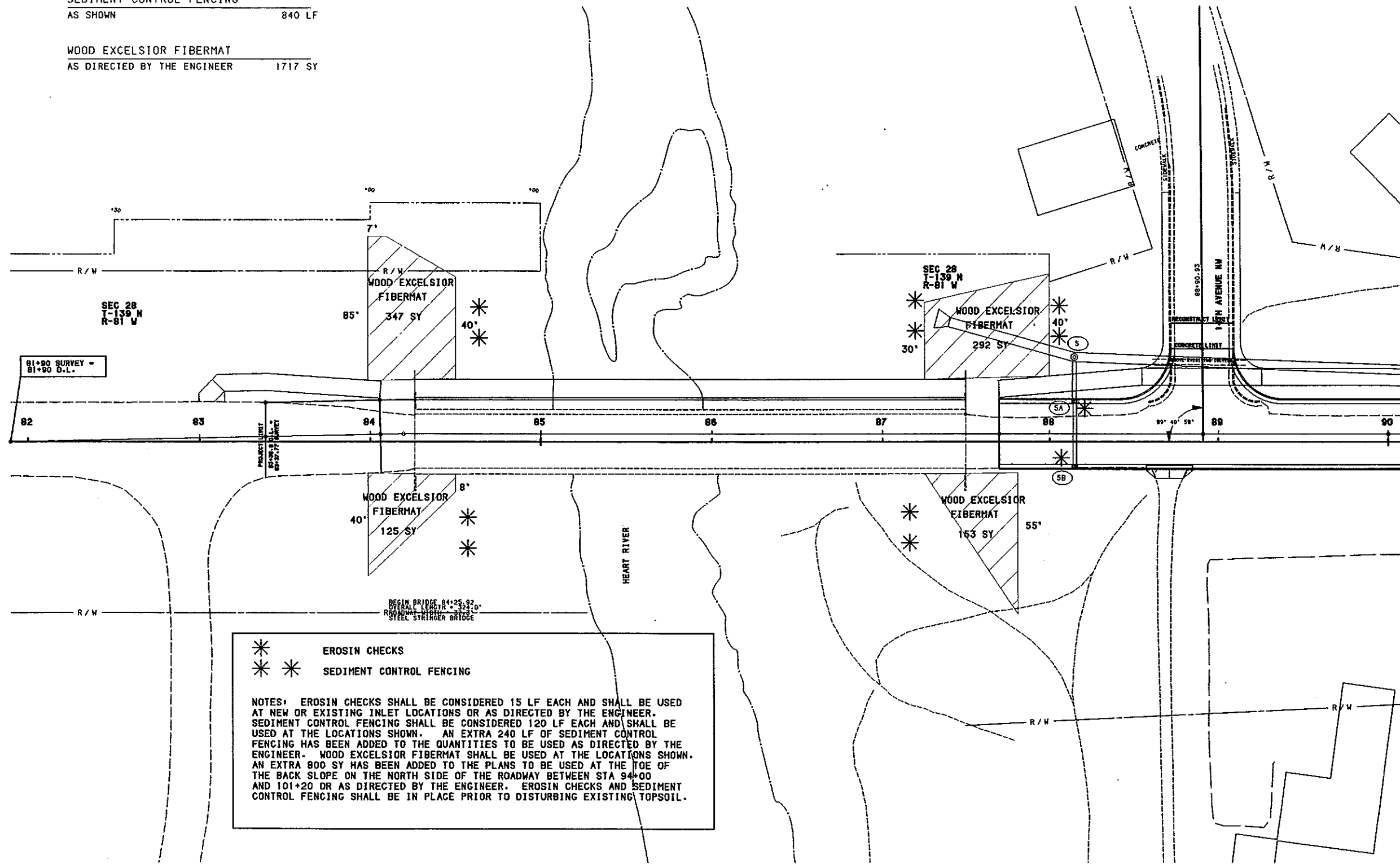
EROSIN CONTROL PLAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	114

EROSIN CHECKS
AS DIRECTED BY THE ENGINEER 300 LF

SEDIMENT CONTROL FENCING
AS SHOWN 840 LF

WOOD EXCELSIOR FIBERMAT
AS DIRECTED BY THE ENGINEER 1717 SY



* EROSION CHECKS
 * * SEDIMENT CONTROL FENCING

NOTES: EROSION CHECKS SHALL BE CONSIDERED 15 LF EACH AND SHALL BE USED AT NEW OR EXISTING INLET LOCATIONS OR AS DIRECTED BY THE ENGINEER. SEDIMENT CONTROL FENCING SHALL BE CONSIDERED 120 LF EACH AND SHALL BE USED AT THE LOCATIONS SHOWN. AN EXTRA 240 LF OF SEDIMENT CONTROL FENCING HAS BEEN ADDED TO THE QUANTITIES TO BE USED AS DIRECTED BY THE ENGINEER. WOOD EXCELSIOR FIBERMAT SHALL BE USED AT THE LOCATIONS SHOWN. AN EXTRA 800 SY HAS BEEN ADDED TO THE PLANS TO BE USED AT THE TOE OF THE BACK SLOPE ON THE NORTH SIDE OF THE ROADWAY BETWEEN STA 94+00 AND 101+20 OR AS DIRECTED BY THE ENGINEER. EROSION CHECKS AND SEDIMENT CONTROL FENCING SHALL BE IN PLACE PRIOR TO DISTURBING EXISTING TOPSOIL.

PROJECT LOCATION
EROSION CONTROL PLAN

FILE:
EROSINCO.GRF

SUMMARY OF EARTHWORK

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	115

LOCATION	STATION	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	
		EXCAVATION CY	SUBCUT EXCAVATION CY	SURFACE REMOVAL CY	TOPSOIL STRIPPING CY	COMMON EXCAVATION CY	EMBANKMENT CY	EXCESS EXCAVATION CY	TOPSOIL FOR SEEDING CY	
HEART RIVER SECTION	82+00 to 101+31	5352		988	1491	2673		5913	-3241	200
URBAN SECTION	107+74.5 to 162+98	25412	10694	11029	83	24993		73	24920	
FLATTEN DITCH	87+00 to 88+50							83	-83	
HEART RIVER BRIDGE								873	-873	
WIDENING EAST OF BRIDGE		4				4			4	
SUNNY ROAD		125				125			125	
10TH AVE NW	101+31 to intersection	151				151			151	
8TH AVE NW		312				312	4		308	
7TH AVE NW		100				100			100	
6TH AVE NW		208				208			208	
4TH AVE NW		104				104			104	
3RD AVE NW		104				104			104	
2ND AVE NW		102				102			102	
1ST AVE NW		119				119			119	
COLLINS		88				88			88	
1ST AVE NE		152				152			152	
2ND AVE NE		101				101			101	
3RD AVE NE		131				131			131	
4TH AVE NE		70				70			70	
TRAFFIC CONTROL		242				242			242	
PARKING LOT 144+00 RT		808				808			808	
TOTALS		33683	10694	12018	1574	30585		6946	23639	200

SURFACE REMOVAL SUMMARY

LOCATION	BITUMINOUS PAVEMENT CY	NON-REINFORCE CONCRETE PAVEMENT EST. @ 8" CY	REINFORCE CONCRETE PAVEMENT EST. @ 9" CY	CONCRETE SIDEWALK, DRIVEWAY SY@4.5" CY	REMOVAL OF CURB AND GUTTER CY		
82+00 to 86+00	14						
86+00 to 90+00	198				7		
90+00 to 93+00	187						
93+00 to 97+00	241						
97+00 to 101+00	281						
101+00 to 105+00	21	30		2	10		
SUBTOTALS	941	30		2	16	988	CY
105+00 to 109+00		579		92	36		
109+00 to 113+00	446.8	108		52	40		
113+00 to 117+00		579		92	36		
117+00 to 121+00	127.2	456		106	38		
121+00 to 125+00		615		91	27		
125+00 to 129+00		571		118	44		
129+00 to 133+00		568		120	45		
133+00 to 137+00	15	575		91	46		
137+00 to 140+00		570		108	36		
140+00 to 144+00		567		107	44		
144+00 to 148+00		569		120	45		
148+00 to 152+00	11.4	72	660	64	46		
152+00 to 156+00			740	74	46		
156+00 to 159+00	13.7		738	38	45		
159+00 to 162+00			316	115	24		
162+00 to 166+00			112	15	22		
SUBTOTALS	614	5828	2566	1402	620	11029	CY

SUBCUT DATA SHEET

STATION	EXISTING ELEVATION	RECOMMENDED CUT DEPTH	SUBGRADE ELEVATION	FINISHED ELEVATION	TOP OF CLASS 3	DEPTH OF CLASS 3	WIDTH OF SUBCUT	VOLUME OF CLASS 3 (CY)
11100	1656.480	0.00	1656.48	1656.20	1654.36			
11200	1651.967	1.50	1650.47	1651.53	1649.69	1.06	62.00	243.33
11300	1650.397	3.00	1647.40	1650.29	1648.46	1.37	62.00	313.60
11400	1649.104	3.00	1646.10	1649.30	1647.47	0.95	62.00	217.84
11500	1649.181	3.00	1646.18	1648.96	1647.13	1.41	62.00	324.62
11600	1648.944	3.00	1645.94	1649.19	1647.36	1.66	62.00	380.42
11700	1648.760	3.00	1645.76	1649.25	1647.42	1.61	62.00	370.55
11800	1648.523	3.00	1645.52	1648.97	1647.14	1.82	64.00	432.28
11900	1648.585	3.00	1645.59	1649.24	1647.41	1.44	64.00	341.49
12000	1648.530	3.00	1645.53	1648.80	1646.97	1.22	64.00	289.58
12100	1648.267	3.00	1645.27	1648.32	1646.49	1.00	62.00	228.86
12200	1648.098	3.00	1645.10	1647.93	1646.09	0.72	62.00	166.18
12300	1647.973	3.00	1644.97	1647.53	1645.70	1.72	62.00	394.66
12400	1647.299	3.00	1644.30	1647.85	1646.02	1.36	62.00	311.30
12500	1647.301	3.00	1644.30	1647.49	1645.66	1.35	62.00	311.07
12600	1647.302	3.00	1644.30	1647.49	1645.66	1.36	62.00	311.53
12700	1647.300	3.00	1644.30	1647.49	1645.66	0.96	62.00	219.91
12800	1647.299	3.00	1644.30	1647.09	1645.26	0.62	62.00	141.38
12900	1647.301	3.00	1644.30	1646.75	1644.92	1.16	62.00	265.60
13000	1647.300	3.00	1644.30	1647.29	1645.46	1.48	62.00	340.46
13100	1647.374	3.00	1644.37	1647.69	1645.86	1.50	62.00	345.06
13200	1647.354	3.00	1644.35	1647.69	1645.86	0.69	62.00	159.52
13300	1647.402	2.60	1644.80	1647.33	1645.50	0.72	62.00	164.57
13400	1647.501	2.40	1645.10	1647.65	1645.82	0.05	62.00	12.09
13500	1647.443	2.00	1645.44	1647.33	1645.50	0.36	62.00	83.28
13600	1647.414	2.00	1645.41	1647.61	1645.78	0.27	62.00	61.92
13700	1647.188	2.00	1645.19	1647.29	1645.46	1.35	62.00	309.00
13800	1647.211	2.70	1644.51	1647.69	1645.86	2.02	62.00	463.55
13900	1647.238	3.40	1643.84	1647.69	1645.86	2.25	62.00	516.59
14000	1647.207	4.00	1643.21	1647.29	1645.46	2.15	62.00	494.09
14100	1647.305	4.00	1643.31	1647.29	1645.46	2.41	62.00	554.02
14200	1647.444	4.00	1643.44	1647.69	1645.86	2.53	62.00	581.35
14300	1647.238	4.00	1643.24	1647.60	1645.77	2.09	62.00	481.00
14400	1647.100	4.00	1643.10	1647.03	1645.19	1.85	62.00	425.20
14500	1647.255	4.00	1643.26	1646.94	1645.11	1.31	62.00	301.20
14600	1647.195	3.00	1644.20	1647.34	1645.51	0.44	62.00	100.04
14700	1647.071	2.00	1645.07	1647.34	1645.51	-0.91	62.00	
14800	1647.017	1.00	1646.02	1646.94	1645.11	0.12	62.00	27.25
14900	1646.988	2.00	1644.99	1646.94	1645.11	0.55	64.50	130.35
15000	1646.920	2.00	1644.92	1647.30	1645.47	-0.00	67.83	
15100	1647.014	2.00	1645.01	1646.84	1645.01	0.07	69.50	17.42
15200	1646.584	2.00	1644.58	1646.49	1644.65	0.45	69.50	115.49
15300	1646.017	2.00	1644.02	1646.30	1644.47	0.37	69.50	95.15
15400	1645.592	2.00	1643.59	1645.80	1643.96	0.22	69.50	57.32
15500	1645.236	2.00	1643.24	1645.29	1643.46	0.40	69.50	104.16
15600	1645.002	2.00	1643.00	1645.24	1643.41	0.65	69.50	166.20
15700	1645.116	2.00	1643.12	1645.60	1643.76	0.38	70.15	98.90
15800	1645.006	2.00	1643.01	1645.22	1643.39	0.29	72.00	76.18
15900	1644.681	2.00	1642.68	1644.80	1642.97			
16000	1644.180	0.00	1644.18	1644.36	1642.53			
16100								
					TOTAL CLASS 3			11545.55

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	117

TIE SLOPE SUMMARY

ROADWAY OFFLOC

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
82+23.00	82+23.00	LEFT	-92.8823	1646.9706	-4.000
		RIGHT	19.7930	1664.4098	-3.000
82+44.00	82+44.01	LEFT	-98.9749	1646.4368	-4.000
		RIGHT	21.6947	1664.2096	-3.000
82+75.00	82+75.01	LEFT	-105.6921	1646.2179	-4.000
		RIGHT	22.4459	1664.5992	-3.000
82+83.00	82+83.02	LEFT	-107.3075	1646.1910	-4.000
		RIGHT	22.6165	1664.7075	-3.000
83+00.00	83+00.02	LEFT	-111.3256	1645.9873	-4.000
		RIGHT	23.3943	1664.7993	-3.000
83+05.00	83+05.02	LEFT	-112.4942	1645.9307	-4.000
		RIGHT	23.9923	1664.7032	-3.000
83+13.00	83+13.02	LEFT	-113.7984	1645.9816	-4.000
		RIGHT	25.1521	1664.4818	-3.000
83+46.00	83+46.03	LEFT	-120.2841	1645.6879	-4.000
		RIGHT	57.1284	1654.3767	-3.000
83+84.00	83+84.04	LEFT	-122.9961	1645.4423	-4.000
		RIGHT	64.7196	1651.8254	-3.000
84+00.00	84+00.04	LEFT	-124.0020	1645.3687	-4.000
		RIGHT	63.0353	1652.3781	-3.000
84+05.78	84+05.82	LEFT	-124.3388	1645.3488	-4.000
		RIGHT	62.9643	1652.3886	-3.000
87+69.86	87+69.90	LEFT	-96.4384	1652.3908	-4.000
		RIGHT	84.5063	1650.2195	-4.000
87+80.00	87+80.04	LEFT	-94.4760	1652.5955	-4.000
		RIGHT	74.7430	1651.6104	-4.000
88+00.00	88+00.04	LEFT	-85.1416	1654.8518	-4.000
		RIGHT	71.7498	1652.2814	-4.000
88+52.00	88+52.04	LEFT	-57.0092	1661.9708	-4.000
		RIGHT	33.6094	1661.9024	-4.000
88+56.00	88+56.04	LEFT	-53.2005	1662.9390	-4.000
		RIGHT	20.8800	1665.1008	-4.000
88+59.00	88+59.04	LEFT	-50.2336	1663.6928	-4.000
		RIGHT	21.2970	1665.0085	-4.000
88+61.00	88+61.04	LEFT	-47.2712	1664.4413	-4.000
		RIGHT	21.6172	1664.9365	-4.000
88+65.00	88+65.04	LEFT	-45.6368	1665.9214	6.000
		RIGHT	22.3148	1664.7781	-4.000
88+72.50	88+72.54	LEFT	-55.8333	1666.3676	-4.000
		RIGHT	29.8916	1664.2332	-4.000
88+73.00	88+73.04	LEFT	-55.6053	1666.4256	-4.000
		RIGHT	29.8244	1664.3011	-4.000
88+91.00	88+91.04	LEFT	-64.3356	1668.3063	6.000
		RIGHT	64.3838	1655.6611	-4.000
89+00.00	89+00.04	LEFT	-54.5836	1667.3409	0.000
		RIGHT	73.9840	1653.2325	-4.000
89+08.50	89+08.54	LEFT	-54.5836	1666.8498	0.000
		RIGHT	74.2557	1653.1201	-4.000
89+09.00	89+09.04	LEFT	-50.6628	1666.6054	50.000
		RIGHT	69.0304	1653.2973	-4.000
89+16.00	89+16.04	LEFT	-64.9475	1666.8410	50.000
		RIGHT	69.1377	1653.2203	-4.000
89+19.00	89+19.04	LEFT	-75.5253	1667.0293	50.000
		RIGHT	68.8713	1653.2637	-4.000
89+25.00	89+25.04	LEFT	-77.7316	1667.0269	50.000
		RIGHT	59.4063	1655.5834	-4.000
89+30.00	89+30.04	LEFT	-77.8370	1666.9903	50.000
		RIGHT	58.1571	1655.8570	-4.000
89+49.00	89+49.04	LEFT	-68.9500	1666.6653	50.000
		RIGHT	54.2581	1656.6845	-4.000
90+00.00	90+00.04	LEFT	-53.7269	1665.9656	50.000
		RIGHT	19.3062	1665.6663	6.000
90+43.62	90+43.66	LEFT	-49.0591	1665.5774	50.000
		RIGHT	19.6265	1665.3432	6.000
90+48.00	90+48.04	LEFT	-49.0548	1665.5653	50.000
		RIGHT	19.3429	1665.2796	6.000
90+58.00	90+58.05	LEFT	-49.1009	1665.5557	50.000
		RIGHT	18.3325	1665.0907	6.000
90+86.00	90+86.07	LEFT	-48.8102	1665.6331	50.000
		RIGHT	55.7584	1660.2526	-8.623
91+00.00	91+00.07	LEFT	-48.8101	1665.6907	50.000
		RIGHT	55.8332	1660.9444	-10.055
91+13.00	91+13.08	LEFT	-48.9704	1665.7473	50.000
		RIGHT	55.9024	1660.6145	-9.143
91+27.00	91+27.09	LEFT	-48.2405	1665.7882	50.000
		RIGHT	48.3497	1664.8196	-4.000
91+44.00	91+44.10	LEFT	-48.3497	1665.8603	50.000
		RIGHT	19.3228	1665.1751	-4.000
91+50.00	91+50.10	LEFT	-48.7660	1665.8932	50.000
		RIGHT	19.1376	1665.2535	-4.000
91+75.00	91+75.11	LEFT	-47.8782	1665.9782	50.000
		RIGHT	37.0536	1660.9079	-4.000
92+00.00	92+00.12	LEFT	-47.5224	1666.0698	50.000
		RIGHT	57.5613	1655.9144	-4.000
92+50.00	92+50.14	LEFT	-48.3863	1666.2559	50.000
		RIGHT	24.9851	1664.2847	-4.000
93+00.00	93+00.16	LEFT	-47.4766	1666.0624	50.000
		RIGHT	46.3831	1658.8413	-4.000
93+50.00	93+50.18	LEFT	-43.4361	1665.8476	50.000
		RIGHT	20.0426	1665.4899	6.000
94+00.00	94+00.20	LEFT	-41.0842	1666.2557	0.000
		RIGHT	19.9653	1665.5932	6.000
94+50.00	94+50.22	LEFT	-40.8168	1666.4391	0.000
		RIGHT	38.0294	1661.3318	-4.000
95+00.00	95+00.23	LEFT	-40.5492	1667.2042	0.000
		RIGHT	39.2406	1661.3506	-4.000
95+50.00	95+50.24	LEFT	-40.2816	1667.4509	0.000

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	118

MANDAN-WEST MAIN STREET
 EARTH DATA FROM STA. 82+00 TO 101+31
 FILE: WSEC.DAT

TIE SLOPE SUMMARY

		ROADWAY OFFLOC			SLOPE
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	
96+00.00	96+00.25	RIGHT	39.0876	1662.1380	-4.000
		LEFT	-40.2793	1667.8434	50.000
96+50.00	96+50.26	RIGHT	48.7280	1660.5292	-4.000
		LEFT	-41.7152	1668.6119	50.000
97+00.00	97+00.27	RIGHT	68.7740	1655.8818	-3.858
		LEFT	-45.3818	1669.4249	50.000
97+50.00	97+50.28	RIGHT	69.0418	1656.5394	-3.834
		LEFT	-42.1901	1670.1007	50.000
98+00.00	98+00.28	RIGHT	69.3096	1657.2646	-3.831
		LEFT	-42.2330	1670.8413	50.000
98+50.00	98+50.28	RIGHT	69.5774	1657.8224	-3.777
		LEFT	-43.4989	1671.6062	50.000
99+00.00	99+00.28	RIGHT	69.8452	1658.0230	-3.624
		LEFT	-41.1917	1672.2974	50.000
99+00.69	99+00.97	RIGHT	70.0006	1658.1095	-3.453
		LEFT	-41.1867	1672.3074	50.000
99+50.00	99+50.28	RIGHT	70.0006	1658.1176	-3.453
		LEFT	-38.5194	1673.3927	0.000
100+00.00	100+00.28	RIGHT	70.0006	1658.8656	-3.459
		LEFT	-49.9994	1678.8865	2.219
101+00.00	101+00.28	RIGHT	80.0006	1656.5694	-3.335
		LEFT	-38.9123	1675.2202	10.000
101+08.00	101+08.28	RIGHT	80.0006	1659.5697	-3.312
		LEFT	-49.9994	1680.2696	2.309
101+10.00	101+10.28	RIGHT	80.0006	1659.8686	-3.323
		LEFT	-49.9994	1680.3285	2.296
101+14.00	101+14.28	RIGHT	49.9994	1680.3331	-3.326
		LEFT	80.0006	1680.0928	2.321
101+21.00	101+21.28	RIGHT	-49.9994	1680.3624	-3.332
		LEFT	80.0006	1660.3794	2.356
101+22.00	101+22.28	RIGHT	-49.9994	1680.3857	-3.348
		LEFT	80.0006	1660.4477	2.352
101+31.00	101+31.28	RIGHT	-49.9994	1680.3162	-3.356
		LEFT	80.0006	1661.1094	2.452
		RIGHT			-3.449

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	OFFSET STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK /SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
82+00.00	82+00.00	0.000	0.000	0.000	0.000	1.2000	0.000	0.000
82+23.00	82+23.00	13.604	5.734	46.989	20.014	1.2000	24.017	-18.222
82+44.00	82+44.01	9.159	8.852	114.372	62.985	1.2000	75.582	-84.952
82+75.00	82+75.01	4.422	7.796	212.327	187.894	1.2000	225.473	-302.628
82+83.00	82+83.02	3.212	1.131	238.756	66.827	1.2000	80.192	-381.690
83+00.00	83+00.02	1.325	1.428	300.865	169.881	1.2000	203.857	-584.119
83+05.00	83+05.02	1.016	0.235	321.268	57.605	1.2000	69.126	-653.028
83+13.00	83+13.02	0.568	0.347	357.583	100.570	1.2000	120.685	-773.478
83+46.00	83+46.03	0.000	0.000	537.213	546.819	1.2000	656.183	-1429.314
83+84.00	83+84.04	0.000	0.000	595.521	797.109	1.2000	956.531	-2385.845
84+00.00	84+00.04	0.000	0.000	616.128	359.007	1.2000	430.808	-2816.653
84+05.78	84+05.82	0.000	0.000	636.698	134.108	1.2000	160.930	-2977.583
84+20.78	84+20.82	0.000	0.000	0.000	176.829	1.2000	212.195	-3189.777
87+69.86	87+69.90	0.116	0.000	557.003	0.000	1.2000	0.000	-3189.777
87+80.00	87+80.04	68.559	12.898	414.505	182.469	1.2000	218.962	-3395.841
88+00.00	88+00.04	70.133	51.367	287.905	260.152	1.2000	312.182	-3656.656
88+52.00	88+52.04	68.148	133.159	114.426	387.430	1.2000	464.916	-3988.413
88+56.00	88+56.04	69.538	10.199	66.306	13.388	1.2000	16.065	-3994.279
88+59.00	88+59.04	70.438	7.776	28.074	5.243	1.2000	6.292	-3992.795
88+61.00	88+61.04	71.230	5.247	14.262	1.568	1.2000	1.882	-3989.429
88+65.00	88+65.04	75.182	10.845	4.948	1.423	1.2000	1.708	-3980.292
88+72.50	88+72.54	109.070	25.591	12.042	2.360	1.2000	2.832	-3957.533
88+73.00	88+73.04	107.521	2.005	11.930	0.222	1.2000	0.266	-3955.794
88+91.00	88+91.04	141.742	83.088	48.712	20.214	1.2000	24.257	-3896.963
89+00.00	89+00.04	135.807	46.258	67.968	19.447	1.2000	23.336	-3874.041
89+08.50	89+08.54	125.481	41.139	73.695	22.299	1.2000	26.759	-3859.671
89+09.00	89+09.04	78.623	1.890	22.156	0.888	1.2000	1.065	-3858.846
89+16.00	89+16.04	80.148	20.581	36.364	7.586	1.2000	9.103	-3847.367
89+19.00	89+19.04	81.439	8.977	66.749	5.728	1.2000	6.874	-3845.265
89+25.00	89+25.04	82.140	18.175	116.084	20.315	1.2000	24.378	-3851.467
89+30.00	89+30.04	82.978	15.289	133.011	23.064	1.2000	27.877	-3863.855
89+45.00	89+45.04	93.279	62.016	107.618	84.666	1.2000	101.599	-3903.438
90+00.00	90+00.04	110.614	192.565	56.994	155.467	1.2000	186.360	-3897.433
90+43.62	90+43.66	120.377	186.589	38.949	77.501	1.2000	93.001	-3803.845
90+48.00	90+48.04	120.431	19.532	38.237	6.261	1.2000	7.513	-3791.825
90+58.00	90+58.05	119.649	44.459	36.728	13.882	1.2000	16.659	-3764.025
90+86.00	90+86.07	130.923	129.926	35.926	37.673	1.2000	45.207	-3679.306
91+00.00	91+00.07	122.459	65.692	33.904	18.104	1.2000	21.725	-3635.339
91+13.00	91+13.08	122.557	58.985	34.054	16.360	1.2000	19.632	-3595.986
91+27.00	91+27.09	109.861	60.256	34.930	17.885	1.2000	21.462	-3557.191
91+44.00	91+44.10	107.101	68.303	32.482	21.222	1.2000	25.467	-3514.355
91+50.00	91+50.10	106.362	63.718	32.124	7.178	1.2000	8.614	-3499.252
91+75.00	91+75.11	108.056	99.730	29.209	28.395	1.2000	34.074	-3433.595
92+00.00	92+00.12	108.800	99.933	33.430	29.000	1.2000	34.800	-3368.462
92+50.00	92+50.14	102.355	193.662	24.436	53.580	1.2000	64.296	-3239.096
93+00.00	93+00.16	110.750	197.320	21.277	42.328	1.2000	50.793	-3092.569
93+50.00	93+50.18	120.623	214.235	4.758	24.107	1.2000	28.928	-2907.263
94+00.00	94+00.20	119.904	222.710	2.681	6.888	1.2000	8.266	-2692.818
94+50.00	94+50.22	116.543	218.932	11.838	13.443	1.2000	16.132	-2490.018
95+00.00	95+00.23	119.148	218.233	14.479	24.368	1.2000	29.241	-2301.026
95+50.00	95+50.24	121.607	222.921	15.196	27.477	1.2000	32.972	-2111.077
96+00.00	96+00.25	106.558	211.264	15.510	28.431	1.2000	34.117	-1933.931
96+50.00	96+50.26	116.000	206.072	17.857	30.895	1.2000	37.074	-1764.933
97+00.00	97+00.27	105.936	205.496	24.099	38.849	1.2000	46.618	-1606.056
97+50.00	97+50.28	102.568	193.059	27.982	48.224	1.2000	57.868	-1470.865
98+00.00	98+00.28	104.124	191.362	34.804	58.135	1.2000	69.782	-1349.246
98+50.00	98+50.28	103.405	192.157	42.401	71.486	1.2000	85.783	-1242.872
99+00.00	99+00.28	90.525	179.565	30.744	67.728	1.2000	81.273	-1144.580
99+00.69	99+00.97	90.318	2.311	30.616	0.784	1.2000	0.941	-1143.211
99+50.00	99+50.28	92.819	167.231	19.213	45.502	1.2000	54.602	-1030.582
100+00.00	100+00.28	105.856	183.958	23.422	39.477	1.2000	47.372	-893.996
101+00.00	101+00.28	94.766	371.522	42.408	121.907	1.2000	146.288	-668.762
101+08.00	101+08.28	97.575	28.495	33.474	11.242	1.2000	13.490	-653.757
101+10.00	101+10.28	100.402	7.332	21.733	2.045	1.2000	2.454	-648.878
101+14.00	101+14.28	108.533	15.477	5.009	1.981	1.2000	2.377	-635.779
101+21.00	101+21.28	121.835	29.852	2.185	0.933	1.2000	1.119	-607.036
101+22.00	101+22.28	123.191	4.538	2.063	0.079	1.2000	0.094	-602.592
101+31.00	101+31.28	127.607	41.800	1.744	0.635	1.2000	0.761	-561.554
Alignment totals			5351.514		4927.557		5913.068	-561.554

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	120

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASILINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK /SWELL	ADV FILL (Cu Yd)	TOTAL (Mass Ord)
107+74.50	29.771	0.000	0.025	0.000	1.2000	0.000	0.000
107+79.00	32.568	5.195	0.000	0.002	1.2000	0.002	5.192
107+83.00	34.953	5.002	0.000	0.000	1.2000	0.000	10.194
107+91.00	38.309	10.854	0.000	0.000	1.2000	0.000	21.048
107+93.00	39.035	10.855	0.000	0.000	1.2000	0.000	23.912
107+95.50	40.069	2.682	0.000	0.000	1.2000	0.000	27.574
107+97.00	41.702	2.244	0.000	0.000	1.2000	0.000	29.818
108+00.00	41.904	4.589	0.000	0.000	1.2000	0.000	34.407
108+17.00	47.078	28.013	0.000	0.000	1.2000	0.000	62.420
108+17.50	47.172	0.873	0.000	0.000	1.2000	0.000	63.293
108+18.00	47.355	1.751	0.000	0.000	1.2000	0.000	65.043
108+21.00	47.797	4.405	0.000	0.000	1.2000	0.000	69.449
108+22.50	48.088	2.663	0.000	0.000	1.2000	0.000	72.112
108+23.00	48.189	0.891	0.000	0.000	1.2000	0.000	73.004
108+23.50	48.294	0.893	0.000	0.000	1.2000	0.000	73.897
108+30.00	49.850	11.814	0.000	0.000	1.2000	0.000	85.711
108+35.00	51.263	9.362	0.000	0.000	1.2000	0.000	95.073
108+35.50	51.403	0.951	0.000	0.000	1.2000	0.000	96.023
108+47.00	54.537	22.561	0.000	0.000	1.2000	0.000	118.585
108+59.50	56.198	25.633	0.000	0.000	1.2000	0.000	144.218
108+61.00	56.182	3.122	0.000	0.000	1.2000	0.000	147.340
108+66.00	55.970	10.384	0.000	0.000	1.2000	0.000	157.724
108+72.00	55.484	12.384	0.000	0.000	1.2000	0.000	170.108
108+72.50	55.426	1.027	0.000	0.000	1.2000	0.000	171.135
108+94.50	49.016	42.550	0.000	0.004	1.2000	0.004	213.681
108+96.00	48.556	2.710	0.000	0.000	1.2000	0.000	216.391
108+98.50	48.369	4.487	0.000	0.000	1.2000	0.000	220.878
109+00.00	48.440	2.689	0.000	0.000	1.2000	0.000	223.568
109+13.00	44.446	46.436	0.140	0.034	1.2000	0.040	269.963
109+16.88	47.760	20.996	0.097	0.027	1.2000	0.020	290.938
109+22.00	52.051	28.427	0.032	0.012	1.2000	0.015	319.350
109+23.50	53.167	8.478	0.014	0.001	1.2000	0.002	327.827
109+24.00	53.527	2.840	0.006	0.000	1.2000	0.000	330.666
109+25.00	54.379	5.700	0.007	0.000	1.2000	0.000	336.366
109+28.00	56.524	17.267	0.019	0.001	1.2000	0.002	353.631
109+47.00	61.090	111.753	0.069	0.031	1.2000	0.037	465.348
109+52.00	64.225	30.122	0.083	0.014	1.2000	0.017	495.452
109+77.50	70.606	158.115	0.010	0.044	1.2000	0.053	655.514
109+86.00	72.173	53.956	0.001	0.002	1.2000	0.002	707.468
109+86.50	74.087	57.710	0.565	0.094	1.2000	0.113	765.065
110+00.00	74.599	32.295	0.000	0.052	1.2000	0.063	797.297
110+04.00	75.904	25.971	0.000	0.000	1.2000	0.000	823.268
110+05.50	76.247	9.782	0.000	0.000	1.2000	0.000	833.050
110+12.50	75.776	45.633	0.000	0.000	1.2000	0.000	878.682
110+20.00	74.969	48.715	0.000	0.000	1.2000	0.000	927.397
110+20.50	74.923	3.240	0.000	0.000	1.2000	0.000	930.637
110+51.00	163.913	191.380	0.000	0.000	1.2000	0.000	1122.017
110+78.50	148.537	156.225	0.000	0.000	1.2000	0.000	1278.242
110+78.50	148.480	2.750	0.000	0.000	1.2000	0.000	1280.992
110+81.00	148.141	13.732	0.000	0.000	1.2000	0.000	1294.724
110+81.50	148.030	2.742	0.000	0.000	1.2000	0.000	1297.457
110+82.00	147.944	2.740	0.000	0.000	1.2000	0.000	1300.207
110+83.00	147.857	5.478	0.000	0.000	1.2000	0.000	1305.685
110+83.41	147.843	2.245	0.000	0.000	1.2000	0.000	1307.930
110+91.00	149.081	41.734	0.000	0.000	1.2000	0.000	1349.665
111+00.00	154.843	50.654	1.587	0.598	1.2000	0.717	1399.601
111+02.00	153.743	11.429	2.929	0.241	1.2000	0.230	1410.741
111+04.50	152.611	14.183	1.914	0.224	1.2000	0.269	1424.655
111+09.50	152.023	28.207	0.496	0.223	1.2000	0.268	1452.594
111+14.00	151.308	25.278	0.774	0.106	1.2000	0.127	1477.744
111+18.50	150.922	25.186	0.765	0.128	1.2000	0.154	1502.776
111+53.00	135.242	182.827	9.483	6.547	1.2000	7.857	1677.746
111+58.50	134.826	27.507	10.991	2.085	1.2000	2.502	1702.751
111+60.50	134.509	9.975	11.141	0.820	1.2000	0.984	1711.742
111+70.00	132.873	47.040	8.996	3.543	1.2000	4.251	1754.531
111+80.50	132.549	2.458	9.127	0.168	1.2000	0.201	1756.787
111+84.50	132.423	48.884	6.422	2.879	1.2000	3.455	1802.215
111+84.50	132.789	19.571	5.178	0.859	1.2000	1.031	1820.755
112+00.00	134.615	76.755	0.227	1.552	1.2000	1.862	1895.648
112+05.00	136.171	25.073	0.003	0.021	1.2000	0.025	1920.696
112+31.50	145.814	138.382	0.000	0.002	1.2000	0.002	2059.076
112+32.00	145.955	2.702	0.000	0.000	1.2000	0.000	2061.777
112+32.50	145.960	2.703	0.000	0.000	1.2000	0.000	2064.480
112+35.00	145.995	10.790	0.000	0.000	1.2000	0.000	2067.183
112+38.00	145.142	16.194	0.000	0.000	1.2000	0.000	2077.973
112+51.50	146.361	73.131	0.000	0.000	1.2000	0.000	2094.167
112+55.00	146.309	18.969	0.000	0.000	1.2000	0.000	2167.298
112+58.50	146.025	18.948	0.000	0.000	1.2000	0.000	2186.267
112+82.50	141.106	127.614	0.000	0.000	1.2000	0.000	2205.215
112+87.00	140.359	23.455	0.000	0.000	1.2000	0.000	2332.829
112+88.50	140.155	7.792	0.000	0.000	1.2000	0.000	2356.284
112+93.00	137.473	23.160	0.000	0.000	1.2000	0.000	2364.076
112+93.50	136.983	2.548	0.000	0.000	1.2000	0.000	2387.236
113+00.00	136.454	33.036	0.000	0.000	1.2000	0.000	2389.784
113+06.00	135.302	30.382	0.000	0.000	1.2000	0.000	2422.821
113+10.00	135.498	62.917	0.000	0.000	1.2000	0.000	2453.203
113+23.00	136.523	2.528	0.000	0.000	1.2000	0.000	2473.333
113+46.00	133.462	114.994	0.001	0.001	1.2000	0.001	2536.249
113+49.50	133.001	17.275	0.002	0.000	1.2000	0.001	2538.777
113+51.00	132.001	7.391	0.001	0.000	1.2000	0.000	2671.045
113+54.50	132.636	17.221	0.001	0.000	1.2000	0.000	2678.435
113+55.00	126.200	2.457	0.001	0.000	1.2000	0.000	2695.656
113+77.50	126.709	107.848	0.001	0.001	1.2000	0.001	2805.959
113+78.00	126.576	2.342	0.001	0.000	1.2000	0.000	2808.301
113+82.50	124.840	18.623	0.001	0.000	1.2000	0.000	2810.646
113+83.00	124.574	2.309	0.001	0.000	1.2000	0.000	2829.269
113+83.00							2831.579

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	121

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
113+85.50	123.167	11.470	0.001	0.000	1.2000	0.000	2843.048
113+90.50	120.050	22.520	0.001	0.000	1.2000	0.000	2865.568
114+00.00	114.341	41.235	0.001	0.000	1.2000	0.001	2906.803
114+21.50	107.006	88.129	0.015	0.006	1.2000	0.008	2994.924
114+29.50	105.115	31.425	0.945	0.142	1.2000	0.018	3026.179
114+30.00	105.272	1.948	1.023	0.018	1.2000	0.022	3028.105
114+31.00	105.958	3.912	1.169	0.041	1.2000	0.049	3031.968
114+36.00	109.800	19.978	0.004	0.109	1.2000	0.130	3051.815
114+50.00	122.267	60.166	0.001	0.001	1.2000	0.002	3111.979
114+52.00	123.151	9.090	0.001	0.000	1.2000	0.000	3121.069
114+62.00	125.515	46.049	0.000	0.000	1.2000	0.000	3167.118
114+66.50	126.137	20.971	0.000	0.000	1.2000	0.000	3188.089
114+67.00	129.518	2.367	0.351	0.003	1.2000	0.004	3190.452
114+67.50	130.152	2.405	0.209	0.005	1.2000	0.006	3192.850
114+68.00	130.372	2.413	0.167	0.003	1.2000	0.004	3195.259
114+72.00	132.022	19.437	0.003	0.013	1.2000	0.015	3214.680
114+74.00	133.106	9.820	0.002	0.000	1.2000	0.000	3224.500
114+81.00	136.429	34.940	0.000	0.000	1.2000	0.000	3259.439
114+84.00	138.034	15.248	0.000	0.000	1.2000	0.000	3274.687
114+88.50	140.707	23.228	0.000	0.000	1.2000	0.000	3297.916
114+89.00	140.971	2.608	0.000	0.000	1.2000	0.000	3300.524
114+92.00	141.537	15.695	0.000	0.000	1.2000	0.000	3316.219
114+96.50	141.862	23.617	0.000	0.000	1.2000	0.000	3339.835
114+97.00	141.878	2.627	0.000	0.000	1.2000	0.000	3342.462
114+97.50	141.766	2.626	0.000	0.000	1.2000	0.000	3345.089
115+00.00	141.347	13.107	0.000	0.000	1.2000	0.000	3358.196
115+11.00	142.324	57.785	0.000	0.000	1.2000	0.000	3415.981
115+17.00	143.072	31.711	0.000	0.000	1.2000	0.000	3447.691
115+17.50	143.410	2.653	0.000	0.000	1.2000	0.000	3450.344
115+18.00	143.456	2.656	0.000	0.000	1.2000	0.000	3453.000
115+22.50	143.608	23.922	0.000	0.000	1.2000	0.000	3476.922
115+24.00	143.595	7.978	0.000	0.000	1.2000	0.000	3484.900
115+25.50	143.531	7.976	0.000	0.000	1.2000	0.000	3492.876
115+29.00	142.786	39.766	0.000	0.000	1.2000	0.000	3532.642
115+33.50	142.728	2.644	0.000	0.000	1.2000	0.000	3535.286
115+37.00	142.326	18.476	0.000	0.000	1.2000	0.000	3553.761
115+38.50	142.008	7.898	0.000	0.000	1.2000	0.000	3561.659
115+39.00	141.864	2.628	0.000	0.000	1.2000	0.000	3564.288
115+44.00	125.868	223.102	0.000	0.000	1.2000	0.000	3787.390
115+50.00	123.259	27.684	0.000	0.000	1.2000	0.000	3815.074
116+00.00	119.530	44.968	0.000	0.000	1.2000	0.000	3860.043
116+13.00	113.831	56.179	0.001	0.000	1.2000	0.000	3916.222
116+20.00	110.583	29.091	0.001	0.000	1.2000	0.000	3945.312
116+21.00	110.093	4.087	0.001	0.000	1.2000	0.001	3949.399
116+25.00	99.367	112.488	0.080	0.043	1.2000	0.052	4061.834
116+64.00	99.198	51.480	0.091	0.044	1.2000	0.051	4113.261
116+67.50	103.272	88.112	0.006	0.042	1.2000	0.051	4201.322
116+90.00	103.826	9.588	0.002	0.000	1.2000	0.000	4210.510
116+91.00	104.166	3.852	0.000	0.000	1.2000	0.000	4214.762
116+94.50	104.186	13.504	0.003	0.000	1.2000	0.000	4228.266
116+95.00	103.542	1.923	0.003	0.000	1.2000	0.000	4230.189
117+00.00	103.310	19.153	0.004	0.001	1.2000	0.001	4249.341
117+21.00	104.805	80.934	0.139	0.056	1.2000	0.067	4330.208
117+43.50	108.528	88.889	0.247	0.161	1.2000	0.193	4418.904
117+44.00	108.853	2.013	0.240	0.005	1.2000	0.005	4420.911
117+48.00	110.695	16.263	0.171	0.030	1.2000	0.037	4437.138
117+52.00	111.494	16.458	0.105	0.020	1.2000	0.025	4453.571
117+57.50	110.545	22.615	0.061	0.037	1.2000	0.020	4476.166
117+58.00	110.408	2.046	0.060	0.001	1.2000	0.001	4478.211
117+72.00	110.420	57.252	0.059	0.031	1.2000	0.037	4535.425
117+72.50	110.410	2.045	0.060	0.001	1.2000	0.001	4537.469
117+85.50	108.283	52.648	0.162	0.053	1.2000	0.064	4590.053
117+86.00	108.236	2.005	0.169	0.003	1.2000	0.004	4592.054
117+86.50	108.630	2.008	0.175	0.003	1.2000	0.004	4594.058
117+90.00	108.650	14.083	0.240	0.027	1.2000	0.032	4608.109
117+95.00	104.484	15.735	0.897	0.105	1.2000	0.126	4627.717
117+99.50	100.390	17.073	1.696	0.216	1.2000	0.259	4644.531
118+00.00	99.890	1.854	1.770	0.032	1.2000	0.039	4646.347
118+07.00	94.692	25.224	4.136	0.766	1.2000	0.919	4670.652
118+07.50	94.520	1.752	4.414	0.079	1.2000	0.095	4672.309
118+09.00	93.872	5.233	6.020	0.290	1.2000	0.348	4677.194
118+09.50	93.716	1.737	6.822	0.119	1.2000	0.143	4678.788
118+30.00	90.761	70.033	2.832	3.665	1.2000	4.398	4744.423
118+47.00	88.648	56.481	2.006	1.523	1.2000	1.828	4799.076
118+49.00	88.205	6.550	1.488	0.129	1.2000	0.155	4805.471
118+50.00	87.983	3.263	0.908	0.044	1.2000	0.053	4808.680
118+50.50	87.878	1.628	0.652	0.014	1.2000	0.017	4810.291
118+51.50	87.642	3.250	0.238	0.016	1.2000	0.020	4813.522
118+52.00	87.652	1.625	0.210	0.004	1.2000	0.005	4815.140
118+53.00	87.832	3.250	0.204	0.008	1.2000	0.009	4818.380
118+58.00	88.363	16.314	0.184	0.036	1.2000	0.043	4834.652
118+59.00	88.467	3.275	0.188	0.007	1.2000	0.008	4837.918
118+63.50	95.136	15.300	0.004	0.016	1.2000	0.019	4853.199
118+64.00	95.750	1.767	0.004	0.000	1.2000	0.000	4854.966
118+69.00	101.031	18.220	0.000	0.000	1.2000	0.000	4873.186
118+71.00	103.550	7.577	0.000	0.000	1.2000	0.000	4880.764
118+84.00	101.505	49.365	0.000	0.000	1.2000	0.000	4930.129
118+88.00	101.049	15.004	0.001	0.000	1.2000	0.000	4945.132
118+89.50	101.024	5.613	0.001	0.000	1.2000	0.000	4950.745
119+00.00	102.385	39.552	0.001	0.000	1.2000	0.001	4990.297
119+05.00	105.059	19.208	0.001	0.000	1.2000	0.000	5009.504
119+35.50	116.437	125.104	0.000	0.001	1.2000	0.001	5134.608
119+37.00	116.627	6.474	0.000	0.000	1.2000	0.000	5141.082
119+41.00	116.732	17.286	0.000	0.000	1.2000	0.000	5158.367
119+41.50	116.764	2.162	0.000	0.000	1.2000	0.000	5160.529
119+44.50	117.190	12.997	0.000	0.000	1.2000	0.000	5173.527
119+47.00	117.524	10.866	0.000	0.000	1.2000	0.000	5184.393
119+67.00	120.165	88.040	0.000	0.000	1.2000	0.000	5272.434
119+67.50	120.336	2.227	0.000	0.000	1.2000	0.000	5274.661
119+70.50	121.325	13.426	0.000	0.000	1.2000	0.000	5288.086

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASILINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK /SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
119+73.00	121.884	11.260	0.000	0.000	1.2000	0.000	5299.346
119+73.50	121.966	2.258	0.000	0.000	1.2000	0.000	5301.604
120+00.00	128.470	122.899	0.000	0.000	1.2000	0.000	5424.503
120+50.00	135.896	244.783	0.000	0.000	1.2000	0.000	5669.286
120+50.50	135.947	2.517	0.000	0.000	1.2000	0.000	5671.803
120+54.00	136.287	17.845	0.000	0.000	1.2000	0.000	5689.447
120+58.50	137.606	22.824	0.000	0.000	1.2000	0.000	5712.272
120+59.00	137.751	2.550	0.000	0.000	1.2000	0.000	5714.822
120+87.00	136.948	142.436	0.000	0.000	1.2000	0.000	5857.258
120+89.00	136.740	10.137	0.000	0.000	1.2000	0.000	5867.395
120+89.50	136.725	2.532	0.000	0.000	1.2000	0.000	5869.927
120+90.00	136.742	2.532	0.000	0.000	1.2000	0.000	5872.459
120+91.00	136.871	5.067	0.000	0.000	1.2000	0.000	5877.526
120+94.50	138.095	17.822	0.000	0.000	1.2000	0.000	5895.348
120+95.00	138.161	2.558	0.000	0.000	1.2000	0.000	5897.906
120+98.50	136.588	17.808	0.000	0.000	1.2000	0.000	5915.713
120+99.00	136.094	2.525	0.000	0.000	1.2000	0.000	5918.238
121+00.00	135.952	5.038	0.000	0.000	1.2000	0.000	5923.276
121+11.50	136.509	12.567	0.000	0.000	1.2000	0.000	5981.259
121+14.00	134.930	9.980	0.000	0.000	1.2000	0.000	5993.866
121+16.00	134.541	2.492	0.000	0.000	1.2000	0.000	6003.846
121+16.50	134.545	143.824	0.001	0.002	1.2000	0.002	6006.337
121+45.00	137.964	2.556	0.001	0.002	1.2000	0.002	6150.159
121+45.50	139.791	10.231	0.001	0.000	1.2000	0.000	6152.715
121+53.50	145.591	31.709	0.001	0.000	1.2000	0.000	6163.007
121+54.50	144.316	5.369	0.001	0.000	1.2000	0.000	6194.715
121+55.00	142.984	2.660	0.001	0.000	1.2000	0.000	6200.084
121+55.50	142.441	2.643	0.001	0.000	1.2000	0.000	6202.744
121+58.00	145.841	61.393	0.000	0.000	1.2000	0.000	6205.387
121+67.00	147.426	27.154	0.000	0.000	1.2000	0.000	6265.780
122+00.00	153.088	155.822	0.000	0.000	1.2000	0.000	6293.924
122+37.00	162.096	215.959	0.000	0.000	1.2000	0.000	6449.756
122+40.00	162.651	18.042	0.000	0.000	1.2000	0.000	6665.716
122+43.00	163.285	18.108	0.000	0.000	1.2000	0.000	6683.757
122+75.00	167.943	196.283	0.000	0.000	1.2000	0.000	6701.865
123+00.00	167.792	155.433	0.000	0.000	1.2000	0.000	6898.148
123+35.00	154.004	208.571	0.000	0.000	1.2000	0.000	7053.580
123+69.50	124.804	178.127	0.000	0.000	1.2000	0.000	7262.152
123+70.00	124.342	9.140	0.000	0.000	1.2000	0.000	7440.272
123+72.00	122.442	8.969	0.000	0.000	1.2000	0.000	7442.586
123+74.00	120.248	8.819	0.000	0.000	1.2000	0.000	7451.726
123+76.00	117.860	98.621	0.001	0.000	1.2000	0.000	7460.714
124+00.00	104.036	17.242	0.051	0.012	1.2000	0.013	7469.533
124+04.50	102.868	9.482	0.218	0.004	1.2000	0.017	7568.141
124+07.50	101.940	1.887	0.241	0.024	1.2000	0.029	7585.376
124+10.00	101.786	9.430	0.284	0.005	1.2000	0.006	7594.843
124+10.50	101.785	7.531	0.300	0.023	1.2000	0.026	7608.127
124+12.50	101.559	24.482	0.954	0.150	1.2000	0.180	7615.511
124+19.00	101.833	3.775	0.954	0.035	1.2000	0.042	7639.813
124+20.00	102.007	57.410	0.474	0.185	1.2000	0.475	7643.546
124+35.00	104.668	53.074	0.267	0.185	1.2000	0.222	7700.479
124+48.50	107.637	46.366	0.242	0.108	1.2000	0.222	7753.331
124+60.00	110.092	170.767	0.055	0.220	1.2000	0.263	7799.567
125+00.00	120.443	141.226	0.000	0.031	1.2000	0.263	7970.070
125+30.50	129.596	2.402	0.000	0.000	1.2000	0.037	8111.260
125+31.00	129.800	70.381	0.000	0.000	1.2000	0.000	8113.661
125+45.50	132.310	12.255	0.000	0.000	1.2000	0.000	8184.043
125+48.00	132.413	49.129	0.000	0.000	1.2000	0.000	8196.298
125+58.00	132.862	2.460	0.000	0.000	1.2000	0.000	8245.427
125+58.50	132.768	2.457	0.000	0.000	1.2000	0.000	8247.887
125+59.00	132.580	2.453	0.000	0.000	1.2000	0.000	8250.344
125+59.50	132.340	38.489	0.212	0.031	1.2000	0.000	8252.797
125+68.00	127.460	2.358	0.291	0.005	1.2000	0.006	8291.248
125+68.50	127.234	2.354	0.157	0.006	1.2000	0.007	8295.947
125+69.00	127.034	102.212	0.157	0.022	1.2000	0.271	8397.889
125+71.00	118.276	39.041	0.317	0.079	1.2000	0.095	8436.835
126+00.00	115.969	61.839	1.237	0.417	1.2000	0.501	8498.174
126+14.50	114.329	4.229	1.335	0.048	1.2000	0.501	8502.346
126+15.50	114.036	10.531	1.217	0.118	1.2000	0.142	8512.735
126+18.00	113.442	2.100	1.169	0.022	1.2000	0.120	8514.809
126+18.50	113.333	23.780	1.180	0.248	1.2000	0.298	8538.291
126+24.20	111.947	2.071	1.208	0.022	1.2000	0.027	8540.335
126+24.70	111.760	25.849	1.572	0.324	1.2000	0.389	8565.796
126+31.00	109.807	138.568	1.596	1.995	1.2000	2.394	8701.970
126+65.00	110.272	148.743	0.912	1.626	1.2000	1.951	8848.762
127+00.00	119.217	184.498	0.134	0.775	1.2000	0.930	9032.330
127+40.00	129.856	200.910	0.000	0.100	1.2000	0.120	9233.121
127+80.00	141.372	106.878	0.002	0.001	1.2000	0.001	9339.998
128+00.00	147.188	188.868	0.000	0.001	1.2000	0.001	9508.865
128+30.00	156.763	250.716	0.000	0.000	1.2000	0.000	9759.581
128+58.60	165.586	18.424	0.000	0.000	1.2000	0.000	9778.005
128+75.00	166.053	49.225	0.000	0.000	1.2000	0.000	9827.230
128+83.00	166.214	15.376	0.000	0.000	1.2000	0.000	9842.606
128+85.50	165.910	3.071	0.000	0.000	1.2000	0.000	9845.677
128+86.00	165.792	3.068	0.000	0.000	1.2000	0.000	9848.746
128+86.50	165.603	54.893	0.000	0.000	1.2000	0.000	9903.639
128+89.50	163.755	3.030	0.000	0.000	1.2000	0.000	9906.669
128+96.00	163.536	23.947	0.000	0.000	1.2000	0.000	9930.616
129+00.00	159.743	69.948	0.001	0.000	1.2000	0.000	10000.564
129+12.00	155.023	87.401	0.020	0.006	1.2000	0.007	10087.957
129+27.50	149.470	2.769	0.020	0.000	1.2000	0.000	10090.726
129+28.00	149.605	2.774	0.036	0.001	1.2000	0.001	10093.500
129+28.50	150.030	8.359	0.143	0.005	1.2000	0.006	10101.853
129+30.00	150.890	2.796	0.105	0.002	1.2000	0.003	10104.646
129+30.50	151.095	22.377	0.000	0.008	1.2000	0.009	10127.014
129+34.50	150.996	30.617	0.000	0.000	1.2000	0.000	10157.631
129+40.00	149.607	13.813	0.000	0.000	1.2000	0.000	10171.444

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
129+43.00	148.595	2.753	0.000	0.000	1.2000	0.000	10174.197
129+45.00	147.997	10.985	0.000	0.000	1.2000	0.000	10185.182
129+49.50	146.958	24.580	0.001	0.000	1.2000	0.000	10209.762
129+50.00	146.910	2.721	0.001	0.000	1.2000	0.000	10212.483
129+51.00	146.872	5.440	0.001	0.000	1.2000	0.000	10217.923
129+70.00	138.767	100.503	0.000	0.000	1.2000	0.000	10318.425
129+70.50	138.647	2.569	0.000	0.000	1.2000	0.000	10320.994
129+73.00	138.058	12.810	0.000	0.000	1.2000	0.000	10333.804
129+77.00	137.228	20.391	0.000	0.000	1.2000	0.000	10354.196
129+77.50	137.132	2.540	0.000	0.000	1.2000	0.000	10356.736
129+95.00	136.924	88.814	0.003	0.001	1.2000	0.001	10445.549
129+96.50	136.268	7.589	0.006	0.000	1.2000	0.000	10453.138
129+97.00	136.041	2.521	0.014	0.000	1.2000	0.000	10455.659
129+99.00	135.381	10.053	0.003	0.001	1.2000	0.001	10465.711
130+00.00	135.543	5.017	0.002	0.000	1.2000	0.000	10470.728
130+04.00	136.376	20.142	0.000	0.000	1.2000	0.000	10490.870
130+04.50	136.456	2.526	0.000	0.000	1.2000	0.000	10493.396
130+10.00	137.142	27.866	0.000	0.000	1.2000	0.000	10521.262
130+11.00	137.349	5.083	0.000	0.000	1.2000	0.000	10526.345
130+12.00	137.480	5.089	0.000	0.000	1.2000	0.000	10531.435
130+18.00	137.323	30.534	0.036	0.004	1.2000	0.005	10561.964
130+19.50	134.064	7.539	0.309	0.010	1.2000	0.011	10569.491
130+20.00	134.019	2.482	0.275	0.005	1.2000	0.006	10571.966
130+35.00	128.419	72.899	0.003	0.077	1.2000	0.092	10644.773
130+52.00	124.793	79.715	0.000	0.001	1.2000	0.001	10744.487
130+52.50	124.706	2.310	0.000	0.000	1.2000	0.000	10726.797
130+59.00	123.631	29.893	0.000	0.000	1.2000	0.000	10756.690
130+61.00	123.208	9.142	0.000	0.000	1.2000	0.000	10765.832
130+60.00	110.337	168.672	0.022	0.016	1.2000	0.019	10934.484
130+50.00	96.037	191.088	0.379	0.372	1.2000	0.446	11125.126
130+00.00	110.626	151.355	0.000	0.351	1.2000	0.421	11316.060
130+17.00	117.879	71.937	0.000	0.000	1.2000	0.000	11387.997
130+19.00	118.727	8.763	0.000	0.000	1.2000	0.000	11396.760
130+24.50	120.933	24.410	0.000	0.000	1.2000	0.000	11421.170
130+25.00	121.124	2.241	0.000	0.000	1.2000	0.000	11423.411
130+25.00	121.124	184.747	0.000	0.000	1.2000	0.000	11608.159
130+64.00	134.853	2.496	0.000	0.000	1.2000	0.000	11610.654
130+71.50	137.376	35.289	0.000	0.000	1.2000	0.000	11645.943
130+00.00	144.369	148.698	0.000	0.000	1.2000	0.000	11794.642
130+07.00	144.677	37.469	0.000	0.000	1.2000	0.000	11832.110
130+13.00	144.154	32.092	0.000	0.000	1.2000	0.000	11864.203
130+16.00	143.227	15.966	0.000	0.000	1.2000	0.000	11880.169
130+19.50	141.434	18.450	0.000	0.000	1.2000	0.000	11898.619
130+20.00	141.225	2.617	0.000	0.000	1.2000	0.000	11901.236
130+20.50	141.020	2.623	0.000	0.000	1.2000	0.000	11903.849
130+21.00	140.804	2.609	0.000	0.000	1.2000	0.000	11906.459
130+25.00	138.985	20.725	0.000	0.000	1.2000	0.000	11927.184
130+25.50	138.768	2.572	0.001	0.000	1.2000	0.000	11929.756
130+30.50	136.878	25.523	0.001	0.000	1.2000	0.000	11955.278
130+31.00	136.813	2.534	0.001	0.000	1.2000	0.000	11957.813
130+54.50	127.750	115.134	0.000	0.000	1.2000	0.001	12072.946
130+59.50	126.635	23.584	0.000	0.000	1.2000	0.000	12096.500
130+60.00	126.442	2.343	0.000	0.000	1.2000	0.000	12098.844
130+66.50	123.445	30.079	0.000	0.000	1.2000	0.000	12148.523
130+76.50	122.692	45.581	0.003	0.001	1.2000	0.001	12174.503
130+77.00	122.492	2.270	0.003	0.000	1.2000	0.000	12176.773
130+78.00	122.060	4.529	0.038	0.001	1.2000	0.001	12181.301
130+80.50	121.386	11.271	0.035	0.003	1.2000	0.004	12192.568
130+81.00	121.255	2.247	0.034	0.001	1.2000	0.001	12194.813
130+83.50	120.438	11.189	0.030	0.003	1.2000	0.004	12205.999
130+84.00	120.280	2.229	0.029	0.001	1.2000	0.001	12208.328
130+88.00	119.367	17.752	0.003	0.002	1.2000	0.003	12225.976
130+90.50	118.718	11.022	0.003	0.000	1.2000	0.000	12236.998
130+91.00	118.628	2.198	0.003	0.000	1.2000	0.000	12239.196
130+99.50	117.083	37.103	0.193	0.031	1.2000	0.037	12276.262
130+00.00	117.048	2.168	0.192	0.004	1.2000	0.004	12278.425
130+08.00	117.191	34.702	0.141	0.049	1.2000	0.059	12313.068
130+26.00	120.988	79.393	0.002	0.048	1.2000	0.057	12392.404
130+26.50	121.139	2.242	0.002	0.000	1.2000	0.000	12394.645
130+30.00	122.264	15.776	0.002	0.000	1.2000	0.000	12410.421
130+34.00	123.177	18.161	0.001	0.000	1.2000	0.000	12428.602
130+65.00	131.607	146.265	0.000	0.001	1.2000	0.001	12574.866
130+00.00	140.753	176.529	0.000	0.000	1.2000	0.000	12751.395
130+43.50	130.172	218.245	0.000	0.000	1.2000	0.000	12969.640
130+44.00	130.419	2.413	0.000	0.000	1.2000	0.000	12972.053
130+46.00	128.572	9.592	0.000	0.000	1.2000	0.000	12981.645
130+69.50	121.039	108.627	0.021	0.009	1.2000	0.011	13090.261
130+73.00	121.487	45.719	0.000	0.001	1.2000	0.002	13105.979
130+77.50	121.252	20.228	0.000	0.000	1.2000	0.000	13126.207
130+98.00	120.652	91.834	0.000	0.000	1.2000	0.000	13218.041
130+00.00	120.860	6.945	0.000	0.000	1.2000	0.000	13226.986
130+01.00	120.981	4.479	0.000	0.000	1.2000	0.000	13231.464
130+33.00	120.756	143.252	0.001	0.001	1.2000	0.001	13374.715
130+36.00	120.782	13.419	0.001	0.000	1.2000	0.000	13388.134
130+58.00	121.220	62.741	0.001	0.001	1.2000	0.001	13450.874
130+77.00	124.371	104.604	0.001	0.001	1.2000	0.001	13555.477
130+77.50	124.289	18.419	0.001	0.000	1.2000	0.000	13573.896
130+95.00	122.202	82.164	0.000	0.000	1.2000	0.000	13656.059
130+97.00	121.662	9.032	0.000	0.000	1.2000	0.000	13665.091
130+00.00	121.061	8.990	0.000	0.000	1.2000	0.000	13674.081
130+00.50	120.653	4.476	0.000	0.000	1.2000	0.000	13678.557
130+04.50	118.115	19.697	0.001	0.000	1.2000	0.000	13698.454
130+05.00	117.942	2.186	0.001	0.000	1.2000	0.000	13700.640
130+05.50	117.835	2.183	0.001	0.000	1.2000	0.000	13702.823
130+06.50	117.807	4.364	0.002	0.000	1.2000	0.000	13707.186
130+08.00	117.576	6.538	0.003	0.000	1.2000	0.000	13713.725
130+13.50	117.466	23.939	0.004	0.001	1.2000	0.001	13737.663
130+14.00	117.587	2.176	0.004	0.000	1.2000	0.000	13739.840
130+35.50	114.197	92.284	0.002	0.002	1.2000	0.003	13832.521
130+37.50	113.845	8.446	0.002	0.000	1.2000	0.000	13840.567

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
137+40.00	113.381	10.520	0.002	0.000	1.2000	0.000	13851.087
137+57.50	112.073	73.064	0.907	0.294	1.2000	0.353	13923.797
137+63.50	110.823	24.766	0.567	0.164	1.2000	0.197	13948.367
137+64.00	110.711	2.051	0.480	0.010	1.2000	0.012	13950.406
137+65.50	110.431	6.143	0.292	0.021	1.2000	0.026	13956.524
137+66.00	110.355	2.044	0.259	0.005	1.2000	0.006	13958.562
137+66.00	108.665	18.252	0.391	0.037	1.2000	0.045	13976.768
137+70.50	108.665	13.989	0.134	0.021	1.2000	0.025	13980.733
137+74.00	107.171	13.984	0.142	0.003	1.2000	0.003	13982.714
137+74.50	107.132	1.984	0.860	0.473	1.2000	0.568	14089.423
138+00.00	98.866	97.276	0.860	4.046	1.2000	4.855	14256.763
138+50.00	87.106	172.196	3.509	4.868	1.2000	5.841	14422.100
138+50.00	97.766	171.178	1.748	4.868	1.2000	5.841	14422.100
139+00.00	106.938	140.261	0.294	1.399	1.2000	1.679	14560.582
139+37.00	110.302	52.299	0.077	0.089	1.2000	0.107	14612.873
139+50.00	110.302	216.712	0.000	0.072	1.2000	0.086	14829.499
140+00.00	123.747	216.712	0.000	0.000	1.2000	0.000	14847.931
140+04.00	125.083	18.432	0.000	0.000	1.2000	0.000	14945.531
140+24.50	132.010	97.600	0.000	0.000	1.2000	0.000	14977.566
140+31.00	134.122	32.034	0.000	0.000	1.2000	0.000	15024.844
140+40.50	134.621	47.279	0.000	0.000	1.2000	0.000	15027.335
140+41.00	134.351	2.490	0.000	0.000	1.2000	0.000	15029.820
140+41.50	134.100	2.486	0.000	0.000	1.2000	0.000	15032.302
140+42.00	133.953	2.482	0.000	0.000	1.2000	0.000	15035.744
140+43.50	133.989	7.443	0.025	0.001	1.2000	0.001	15039.744
140+54.50	135.199	54.835	0.002	0.005	1.2000	0.007	15094.572
140+75.50	132.015	103.917	0.001	0.001	1.2000	0.001	15198.488
140+76.00	132.366	2.448	0.000	0.000	1.2000	0.000	15200.936
140+83.50	132.544	36.793	0.001	0.000	1.2000	0.000	15237.729
140+84.50	132.178	4.902	0.001	0.000	1.2000	0.000	15242.631
140+85.00	131.986	2.446	0.001	0.000	1.2000	0.000	15257.251
140+87.50	130.984	12.175	0.001	0.000	1.2000	0.000	15259.675
140+88.00	130.769	2.424	0.001	0.000	1.2000	0.000	15286.044
140+93.50	128.129	26.369	0.003	0.000	1.2000	0.001	15286.044
140+95.00	128.449	7.127	0.003	0.000	1.2000	0.000	15293.170
140+95.50	128.577	2.380	0.003	0.000	1.2000	0.000	15295.550
141+00.00	125.213	21.149	0.001	0.000	1.2000	0.000	15316.699
141+17.00	124.486	78.609	0.001	0.001	1.2000	0.001	15395.307
141+38.50	125.701	99.611	0.002	0.001	1.2000	0.001	15494.917
141+40.00	125.498	6.978	0.002	0.000	1.2000	0.000	15501.895
141+44.00	124.859	18.545	0.001	0.000	1.2000	0.000	15520.440
141+44.50	124.768	2.311	0.001	0.000	1.2000	0.000	15522.751
141+45.00	124.676	2.310	0.001	0.000	1.2000	0.000	15525.061
141+45.00	124.482	4.614	0.000	0.000	1.2000	0.000	15528.675
141+46.00	122.983	36.661	0.000	0.000	1.2000	0.000	15566.336
141+54.00	122.583	9.133	0.000	0.000	1.2000	0.000	15575.469
141+56.00	123.599	4.587	0.000	0.000	1.2000	0.000	15580.055
141+57.00	124.082	4.587	0.000	0.000	1.2000	0.000	15596.199
141+60.50	124.986	16.143	0.000	0.000	1.2000	0.000	15671.185
141+77.00	120.423	74.986	0.000	0.000	1.2000	0.000	15691.108
141+81.50	118.651	19.923	0.000	0.000	1.2000	0.000	15770.515
142+00.00	112.135	79.408	0.001	0.000	1.2000	0.001	15871.857
142+00.00	105.780	101.350	0.013	0.007	1.2000	0.008	15902.855
142+25.00	103.449	30.997	0.097	0.016	1.2000	0.020	15918.074
142+33.00	102.584	15.262	0.158	0.019	1.2000	0.023	15921.861
142+38.00	102.321	3.795	0.175	0.006	1.2000	0.007	15970.543
142+51.00	100.371	48.796	0.220	0.095	1.2000	0.114	15970.543
142+59.50	98.501	31.304	1.467	0.266	1.2000	0.319	16001.528
142+60.00	98.226	1.822	1.629	0.029	1.2000	0.034	16003.315
142+65.00	102.539	92.947	1.331	1.370	1.2000	1.644	16094.618
142+65.50	102.707	1.900	1.200	0.023	1.2000	0.028	16096.490
142+81.00	104.807	21.136	0.030	0.125	1.2000	0.150	16117.475
142+83.00	106.305	7.819	0.002	0.001	1.2000	0.001	16125.293
143+00.00	108.272	27.816	0.000	0.000	1.2000	0.000	16153.108
143+08.00	110.589	32.424	0.000	0.000	1.2000	0.000	16185.532
143+30.00	115.844	92.250	0.002	0.001	1.2000	0.001	16277.781
143+33.50	115.649	15.069	0.002	0.000	1.2000	0.000	16292.850
143+41.00	117.161	32.474	0.058	0.008	1.2000	0.010	16325.314
143+41.50	117.238	2.170	0.057	0.001	1.2000	0.001	16327.483
143+42.00	117.270	2.171	0.055	0.001	1.2000	0.001	16329.653
143+53.50	120.422	50.620	0.021	0.016	1.2000	0.019	16380.253
143+54.00	120.630	2.232	0.019	0.000	1.2000	0.000	16382.484
143+61.50	124.565	34.055	0.001	0.003	1.2000	0.003	16416.536
144+00.00	135.481	185.403	0.000	0.001	1.2000	0.001	16601.938
144+02.50	135.778	12.558	0.000	0.000	1.2000	0.000	16614.497
144+04.50	136.270	10.076	0.000	0.000	1.2000	0.000	16624.573
144+06.00	136.172	7.568	0.000	0.000	1.2000	0.000	16632.140
144+09.00	136.742	15.162	0.000	0.000	1.2000	0.000	16647.302
144+40.50	147.165	165.612	0.000	0.000	1.2000	0.000	16812.914
144+43.50	146.714	16.327	0.000	0.000	1.2000	0.000	16829.241
144+44.00	146.818	2.718	0.000	0.000	1.2000	0.000	16831.959
144+47.00	146.964	16.321	0.000	0.000	1.2000	0.000	16848.280
144+47.50	146.864	2.721	0.000	0.000	1.2000	0.000	16851.001
144+49.50	146.410	10.862	0.000	0.000	1.2000	0.000	16861.863
144+53.50	144.101	21.519	0.000	0.000	1.2000	0.000	16883.382
144+61.50	145.059	42.839	0.000	0.000	1.2000	0.000	16926.221
144+62.00	145.440	2.690	0.000	0.000	1.2000	0.000	16928.910
144+66.00	148.774	21.794	0.000	0.000	1.2000	0.000	16950.704
144+68.00	150.014	11.066	0.000	0.000	1.2000	0.000	16961.770
144+69.00	150.458	5.564	0.000	0.000	1.2000	0.000	16967.335
144+73.50	151.998	25.205	0.000	0.000	1.2000	0.000	16982.539
144+74.00	152.198	2.817	0.000	0.000	1.2000	0.000	16985.356
144+74.50	152.405	2.820	0.000	0.000	1.2000	0.000	16988.176
144+75.50	152.805	5.652	0.000	0.000	1.2000	0.000	17003.828
144+76.00	152.996	2.831	0.000	0.000	1.2000	0.000	17006.660
144+79.00	154.132	17.063	0.000	0.000	1.2000	0.000	17023.722
144+89.00	146.276	55.631	0.000	0.000	1.2000	0.000	17079.354
144+93.00	146.524	21.589	0.000	0.000	1.2000	0.000	17101.043
144+96.00	146.662	16.288	0.000	0.000	1.2000	0.000	17117.331
145+00.00	146.807	21.738	0.000	0.000	1.2000	0.000	17139.069
145+19.50	151.017	104.790	0.000	0.000	1.2000	0.000	17243.859
145+19.50	150.826	2.795	0.000	0.000	1.2000	0.000	17246.654
145+21.00	150.311	8.365	0.000	0.000	1.2000	0.000	17255.019

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
145+22.50	149.900	8.339	0.000	0.000	1.2000	0.000	17263.358
145+30.00	147.860	41.355	0.000	0.000	1.2000	0.000	17304.713
145+32.00	147.447	10.937	0.000	0.000	1.2000	0.000	17315.651
145+33.50	147.162	8.184	0.000	0.000	1.2000	0.000	17323.835
145+35.00	145.871	8.140	0.000	0.000	1.2000	0.000	17331.975
145+39.50	143.427	24.108	0.000	0.000	1.2000	0.000	17356.083
145+40.00	143.210	2.654	0.000	0.000	1.2000	0.000	17358.737
145+58.00	135.128	92.779	0.002	0.001	1.2000	0.001	17451.516
145+58.50	134.916	2.500	0.000	0.000	1.2000	0.000	17454.016
145+61.00	134.108	12.455	0.001	0.000	1.2000	0.000	17466.471
145+65.00	133.739	19.841	0.000	0.000	1.2000	0.000	17486.311
145+65.00	123.114	128.426	0.002	0.001	1.2000	0.002	17614.736
145+97.50	120.585	24.821	0.001	0.000	1.2000	0.000	17639.557
145+99.00	119.805	4.447	0.001	0.000	1.2000	0.000	17641.788
146+00.00	119.304	4.428	0.001	0.000	1.2000	0.000	17646.235
146+12.00	114.735	52.009	0.003	0.001	1.2000	0.001	17650.662
146+15.50	113.650	14.803	0.003	0.000	1.2000	0.000	17702.670
146+16.00	113.500	2.103	0.003	0.000	1.2000	0.000	17717.472
146+17.50	113.145	6.296	0.003	0.000	1.2000	0.000	17719.576
146+18.00	113.052	2.094	0.003	0.000	1.2000	0.000	17725.871
146+24.00	112.693	25.083	0.003	0.001	1.2000	0.001	17727.965
146+59.00	108.108	143.112	0.006	0.005	1.2000	0.007	17752.047
146+61.00	108.347	8.017	0.003	0.000	1.2000	0.000	17896.152
146+63.00	107.668	8.001	0.002	0.000	1.2000	0.000	17904.169
146+79.50	112.115	67.156	0.000	0.001	1.2000	0.001	17912.169
146+82.00	113.390	10.440	0.000	0.000	1.2000	0.000	17979.325
147+00.00	117.182	76.850	0.000	0.000	1.2000	0.000	17989.765
147+29.50	123.129	2.280	0.000	0.000	1.2000	0.000	18066.615
147+34.00	123.537	20.555	0.001	0.000	1.2000	0.000	18095.677
147+38.50	122.986	20.544	0.001	0.000	1.2000	0.000	18137.958
147+39.00	122.938	2.277	0.002	0.000	1.2000	0.000	18218.513
147+63.00	127.156	111.153	0.001	0.001	1.2000	0.002	18239.056
147+63.50	127.363	2.357	0.001	0.000	1.2000	0.000	18241.333
147+72.00	130.558	40.599	0.000	0.000	1.2000	0.000	18352.485
147+86.00	130.886	120.162	0.000	0.000	1.2000	0.000	18354.842
148+00.00	141.239	12.986	0.000	0.000	1.2000	0.000	18395.440
148+00.00	141.239	7.832	0.000	0.000	1.2000	0.000	18515.602
148+06.00	143.365	31.623	0.000	0.000	1.2000	0.000	18528.588
148+39.00	150.763	179.745	0.000	0.000	1.2000	0.000	18536.420
148+43.50	148.008	24.898	0.000	0.000	1.2000	0.000	18568.042
148+44.50	147.406	5.471	0.000	0.000	1.2000	0.000	18747.787
148+45.00	147.045	2.726	0.000	0.000	1.2000	0.000	18772.685
148+48.00	144.150	16.178	0.000	0.000	1.2000	0.000	18778.156
148+49.00	143.434	5.328	0.000	0.000	1.2000	0.000	18780.882
148+53.00	141.216	21.085	0.001	0.000	1.2000	0.000	18797.060
148+53.50	141.037	2.613	0.001	0.000	1.2000	0.000	18802.386
148+57.00	140.390	18.241	0.001	0.000	1.2000	0.000	18823.471
148+57.50	139.783	2.594	0.061	0.001	1.2000	0.000	18826.084
148+65.50	133.501	40.487	0.002	0.009	1.2000	0.011	18844.325
148+66.50	133.220	4.939	0.002	0.000	1.2000	0.000	18846.918
148+67.00	133.077	2.466	0.002	0.000	1.2000	0.000	18887.394
148+74.00	130.764	34.202	0.015	0.002	1.2000	0.003	18892.333
148+76.50	130.567	12.099	0.012	0.001	1.2000	0.001	18894.798
148+80.00	129.294	16.843	0.022	0.002	1.2000	0.003	18928.997
148+94.00	123.858	65.632	0.203	0.058	1.2000	0.070	18941.095
149+00.00	124.080	27.548	0.374	0.064	1.2000	0.077	18957.935
149+00.50	123.846	2.296	0.428	0.007	1.2000	0.009	19023.497
149+01.00	123.646	2.292	0.491	0.009	1.2000	0.010	19050.969
149+01.50	123.458	2.288	0.544	0.010	1.2000	0.012	19053.255
149+03.50	122.794	9.120	0.523	0.040	1.2000	0.047	19055.337
149+05.50	122.448	9.083	0.588	0.041	1.2000	0.049	19057.813
149+07.50	121.698	9.042	0.661	0.054	1.2000	0.064	19066.886
149+10.50	120.663	13.464	0.907	0.098	1.2000	0.118	19075.920
149+11.00	120.684	2.235	0.812	0.015	1.2000	0.019	19084.898
149+12.50	121.403	6.725	0.734	0.043	1.2000	0.052	19098.245
149+13.00	121.568	2.250	0.690	0.013	1.2000	0.016	19100.460
149+15.50	120.861	11.224	0.473	0.054	1.2000	0.016	19107.133
149+16.50	120.563	4.471	0.489	0.018	1.2000	0.021	19109.367
149+17.00	120.421	2.231	0.494	0.009	1.2000	0.011	19120.526
149+18.00	120.235	4.457	0.500	0.018	1.2000	0.022	19124.976
149+19.00	120.243	4.453	0.499	0.018	1.2000	0.022	19127.196
149+22.00	119.575	13.323	0.441	0.018	1.2000	0.022	19131.631
149+32.00	117.170	43.842	0.091	0.052	1.2000	0.063	19136.062
149+50.00	113.320	76.830	0.131	0.079	1.2000	0.118	19149.322
149+56.00	112.510	25.092	0.580	0.079	1.2000	0.089	19193.046
149+57.00	111.719	4.152	0.582	0.022	1.2000	0.026	19269.787
149+57.50	111.265	2.065	0.583	0.011	1.2000	0.013	19294.784
149+61.00	109.136	14.285	0.786	0.069	1.2000	0.095	19300.962
149+65.50	107.834	18.081	1.130	0.160	1.2000	0.107	19315.141
149+68.00	107.301	9.964	1.181	0.107	1.2000	0.128	19333.030
149+68.50	107.301	1.988	1.188	0.022	1.2000	0.026	19342.866
149+87.00	104.185	72.454	1.513	0.925	1.2000	1.110	19344.828
149+88.50	104.174	5.788	1.268	0.077	1.2000	0.093	19416.171
149+89.00	104.296	1.930	1.104	0.022	1.2000	0.026	19421.866
149+91.00	104.916	7.749	0.903	0.074	1.2000	0.089	19423.770
150+00.00	106.790	35.284	0.853	0.293	1.2000	0.351	19431.429
150+17.00	115.231	69.895	0.707	0.491	1.2000	0.589	19456.362
150+17.50	115.549	2.137	0.701	0.013	1.2000	0.016	19535.668
150+20.50	115.855	12.856	0.643	0.075	1.2000	0.090	19537.790
150+34.50	125.732	62.634	0.096	0.192	1.2000	0.230	19550.556
150+38.00	127.954	16.443	0.002	0.006	1.2000	0.008	19612.960
150+53.50	135.626	75.657	0.001	0.001	1.2000	0.001	19629.395
150+57.50	138.544	20.309	0.001	0.000	1.2000	0.000	19705.051
150+62.00	141.085	23.303	0.000	0.000	1.2000	0.000	19725.360
150+64.50	142.750	13.141	0.000	0.000	1.2000	0.000	19748.663
150+65.00	143.015	2.646	0.000	0.000	1.2000	0.000	19761.804
150+66.00	143.491	5.306	0.000	0.000	1.2000	0.000	19764.450
150+66.50	143.699	2.659	0.000	0.000	1.2000	0.000	19769.756
150+66.50	143.699	2.659	0.000	0.000	1.2000	0.000	19772.415

D E T A I L E D B A R T H W O R K Q U A N T I T I E S

BASILINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
150+67.00	143.901	2.663	0.000	0.000	1.2000	0.000	19775.078
150+69.00	144.680	10.688	0.000	0.000	1.2000	0.000	19785.766
150+70.50	144.713	8.039	0.000	0.000	1.2000	0.000	19793.805
150+72.50	143.680	10.681	0.000	0.000	1.2000	0.000	19804.486
150+73.00	143.880	2.663	0.000	0.000	1.2000	0.000	19807.148
151+00.00	156.260	150.070	0.000	0.000	1.2000	0.000	19957.218
151+08.50	158.733	49.582	0.000	0.000	1.2000	0.000	20006.801
151+16.00	161.054	44.420	0.000	0.000	1.2000	0.000	20051.221
151+18.50	161.785	9.010	0.000	0.000	1.2000	0.000	20066.169
151+20.00	162.564	6.030	0.000	0.000	1.2000	0.000	20075.179
151+21.00	163.070	18.183	0.000	0.000	1.2000	0.000	20081.209
151+24.00	164.229	18.183	0.000	0.000	1.2000	0.000	20092.392
151+45.00	169.051	129.609	0.000	0.000	1.2000	0.000	20229.001
151+46.00	169.101	6.262	0.000	0.000	1.2000	0.000	20235.263
151+47.50	169.384	9.402	0.000	0.000	1.2000	0.000	20244.666
151+50.00	170.218	15.722	0.000	0.000	1.2000	0.000	20260.388
151+52.00	170.229	12.609	0.000	0.000	1.2000	0.000	20272.997
151+54.50	169.983	15.751	0.000	0.000	1.2000	0.000	20288.748
151+57.00	168.551	147.325	0.000	0.000	1.2000	0.000	20436.073
151+79.50	168.378	9.359	0.000	0.000	1.2000	0.000	20445.432
151+84.50	169.565	31.291	0.000	0.000	1.2000	0.000	20476.723
151+85.50	169.565	6.262	0.000	0.000	1.2000	0.000	20482.985
151+85.50	168.558	89.240	0.000	0.000	1.2000	0.000	20572.224
152+00.00	163.783	109.593	0.000	0.000	1.2000	0.000	20677.777
152+00.00	162.876	11.273	0.000	0.000	1.2000	0.000	20689.051
152+18.00	152.800	11.273	0.000	0.000	1.2000	0.000	20705.753
152+20.00	151.506	16.703	0.000	0.000	1.2000	0.000	20724.873
152+23.00	149.141	19.120	0.000	0.000	1.2000	0.000	20735.602
152+26.50	145.847	10.729	0.000	0.000	1.2000	0.001	20751.416
152+28.50	143.845	15.814	0.010	0.001	1.2000	0.001	20771.909
152+31.50	140.815	20.895	0.001	0.037	1.2000	0.044	20794.119
152+35.50	135.861	22.254	0.449	0.008	1.2000	0.010	20795.536
152+40.50	131.188	2.426	0.445	0.008	1.2000	0.235	20870.971
152+40.50	130.829	74.670	0.215	0.196	1.2000	0.046	20886.614
152+56.50	120.872	15.689	0.373	0.038	1.2000	0.130	20919.737
152+60.00	120.872	33.252	0.404	0.108	1.2000	0.171	20960.942
152+67.50	118.546	41.376	0.408	0.008	1.2000	0.009	20986.892
152+77.50	116.613	2.160	0.000	0.134	1.2000	0.161	21026.345
152+77.50	116.613	23.961	0.340	0.000	1.2000	0.016	21030.759
152+83.00	118.639	39.709	0.372	0.214	1.2000	0.096	21057.252
152+92.00	119.614	4.431	0.369	0.014	1.2000	0.016	21061.667
152+93.00	119.650	26.589	0.353	0.080	1.2000	0.016	21061.667
153+00.00	119.653	4.431	0.351	0.013	1.2000	0.016	21234.993
153+00.00	127.291	173.775	0.181	0.374	1.2000	0.449	21256.307
153+38.00	128.694	21.332	0.002	0.015	1.2000	0.018	21412.392
153+42.50	128.694	156.178	0.127	0.077	1.2000	0.093	21431.803
153+75.00	130.802	19.442	0.223	0.026	1.2000	0.031	21451.262
153+79.00	131.662	19.501	0.253	0.035	1.2000	0.042	21451.262
153+83.00	131.608	83.406	0.133	0.121	1.2000	0.146	21534.522
154+00.00	133.328	22.266	0.103	0.020	1.2000	0.024	21556.765
154+04.50	133.869	2.480	0.100	0.002	1.2000	0.002	21556.765
154+05.00	133.928	2.480	0.000	0.058	1.2000	0.070	21556.765
154+36.50	137.579	158.379	0.000	0.000	1.2000	0.000	21717.551
154+70.00	142.698	173.875	0.000	0.000	1.2000	0.000	21891.426
155+00.00	145.222	159.955	0.010	0.005	1.2000	0.006	22051.375
155+25.50	147.175	138.076	0.000	0.005	1.2000	0.006	22189.446
155+29.50	146.216	21.733	0.000	0.000	1.2000	0.000	22211.178
155+50.00	149.503	112.264	0.001	0.001	1.2000	0.001	22323.441
155+86.00	132.675	188.119	0.387	0.259	1.2000	0.311	22511.250
155+86.50	131.618	2.447	0.397	0.007	1.2000	0.009	22513.688
155+90.00	126.552	16.733	0.355	0.049	1.2000	0.059	22530.363
155+91.50	126.347	7.025	0.270	0.017	1.2000	0.021	22537.367
155+94.00	125.865	11.676	0.196	0.022	1.2000	0.028	22548.018
155+97.50	125.665	16.303	0.248	0.029	1.2000	0.035	22565.286
156+00.00	125.256	11.617	0.278	0.024	1.2000	0.029	22576.874
156+00.50	125.037	2.318	0.284	0.005	1.2000	0.006	22579.185
156+00.50	125.037	25.242	0.330	0.062	1.2000	0.075	22604.352
156+06.00	122.791	9.057	2.726	0.025	1.2000	0.200	22671.854
156+08.00	121.756	59.395	2.411	0.093	1.2000	0.030	22671.854
156+21.50	115.825	4.293	2.380	0.049	1.2000	0.030	22671.854
156+22.00	115.854	12.914	1.957	0.097	1.2000	0.059	22673.940
156+23.00	115.945	4.293	2.380	0.049	1.2000	0.111	22678.121
156+26.00	116.505	12.914	1.957	0.097	1.2000	0.116	22690.746
156+28.00	114.481	8.555	0.661	0.057	1.2000	0.116	22699.185
156+40.00	112.783	50.503	0.657	0.293	1.2000	0.351	22749.336
156+40.00	112.783	75.008	3.212	0.293	1.2000	0.351	22749.336
156+58.00	112.239	2.078	3.231	0.060	1.2000	0.072	22822.796
156+58.50	112.176	67.026	0.258	1.034	1.2000	1.240	22824.803
156+74.50	114.036	18.994	0.293	0.046	1.2000	0.055	22890.588
156+79.00	113.890	6.323	0.305	0.017	1.2000	0.020	22909.527
156+80.50	113.720	2.106	0.309	0.006	1.2000	0.007	22915.829
156+81.00	113.674	6.310	0.320	0.017	1.2000	0.021	22924.218
156+81.00	113.503	6.310	0.324	0.017	1.2000	0.021	22924.218
156+83.00	113.446	2.101	0.324	0.006	1.2000	0.007	22926.312
156+94.50	112.482	46.027	0.371	0.007	1.2000	0.170	22972.169
156+98.00	112.432	14.578	0.372	0.048	1.2000	0.008	22974.244
157+00.00	112.637	8.336	0.370	0.007	1.2000	0.058	22988.764
157+08.00	113.728	33.536	0.335	0.027	1.2000	0.033	22997.067
157+10.00	113.746	8.425	0.322	0.104	1.2000	0.125	23030.477
157+46.00	120.824	156.380	0.204	0.024	1.2000	0.029	23038.873
157+46.50	120.936	2.239	0.204	0.351	1.2000	0.422	23194.831
157+49.00	121.415	11.220	0.193	0.004	1.2000	0.005	23197.065
157+53.50	122.034	20.287	0.183	0.031	1.2000	0.022	23208.263
157+63.00	123.522	43.200	0.115	0.053	1.2000	0.038	23228.513
157+64.50	123.803	6.870	0.113	0.006	1.2000	0.063	23271.649
157+65.00	123.950	2.294	0.113	0.002	1.2000	0.003	23280.803
157+65.50	124.134	2.297	0.113	0.002	1.2000	0.003	23283.098
157+66.00	124.118	2.299	0.112	0.002	1.2000	0.002	23285.394
157+66.50	123.738	2.295	0.112	0.002	1.2000	0.002	23287.687
157+68.00	123.280	6.862	0.110	0.006	1.2000	0.007	23294.541
157+79.00	124.589	50.492	0.095	0.042	1.2000	0.050	23344.582
157+88.00	126.676	41.877	0.123	0.036	1.2000	0.044	23386.816
157+89.50	127.384	7.057	0.121	0.007	1.2000	0.008	23393.865

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASLINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
157+92.00	128.126	11.829	0.115	0.011	1.2000	0.013	23405.681
157+94.00	128.400	9.501	0.107	0.008	1.2000	0.010	23415.173
158+00.00	128.761	28.573	0.075	0.020	1.2000	0.024	23443.722
158+08.50	129.967	40.726	0.035	0.017	1.2000	0.021	23484.426
158+09.00	130.344	2.410	0.033	0.001	1.2000	0.007	23486.036
158+16.50	130.965	36.293	0.010	0.006	1.2000	0.007	23523.122
158+17.00	131.051	2.426	0.009	0.000	1.2000	0.000	23525.548
158+26.00	132.500	43.925	0.001	0.002	1.2000	0.002	23559.471
158+29.00	133.020	14.751	0.001	0.000	1.2000	0.000	23584.222
158+32.50	133.878	17.299	0.001	0.000	1.2000	0.000	23601.521
158+33.50	133.847	7.437	0.002	0.000	1.2000	0.000	23608.957
158+34.50	134.049	2.481	0.002	0.000	1.2000	0.000	23611.438
158+36.00	134.668	7.464	0.002	0.000	1.2000	0.000	23618.902
158+54.00	136.188	90.285	0.002	0.001	1.2000	0.002	23709.186
158+55.50	136.405	7.572	0.002	0.000	1.2000	0.000	23716.758
158+56.00	136.647	2.528	0.002	0.000	1.2000	0.000	23719.286
158+56.50	136.946	2.533	0.001	0.000	1.2000	0.000	23721.819
158+58.00	137.981	7.637	0.001	0.000	1.2000	0.000	23729.456
158+61.00	139.643	15.424	0.001	0.000	1.2000	0.000	23744.879
158+62.00	139.856	5.176	0.001	0.000	1.2000	0.000	23750.055
158+64.00	140.237	10.374	0.000	0.000	1.2000	0.000	23760.429
158+68.50	140.920	23.430	0.000	0.000	1.2000	0.000	23783.859
158+69.50	141.091	5.222	0.000	0.000	1.2000	0.000	23789.081
158+73.00	141.612	18.323	0.000	0.000	1.2000	0.000	23807.405
158+75.50	140.840	13.076	0.000	0.000	1.2000	0.000	23820.481
158+76.00	140.691	2.697	0.000	0.000	1.2000	0.000	23823.088
158+77.00	140.556	5.208	0.000	0.000	1.2000	0.000	23828.296
158+97.00	140.972	104.269	0.000	0.000	1.2000	0.000	23932.565
158+99.50	142.124	13.106	0.000	0.000	1.2000	0.000	23945.672
159+00.00	142.303	2.634	0.000	0.000	1.2000	0.000	23948.305
159+00.50	71.582	1.980	0.012	0.000	1.2000	0.000	23950.286
159+02.00	71.815	3.983	0.012	0.001	1.2000	0.001	23954.268
159+07.00	72.615	13.373	0.011	0.002	1.2000	0.002	23967.639
159+14.00	73.536	18.945	0.009	0.003	1.2000	0.003	23986.581
159+18.50	74.162	12.308	0.009	0.002	1.2000	0.002	23998.887
159+19.00	74.277	1.374	0.009	0.000	1.2000	0.000	24000.261
159+20.00	74.548	2.756	0.008	0.000	1.2000	0.000	24003.017
159+24.00	75.589	11.121	0.008	0.001	1.2000	0.001	24014.137
159+28.00	75.154	98.225	0.015	0.014	1.2000	0.017	24112.344
159+59.50	78.264	2.897	0.015	0.001	1.2000	0.001	24115.240
159+65.00	78.591	15.976	0.018	0.003	1.2000	0.004	24131.212
159+75.50	79.271	30.695	0.024	0.008	1.2000	0.010	24161.898
159+76.50	79.462	2.939	0.024	0.001	1.2000	0.001	24164.837
159+82.00	80.619	16.305	0.027	0.005	1.2000	0.006	24181.135
159+86.50	81.718	13.528	0.026	0.004	1.2000	0.005	24194.558
159+87.00	81.855	1.515	0.026	0.000	1.2000	0.001	24196.172
159+88.00	82.135	3.037	0.025	0.001	1.2000	0.001	24199.207
159+88.50	82.278	1.522	0.025	0.000	1.2000	0.001	24200.729
159+92.50	83.433	12.275	0.022	0.003	1.2000	0.004	24213.000
159+95.50	84.315	9.319	0.021	0.002	1.2000	0.003	24222.316
159+97.00	84.760	4.697	0.020	0.001	1.2000	0.001	24237.012
159+98.00	85.058	3.145	0.019	0.001	1.2000	0.001	24230.155
159+98.50	85.209	1.577	0.019	0.000	1.2000	0.000	24231.732
160+00.00	85.659	4.746	0.018	0.001	1.2000	0.001	24236.477
160+00.50	85.809	1.588	0.018	0.000	1.2000	0.000	24238.064
160+01.00	85.961	1.590	0.017	0.000	1.2000	0.000	24239.654
160+01.50	86.113	1.593	0.017	0.000	1.2000	0.000	24241.247
160+02.00	86.264	1.596	0.017	0.000	1.2000	0.000	24242.843
160+02.50	86.416	1.599	0.016	0.000	1.2000	0.000	24244.441
160+03.00	86.568	1.602	0.016	0.000	1.2000	0.000	24246.043
160+05.50	87.371	8.053	0.015	0.001	1.2000	0.002	24254.094
160+06.00	87.542	1.620	0.014	0.000	1.2000	0.000	24255.713
160+06.50	87.715	1.623	0.014	0.000	1.2000	0.000	24257.335
160+07.50	88.074	3.255	0.013	0.001	1.2000	0.001	24260.590
160+11.00	89.471	11.508	0.011	0.002	1.2000	0.001	24260.590
160+17.00	92.109	20.176	0.008	0.002	1.2000	0.003	24272.096
160+20.00	93.397	10.306	0.006	0.001	1.2000	0.001	24292.269
160+33.00	96.826	45.794	0.001	0.002	1.2000	0.002	24302.573
160+33.50	96.961	1.794	0.000	0.000	1.2000	0.000	24348.366
160+34.00	97.095	1.797	0.000	0.000	1.2000	0.000	24350.160
160+34.50	97.228	1.799	0.000	0.000	1.2000	0.000	24351.957
160+36.00	97.627	5.413	0.000	0.000	1.2000	0.000	24353.756
160+37.00	97.871	3.620	0.000	0.000	1.2000	0.000	24359.169
160+38.50	98.285	5.449	0.000	0.000	1.2000	0.000	24362.789
160+39.00	98.402	1.821	0.000	0.000	1.2000	0.000	24368.238
160+39.50	98.500	1.823	0.000	0.000	1.2000	0.000	24370.059
160+40.00	98.578	1.825	0.000	0.000	1.2000	0.000	24371.882
160+40.50	98.638	1.826	0.000	0.000	1.2000	0.000	24373.707
160+41.50	98.702	3.654	0.000	0.000	1.2000	0.000	24375.533
160+43.00	98.855	5.488	0.000	0.000	1.2000	0.000	24379.188
160+56.00	99.631	47.784	0.000	0.000	1.2000	0.000	24384.675
160+56.50	99.626	1.845	0.000	0.000	1.2000	0.000	24432.459
160+61.00	99.576	16.600	0.000	0.000	1.2000	0.000	24434.304
160+63.00	99.569	7.376	0.000	0.000	1.2000	0.000	24450.904
160+63.50	99.571	1.844	0.000	0.000	1.2000	0.000	24458.280
160+67.00	98.945	12.867	0.000	0.000	1.2000	0.000	24460.124
160+69.00	99.572	7.352	0.000	0.000	1.2000	0.000	24472.990
160+70.00	99.933	3.695	0.000	0.000	1.2000	0.000	24480.343
160+72.50	99.988	9.256	0.000	0.000	1.2000	0.000	24484.037
160+75.50	99.353	11.074	0.000	0.000	1.2000	0.000	24493.293
160+76.40	99.105	3.308	0.000	0.000	1.2000	0.000	24504.368
160+79.00	98.394	9.509	0.000	0.000	1.2000	0.000	24507.675
160+80.00	98.124	3.639	0.000	0.000	1.2000	0.000	24517.184
161+00.00	96.153	71.954	0.003	0.001	1.2000	0.001	24520.824
161+07.00	96.235	24.939	0.003	0.001	1.2000	0.001	24522.776
161+11.50	96.322	16.947	0.003	0.001	1.2000	0.001	24617.715
161+12.00	96.332	1.784	0.003	0.001	1.2000	0.001	24633.761
161+15.00	96.655	10.721	0.003	0.000	1.2000	0.000	24646.265
161+20.50	97.363	19.761	0.003	0.001	1.2000	0.001	24666.026
161+22.50	97.480	7.216	0.003	0.000	1.2000	0.000	24673.242

D E T A I L E D E A R T H W O R K Q U A N T I T I E S

BASELINE STATION	CUT AREA (Sq Ft)	CUT VOL (Cu Yd)	FILL AREA (Sq Ft)	FILL VOL (Cu Yd)	SHRINK / SWELL	ADJ FILL (Cu Yd)	TOTAL (Mass Ord)
161+36.50	98.129	50.713	0.003	0.002	1.2000	0.002	24723.954
161+37.00	98.158	1.817	0.003	0.000	1.2000	0.000	24725.771
161+45.00	99.443	29.274	0.003	0.001	1.2000	0.001	24755.044
161+45.50	99.813	1.845	0.003	0.000	1.2000	0.000	24756.889
161+47.50	101.691	7.463	0.002	0.000	1.2000	0.000	24764.352
161+49.00	102.654	5.676	0.002	0.000	1.2000	0.000	24770.028
161+56.00	105.067	26.927	0.002	0.001	1.2000	0.001	24796.954
161+56.50	105.351	1.948	0.002	0.000	1.2000	0.000	24798.903
161+58.00	107.516	5.913	0.003	0.000	1.2000	0.000	24804.815
161+67.00	107.399	35.819	0.000	0.000	1.2000	0.001	24840.634
161+68.50	106.886	5.952	0.000	0.000	1.2000	0.000	24846.586
161+70.00	105.976	5.913	0.000	0.000	1.2000	0.000	24852.499
161+70.50	105.712	1.960	0.000	0.000	1.2000	0.000	24854.459
161+72.00	105.140	5.857	0.000	0.000	1.2000	0.000	24860.316
161+72.50	105.028	1.946	0.000	0.000	1.2000	0.000	24862.262
161+73.50	105.036	3.890	0.000	0.000	1.2000	0.000	24866.152
161+77.50	104.867	15.548	0.000	0.000	1.2000	0.000	24881.701
161+79.00	104.749	5.823	0.000	0.000	1.2000	0.000	24887.523
161+79.50	104.706	1.939	0.000	0.000	1.2000	0.000	24889.463
161+85.00	104.134	21.271	0.000	0.000	1.2000	0.000	24910.733
161+86.00	104.023	3.855	0.000	0.000	1.2000	0.000	24914.588
161+96.50	102.796	40.215	0.000	0.000	1.2000	0.000	24954.803
161+97.00	102.732	1.903	0.000	0.000	1.2000	0.000	24956.706
162+00.00	101.661	11.355	0.000	0.000	1.2000	0.000	24968.061
162+02.00	101.069	7.509	0.000	0.000	1.2000	0.000	24975.570
162+11.00	99.576	33.441	0.000	0.000	1.2000	0.000	25009.011
162+46.50	95.099	127.981	0.000	0.000	1.2000	0.000	25136.991
162+52.00	95.577	19.828	0.000	0.000	1.2000	0.000	25156.819
162+54.00	100.747	7.419	0.000	0.000	1.2000	0.000	25164.238
162+55.50	101.660	5.622	0.000	0.000	1.2000	0.000	25169.861
162+56.50	102.280	3.777	0.000	0.000	1.2000	0.000	25173.638
162+62.50	105.212	23.055	0.002	0.000	1.2000	0.000	25196.692
162+75.00	107.624	49.268	0.000	0.001	1.2000	0.001	25245.959
162+83.00	108.657	32.042	0.002	0.000	1.2000	0.000	25278.000
162+98.00	109.808	60.685	0.382	0.107	1.2000	0.128	25338.557
*****	*****	*****	*****	*****	*****	*****	*****
Project totals	25411.686	60.941	60.941	73.129	*****	73.129	25338.557

PROJECT NO. _____
DATE _____

SIGN NUMBER	SIGN SIZE	DESCRIPTION	PHASE		AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB-TOTAL	
			I	II				
G20-1a-60	60"x 24"	ROAD WORK NEXT MILES				28	28	
G20-1b-60	60"x 24"	WORK IN PROGRESS (BACK TO BACK)				28	28	
G20-2-60	60"x 24"	END CONSTRUCTION				28	28	
G20-2a-48	48"x 24"	END ROAD WORK	6		6	24	144	
G20-4-36	36"x 18"	PILOT CAR FOLLOW ME				10	10	
G20-8-48	48"x 36"	TEMPORARY SURFACE NEXT MILES				30	30	
G20-50a-72	72"x 36"	ROAD WORK NEXT MILES RT & LT ARROWS	6		6	38	228	
G20-52a-72	72"x 24"	ROAD WORK NEXT MILES RT or LT ARROW				30	30	
G20-54-48	48"x 36"	OVERHEAD BRIDGE PAINTING				30	30	
M1-1-48	48"x 48"	INTERSTATE SHIELD				34	34	
M1-4-24	24"x 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)	15		15	10	150	
M3-1-24	24"x 12"	NORTH (MOUNTED ON ROUTE MARKER POST)				6	6	
M3-2-24	24"x 12"	EAST (MOUNTED ON ROUTE MARKER POST)				6	6	
M3-3-24	24"x 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)				6	6	
M3-4-24	24"x 12"	WEST (MOUNTED ON ROUTE MARKER POST)	15		15	6	90	
M4-8-24	24"x 12"	DETOUR (MOUNTED ON ROUTE MARKER POST)	15		15	6	90	
M4-8-30	30"x 15"	DETOUR (MOUNTED ON ROUTE MARKER POST)				13	13	
M4-9-30	30"x 24"	DETOUR RIGHT or LEFT ARROW				10	10	
M4-10-48	48"x 18"	DETOUR ARROW RIGHT or LEFT	1		1	22	22	
M5-1-21	21"x 15"	ARROW AHD AND RT or LT (MTD ON ROUTE MKR POST)	5		5	6	30	
M6-1-21	21"x 15"	ARROW RT or LT (MOUNTED ON ROUTE MKR POST)	4		4	6	24	
R1-1a-18	18"x 18"	STOP and SLOW PADDLE Back to Back	2		2	8	16	
R1-1-30	30"x 30"	STOP				17	17	
R1-1-48	48"x 48"	STOP	7		10	34	340	
R1-2-48	48"x 48" &	YIELD & TO ONCOMING TRAFFIC				45	45	
R1-6-36	36"x 12"	ONE WAY ARROW LEFT or RIGHT	1		1	19	19	
R1-2-60	60"x 60"	YIELD & TO ONCOMING TRAFFIC				28	28	
R1-3-12	12"x 6"	3-WAY OR 4-WAY				5	5	
R2-1-48	48"x 60"	SPEED LIMIT	9		7	9	40	
R2-1a-24	24"x 18"	MINIMUM FEE \$40 (MOUNTED ON SPEED LIMIT POST)	9		7	9	72	
R2-5A-48	48"x 60"	REDUCED SPEED AHEAD	1		1	40	40	
R4-1-48	48"x 60"	DO NOT PASS				40	40	
R4-2-48	48"x 60"	PASS WITH CARE				4	4	
R5-1-48	48"x 48"	DO NOT ENTER				88	88	
R8-3-30	24"x 30"	NO PARKING	3		3	44	1320	
R10-6-48	48"x 72"	STOP HERE ON RED	3		3	44	132	
R11-2-48	48"x 30"	ROAD CLOSED	1		1	26	26	
R11-2a-48	48"x 30"	STREET CLOSED	8		8	26	208	
R11-3a-60	60"x 30"	ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY	8		8	30	240	
R11-3b-60	60"x 30"	BRIDGE OUT MILES AHEAD LOCAL TRAFFIC ONLY				30	30	
R11-3c-48	60"x 30"	STREET CLOSED MILES AHEAD LOCAL TRAFFIC ONLY				30	30	
R11-4a-60	60"x 30"	STREET CLOSED TO THRU TRAFFIC				30	30	
W1-1-48	48"x 48"	RIGHT or LEFT SHARP CURVE ARROW				34	34	
W1-2-48	48"x 48"	RIGHT or LEFT CURVE ARROW				34	34	
W1-3-48	48"x 48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW	5		7	8	272	
W1-4-48	48"x 48"	RIGHT or LEFT REVERSE CURVE ARROW				34	34	
W1-6-48	48"x 24"	LEFT OR RIGHT ARROW				26	26	
W3-1a-48	48"x 48"	STOP AHEAD SYMBOL				34	34	
W3-2a-48	48"x 48"	YIELD AHEAD SYMBOL				34	34	
W3-3-48	48"x 48"	SIGNAL AHEAD SYMBOL	3		3	34	102	
W4-2-48	48"x 48"	LANE TRANSITION SYMBOL	1		1	2	68	
W5-1-48	48"x 48"	ROAD NARROWS				34	34	
W6-3-48	48"x 48"	TWO WAY TRAFFIC SYMBOL	7		5	7	238	
W8-1-48	48"x 48"	BUMP				34	34	
W8-3a-24	24"x 18"	PAVEMENT END PLAQUE				40	40	
W8-3b-48	48"x 48"	PAVEMENT ENDS SYMBOL				34	34	
W8-9-48	48"x 48"	LOW SHOULDER				34	34	
W8-9a-48	48"x 48"	SHOULDER DROP-OFF				34	34	
W8-11-48	48"x 48"	UNEVEN LANES				34	34	
W8-12-48	48"x 48"	NO CENTER STRIPE				34	34	
W8-51-48	48"x 48"	UNEVEN PAVEMENT				34	34	
W8-53-48	48"x 48"	TRUCKS ENTERING HIGHWAY				34	34	
W8-54-48	48"x 48"	TRUCKS ENTERING AHEAD or FT.				34	34	
W8-55-48	48"x 48"	TRUCKS CROSSING AHEAD or FT.				34	34	
W12-2-48	48"x 48"	LOW CLEARANCE SYMBOL				10	10	
W13-1-24	24"x 24"	MPH ADVISORY SPEED PLATE				40	40	
W13-4-48	48"x 60"	RAMP ARROW				27	27	
W14-3-64	64"x 48"	NO PASSING ZONE				34	34	
W20-1-48	48"x 48"	ROAD CONSTRUCTION - AHEAD, 1/2 MILE, or FT.				34	34	
W20-2-48	48"x 48"	DETOUR FT.				34	34	
W20-3-48	48"x 48"	ROAD or STREET CLOSED AHEAD or FT.	3		2	3	102	
W20-4-48	48"x 48"	ONE LANE ROAD AHEAD or FT.	1		1	2	68	
W20-5-48	48"x 48"	RIGHT or LEFT LANE CLOSED AHEAD or FT.	2		2	2	68	
W20-7a-48	48"x 48"	FLAGGING SYMBOL				8	8	
W20-7b-48	48"x 48"	FEET				34	34	
W20-7c-24	24"x 18"	STREET CLOSED				34	34	
W20-8-48	48"x 48"	BE PREPARED TO STOP				34	34	
W20-50-48	48"x 48"	EQUIPMENT WORKING				10	10	
W20-51-48	48"x 48"	NEXT MILES				34	34	
W20-52-54	54"x 12"	MEN WORKING SYMBOL				34	34	
W21-1b-48	48"x 48"	FRESH OIL				34	34	
W21-2-48	48"x 48"	ROAD MACHINERY FT.				34	34	
W21-3-48	48"x 48"	ROAD WORK FT.	19		24	24	816	
W21-4-48	48"x 48"	SHOULDER WORK				34	34	
W21-5-48	48"x 48"	SURVEY CREW				34	34	
W21-6-48	48"x 48"	MATERIAL ON ROADWAY				34	34	
W21-50-48	48"x 48"	SPECIAL SIGN (NO. 25 SEE SIGN KEY AND DETAIL)	5		5	95	475	
W21-51-48	48"x 48"	SPECIAL SIGN (NO. 29 SEE SIGN KEY AND DETAIL)	1		2	26	52	
TOTAL UNITS							5948	
SPEC&CODE							704-1000	
TYPE II	2' MIN.	BARRICADES	EACH	46		46	46	
TYPE III	8' LONG	BARRICADES	EACH	51		51	51	
16"x 36" MIN.		DELINEATOR DRUMS	EACH	499		514	514	
		FLEXIBLE DELINEATORS	EACH	357		357	357	
		OBLITERATION OF PAVEMENT MARKING	SF	500		500	500	
		SHORT TERM 4" LINE - TYPE R	LF	6015		7921	13936	
		SHORT TERM 4" LINE - TYPE NR	LF	18200		10814	28014	
		SHORT TERM 24" LINE - TYPE R	LF	48		17	65	
		SAFETY FENCE	LF	3000		3000	3000	
		ATTENUATION DEVICE TYPE B-35	EA	2		2	2	

TRAFFIC CONTROL DEVICES LIST
CONSTRUCTION AREA

SPECIAL SIGN DETAIL

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-5-094 (035) 900	131

SIGN LAYOUT
SCALE 1/40

12'-6"

5'-6"

**11 Ft Lane Width
Ahead
Wide Vehicles
Use Alternate Route**

COLORS
LEGEND & BORDER -BLACK (Type 3A REFL. Sheeting)
BACKGROUND -Orange (Type 3A REFL. Sheeting)

ALL DIMENSIONS IN INCHES

North Dakota
Department of Transportation

SIGN NUMBER	11FTLANE
WIDTH x HEIGHT	12'6" x 5'6"
BORDER WIDTH	2.0"
CORNER RADIUS	8.0"

ALL COORDS TO LOWER LEFT CORNERS

SYMBOL	X	Y	WID	HT

Y FONT	LETTER POSITIONS (X)													HT LEN				
50.0	1	1	F	t	L	a	n	e	W	i	d	t	h				8.0	
EM	23.3	27.7	38.1	45.1	57.1	64.6	72.7	80.3	93.3	103.8	107.8	115.1	121.6				103.3	
36.0	A	H	E	A	D												8.0	
EM	54.5	64.1	72.5	79.5	89.2												41.1	
22.0	W	i	d	e	V	e	h	i	c	l	e	s					8.0	
EM	31.7	42.2	46.2	53.7	66.7	75.4	82.9	91.0	95.0	102.6	106.5	113.3					86.6	
8.0	U	s	e	A	i	t	e	r	n	a	t	e	R	o	u	t	e	8.0
EM	10.2	18.9	25.7	38.8	48.9	52.7	58.5	66.0	71.8	79.3	86.6	92.5	105.5	114.0	121.7	129.0	134.8	129.7

SIGN NO. 25 ON CONSTRUCTION SIGN KEY

SIGN LAYOUT
SCALE 1/80

36"

36"

**NO
TURN
ON RED**

R10-11B-36
COLORS
LEGEND BACKGROUND -BLACK (NON-REFL)
-WHITE (REF)

ALL DIMENSIONS IN INCHES

GuidSIGN

SIGN NUMBER	B
WIDTH x HEIGHT	36" x 36"
BORDER WIDTH	1.0"
CORNER RADIUS	3.0"

ALL COORDS TO LOWER LEFT CORNERS

SYMBOL	X	Y	WID	HT

Y FONT	LETTER POSITIONS (X)													HT LEN			
23.0	N	O															6.0
B	12.9	18.4															9.3
14.0	T	U	R	N													6.0
B	8.6	13.1	18.2	23.3													28.8
5.0	O	N	R	E	D												6.0
B	3.5	8.8	13.8	19.3	24.5												23.0

SIGN NO. 29 ON CONSTRUCTION SIGN KEY

CONSTRUCTION SIGN KEY

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	137



1



2



3



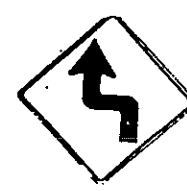
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5



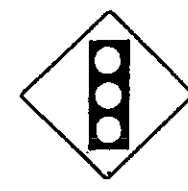
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7



8



9



10



11



12



13



14



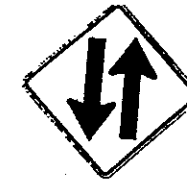
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16



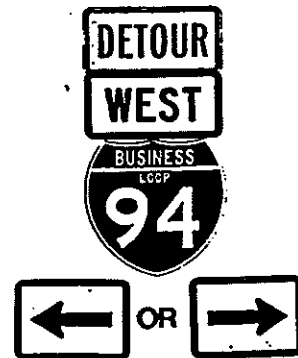
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18



19



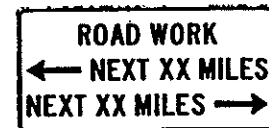
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21



22



23



24



"SPECIAL SIGN" SEE DETAIL

25



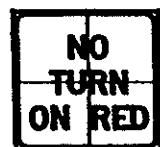
26



27



28



"SPECIAL SIGN" SEE DETAIL

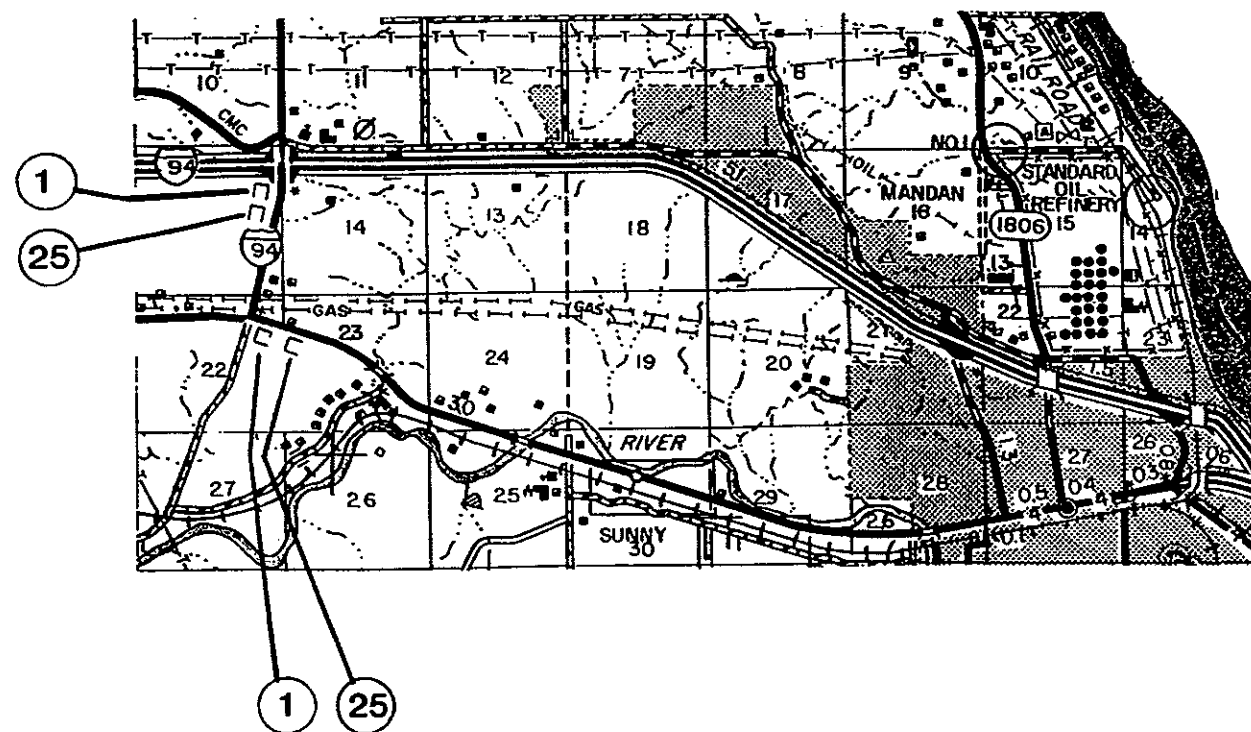
29

MANDAN MAIN STREET
CONSTRUCTION SIGNS

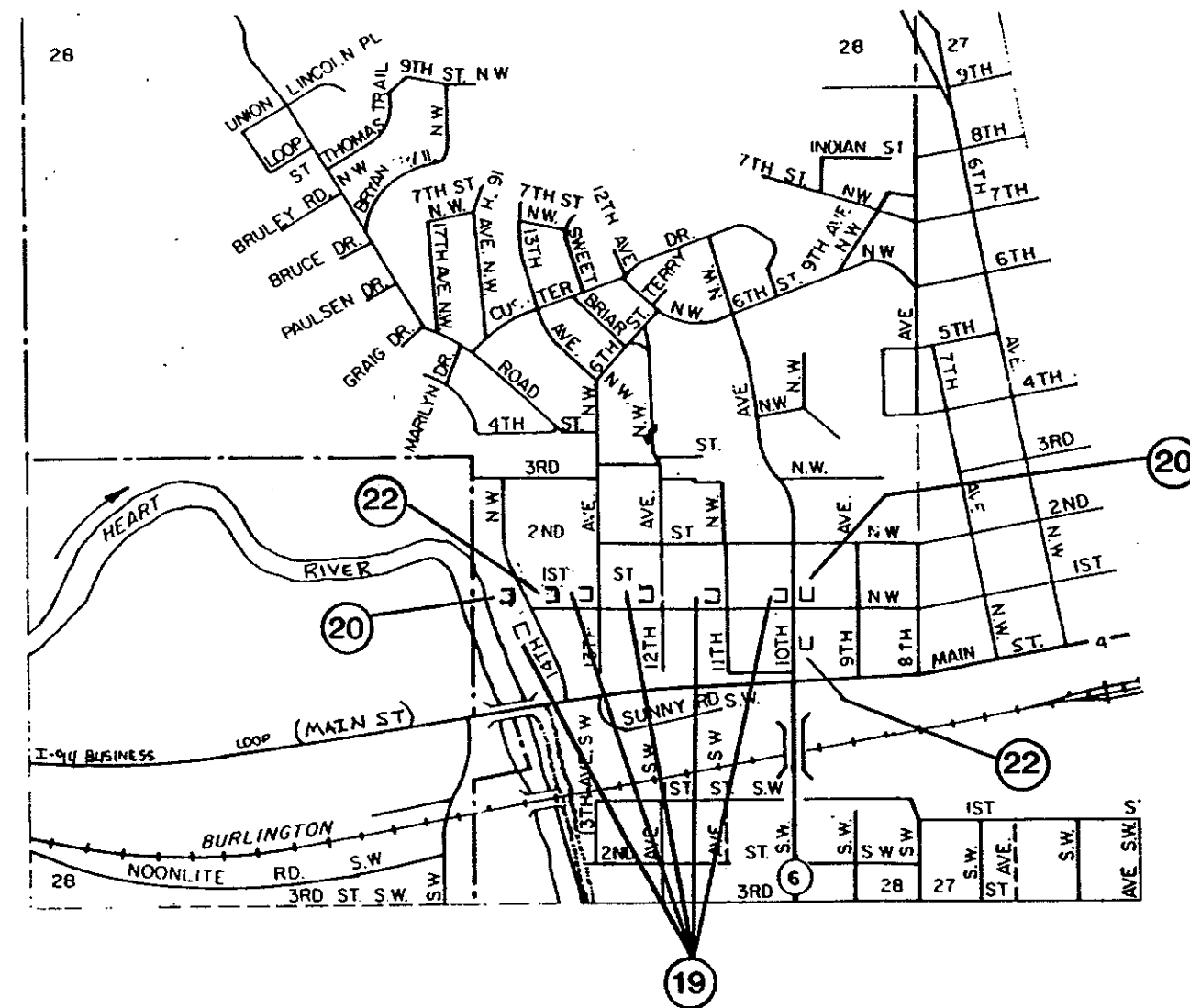
FILE:
TCP2-3.GRF

TRAFFIC CONTROL - DETOUR SIGNING

PHASE #1 & PHASE #2
(Lane Width Restriction - I94 Business Loop)



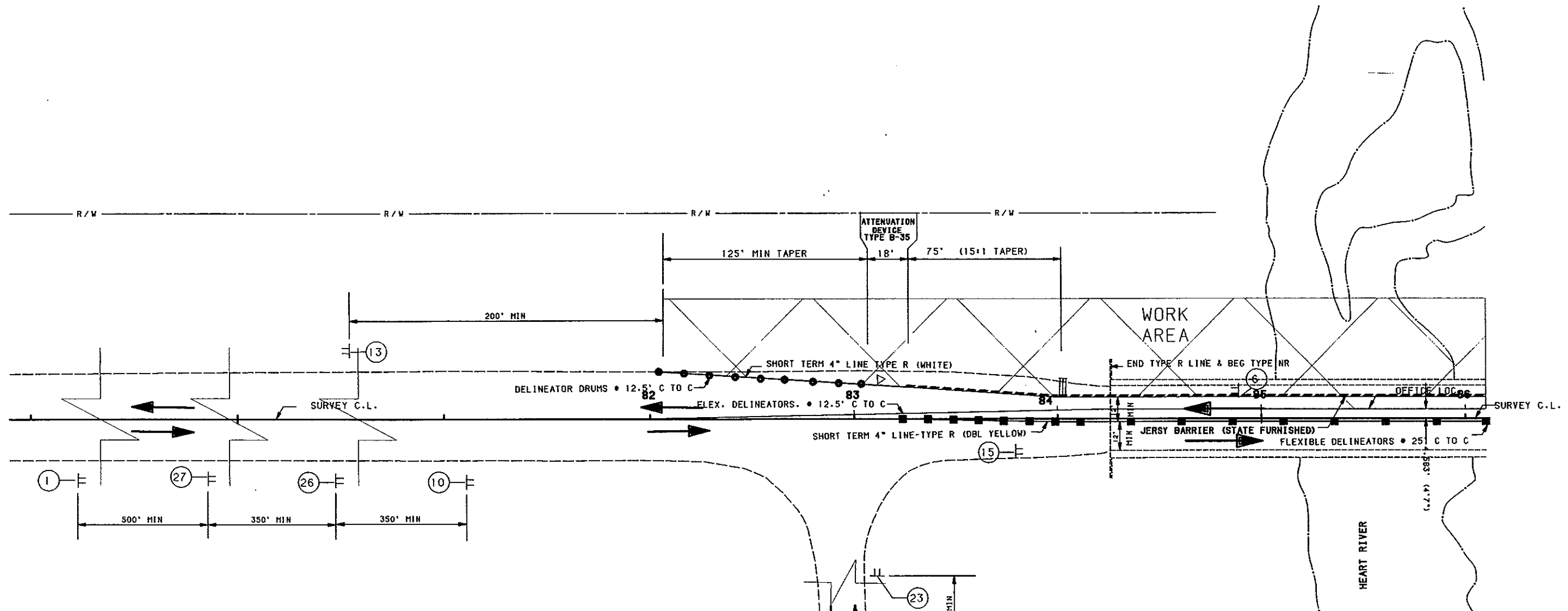
PHASE #2
(Detour Signing - 10th Ave. to 14th Ave.)



NOTE: See The "Construction Sign Key" Sheet For Sign Number Descriptions.

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	134



- KEY**
- ▲ SIGN
 - DELINEATOR DRUM
 - ▣ TUBULAR MARKER
 - ▤ FLEXIBLE DELINEATOR
 - ▥ TYPE 3 - BARRICADE
 - ▦ TYPE 2 - BARRICADE
 - ▧ ATTENUATION DEVICE
 - ▨ SEQUENCING ARROW PANEL
 - ▩ CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELENEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

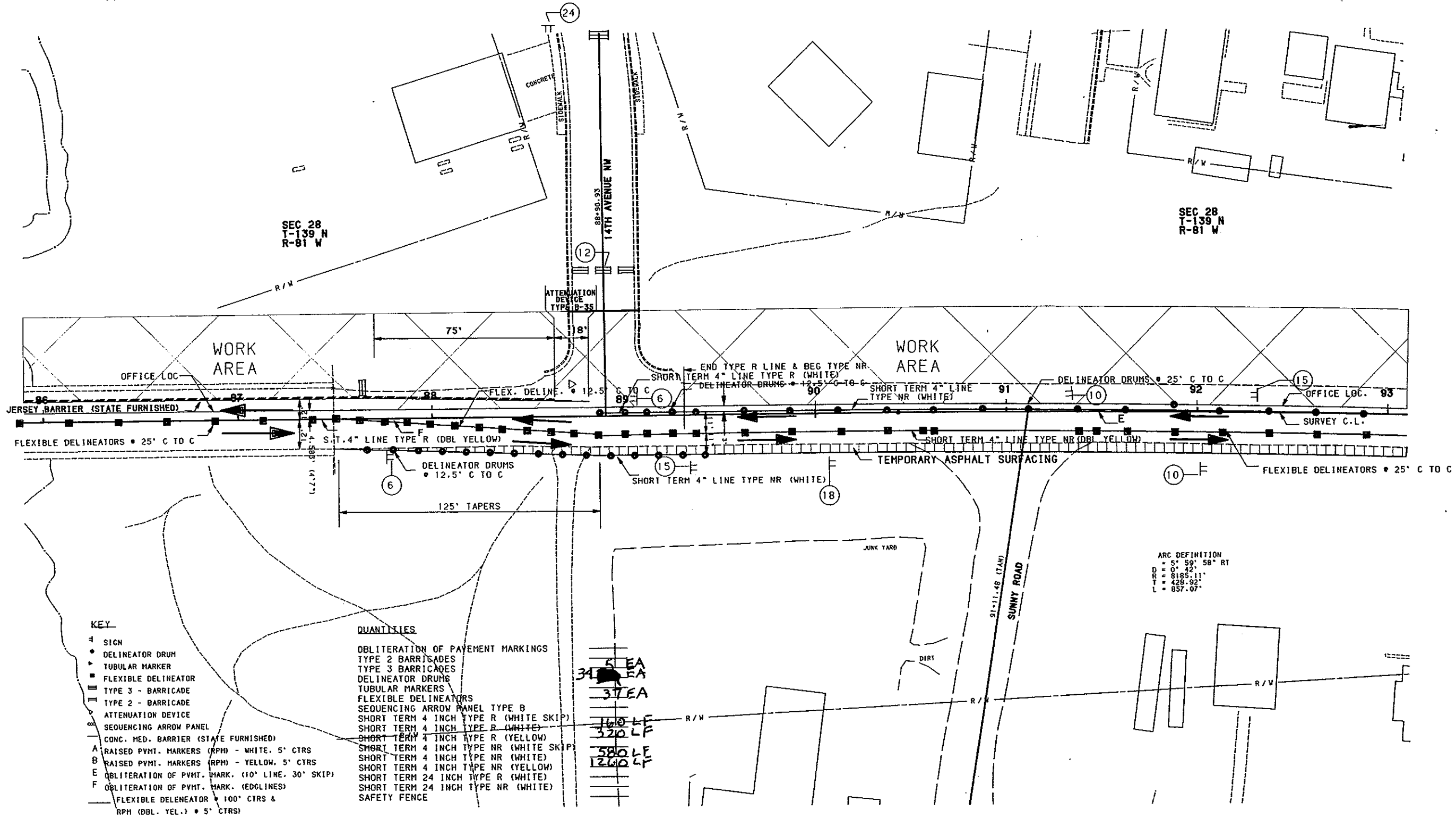
QUANTITIES

OBLITERATION OF PAVEMENT MARKINGS	500 LF
TYPE 2 BARRICADES	1 EA
TYPE 3 BARRICADES	1 EA
DELINEATOR DRUMS	15 EA
TUBULAR MARKERS	
FLEXIBLE DELINEATORS	120 LF
SEQUENCING ARROW PANEL TYPE B	210 LF
SHORT TERM 4 INCH TYPE R (WHITE SKIP)	
SHORT TERM 4 INCH TYPE R (WHITE)	
SHORT TERM 4 INCH TYPE R (YELLOW)	
SHORT TERM 4 INCH TYPE NR (WHITE SKIP)	
SHORT TERM 4 INCH TYPE NR (WHITE)	340 LF
SHORT TERM 4 INCH TYPE NR (YELLOW)	
SHORT TERM 24 INCH TYPE R (WHITE)	
SHORT TERM 24 INCH TYPE NR (WHITE)	300 LF
SAFETY FENCE	

MANDAN MAIN STREET
 STATION 79+00 TO 86+00
 FILE:
 TCP1A-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	135



KEY

- 4 SIGN
- DELINEATOR DRUM
- ◐ TUBULAR MARKER
- ▣ FLEXIBLE DELINEATOR
- ▤ TYPE 3 - BARRICADE
- ▥ TYPE 2 - BARRICADE
- ▧ ATTENUATION DEVICE
- ▨ SEQUENCING ARROW PANEL
- ▩ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPH) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPH) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPH (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAYMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

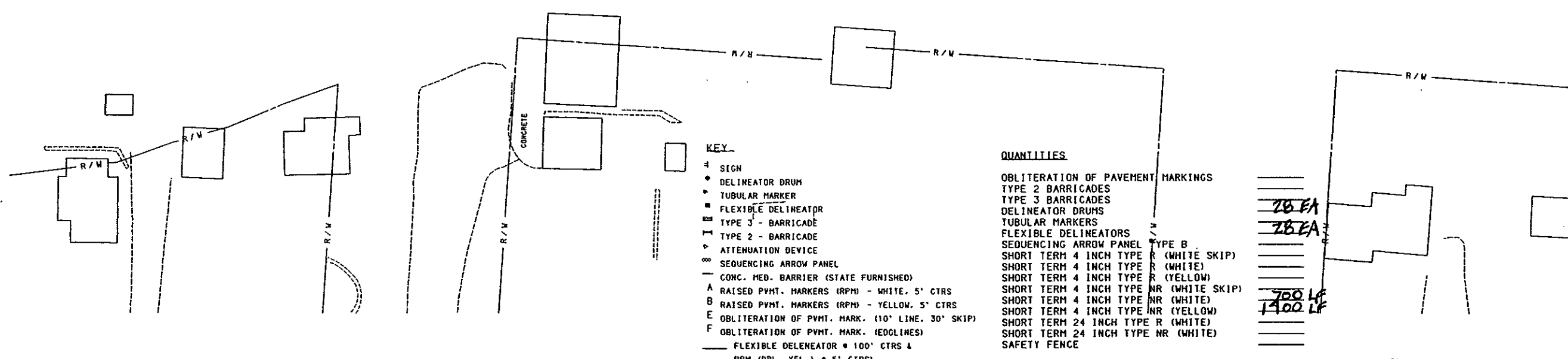
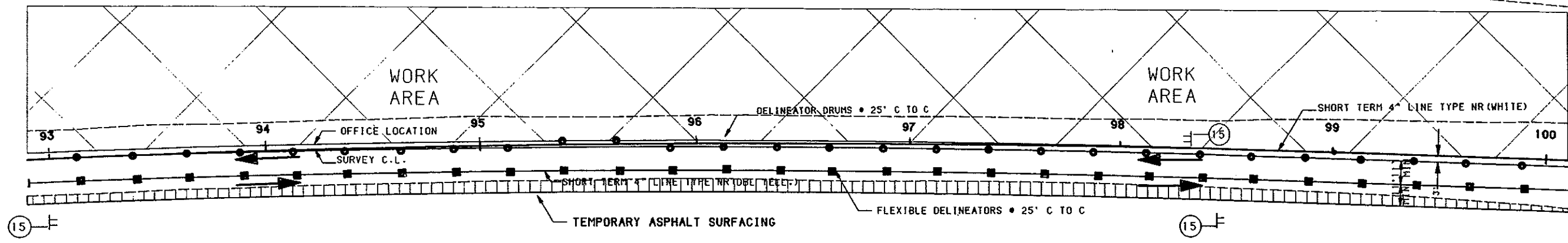
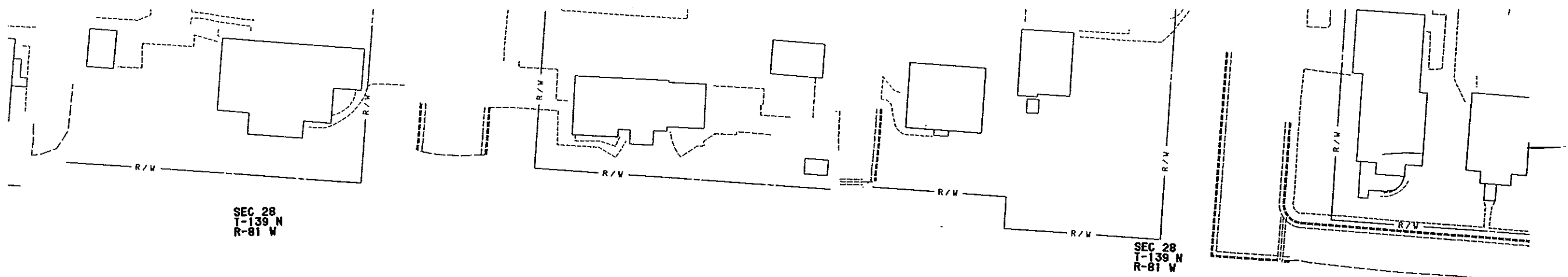
31 EA
37 EA
160 LF
320 LF
580 LF
1260 LF

ARC DEFINITION
 D = 5' 59" 58" RT
 R = 0' 42"
 T = 8185.11'
 L = 857.07'

MANDAN MAIN STREET
 STATION 86+00 TO 93+00
 FILE
 TCP1A-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (Q35) 915	136



- KEY**
- 4 SIGN
 - DELINATOR DRUM
 - TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - TYPE 3 - BARRICADE
 - TYPE 2 - BARRICADE
 - ATTENUATION DEVICE
 - 8 SEQUENCING ARROW PANEL
 - CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PYMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

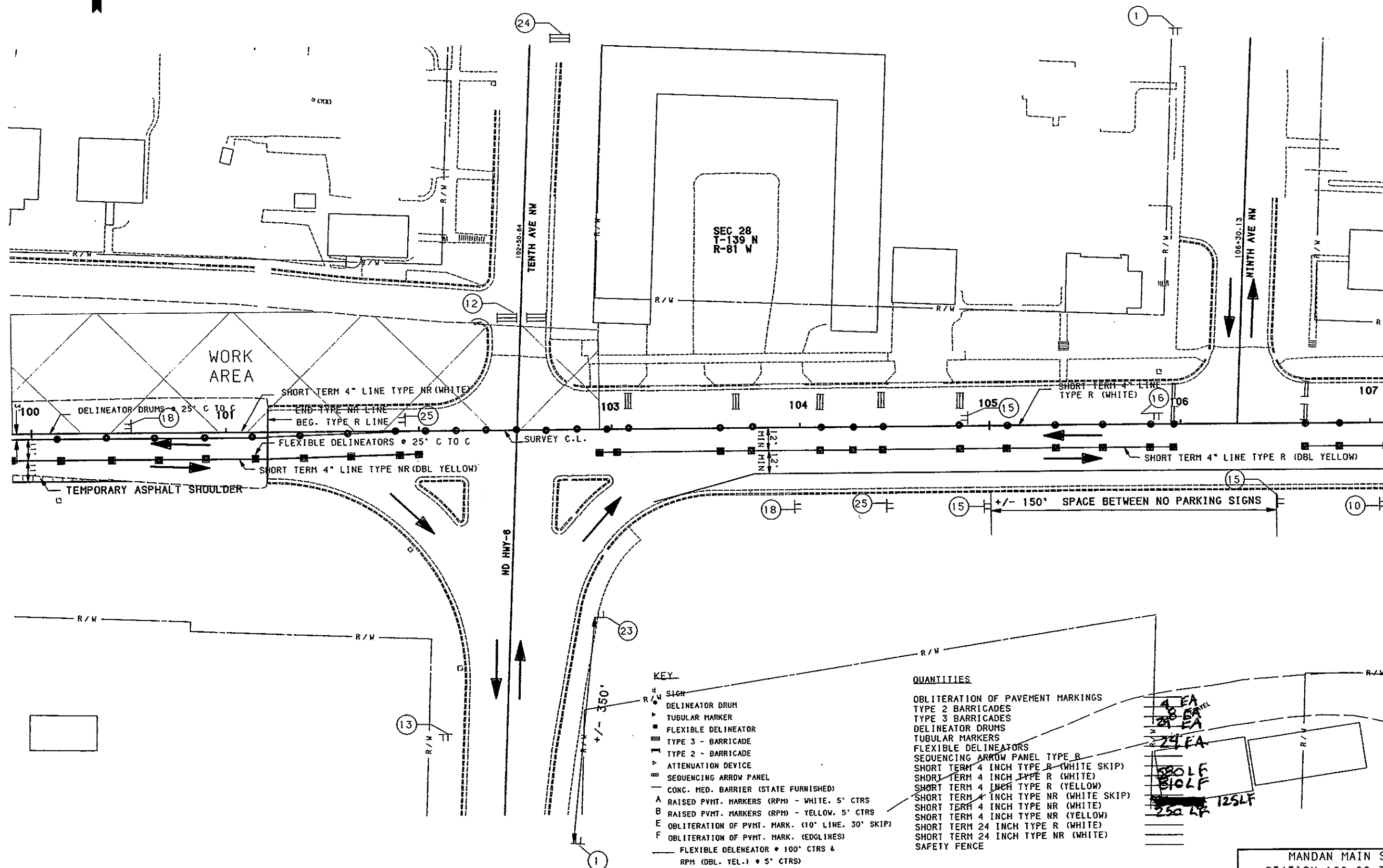
- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

28 EA
28 EA
700 LF
1400 LF

MANDAN MAIN STREET
STATION 93+00 TO 100+00

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	37



KEY

- SIGN
- DELINEATOR DRUM
- ▬ TUBULAR MARKER
- ▬ FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

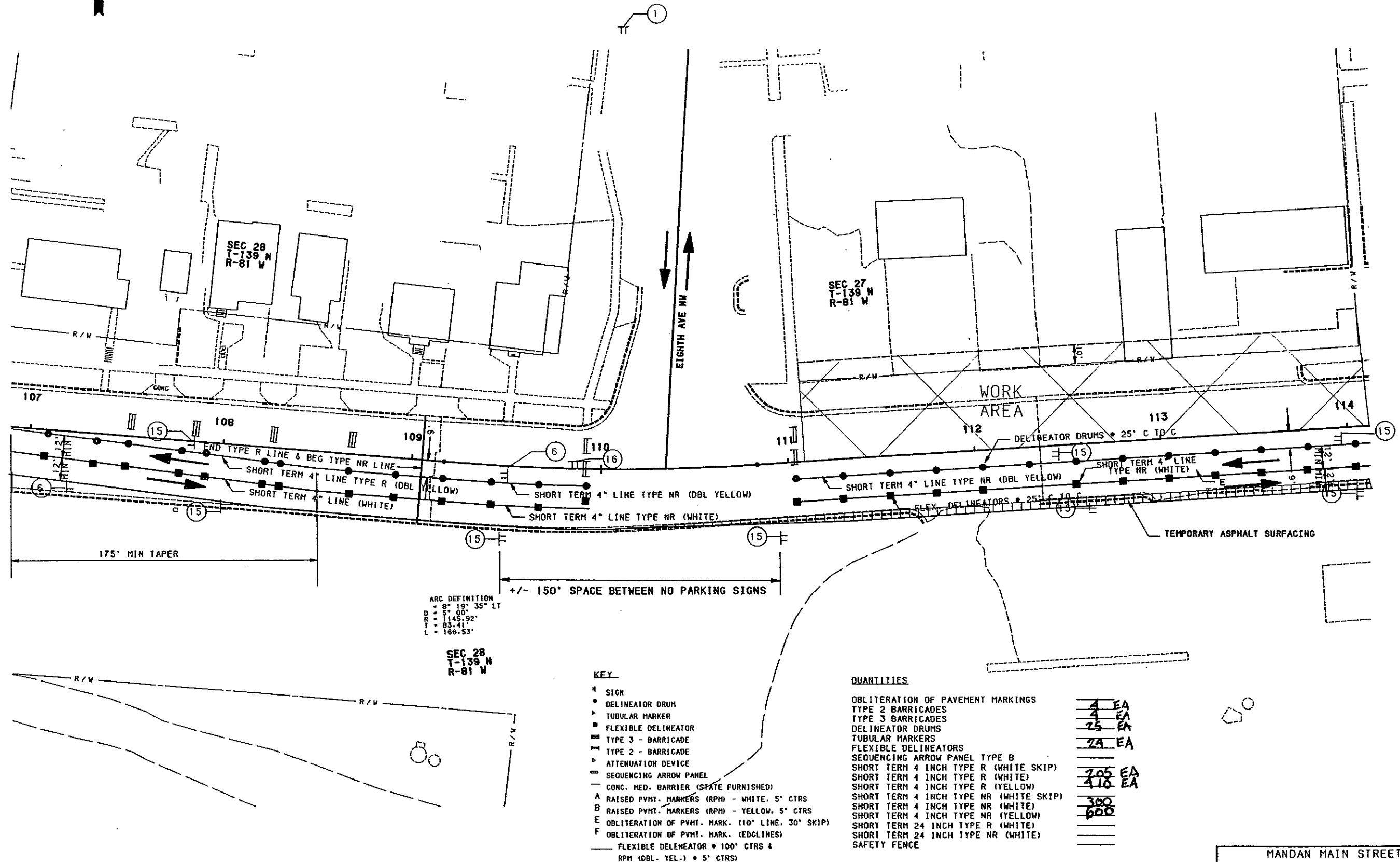
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

4 EA
8 EA
24 EA
24 EA
50 LF
50 LF
250 LF 125 LF

MANDAN MAIN STREET
STATION 100+00 TO 107+00
FILE:
TCP1A-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	138



ARC DEFINITION
 Δ = 8° 19' 35" LT
 D = 5' 00"
 R = 145.92'
 L = 83.41'
 L = 166.53'

SEC 28
 T-139 N
 R-81 W

KEY

- 4 SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- ▣ FLEXIBLE DELINEATOR
- ▤ TYPE 3 - BARRICADE
- ▥ TYPE 2 - BARRICADE
- ▧ ATTENUATION DEVICE
- ▨ SEQUENCING ARROW PANEL
- ▩ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5" CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5" CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

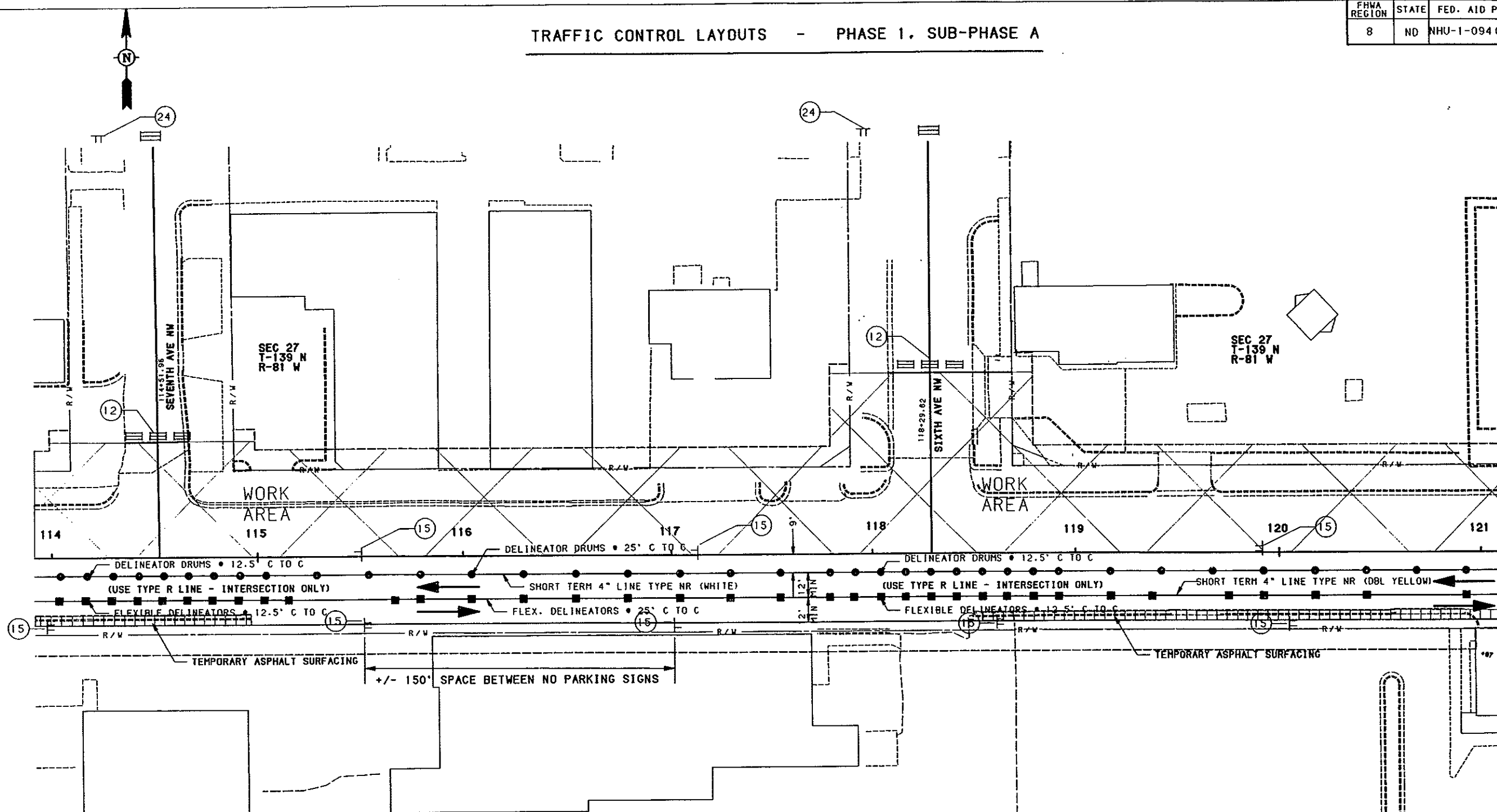
QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES 4 EA
- TYPE 3 BARRICADES 4 EA
- DELINEATOR DRUMS 25 EA
- TUBULAR MARKERS 24 EA
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP) 205 EA
- SHORT TERM 4 INCH TYPE R (WHITE) 410 EA
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP) 300
- SHORT TERM 4 INCH TYPE NR (WHITE) 600
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

MANDAN MAIN STREET
 STATION 107+00 TO 114+00
 FILE: TCP1A-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	139



KEY

- ▲ SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONG. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

QUANTITIES

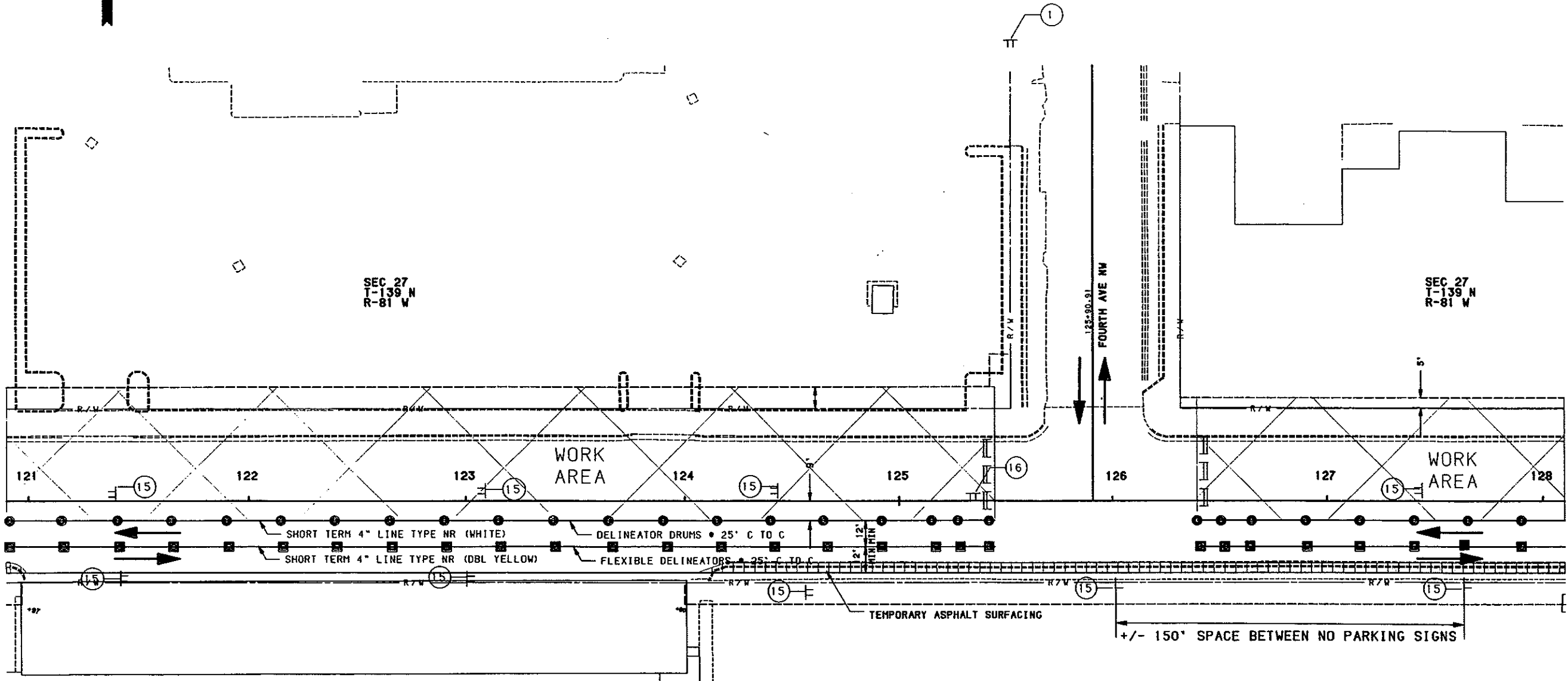
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

8
 37
 36
 170 LF
 340 LF
 530 LF
 1060 LF

MANDAN MAIN STREET
 STATION 114+00 TO 121+00
 FILE: TCP1A-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	40

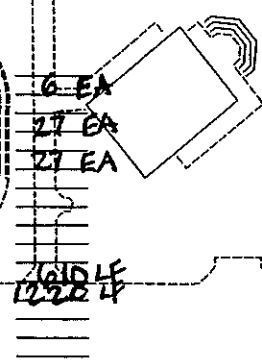


KEY

- 4 SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- ▣ FLEXIBLE DELINEATOR
- ▢ TYPE 3 - BARRICADE
- ▤ TYPE 2 - BARRICADE
- ▥ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

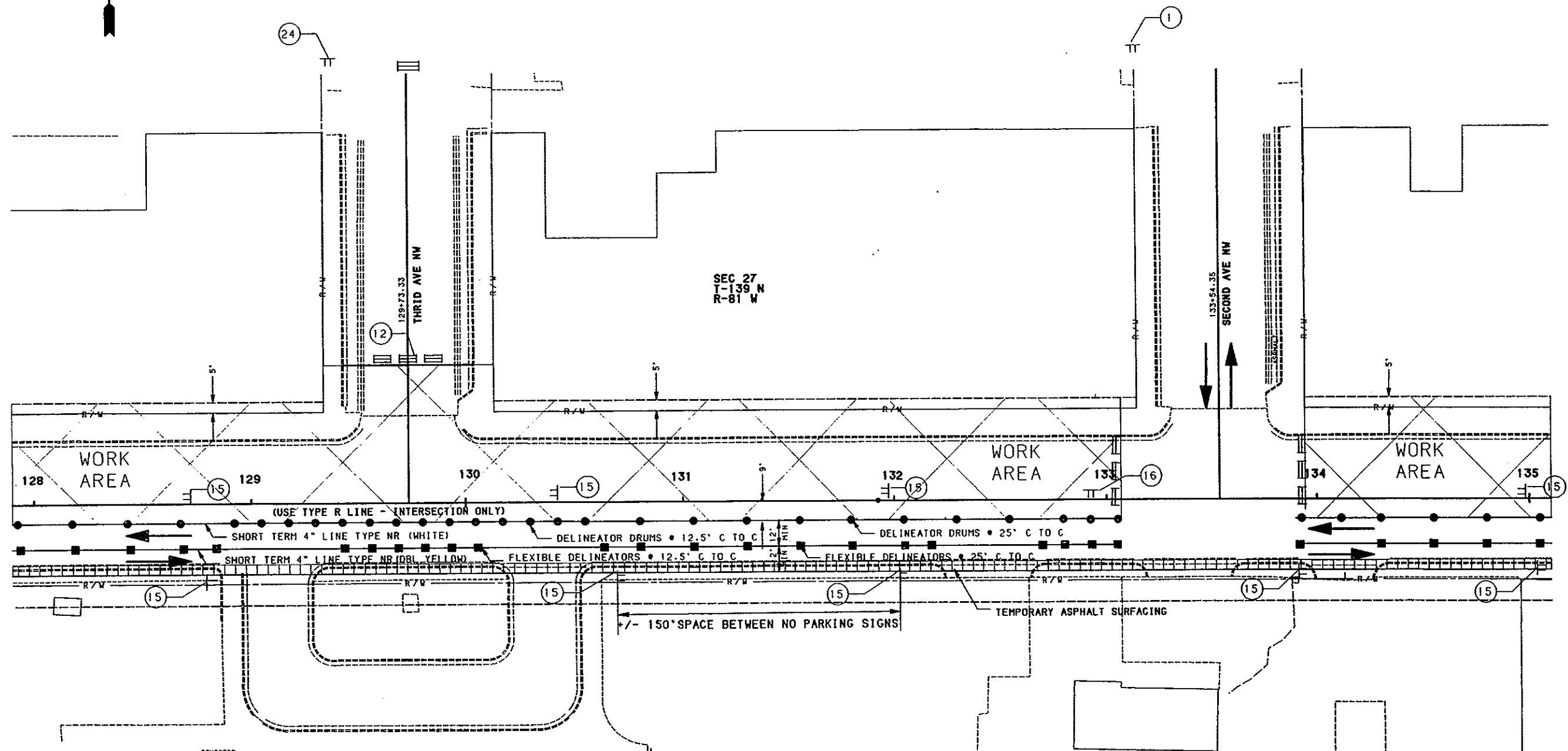
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE



MANDAN MAIN STREET
STATION 121+00 TO 128+00
FILE: TCP1A-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	141



KEY

- SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▣ TYPE 3 - BARRICADE
- ▢ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- ▲ RAISED PVMT. MARKERS (RPM) - WHITE, 5" CTRS
- RAISED PVMT. MARKERS (RPM) - YELLOW, 5" CTRS
- OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5" CTRS

QUANTITIES

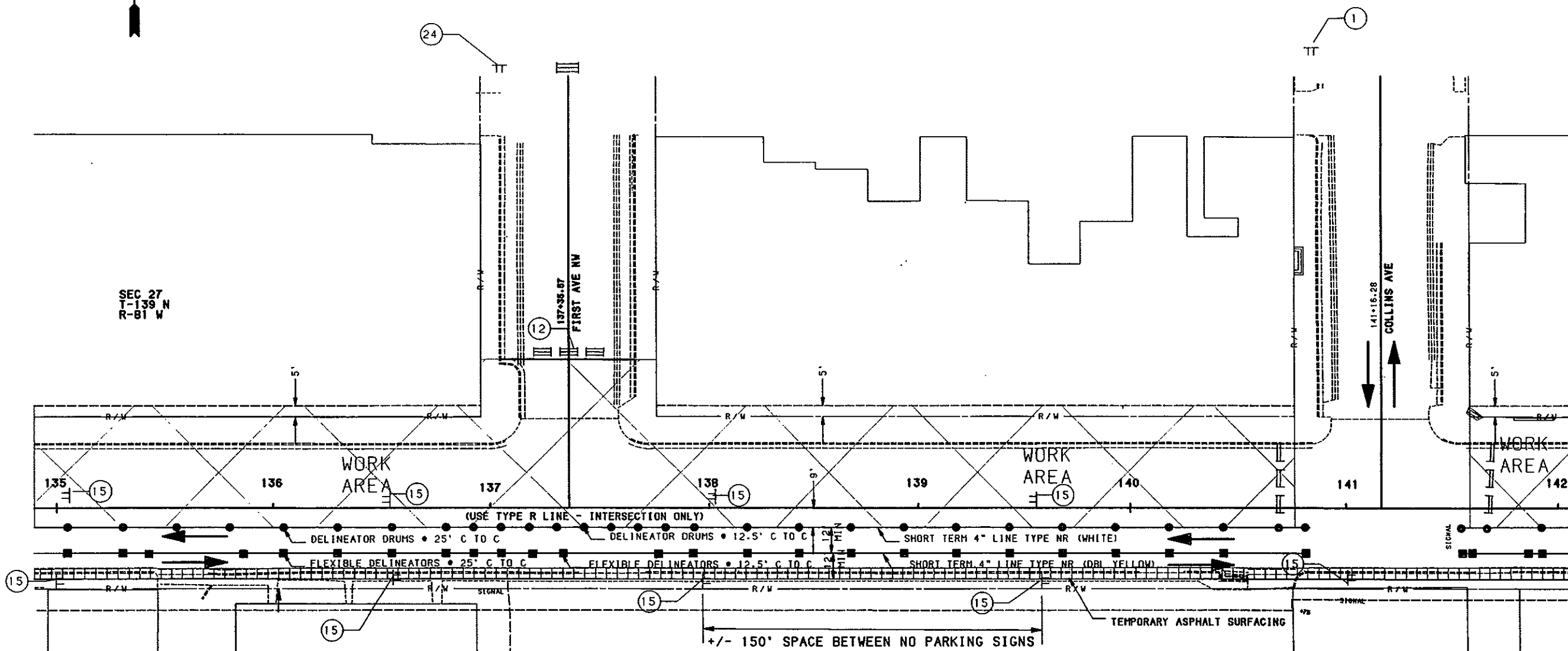
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

6 FA
 30 FA
 27 FA
 85 LF
 170 LF
 530 LF
 1060 LF

MANDAN MAIN STREET
 STATION 128+00 TO 135+00
 FILE: TCP1A-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	142



KEY

- ⚡ SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▶ ATTENUATION DEVICE
- ⊞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

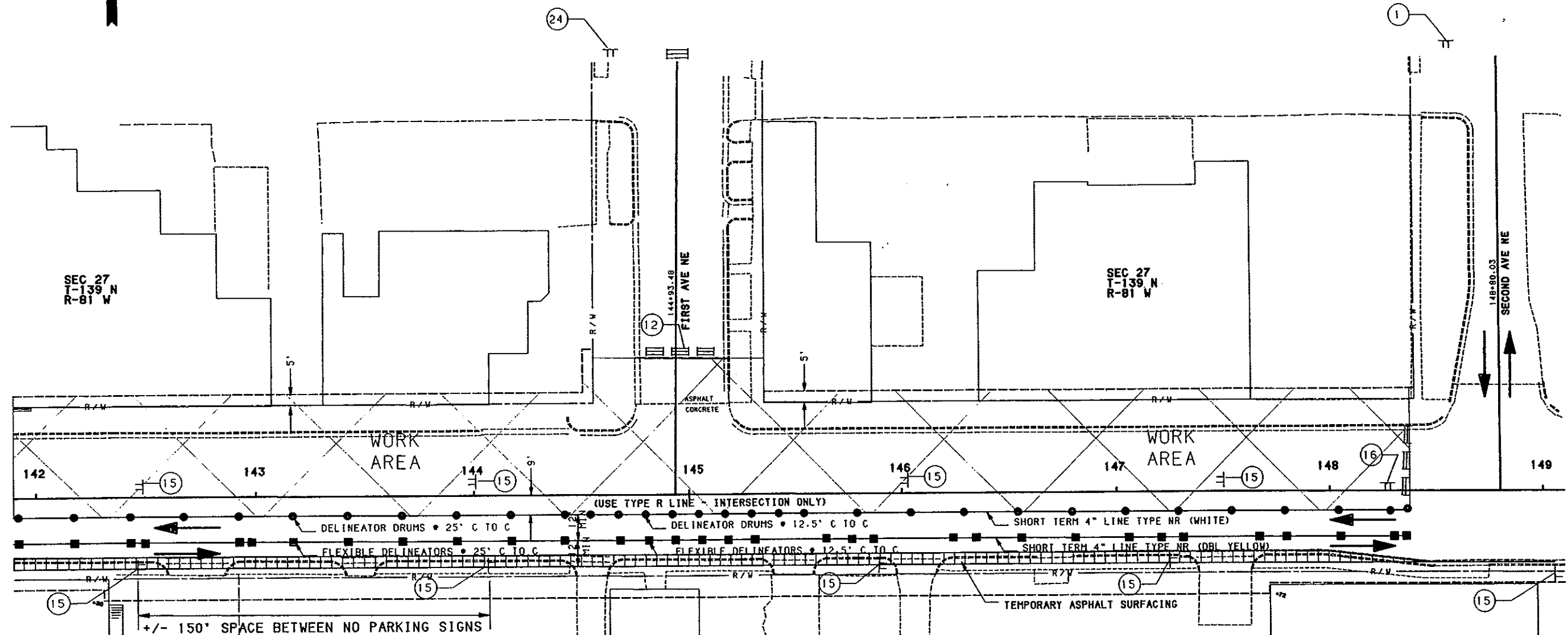
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

62 BA
 37 BA
 24 BA
 70 LF
 190 LF
 560 LF
 1720 LF

MANDAN MAIN STREET
 STATION 135+00 TO 142+00
 FILE: TCPIA-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	143



KEY

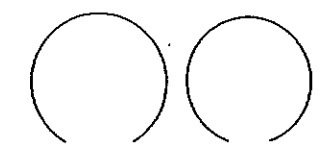
- ⊠ SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

3	EA
3	EA
31	EA
33	EA
85	LF
170	LF
555	LF
1110	LF

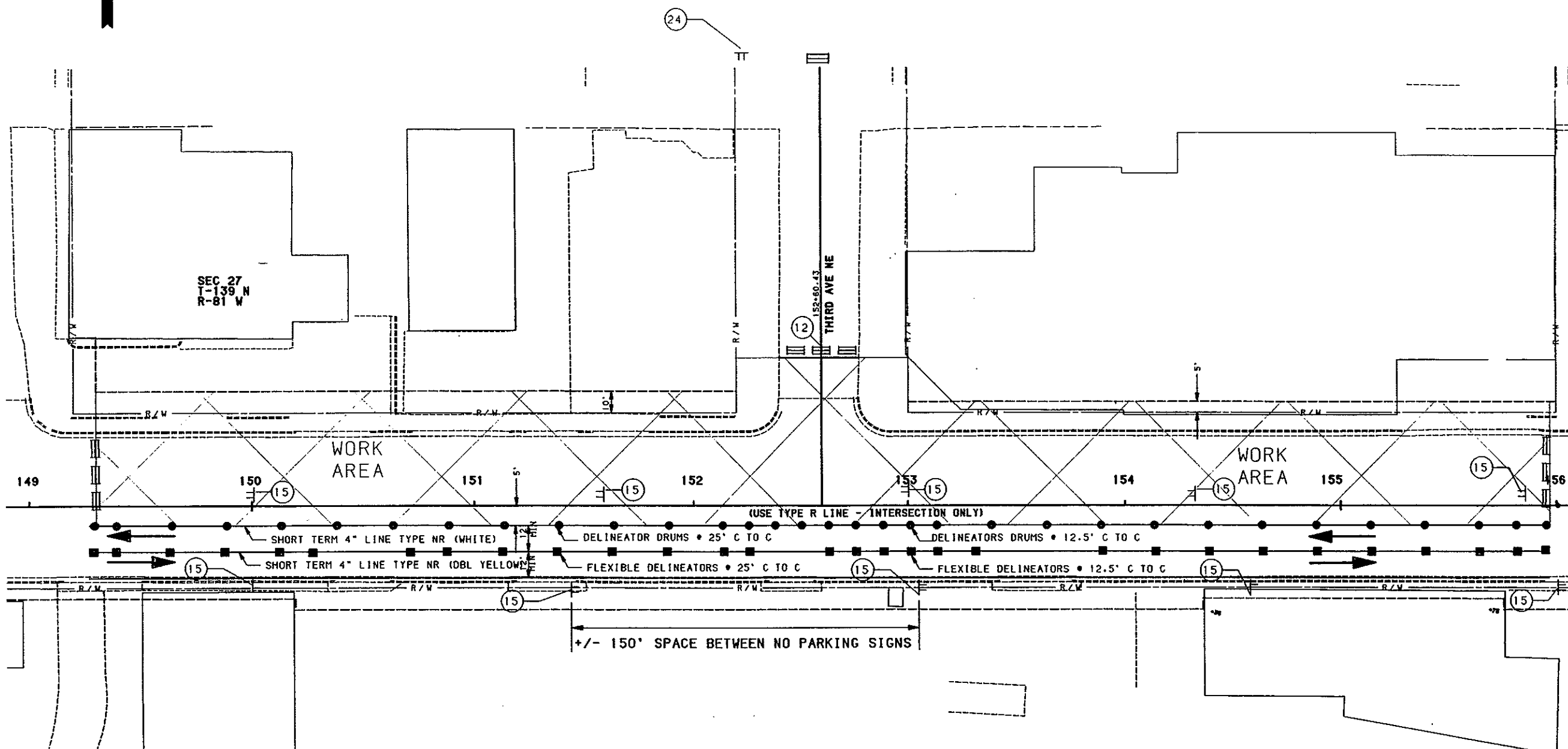
DIRT



MANDAN MAIN STREET
STATION 142+00 TO 149+00
FILE: TCP1A-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1. SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	144



KEY

- 4 SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

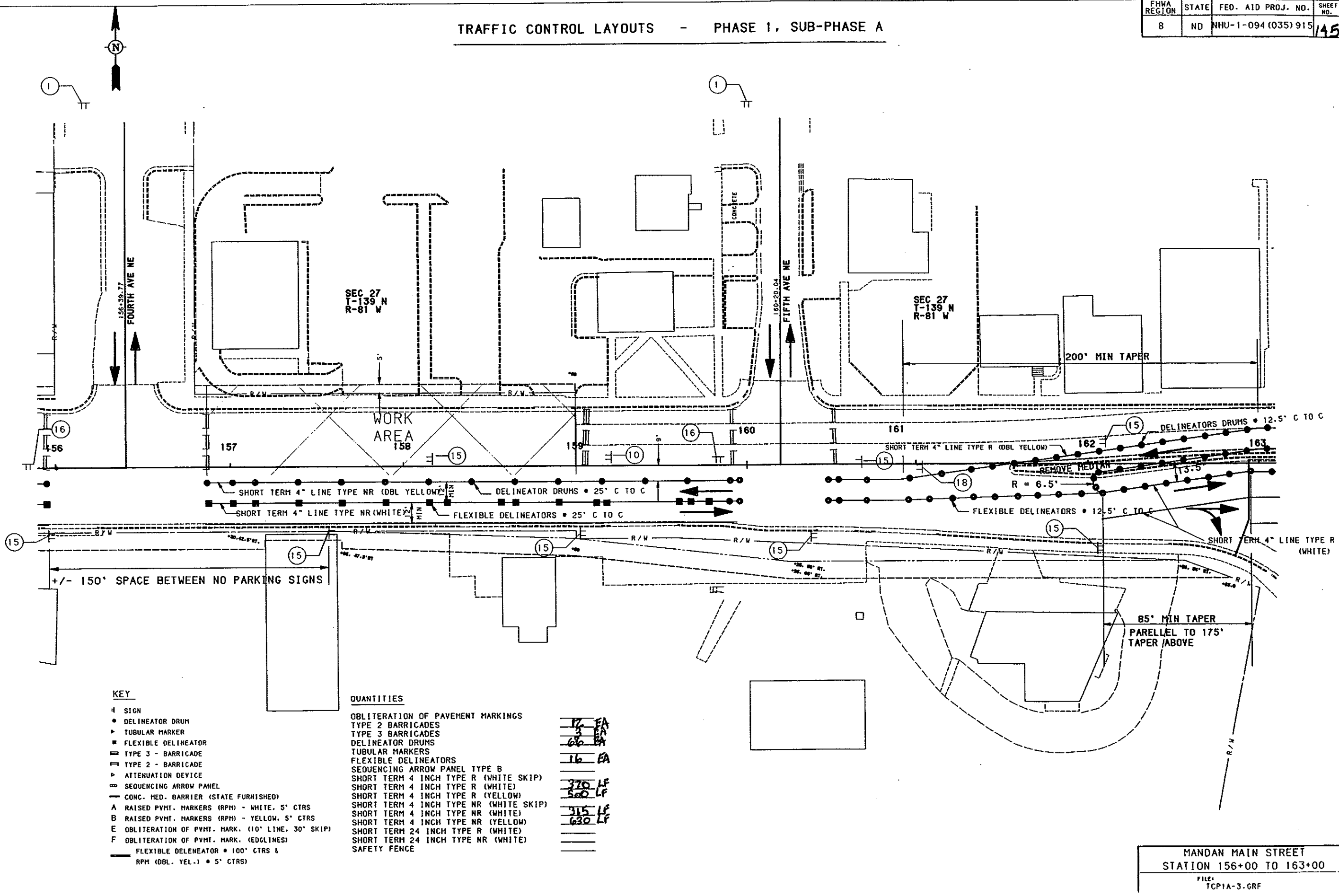
3	EA
3	EA
3	EA
30	EA
90	LF
100	LF
385	LF
1170	LF

DIRT/GRAVEL PILES

MANDAN MAIN STREET
STATION 149+00 TO 156+00
FILE: TCP1A-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	145



- KEY**
- ⊕ SIGN
 - DELINEATOR DRUM
 - ▴ TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - ▣ TYPE 3 - BARRICADE
 - ▢ TYPE 2 - BARRICADE
 - ▷ ATTENUATION DEVICE
 - ▭ SEQUENCING ARROW PANEL
 - CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

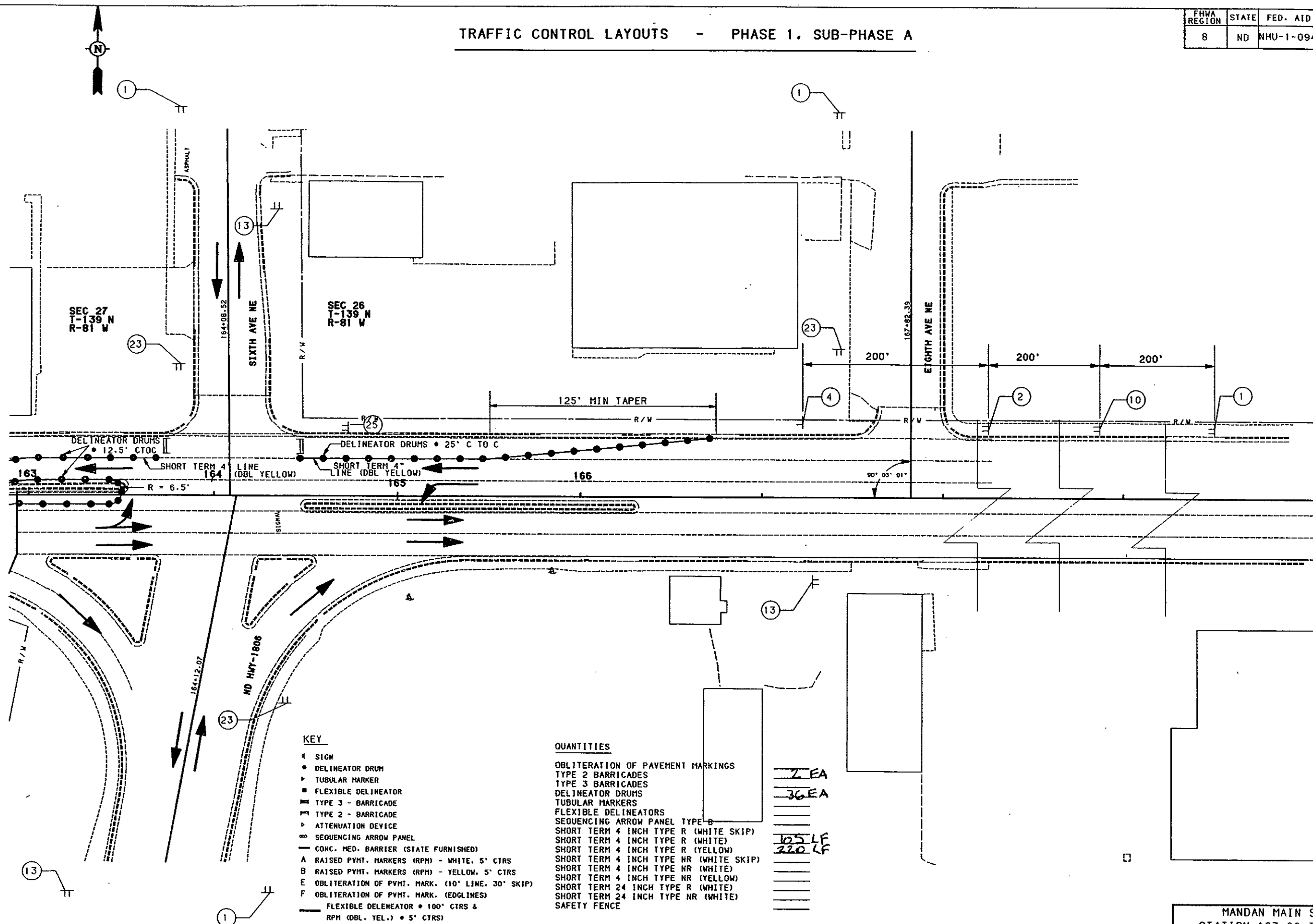
- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

12	EA
3	EA
66	EA
16	EA
370	LF
500	LF
315	LF
630	LF

MANDAN MAIN STREET
STATION 156+00 TO 163+00
FILE: TCP1A-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1. SUB-PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	196



KEY

- 1 SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- ▬ FLEXIBLE DELENEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

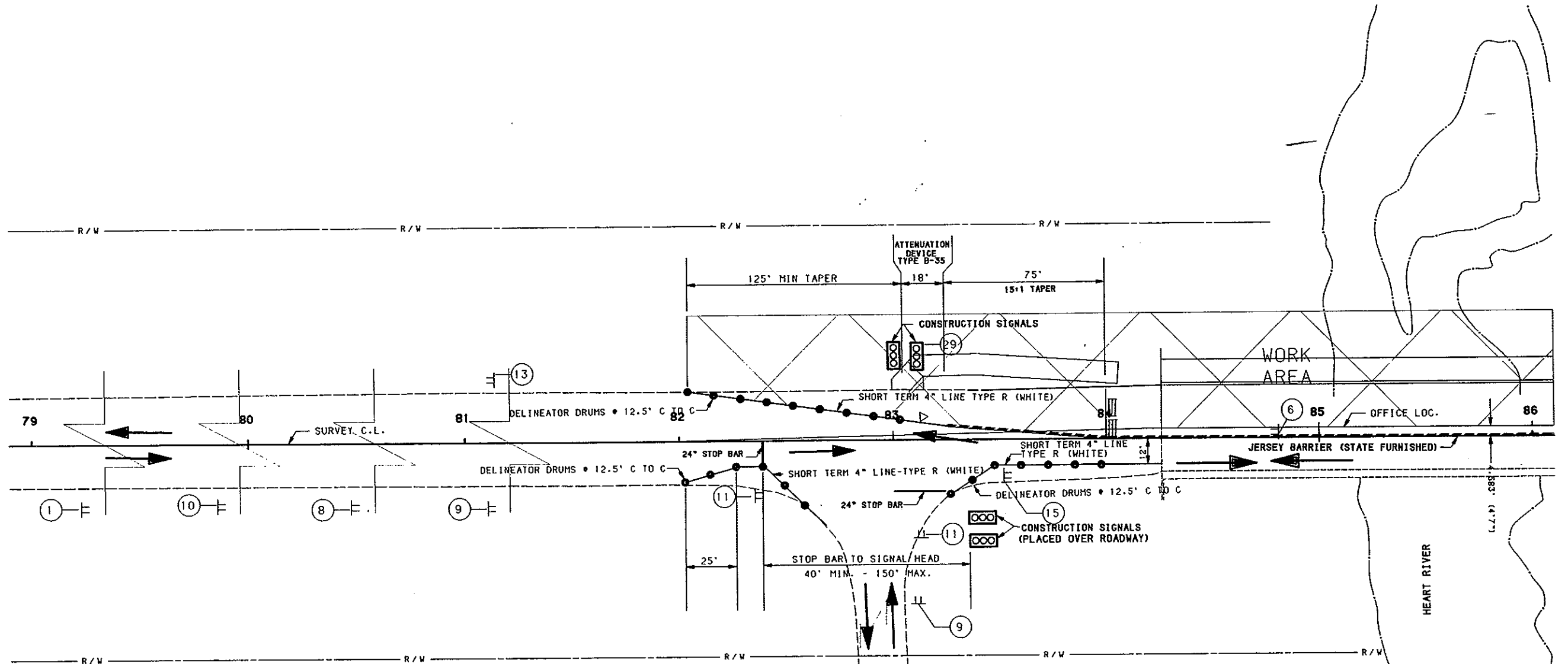
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE-B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

2 EA
 36 EA
 105 LF
 220 LF

MANDAN MAIN STREET
 STATION 163+00 TO 169+00
 FILE:
 TCP1A-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

NOTE: SEE STD DRAWING D-704-16 FOR SIGN SPACING AT A TYPICAL CONSTRUCTION SIGNAL LAYOUT.



- KEY**
- 4 SIGN
 - DELINEATOR DRUM
 - ▴ TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - ▭ TYPE 3 - BARRICADE
 - ▭ TYPE 2 - BARRICADE
 - ▴ ATTENUATION DEVICE
 - ▭ SEQUENCING ARROW PANEL
 - ▭ CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

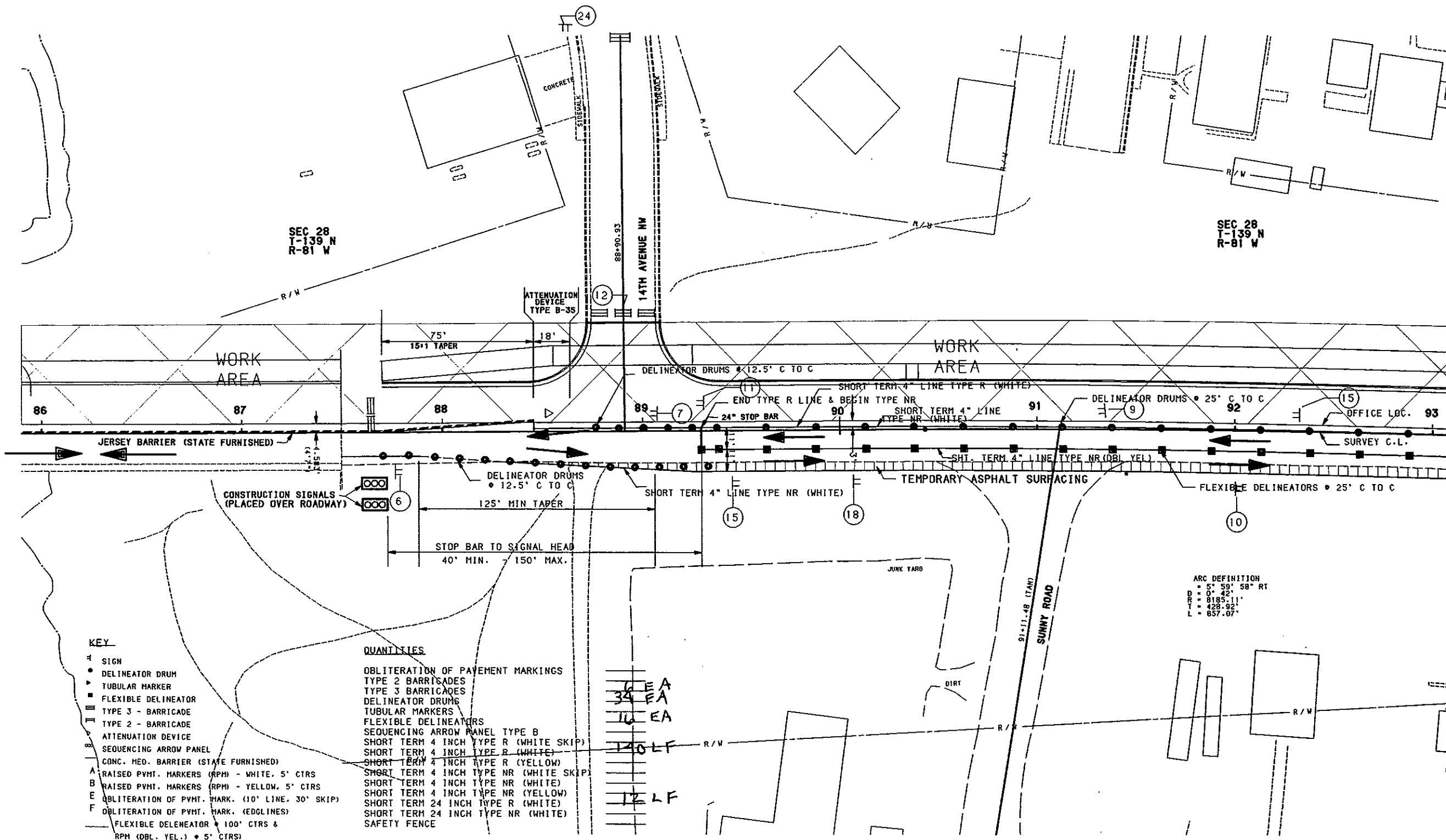
2 EA
27 EA
245 LF
36 LF



TRAFFIC CONTROL LAYOUTS - PHASE I, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	48

NOTE: SEE STD DRAWING D-704-16 FOR SIGN SPACING AT A TYPICAL CONSTRUCTION SIGNAL LAYOUT.



KEY

- △ SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- ▬ FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- ▬ FLEXIBLE DELINEATOR 100' CTRS & RPM (DBL. YEL.) 5' CTRS

QUANTITIES

- OBLITERATION OF PAYEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

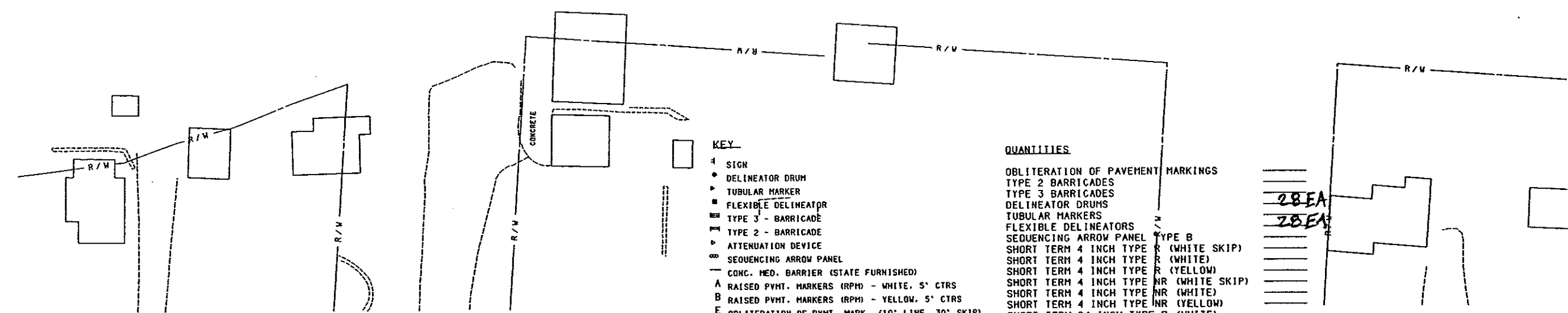
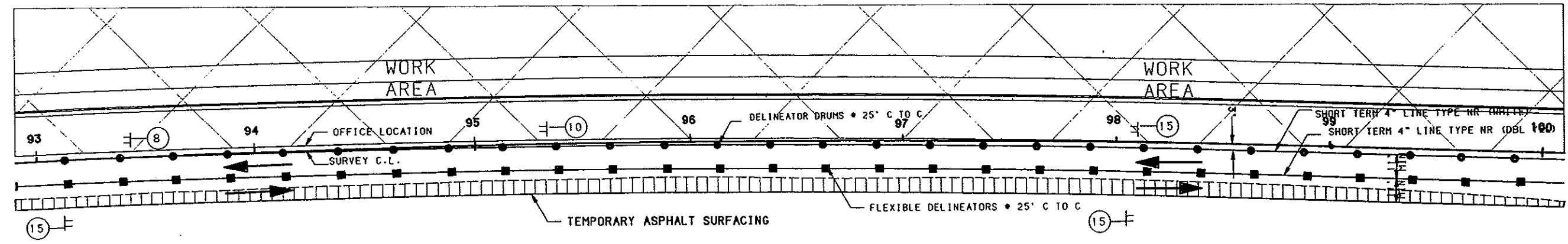
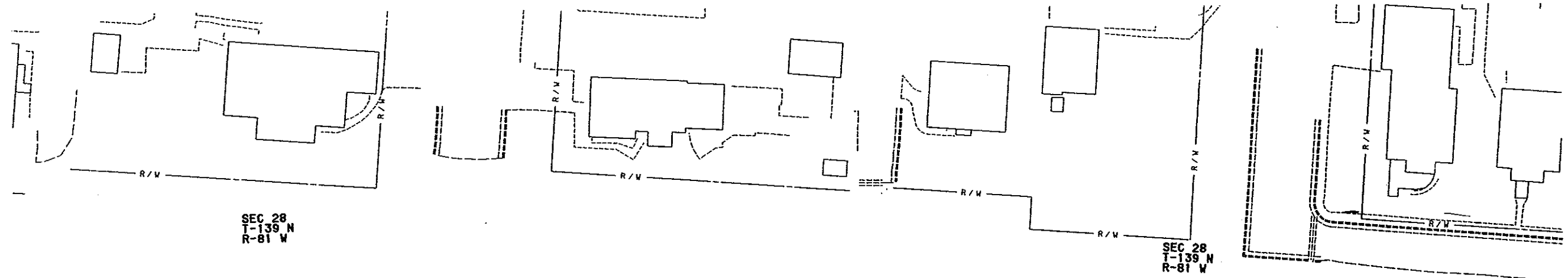
6	EA
34	EA
10	EA
140	LF
12	LF

ARC DEFINITION
 D = 50' 58" RT
 L = 8185.11'
 L = 428.92'
 L = 657.07'

MANDAN MAIN STREET
 STATION 86+00 TO 93+00
 FILE:
 TCP1B-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

NOTE: SEE STD DRAWING D-704-16 FOR SIGN SPACING AT A TYPICAL CONSTRUCTION SIGNAL LAYOUT.

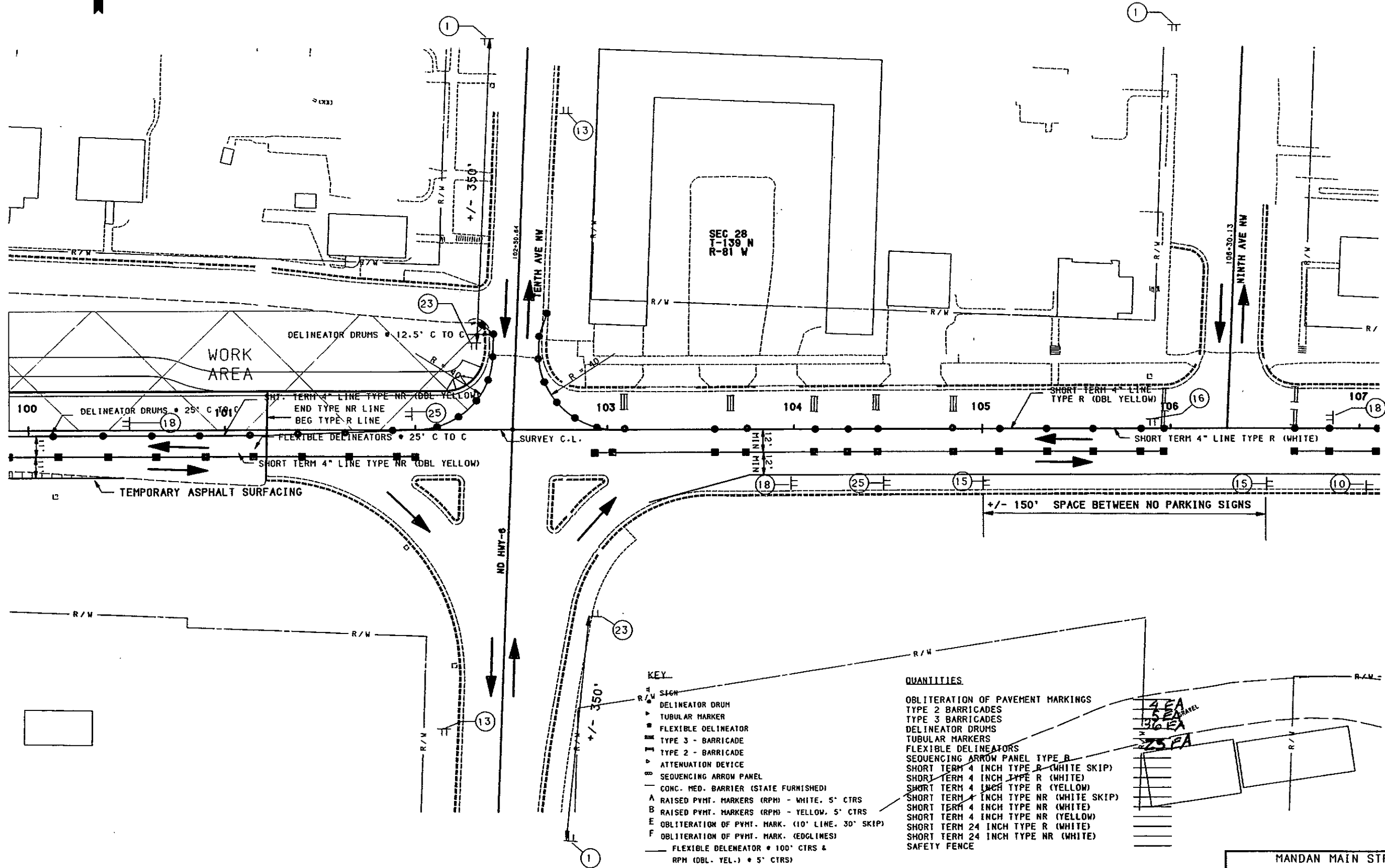


- KEY**
- 4 SIGN
 - DELINEATOR DRUM
 - ◼ TUBULAR MARKER
 - ▬ FLEXIBLE DELINEATOR
 - TYPE 3 - BARRICADE
 - ▬ TYPE 2 - BARRICADE
 - ▶ ATTENUATION DEVICE
 - 8 SEQUENCING ARROW PANEL
 - CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVHT. MARKERS (RPH) - WHITE, 5' CTRS
 - B RAISED PVHT. MARKERS (RPH) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVHT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVHT. MARK. (EDGLINES)
 - FLEXIBLE DELENEATOR • 100' CTRS & RPH (DBL. YEL.) • 5' CTRS
- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

28EA
28EA

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	150



KEY

- SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- TYPE 3 - BARRICADE
- TYPE 2 - BARRICADE
- ATTENUATION DEVICE
- SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

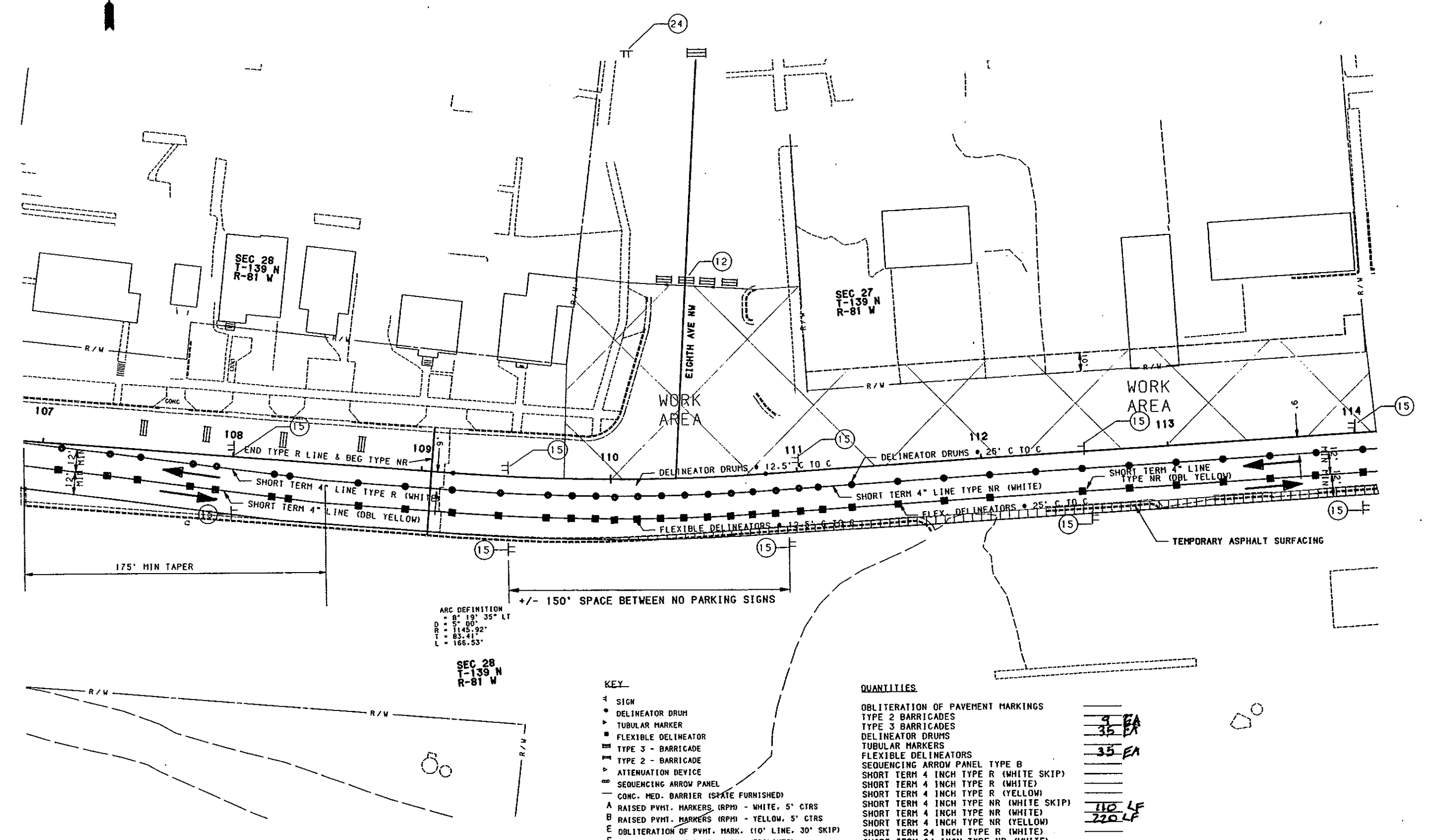
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

4 EA
130 EA
225 PA

MANDAN MAIN STREET
STATION 100+00 TO 107+00
FILE: TCP1B-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	51



ARC DEFINITION
 = 8° 19' 35" LT
 D = 5' 00"
 R = 1145.92'
 T = 85.41'
 L = 166.53'

SEC 28
 T-139 N
 R-81 W

KEY

- ▲ SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (SPATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS • RPM (DBL. YEL.) • 5' CTRS

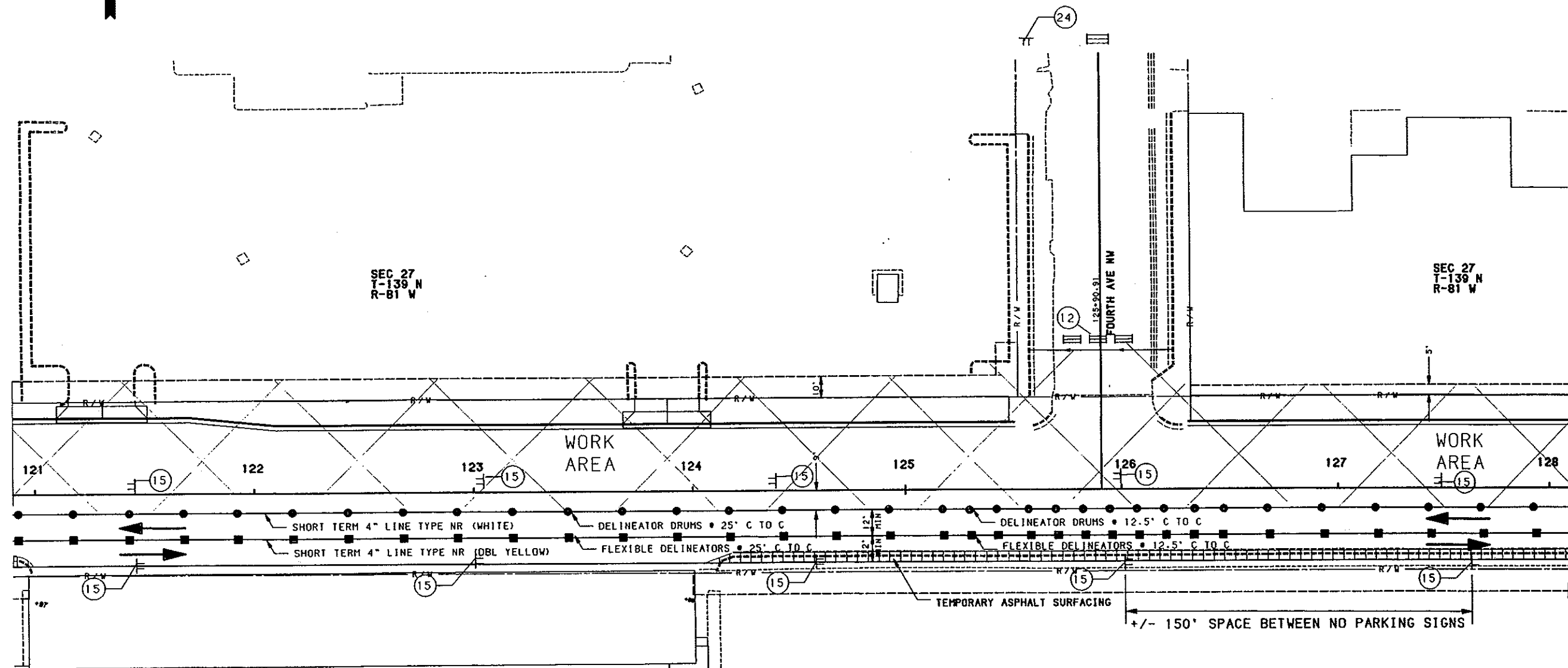
QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE
- Handwritten quantities:
- 9 EA
 - 35 EA
 - 35 EA
 - 110 LF
 - 220 LF

MANDAN MAIN STREET
 STATION 107+00 TO 114+00
 FILE: TCPIR-1.GPJ

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	153

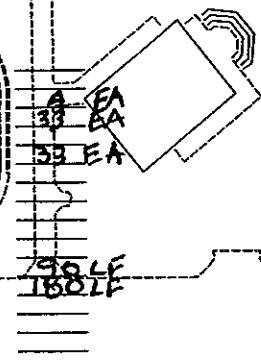


KEY

- ◆ SIGN
- DELINEATOR DRUM
- ▶ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▣ TYPE 3 - BARRICADE
- ▢ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

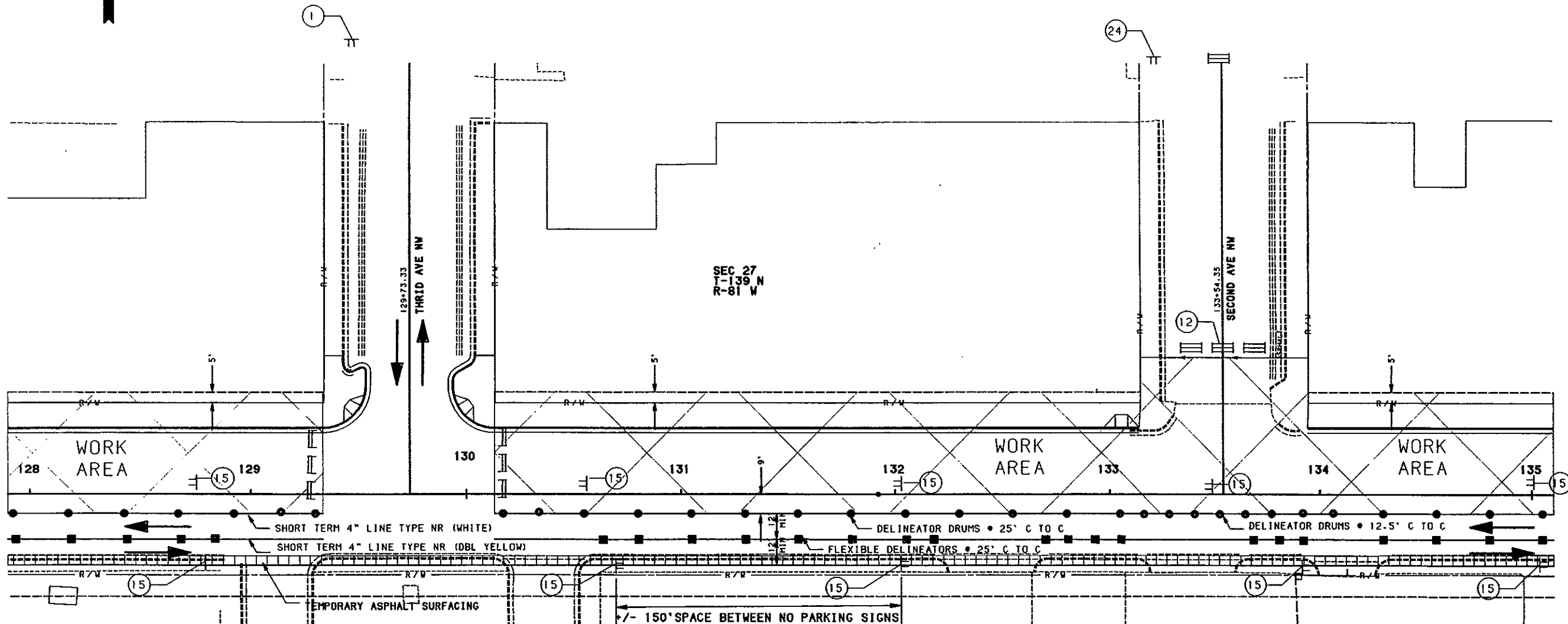
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE



MANDAN MAIN STREET
STATION 121+00 TO 128+00
FILE: TCP18-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	154



KEY

- SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▣ TYPE 3 - BARRICADE
- ▤ TYPE 2 - BARRICADE
- ▥ ATTENUATION DEVICE
- ▧ SEQUENCING ARROW PANEL
- CONG. MED. BARRIER (STATE FURNISHED)
- A RAISED PVHT. MARKERS (RPH) - WHITE, 5' CTRS
- B RAISED PVHT. MARKERS (RPH) - YELLOW, 5' CTRS
- E OBLITERATION OF PVHT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVHT. MARK. (EDGLINES)
- FLEXIBLE DELENEATOR • 100' CTRS & RPH (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

10 EA
30 EA
22 EA

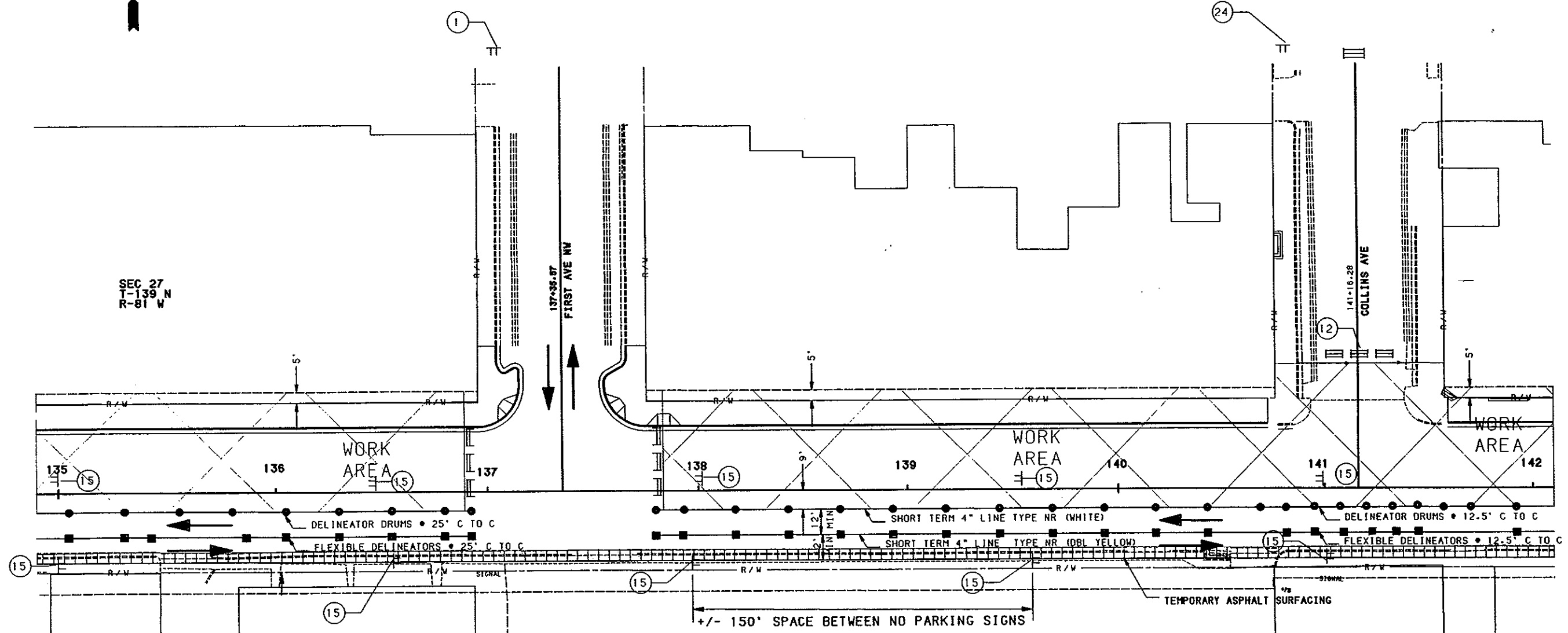
85 LF
170 LF

MANDAN MAIN STREET
STATION 128+00 TO 135+00
FILE: TCP1B-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	155

SEC 27
T-139 N
R-81 W



KEY

- 1 SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ≡ TYPE 3 - BARRICADE
- ≡ TYPE 2 - BARRICADE
- ATTENUATION DEVICE
- ⊞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVHT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVHT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVHT. MARK. (10' LINE, 30" SKIP)
- F OBLITERATION OF PVHT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

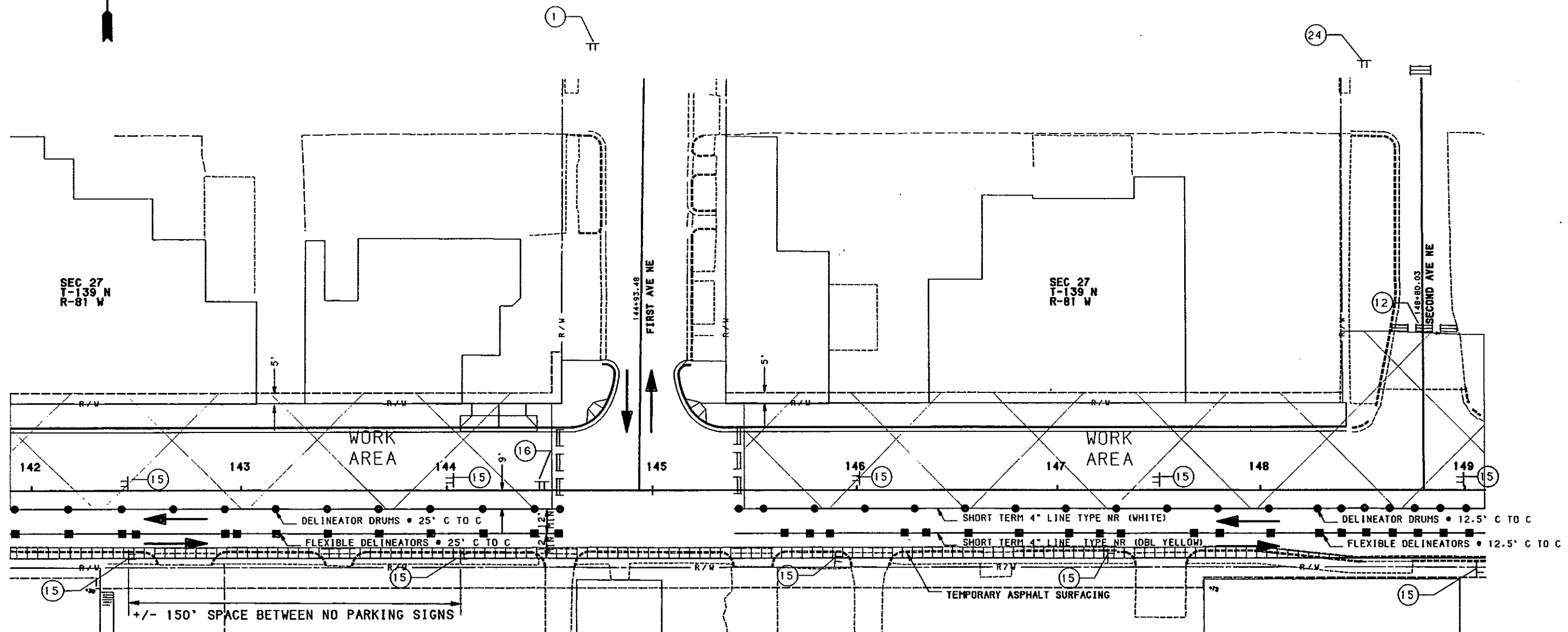
QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

8
31
28
78 LF
140 LF

MANDAN MAIN STREET
STATION 135+00 TO 142+00
FILE: TCP1B-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B



KEY

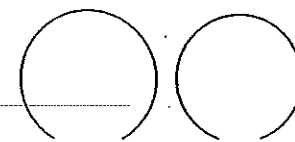
- ⊠ SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▣ TYPE 3 - BARRICADE
- ▤ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ⊞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

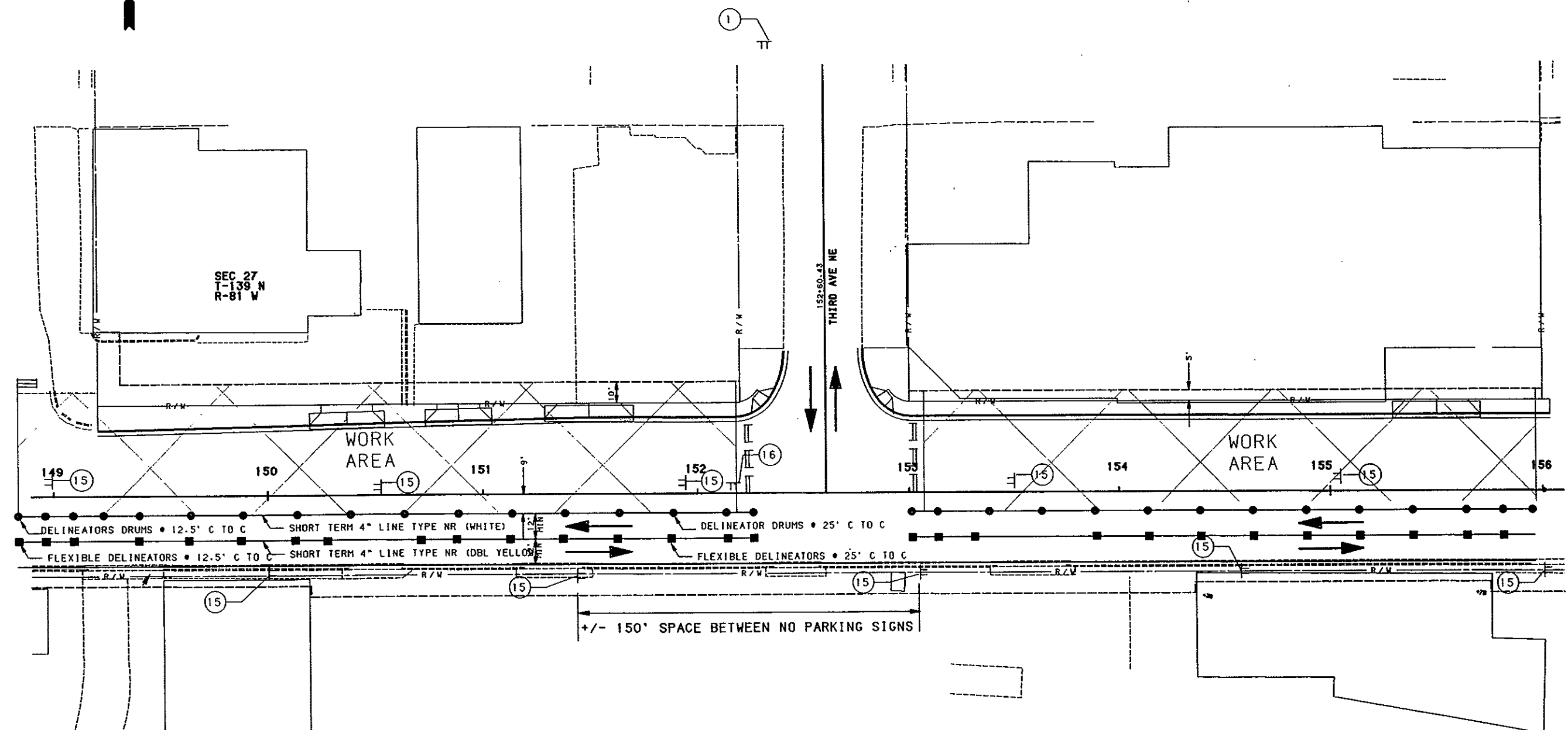
6 EA
 30 EA
 32 EA
 60 LF
 120 LF

DIST



TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	157



KEY

- 4 SIGN
- DELINEATOR DRUM
- ◐ TUBULAR MARKER
- ▬ FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- ▬ FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

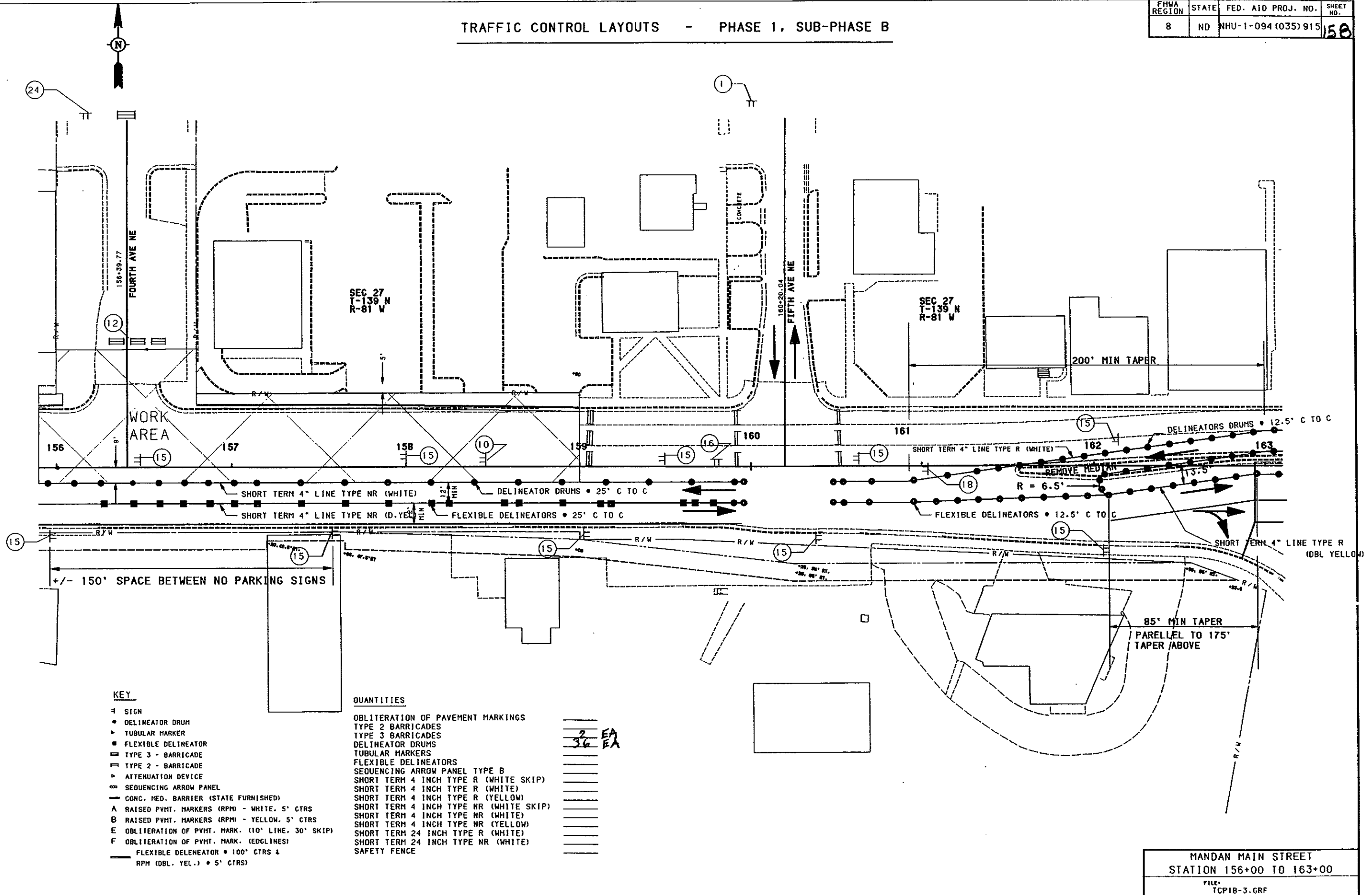
6 EA
 29 EA
 26 EA
 25 LF
 50 LF

DIRT/GRAVEL PILES

MANDAN MAIN STREET
 STATION 149+00 TO 156+00
 FILE: TCP1B-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	158



KEY

- ⊠ SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▢ TYPE 3 - BARRICADE
- ▣ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

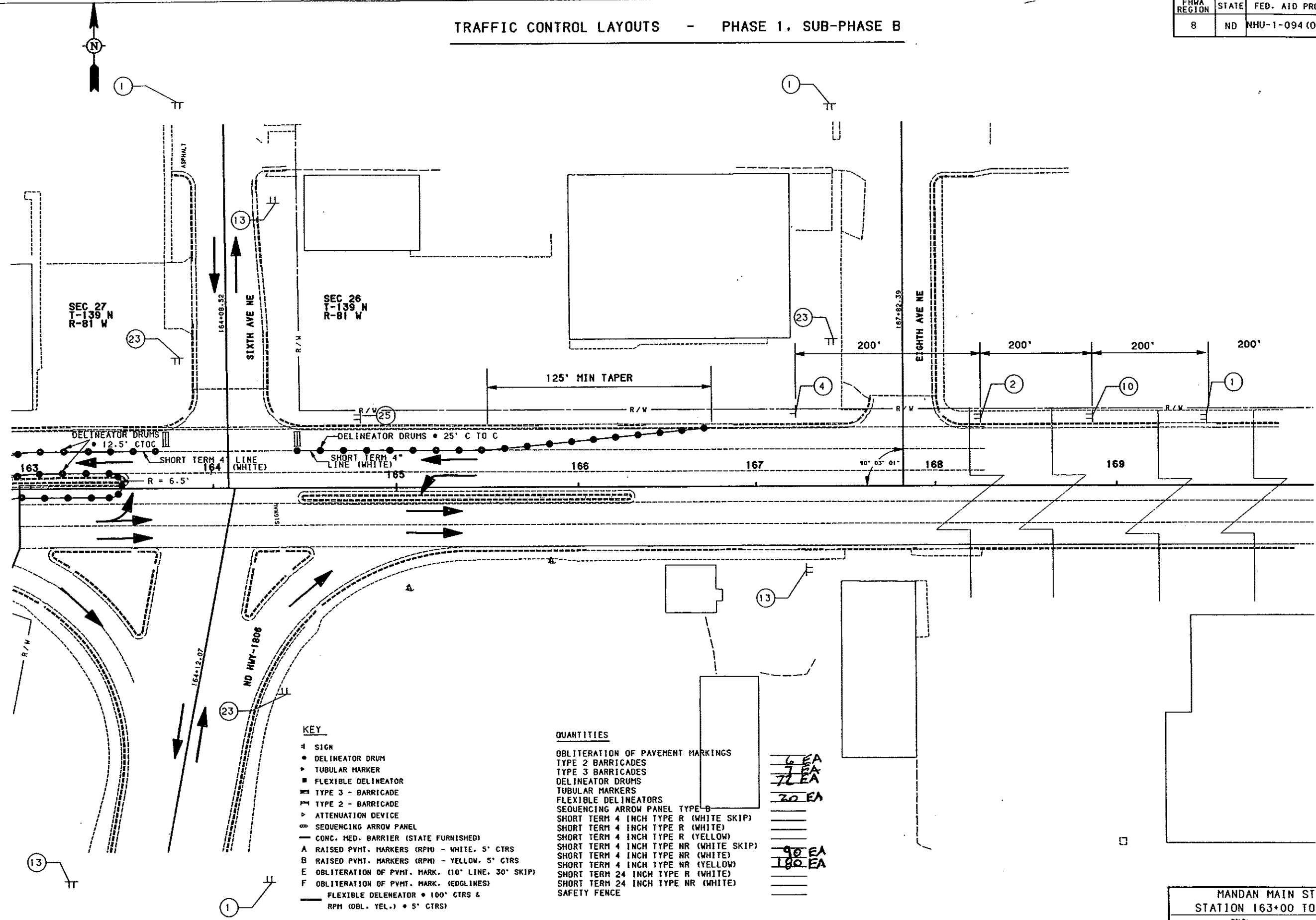
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

EA
36

MANDAN MAIN STREET
STATION 156+00 TO 163+00
FILE: TCP1B-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 1, SUB-PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	159



- 4 SIGN
- DELINEATOR DRUM
- ▬ TUBULAR MARKER
- ▬ FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- ▬ FLEXIBLE DELENEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE-B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

6 EA
 7 EA
 7 EA
 20 EA
 90 EA
 180 EA

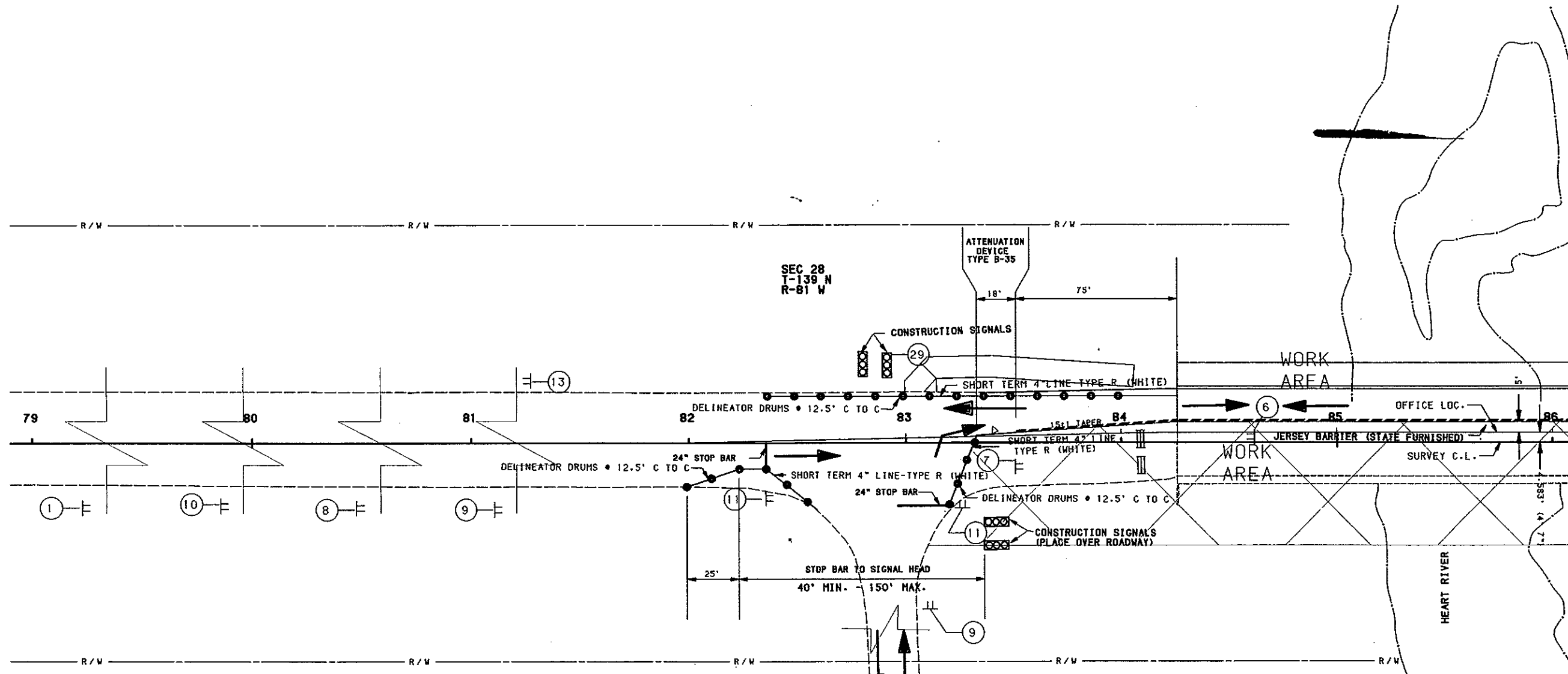
MANDAN MAIN STREET
 STATION 163+00 TO 169+00
 FILE:
 TCP1B-3.GRF



TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	160

NOTE: SEE STD DRAWING D-704-16 FOR SIGN SPACING AT A TYPICAL CONSTRUCTION SIGNAL LAYOUT.

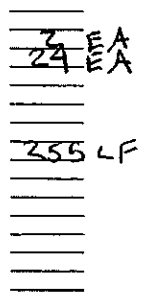


KEY

- 4 SIGN
- DELINEATOR DRUM
- ▶ TUBULAR MARKER
- ▣ FLEXIBLE DELINEATOR
- ▢ TYPE 3 - BARRICADE
- ▤ TYPE 2 - BARRICADE
- ▷ ATTENUATION DEVICE
- ∞ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVHT. MARKERS (RPH) - WHITE, 5' CTRS
- B RAISED PVHT. MARKERS (RPH) - YELLOW, 5' CTRS
- E OBLITERATION OF PVHT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVHT. MARK. (EDGLINES)
- FLEXIBLE DELENEATOR • 100' CTRS & RPH (OBL. YEL.) • 5' CTRS

QUANTITIES

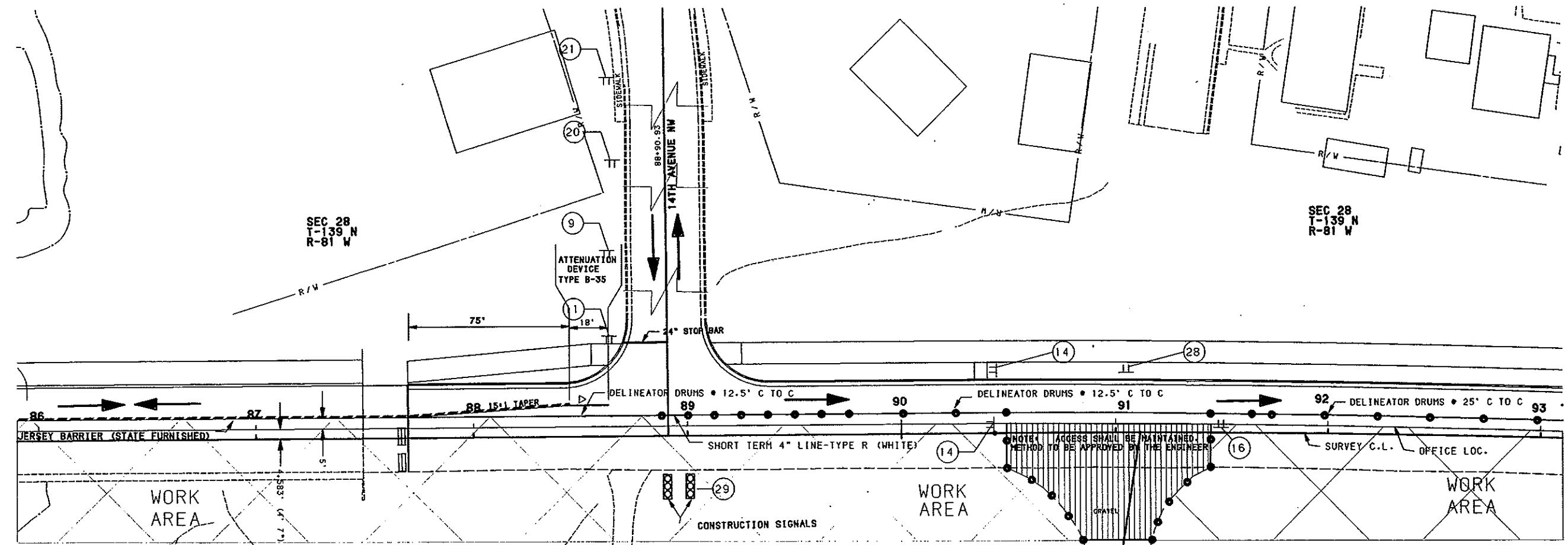
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE



MANDAN MAIN STREET STATION 79+00 TO 86+00 FILE: TCP2-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	161



- KEY**
- ▲ SIGN
 - DELINEATOR DRUM
 - ▴ TUBULAR MARKER
 - ▢ FLEXIBLE DELINEATOR
 - ▣ TYPE 3 - BARRICADE
 - ▤ TYPE 2 - BARRICADE
 - ▥ ATTENUATION DEVICE
 - ▧ SEQUENCING ARROW PANEL
 - ▨ CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

3 EA
31 EA
525 EA
17 LF

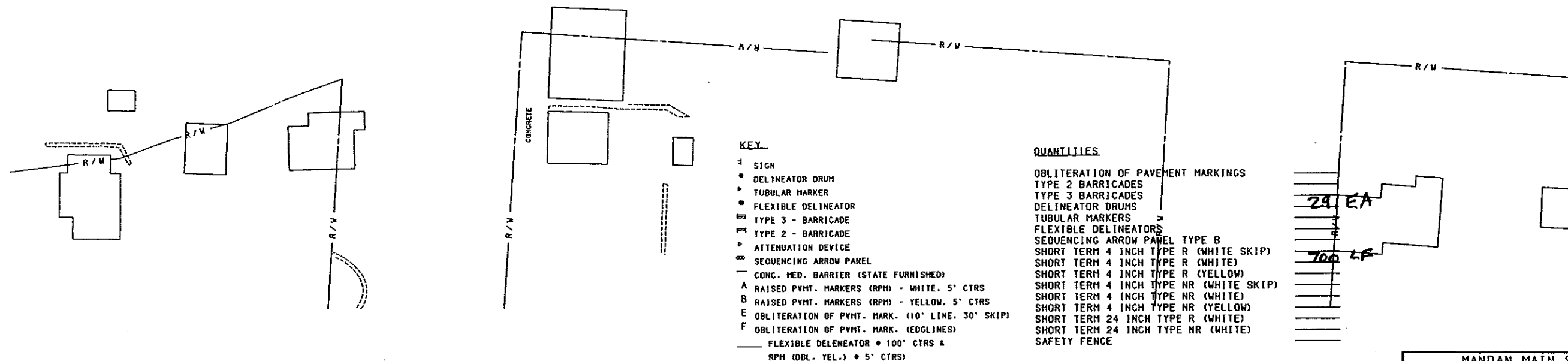
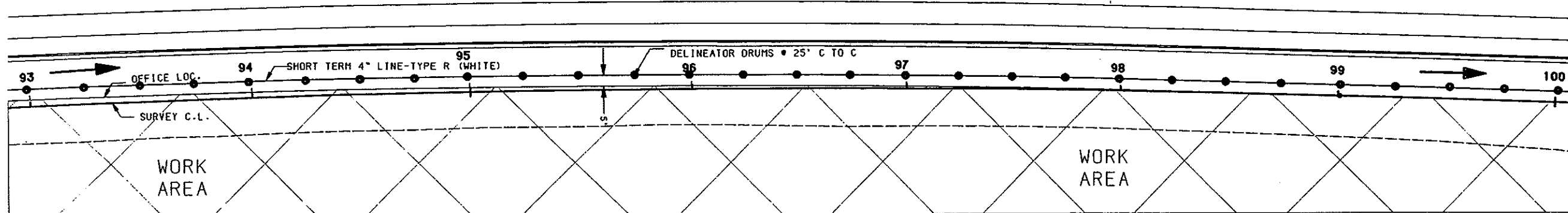
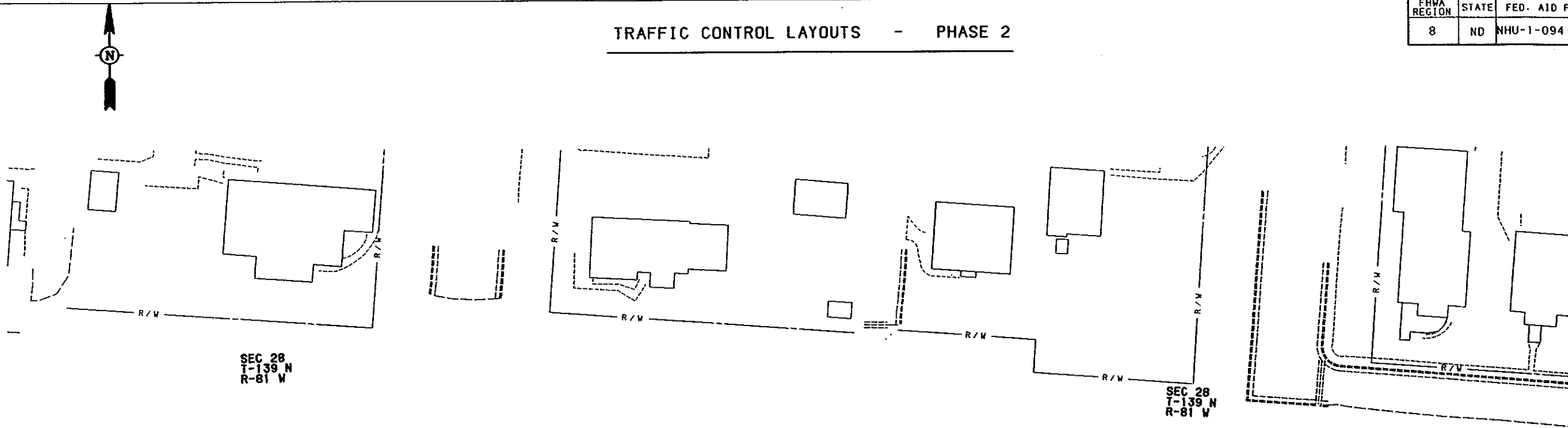
NOTE: ACCESS SHALL BE MAINTAINED. METHOD TO BE APPROVED BY THE ENGINEER.

ARC DEFINITION
 Δ = 5° 59' 58" RT
 D = 0' 42"
 R = 8185.11'
 T = 428.92'
 L = 857.07'

MANDAN MAIN STREET
 STATION 86+00 TO 93+00
 FILE:
 TCP2-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	162

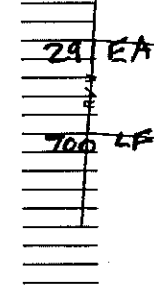


KEY

- ▲ SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- ◐ FLEXIBLE DELINEATOR
- TYPE 3 - BARRICADE
- ▨ TYPE 2 - BARRICADE
- ▧ ATTENUATION DEVICE
- ▩ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVHT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVHT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVHT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVHT. MARK. (EDGLINES)
- FLEXIBLE DELENEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS)

QUANTITIES

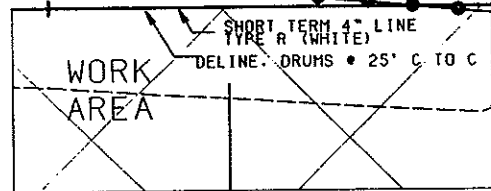
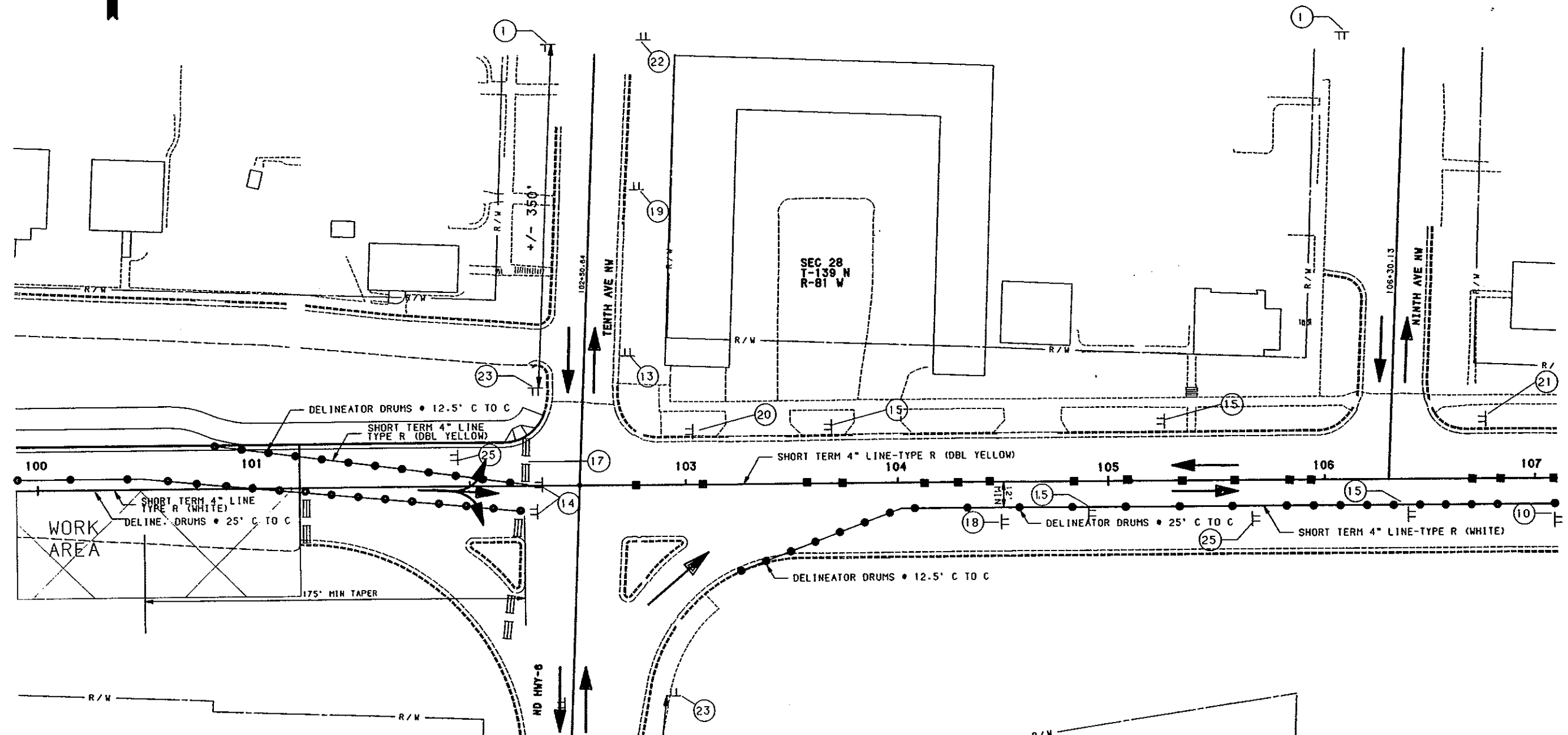
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE



MANDAN MAIN STREET
 STATION 93+00 TO 100+00
 FILE:
 TCP2-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	163



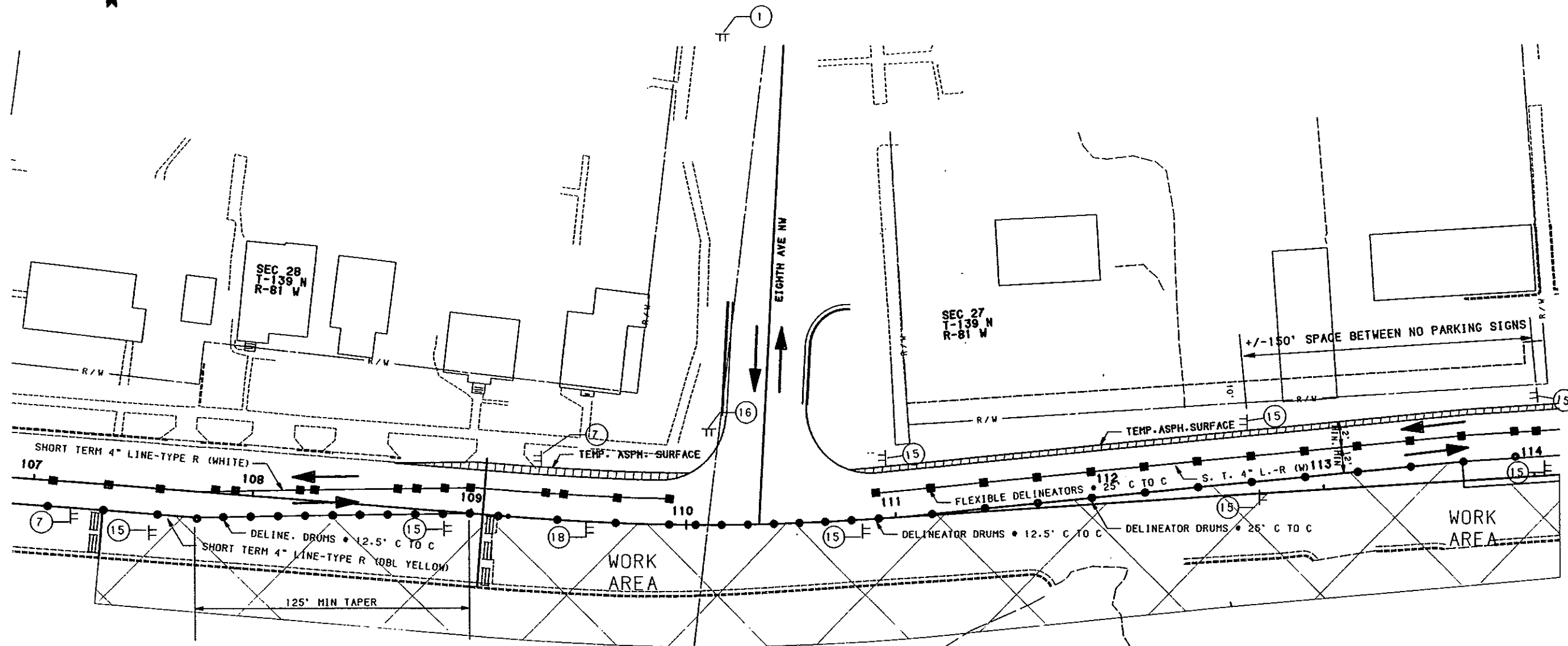
- KEY**
- SIGN
 - DELINEATOR DRUM
 - TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - TYPE 3 - BARRICADE
 - TYPE 2 - BARRICADE
 - ATTENUATION DEVICE
 - SEQUENCING ARROW PANEL
 - CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PYMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

7EA
53EA
16EA
625 LF
980 LF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	164



ARC DEFINITION
 D = 8° 19' 35" LT
 R = 5' 00"
 T = 1145.92'
 L = 83.41'
 L = 166.53'

SEC 28
 T-139 N
 R-81 W

KEY

- R/W
- SIGN
- DELIN. DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- TYPE 3 - BARRICADE
- TYPE 2 - BARRICADE
- ATTENUATION DEVICE
- SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

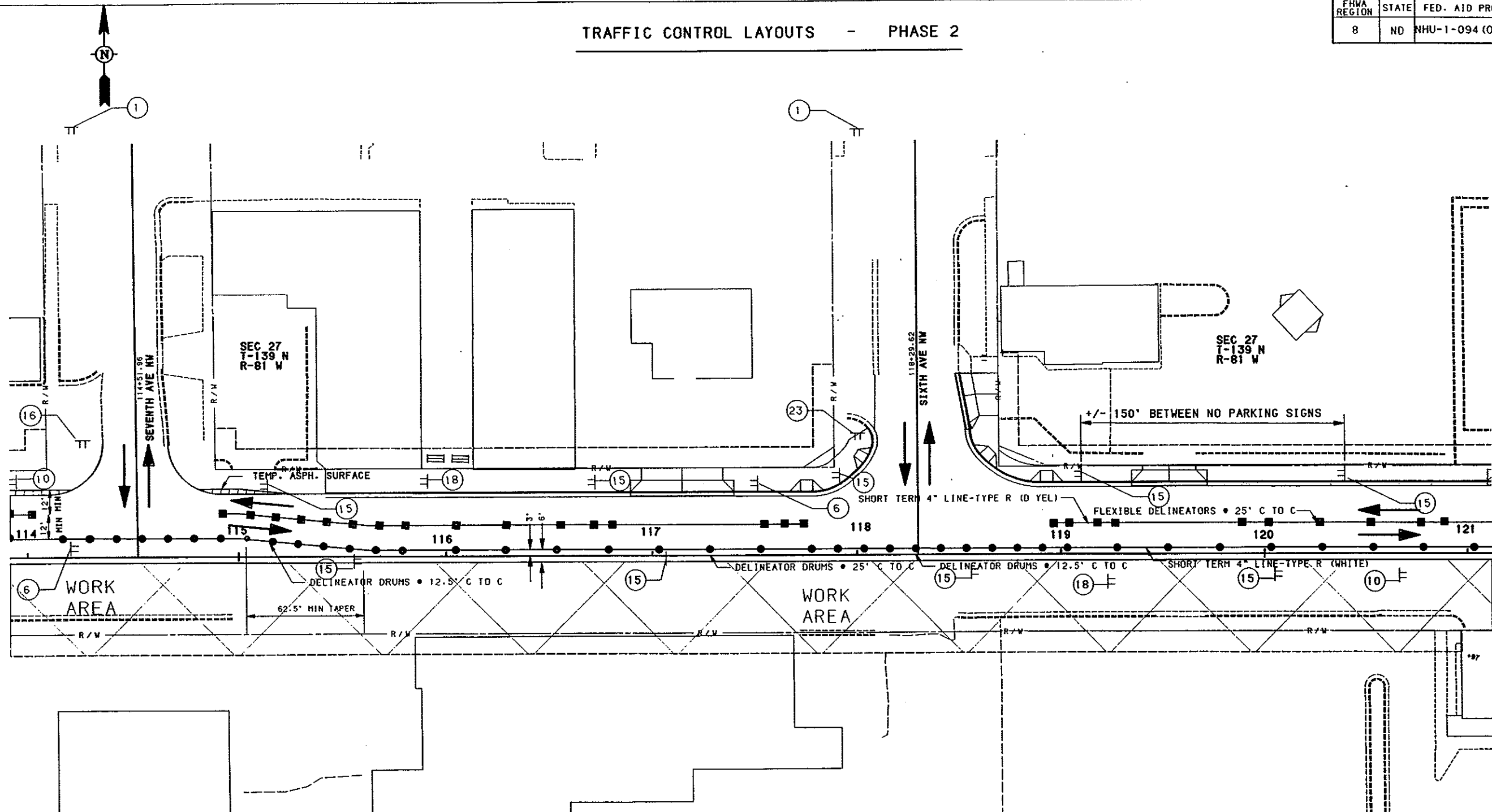
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELIN. DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

5 EA
 38 EA
 29 EA
 610 LF
 1410 LF

MANDAN MAIN STREET
 STATION 107+00 TO 114+00
 FILE:
 TCP2-1.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	165



- KEY**
- ① SIGN
 - DELINEATOR DRUM
 - TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - ▬ TYPE 3 - BARRICADE
 - ▬ TYPE 2 - BARRICADE
 - ▬ ATTENUATION DEVICE
 - ▬ SEQUENCING ARROW PANEL
 - ▬ CONG. MED. BARRIER (STATE FURNISHED)
 - A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PYMT. MARK. (EDGLINES)
 - ▬ FLEXIBLE DELINEATOR • 100' CTRS & RPM (OBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

38 EA
 27 EA
 702 LF
 989 LF

MANDAN MAIN STREET
 STATION 114+00 TO 121+00
 FILE:
 TCP2-1.GRF

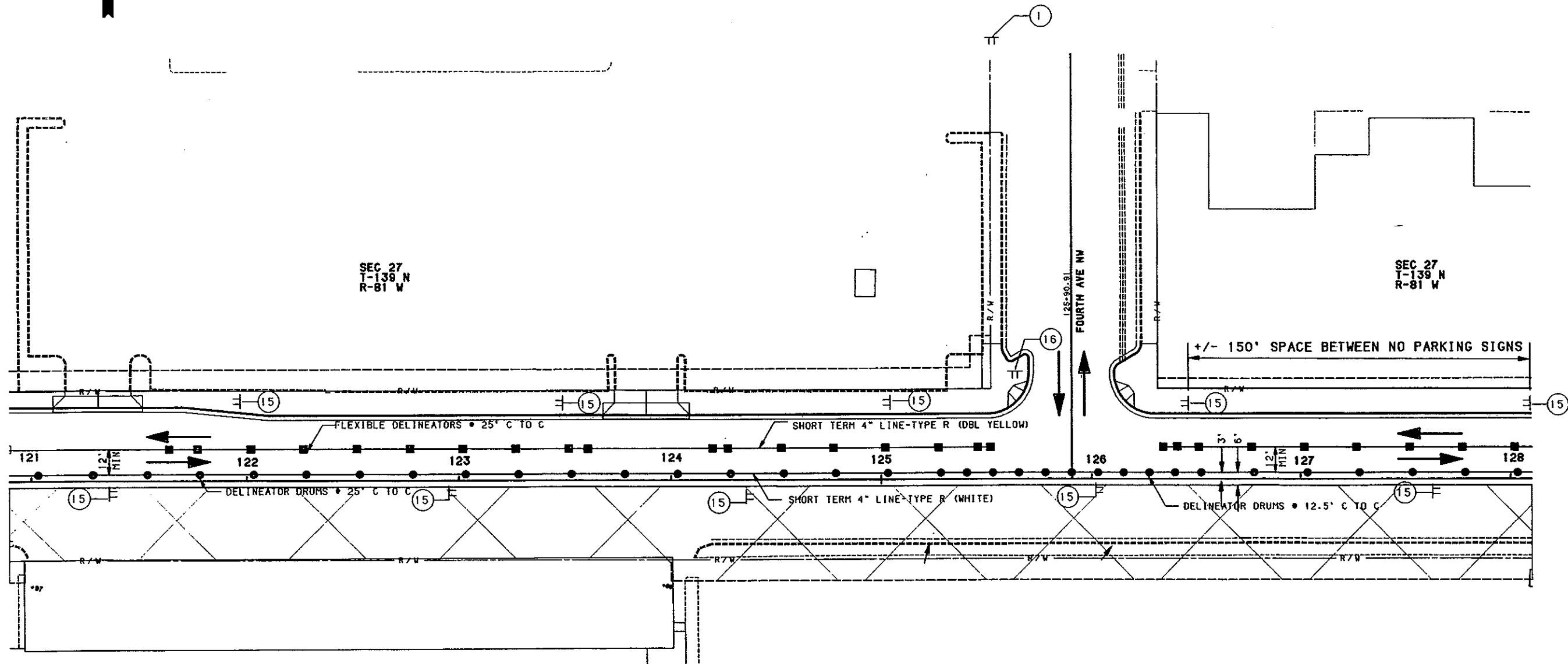
TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	166



SEC 27
T-138 N
R-81 W

SEC 27
T-139 N
R-81 W



+/- 150' SPACE BETWEEN NO PARKING SIGNS

KEY

- ⊢ SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- ▣ FLEXIBLE DELINEATOR
- ▩ TYPE 3 - BARRICADE
- ▨ TYPE 2 - BARRICADE
- ATTENUATION DEVICE
- SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVHT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVHT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVHT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVHT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

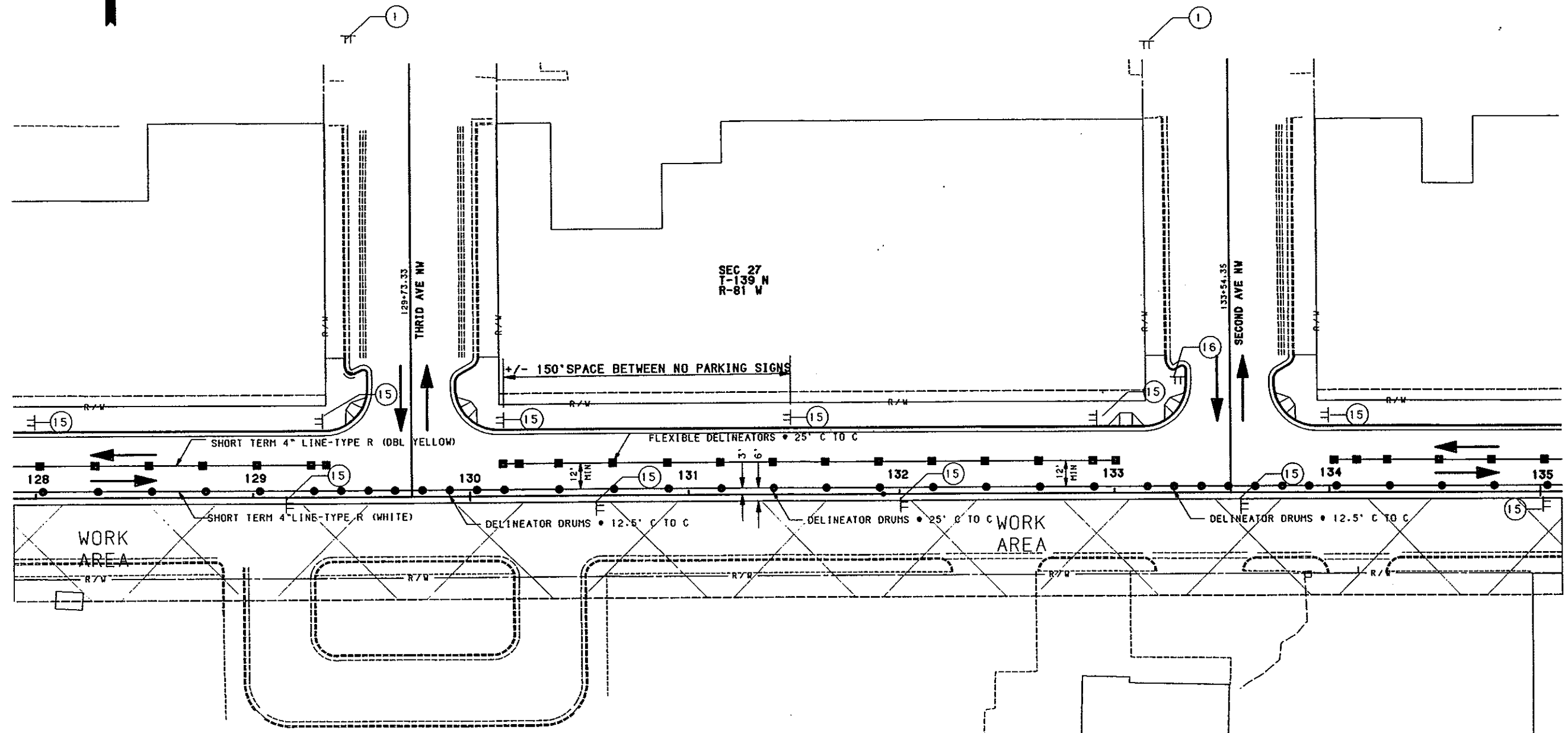
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

33 EA	
26 EA	
780 LF	
1740 LF	

MANDAN MAIN STREET
STATION 121+00 TO 128+00
FILE:
TCP2-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	167



- KEY**
- ▲ SIGN
 - DELINEATOR DRUM
 - ▬ TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - ▬ TYPE 3 - BARRICADE
 - ▬ TYPE 2 - BARRICADE
 - ▬ ATTENUATION DEVICE
 - ▬ SEQUENCING ARROW PANEL
 - ▬ CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - ▬ FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

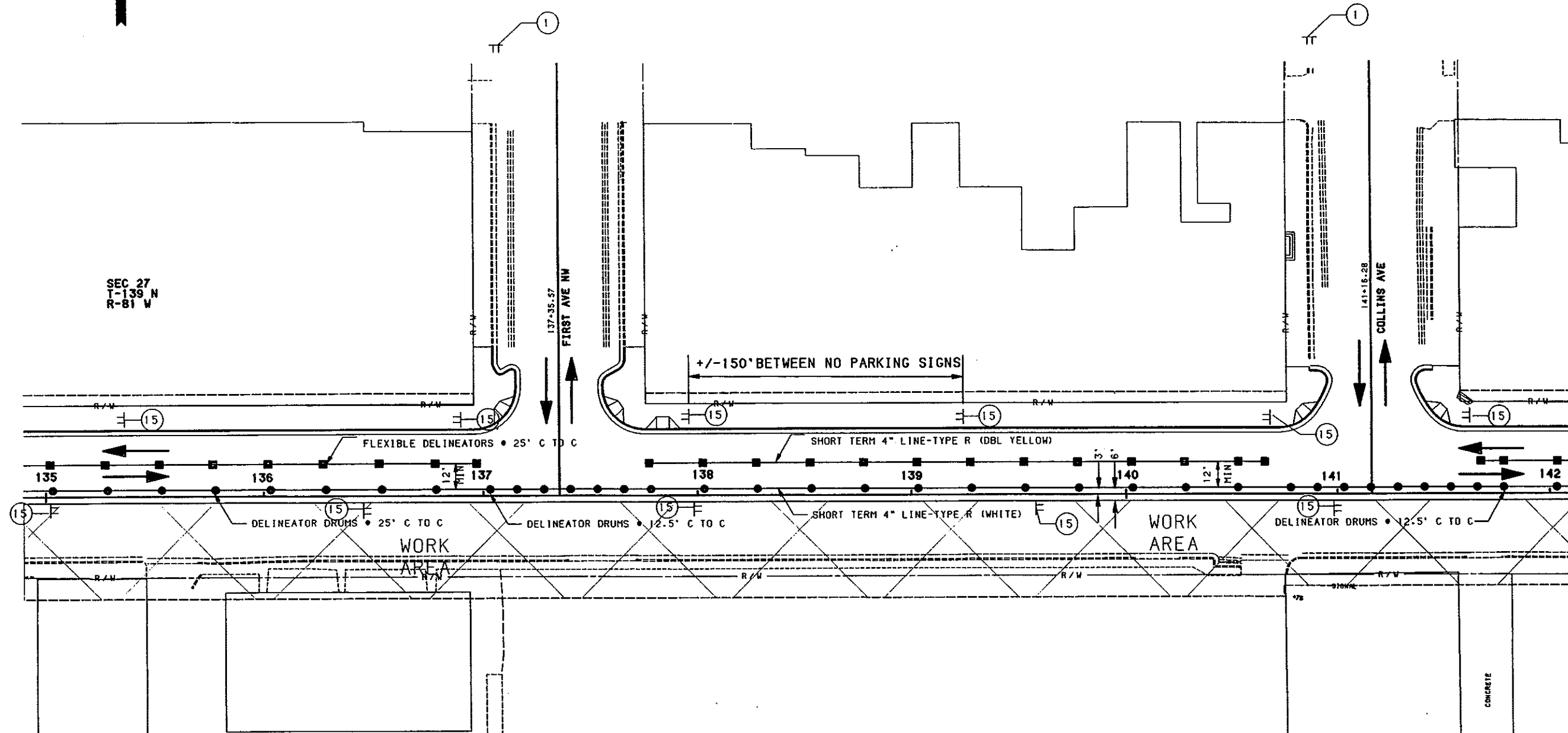
- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

35 EA
 26 EA
 700 LF
 1650 LF

MANDAN MAIN STREET
 STATION 128+00 TO 135+00
 FILE: TCP2-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

SEC 27
T-139 N
R-81 W



KEY

- 4 SIGN
- DELINEATOR DRUM
- ▴ TUBULAR MARKER
- ▾ FLEXIBLE DELINEATOR
- ▭ TYPE 3 - BARRICADE
- ▭ TYPE 2 - BARRICADE
- ▭ ATTENUATION DEVICE
- ▭ SEQUENCING ARROW PANEL
- CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELENEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

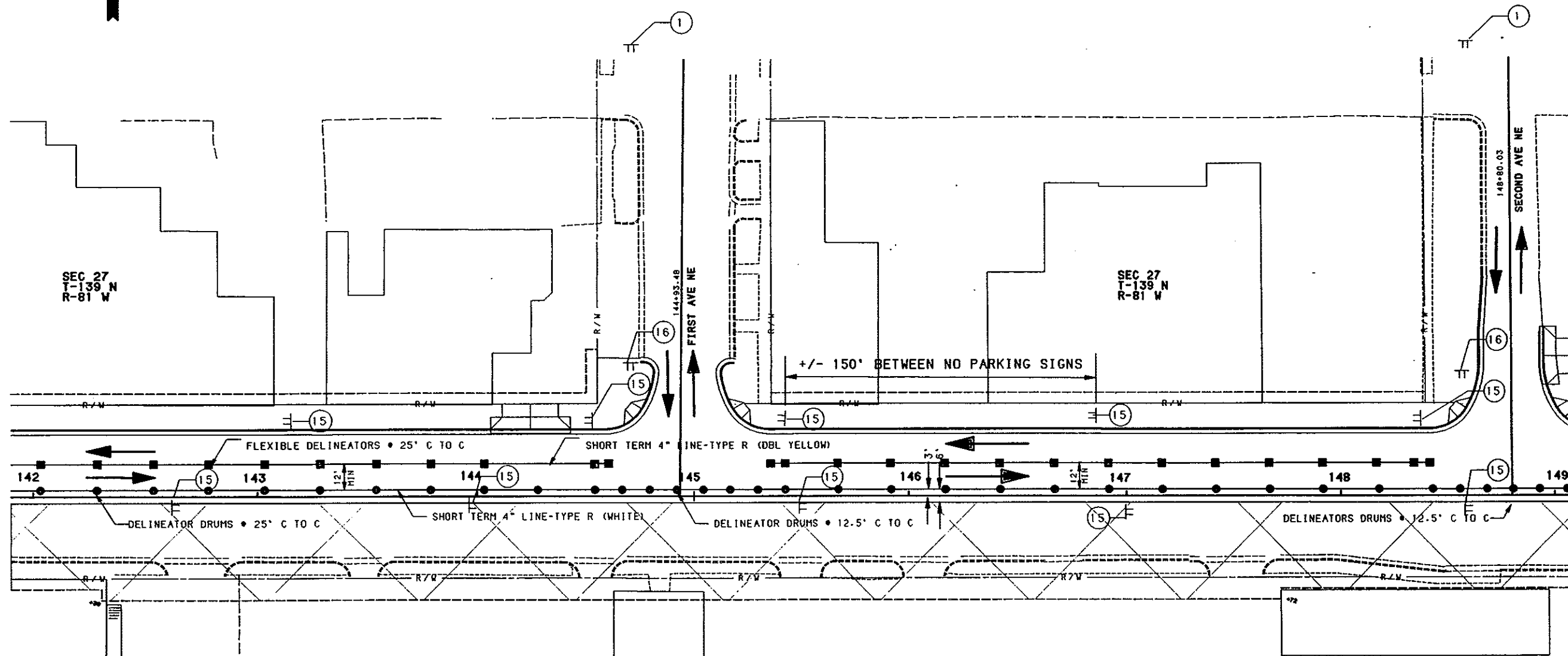
QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE
- 35 EA
29 EA
700 LF
1060 LF

MANDAN MAIN STREET
STATION 135+00 TO 142+00
FILE: TCP2-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	169



ASPHALT

KEY

- ▲ SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- FLEXIBLE DELINEATOR
- ▤ TYPE 3 - BARRICADE
- ▥ TYPE 2 - BARRICADE
- ▽ ATTENUATION DEVICE
- ▧ SEQUENCING ARROW PANEL
- ▨ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PYMT. MARKERS (RPM) - WHITE, 5' CTRS
- B RAISED PYMT. MARKERS (RPM) - YELLOW, 5' CTRS
- E OBLITERATION OF PYMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PYMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

QUANTITIES

- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

34 EA
26 EA
700 EA
1130 EA

DIRT

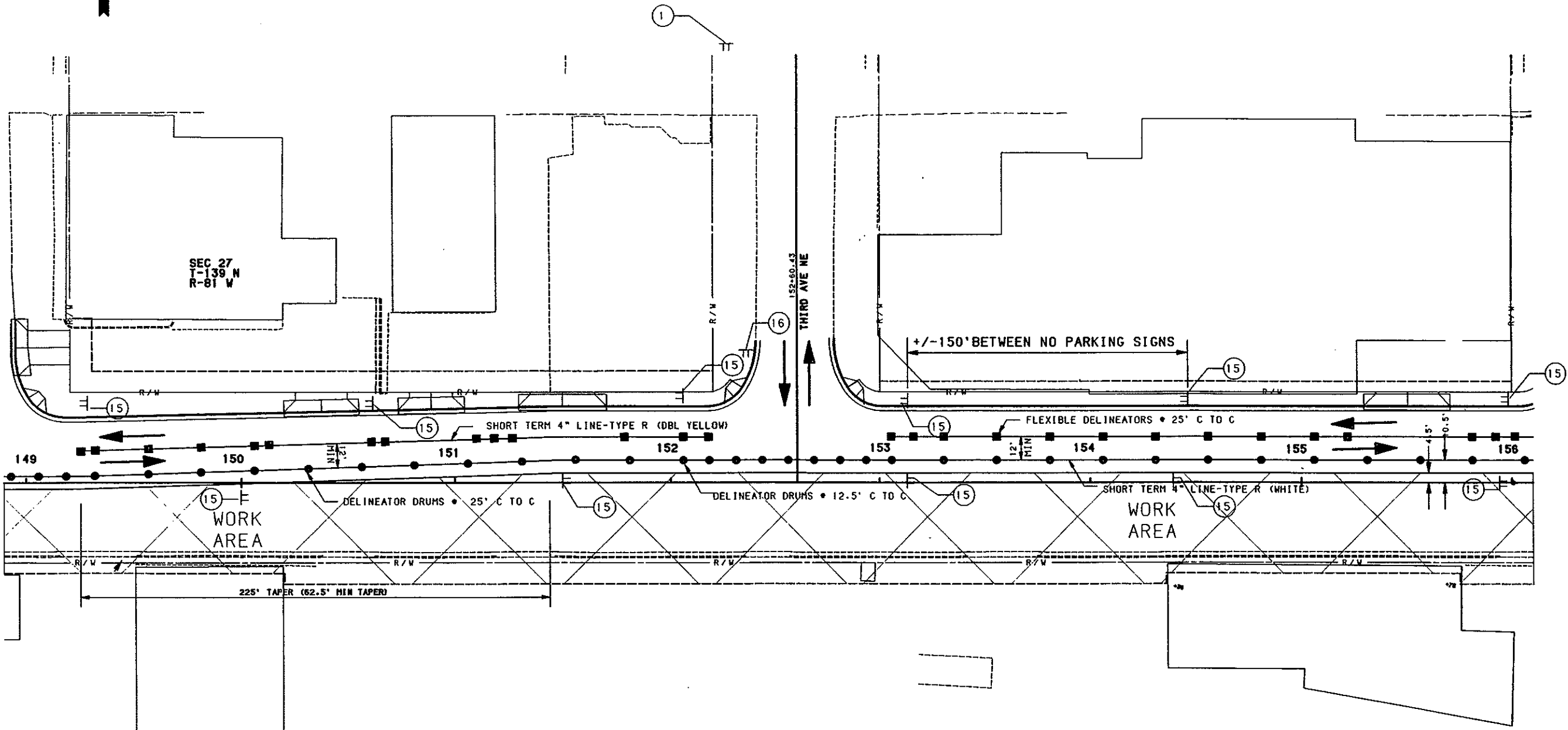


MANDAN MAIN STREET
STATION 142+00 TO 149+00

FILE: TCP2-2.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	170



- KEY**
- SIGN
 - DELINEATOR DRUM
 - TUBULAR MARKER
 - FLEXIBLE DELINEATOR
 - TYPE 3 - BARRICADE
 - TYPE 2 - BARRICADE
 - ▲ ATTENUATION DEVICE
 - ▲ SEQUENCING ARROW PANEL
 - CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

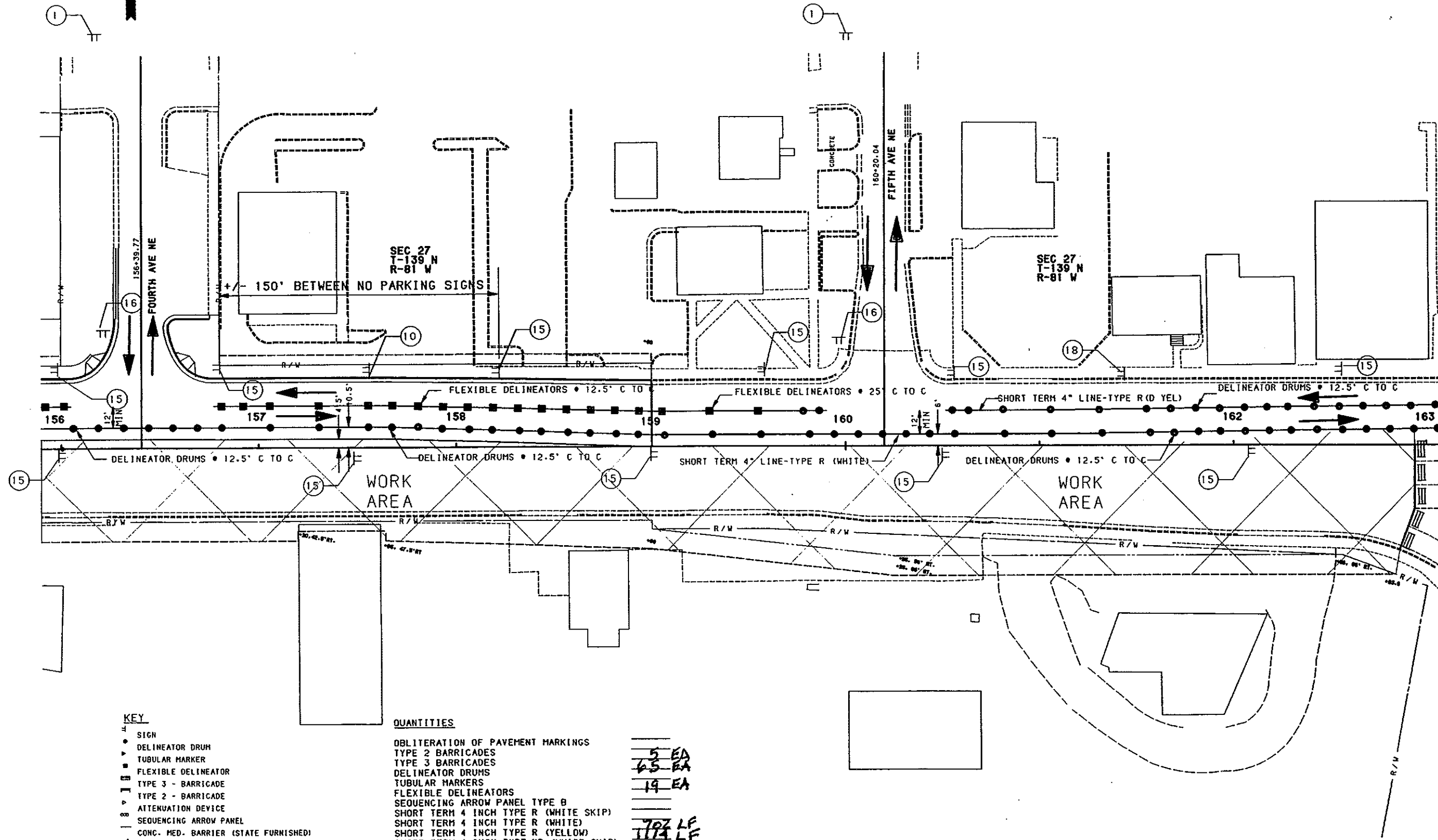
_____	33 EA
_____	76 EA
_____	700 LF
_____	1186 LF

DIRT/GRAVEL PILES

MANDAN MAIN STREET
STATION 149+00 TO 156+00
FILE:
TCP2-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	171



KEY

- SIGN
- DELINEATOR DRUM
- TUBULAR MARKER
- ▬ FLEXIBLE DELINEATOR
- ▬ TYPE 3 - BARRICADE
- ▬ TYPE 2 - BARRICADE
- ▬ ATTENUATION DEVICE
- ▬ SEQUENCING ARROW PANEL
- ▬ CONC. MED. BARRIER (STATE FURNISHED)
- A RAISED PVMT. MARKERS (RPH) - WHITE, 5' CTRS
- B RAISED PVMT. MARKERS (RPH) - YELLOW, 5' CTRS
- E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
- F OBLITERATION OF PVMT. MARK. (EDGLINES)
- FLEXIBLE DELINEATOR • 100' CTRS & RPH (DBL. YEL.) • 5' CTRS

QUANTITIES

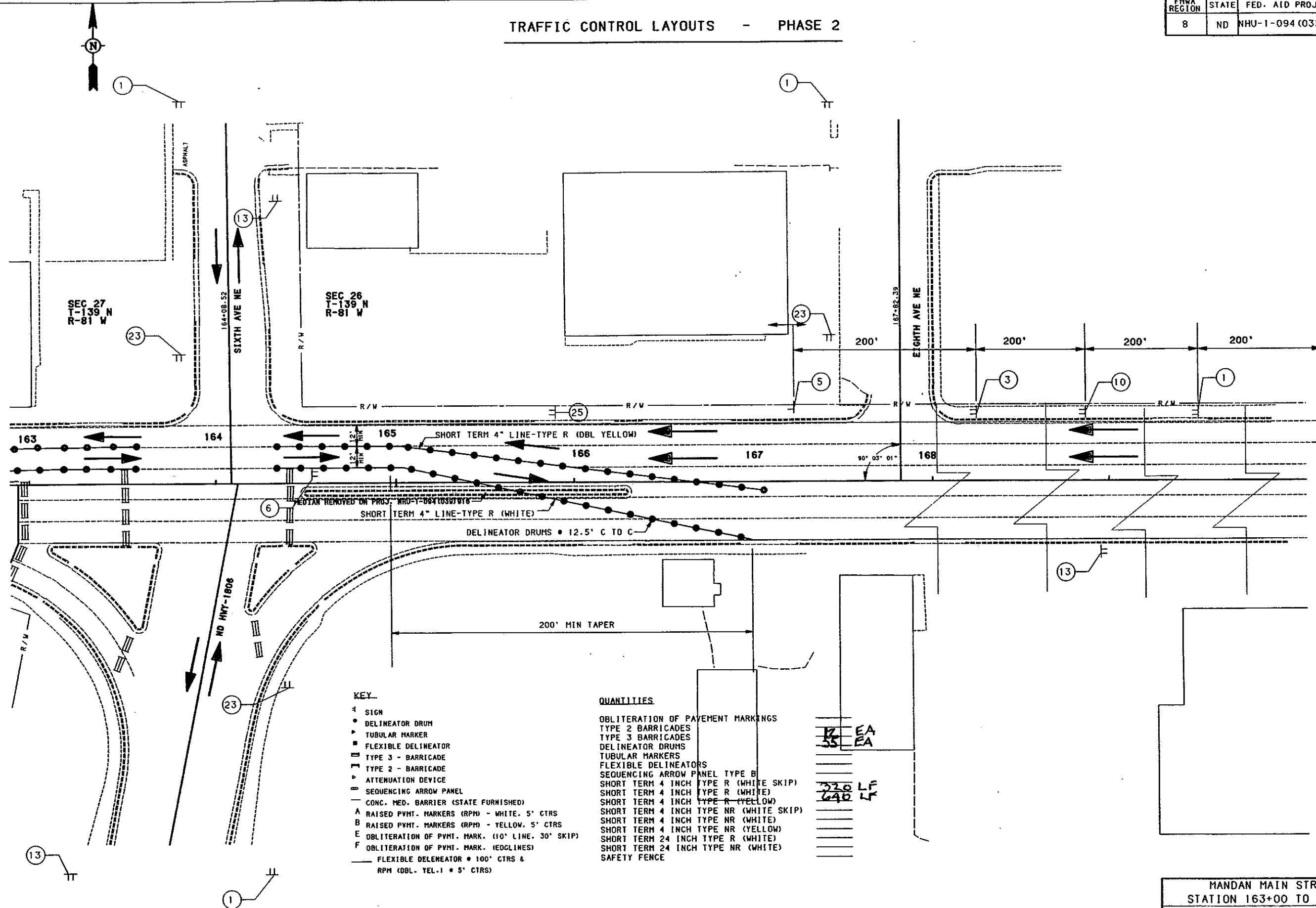
- OBLITERATION OF PAVEMENT MARKINGS
- TYPE 2 BARRICADES
- TYPE 3 BARRICADES
- DELINEATOR DRUMS
- TUBULAR MARKERS
- FLEXIBLE DELINEATORS
- SEQUENCING ARROW PANEL TYPE B
- SHORT TERM 4 INCH TYPE R (WHITE SKIP)
- SHORT TERM 4 INCH TYPE R (WHITE)
- SHORT TERM 4 INCH TYPE R (YELLOW)
- SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
- SHORT TERM 4 INCH TYPE NR (WHITE)
- SHORT TERM 4 INCH TYPE NR (YELLOW)
- SHORT TERM 24 INCH TYPE R (WHITE)
- SHORT TERM 24 INCH TYPE NR (WHITE)
- SAFETY FENCE

5 EA
 45 EA
 19 EA
 707 LF
 1174 LF

MANDAN MAIN STREET
 STATION 156+00 TO 163+00
 FILE: TCP2-3.GRF

TRAFFIC CONTROL LAYOUTS - PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (035) 915	172



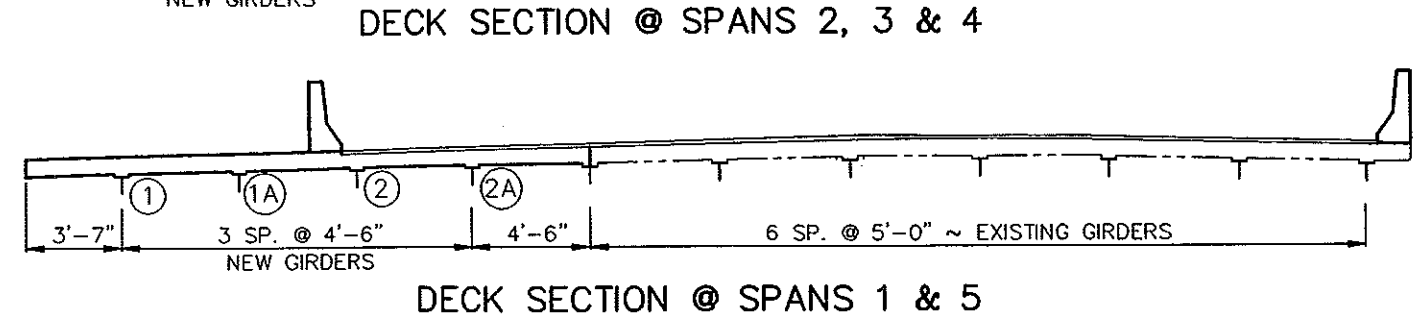
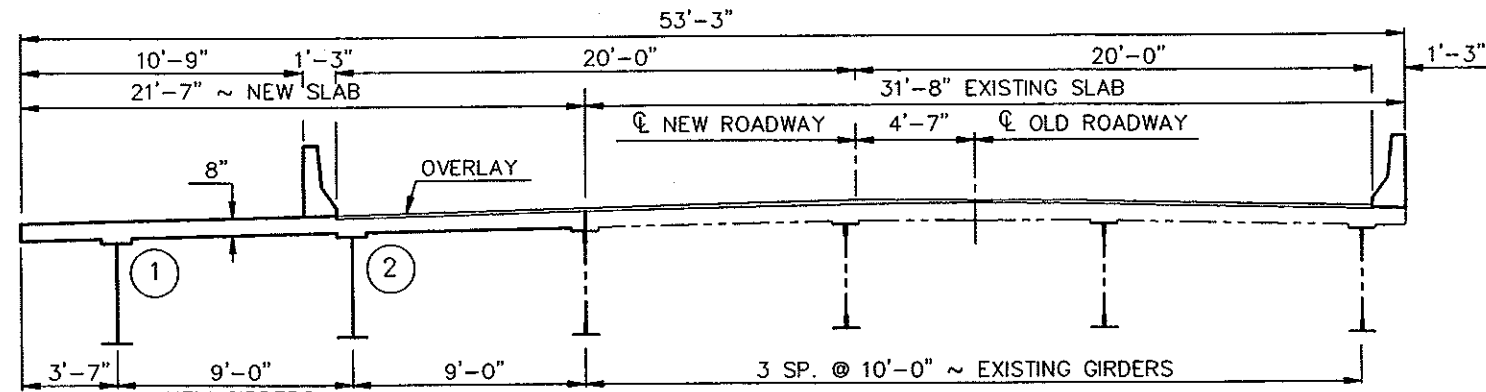
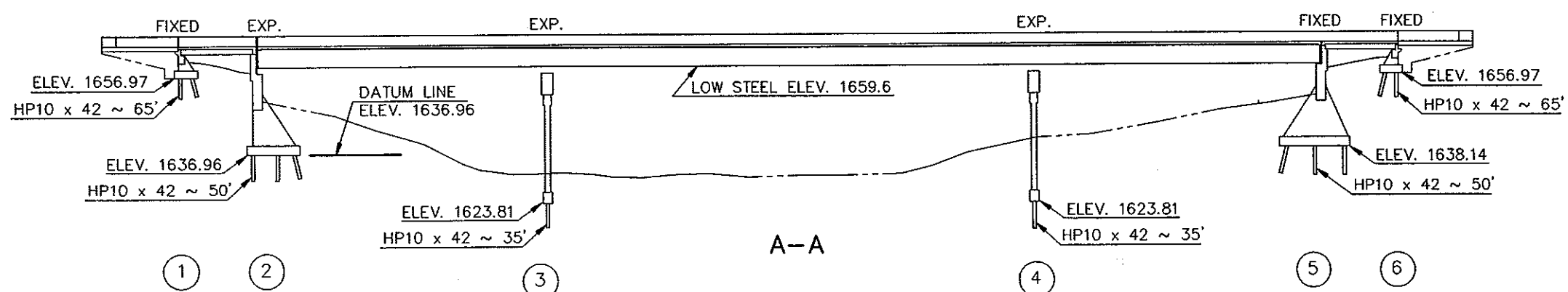
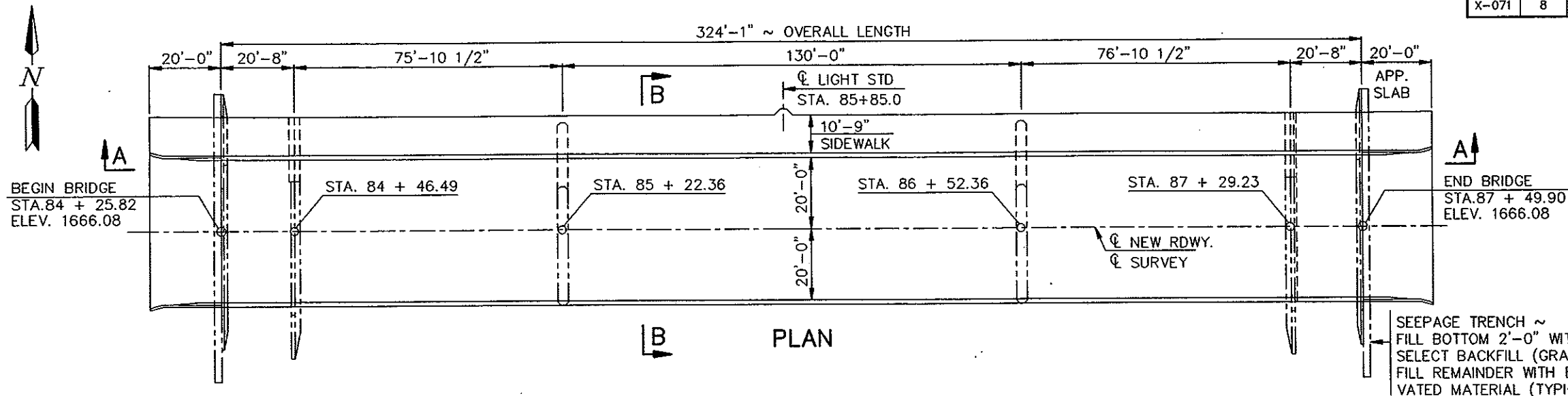
- KEY**
- 1 SIGN
 - DELINEATOR DRUM
 - TUBULAR MARKER
 - ▣ FLEXIBLE DELINEATOR
 - ▤ TYPE 3 - BARRICADE
 - ▥ TYPE 2 - BARRICADE
 - ▧ ATTENUATION DEVICE
 - ▨ SEQUENCING ARROW PANEL
 - ▩ CONC. MED. BARRIER (STATE FURNISHED)
 - A RAISED PVMT. MARKERS (RPM) - WHITE, 5' CTRS
 - B RAISED PVMT. MARKERS (RPM) - YELLOW, 5' CTRS
 - E OBLITERATION OF PVMT. MARK. (10' LINE, 30' SKIP)
 - F OBLITERATION OF PVMT. MARK. (EDGLINES)
 - FLEXIBLE DELINEATOR • 100' CTRS & RPM (DBL. YEL.) • 5' CTRS

- QUANTITIES**
- OBLITERATION OF PAVEMENT MARKINGS
 - TYPE 2 BARRICADES
 - TYPE 3 BARRICADES
 - DELINEATOR DRUMS
 - TUBULAR MARKERS
 - FLEXIBLE DELINEATORS
 - SEQUENCING ARROW PANEL TYPE B
 - SHORT TERM 4 INCH TYPE R (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE R (WHITE)
 - SHORT TERM 4 INCH TYPE R (YELLOW)
 - SHORT TERM 4 INCH TYPE NR (WHITE SKIP)
 - SHORT TERM 4 INCH TYPE NR (WHITE)
 - SHORT TERM 4 INCH TYPE NR (YELLOW)
 - SHORT TERM 24 INCH TYPE R (WHITE)
 - SHORT TERM 24 INCH TYPE NR (WHITE)
 - SAFETY FENCE

EA
EA
LF
LF

MANDAN MAIN STREET
STATION 163+00 TO 170+00
FILE:
TCP2-3.GRF

BRIDGE CODE	FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
X-071	8	N.D.	NHU-1-094(035)915	173



STANDARD DRAWINGS	
D-622-1, D-900-1	
* S.P. - 174(92)	
HS 20 DESIGN LOADING	F.W.S. 15 PSF
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
HEART RIVER WEST MAIN STREET MANDAN	
BRIDGE LAYOUT	
PROJECT: NHU-1-094(035)915	
STATION 85 + 87.86	
MORTON COUNTY	
APPROVED	DATE
12/20/95	STEVEN J. MILLER
	BRIDGE ENGINEER

* S.P. - 174(92) BRIDGE PAINT:
LEAD PAINT REMOVAL AND
CONTAINMENT

HEART RIVER--WEST MAIN STREET--MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	174

- 100 SCOPE OF WORK: This work shall consist of widening the existing structure, painting the existing steel girders, overlaying the existing deck, and adding approach slabs to the ends of the structure. The existing structure is a 324-foot long, 5-span structure with a 32-foot clear roadway.
- 100 GENERAL: The cost of furnishing and placing tie wire, bar spacers, bar supports, deck drains, and other miscellaneous items shall be included in the price bid for Class AE-3 and AAE-3 concrete.
- 105 The existing structural steel is painted with lead-based paint. Certain contractor operations could expose employees to hazardous levels of lead. The contractor shall plan accordingly and shall inform employees of the hazards of lead-based paint.
- 202 REMOVAL OF CONCRETE: The deck and substructures are made of concrete. The railings are metal. All materials removed shall become the property of the contractor and shall be disposed of properly off the right of way. The estimated quantity of "Removal of Concrete" is 83 CY.
- 210 EXCAVATION: Class 1 excavation, at the abutments, shall extend from the bottom of the footing to the upper limits as shown on the detail at new abutment. Class 1 excavation, at piers 2 and 5 shall extend from the bottom of the footing to the upper limits as shown on the bridge layout drawing.
- 210 EXCAVATION: Class 2 excavation at piers 3 and 4 shall extend from the bottom of the footing to the upper limits as shown on the bridge layout drawing.
- 210 EXCAVATION: The excavation at the abutments, as shown, and the excavation required to build piers 2 and 5 shall be included in the lump sum bid item, "Class 1 Excavation." The estimated quantity of "Class 1 Excavation" is 260 CY.
- 210 EXCAVATION: The excavation at piers 3 and 4 shall be included in the lump sum bid item, "Class 2 Excavation." The estimated quantity of "Class 2 Excavation" is 240 CY.
- 210 SELECT BACKFILL: Select backfill shall meet the requirements of Section 816.03, Class 3. The backfill shall be placed in layers of not more than 6 inches, moistened or dried as required, and thoroughly compacted with mechanical tamping equipment.
- 550 BRIDGE APPROACH SLABS: Mechanical finishing of the approach slabs shall be required. A mechanical or hand-held transverse metal tine finish shall be applied. Tining shall start 6" from the beginning and end of the approach slabs. A surface tolerance of 3/16" in 10 feet is also required.
- 602 SURFACE FINISH "D": Surface Finish "D" shall be required for the inside, top and outer surfaces of the barrier and the edges of the deck.
- 602 DECK CONCRETE: Beams and girders have slight variations in the anticipated camber. To build the deck to the designated thickness will require slight adjustments in deck elevation and/or riser dimensions. These adjustments result in minor concrete quantity discrepancies. The contractor shall consider this quantity discrepancy when he bids the unit price for Class AAE-3 Concrete. The Department will pay plan quantity of Class AAE-3 Concrete.
- 602 Deflection of the deck shoring shall be computed using the total dead load plus the weight of the finishing machine. The forming shall be adjusted properly to accommodate the deflection and thereby maintain the total slab thickness specified in the plans.
- 602 PENETRATING WATER REPELLENT TREATMENT: Penetrating water repellent shall be applied to the driving surface of the concrete deck.
- 602 BARRIERS: Barriers shall be constructed according to the provisions of Section 602.03 B.4 except that there shall be no expansion or deflection joints. Make 3/4" V-grooves in all faces of the barriers at each pier and at equal spaces between substructures at approximately 10-foot spacing.
- 602 DECK TINING: Tining shall begin 6 inches from the beginning and the end of the deck and 6 inches from the deck joint.
- 602 SIDEWALK BROOMING: The sidewalk on the bridge shall not be tined. The sidewalk shall be transversely broomed to slightly roughen the surface.
- 616 STRUCTURAL STEEL: Structural steel shall be AASHTO M 270. The welded girders, rolled beams, field splice plates and bearing stiffeners shall be Grade 50T2. All other steel shall be Grade 36T2. The requirement for Charpy V-Notch test is waived for the bearings, diaphragms, and diaphragm connection material. The estimated quantity of "Structural Steel" is 127,148 lbs.
- 616 Field connections shall be made with 7/8 inch diameter, AASHTO M 164 high-strength bolts unless otherwise shown.
- 616 Temporary or permanent attachments or devices that are not shown on the plans as part of the structure shall not be welded to the structural steel members during the fabrication and construction process.

HEART RIVER--WEST MAIN STREET--MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	175

- 616 The cost of swedge bolts shall be included in the total cost of structural steel.
- 622 PILING: Piling shall be driven with a steam, air, or diesel hammer with a rated energy and ram weight not less than 18,028 foot-pound-tons, as computed by the formula $W(E - 7623) + .473 E$, where W is the weight of the ram in tons and E is the rated hammer energy. In no case shall the ram weight be less than 2,700 pounds.
- 630 PAINT AND PAINTING: The structural steel shall be painted according to the specifications. The finish coats shall be Red Color No. 31302 and shall meet Federal Standard No. 595B colors.
- 630 Cleaning and painting of the existing steel shall be included in the lump sum price bid for "Sandblasting and Painting." Cleaning and painting of new steel shall be included in the lump sum price bid for "Structural Steel."
- 704 TRAFFIC CONTROL: At least one lane of traffic shall be maintained on the bridge at all times during the project.

OTHER: A United States Geological Survey (USGS) wire weigh gage is mounted on the north railing of the structure. The contractor shall notify Russ Harkness of the Bismarck office of the USGS (250-4604) to have the gage removed before removing the railing. Also, there is an additional box next to the USGS gage of unknown purpose. If this box is not USGS property, it shall become the property of the contractor and disposed of properly off the right of way.

CONSTRUCTION SEQUENCE: The construction shall be done in three phases.

Phase 1 shall consist of the widening of the substructures and the superstructure. Two-way traffic shall be maintained during phase 1.

Phase 2 shall consist of the approach slabs and deck overlay on the north portion of the structure. One lane of traffic shall be maintained on the south side of the structure during phase 2.

Phase 3 shall consist of the approach slabs, deck overlay, and barrier on the south portion of the structure. One lane of traffic shall be maintained on the north side of the structure during phase 3.

SHOP DRAWINGS: CAD-generated shop drawings may be submitted on 11-inch by 17-inch detail sheets. The contractor shall submit the following shop drawings to the Construction office for approval:

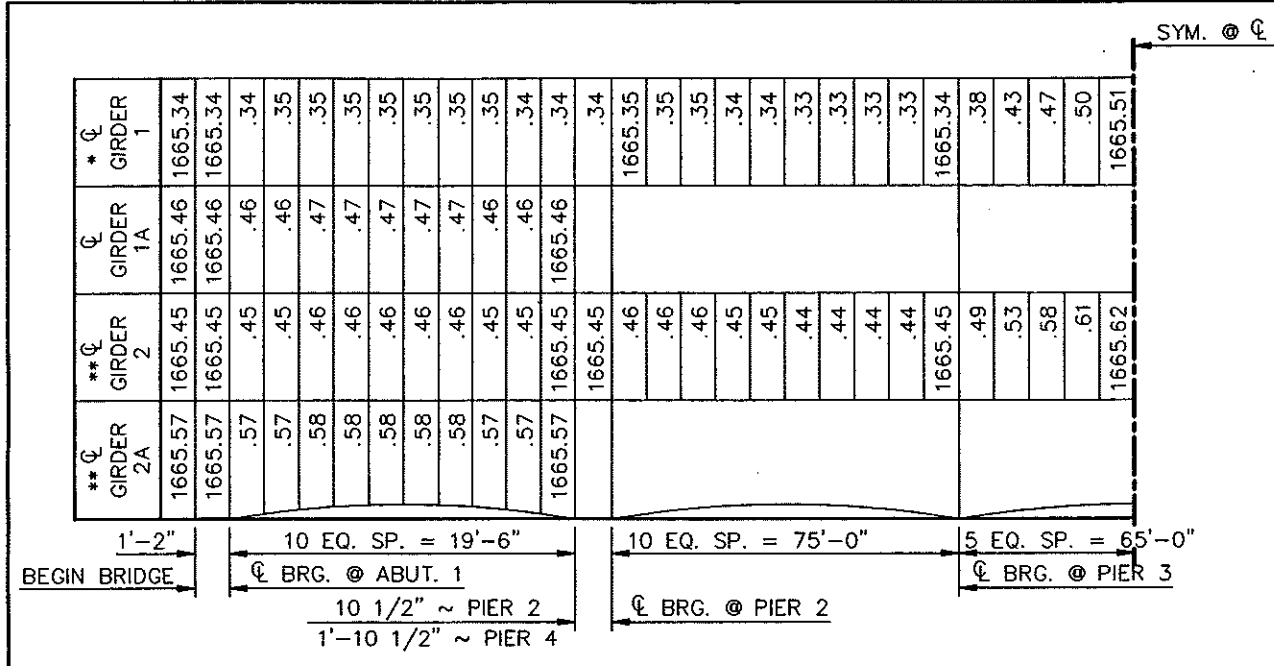
1. Structural Steel

DESIGN STRENGTH: F'C 3,000 PSI Cl. AE-3 Concrete
 F'C 4,000 PSI Cl. AAE-3 Concrete
 FY 60,000 PSI GR. 60 Reinforcing Steel
 FY 36,000 PSI Structural Steel M270 Grade 36T2
 FY 50,000 PSI Structural Steel M270 Grade 50T2

DESIGN METHOD: Load Factor Design

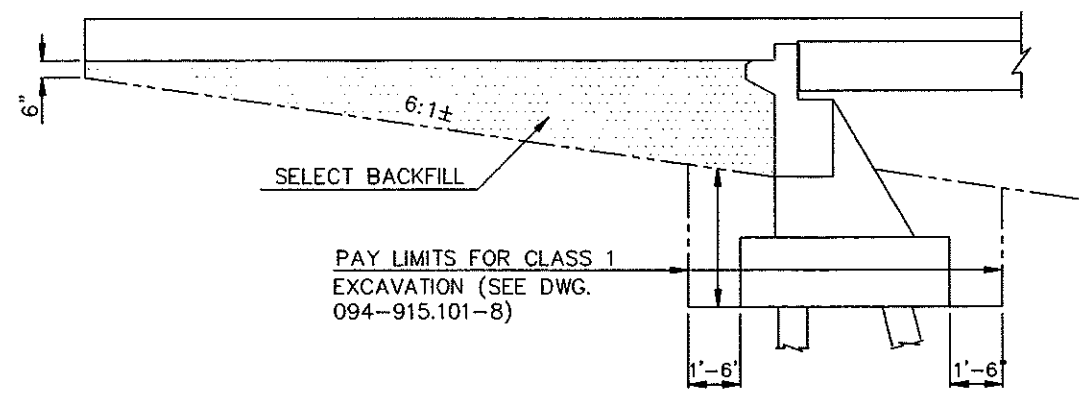
QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0111	REMOVAL OF CONCRETE	L. SUM	1.0
210	0101	CLASS 1 EXCAVATION	L. SUM	1.0
210	0111	CLASS 2 EXCAVATION	L. SUM	1.0
210	0198	SELECT BACKFILL	TON	250.0
210	0201	FOUNDATION PREPARATION	EA.	1.0
550	0215	CONCRETE BRIDGE APPROACH SLAB	SQ. YD.	236.4
602	0130	CLASS AAE-3 CONCRETE	CU. YD.	220.2
602	1130	CLASS AE-3 CONCRETE	CU. YD.	217.0
602	1250	PENETRATING WATER REPELLENT TR.	SQ. YD.	1441.0
612	0115	REINFORCING STEEL GRADE 60	LBS.	29,019.0
612	0116	REINFORCING STEEL GRADE 60 EPOXY	LBS.	50,239.0
616	5890	STRUCTURAL STEEL	L. SUM	1.0
622	0020	STEEL PILING HP 10X42	L. FT.	2100.0
624	0123	PEDESTRIAN RAILING	L. FT.	323.0
624	0124	PEDESTRIAN FENCE	L. FT.	322.9
626	0100	COFFERDAM	EA.	2.0
630	0100	SAND BLASTING AND PAINTING	L. SUM	1.0
630	9000	CONTAINMENT SYSTEM	L. SUM	1.0
650	0699	CLASS 1A OVERLAY	SQ. YD.	344.7
650	0700	CLASS 1 OVERLAY	SQ. YD.	1094.2
650	0701	CLASS 2 OVERLAY	SQ. YD.	218.8
650	0702	CLASS 3 OVERLAY	SQ. YD.	54.7
650	0703	CLASS 2A OVERLAY	L. FT.	393.8
930	3000	BRIDGE BENCH MARKS	SET	1.0
930	8680	EXPANSION JOINT STRIP SEAL	L. FT.	52.6
930	9630	PIER REPAIR	L. SUM	1.0

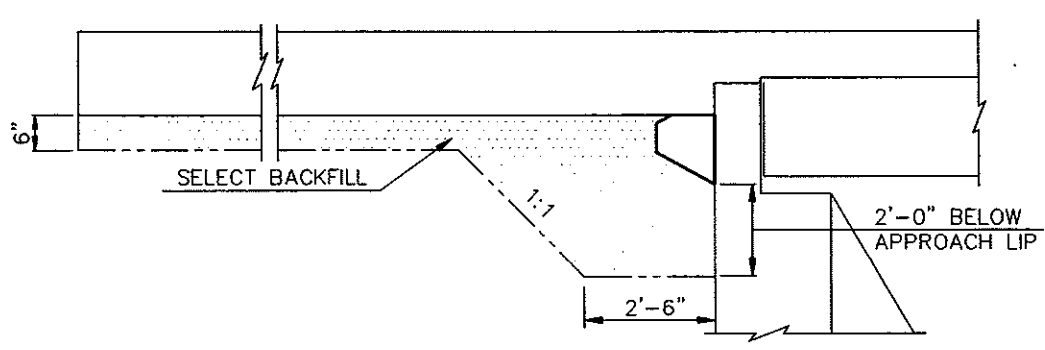


SCREED ELEVATIONS ~ SHOWING HALF BRIDGE

* GIRDER NO. 1 IS THE NORTH GIRDER
 ** BOTTOM OF CLASS 1A OVERLAY



DETAIL AT NEW ABUTMENT



DETAIL AT EXISTING ABUTMENT

HYDRAULIC DESIGN DATA

DRAINAGE AREA	3310 SQ. MI.
DESIGN FREQUENCY	50 YEAR
DESIGN DISCHARGE	31,000 CFS
DESIGN STAGE (UPSTREAM)	1657.46
STREAM GRADIENT	0.001986 FT./FT.
WATERWAY PROVIDED BELOW DESIGN STAGE	4303 FT. ²
WATERWAY PROVIDED BELOW CLEARANCE ELEVATION	5516 FT. ²
AVERAGE VELOCITY OF FLOW IN NATURAL CHANNEL	2.93 FPS
DEPTH OF FLOW	25.5 FT. ±
VELOCITY OF FLOW UNDER BRIDGE	6.79 FT/SEC
FREEBOARD PROVIDED	2.74 FT.
100-YEAR FREQUENCY DISCHARGE	40,000 CFS
100-YEAR FREQUENCY STAGE	ELEV. 1660.60
OVERTOPPING STAGE	ELEV. 1667.0

PILE LOADING

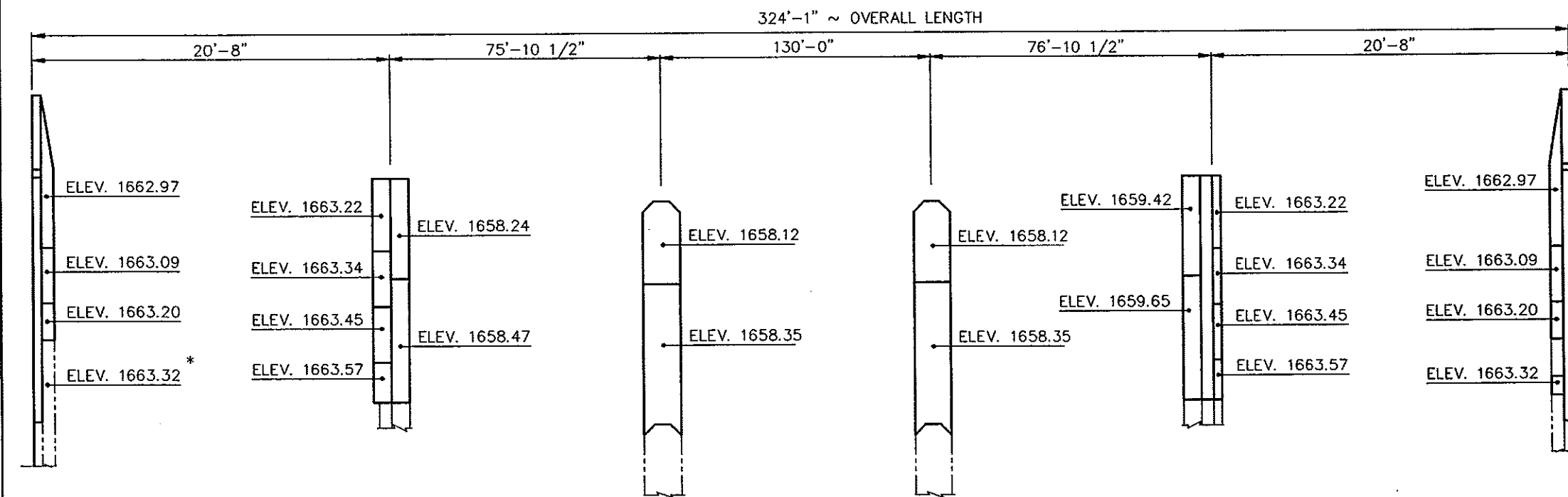
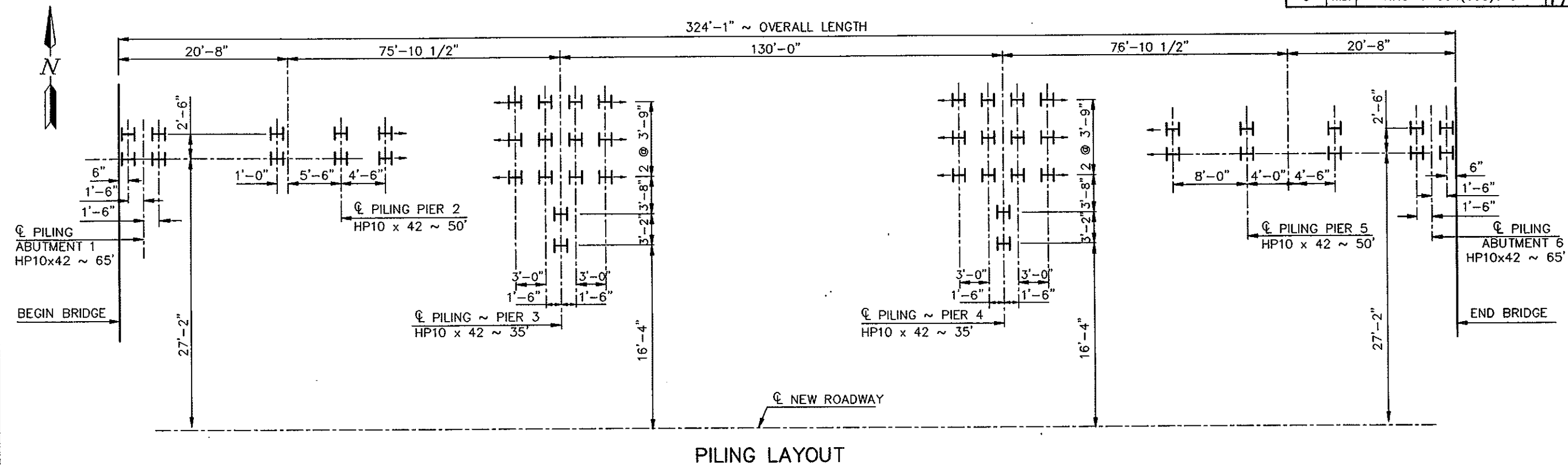
LOCATION	DEAD LOAD	EARTH LOAD	LIVE LOAD	DESIGN LOAD	MINIMUM ** PENETRATION
ABUT. 1 & 6	10.3 T	1.5 T	3.6 T	15.4 T	50.0 FT.
PIER 2	33.7 T	14.6 T	6.7 T	55.0 T	30.0 FT.
PIER 3 & 4	38.6 T	9.2 T	7.2 T	55.0 T	15.0 FT.
PIER 5	32.6 T	17.1 T	5.3 T	55.0 T	30.0 FT.

** MEASURED BELOW BOTTOM OF FOOTING

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
I	REBAR IRON 1' N. OF L.P.W. 1ST L. POLE E. OF SUNNY RD.	STA. 91+45-22' RT.	1665.08
J	SQUARE CHISSELED IN E. END OF BRIDGE N. SIDE RD. ON CURB	STA. 87+50-16' LT.	1666.76
K	REBAR IRON S. SIDE OF RD. 1' N. OF NDIS SIGN	STA. 81+83-27' RT.	1663.82

HEART RIVER
 WEST MAIN STREET MANDAN
 DETAIL AT ABUTMENT
 PILE LOADING
 SCREED ELEVATIONS
 QUANTITIES



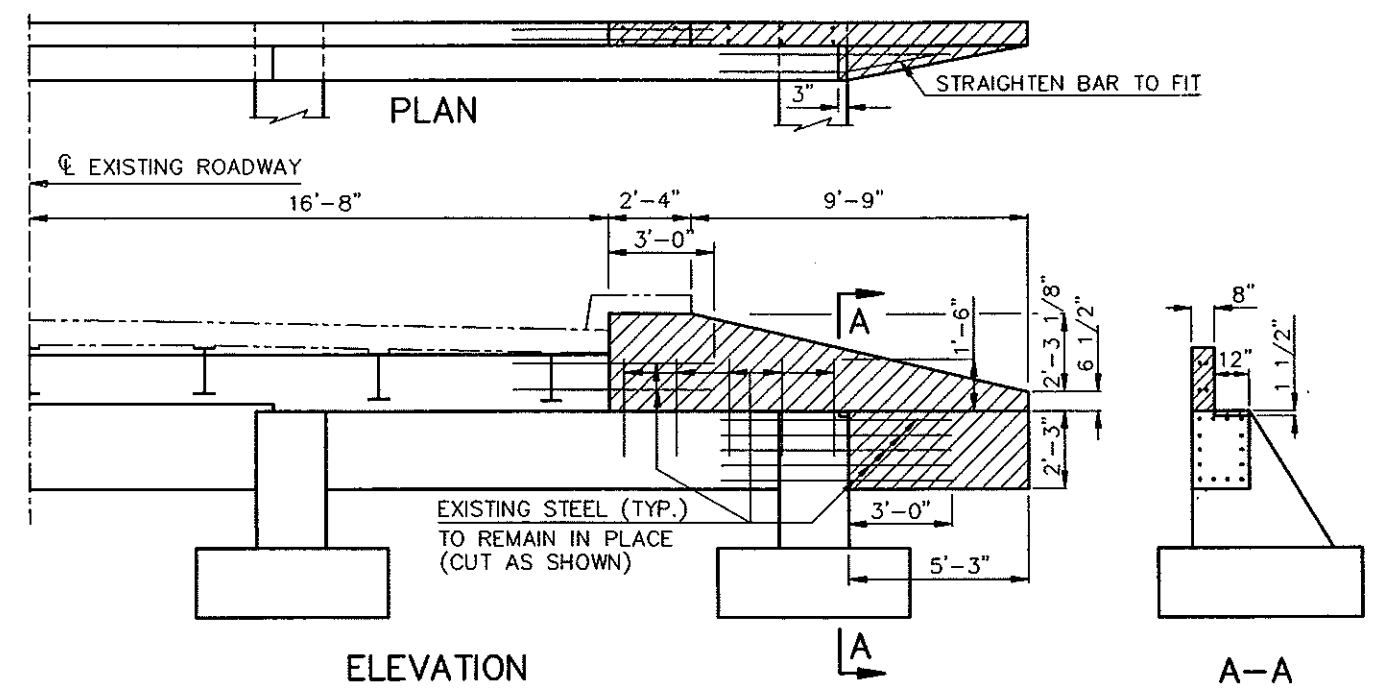
NOTE:
THE ESTIMATED PILE LENGTHS ARE BASED ON THE BORING LOGS AND THE PILE DRIVING RECORDS FROM THE HEART RIVER AND THE BURLINGTON NORTHERN STRUCTURES ON HIGHWAY 6.

* EXISTING BEARING SEAT - ORIGINAL PLAN
NO ADJUSTMENT NECESSARY IF ACTUAL ELEVATION VARIES SLIGHTLY.

BEARING ELEVATIONS
ELEVATIONS SHOWN ARE TO TOP OF FINISHED CONCRETE

HEART RIVER
WEST MAIN STREET MANDAN
**PILING LAYOUT
BEARING ELEVATIONS**

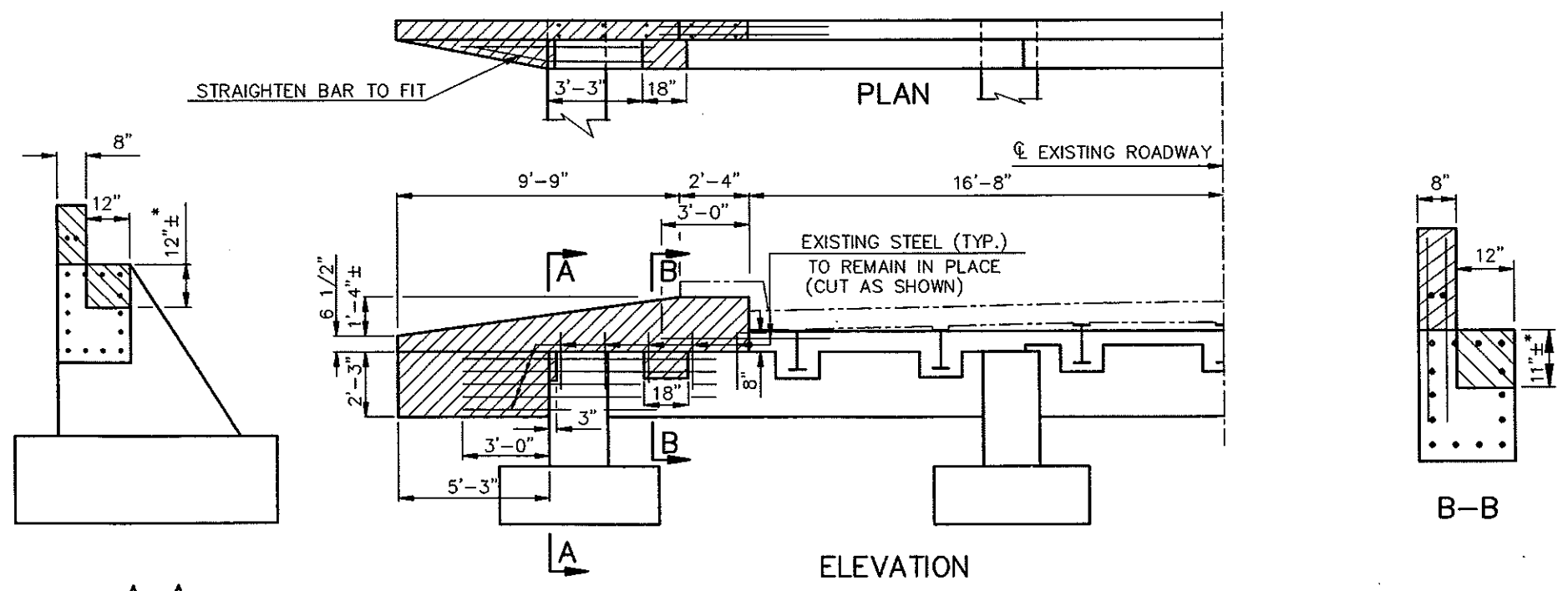
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	178



ABUTMENT 1



 CONCRETE TO BE REMOVED

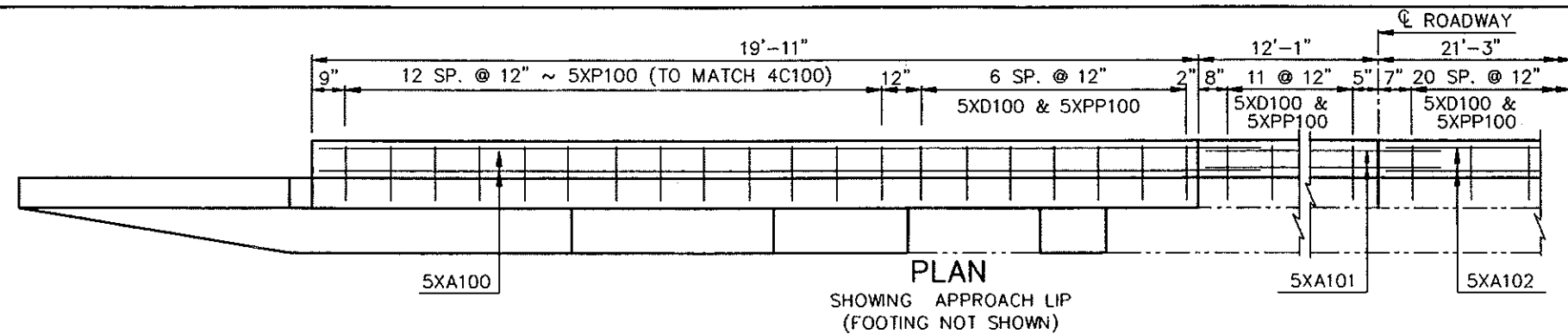


ABUTMENT 6

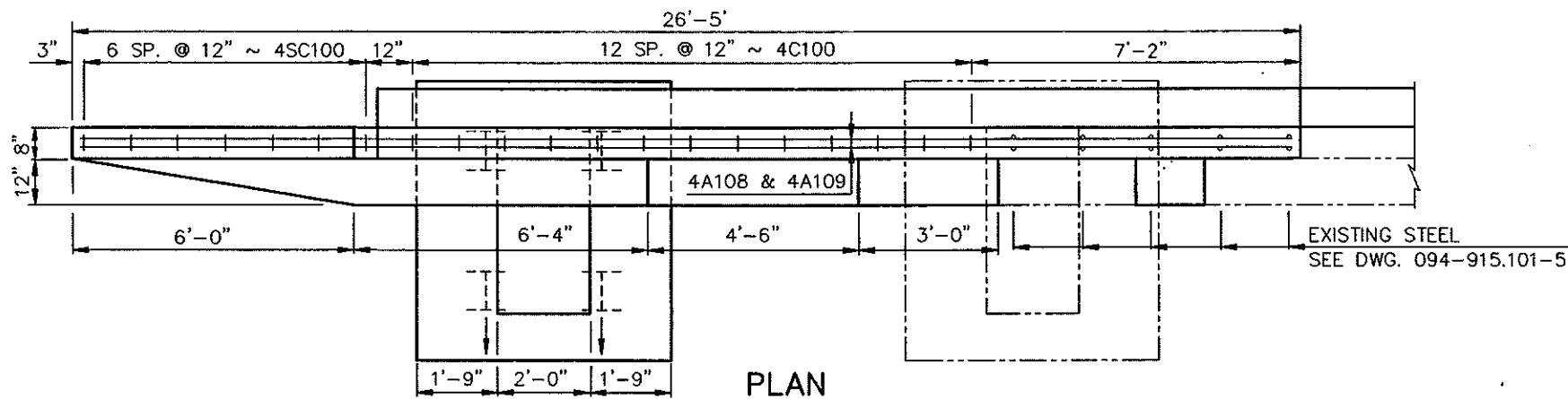
* SEE BEARING ELEVATIONS AND ABUTMENT 6 DETAILS, DWG. 094-915.101-7.

HEART RIVER
 WEST MAIN STREET MANDAN
ABUTMENT 1 & 6
CONCRETE REMOVAL

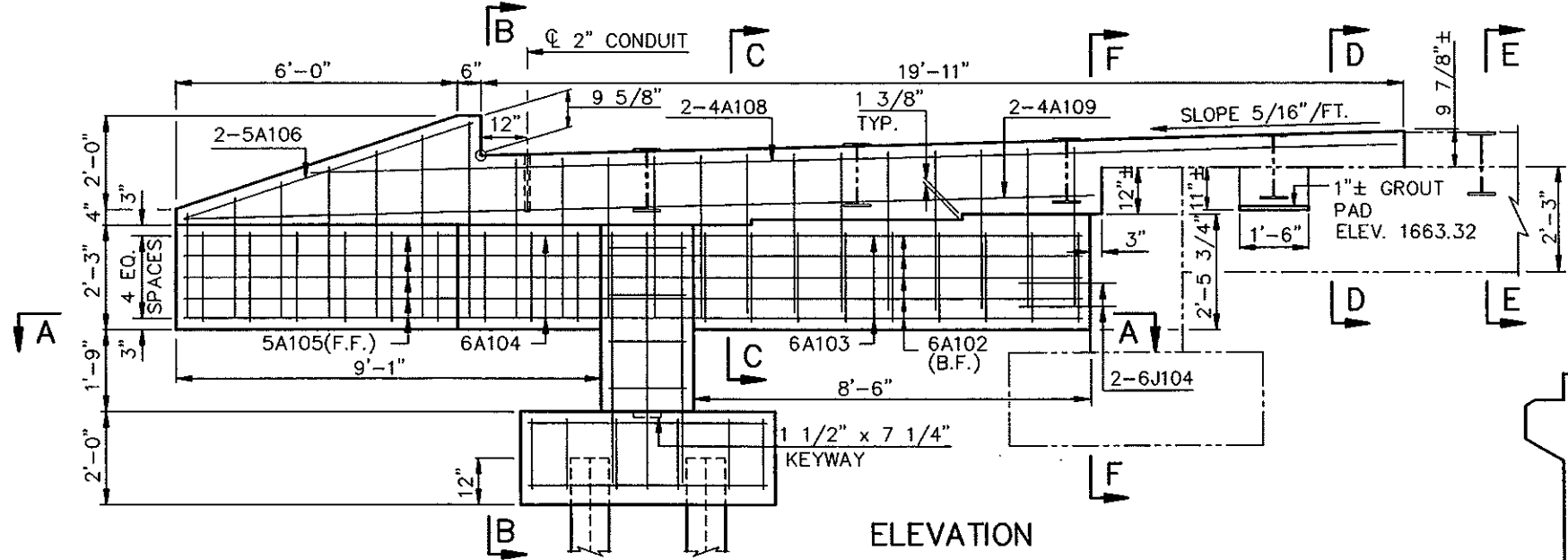
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	180



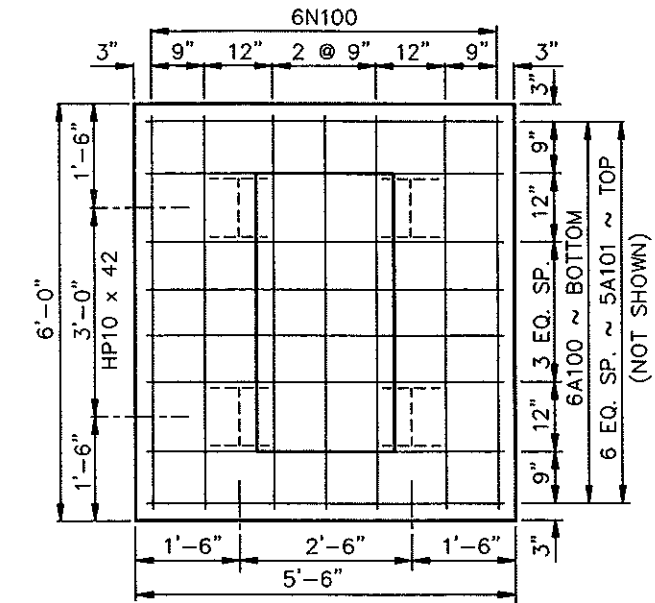
PLAN
SHOWING APPROACH LIP
(FOOTING NOT SHOWN)



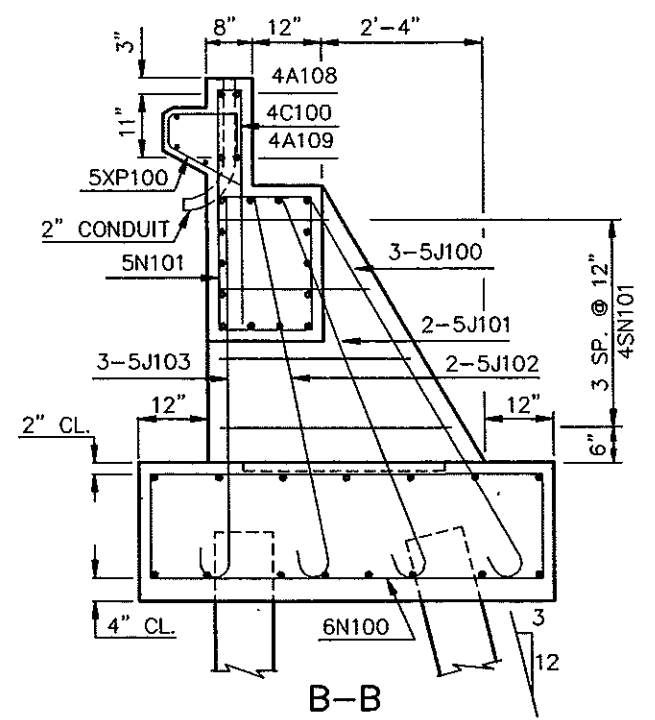
PLAN



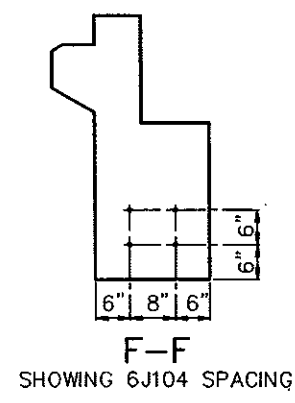
ELEVATION



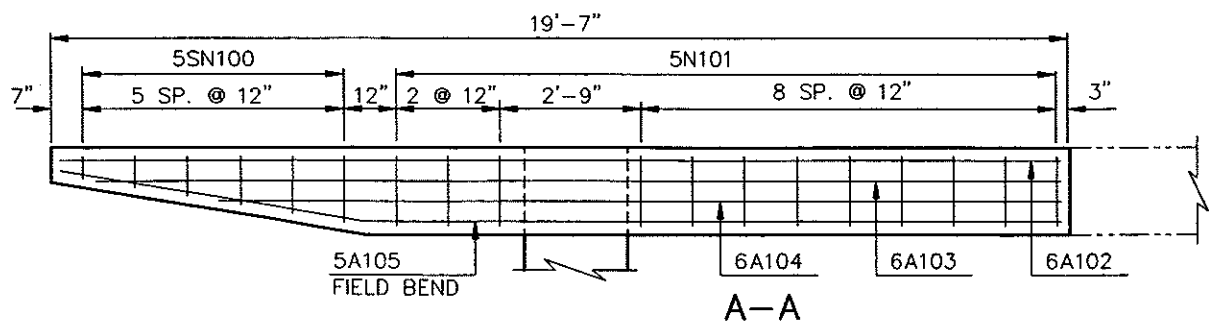
FOOTING PLAN



B-B



F-F
SHOWING 6J104 SPACING



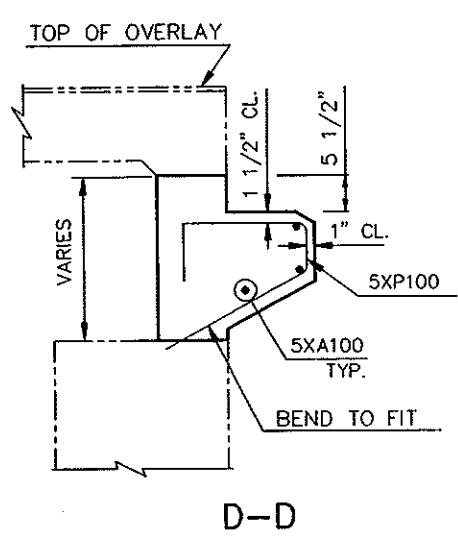
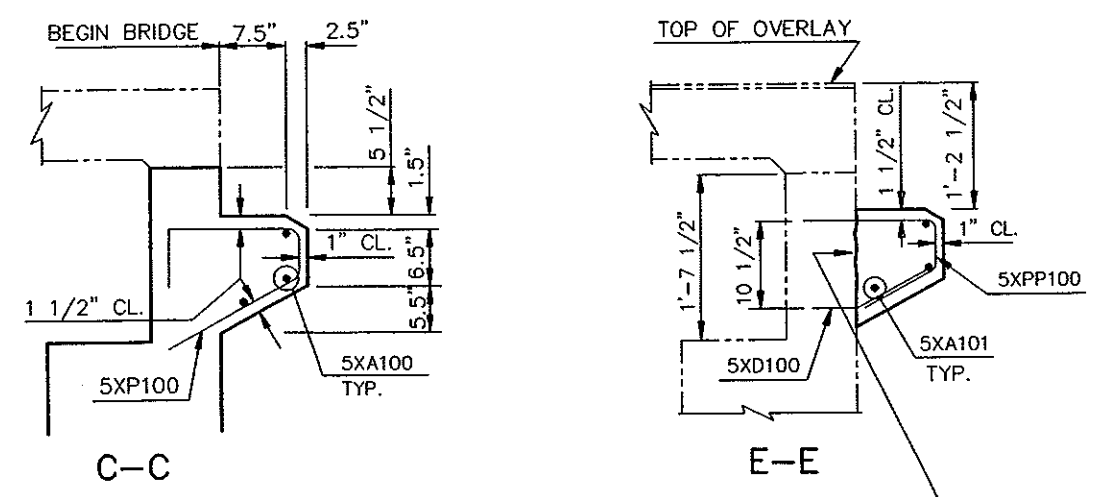
A-A

QUANTITIES	
CLASS AE-3 CONC.	7.7 C.Y.
REINFORCING STEEL	1021 LBS.
REINF. STEEL (EPOXY)	374 LBS.

HEART RIVER
WEST MAIN STREET MANDAN
ABUTMENT 6 DETAILS

NOTE:
FOR SECTION C-C, D-D & E-E
SEE DWG. 095-915.101-8

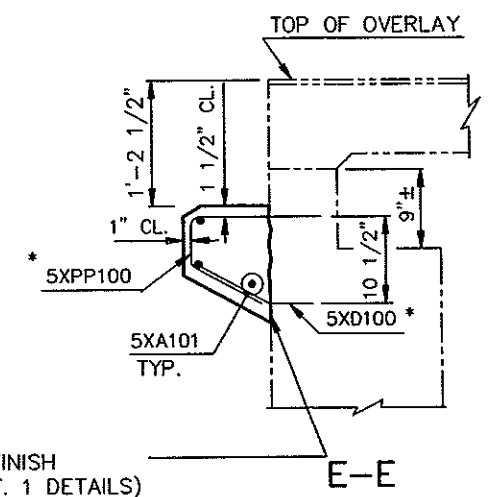
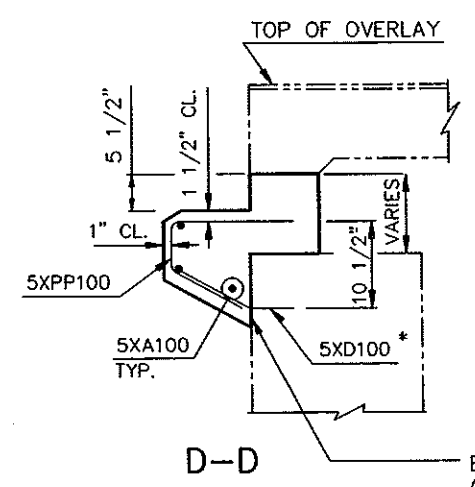
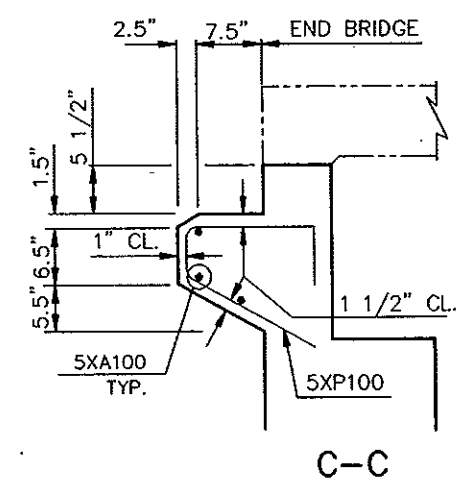
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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BUSH HAMMER FINISH: BEFORE ANY CONCRETE IS PLACED AGAINST EXISTING CONCRETE, THE SURFACE SHALL BE PREPARED WITH A BUSH HAMMER TO PRODUCE A CLEAN, ROUGH SURFACE.

5XD100 & 5XPP100 SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS. ULTIMATE PULLOUT CAPACITY OF 18.6 K.

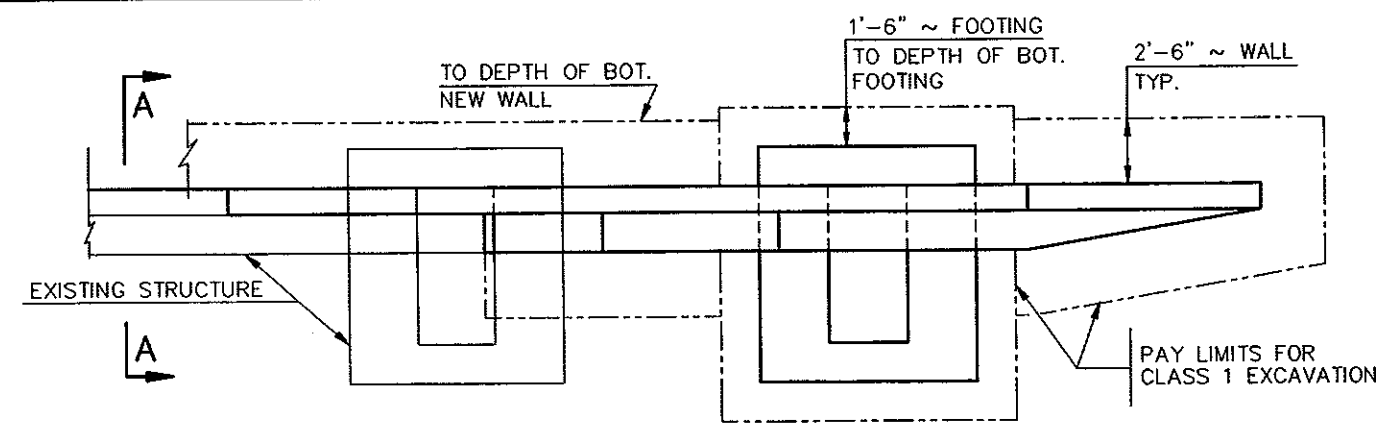
ABUTMENT 1 DETAILS



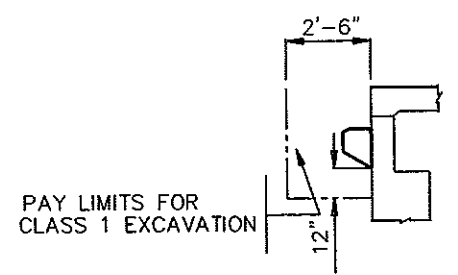
BUSH HAMMER FINISH (SEE NOTE ABUT. 1 DETAILS)

ABUTMENT 6 DETAILS

* SEE ANCHORAGE NOTE ABUTMENT 1

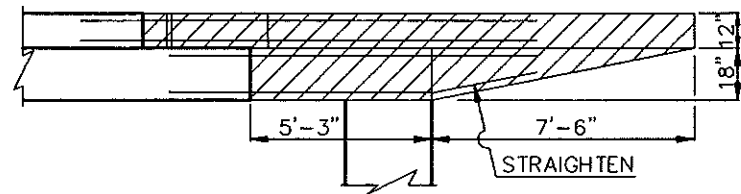


PLAN ~ SHOWING EXCAVATION

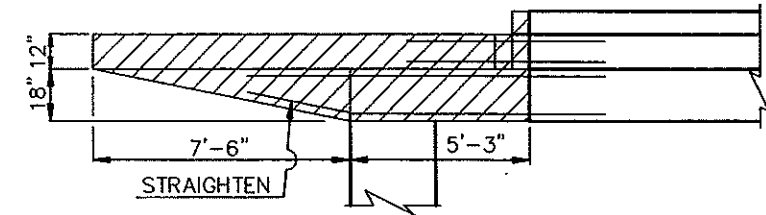


A-A

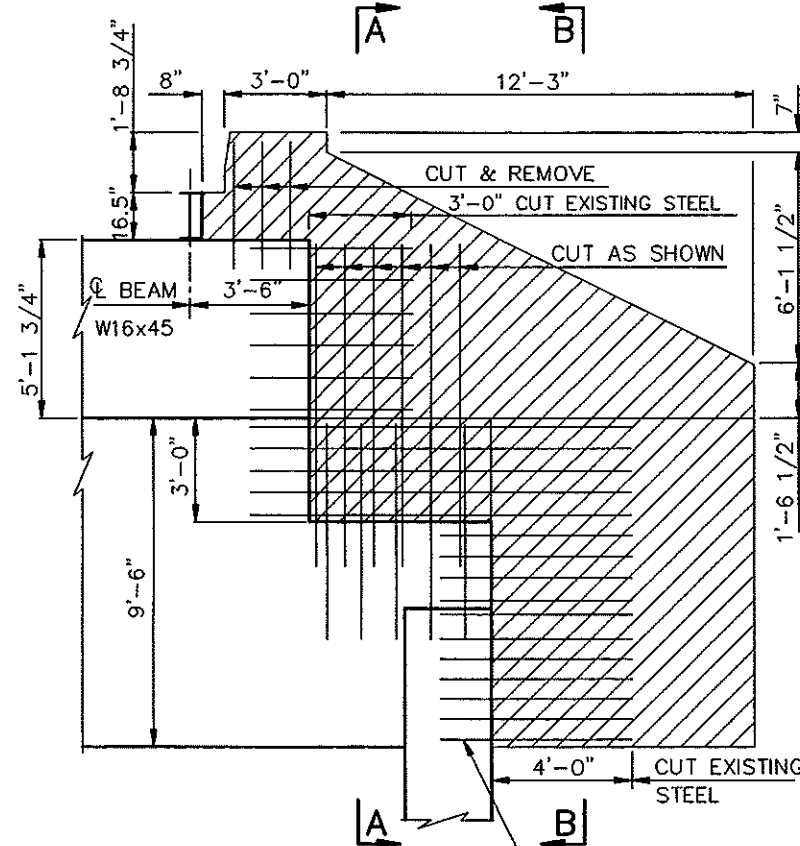
HEART RIVER
WEST MAIN STREET MANDAN
ABUTMENTS 1. & 6
DETAILS



PLAN

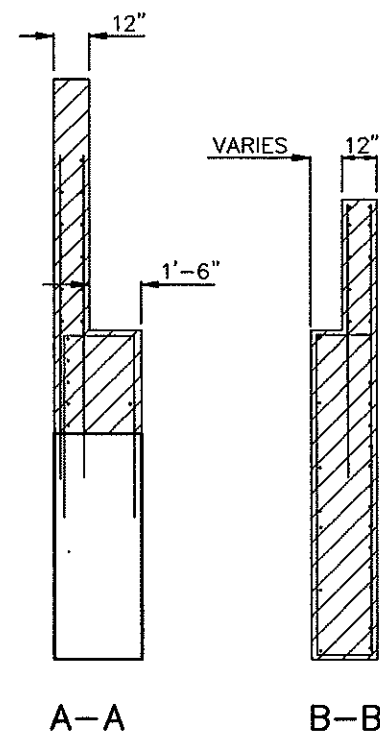


PLAN



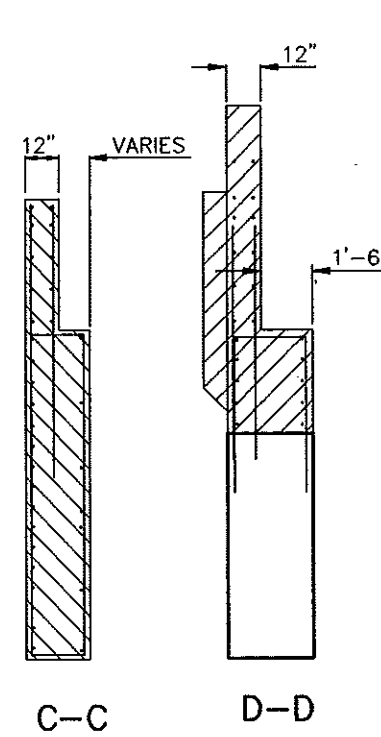
ELEVATION

EXISTING NORTH WING - PIER 2
LOOKING WEST



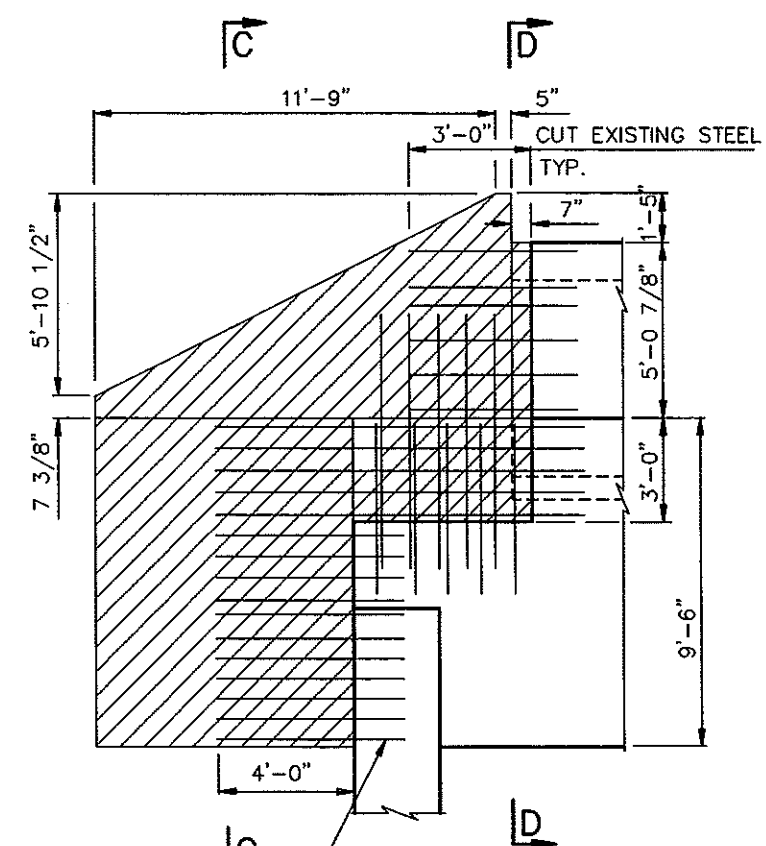
A-A

B-B



C-C

D-D

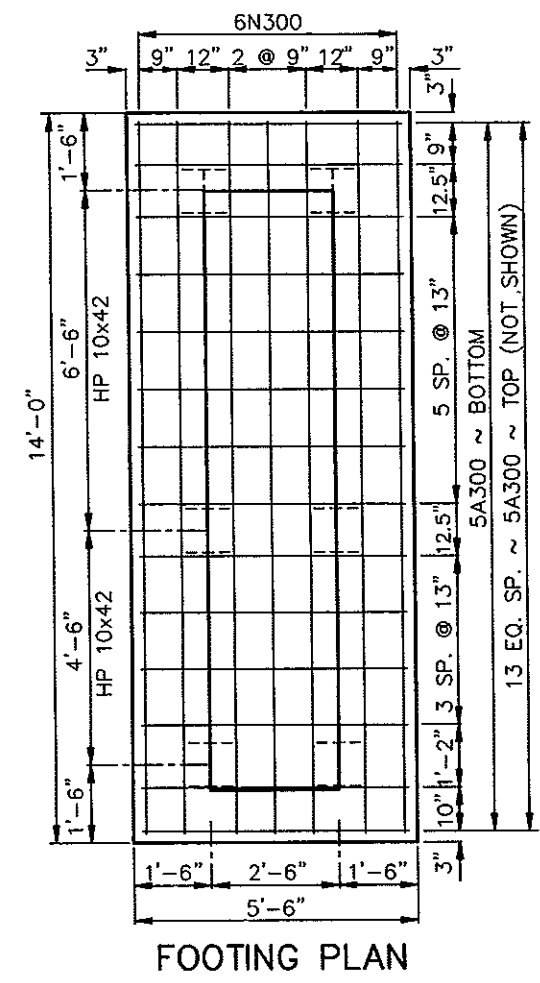
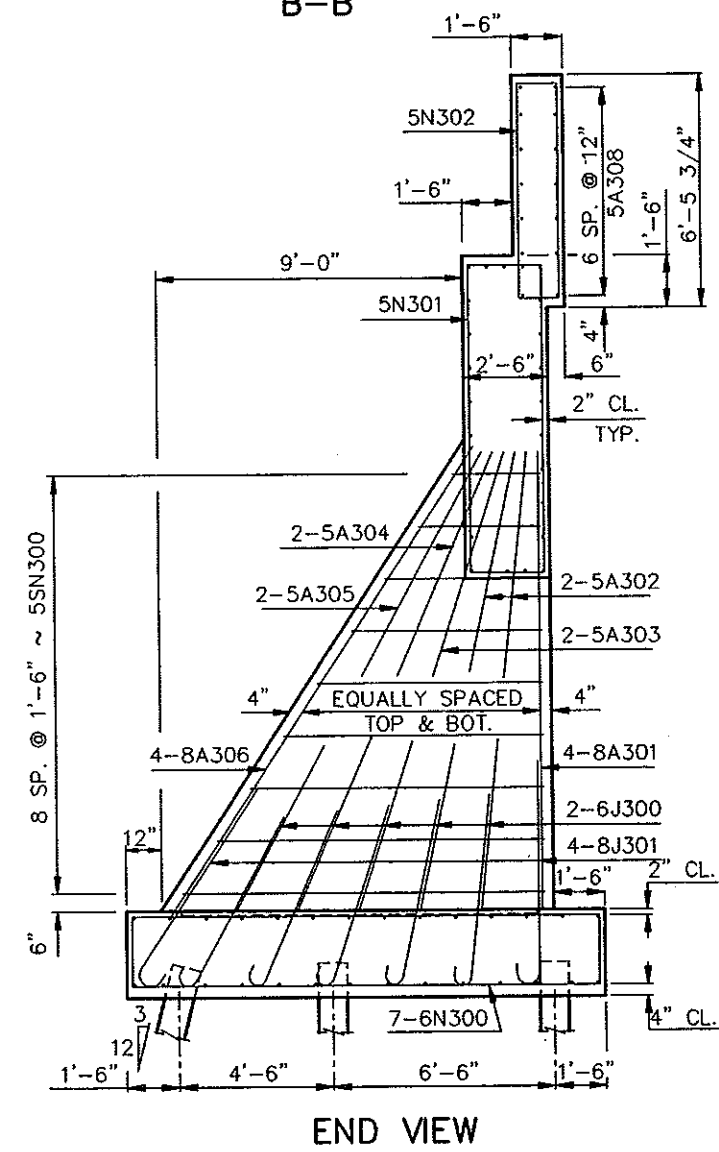
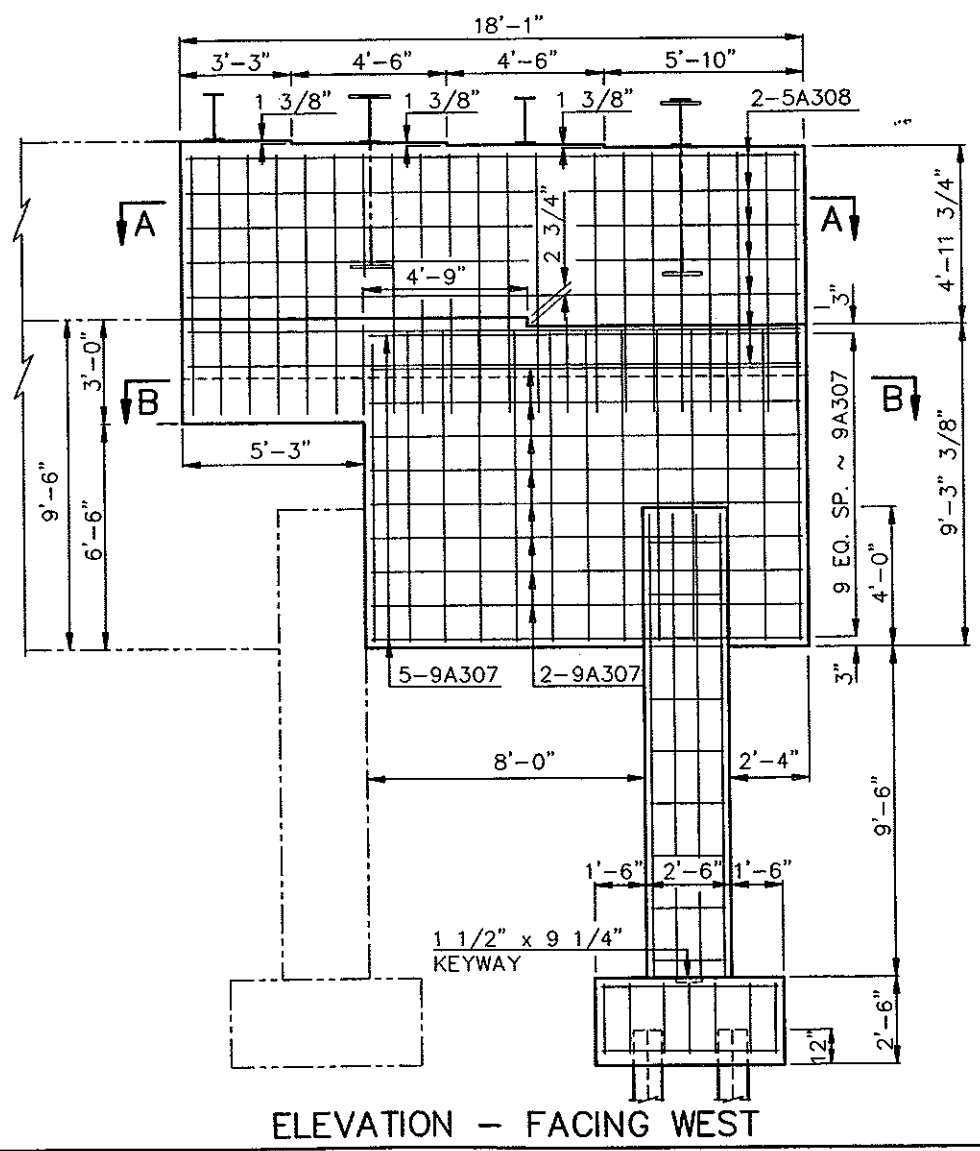
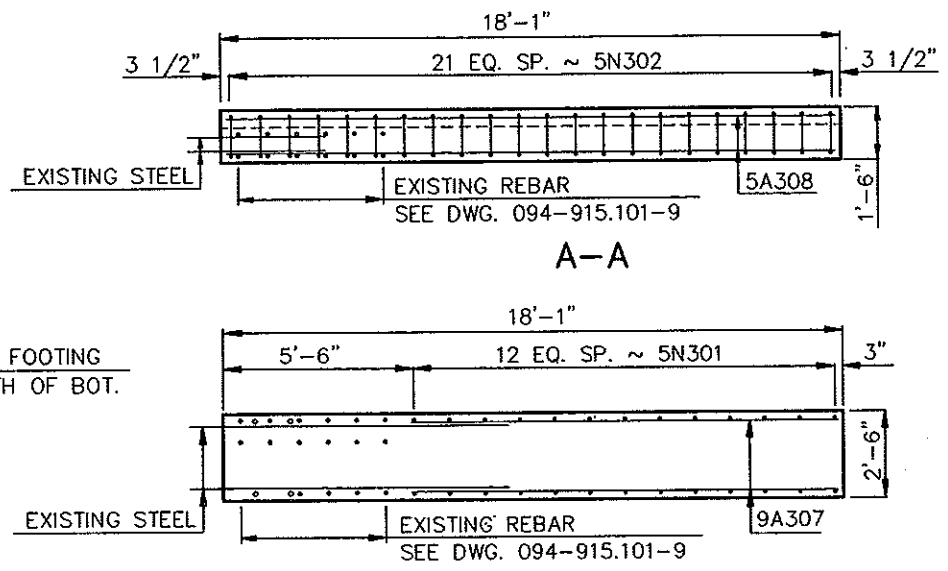
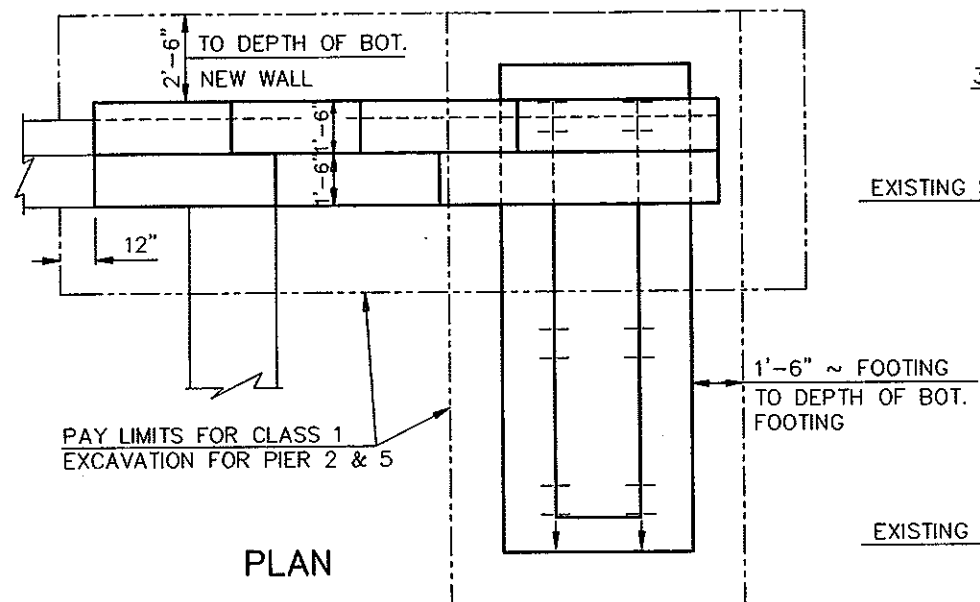


ELEVATION

EXISTING NORTH WING - PIER 5
LOOKING EAST

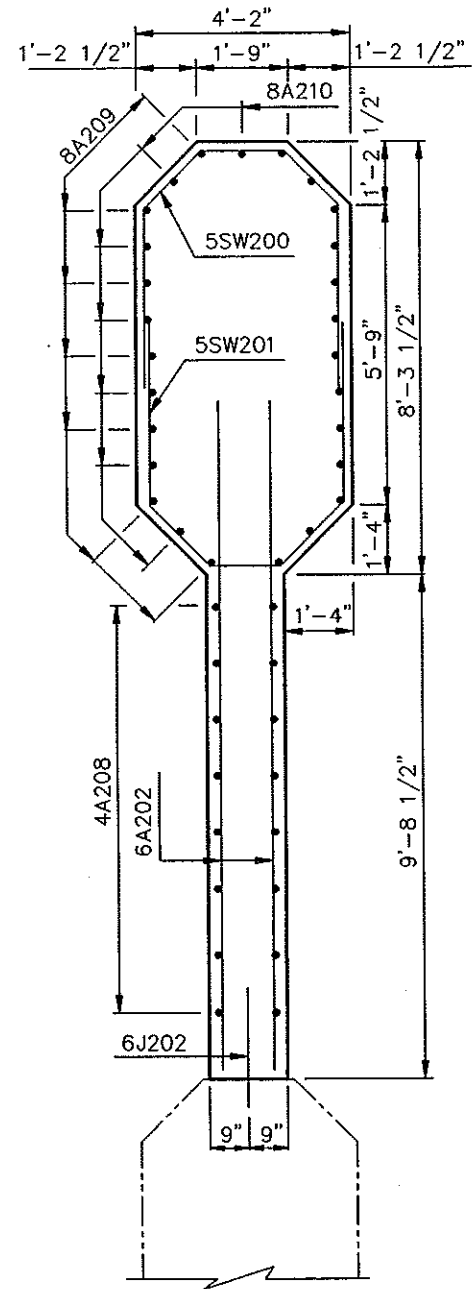
 CONCRETE TO BE REMOVED

HEART RIVER
WEST MAIN STREET MANDAN
PIER 2 & 5
CONCRETE REMOVAL

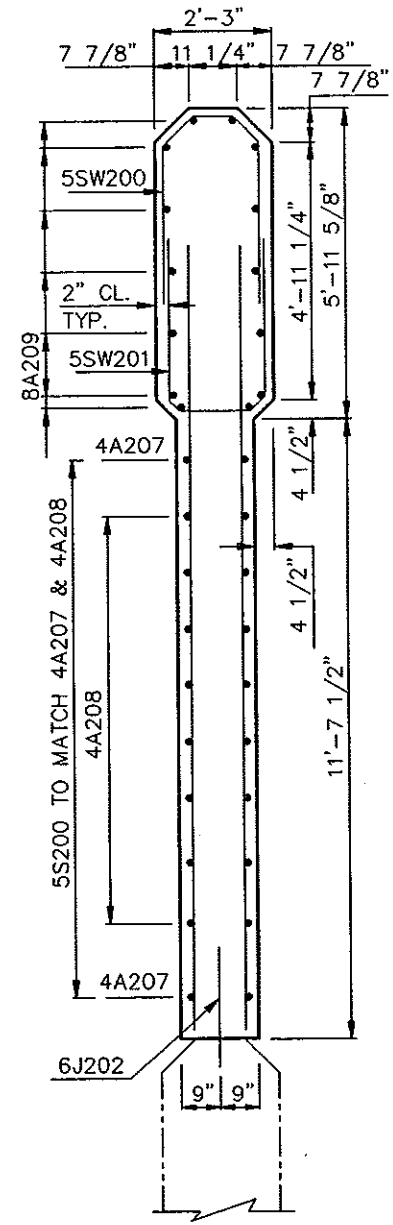


QUANTITIES	
CLASS AE-3 CONC.	33.2 C.Y.
REINFORCING STEEL	3585 LBS.

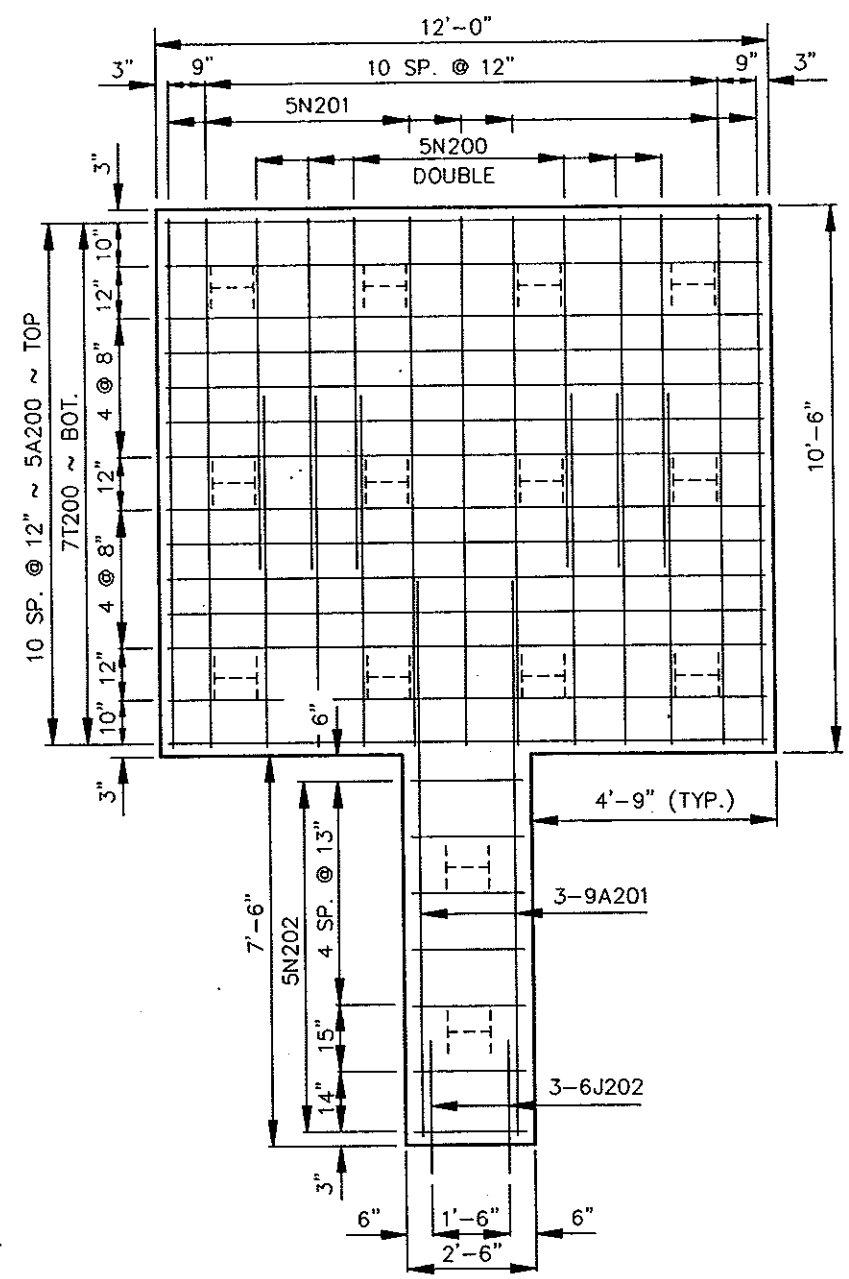
HEART RIVER
WEST MAIN STREET MANDAN
PIER NO. 2



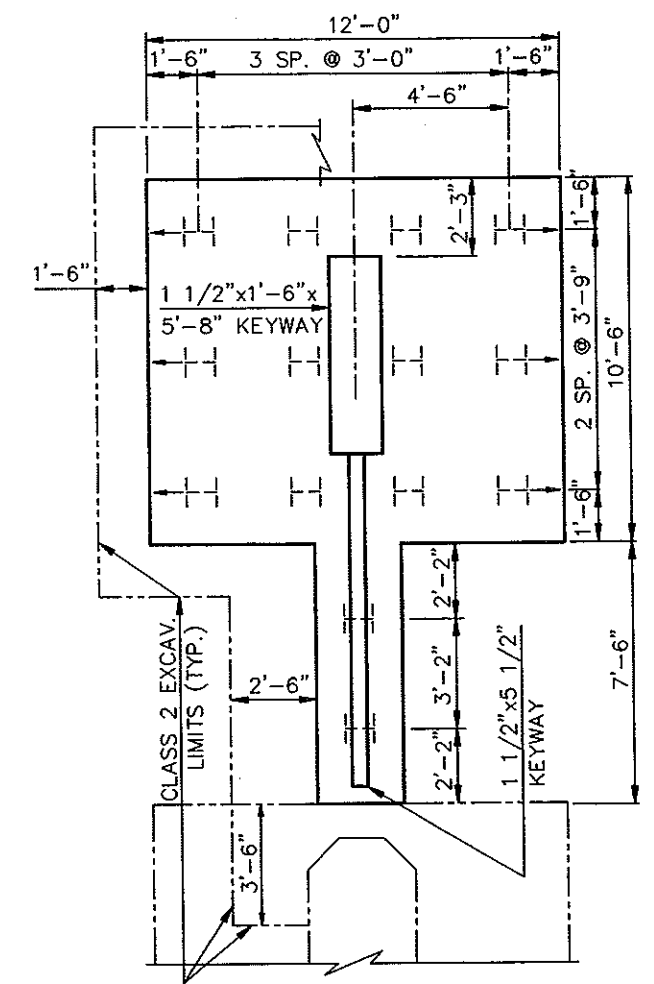
C-C



B-B



FOOTING PLAN
SHOWING REINFORCING



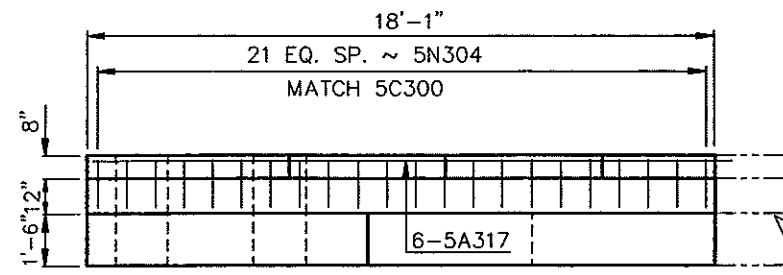
FOOTING PLAN
SHOWING PILING & EXCAVATION

6J202 SHALL BE INSTALLED, ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS.

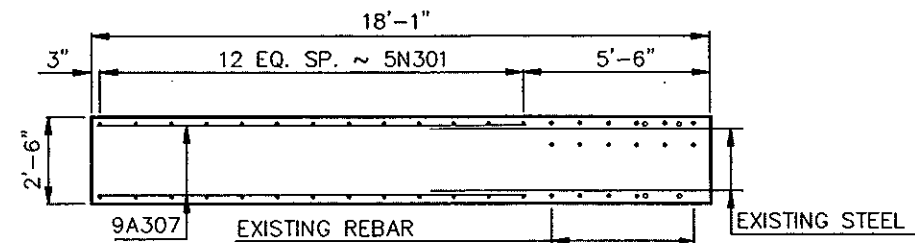
QUANTITIES (ONE PIER)	
CLASS AE-3 CONC.	63.8 C.Y.
REINFORCING STEEL	6182 LBS.

HEART RIVER
WEST MAIN STREET MANDAN

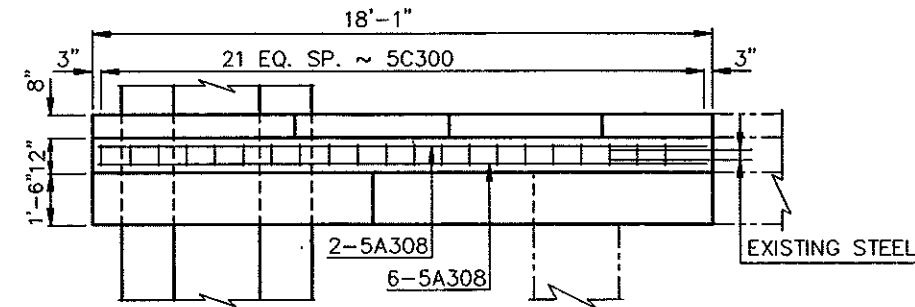
PIERS 3 & 4



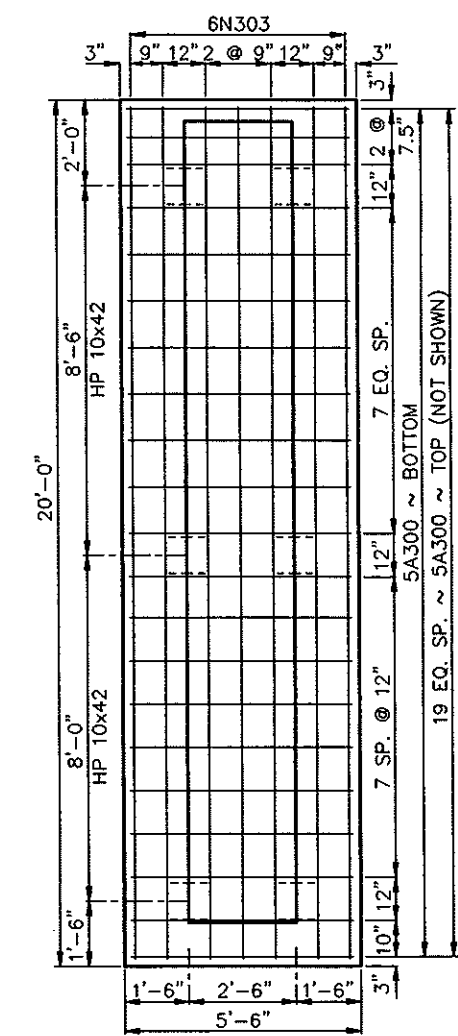
A-A
SHOWING REBAR IN APPROACH LIP ONLY



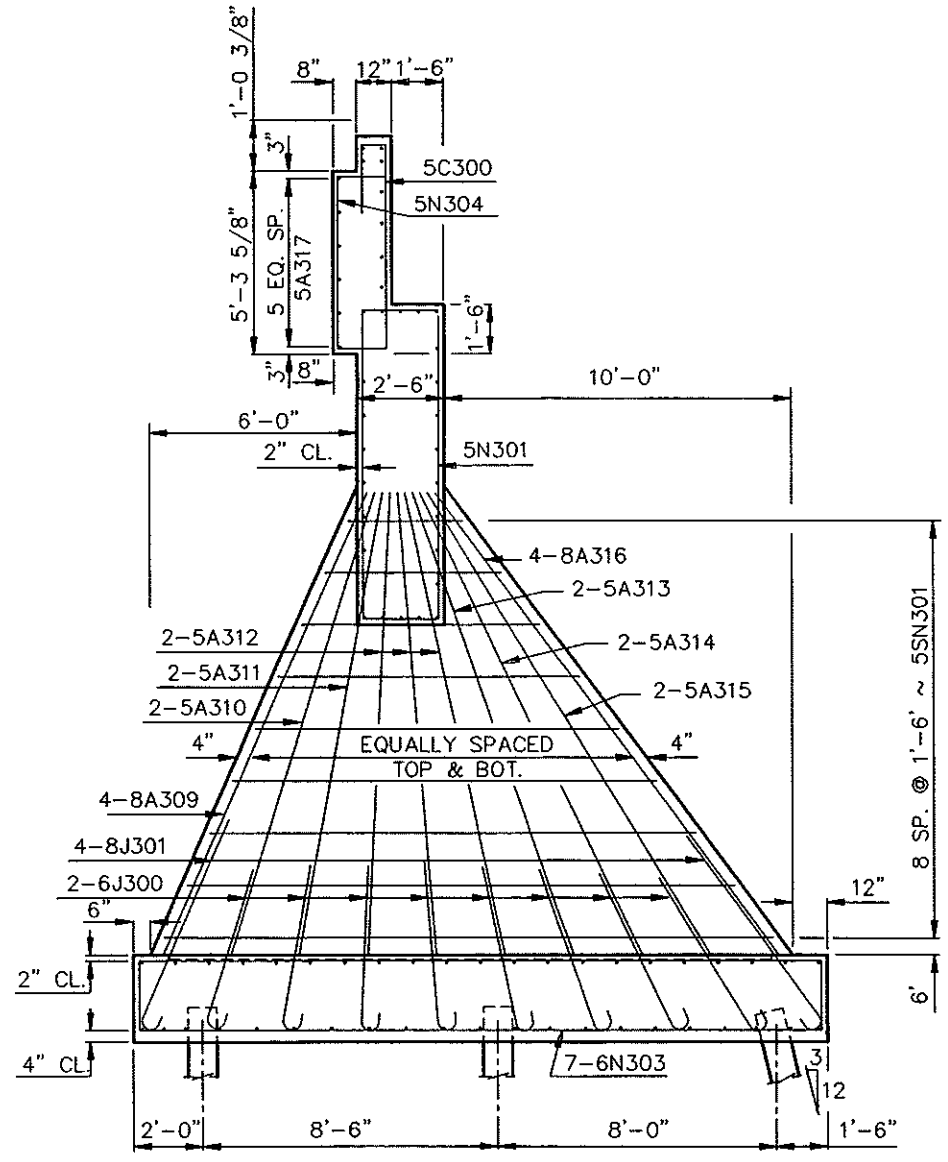
B-B



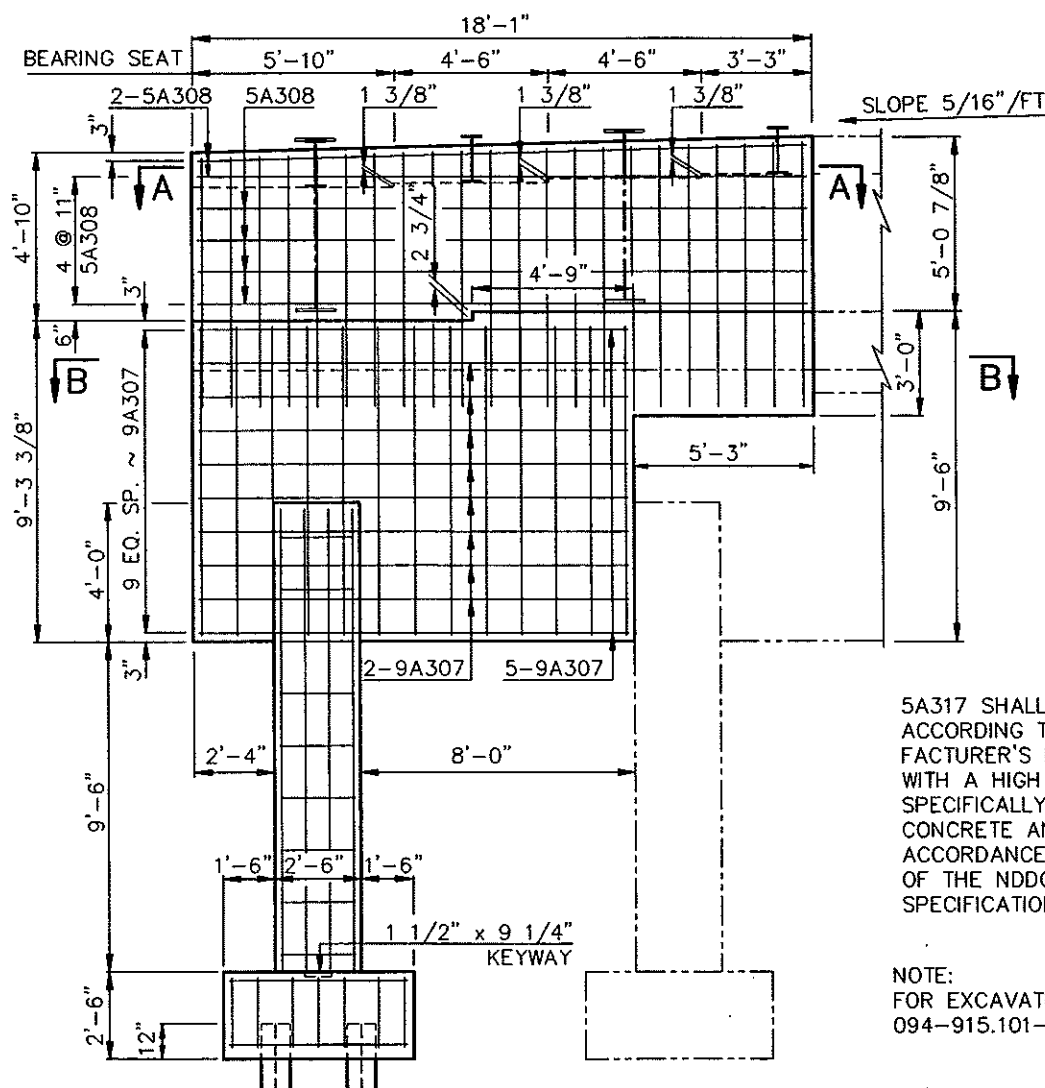
PLAN



FOOTING PLAN



END VIEW



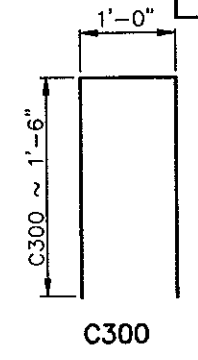
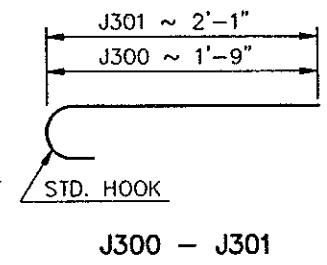
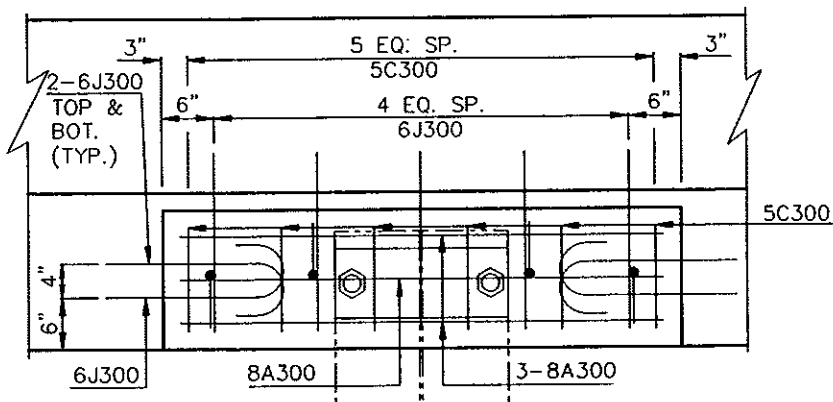
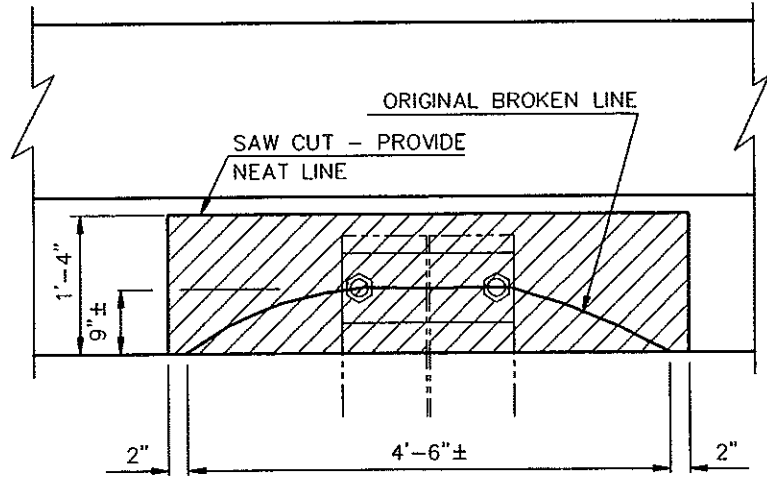
ELEVATION - FACING EAST

5A317 SHALL BE INSTALLED, ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS.

NOTE:
FOR EXCAVATION LIMITS SEE DWG. 094-915.101-10

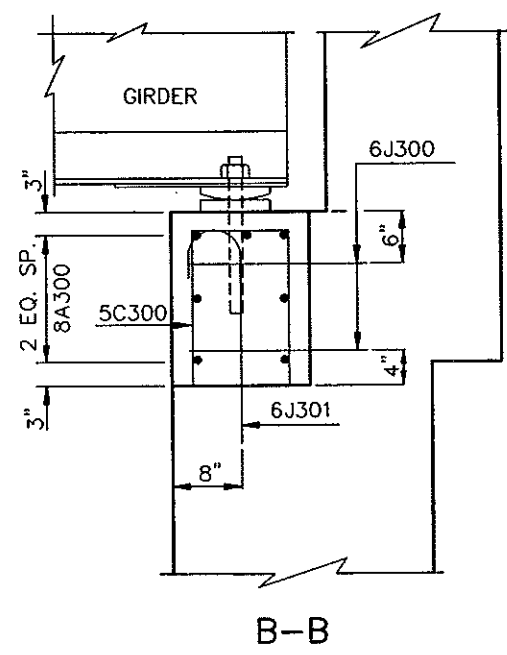
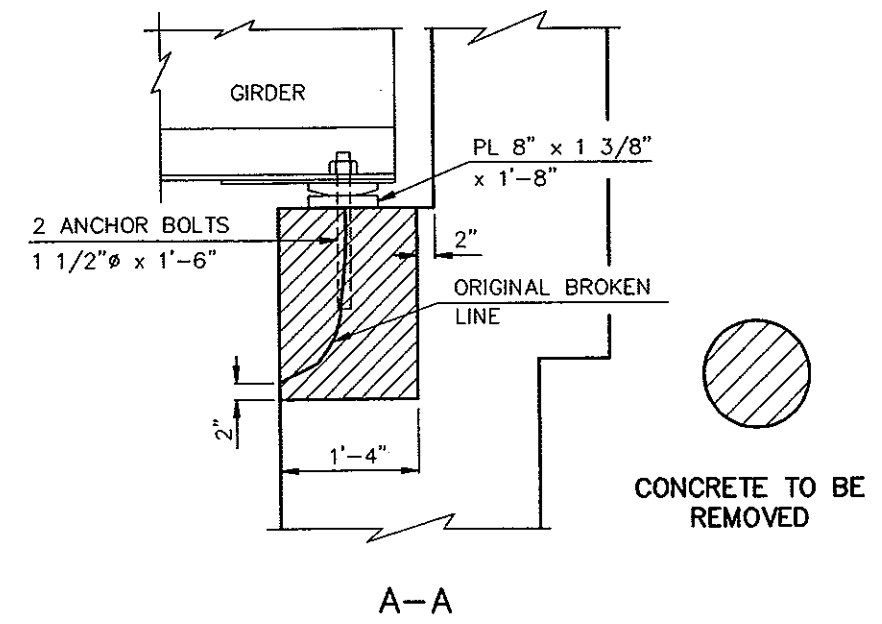
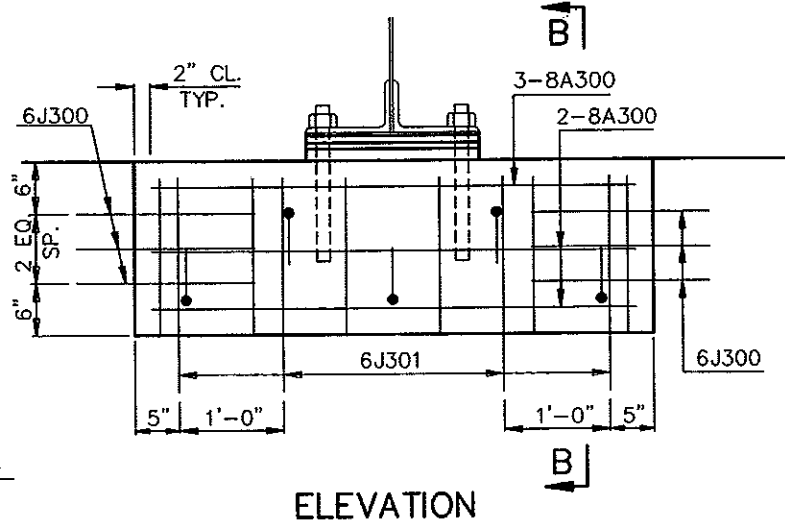
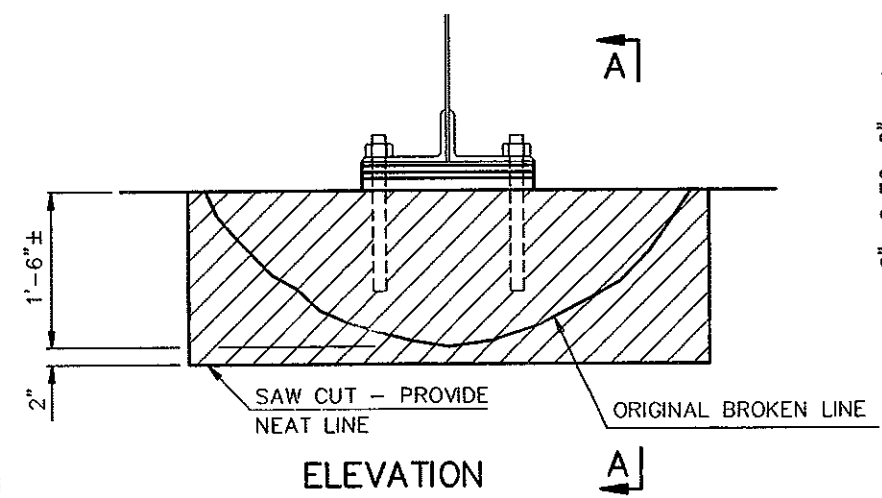
QUANTITIES		
CLASS AE-3 CONC.	40.7	C.Y.
REINFORCING STEEL	3947	LBS.

HEART RIVER
WEST MAIN STREET MANDAN
PIER NO. 5



BAR LIST			
SIZE	MARK	NO.	LENGTH
8	A300	7	4'-6"
5	C300	6	4'-0"
6	J300	11	2'-5"
6	J301	4	2'-9"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS.)	CONCRETE (C.Y.)
166	0.4



THE REPAIRS TO THE SOUTH GIRDER SHALL BE MADE DURING CONSTRUCTION PHASE 3.

THE REPAIR CONCRETE SHALL BE CLASS AE-3 WITH $F'_c = 3000$ PSI. THE REINFORCING STEEL SHALL BE $F_y = 60,000$ PSI.

TEMPORARY SUPPORT OF THE SOUTH GIRDER DURING THE REPAIR SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT PLANS FOR THE TEMPORARY SUPPORT TO THE ENGINEER FOR APPROVAL BEFORE THE REPAIR BEGINS. THE TEMPORARY SUPPORT SHALL REMAIN IN PLACE UNTIL THE CONCRETE HAS REACHED 70 PER CENT OF ITS DESIGN STRENGTH.

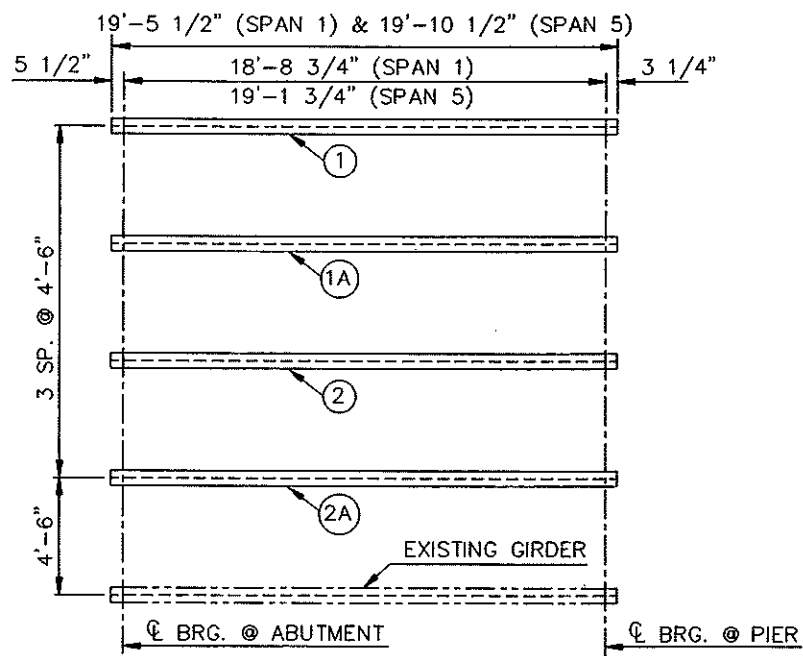
J300 AND J301 SHALL BE INSTALLED, ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS.

SOME, POSSIBLY ALL OF THE REINFORCING SHOWN MAY BE WAIVED IF SUFFICIENT EXISTING REINFORCING CAN BE SALVAGED DURING CONCRETE REMOVAL. THE DOT FIELD ENGINEER SHALL DISCUSS THIS WITH THE BRIDGE DIVISION AT THE TIME OF THE REPAIR.

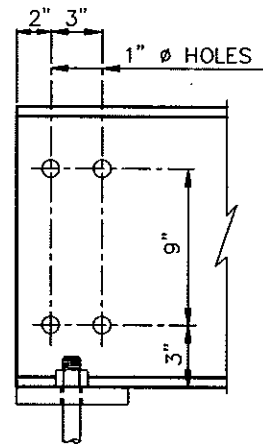
CRACKS AT THE BEARINGS OF THE OTHER THREE EXISTING GIRDERS AT PIER 5 SHALL BE REPAIRED BY PRESSURE INJECTION EPOXY. THE CRACKS ARE APPROXIMATELY 2 FEET LONG PER BEARING. THE INJECTION PROCEDURES SHALL BE DONE BY EXPERIENCED PERSONNEL.

ALL MATERIAL, EQUIPMENT, TEMPORARY SUPPORT AND LABOR REQUIRED TO REPAIR THE BEARING SEATS SHALL BE INCIDENTAL TO THE PAY ITEM "PIER REPAIR".

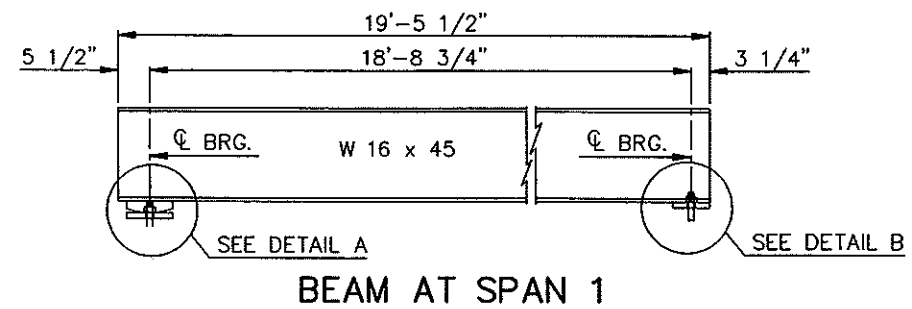
HEART RIVER
WEST MAIN STREET MANDAN
PIER NO. 5 REPAIR
SOUTH GIRDER



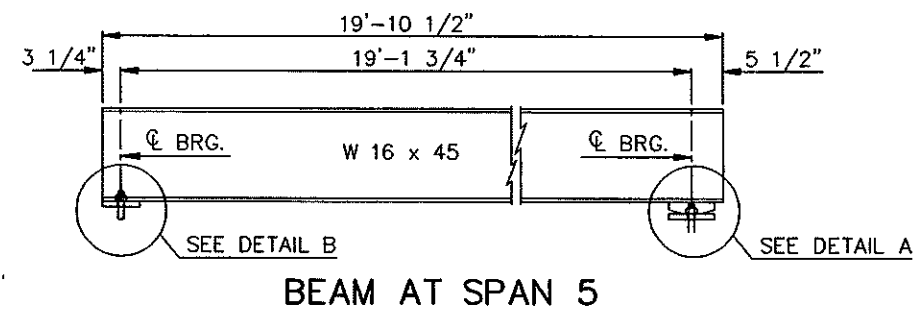
GIRDER LAYOUT SPAN 1 & SPAN 5



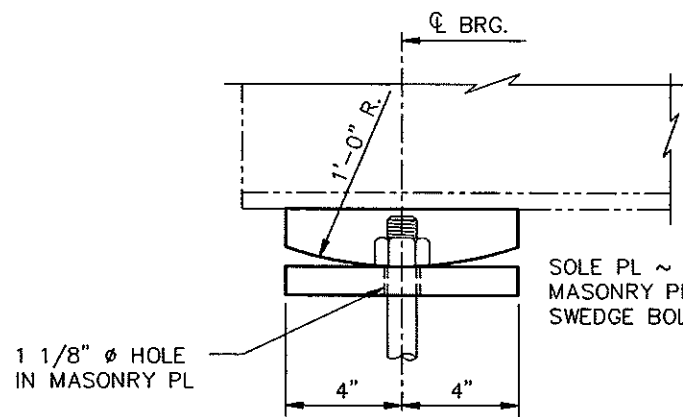
BEAM END @ PIERS



BEAM AT SPAN 1

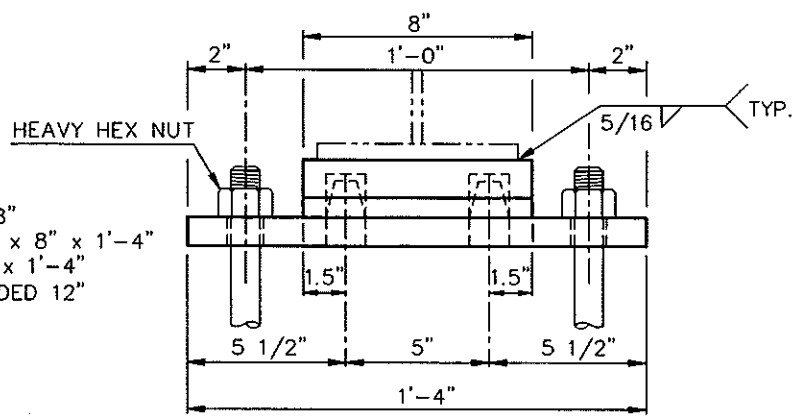


BEAM AT SPAN 5

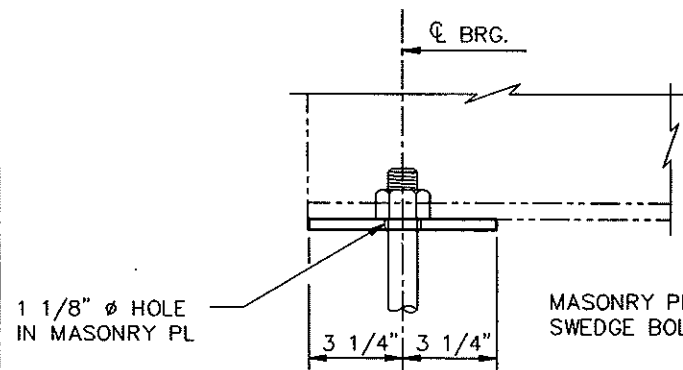


SOLE PL ~ 8" x 2" x 8"
MASONRY PL ~ 1 3/8" x 8" x 1'-4"
SWEDGE BOLTS ~ 1" Ø x 1'-4"
EMBEDDED 12"

DETAIL A

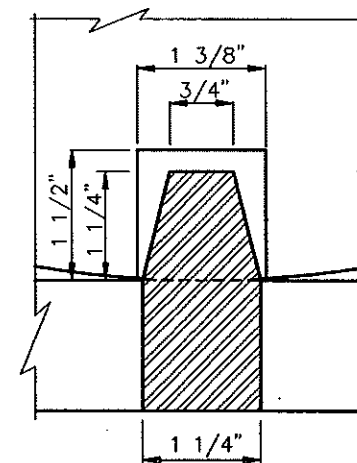
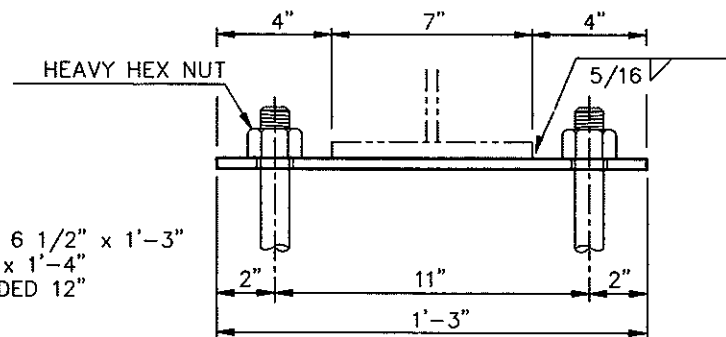


DETAIL B



MASONRY PL ~ 3/8" x 6 1/2" x 1'-3"
SWEDGE BOLTS ~ 1" Ø x 1'-4"
EMBEDDED 12"

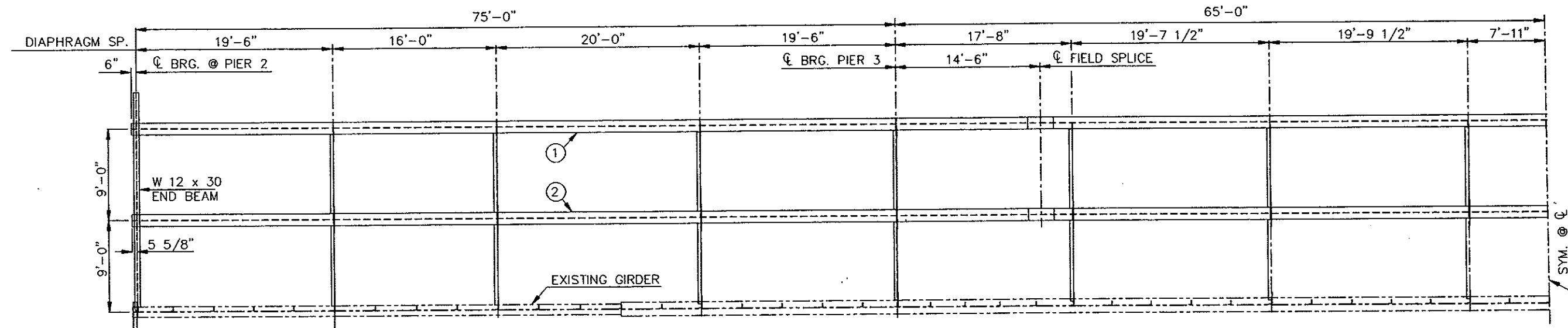
DETAIL B



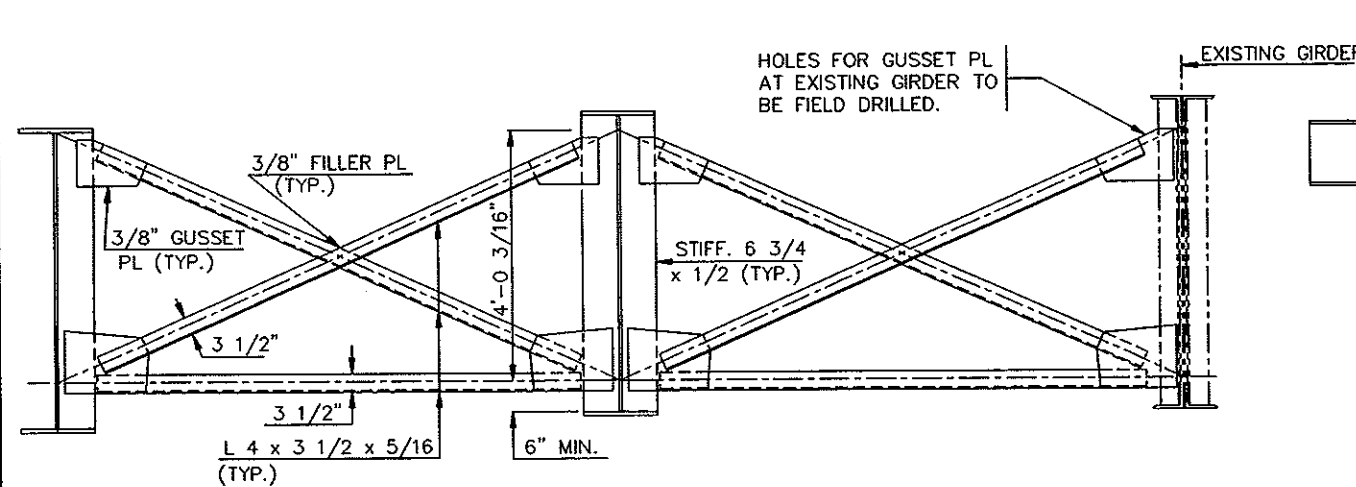
SECTION AT PINTLE

W16x45 ~ SHALL MEET THE LONGITUDINAL CHARP V-NOTCH TEST REQUIREMENTS FOR ZONE 2.

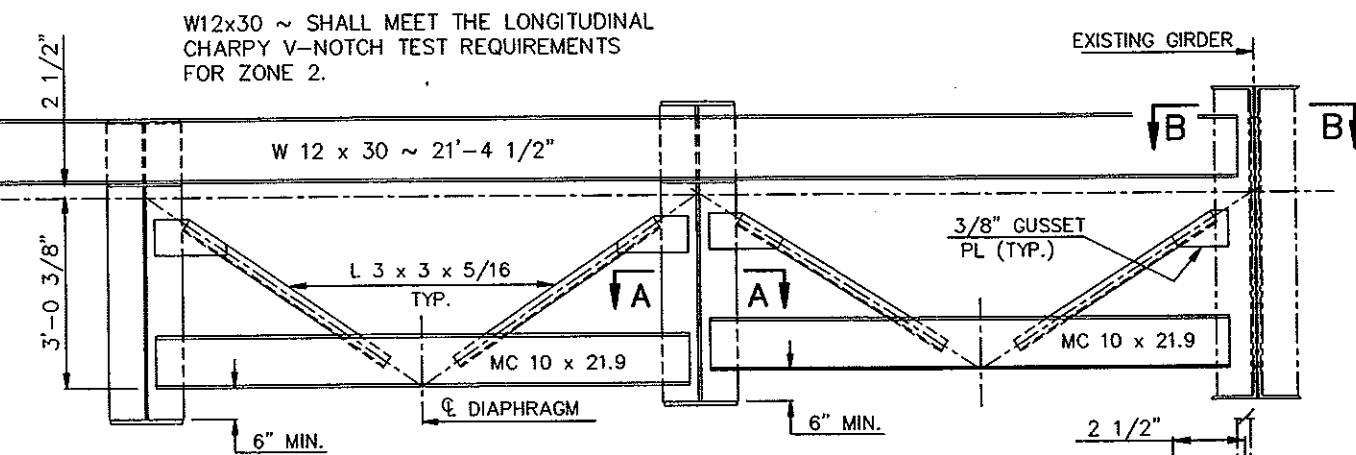
HEART RIVER
WEST MAIN STREET MANDAN
**STEEL LAYOUT
BEARING DETAILS**
SPANS 1 & 5



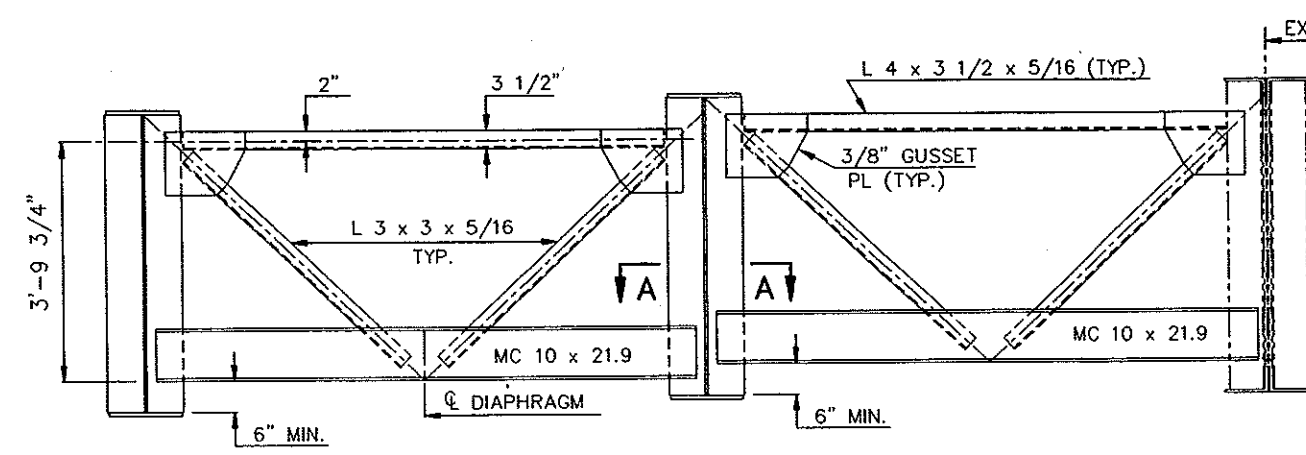
HALF GIRDER LAYOUT



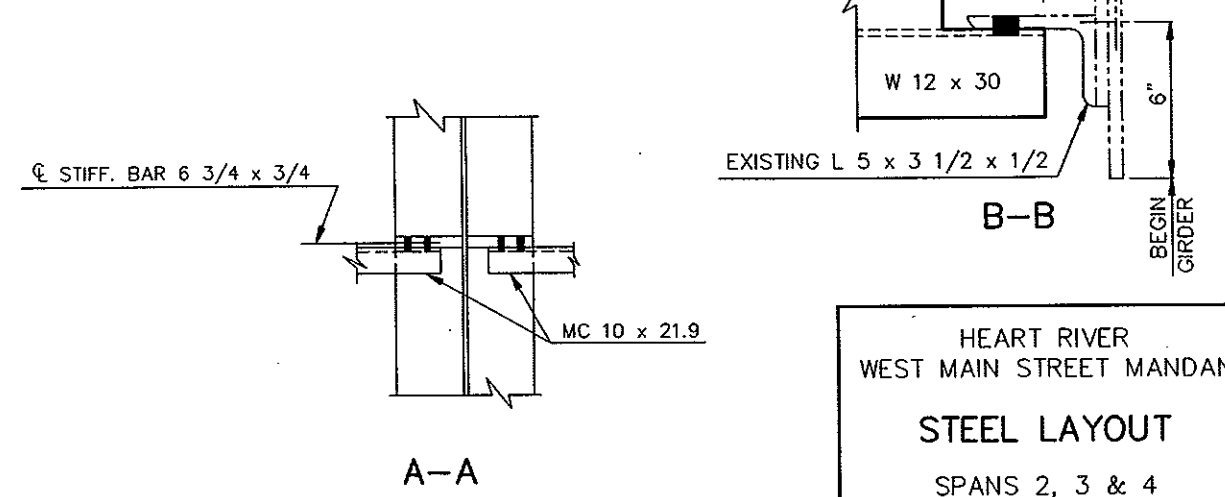
TYPICAL INTERMEDIATE DIAPHRAGM



PIER 2 DIAPHRAGM

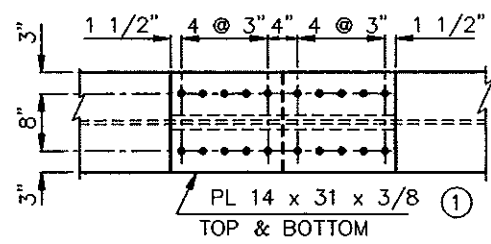
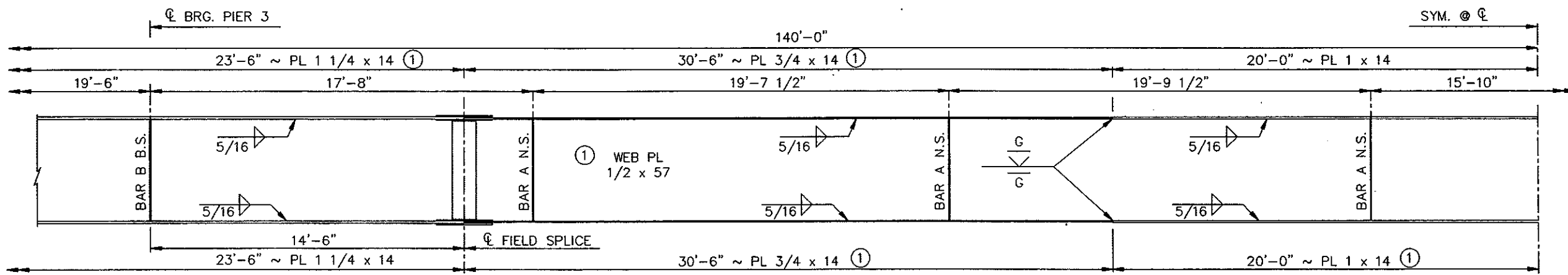
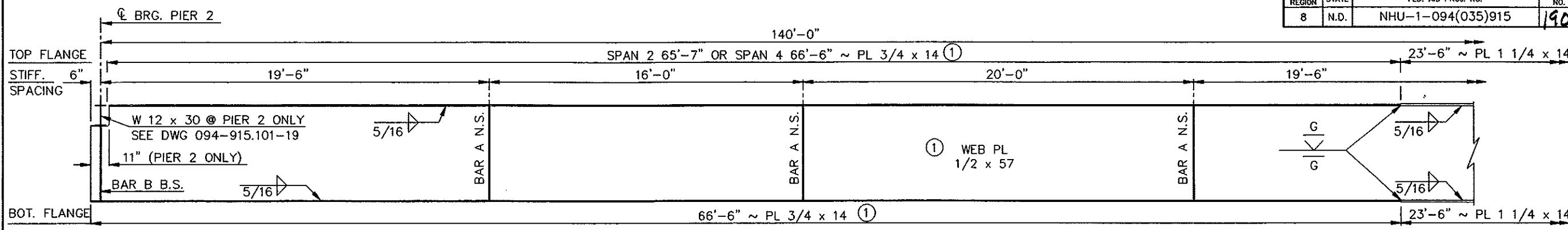


TYPICAL PIER DIAPHRAGM @ PIERS 3, 4 & 5

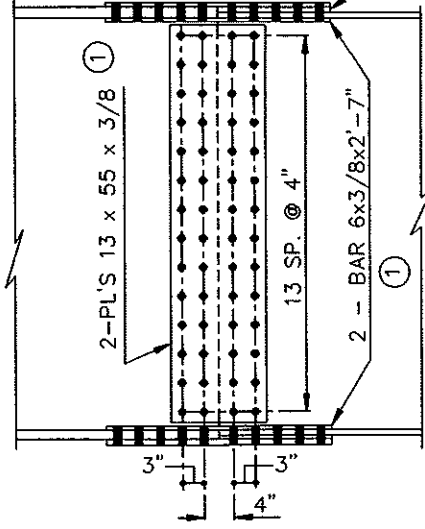


HEART RIVER
WEST MAIN STREET MANDAN
STEEL LAYOUT
SPANS 2, 3 & 4

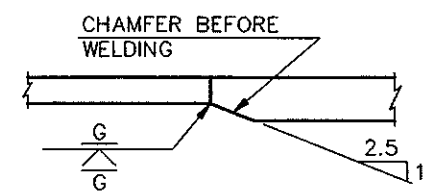
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	190



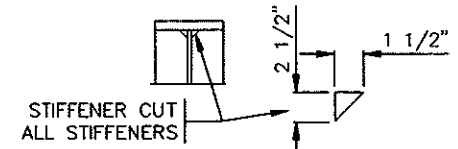
FILLER PL 1/2 x 14 x 1'-3 1/2" TYP. TOP & BOT.



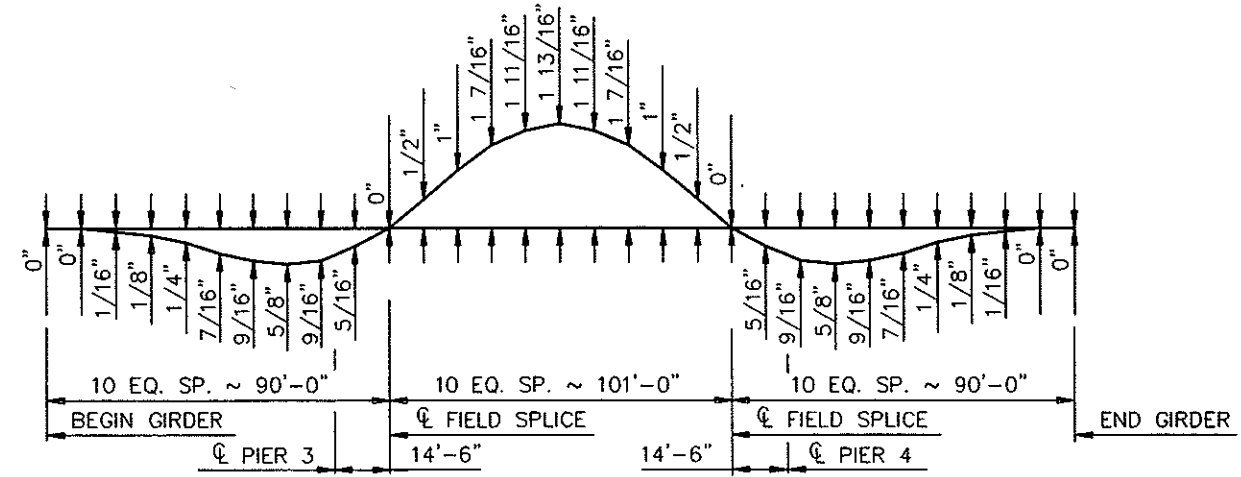
FIELD SPLICE DETAILS



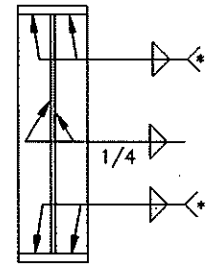
SHOP FLANGE SPLICE



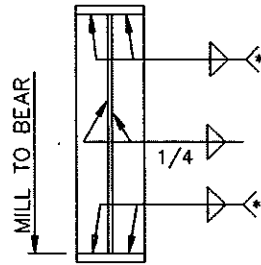
STIFFENER CUT ALL STIFFENERS



SHOP CAMBER DIAGRAMS



BAR A (6 3/4 x 1/2)



BAR B (6 3/4 x 3/4)

NOMENCLATURE:

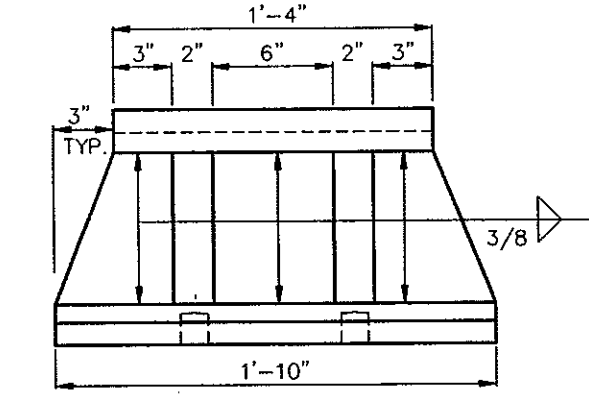
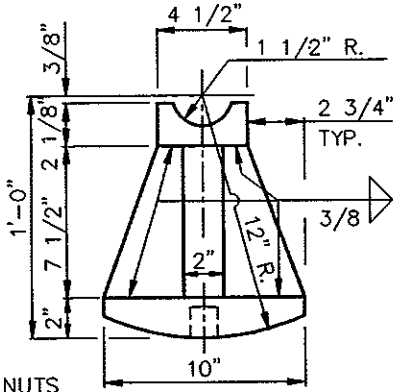
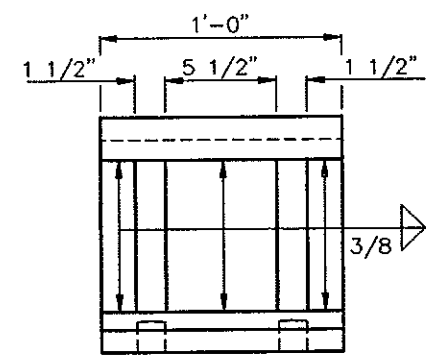
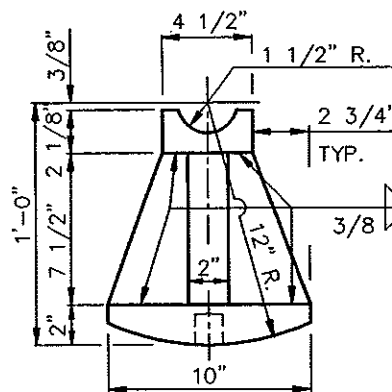
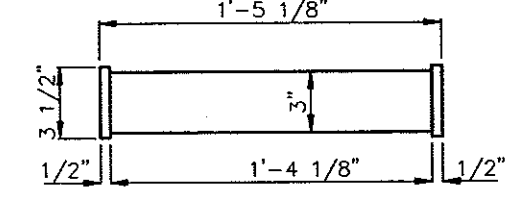
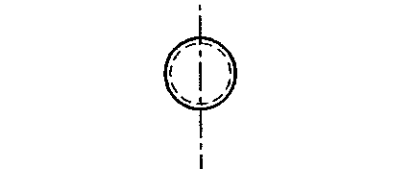
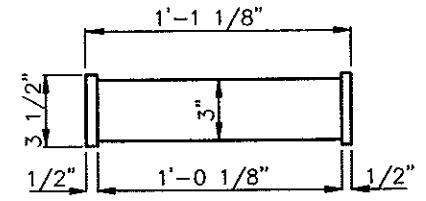
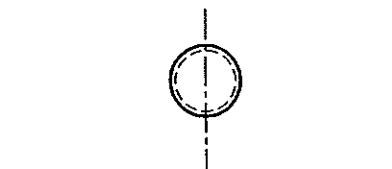
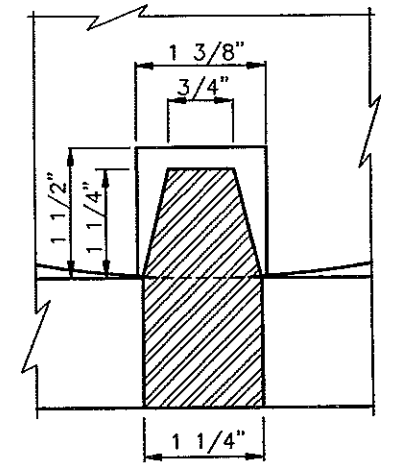
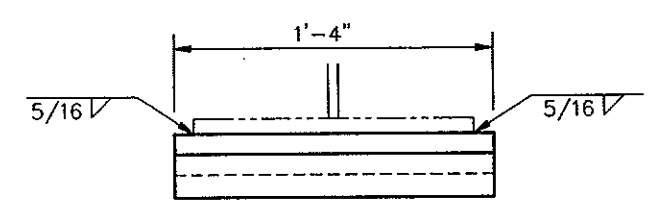
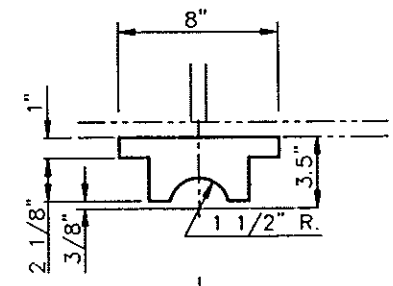
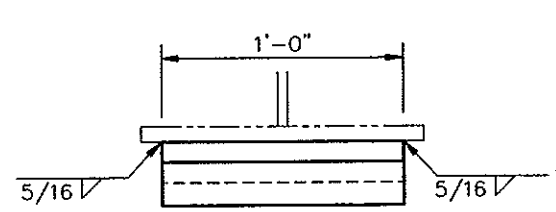
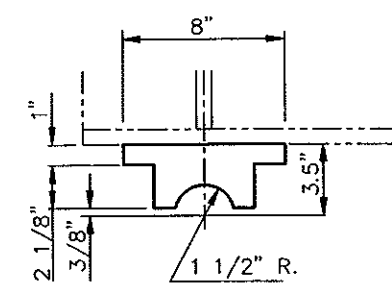
N.S. = NEAR SIDE
B.S. = BOTH SIDE

WELD SIZE	FLANGE THICKNESS
1/4	0 TO 3/4
5/16	OVER 3/4 TO 1 3/4

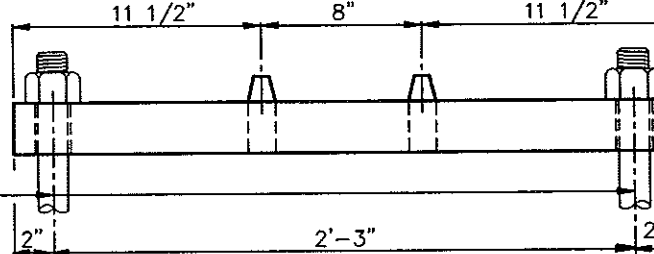
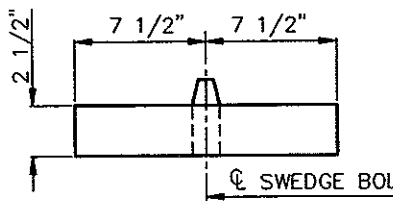
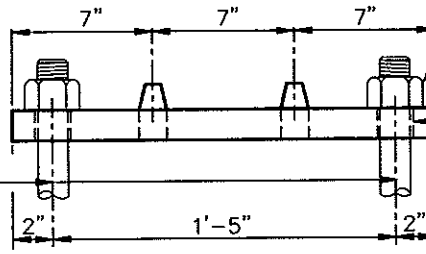
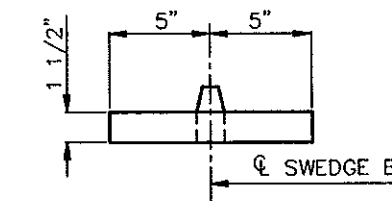
① ALL DESIGNATED MATERIALS SHALL MEET THE LONGITUDINAL CHARTY V-NOTCH TEST REQUIREMENTS FOR ZONE 2.

THE ELEVATION DETAILS SHOWN REPRESENT GIRDER NO. 1. GIRDER 2 IS SIMILAR AND SHALL BE FABRICATED ACCORDINGLY.

HEART RIVER
WEST MAIN STREET MANDAN
STEEL LAYOUT



SECTION AT PINTLE



HEAVY HEX NUTS

HEAVY HEX NUTS

1 5/8" Ø HOLES TYP.

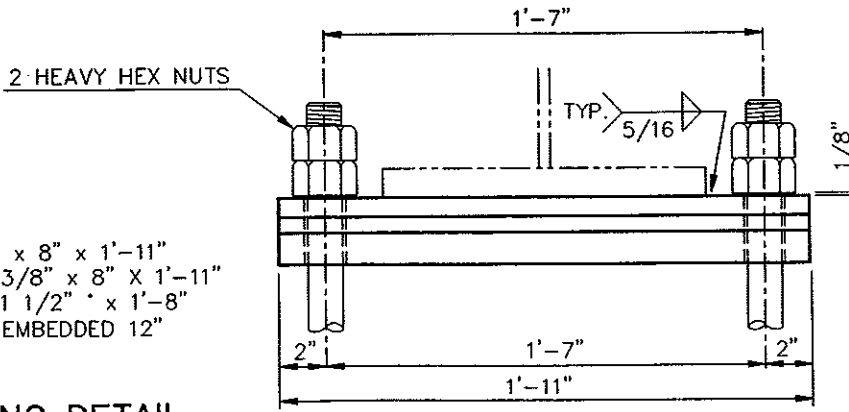
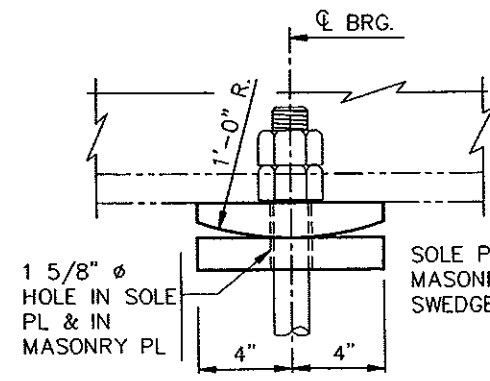
1 5/8" Ø HOLES TYP.

SWEDGE BOLTS ~ 1 1/2" x 1'-4" EMBEDDED 12"

SWEDGE BOLTS ~ 1 1/2" x 1'-8" EMBEDDED 15"

PIER 2 BEARING DETAIL

PIER 3 & 4 BEARING DETAIL



1 5/8" Ø HOLE IN SOLE PL & IN MASONRY PL

SOLE PL ~ 1 1/2" x 8" x 1'-11"
MASONRY PL ~ 1 3/8" x 8" x 1'-11"
SWEDGE BOLTS ~ 1 1/2" x 1'-8" EMBEDDED 12"

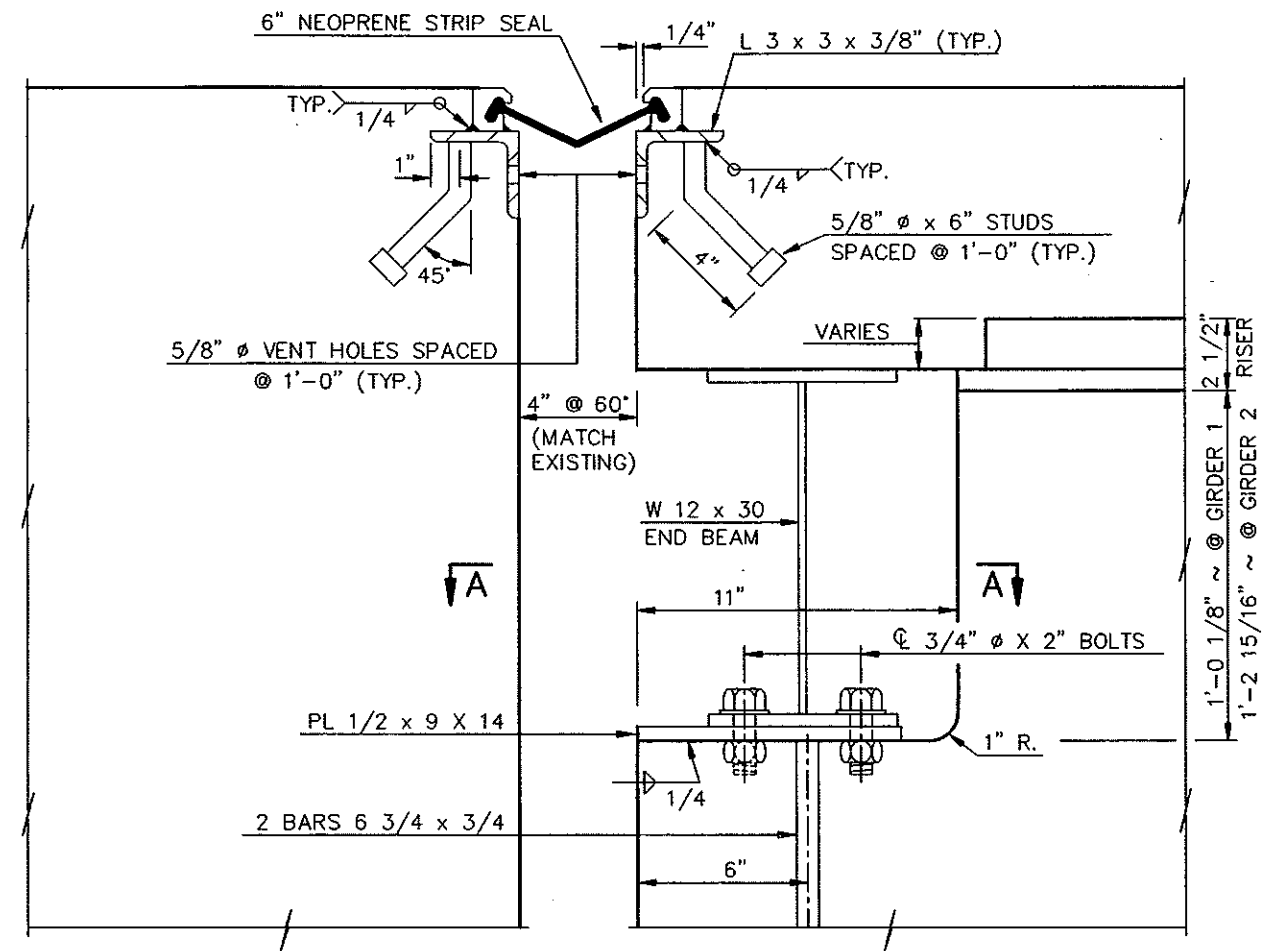
2 HEAVY HEX NUTS

PIER 5 BEARING DETAIL

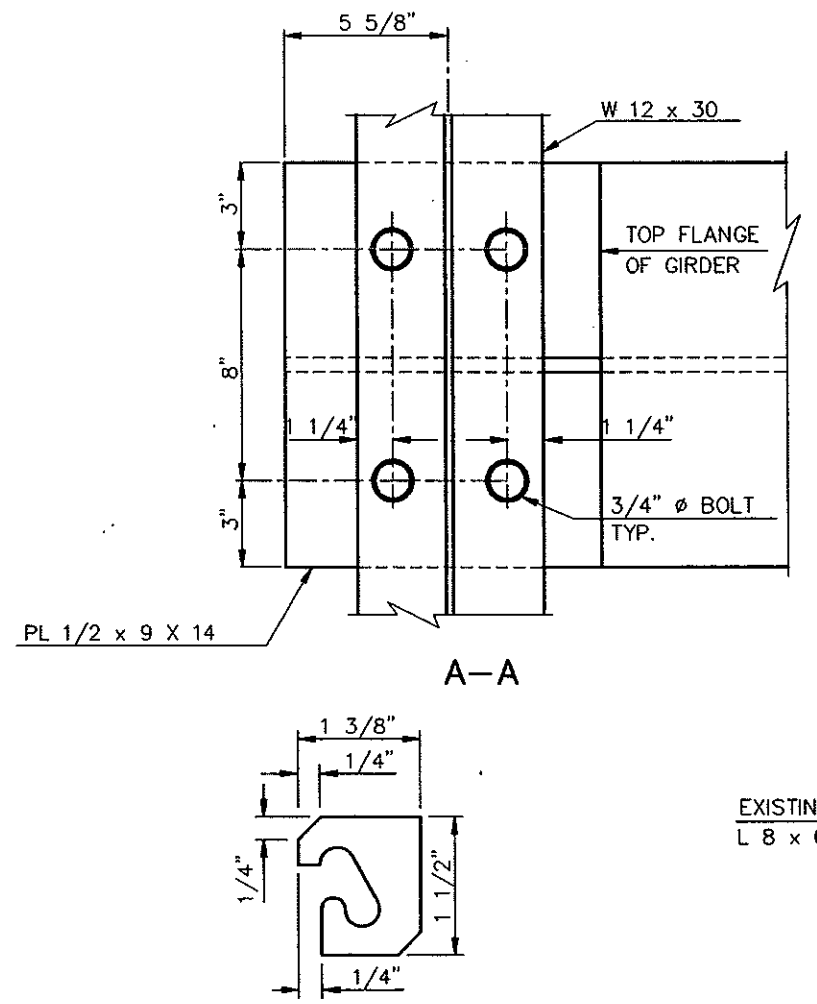
THE ROCKERS SHALL REQUIRE STRESS RELIEF ACCORDING TO SECTION 4-4 OF AASHTO D1.5-95.

HEART RIVER
WEST MAIN STREET MANDAN
BEARING DETAILS
SPANS 2, 3 & 4

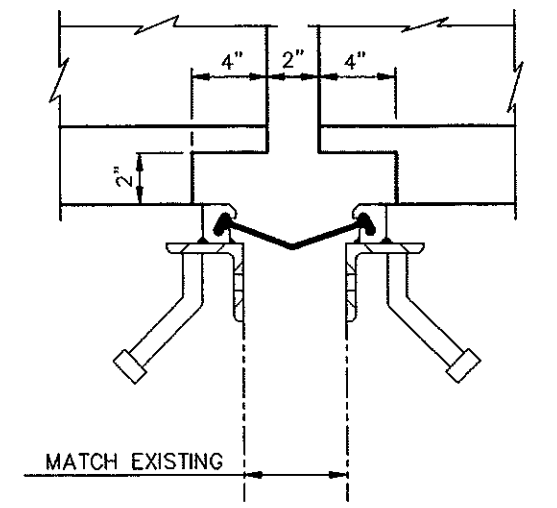
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	192



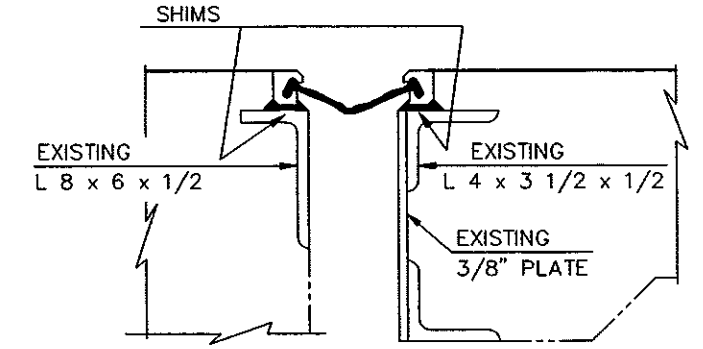
EXPANSION JOINT AND END BEAM DETAIL
TYPICAL WIDENED SECTION



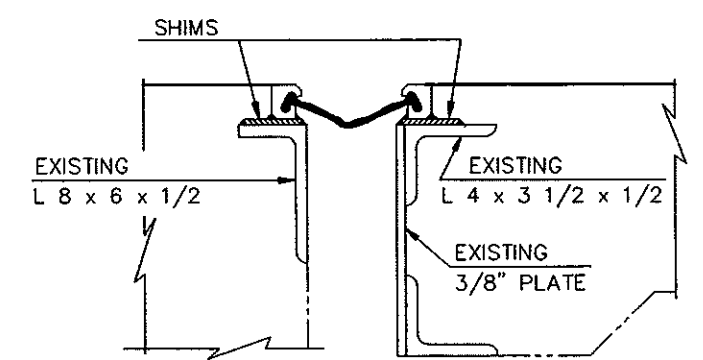
STEEL EXTRUSION DETAIL



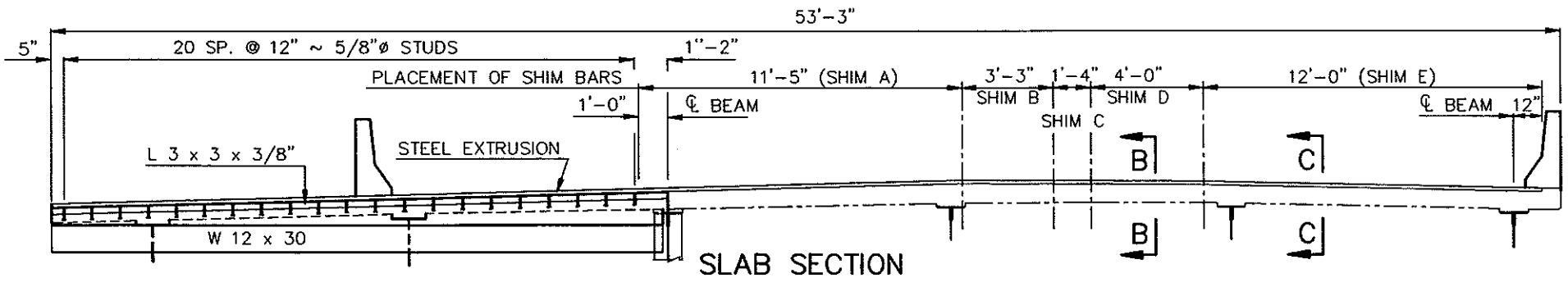
SECTION AT BARRIER



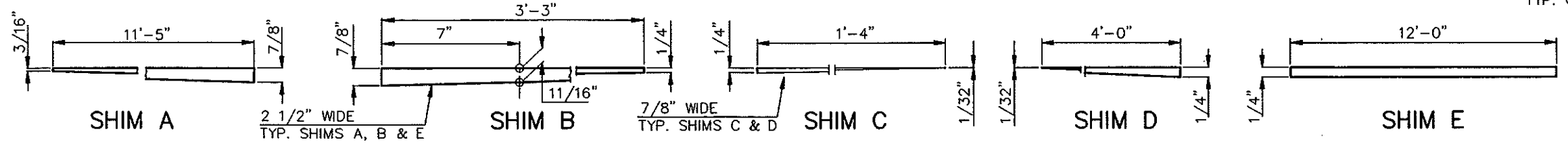
B-B
TYP. @ SHIMS C & D



C-C
TYP. @ SHIMS A, B & E

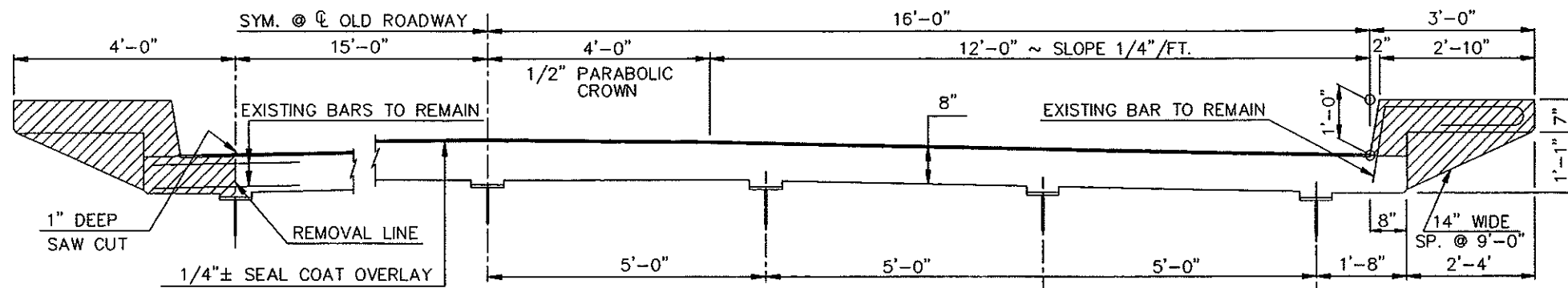


SLAB SECTION

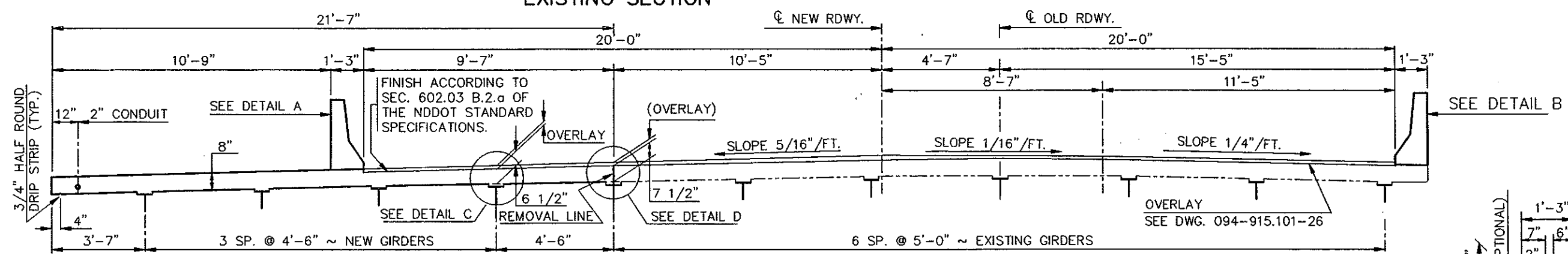


HEART RIVER
WEST MAIN STREET MANDAN
PIER 2
EXPANSION JOINT

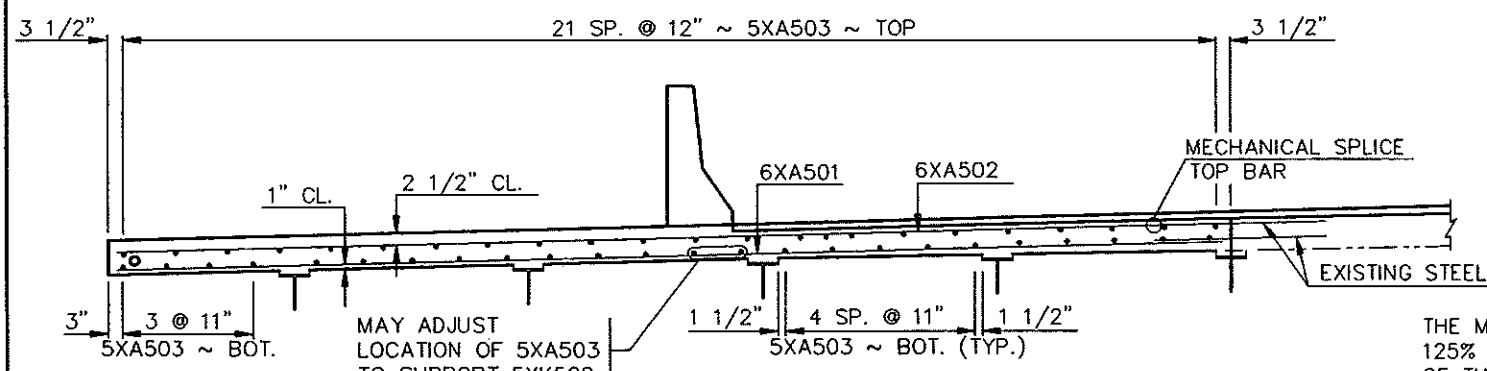
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	44



 CONCRETE TO BE REMOVED

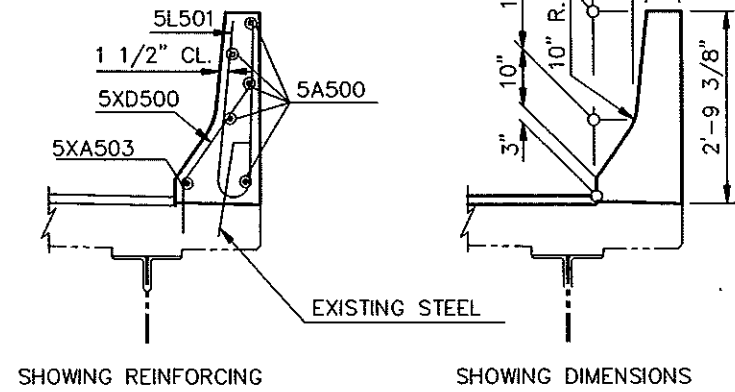


TYPICAL SLAB SECTION
SHOWING DIMENSIONS



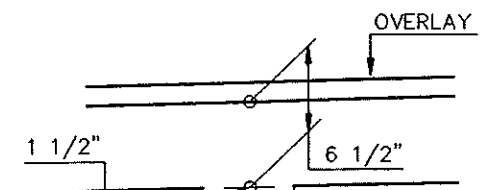
TYPICAL SLAB SECTION @ WIDENING
SHOWING REINFORCING

5XD500 SHALL BE INSTALLED, ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS.

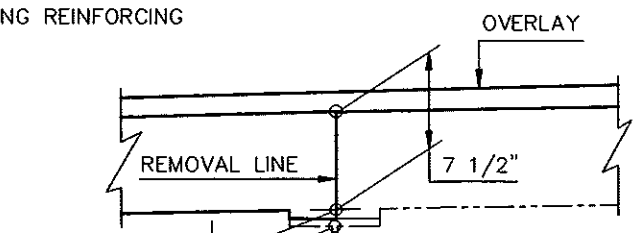


DETAIL "B"

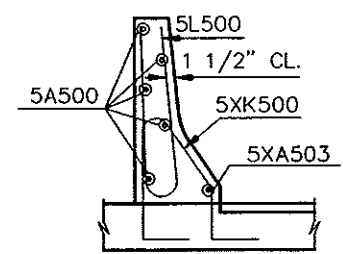
THE MECHANICAL SPLICE SHALL DEVELOP 125% OF THE SPECIFIED YIELD STRENGTH OF THE BAR.



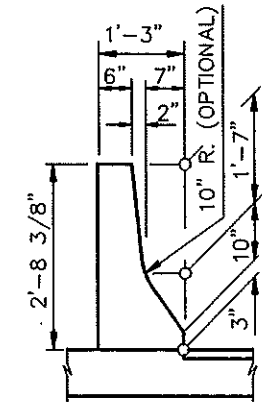
DETAIL C



DETAIL D

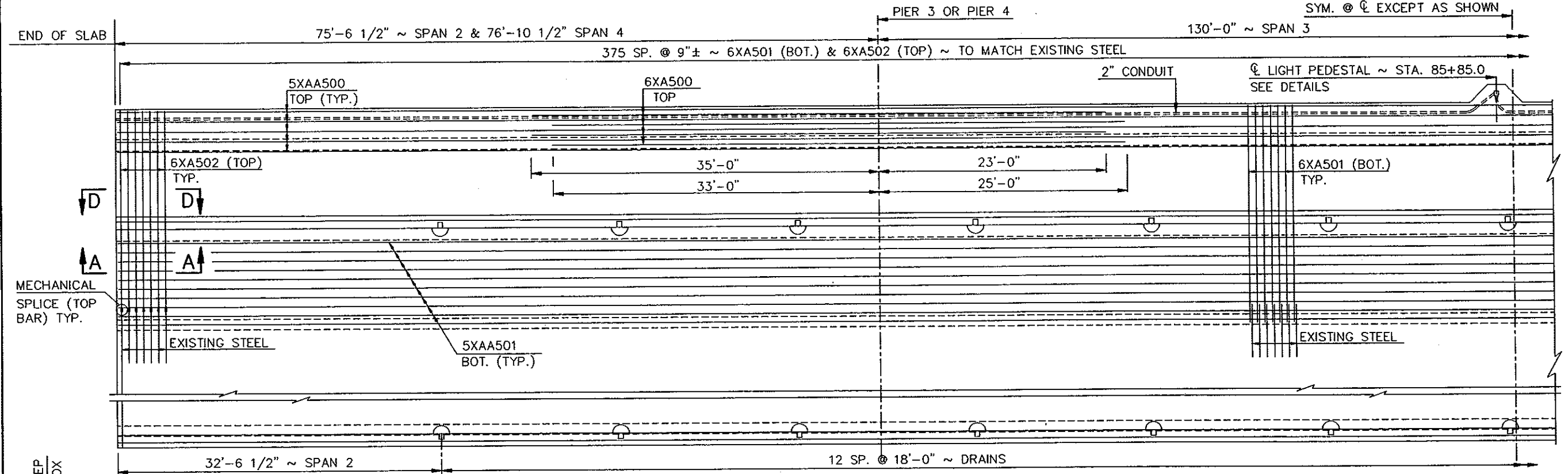


DETAIL "A"

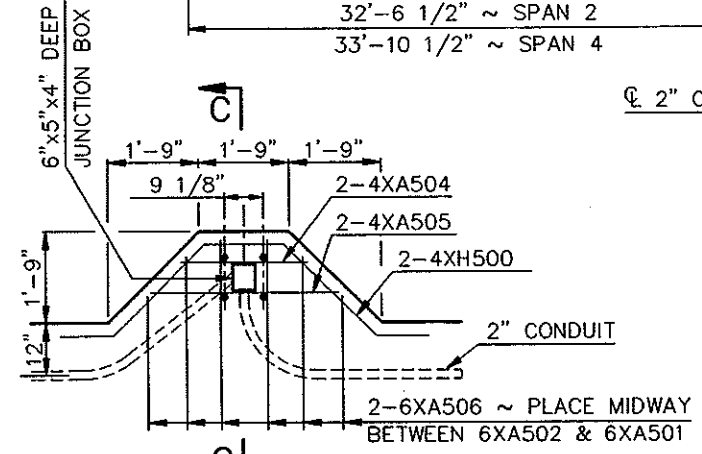


SHOWING DIMENSIONS

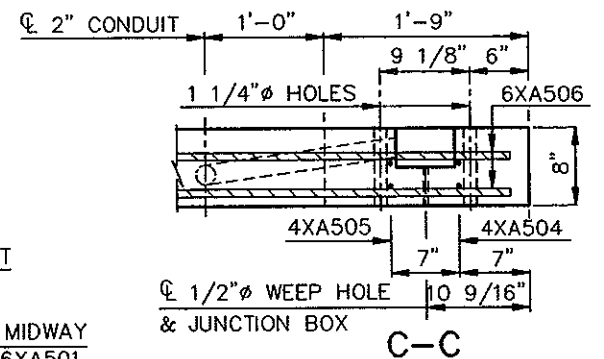
QUANTITIES
SEE DWG. 094-915.10-23
HEART RIVER WEST MAIN STREET MANDAN SUPERSTRUCTURE DETAILS SPANS 1 & 5



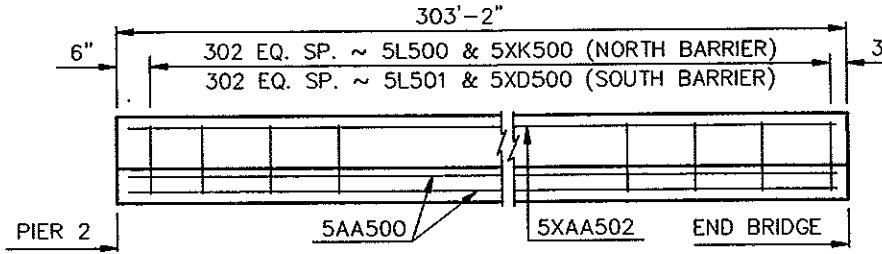
HALF PLAN



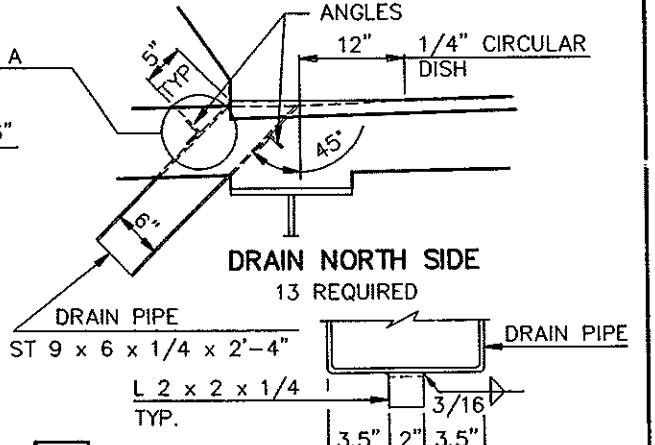
PLAN ~ LIGHT PEDESTAL
STA. 85 + 85.0



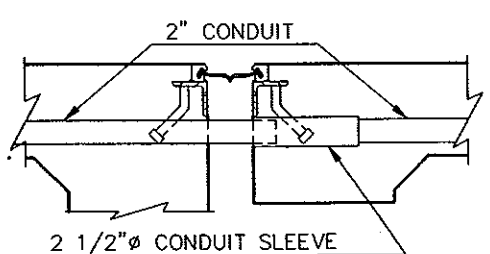
C-C



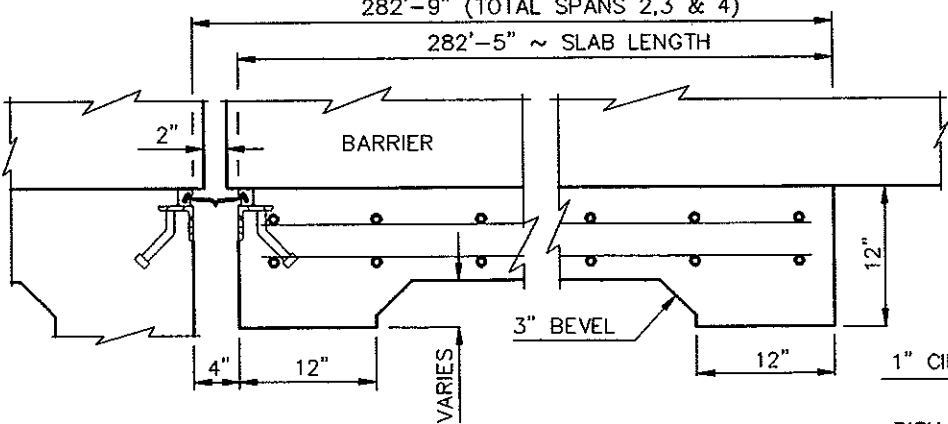
PLAN ~ BARRIER DETAIL



DETAIL A

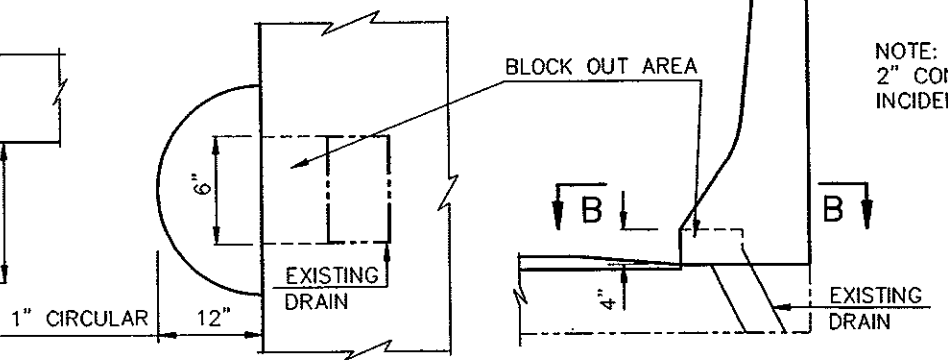


CONDUIT DETAIL @
EXP. JT.



A-A
BEGIN SPAN 2

D-D
END SPAN 4

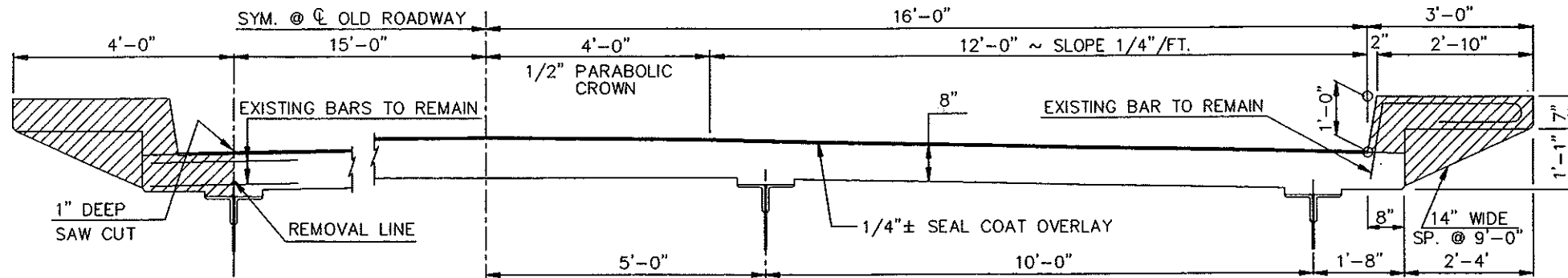


B-B

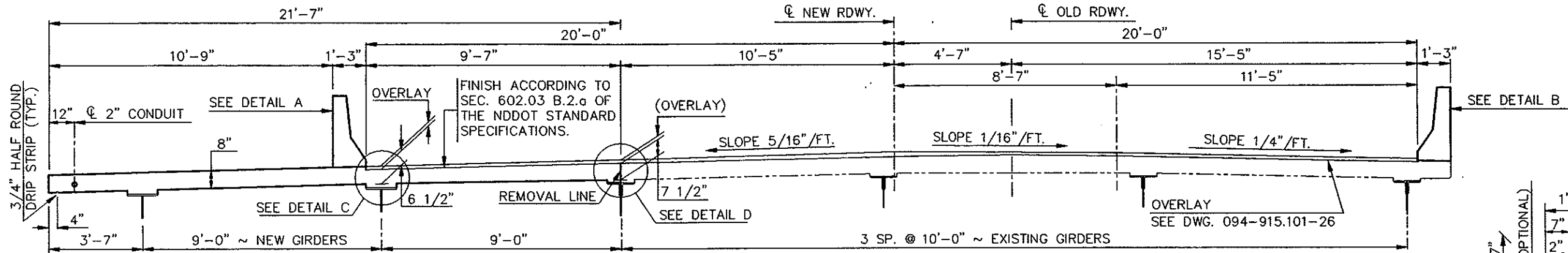
DRAIN SOUTH SIDE

NOTE:
2" CONDUIT AND ITEMS SHALL BE INCIDENTAL TO CLASS AAE-3 CONCRETE.

QUANTITIES
SEE DWG. 094-915.101-23
HEART RIVER WEST MAIN STREET MANDAN
SUPERSTRUCTURE DETAILS
SPANS 2, 3 & 4



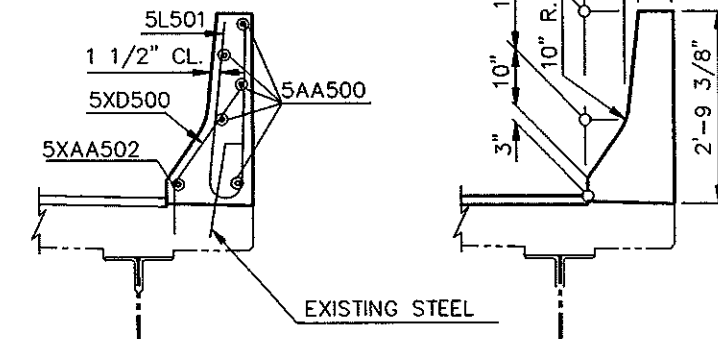
 CONCRETE TO BE REMOVED



TYPICAL SLAB SECTION
SHOWING DIMENSIONS

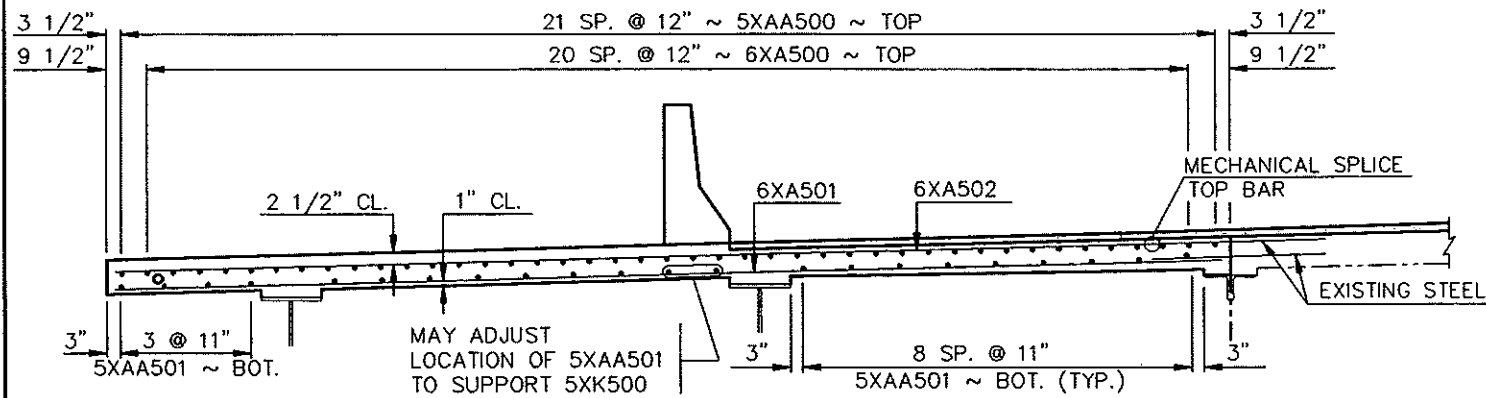
5XD500 SHALL BE INSTALLED, ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE, IN ACCORDANCE WITH SEC. 806.02 OF THE NDDOT STANDARD SPECIFICATIONS.

THE MECHANICAL SPLICE SHALL DEVELOP 125% OF THE SPECIFIED YIELD STRENGTH OF THE BAR.

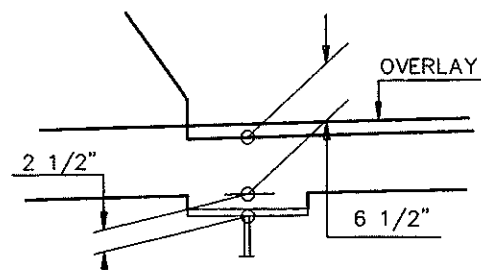


SHOWING REINFORCING

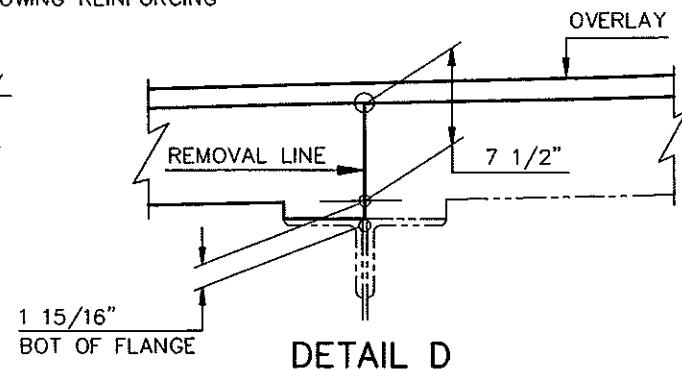
SHOWING DIMENSIONS



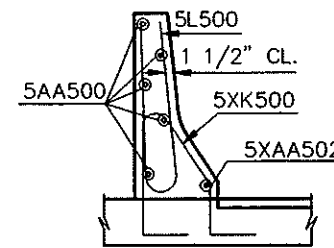
TYPICAL SLAB SECTION @ WIDENING
SHOWING REINFORCING



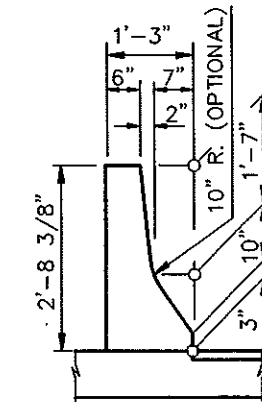
DETAIL C



DETAIL D



SHOWING REINFORCING

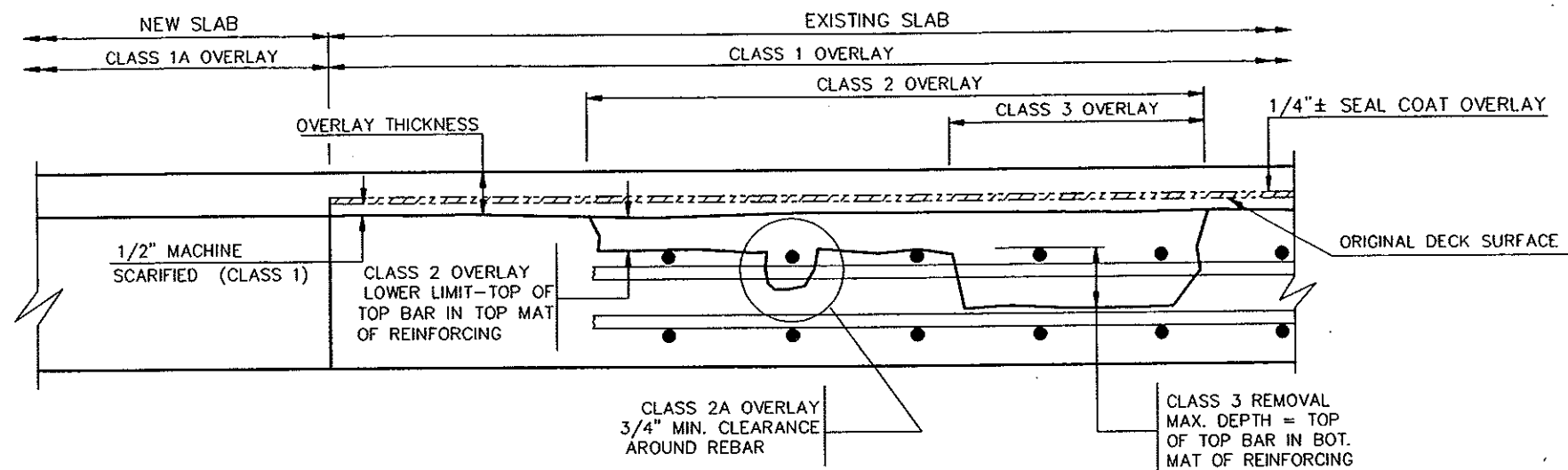


SHOWING DIMENSIONS

DETAIL "B"

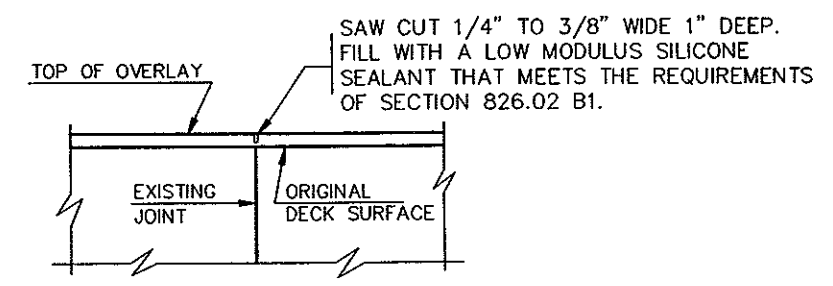
QUANTITIES (SPANS 1 THRU 5)	
CLASS AAE-3 CONC.	220.2 C.Y.
REINFORCING STEEL	7,089 LBS.
REINF. STEEL (EPOXY)	49,490 LBS.

HEART RIVER
WEST MAIN STREET MANDAN
**SUPERSTRUCTURE
DETAILS**
SPANS 2, 3 & 4



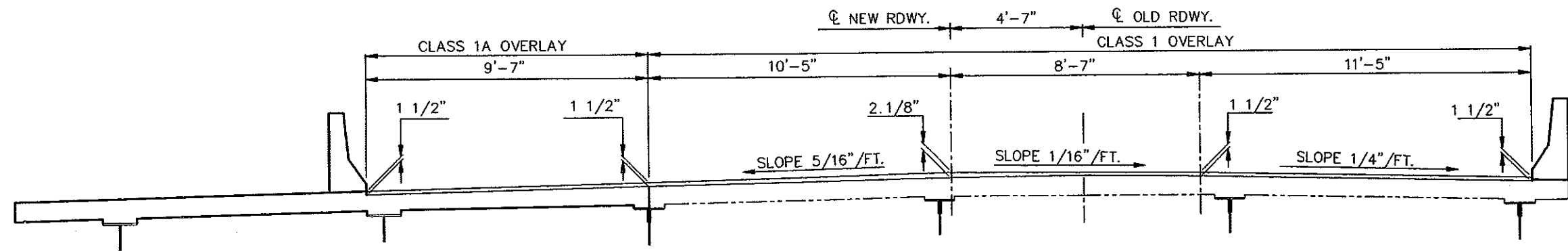
BRIDGE DECK
(OVERLAY CLASSIFICATIONS)

CLASS 4 REMOVAL SHALL BE BELOW LIMITS OF CLASS 3 REMOVAL TO FULL DEPTH.



CONSTRUCTION JOINTS

1. LONGITUDINAL JOINT AT GIRDER 3
2. TRANSVERSE JOINT AT PIER 5 (INCIDENTAL TO CLASS 1 OVERLAY)

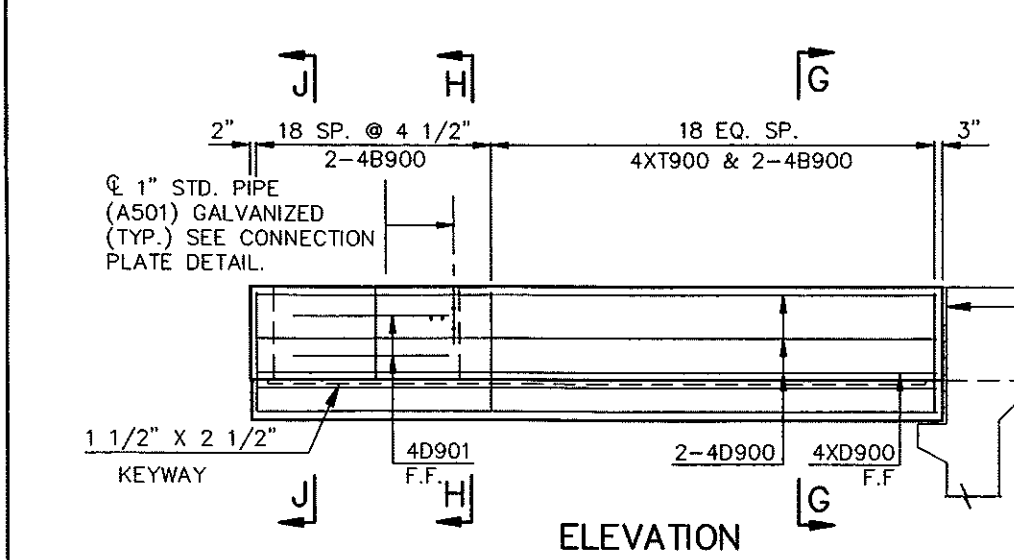
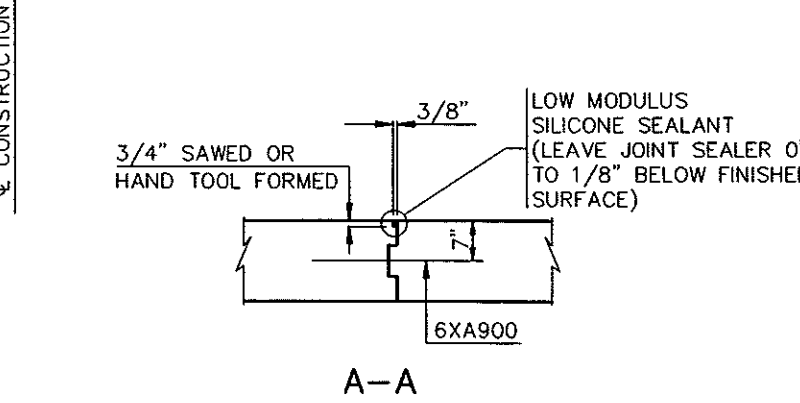
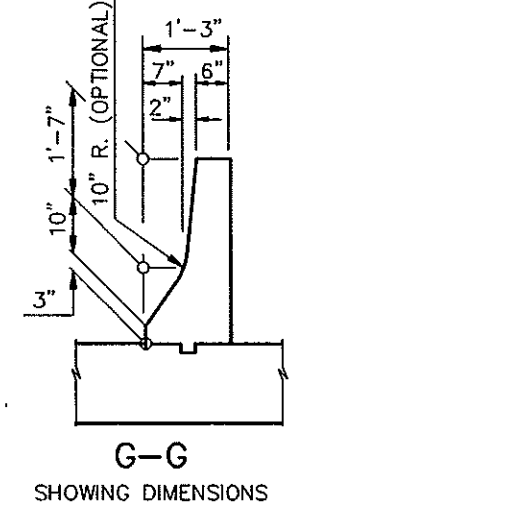
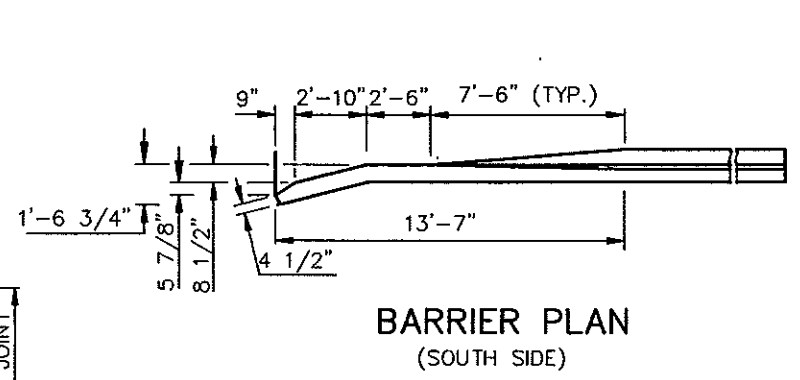
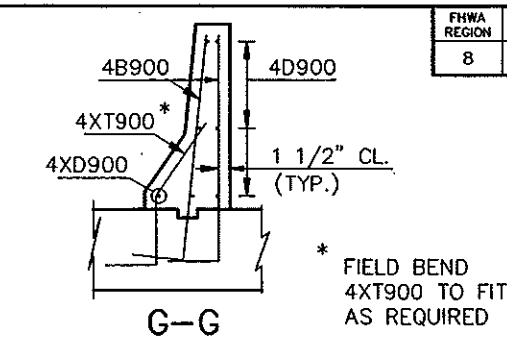
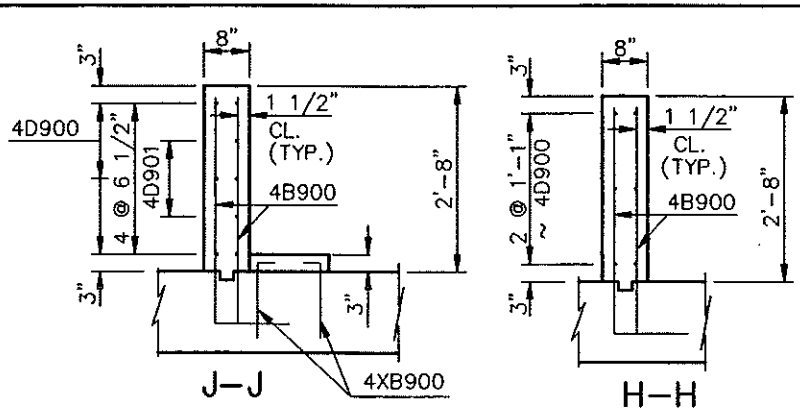
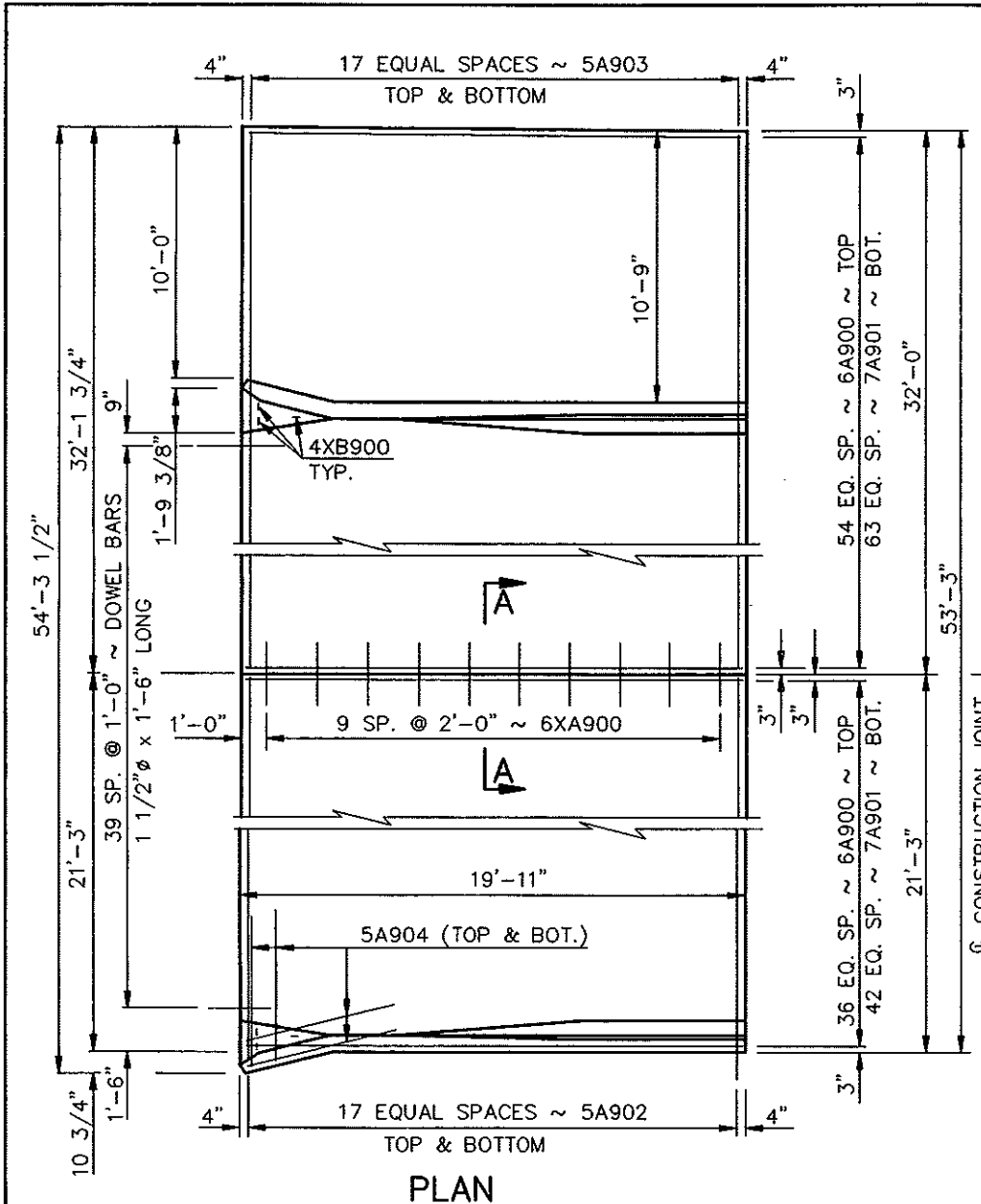


TYPICAL DECK SECTION

QUANTITIES		
CLASS 1A OVERLAY	344.7	S.Y.
CLASS 1 OVERLAY	1094.2	S.Y.
CLASS 2 OVERLAY	218.8	S.Y.
CLASS 3 OVERLAY	54.7	S.Y.
CLASS 2A OVERLAY	393.8	L.F.T.

HEART RIVER
WEST MAIN STREET MANDAN

OVERLAY



NOTE:

SEE DWG. 094-915.101-29 & 30 FOR ADDITIONAL DETAILS.

THE ABOVE ESTIMATED MATERIAL QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. ALL MATERIALS INCLUDING CONCRETE, REINFORCING BARS, DOWEL BARS, BACKER ROD, POLYETHYLENE MEMBRANE, SILICONE SEALANT, PREFORMED JOINT FILLER AND LABOR REQUIRED TO BUILD THE APPROACH SLABS AND APPROACH SLAB BARRIERS SHALL BE INCIDENTAL TO THE PAY ITEM, "CONCRETE BRIDGE APPROACH SLAB."

THE CONCRETE SHALL BE CLASS AE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60. THE POLYETHYLENE MEMBRANE SHALL MEET THE REQUIREMENTS OF AASHTO M171.

SURFACE FINISH "D" SHALL BE REQUIRED FOR THE EXPOSED SURFACES OF THE BARRIERS.

ALL DOWEL BARS SHALL BE EPOXY COATED AND CONFORM TO AASHTO M-254 TYPE B. FREE ENDS OF THE DOWEL BARS SHALL BE GIVEN A THIN, UNIFORM COATING OF GREASE. THIS COATING SHALL BE APPLIED WITHIN TWO HOURS BEFORE COVERING WITH CONCRETE.

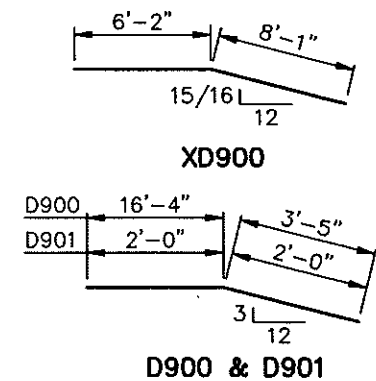
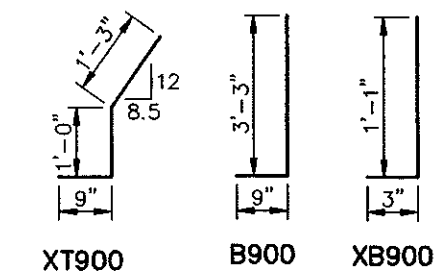
SKREW ANGLE = 0°

BAR LIST - ONE SLAB			
SIZE	MARK	NO.	LENGTH
6	A900	92	19'-8"
7	A901	107	19'-8"
5	A902	36	20'-11"
5	A903	36	31'-8"
5	A904	8	6'-0"
4	B900	148	4'-0"
4	D900	12	19'-9"
4	D901	4	4'-0"
6	XA900	10	2'-6"
4	XB900	6	1'-4"
4	XD900	2	14'-3"
4	XT900	38	3'-0"

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS.)	CONCRETE (C.Y.)
9746	48.8

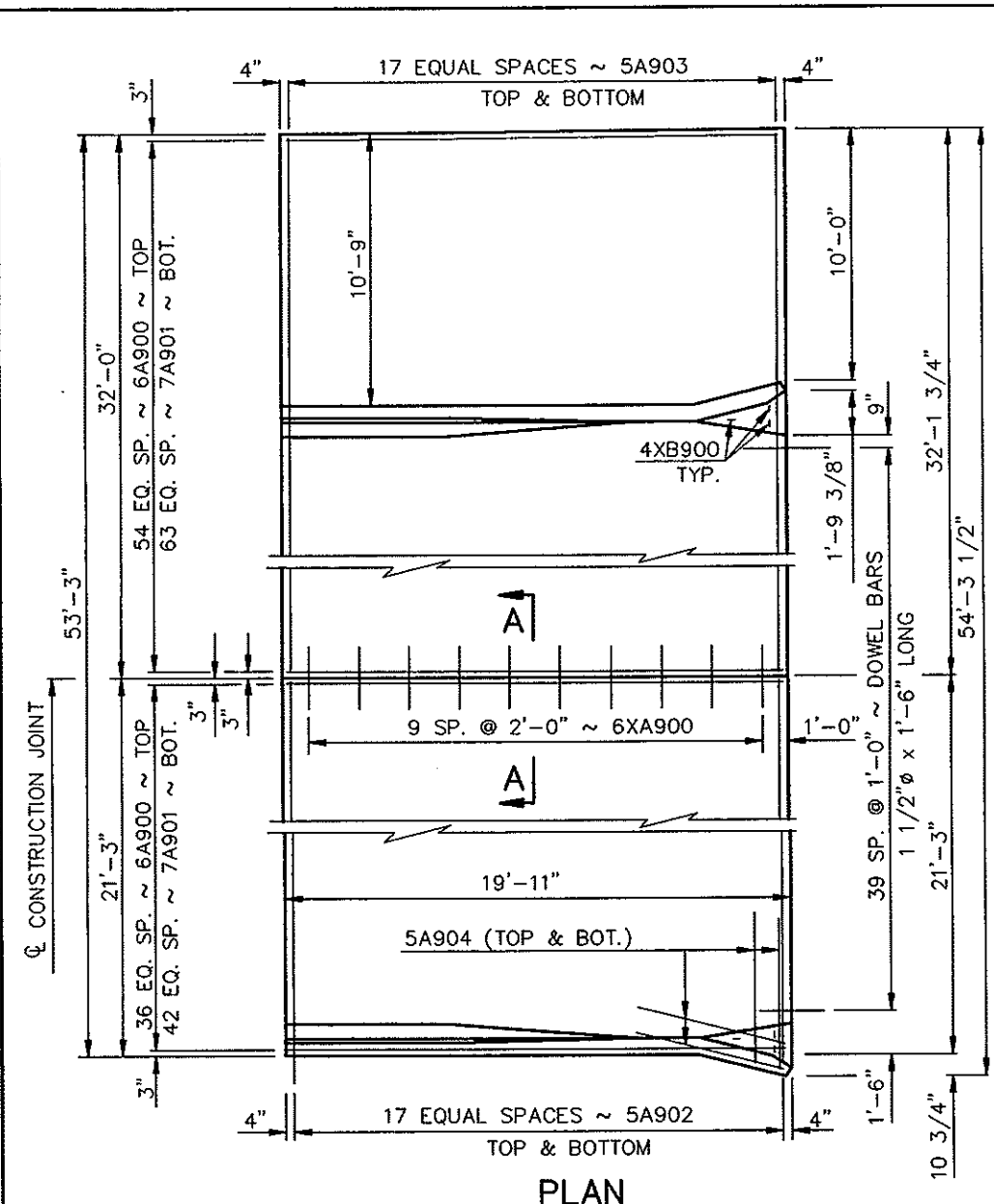
X = EPOXY BARS



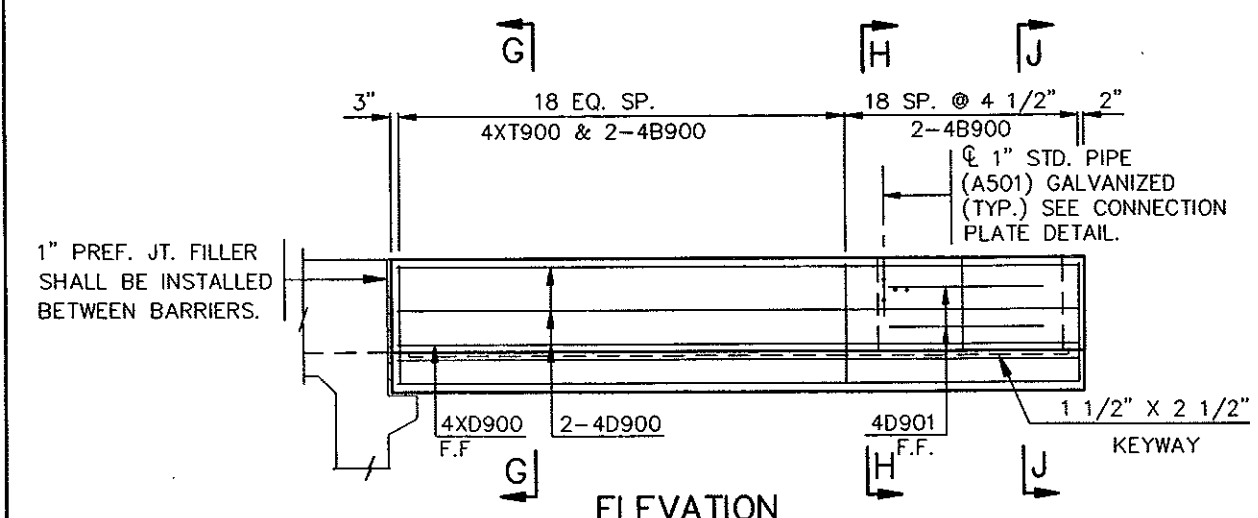
QUANTITIES (ONE SLAB)

APPROACH SLAB	118.2 SQ. YD.
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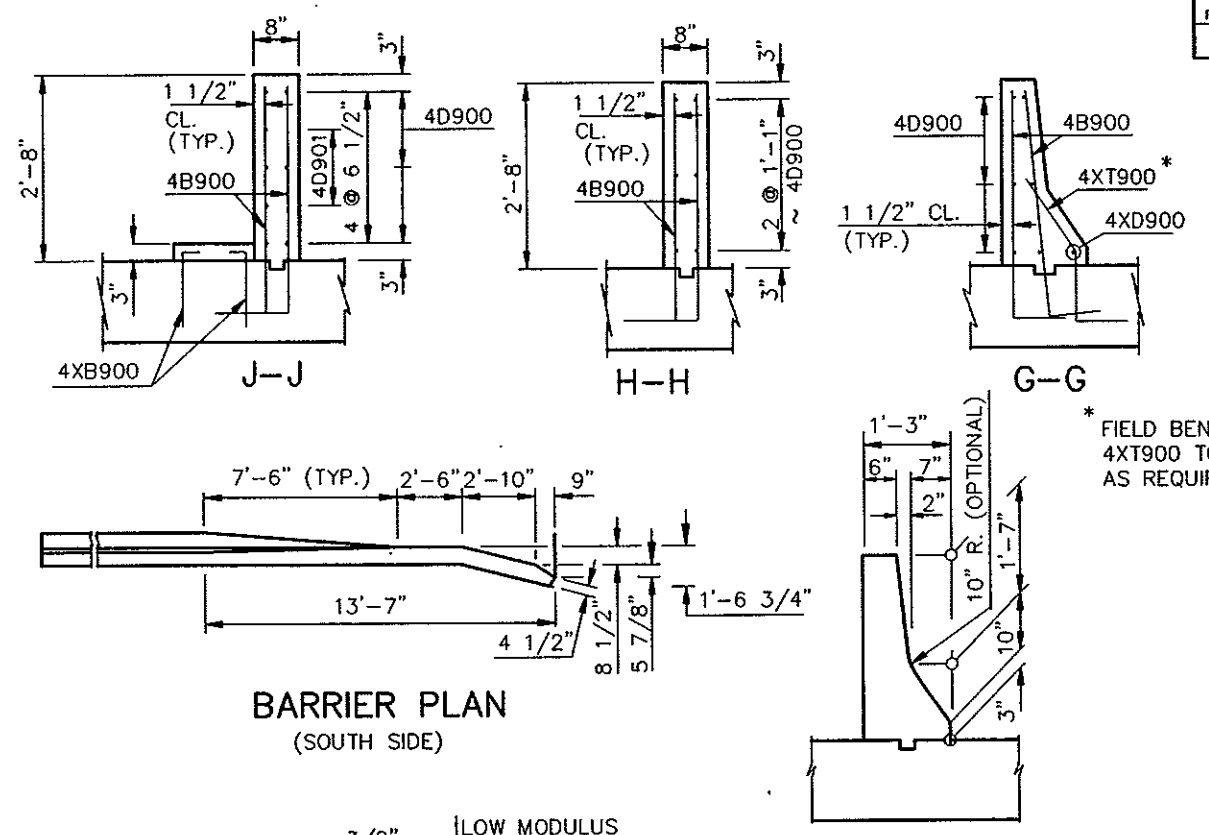
HEART RIVER
WEST MAIN STREET MANDAN
(AT BEGIN BRIDGE)
APPROACH SLAB



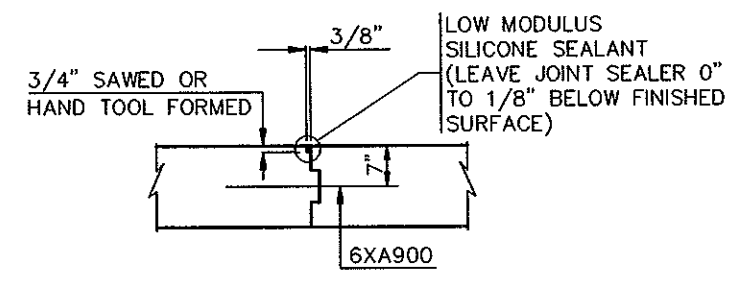
PLAN



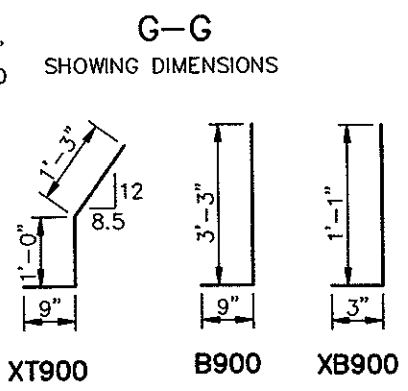
ELEVATION



BARRIER PLAN (SOUTH SIDE)



A-A



XT900 B900 XB900

NOTE:

SEE DWG. 094-915.101-29 & 30 FOR ADDITIONAL DETAILS.

THE ABOVE ESTIMATED MATERIAL QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. ALL MATERIALS INCLUDING CONCRETE, REINFORCING BARS, DOWEL BARS, BACKER ROD, POLYETHYLENE MEMBRANE, SILICONE SEALANT, PREFORMED JOINT FILLER AND LABOR REQUIRED TO BUILD THE APPROACH SLABS AND APPROACH SLAB BARRIERS SHALL BE INCIDENTAL TO THE PAY ITEM, "CONCRETE BRIDGE APPROACH SLAB."

THE CONCRETE SHALL BE CLASS AE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60. THE POLYETHYLENE MEMBRANE SHALL MEET THE REQUIREMENTS OF AASHTO M171.

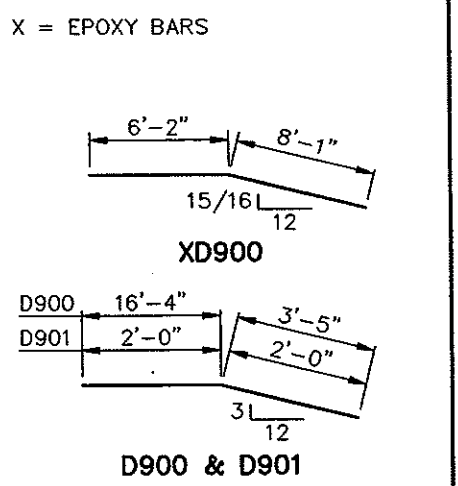
SURFACE FINISH "D" SHALL BE REQUIRED FOR THE EXPOSED SURFACES OF THE BARRIERS AND CURB TRANSITIONS.

ALL DOWEL BARS SHALL BE EPOXY COATED AND CONFORM TO AASHTO M-254 TYPE B. FREE ENDS OF THE DOWEL BARS SHALL BE GIVEN A THIN, UNIFORM COATING OF GREASE. THIS COATING SHALL BE APPLIED WITHIN TWO HOURS BEFORE COVERING WITH CONCRETE.

SKEW ANGLE = 0°

BAR LIST - ONE SLAB			
SIZE	MARK	NO.	LENGTH
6	A900	92	19'-8"
7	A901	107	19'-8"
5	A902	36	20'-11"
5	A903	36	31'-8"
5	A904	8	6'-0"
4	B900	148	4'-0"
4	D900	12	19'-9"
4	D901	4	4'-0"
6	XA900	10	2'-6"
4	XB900	6	1'-4"
4	XD900	2	14'-3"
4	XT900	38	3'-0"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS.)	CONCRETE (C.Y.)
9746	48.8



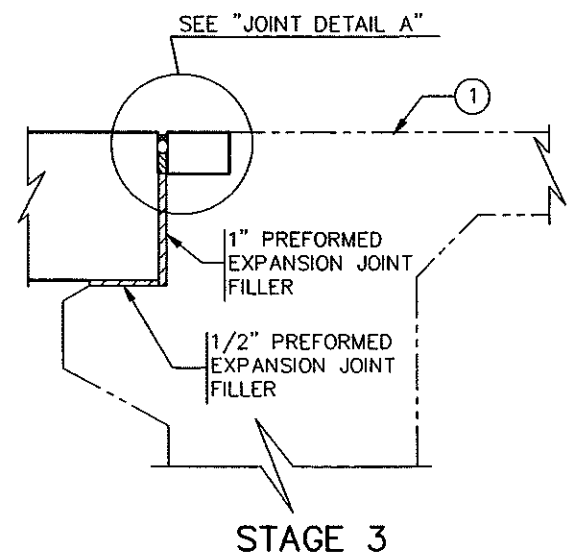
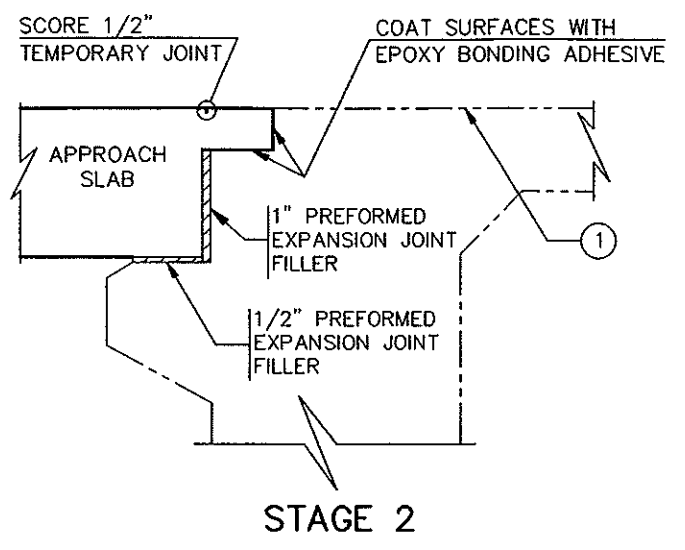
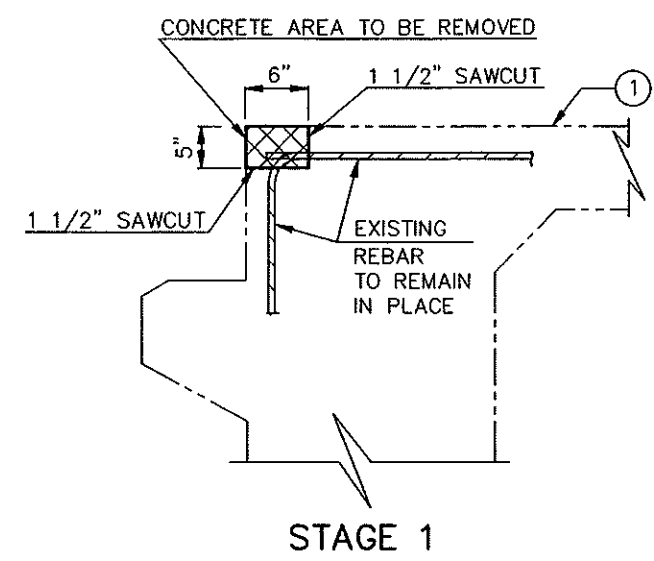
QUANTITIES (ONE SLAB)	
APPROACH SLAB	118.2 SQ. YD.

HEART RIVER
WEST MAIN STREET MANDAN
(AT END BRIDGE)
APPROACH SLAB

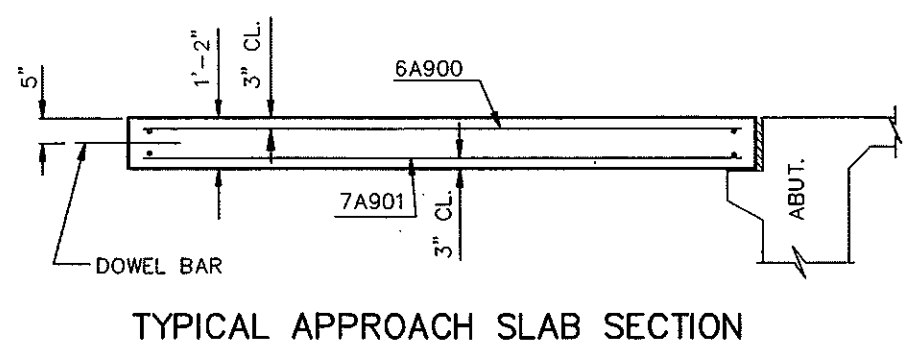
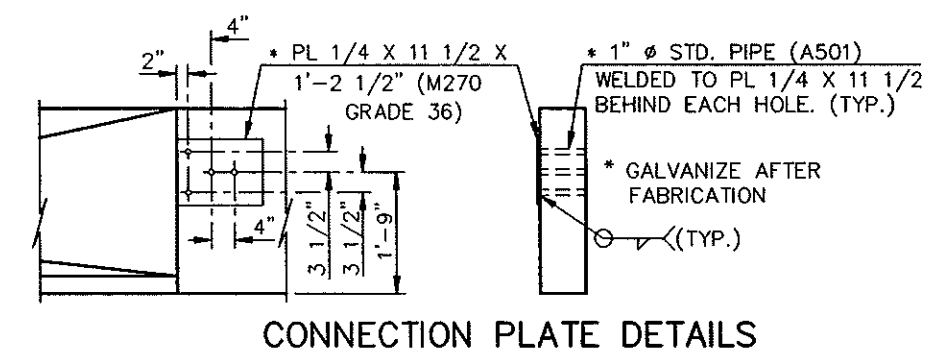
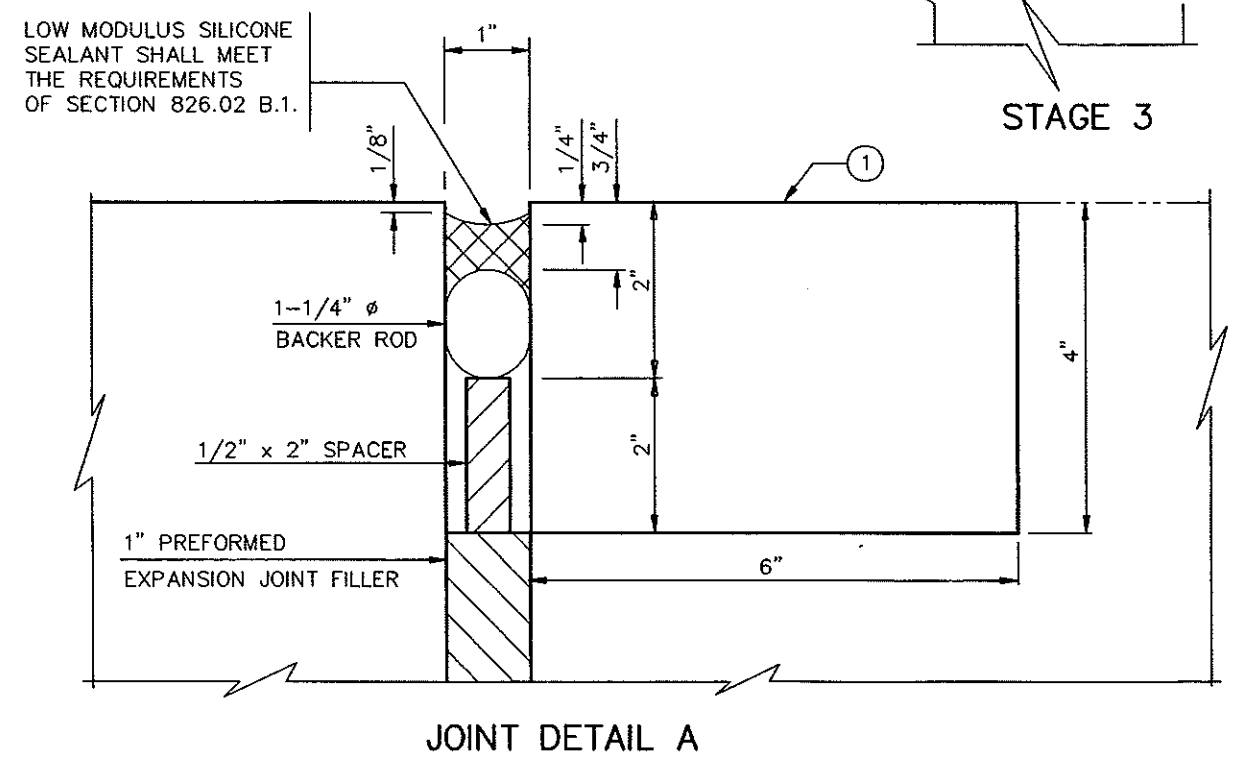
APPROACH SLAB - BRIDGE DECK JOINT

- STAGE 1:
1. SAW 1 1/2" DEEP CUTS ALONG THE TOTAL WIDTH OF THE DECK OR AS CLOSE TO THE CURB LINES AS POSSIBLE.
 2. REMOVE THE CONCRETE FROM THE DECK APPROXIMATELY 4" DEEP AND 6" ACROSS FROM CURB LINE TO CURB LINE WITHOUT DAMAGING THE REINFORCING STEEL.
- STAGE 2:
3. AFTER PLACING 1" THICK PREFORMED EXPANSION JOINT FILLER AGAINST THE EDGE OF THE DECK, PLACE THE NEW APPROACH SLAB CONCRETE INCLUDING THE 4"x6" AREA OF DECK. IMMEDIATELY BEFORE PLACING CONCRETE IN THE 4"x6" AREA, COAT THE SURFACES OF THE DECK WITH A EPOXY BONDING ADHESIVE. THIS ADHESIVE SHALL MEET THE REQUIREMENTS OF AASHTO M-235 TYPE 2, GRADE 2 AND THE APPROPRIATE CLASS DEPENDING ON THE TEMPERATURE OF THE DECK CONCRETE AT THE TIME OF APPLICATION.
- STAGE 3:
4. AFTER THE CONCRETE HAS SET SAW CUT A 1" WIDE BY 4" DEEP JOINT OUT OF THE CONCRETE BETWEEN THE APPROACH SLAB AND THE NEW BRIDGE DECK END. JOINT SHOULD BE CENTERED OVER THE PREFORMED EXPANSION JOINT FILLER.
 5. CLEAN THE JOINT AND INSTALL THE 2" SPACER, THE BACKER ROD AND THE SILICONE SEALANT ACCORDING TO SECTION 550.04 M.3 OF THE STANDARD SPECS.

GENERAL:
 WHEN SAW CUTTING CANNOT EXTEND ALONG THE TOTAL WIDTH OF THE DECK, THE AREA FROM WHERE THE SAW CUT ENDS AND THE SIDE EDGES OF THE DECK SHALL BE FORMED WITH 1" THICK PREFORMED JOINT FILLER AND FINISHED WITH BACKER ROD AND SILICONE SEALANT.



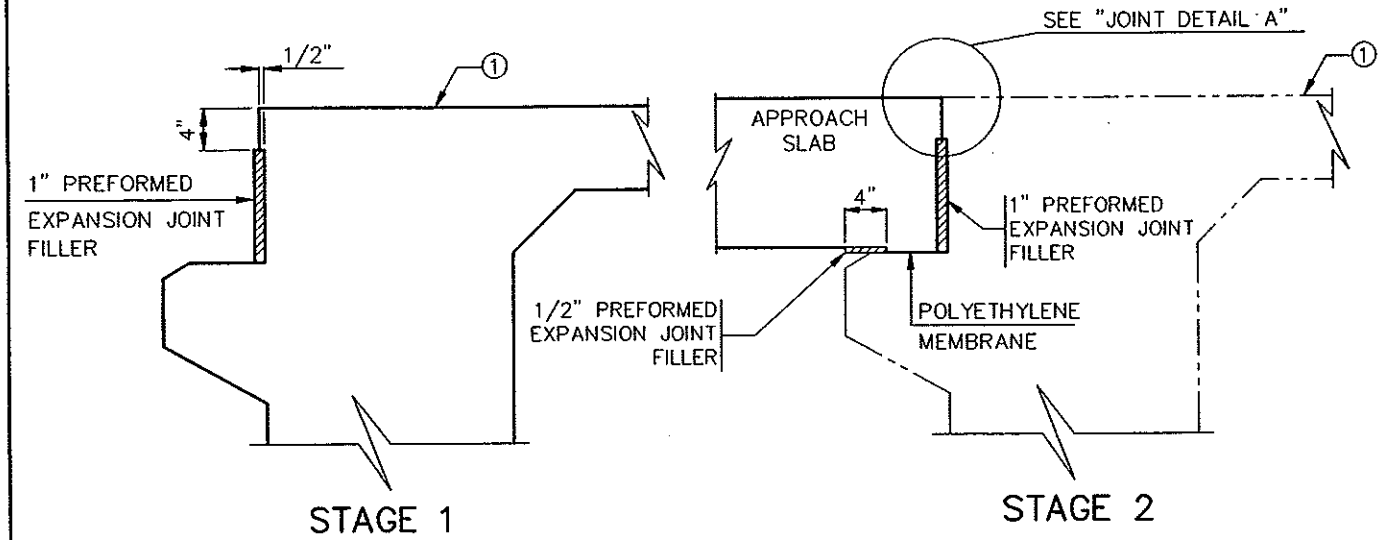
① TOP OF OVERLAY



HEART RIVER
 WEST MAIN STREET MANDAN

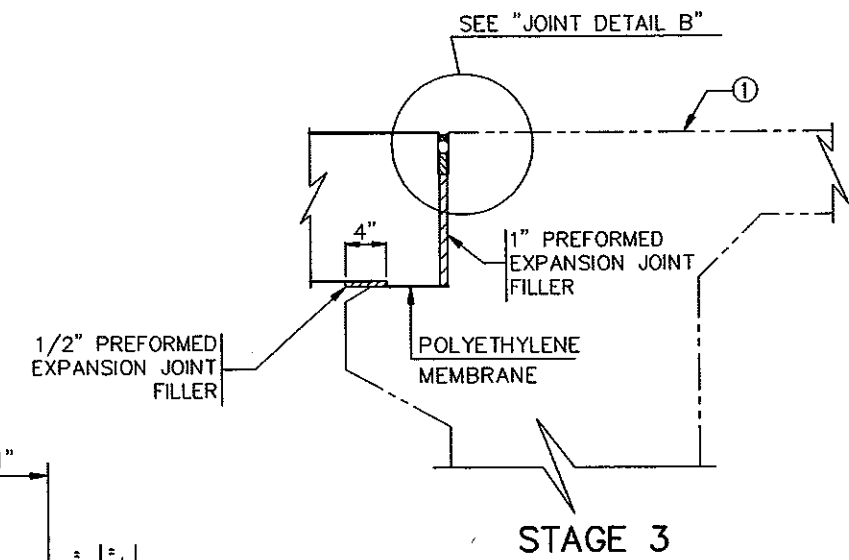
APPROACH SLAB
 JOINT DETAIL
 (AT EXISTING SLAB)

APPROACH SLAB - BRIDGE DECK JOINT

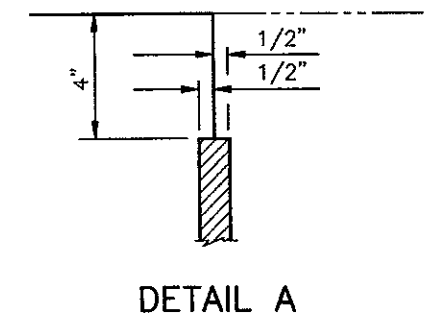
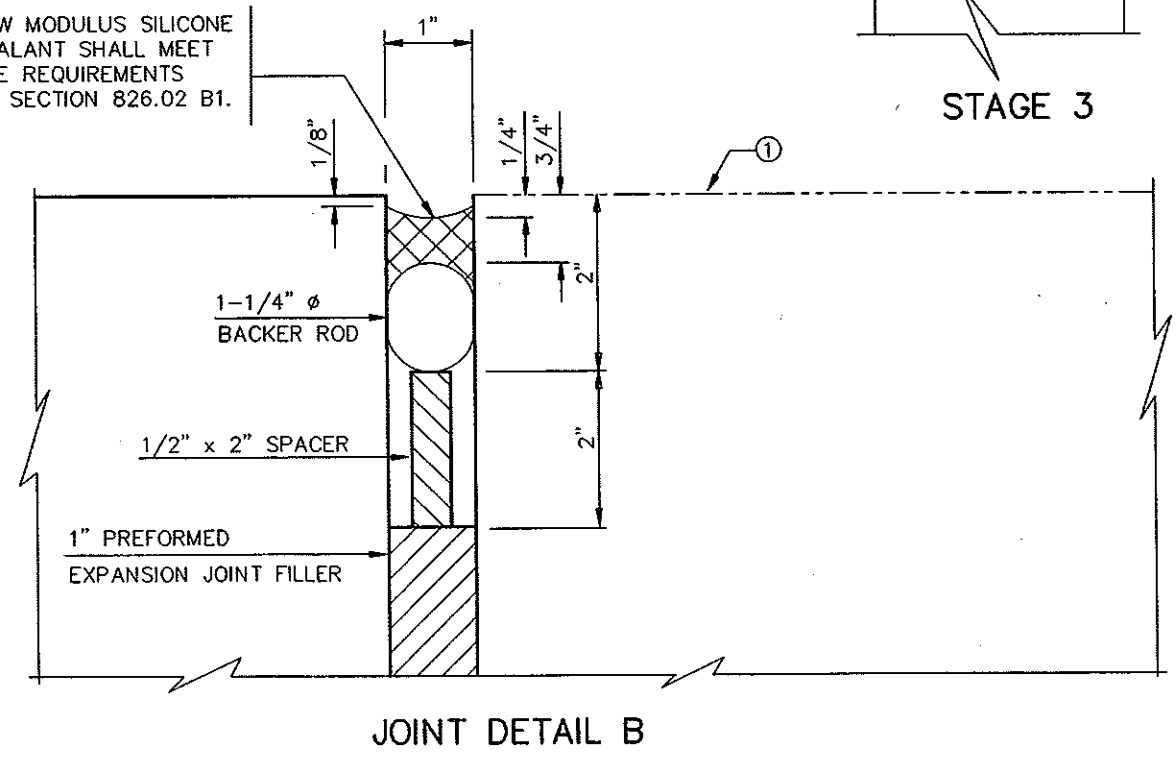


- STAGE 1:
1. CAST 4"x1/2" LIP DURING DECK PLACEMENT.
 2. 1" THICK PREFORMED EXPANSION JOINT FILLER TO BE INSTALLED PRIOR TO DECK PLACEMENT.
- STAGE 2:
3. AFTER PLACING THE 1/2" THICK PREFORMED EXPANSION JOINT FILLER AND POLYETHYLENE MEMBRANE, PLACE THE NEW APPROACH SLAB CONCRETE.
- STAGE 3:
4. AFTER THE CONCRETE HAS SET SAW CUT A 1" WIDE BY 4" DEEP JOINT OUT OF THE CONCRETE BETWEEN THE APPROACH SLAB AND THE NEW BRIDGE DECK END. JOINT SHOULD BE CENTERED OVER THE PREFORMED EXPANSION JOINT FILLER.
 5. CLEAN THE JOINT AND INSTALL THE 1/2"x2" SPACER, THE BACKER ROD AND THE SILICONE SEALANT ACCORDING TO SECTION 550.04 M.3 OF THE STANDARD SPECS.

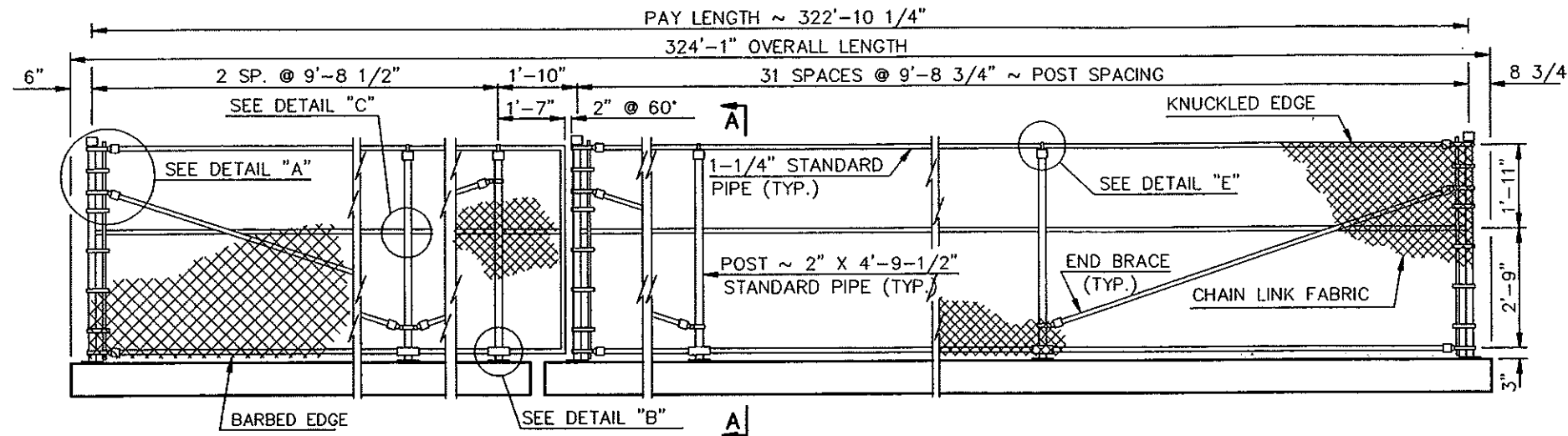
① TOP OF OVERLAY



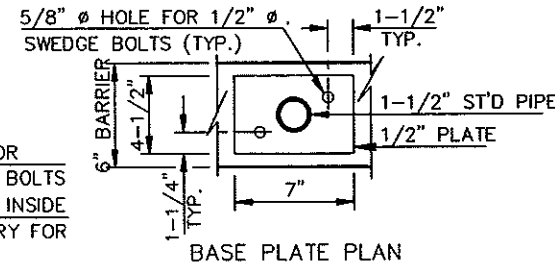
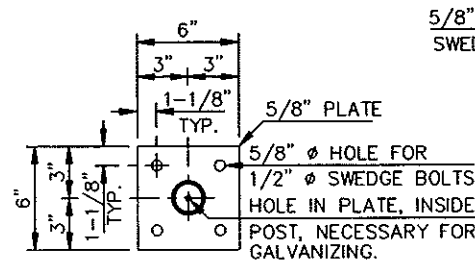
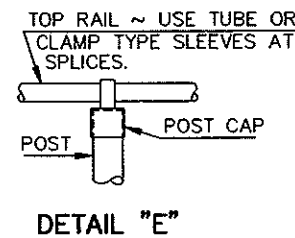
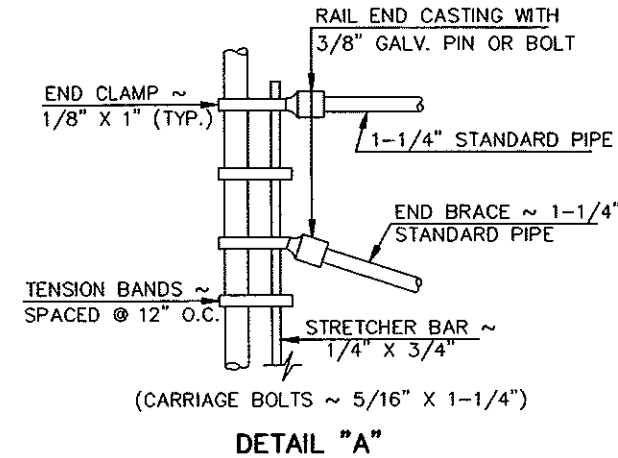
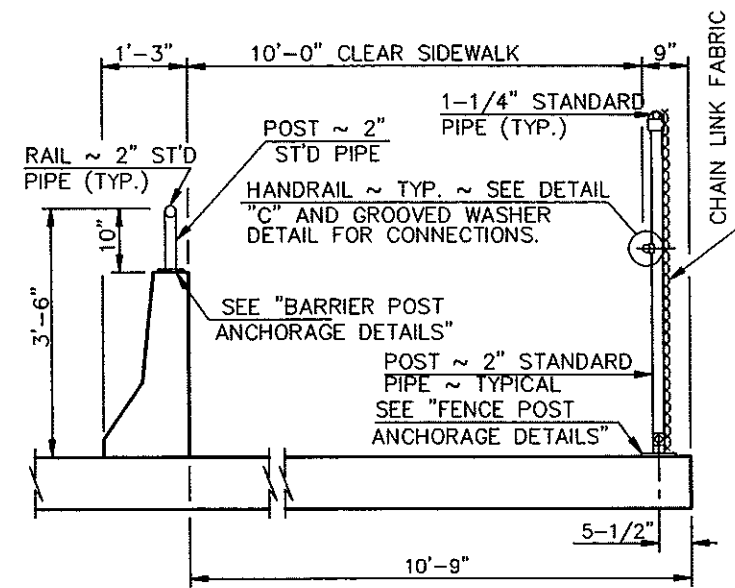
LOW MODULUS SILICONE SEALANT SHALL MEET THE REQUIREMENTS OF SECTION 826.02 B1.



HEART RIVER
WEST MAIN STREET MANDAN
APPROACH SLAB
JOINT DETAIL
(AT NEW SLAB)



FENCE ELEVATION



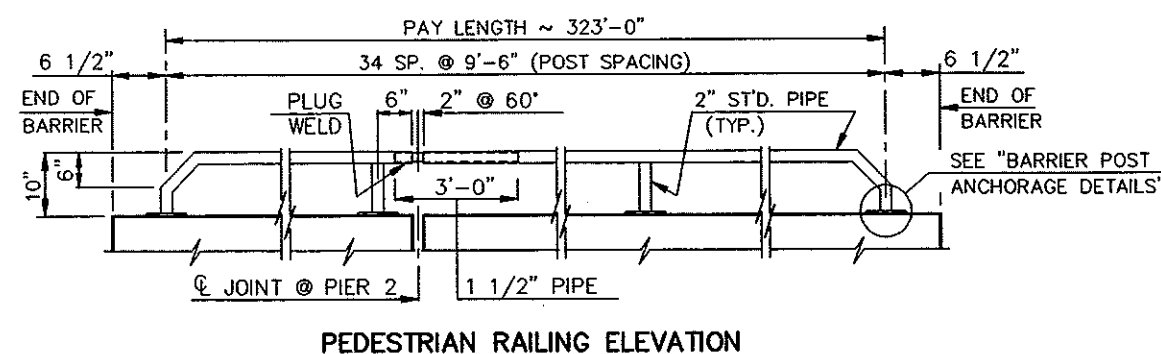
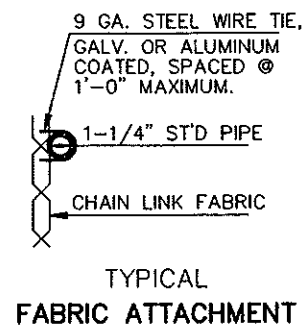
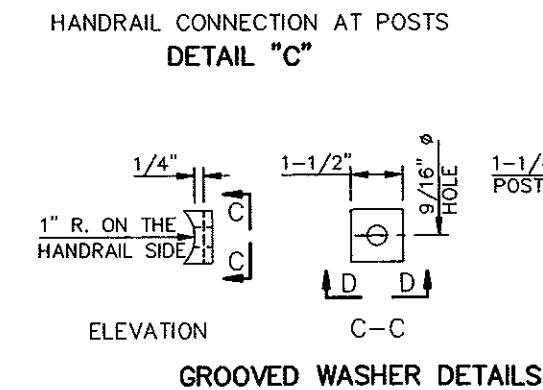
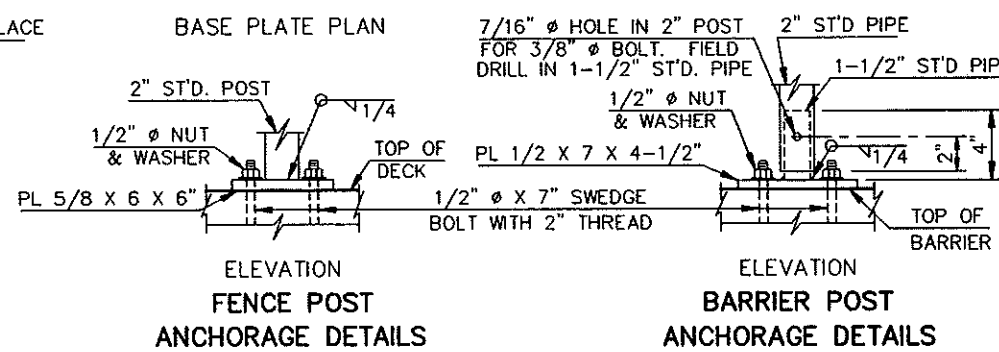
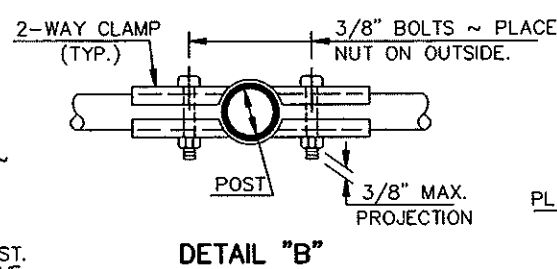
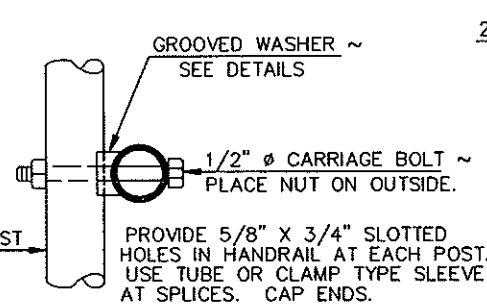
NOTE:

FABRIC SHALL BE AASHTO M181, TYPE 1 AND SHALL BE OF 9-GAGE WIRE, 2-INCH MESH, 60 INCHES HIGH, TOP SELVAGE KNUCKLED AND BOTTOM SELVAGE BARBED.

POSTS AND FITTINGS SHALL BE AASHTO M181, CLASS I.

ANCHORAGE PLATES SHALL BE AASHTO M183 AND SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M232.

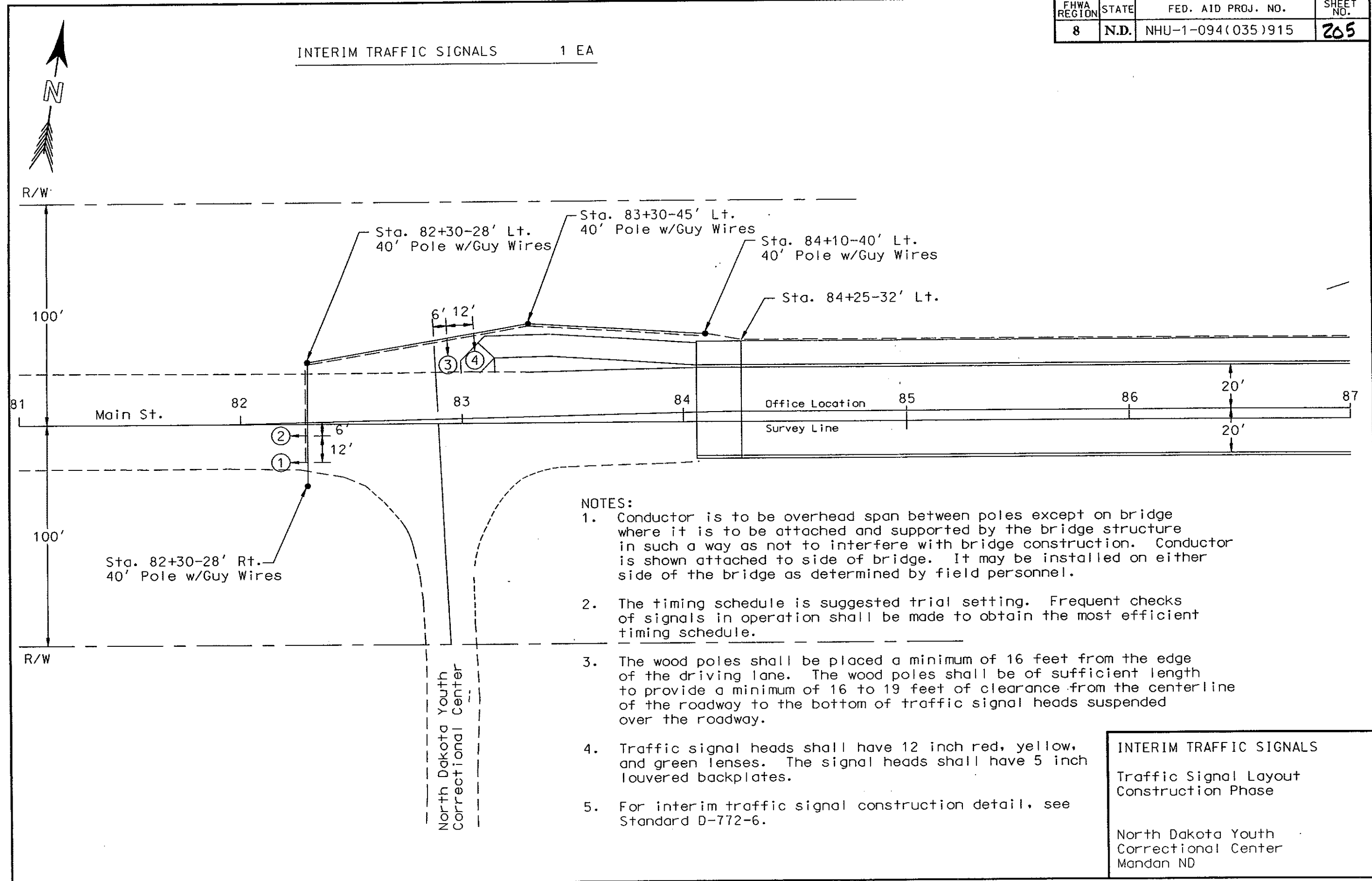
TO ANCHOR BASE PLATES, THE CONTRACTOR HAS THE OPTION TO EITHER DRILL IN 1/2" Ø SWEDGE BOLTS OR PLACE THEM IN THE CONCRETE AT THE TIME OF POURING. IF THE CONTRACTOR ELECTS TO DRILL THE BOLT HOLES, EXTREME CAUTION SHALL BE EXERCISED NOT TO DAMAGE THE CONCRETE BARRIERS.



QUANTITIES	
PEDESTRIAN RAILING	323.0 L. FT.
PEDESTRIAN FENCE	322.9 L. FT.
HEART RIVER WEST MAIN STREET MANDAN	
PEDESTRIAN FENCE & PIPE RAILING DETAILS	

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	205

INTERIM TRAFFIC SIGNALS 1 EA

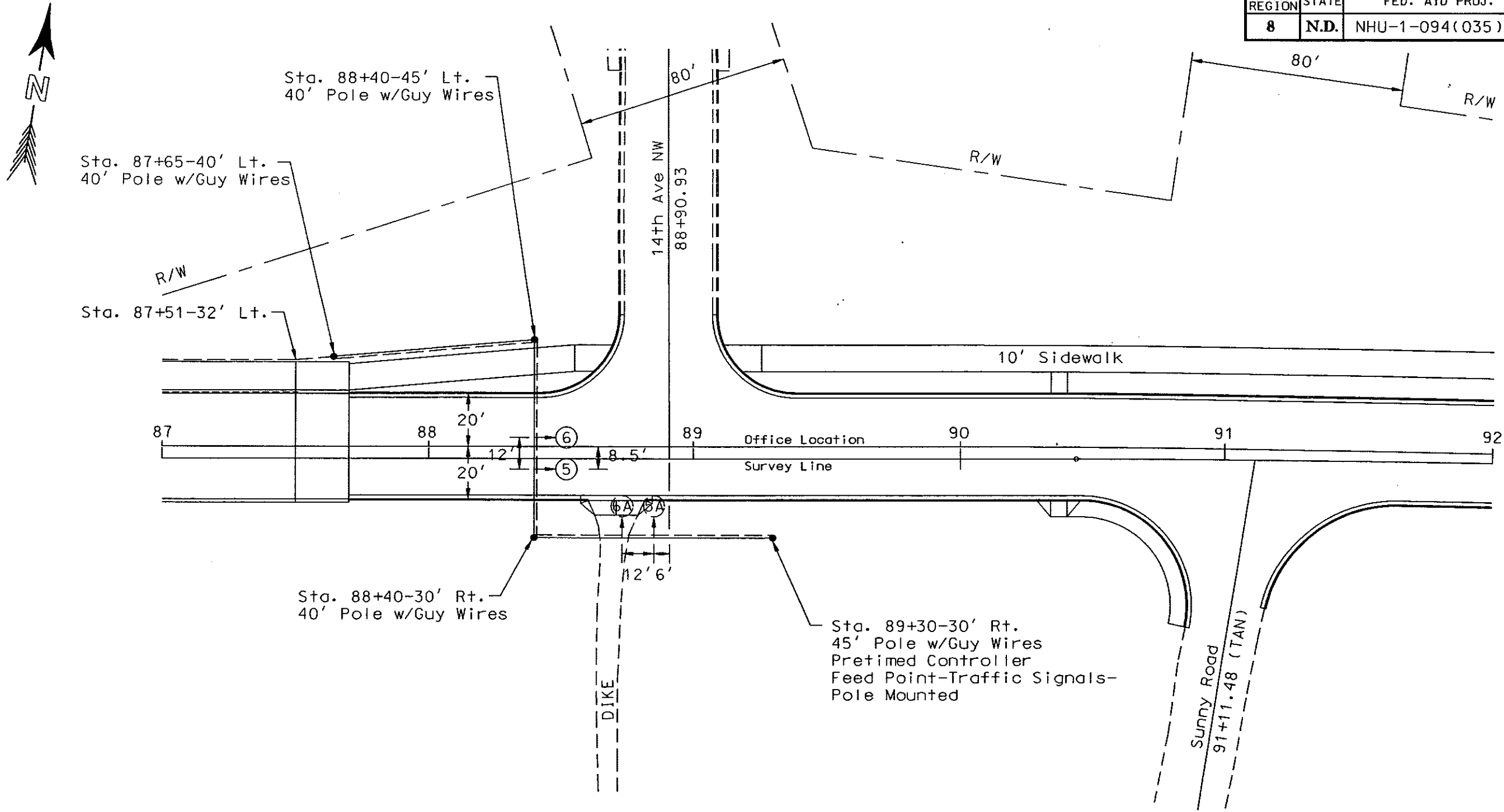


NOTES:

1. Conductor is to be overhead span between poles except on bridge where it is to be attached and supported by the bridge structure in such a way as not to interfere with bridge construction. Conductor is shown attached to side of bridge. It may be installed on either side of the bridge as determined by field personnel.
2. The timing schedule is suggested trial setting. Frequent checks of signals in operation shall be made to obtain the most efficient timing schedule.
3. The wood poles shall be placed a minimum of 16 feet from the edge of the driving lane. The wood poles shall be of sufficient length to provide a minimum of 16 to 19 feet of clearance from the centerline of the roadway to the bottom of traffic signal heads suspended over the roadway.
4. Traffic signal heads shall have 12 inch red, yellow, and green lenses. The signal heads shall have 5 inch louvered backplates.
5. For interim traffic signal construction detail, see Standard D-772-6.

INTERIM TRAFFIC SIGNALS
 Traffic Signal Layout
 Construction Phase
 North Dakota Youth
 Correctional Center
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	206



R/W

(A) When relocating signal heads 5 and 6 the contractor shall coil enough conductor to service future signal head locations.

INTERIM TRAFFIC SIGNALS
 Traffic Signal Layout
 Construction Phase

 North Dakota Youth
 Correctional Center
 Mandan ND

QUANTITIES (A)																					
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1.5" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point - Traffic Signals- Pole Mtd-Switch Box & Meter Trim	1-Way 3 Sec. Head W/12 in Lenses Span Mounted	Pretimed Controller	Remove Interim Traffic Signals	Relocate Span Mtd Signal Heads	1/8" Stability Wire- High Strength Steel	3/8" Stability Wire- High Strength Steel	1/2" Stability Wire- High Strength Steel	3/8" Span Wire- High Strength Steel	1/2" Span Wire- High Strength Steel	40' Wood Service Pole - W/Guys	45' Wood Service Pole - W/Guys	10' Copper Ground Rod	Mounting Hardware		
	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	LS		
Sta. 82+30-28' Rt.																1					
Sta. 82+30-28' Lt.																1					
Sta. 83+30-45' Lt.																1					
Sta. 84+10-40' Lt.																1					
Sta. 87+80-40' Lt.																1					
Sta. 88+40-45' Lt.																1					
Sta. 88+40-30' Rt.																1					
Sta. 89+30-30' Rt.	6			120		1		1									1	1			
Var. Locations		31	28		997		6		1	2	60	336	105	792	210				1		
TOTAL	6	31	28	120	997	1	6	1	1	2	60	336	105	792	210	7	1	1	1		

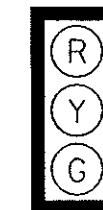
(A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".

INTERIM TRAFFIC SIGNALS
 Quantities
 North Dakota Youth
 Correctional Center
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	208

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
82+30-28' Rt. to 82+30-28' Lt.				60' 120' 58'	1/8" Stability Wire 3/8" Span Wire Cable 1
82+30-28' Lt. to 83+30-45' Lt.				105' 210' 117'	1/2" Stability Wire 1/2" Span Wire Cable 1
83+30-45' Lt. to 84+10-40' Lt.				84' 168' 84'	3/8" Stability Wire 3/8" Span Wire Cable 1
84+10-40' Lt.				33'	Cable 1
84+10-40' Lt. to 84+25-32' Lt.				17'	Cable 1
84+25-32' Lt. to 87+51-32' Lt.				326'	Cable 1
87+51-32' Lt. to 87+65-40' Lt.				16'	Cable 1
87+65-40' Lt. to				33'	Cable 1
87+65-40' Lt. to 88+40-45' Lt.				79' 158' 79'	3/8" Stability Wire 3/8" Span Wire Cable 1
88+40-45' Lt. to 88+40-30' Rt.				79' 158' 91'	3/8" Stability Wire 3/8" Span Wire Cable 1
88+40-30' Rt. to 89+30-30' Rt.				94' 188' 106'	3/8" Stability Wire 3/8" Span Wire Cable 1
89+30-30' Rt.	31' 28'	1"(A) 1.5"(A)		120' 37'	No. 8 RHW Cable 1

CONDUCTOR		Cable 1 (12-12)	
Base	Tracer	Head	Indication
1 Black			Spare
2 White			Neutral
3 Red		1 & 2	Red
4 Green			Ground
5 Orange		1 & 2	Yellow
6 Blue		1 & 2	Green
7 White	Black	5 & 6	Red
8 Red	Black	3 & 4	Red
9 Green	Black	5 & 6	Yellow
10 Orange	Black	3 & 4	Yellow
11 Blue	Black	3 & 4	Green
12 Black	White	5 & 6	Green



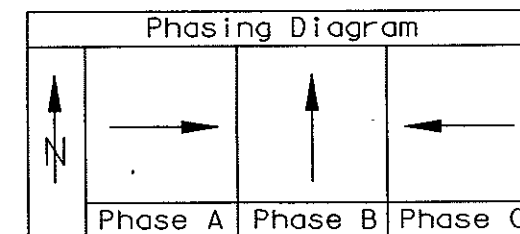
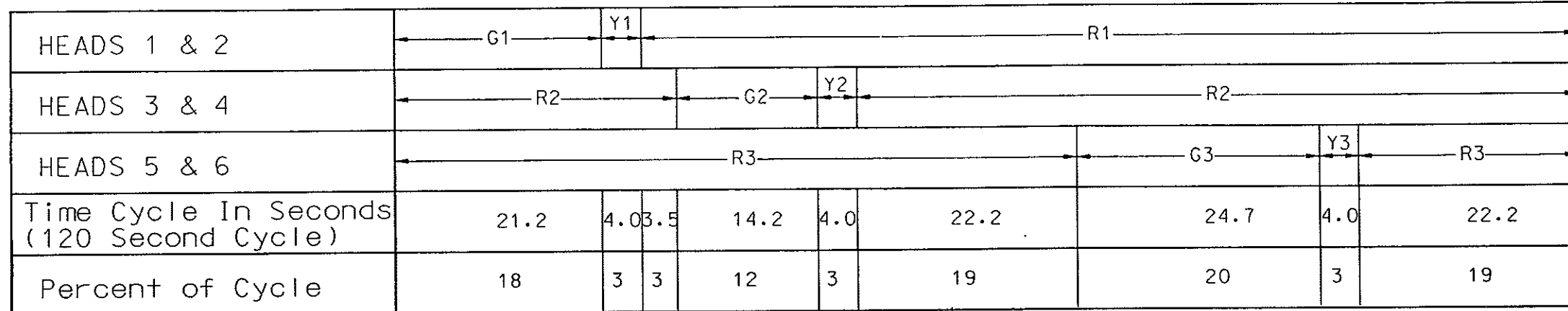
5 Inch Louvered Backplates

Heads: 1,2,3, 4,5, and 6

(A) Pole mounted

INTERIM TRAFFIC SIGNALS
 Conductor and Conduit Runs,
 Conductors, and Signal Heads

 North Dakota Youth
 Correctional Center
 Mandan ND



CAM BREAKOUT CHART															
INTERVAL	CAM POSITION	CAMS											DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	G3	Y3	R3	Sec.	%	Setting
I	1	X	X	X					X			X	7.0	6	6
	2			X					X		X	7.1	6	12	
	3			X					X		X	7.1	6	18	
II	4				X				X		X	4.0	3	21	
III	5					X		X			X	3.5	3	24	
IV	6					X	X				X	7.1	6	30	
	7					X	X				X	7.1	6	36	
V	8					X		X			X	4.0	3	39	
VI	9					X			X		X	10.2	9	48	
	10					X			X		X	12.0	10	58	
VII	11					X		X	X			8.2	6	64	
	12					X		X	X			8.2	7	71	
	13					X		X	X			8.3	7	78	
VIII	14					X		X		X	4.0	3	81*		
IX	15					X		X			X	10.2	9	90	
	16					X		X			X	12.0	10	100	

NOTE: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

G-Green
Y-Yellow
R-Red

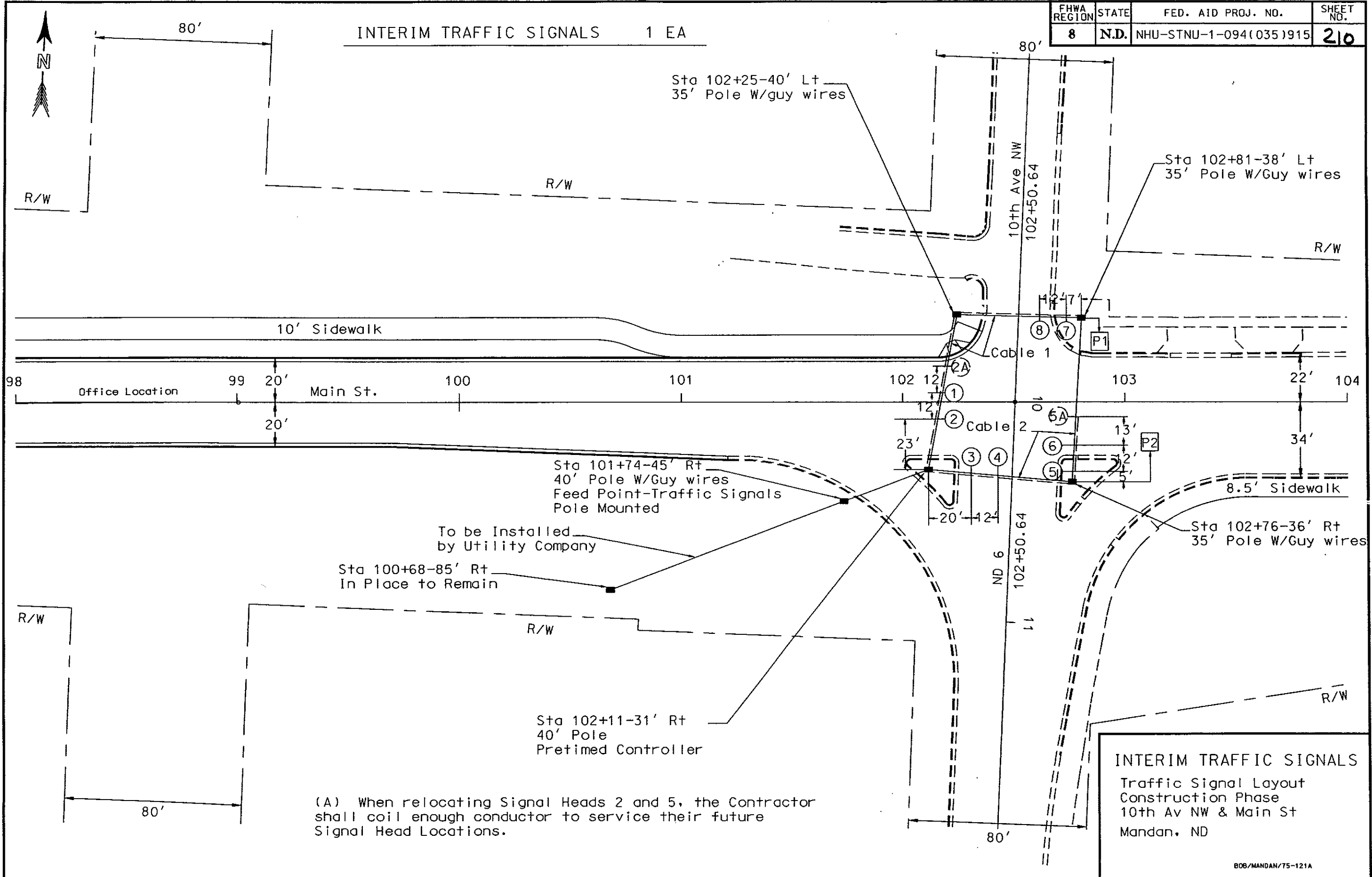
X-Cam Broken Out
* - Interlock (Green) Key

INTERIM TRAFFIC SIGNALS

Contoller Settings

North Dakota Youth
Correctional Center
Mandan ND

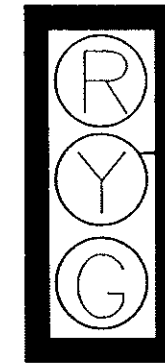
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	210



CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)	
Base	Tracer	Head	Indication	Head	Indication
1	Black		Spare		Spare
2	White		Neutral		Neutral
3	Red	1,2	Red	5,6	Red
4	Green		Ground		Ground
5	Orange	1,2	Yellow	5,6	Yellow
6	Blue	1,2	Green	5,6	Green
7	White	Black	Spare		Spare
8	Red	Black	Red	3,4	Red
9	Green	Black	Walk	P2	Walk
10	Orange	Black	Yellow	3,4	Yellow
11	Blue	Black	Green	3,4	Green
12	Black	White	Don't Walk	P2	Don't Walk



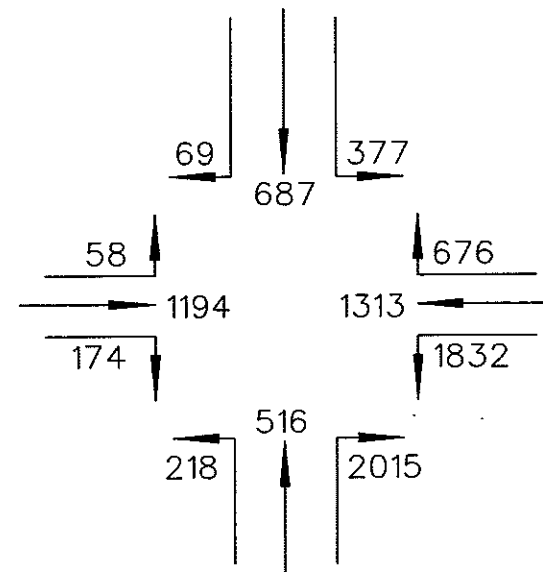
All Ped. Heads (12" Lenses)



12" Lenses

Heads 1 2 3 4
5 6 7 8

5 In. Louvered Backplates

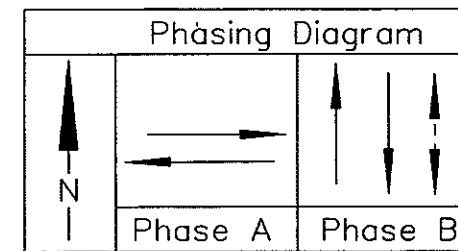


ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 10th Avenue NW (ND Hwy 6)
 Mandan, ND

Main Street	Vehicles	G1		Y1	R1			
10th Av W	Vehicles	R2		G2		Y2		
	Pedestrians	DW2		W2	FDW2			
Time Cycle In Seconds (50 Second Cycle)		21	3	1	10.5	10.5	3	1
Percent of Cycle		42	6	2	21	21	6	2

ALL DIALS



CAM BREAKOUT CHART															
INTERNAL	CAM POSITION	CAMS											DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W2	DW2	FDW2	Sec.	%	Setting
I	1	X	X	X					X		X		10.5	21	21
	2			X					X		X		10.5	21	42
II	3				X				X		X		3	6	48
III	4					X			X		X		1	2	50
IV	5					X	X			X			10.5	21	71
V	6					X	X				X		10.5	21	92
VI	7					X		X			X		3	6	98
VII	8					X			X		X		1	2	00
I	9	X	X	X					X		X		10.5	21	21
	10			X					X		X		10.5	21	42
II	11				X				X		X		3	6	48
III	12					X			X		X		1	2	50
IV	13					X	X			X			10.5	21	71
V	14					X	X				X		10.5	21	92
VI	15					X		X			X		3	6	98
VII	16					X			X		X		1	2	00

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk

X-Cam Broken Out
*-Interlock (Green) Key

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

Dial 1- 6:00 AM to 11:00 AM
Dial 2- 11:00 AM to 7:00 PM
Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
10th Av W

INTERIM TRAFFIC SIGNALS

Controller Settings

10th Avenue NW (ND Hwy 6)
Mandan, ND

CONTRST 11-IPF

	QUANTITIES (A)																		
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1-1/2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point-Traffic Signals-Pole Mtd-Switch Box & Meter Trim	1-Way 3 Sec. Head W/12in. Lenses Span Mounted	1-Way 2 Sec. Head Ped. Signal Pole Mounted	Pretimed Controller	Remove Interim Traffic Signals	Relocate Span Mtd Signal Heads	3/8" Stability Wire-High Strength Steel	3/8" Span Wire-High Strength Steel	40' Wood Service Pole-W/Guys	35' Wood Service Pole-W/Guys	10' Copper Ground Rod	Mounting Hardware	5" Louvered Backplates
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	LS	EA
101+74-45' Rt	6	24			102		1								1		1		
102+11-31' Rt		24		23	99	66			1						1				
102+25-40' Lt																1			
102+76-36' Rt				19		50			1							1			
102+81-38' Lt			19			25			1							1			
Var. Locations					129	292		8		1	2	326	652				1		8
TOTAL	6	48	19	42	330	433	1	8	2	1	1	2	326	652	2	3	1	1	8

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
101+74-45' Rt to 102+11-31' Rt	24'(B) 24'(B)	1" 1"	330' 43' 86'	(3) No. 8 RHW (1) Stability Wire (2) Span Wire
102+11-31' Rt	23'(B)	2 1/2"	33' 33'	Cable 1 Cable 2
102+11-31' Rt to 102+25-40' Lt			94' 76' 152'	Cable 1 (1) Stability Wire (2) Span Wire
102+25-40' Lt to 102+81-38' Lt			72' 60' 120'	Cable 1 (1) Stability Wire (2) Span Wire
102+81-38' Lt	19'(B)	1 1/2"	25'	Cable 1
102+11-31' Rt to 102+76-36' Rt			81' 69' 138'	Cable 2 (1) Stability Wire (2) Span Wire
102+76-36' Rt	19'(B)	2 1/2"	50'	Cable 2
102+76-36' Rt to 102+81-38' Lt			45' 78' 156'	Cable 2 (1) Stability Wire (2) Span Wire

(B) These items shall be wood pole mounted.

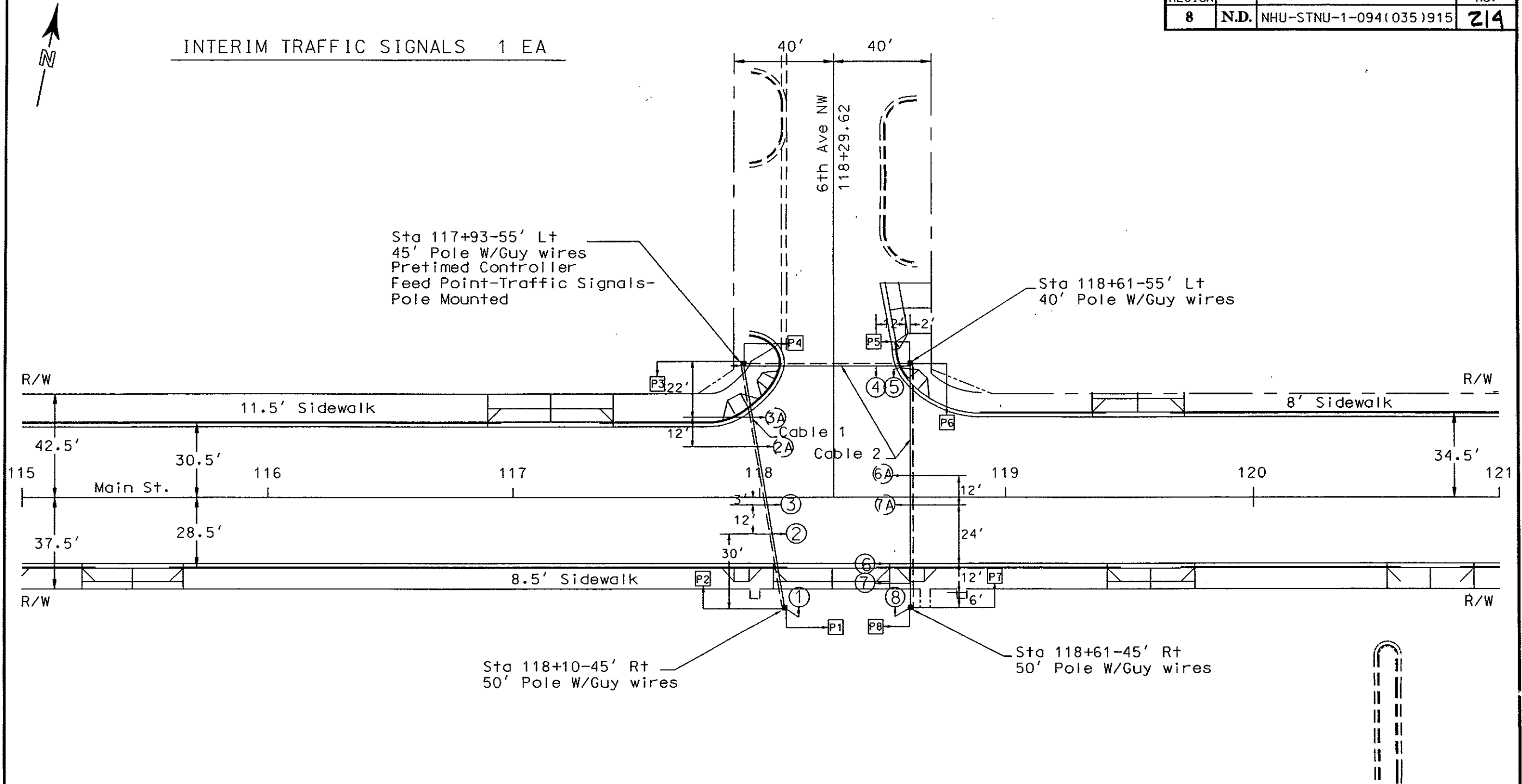
(A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".

(B) These items shall be State Furnished.

INTERIM TRAFFIC SIGNALS
Summary of Quantities
10th Avenue NW (ND Hwy 6)
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	214

INTERIM TRAFFIC SIGNALS 1 EA



(A) When relocating Signal Heads 2, 3, 6 and 7 the Contractor shall coil enough conductor to service their future Signal Head Locations.

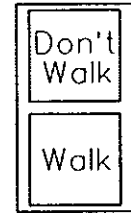
INTERIM TRAFFIC SIGNALS

Traffic Signal Layout
Construction Phase
6th Av NW & Main St

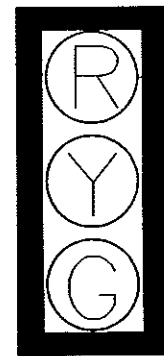
Mandan, ND

BOB/MANDAN/75-121B 11= 40MU

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)	
Base	Tracer	Head	Indication	Head	Indication
1	Black	P2,P3	Walk	P5,P8	Walk
2	White		Neutral		Neutral
3	Red	1	Red	4,5,8	Red
4	Green		Ground		Ground
5	Orange	1	Yellow	4,5,8	Yellow
6	Blue	1	Green	4,5,8	Green
7	White	Black	Don't Walk	P5,P8	Don't Walk
8	Red	Black	Red	3,4	Red
9	Green	Black	Walk	P6,P7	Walk
10	Orange	Black	Yellow	3,4	Yellow
11	Blue	Black	Green	3,4	Green
12	Black	White	Don't Walk	P6,P7	Don't Walk



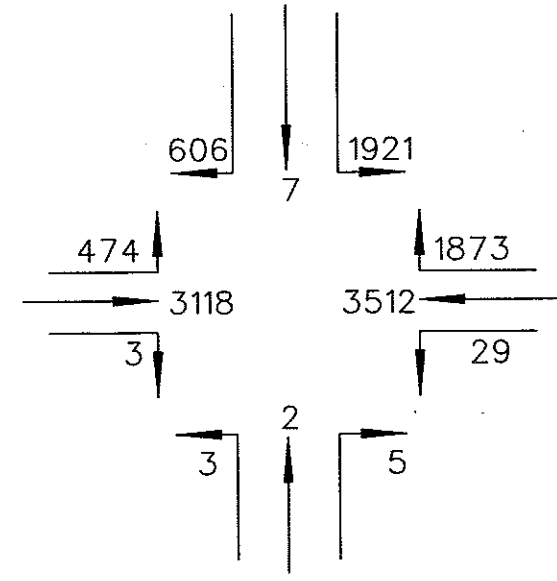
All Ped. Heads (12" Lenses)



12" Lenses

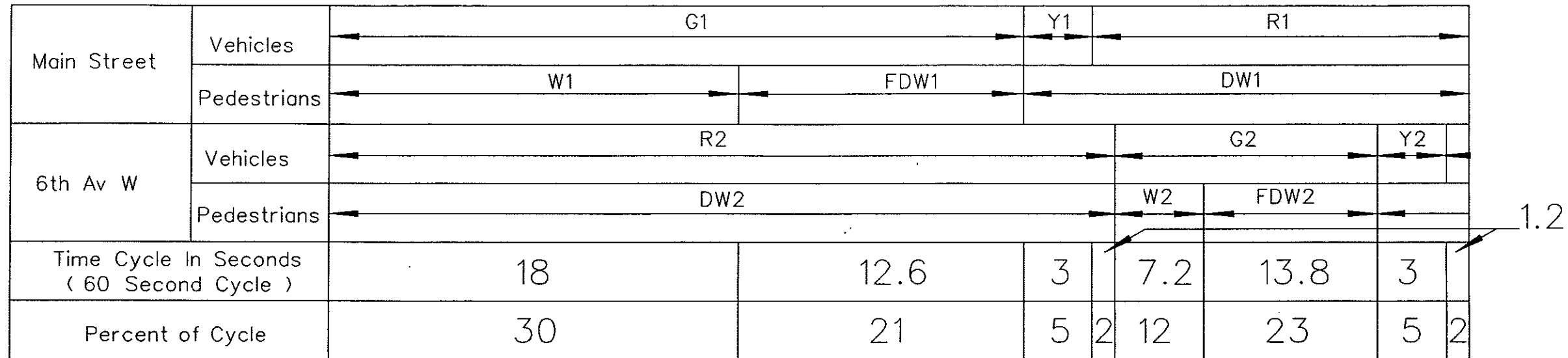
Heads 1 2 3 4
5 6 7 8

5 In. Louvered Backplates

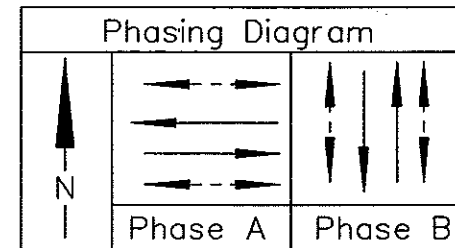


ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 6th Avenue NW
 Mandan, ND



ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS													DIAL		SETTINGS	
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X			X			18	30	30
II	2			X				X				X	X			12.6	21	51
III	3				X			X	X			X				3	5	56
IV	4					X		X	X			X				1.2	2	58
V	5					X	X		X	X						7.2	12	70
VI	6					X	X		X					X		13.8	23	93
VII	7					X	X		X	X						3	5	98
VIII	8					X		X	X	X						1.2	2	00
I	9	X	X	X				X	X			X				18	30	30
II	10			X				X				X	X			12.6	21	51
III	11				X			X	X			X				3	5	56
IV	12					X		X	X			X				1.2	2	58
V	13					X	X		X	X						7.2	12	70
VI	14					X	X		X					X		13.8	23	93
VII	15					X		X	X			X				3	5	98
VIII	16					X		X	X	X		X				1.2	2	00

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk
X-Cam Broken Out
*-Interlock (Green) Key

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW Main Street
FLASHING RED 6th Av W

INTERIM TRAFFIC SIGNALS
Controller Settings
6th Avenue NW
Mandan, ND

	QUANTITIES (A)																					
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1-1/2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point-Traffic Signals-Pole Mtd-Switch Box & Meter Trim	(B) 1-Way 3 Sec. Head W/12in. Lenses Span Mounted	(B) 1-Way 3 Sec. Head W/12in. Lenses Post Mounted	(B) 1-Way 2 Sec. Head Ped. Signal Pole Mounted	(C) Pretimed Controller	Time Base Coordination Unit	Remove Interim Traffic Signals	Relocate Span Mtd Signal Heads	1/2" Stability Wire-High Strength Steel	1/2" Span Wire-High Strength Steel	40' Wood Service Pole-W/Guys	45' Wood Service Pole-W/Guys	50' Wood Service Pole-W/Guys	10' Copper Ground Rod	Mounting Hardware	5" Louvered Backplates
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	EA	LS	EA
117+93-55' Lt	6	29		29	120	83	1			2	1	1						1	1			
118+10-45' Rt			24			30				2									1			
118+61-55' Lt				24		60				2						1						
118+61-45' Rt			24			30				2									1			
Var. Locations						342		6	2			1	4	282	564						1	8
TOTAL	6	29	48	53	120	545	1	6	2	8	1	1	1	4	282	564	1	1	2	1	1	8

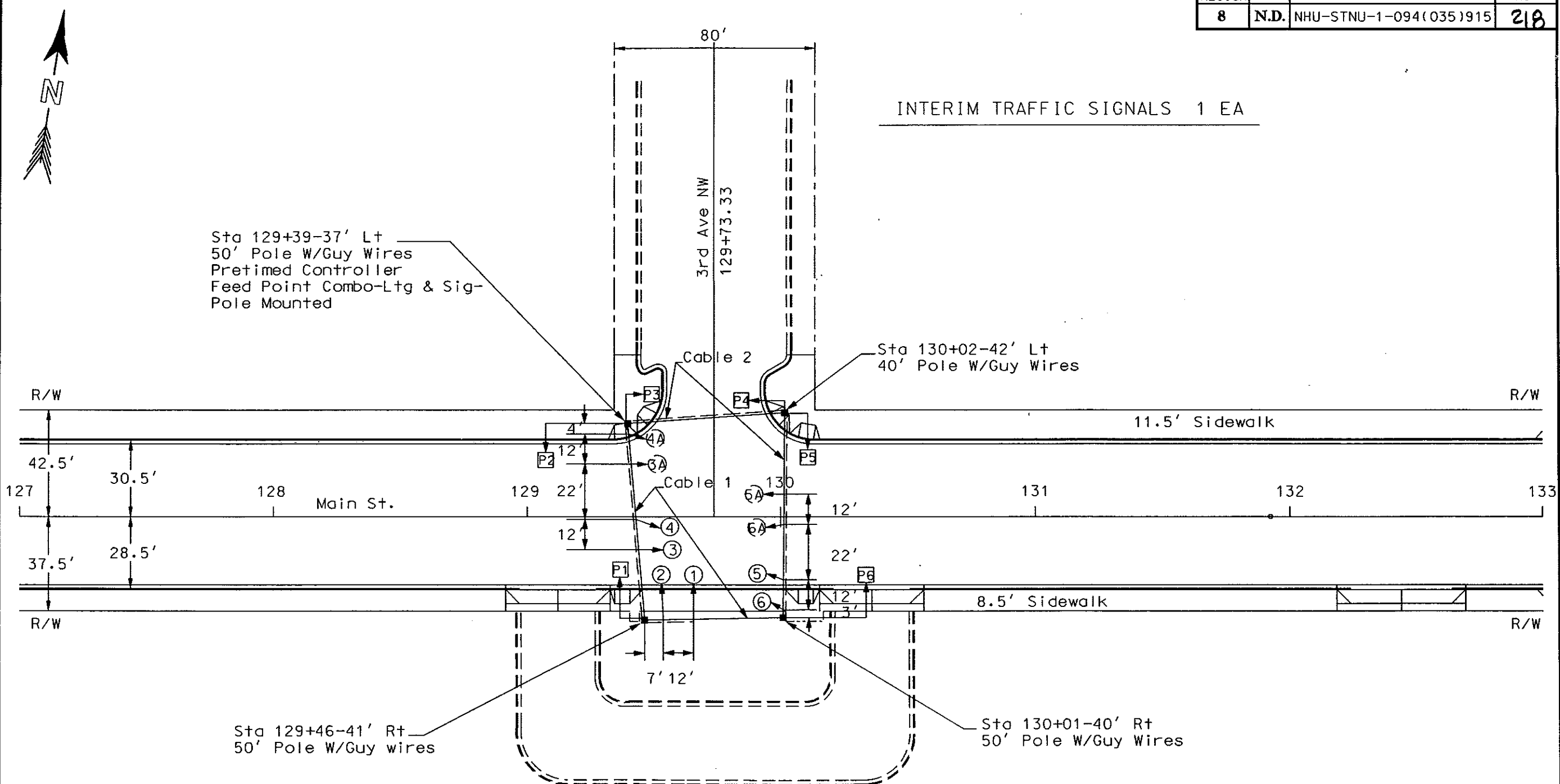
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
117+93-55' Lt	29'(B)	2 1/2"	44' 39'	Cable 1 Cable 2
	29'(B)	1"	120'	(3) No. 8 RHW
117+93-55' Lt to 118+10-45' Rt			130' 106' 212'	Cable 1 (1) Stability Wire (2) Span Wire
118+10-45' Rt	24'(B)	1 1/2"	30'	Cable 1
117+93-55' Lt to 118+61-55' Lt			84' 72' 144'	Cable 2 (1) Stability Wire (2) Span Wire
118+61-55' Lt	24'(B)	2 1/2"	60'	(2) Cable 2
118+61-55' Lt to 118+61-45' Rt			128' 104' 208'	Cable 2 (1) Stability Wire (2) Span Wire
118+61-45' Rt	24'(B)	1 1/2"	30'	Cable 2

(B) These items shall be wood pole mounted.

- (A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".
- (B) These items shall be State Furnished.
- (C) See Notes.

INTERIM TRAFFIC SIGNALS
Summary of Quantities
6th Avenue NW
Mandan, ND

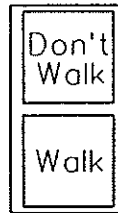
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	218



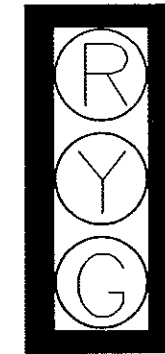
(A) When relocating Signal Heads 3, 4, 5, and 6 the contractor shall coil enough conductor to service their future Signal Head Locations.

INTERIM TRAFFIC SIGNALS
 Traffic Signal Layout
 Construction Phase
 3rd Av NW & Main St
 Mandan, ND
 BOB/MAMDAN/75-121C

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		
Base	Tracer	Head	Indication	Head	Indication	
1	Black	P3	Walk	P6	Walk	
2	White		Neutral		Neutral	
3	Red	1,2	Red	5,6	Red	
4	Green		Ground		Ground	
5	Orange	1,2	Yellow	5,6	Yellow	
6	Blue	1,2	Green	5,6	Green	
7	White	Black	P3	Don't Walk	P6	Don't Walk
8	Red	Black	3,4	Red		Spare
9	Green	Black	P1,P2	Walk	P4,P5	Walk
10	Orange	Black	3,4	Yellow		Spare
11	Blue	Black	3,4	Green		Spare
12	Black	White	P1,P2	Don't Walk	P4,P5	Don't Walk



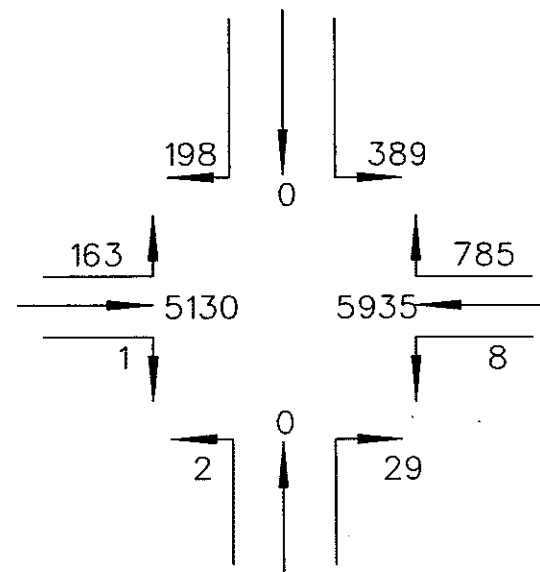
All Ped. Heads (12" Lenses)



12" Lenses

Heads 1 2 3
4 5 6

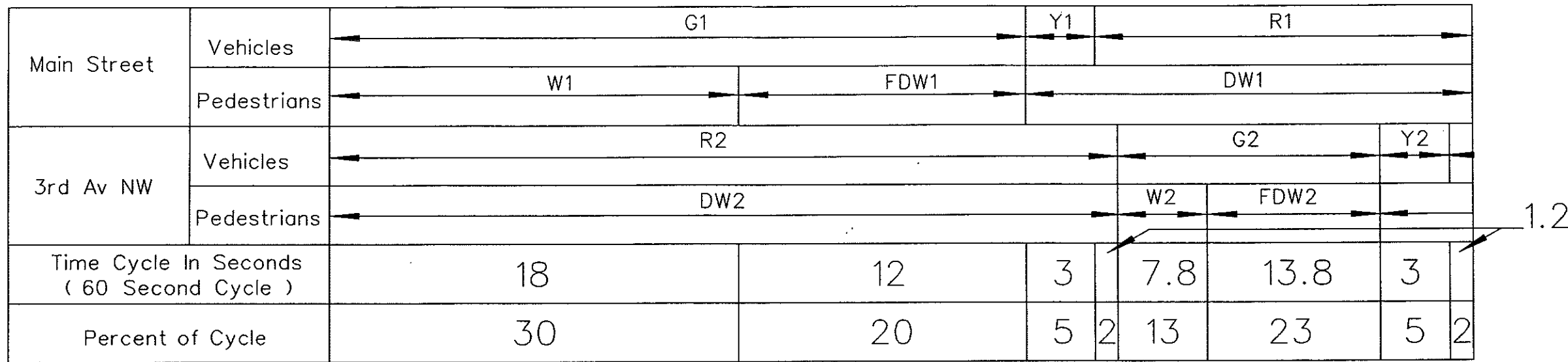
5 In. Louvered Backplates



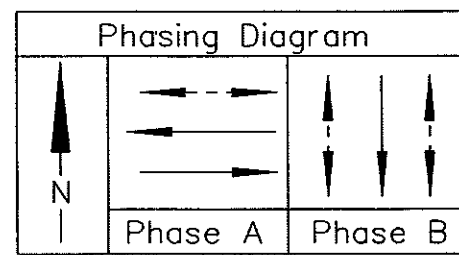
ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
3rd Avenue NW
Mandan, ND



ALL DIALS



CAM BREAKOUT CHART																			
INTERNAL	CAM POSITION	CAMS														DIAL		SETTINGS	
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting	
I	1	X	X	X					X	X				X			18	30	30
II	2			X					X				X	X			12	20	50
III	3				X				X	X		X					3	5	55
IV	4					X			X	X		X					1.2	2	57
V	5					X	X			X	X						7.8	13	70
VI	6					X	X			X					X		13.8	23	93
VII	7					X	X			X	X		X				3	5	98
VIII	8					X			X	X		X					1.2	2	00
I	9	X	X	X					X	X							18	30	30
II	10			X					X					X			12	20	50
III	11				X				X	X							3	5	55
IV	12					X			X	X							1.2	2	57
V	13					X	X			X	X						7.8	13	70
VI	14					X	X			X				X			13.8	23	93
VII	15					X	X			X	X		X				3	5	98
VIII	16					X			X	X		X					1.2	2	00

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW Main Street FLASHING RED 3rd Av W

G-Green W-Walk X-Cam Broken Out
 Y-Yellow DW-Don't Walk *-Interlock (Green) Key
 R-Red FDW-Flashing Don't Walk

INTERIM TRAFFIC SIGNALS
 Controller Settings
 3rd Avenue NW
 Mandan, ND

STATION	QUANTITIES (A)																			
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1-1/2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point Combo-Ltg & Sig-Pole Mtd-Switch Box & Meter Trim	1-Way 3 Sec. Head W/12in. Lenses Span Mounted (B)	1-Way 2 Sec. Head Ped. Signal Pole Mounted (C)	Pretimed Controller	Time Base Coordination Unit	Remove Interim Traffic Signals	Relocate Span Mtd Signal Heads	3/8" Stability Wire-High Strength Steel	3/8" Span Wire-High Strength Steel	40' Wood Service Pole-W/Guys	50' Wood Service Pole-W/Guys	10' Copper Ground Rod	Mounting Hardware	5" Covered Backplates
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	LS	EA
129+39-37' Lt	6	29		29	120	83	1		2	1	1						1	1		
129+46-41' Rt				24		60			1								1			
130+01-40' Rt			24			30			1								1			
130+02-42' Lt				24		60			2							1				
Var. Locations						311		6				1	4	294	588				1	6
TOTAL	6	29	24	77	120	544	1	6	6	1	1	1	4	294	588	1	3	1	1	6

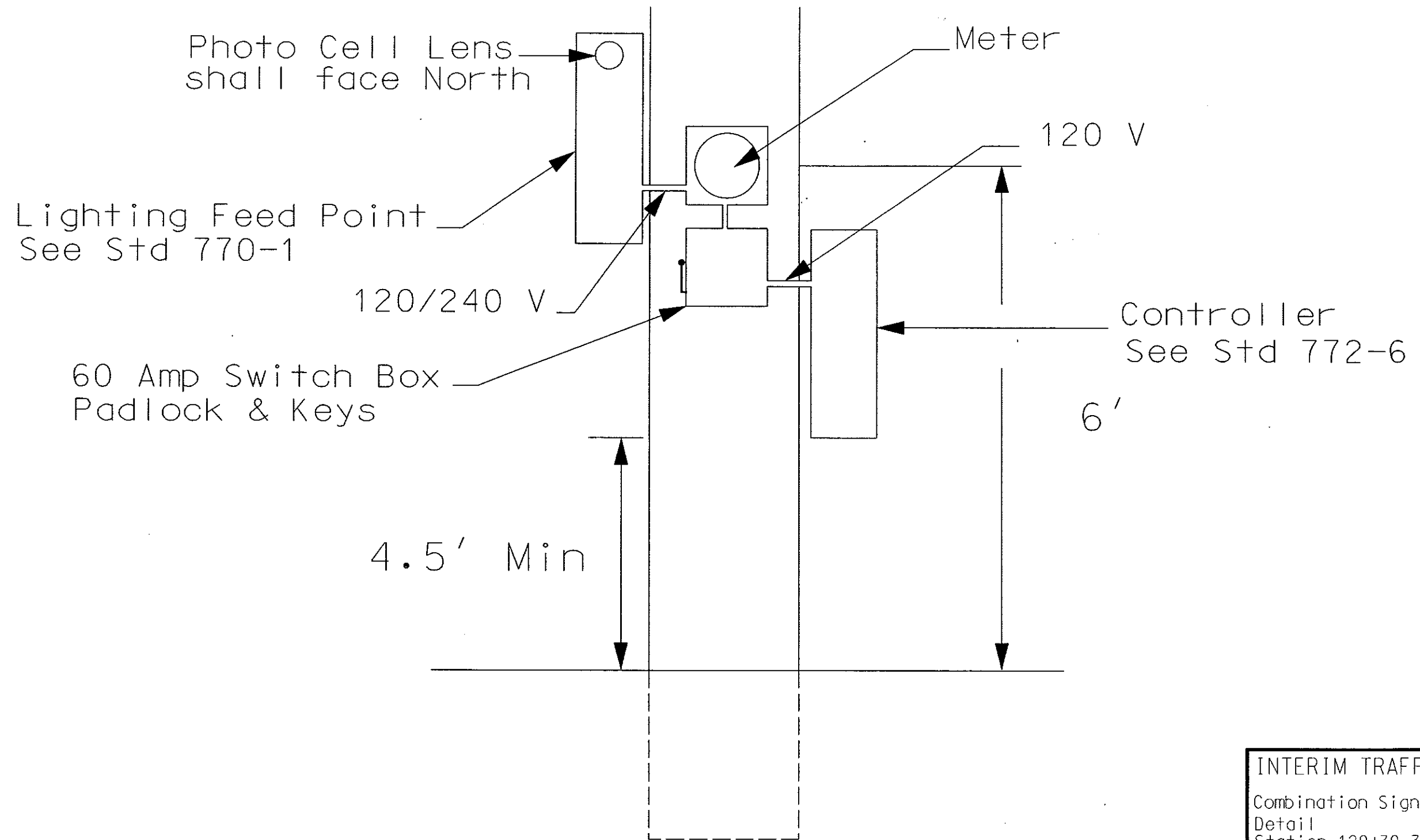
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
129+39-37' Lt	29'(B)	2 1/2"	44' 39'	Cable 1 Cable 2
	29'(B)	1"	120'	(3) No. 8 RHW
129+39-37' Lt to 129+46-41' Rt			106' 82' 164'	Cable 1 (1) Stability Wire (2) Span Wire
129+46-41' Rt	24'(B)	2 1/2"	60'	(2) Cable 1
129+46-41' Rt to 130+01-40' Rt			28' 59' 118'	Cable 1 (1) Stability Wire (2) Span Wire
129+39-37' Lt to 130+02-42' Lt			67' 67' 134'	Cable 2 (1) Stability Wire (2) Span Wire
130+02-42' Lt	24'(B)	2 1/2"	60'	(2) Cable 2
130+02-42' Lt to 130+01-40' Rt			110' 86' 172'	Cable 2 (1) Stability Wire (2) Span Wire
130+01-40' Rt	24'(B)	1 1/2"	30'	Cable 2

- (A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".
- (B) These items shall be State Furnished.
- (C) See Notes.

(B) These items shall be wood pole mounted.

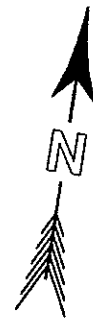
INTERIM TRAFFIC SIGNALS
 Summary of Quantities
 3rd Avenue NW
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND.	NHU-1-094(035)915	222

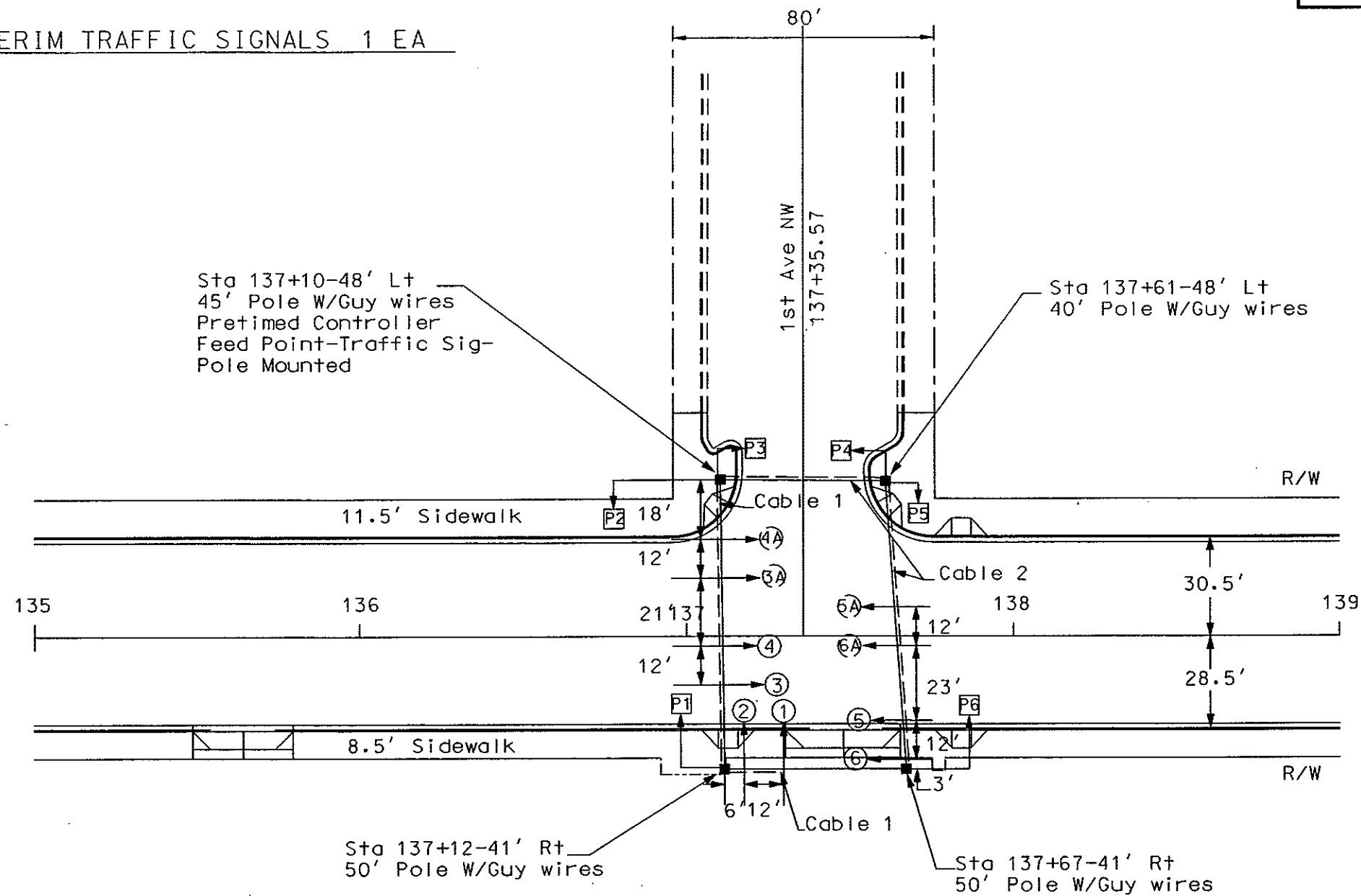


INTERIM TRAFFIC SIGNALS
 Combination Signal & Lighting
 Detail
 Station 129+39-37' Lt
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	223



INTERIM TRAFFIC SIGNALS 1 EA



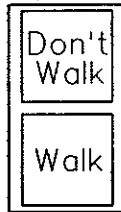
(A) When relocating Signal Heads 3, 4, 5, and 6 the contractor shall coil enough conductor to service their future Signal Head Locations.

INTERIM TRAFFIC SIGNALS

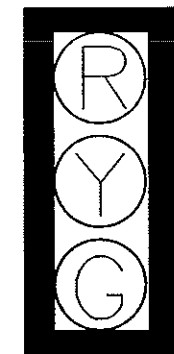
Traffic Signal Layout
Construction Phase
1st Av NW & Main St
Mandan, ND

808/MANDAN/75-121D 11=40MJ

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)	
Base	Tracer	Head	Indication	Head	Indication
1	Black	P3	Walk	P5,P6	Walk
2	White		Neutral		Neutral
3	Red	3,4	Red	5,6	Red
4	Green		Ground		Ground
5	Orange	3,4	Yellow	5,6	Yellow
6	Blue	3,4	Green	5,6	Green
7	White	Black	Don't Walk	P5,P6	Don't Walk
8	Red	Black	Red		Spare
9	Green	Black	Walk	P4	Walk
10	Orange	Black	Yellow	P4	Don't Walk
11	Blue	Black	Green		Spare
12	Black	White	Don't Walk		Spare



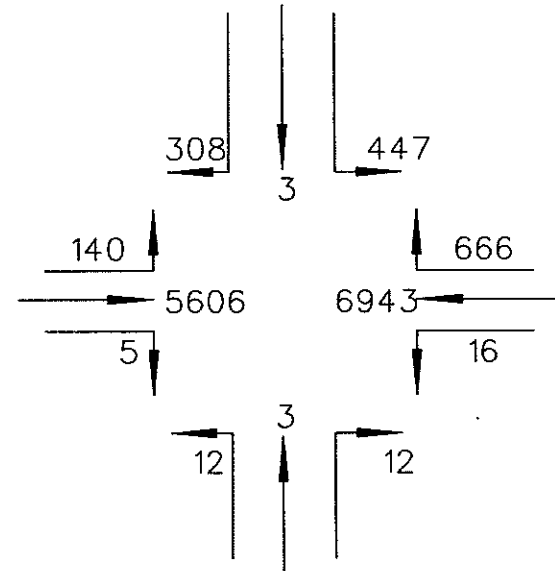
All Ped. Heads (12" Lenses)



12" Lenses

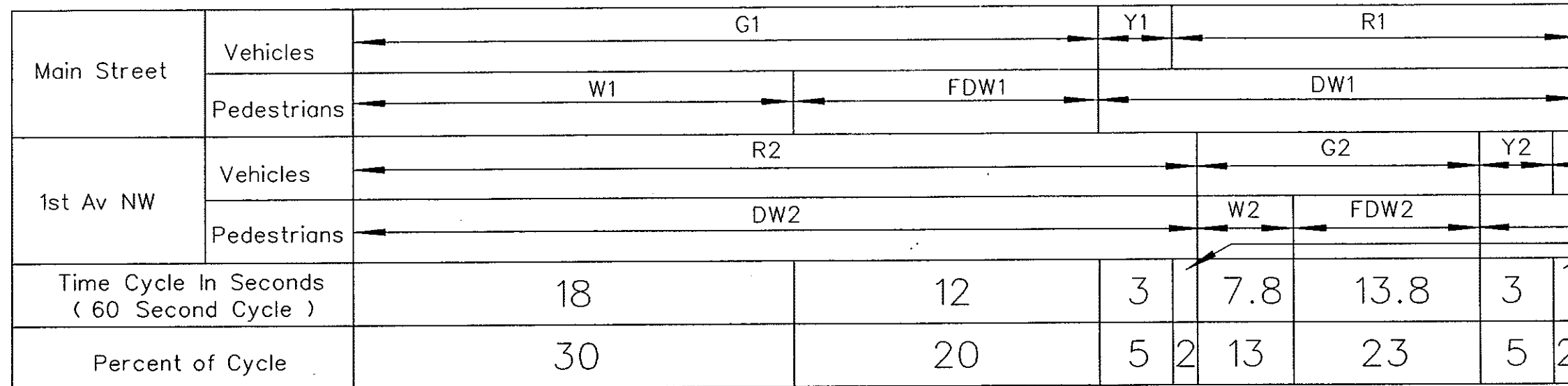
Heads 1 2 3
4 5 6

5 In. Louvered Backplates



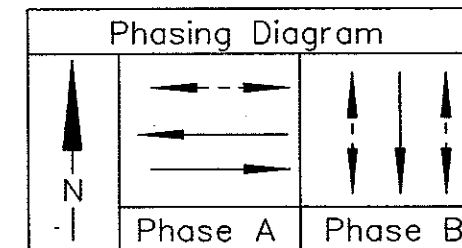
ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 1st Avenue NW
 Mandan, ND



1.2

ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS														DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X			X			18	30	30
II	2			X				X				X	X			12	20	50
III	3				X			X	X		X					3	5	55
IV	4					X		X	X		X	X				1.2	2	57
V	5					X	X			X	X					7.8	13	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X	X					3	5	98
VIII	8					X		X	X	X						1.2	2	00
I	9	X	X	X				X	X			X				18	30	30
II	10			X				X				X	X			12	20	50
III	11				X			X	X		X	X				3	5	55
IV	12					X		X	X		X	X				1.2	2	57
V	13					X	X			X	X					7.8	13	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X	X					3	5	98
VIII	16					X		X	X	X						1.2	2	00

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW Main Street FLASHING RED 1st Av W

G-Green W-Walk X-Cam Broken Out
 Y-Yellow DW-Don't Walk *-Interlock (Green) Key
 R-Red FDW-Flashing Don't Walk

INTERIM TRAFFIC SIGNALS
 Controller Settings
 1st Avenue NW
 Mandan, ND

STATION	QUANTITIES (A)																					
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1-1/2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point-Traffic Signals-Pole Mtd-Switch Box & Meter Trim	1-Way 3 Sec. Head W/12in. Lenses Span Mounted	1-Way 2 Sec. Head Ped. Signal Pole Mounted	Pretimed Controller	Time Base Coordination Unit	Remove Interim Traffic Signals	Relocate Span Mtd SignalHeads	3/8" Stability Wire-High Strength Steel	3/8" Span Wire-High Strength Steel	40' Wood Service Pole-W/Guys	45' Wood Service Pole-W/Guys	50' Wood Service Pole-W/Guys	10' Copper Ground Rod	Mounting Hardware	5" Louvered Backplates	
137+10-48' Lt	6	29		29	120	83	1		2	1	1						1		1			
137+12-41' Rt				24		60		1									1					
137+61-48' Lt				24		60		2							1							
137+62-41' Rt			24			30		1									1					
Var. Locations						319		6			1	4	300	600					1	6		
TOTAL	6	29	24	77	120	552	1	6	6	1	1	1	4	300	600	1	1	2	1	1	6	

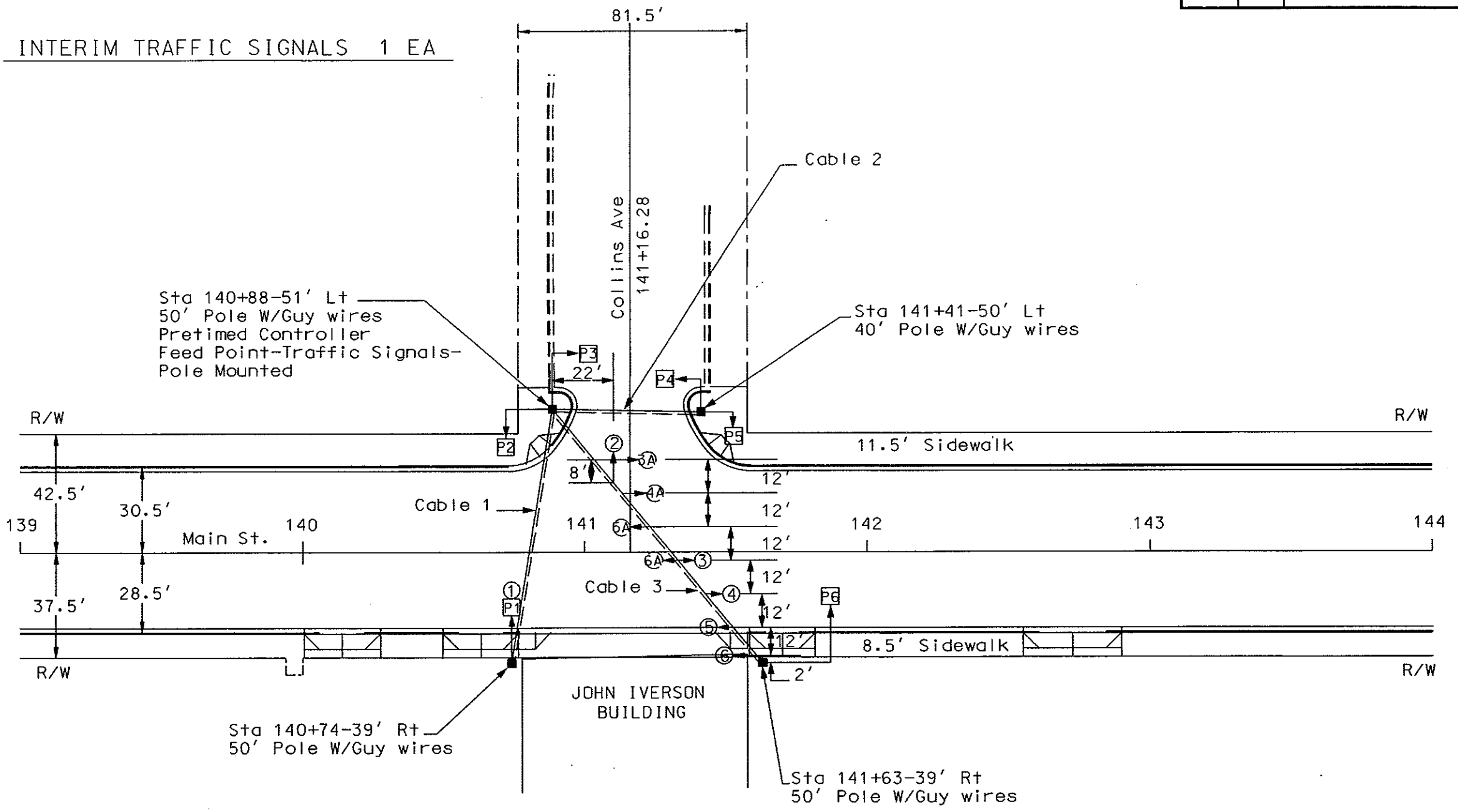
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
137+10-48' Lt	29'(B)	2 1/2"	44' 39'	Cable 1 Cable 2
	29'(B)	1"	120'	(3) No. 8 RHW
137+10-48' Lt to 137+12-41' Rt			117' 93' 186'	Cable 1 (1) Stability Wire (2) Span Wire
137+12-41' Rt	24'(B)	2 1/2"	60'	(2) Cable 1
137+12-41' Rt to 137+67-41' Rt			30' 59' 118'	Cable 1 (1) Stability Wire (2) Span Wire
137+10-48' Lt to 137+61-48' Lt			55' 55' 110'	Cable 2 (1) Stability Wire (2) Span Wire
137+61-48' Lt	24'(B)	2 1/2"	60'	(2) Cable 2
137+61-48' Lt to 137+62-41' Rt			117' 93' 186'	Cable 2 (1) Stability Wire (2) Span Wire
137+62-41' Rt	24'(B)	1 1/2"	30'	Cable 2

- (A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".
- (B) These items shall be State Furnished.
- (C) See Notes.

(B) These items shall be wood pole mounted.

INTERIM TRAFFIC SIGNALS
Summary of Quantities
1st Avenue NW
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	227

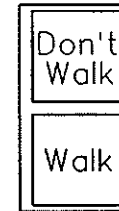


INTERIM TRAFFIC SIGNALS 1 EA

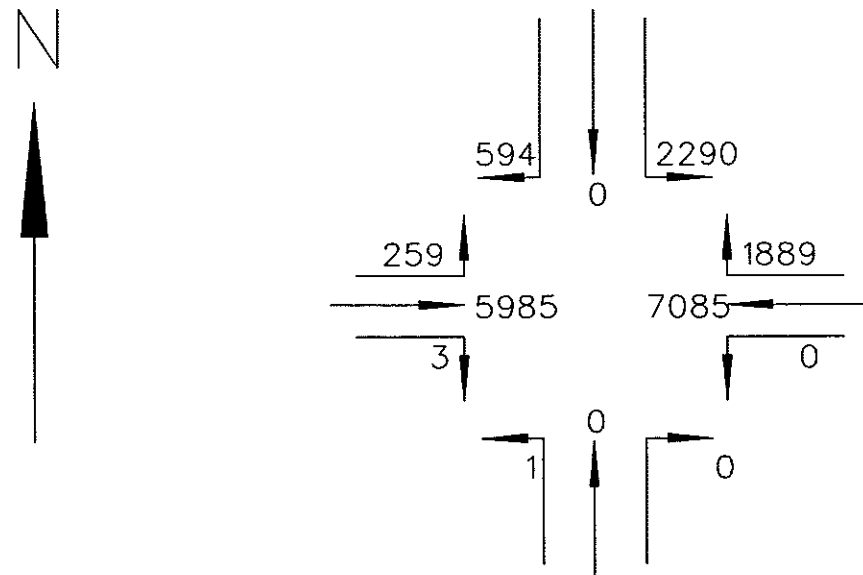
(A) When relocating Signal Heads 3, 4, 5, and 6 the contractor shall coil enough conductor to service their future Signal Head Locations.

INTERIM TRAFFIC SIGNALS
 Traffic Signal Layout
 Construction Phase
 Collins Av & Main St
 Mandan, ND

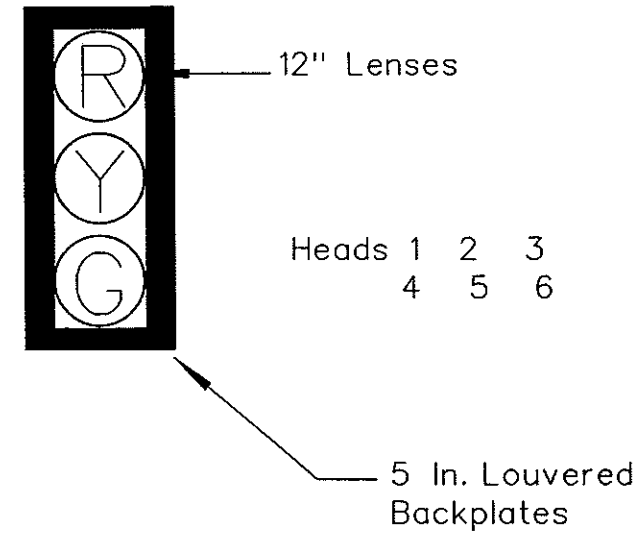
CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		CABLE 3 (12-12)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare	P6	Walk
2	White		Neutral		Neutral		Neutral
3	Red	1	Red		Spare	3,4,5,6	Red
4	Green		Ground		Ground		Ground
5	Orange	1	Yellow		Spare	3,4,5,6	Yellow
6	Blue	1	Green		Spare	3,4,5,6	Green
7	White	Black	Spare		Spare	P6	Don't Walk
8	Red	Black	Spare		Spare	2	Red
9	Green	Black	Spare	P3, P4	Walk	2	Green
10	Orange	Black	Spare	P3, P4	Don't Walk	2	Yellow
11	Blue	Black	P1,P2	Walk	P5	Walk	Spare
12	Black	White	P1,P2	Don't Walk	P5	Don't Walk	Spare



All Ped. Heads (12" Lenses)

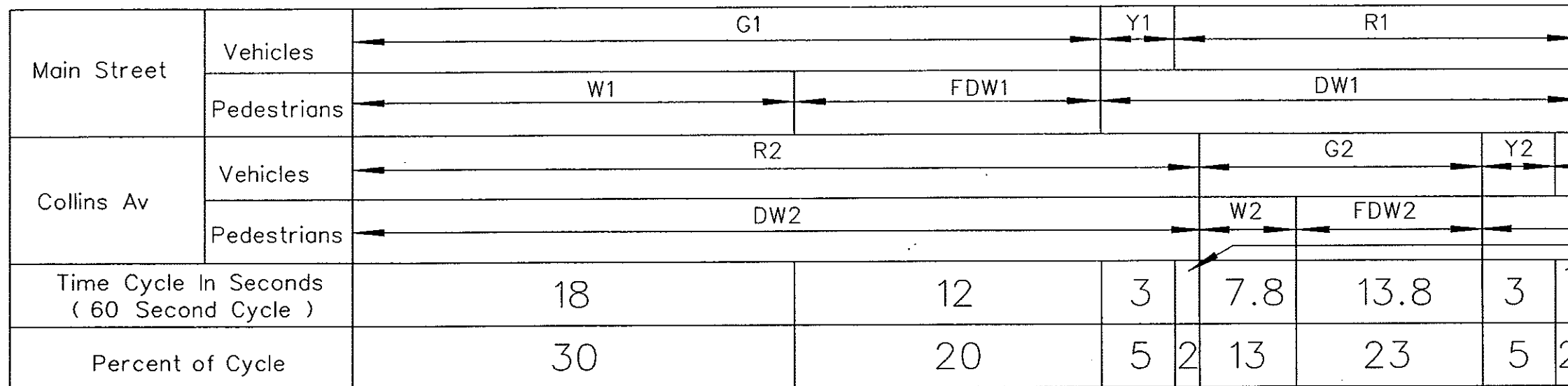


ESTIMATED 1993 ADT



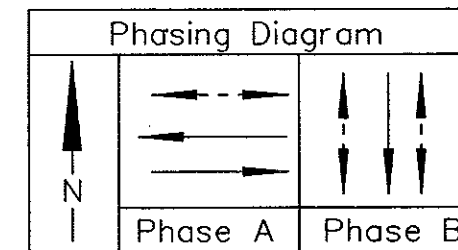
INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
Collins Avenue NW
Mandan, ND



1.2

ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS														DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X			X			18	30	30
II	2			X					X				X	X		12	20	50
III	3				X				X	X			X			3	5	55
IV	4					X			X	X			X			1.2	2	57
V	5					X	X			X	X					7.8	13	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X	X					3	5	98
VIII	8					X			X	X			X			1.2	2	00
I	9	X	X	X					X	X			X			18	30	30
II	10			X					X				X	X		12	20	50
III	11				X				X	X			X			3	5	55
IV	12					X			X	X			X			1.2	2	57
V	13					X	X			X	X					7.8	13	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X	X					3	5	98
VIII	16					X			X	X			X			1.2	2	00

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
Collins Av

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk

X-Cam Broken Out
*-Interlock (Green) Key

INTERIM TRAFFIC SIGNALS

Controller Settings

Collins Avenue

Mandan, ND

QUANTITIES (A)

STATION	QUANTITIES (A)																					
	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	1-1/2" Diameter Rigid Conduit	3" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Feed Point-Traffic Signals- Pole Mtd-Switch Box & Meter Trim	(B) 1-Way 3 Sec. Head W/12in. Lenses Span Mounted	(B) 1-Way 3 Sec. Head W/12in. Lenses Post Mounted	(C) 1-Way 2 Sec. Head Ped. Signal Pole Mounted	Pretimed Controller	Time Base Coordination Unit	Remove Interim Traffic Signals	Relocate Span Mtd SignalHeads	5/8" Stability Wire- High Strength Steel	5/8" Span Wire- High Strength Steel	40' Wood Service Pole-W/Guys	50' Wood Service Pole-W/Guys	10' Copper Ground Rod	Mounting Hardware	5" Louvered Backplates	
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	LS	EA	
140+74-39' Rt			24			30				1								1				
140+88-51' Lt	6	29		29	120	122	1			2	1	1						1	1			
141+41-50' Lt			24			30				2							1					
141+63-39' Rt			24			30				1								1				
Var. Locations						340		5	1			1	4	286	572					1	6	
TOTAL	6	29	72	29	120	552	1	5	1	6	1	1	1	4	286	572	1	3	1	1	6	

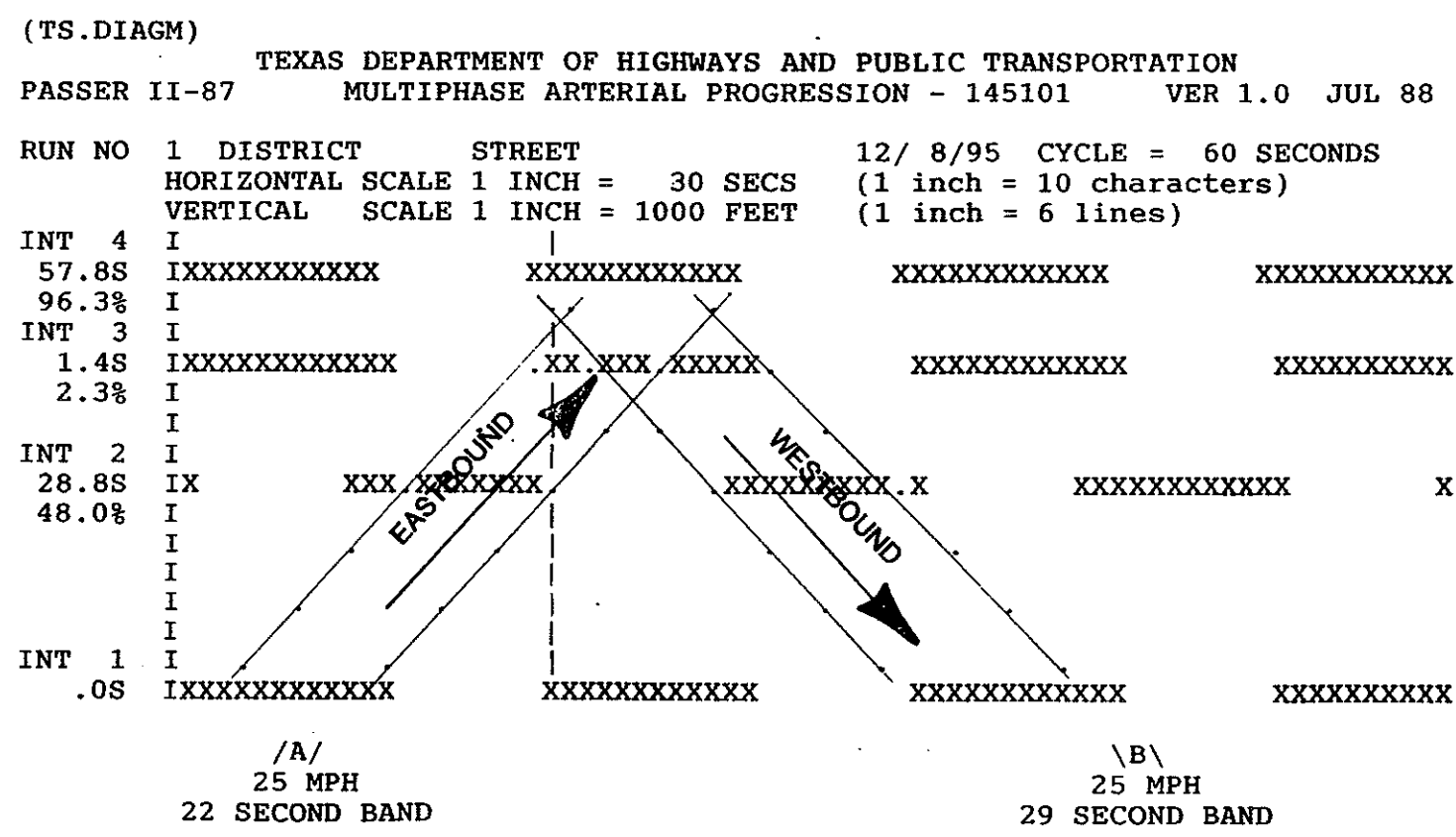
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
140+88-51' Lt	29'(B)	3"	44'	Cable 1
			39'	Cable 2
			39'	Cable 3
	29'(B)	1"	120'	(3) No. 8 RHW
140+88-51' Lt to 140+74-39' Rt			108'	Cable 1
			108'	(1) Stability Wire
			216'	(2) Span Wire
140+74-39' Rt	24'(B)	1/2"	30'	Cable 1
140+88-51' Lt to 141+41-50' Lt			57'	Cable 2
			57'	(1) Stability Wire
			114'	(2) Span Wire
141+41-50' Lt	24'(B)	1/2"	30'	Cable 2
140+88-51' Lt to 141+63-39' Rt			175'	Cable 3
			121'	(1) Stability Wire
			242'	(2) Span Wire
141+63-39' Rt	24'(B)	1/2"	30'	Cable 3

- (A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".
- (B) These items shall be State Furnished.
- (C) See Notes.

(B) These items shall be wood pole mounted.

INTERIM TRAFFIC SIGNALS
Summary of Quantities
Collins Avenue
Mandan, ND

INTERSECTION	CROSSROAD
1	6th Av NW
2	3rd Av NW
3	1st Av NW
4	Collins Av



=== DUAL LEFTS (1+5)
 /// LT 5 LEADS (2+5)

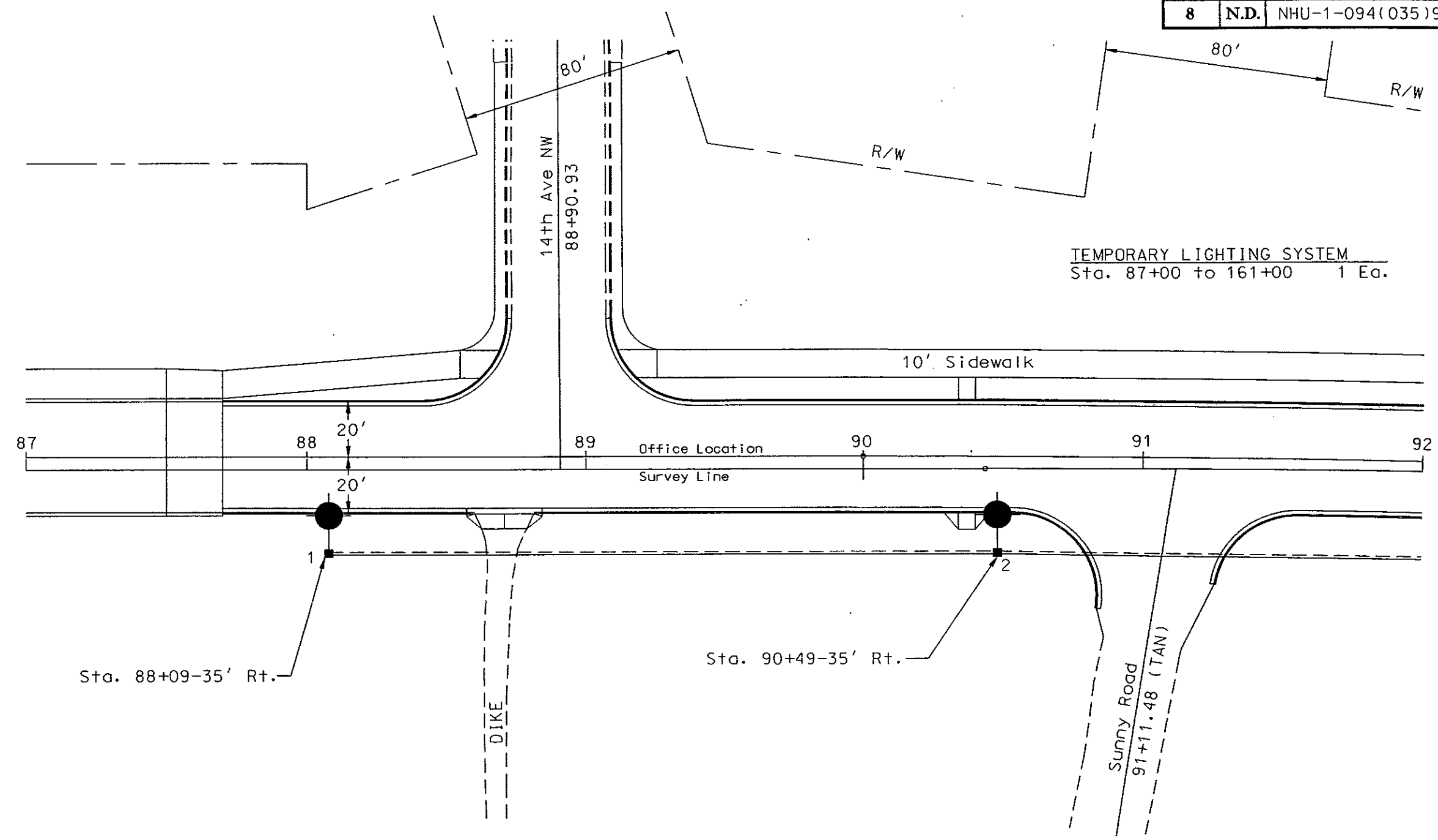
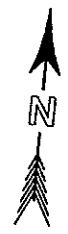
XXX DUAL THRU (2+6)
 \\\ LT 1 LEADS (1+6)

INTERIM TRAFFIC SIGNALS

Coordination System
 Main Street
 Mandan, ND

BOB/MANDAN/PROGRES 11=40MJ

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	232



TEMPORARY LIGHTING SYSTEM
Sta. 87+00 to 161+00 1 Ed.

Sta. 88+09-35' Rt.

Sta. 90+49-35' Rt.

Sunny Road
91+11.48 (TAN)

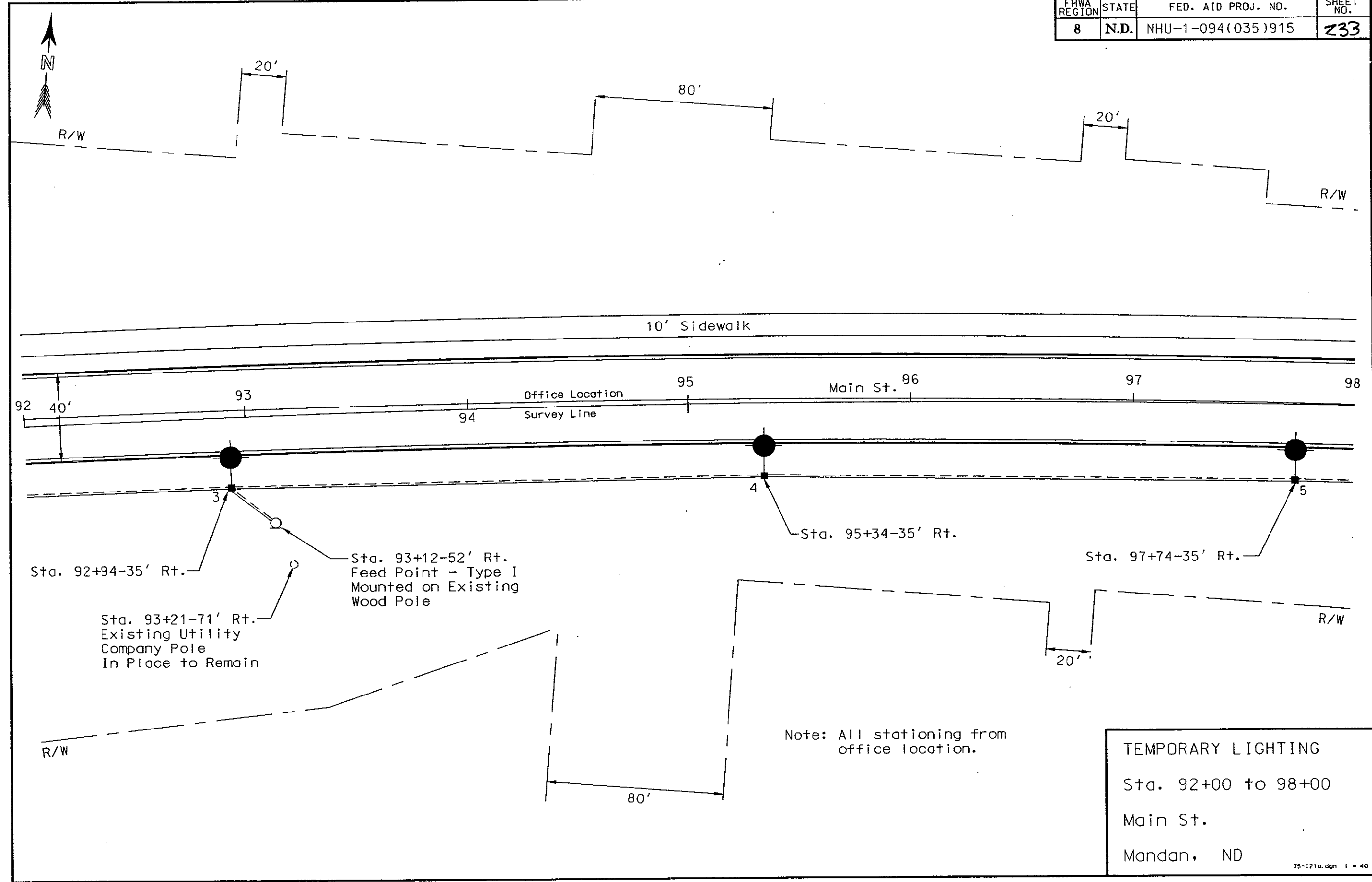
R/W

Note: All stationing from office location.

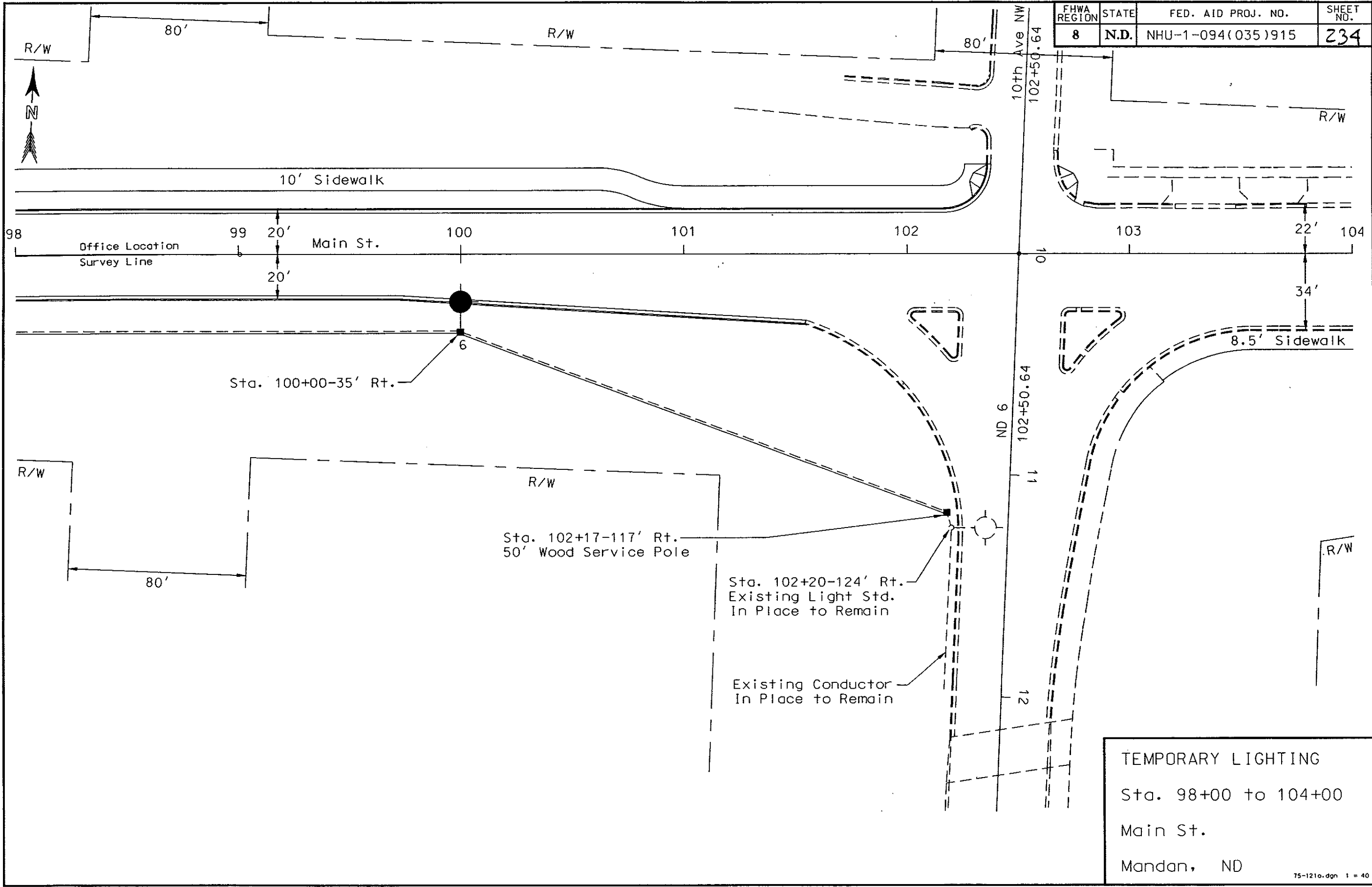
R/W

TEMPORARY LIGHTING
Sta. 87+00 to 92+00
Main St.
Mandan, ND

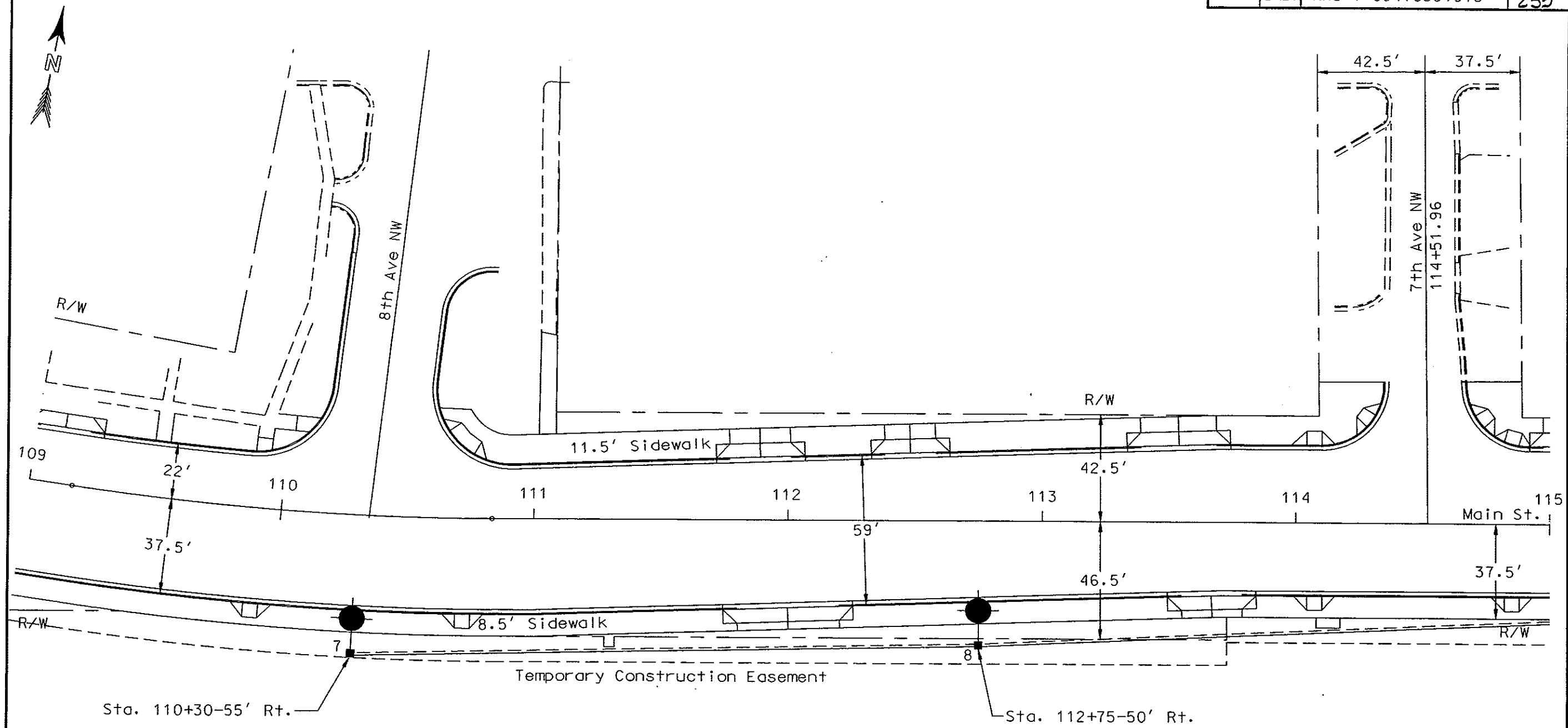
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	233



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	234

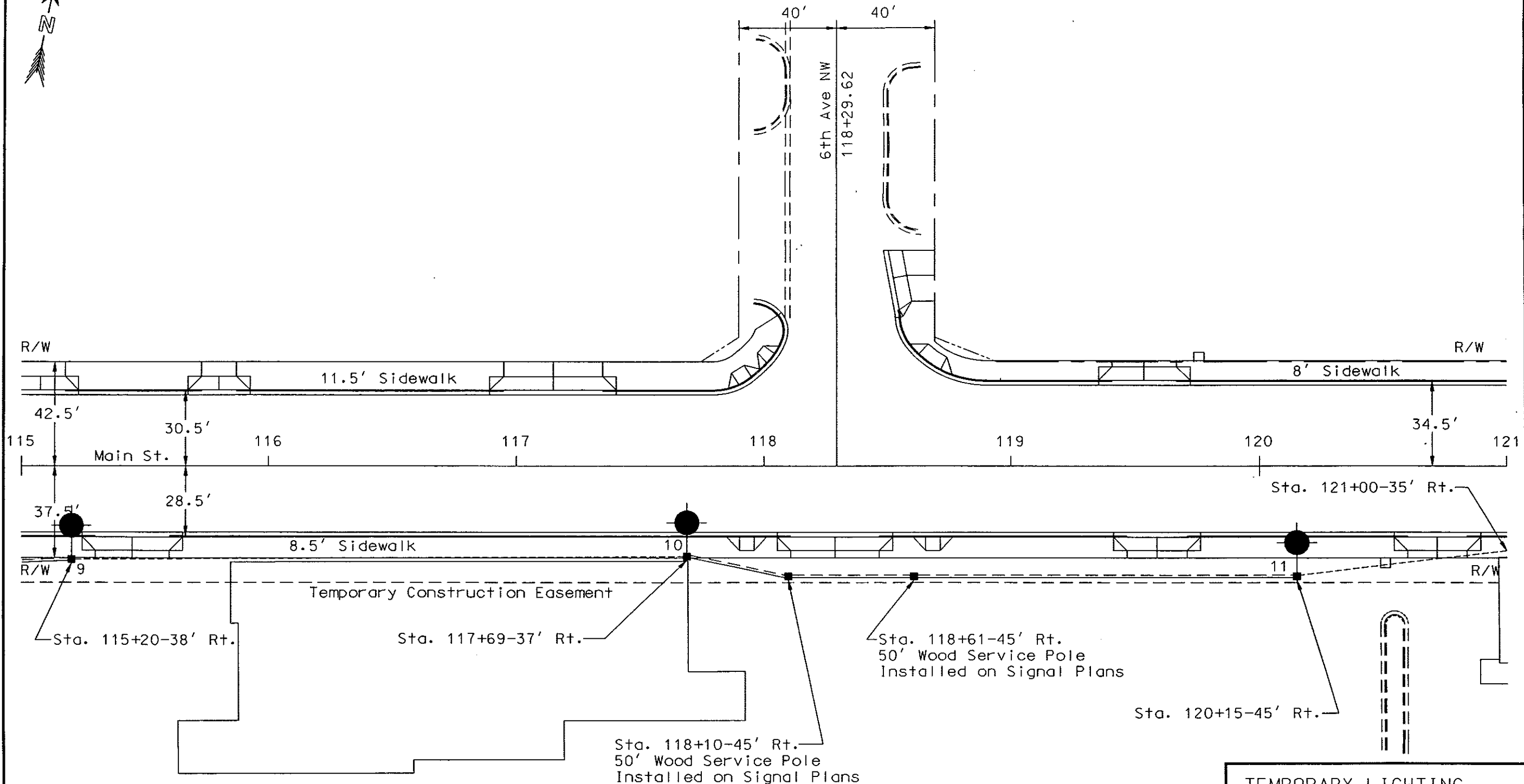
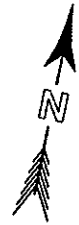


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	235



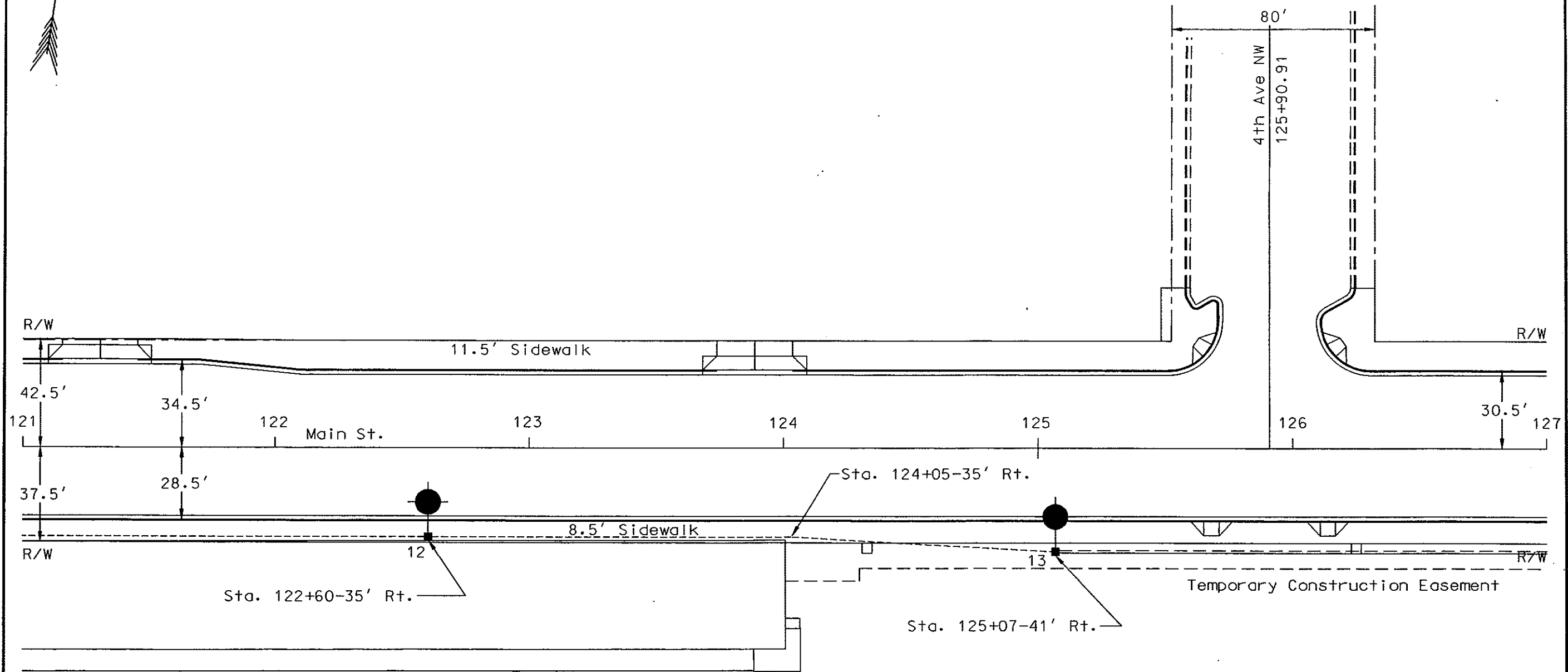
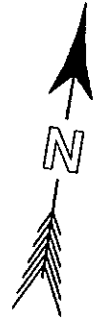
TEMPORARY LIGHTING
Sta. 108+00 to 115+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	236



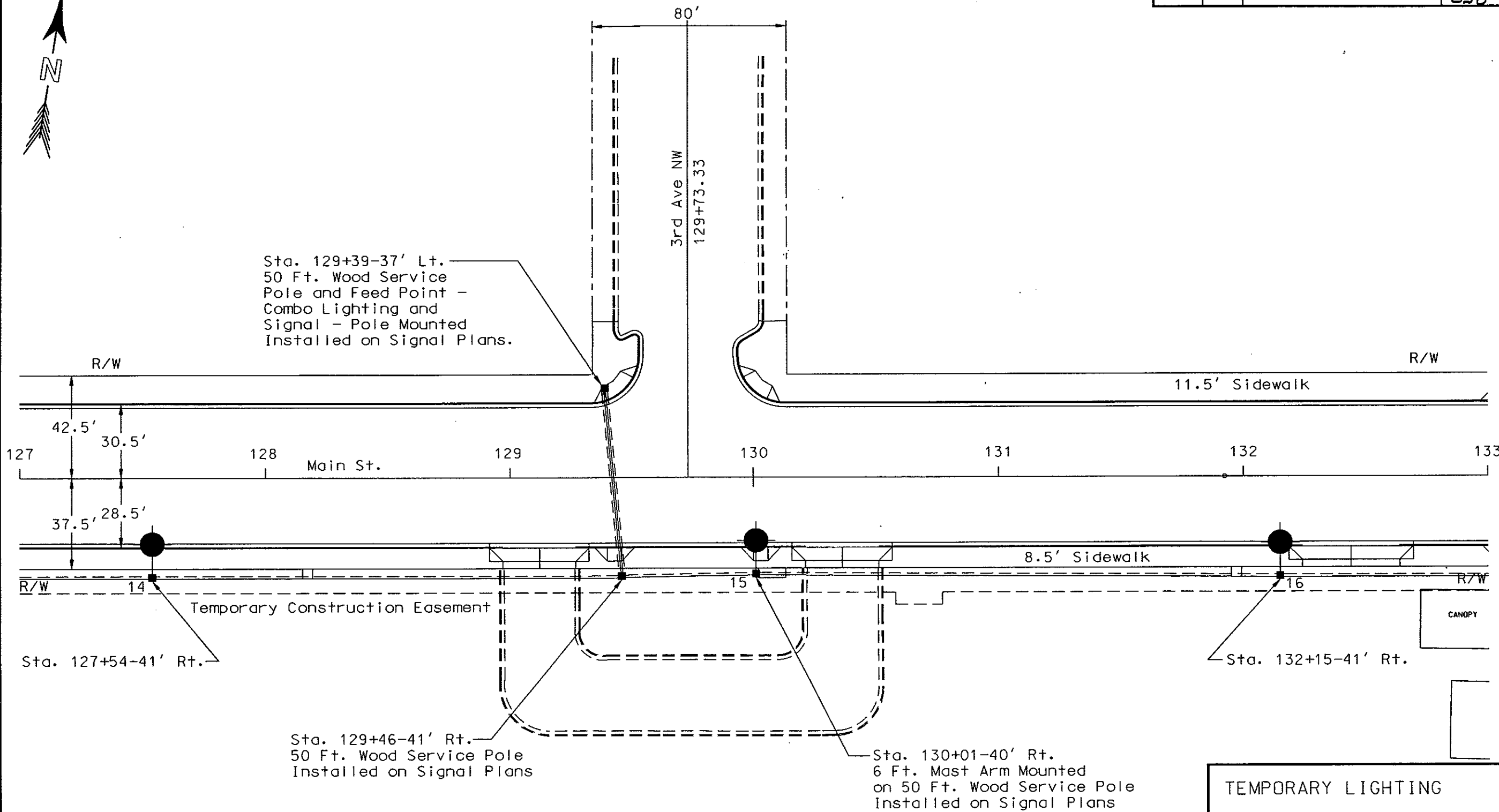
TEMPORARY LIGHTING
 Sta. 115+00 to 121+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	237



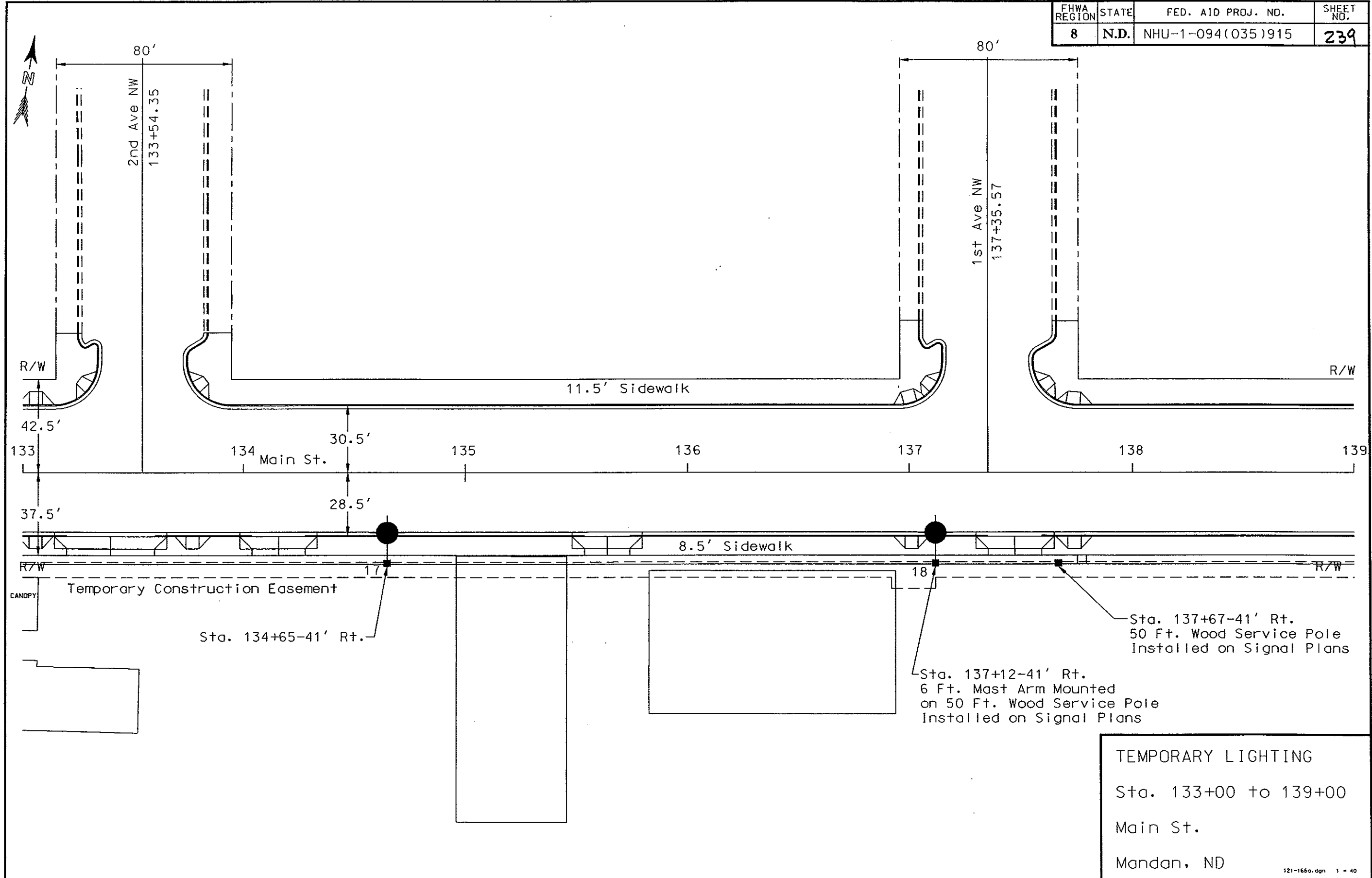
TEMPORARY LIGHTING
Sta. 121+00 to 127+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	238

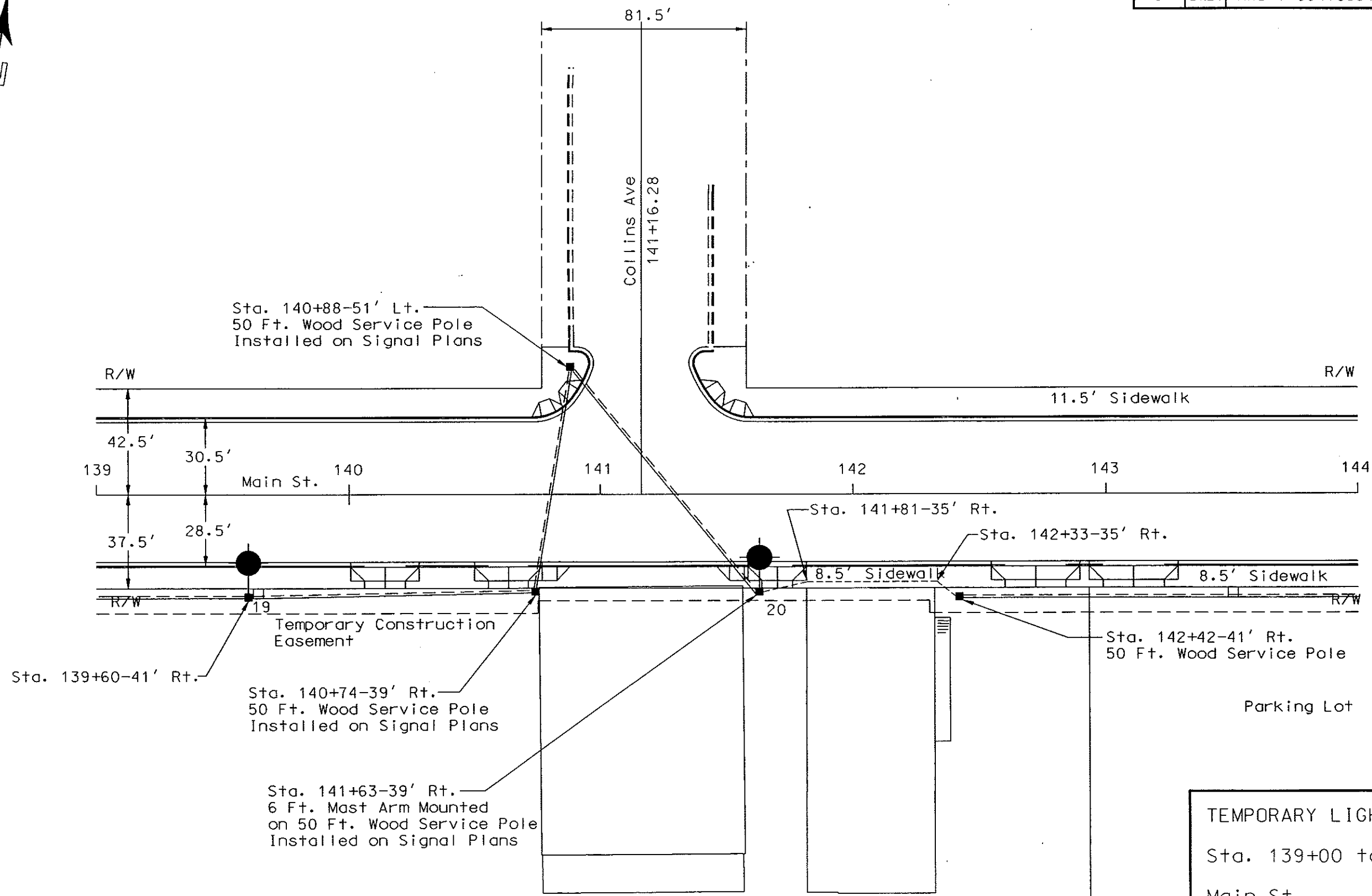
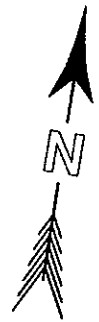


TEMPORARY LIGHTING
 Sta. 127+00 to 133+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	239

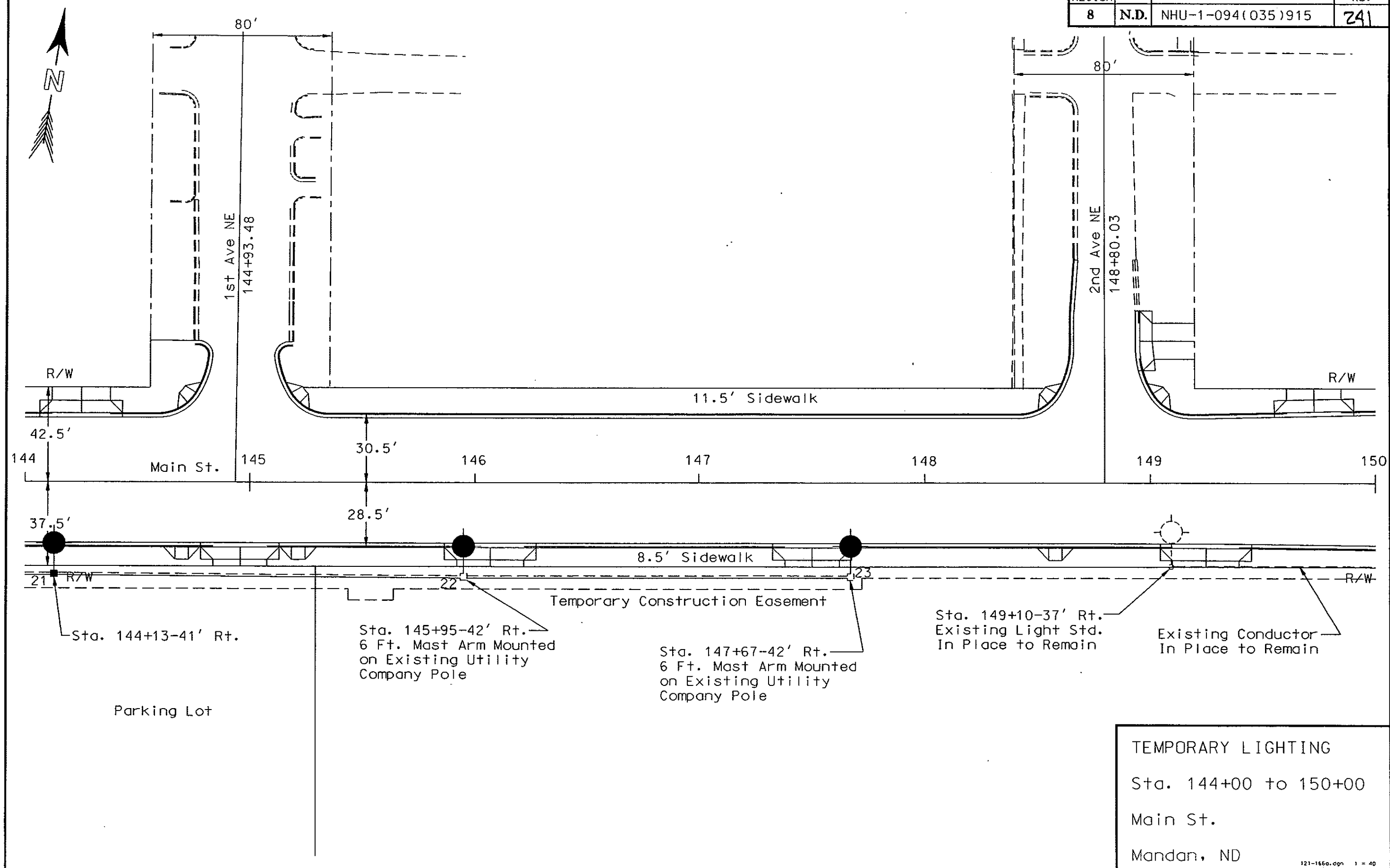


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	290



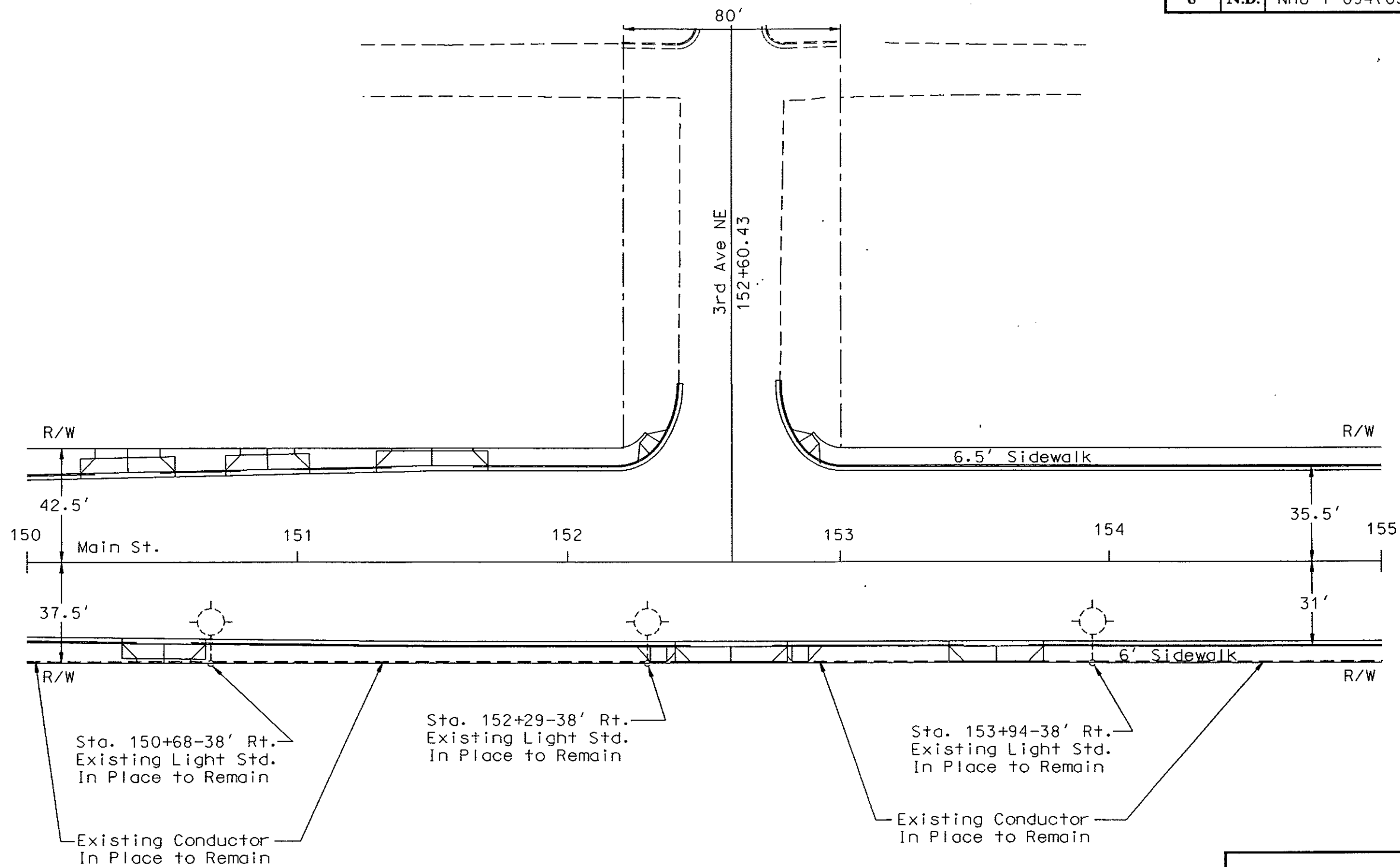
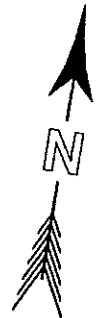
TEMPORARY LIGHTING
 Sta. 139+00 to 144+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	241



TEMPORARY LIGHTING
 Sta. 144+00 to 150+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	292



Sta. 150+68-38' Rt.
Existing Light Std.
In Place to Remain

Sta. 152+29-38' Rt.
Existing Light Std.
In Place to Remain

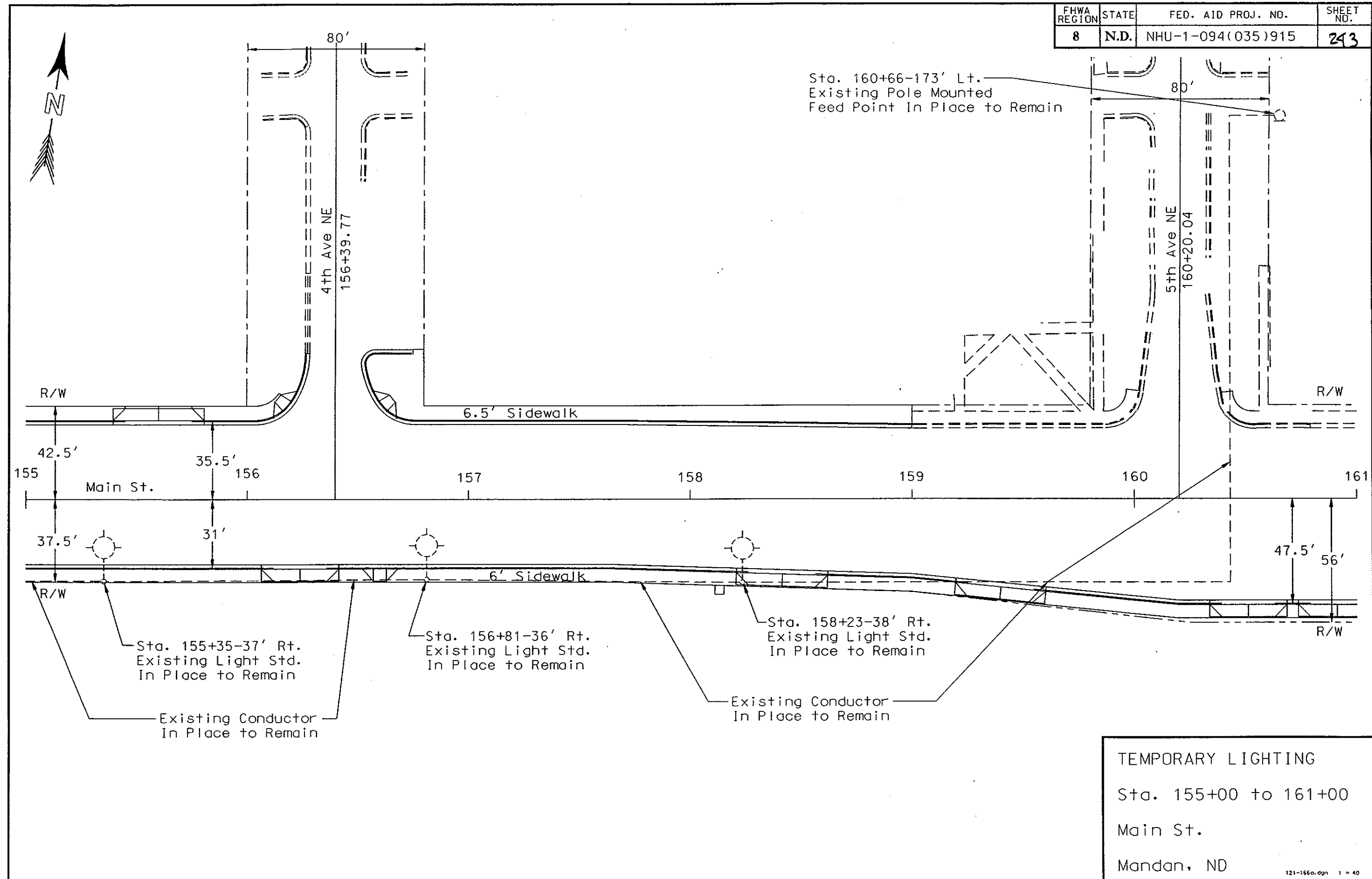
Sta. 153+94-38' Rt.
Existing Light Std.
In Place to Remain

Existing Conductor
In Place to Remain

Existing Conductor
In Place to Remain

TEMPORARY LIGHTING
Sta. 150+00 to 155+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	243



TEMPORARY LIGHTING
 Sta. 155+00 to 161+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS		STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type		Length	Size	Length	Length	Type
88+09-35' Rt. to 90+49-35' Rt.				245'	No. 6 AWG Aerial Cable	125+07-41' Rt. to 127+54-41' Rt.				252'	No. 4 AWG Aerial Cable
90+49-35' Rt. to 92+94-35' Rt.				250'	No. 6 AWG Aerial Cable	127+54-41' Rt. to 129+46-41' Rt.				196'	No. 4 AWG Aerial Cable
92+94-35' Rt. to 93+12-52' Rt.	25' (B)	2"		55'	No. 6 AWG Aerial Cable	129+39-37' Lt. to 129+46-41' Rt.	30' (B)	2"		238'	(2) No. 4 AWG Aerial Cable
92+94-35' Rt. to 95+34-35' Rt.				245'	No. 6 AWG Aerial Cable	129+46-41' Rt. to 130+01-40' Rt.				59'	No. 4 AWG Aerial Cable
95+34-35' Rt. to 97+74-35' Rt.				245'	No. 6 AWG Aerial Cable	130+01-40' Rt. to 132+15-41' Rt.				219'	No. 4 AWG Aerial Cable
97+74-35' Rt. to 100+00-35' Rt.				231'	No. 6 AWG Aerial Cable	132+15-41' Rt. to 134+65-41' Rt.				255'	No. 4 AWG Aerial Cable
100+00-35' Rt. to 102+17-117' Rt.				237'	No. 6 AWG Aerial Cable	134+65-41' Rt. to 137+12-41' Rt.				252'	No. 4 AWG Aerial Cable
102+17-117' Rt.	38' (B)	2"		86'	(2) No. 6 RHW	137+12-41' Rt. to 137+67-41' Rt.				59'	No. 4 AWG Aerial Cable
102+17-117' Rt. to 102+20-124' Rt.			7'	22'	(2) No. 6 RHW	137+67-41' Rt. to 139+60-41' Rt.				197'	No. 4 AWG Aerial Cable
110+30-55' Rt. to 112+75-50' Rt.				252'	No. 6 AWG Aerial Cable	139+60-41' Rt. to 140+74-39' Rt.				118'	No. 4 AWG Aerial Cable
112+75-50' Rt. to 115+20-38' Rt.				251'	No. 6 AWG Aerial Cable	140+74-39' Rt. to 140+88-51' Lt.				95'	No. 4 AWG Aerial Cable
115+20-38' Rt.	38' (B)	2"		86'	(2) No. 6 RHW	140+88-51' Lt. to 141+63-39' Rt.				121'	No. 4 AWG Aerial Cable
115+20-38' Rt. to 117+69-37' Rt.			248'	498'	(2) No. 6 RHW	141+63-39' Rt. to 141+81-35' Rt. to	38' (B)	2"		86'	(2) No. 4 RHW
117+69-37' Rt.	38' (B)	2"		86'	(2) No. 6 RHW	142+33-35' Rt. to 142+42-41' Rt.			18' 52' 10'	164'	(2) No. 4 RHW
117+69-37' Rt. to 118+10-45' Rt.				46'	No. 6 AWG Aerial Cable	142+42-41' Rt.	38' (B)	2"		86'	(2) No. 4 RHW
118+10-45' Rt. to 118+61-45' Rt.				55'	No. 6 AWG Aerial Cable	142+42-41' Rt. to 144+13-41' Rt.				175'	No. 4 AWG Aerial Cable
118+61-45' Rt. to 120+15-45' Rt.				158'	No. 6 AWG Aerial Cable	144+13-41' Rt. to 145+95-42' Rt.				186' (D)	No. 4 AWG Aerial Cable
120+15-45' Rt.	38' (B)	2"		86'	(2) No. 4 RHW	145+95-42' Rt. to 147+67-42' Rt.				176' (D)	No. 4 AWG Aerial Cable
120+15-45' Rt. to 121+00-35' Rt. to 122+60-35' Rt.			85' 159'	492'	(2) No. 4 RHW						
122+60-35' Rt.	38' (B)	2"		172'	(4) No. 4 RHW						
122+60-35' Rt. to 124+05-35' Rt. to 125+07-41' Rt.			144' 101'	494'	(2) No. 4 RHW						
125+07-41' Rt.	38' (B)	2"		86'	(2) No. 4 RHW						

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	244

(B) Pole Mounted Conduit

(D) This Cable shall be supplied by the contractor and installed & removed by the utility company.

TEMPORARY LIGHTING SYSTEM

Conduit and Cable Runs

Sta. 87+00 to 161+00
Main St.
Mandan, ND

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	MOUNTING HEIGHT	MAST ARM	WOOD POLE LENGTH
1	88+09	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
2	90+49	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
3	92+94	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
4	95+34	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
5	97+74	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
6	100+00	35' Rt.	250	A1	MSC-III	40 Ft.	6 Ft.	50 Ft.
7	110+30	55' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
8	112+75	50' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
9	115+20	38' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
10	117+69	37' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
11	120+15	45' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
12	122+60	35' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
13	125+07	41' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
14	127+54	41' Rt.	250	B1	MSC-II	40 Ft.	6 Ft.	50 Ft.
15	130+01	40' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	(C)50 Ft.
16	132+15	41' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	50 Ft.
17	134+65	41' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	50 Ft.
18	137+12	41' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	(C)50 Ft.
19	139+60	41' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	50 Ft.
20	141+63	39' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	(C)50 Ft.
21	144+13	41' Rt.	250	B2	MSC-II	40 Ft.	6 Ft.	50 Ft.
22(F)	145+95	42' Rt.	250	B2	MSC-II	30 Ft.	6 Ft.	(E)
23(F)	147+67	42' Rt.	250	B2	MSC-II	30 Ft.	6 Ft.	(E)

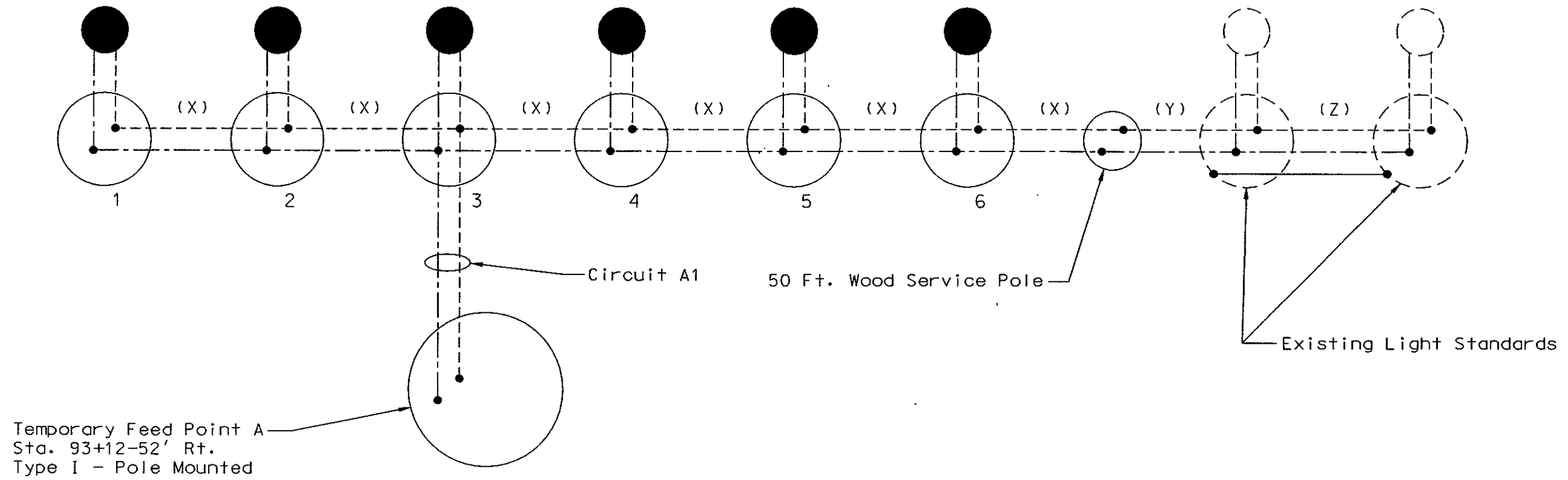
- (C) Installed on Signal Plans
- (E) Existing Utility Company Pole
- (F) The Mast Arm and Luminaire at Sta. 145+95-42' Rt. and 147+67-42' Rt. shall be supplied by the contractor and installed & removed by the utility company.

(A) QUANTITIES												
Cable Trench	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	No. 4 AWG Aerial Cable	No. 6 AWG Aerial Cable	H.P. Sodium Vapor Luminaire 250 Watt	50' Wood Service Pole	6 Ft. Wood Pole Mounted Mast Arm	Mounting Hardware	Feed Point - Type I - Pole Mounted	Remove Temporary Lighting System	
LF	LF	LF	LF	LF	LF	EA	EA	EA	LS	EA	EA	
824	359	1666	778	2491	2377	23	20	23	1	1	1	

(A) These items are not to be bid separately, but shall be included in the item "Temporary Lighting System."

TEMPORARY LIGHTING SYSTEM
SUMMARY OF QUANTITIES
Sta. 87+00 to 161+00
Main St.
Mandan, ND


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	246

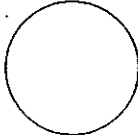


LEGEND

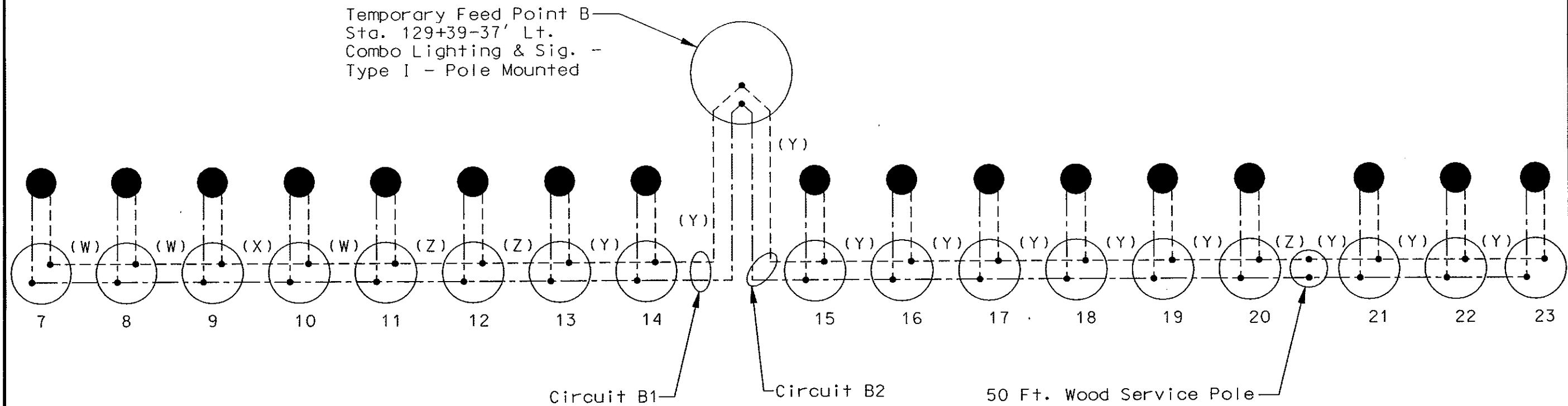
----- Phase Conductor
 - - - - - Phase Conductor
 _____ Ground Conductor

(X) No. 6 AWG Aerial Cable
 (Y) (2) No. 6 RHW
 (Z) Existing Conductor

 250 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

 Wood Pole Light Standard
 5 Light Standard Number

TEMPORARY LIGHTING SCHEMATIC
 Temporary Feed Point A
 Sta. 93+12-52' Rt.
 Main St.
 Mandan, ND



LEGEND

----- Phase Conductor
 ----- Phase Conductor

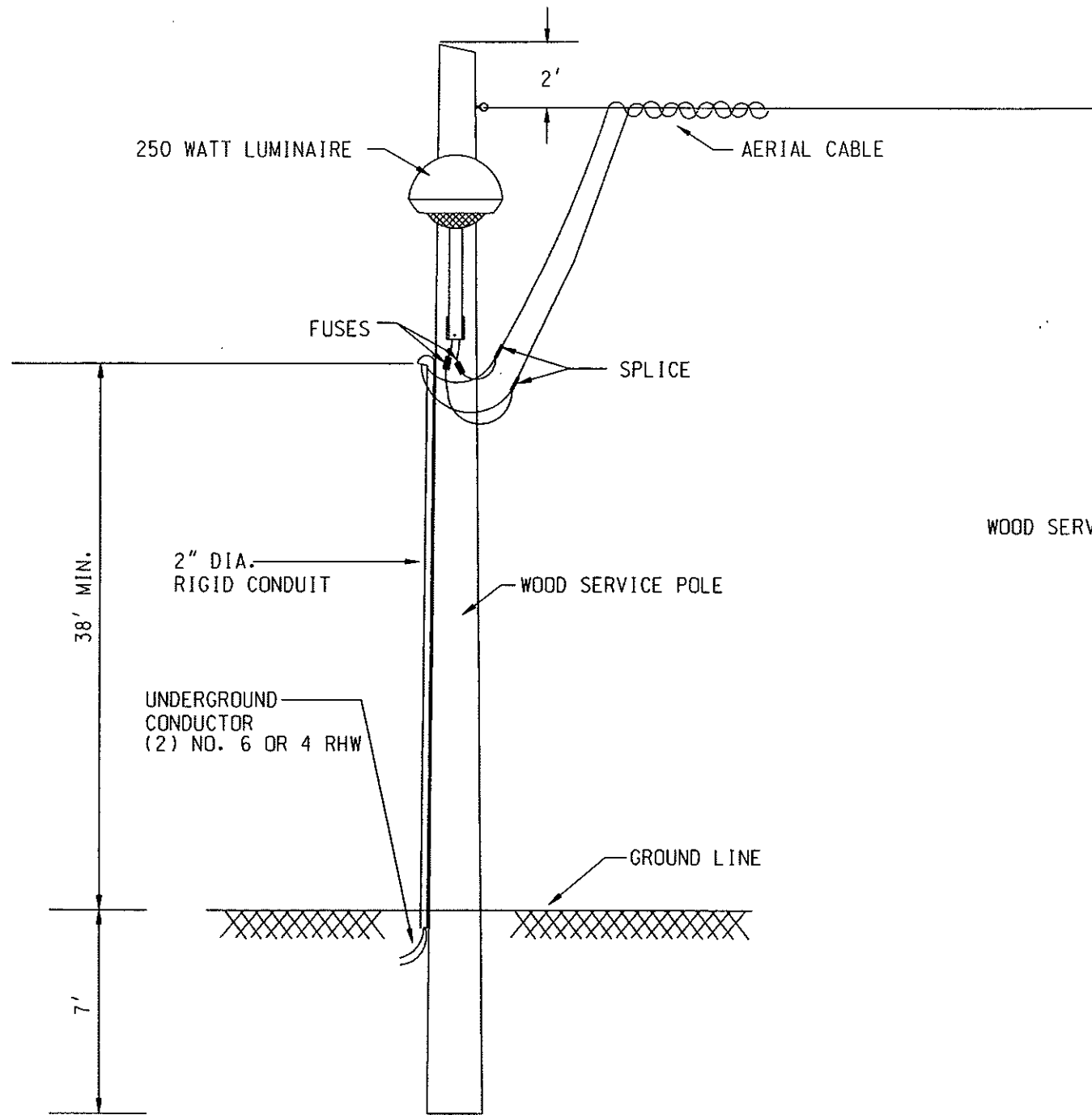
(W) No. 6 AWG Aerial Cable
 (X) (2) No. 6 RHW
 (Y) No. 4 AWG Aerial Cable
 (Z) (2) No. 4 RHW

● 250 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

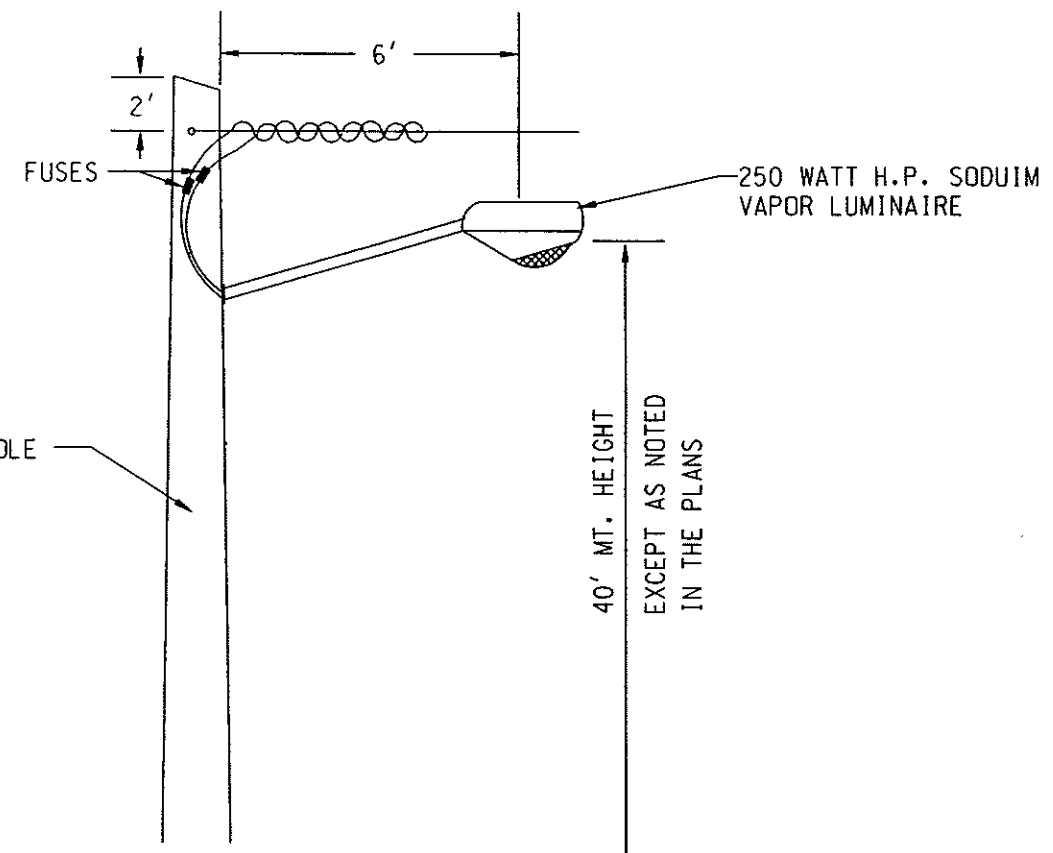
○ Wood Pole Light Standard
 11 Light Standard Number

TEMPORARY LIGHTING
 SCHEMATIC
 Temporary Feed Point B
 Sta. 129+39-37' Lt.
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	248



UNDERGROUND WIRING TO OVERHEAD WIRING DETAIL



LUMINAIRE WIRING DETAIL

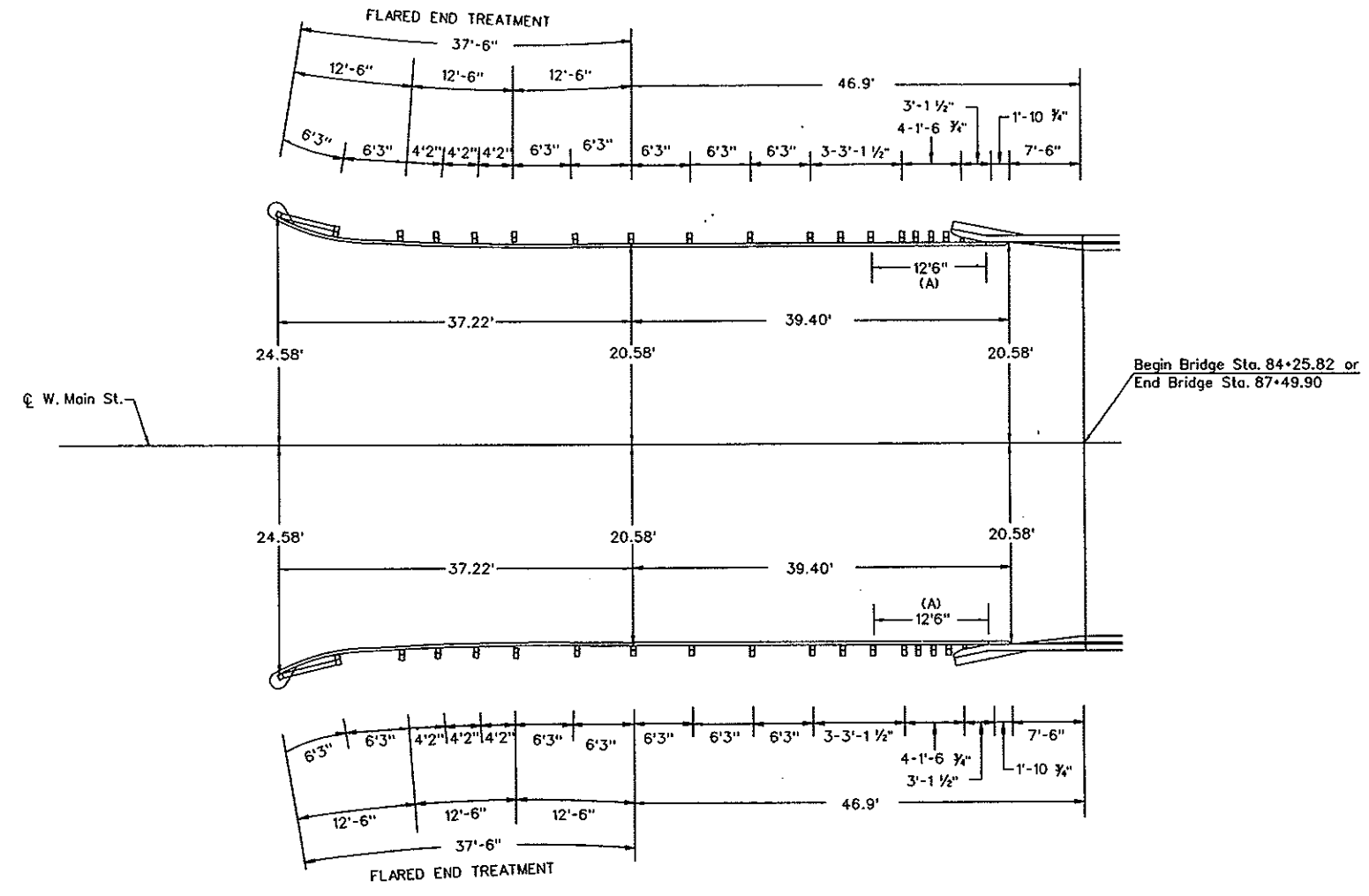
LENGTH OF POLE 50 FT. DEPTH IN GROUND 7 FT.

TEMPORARY LIGHTING DETAIL

Main St.

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	249



(A). 12'-6" Double Rail Sections

W-Beam Guardrail Layout
Heart River Bridge
Station 85+88.37
West Main Street
Both Ends of Structure

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	250

W-BEAM SUMMARY SHEET										
LOCATION	W-BEAM GUARDRAIL AT BRIDGE ENDS									
	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
	TERMINAL CON-NECTOR	6" ID STD PIPE 9" LONG	7/8" @ X 10" LONG HEX HEAD BOLT	5/8" @ x 16" LONG BUTTON HEAD BOLT	6"x6" x 14" WOOD OFF-SET BLOCK	6"x8" x 6" TIMBER POST	5/8" @ x 1 1/4" LONG BUTTON HEAD BOLT	12' 6" DOUBLE RAIL SECTION	12' 6" STRAIGHT RAIL SECTION	REFLECTORIZED PLATES
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta. 1462+85.61 to 1463+37.5 Rt.	1	1	4	10	10	10	32	1	2	2
Sta. 1462+85.61 to 1463+37.5 Rt. Med.	1	1	4	10	10	10	32	1	2	2
	1	1	4	10	10	10	32	1	2	2
	1	1	4	10	10	10	32	1	2	2
TOTAL	4	4	16	40	40	40	128	4	8	8

W-BEAM GUARDRAIL

Sta. 83+78.92 to 84+18.32 Rt.	39.4 LF
Sta. 83+78.92 to 84+18.32 Lt.	39.4 LF
Sta. 87+57.40 to 87+96.80 Rt.	39.4 LF
Sta. 87+57.40 to 87+96.80 Lt.	39.4 LF
TOTAL	157.6 LF

(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam Guardrail".

W-BEAM GUARDRAIL QUANTITIES
Heart River Bridge
Sta. 85+88.37 W. Main Street
Mandan, ND

W-BEAM G. R.-FLARED END TREAT. & TRANSITION

W-BEAM G. R.-FLARED END TREAT. & TRANSITION QUANTITIES

LOCATION	(A) 5/8" DIA. x 16" LONG BUTTON HEAD BOLT	(A) 5/8" @ x 1 1/4" LONG BUTTON HEAD BOLT	(A) 5/8" DIA. x 10" LONG BUTTON HEAD BOLT	(A) 6"x8" x 6'-0" W O S D T	(A) 6"x6" x 14" W B O O D C K	(A) 6"x8" x 14" W B O O D C K	(A) 2"x2" x1/4" S S P T O L	(A) BCT A	(A) BCT	(A) BCT	(A) BEA UN S	(A) W- BEAM TER- MINAL	(A) 5/8" DIA. x 1 1/2"	(A) 3/4" DIA. x 7 1/2"	(A) R E L S E C T I O N	(A) 12'-6" W-BEAM RAIL SECTION	(A) BREAK AWAY TER- MINAL SLEEVE	(A) 8"x6" x 5' TER- MINAL SLEEVE	(A) 5 1/2"x 7 1/2"x 3'-6 3/4"	(A) 6"x8" x 6'-0" WOOD BREAK AWAY POST	(A) 5/8" DIA. x 1 3/4"	(A) 6" x 7 1/2" x 1 3/4" STEEL SHELF ANGLE	(A) STRUT AND YOKE ASS- 10" HEX HEAD BOLT	(A) 3/4" DIA. x 10" HEX HEAD BOLT
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Sta. 83+41.70 to 83+78.92 Rt.	6	30	1	1	1	4	2	1	1	1	1	1	8	4	2	3	1	2	2	4	1	1	1	2
Sta. 83+41.70 to 83+78.92 Lt.	6	30	1	1	1	4	2	1	1	1	1	1	8	4	2	3	1	2	2	4	1	1	1	2
Sta. 87+96.80 to 88+34.02 Rt.	6	30	1	1	1	4	2	1	1	1	1	1	8	4	2	3	1	2	2	4	1	1	1	2
Sta. 87+96.80 to 88+34.02 Lt.	6	30	1	1	1	4	2	1	1	1	1	1	8	4	2	3	1	2	2	4	1	1	1	2
TOTAL	24	120	4	4	4	16	8	4	4	4	4	4	32	16	8	12	4	8	8	16	4	4	4	8

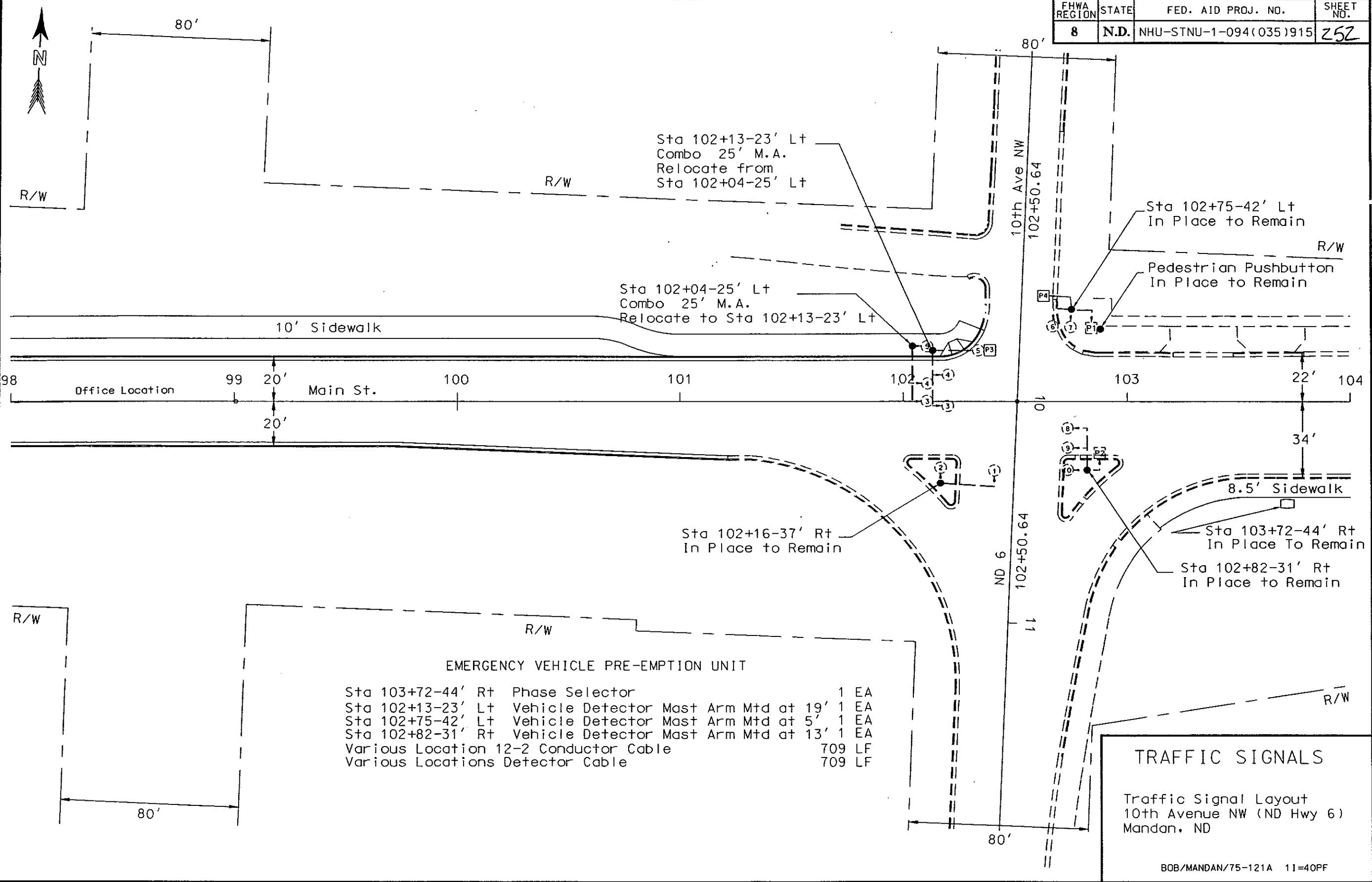
W-BEAM G.R. FLARED END TREAT. & TRANSITION

Sta. 83+41.70 to 83+78.92 Rt.	1 EACH
Sta. 83+41.70 to 83+78.92 Lt.	1 EACH
Sta. 87+96.80 to 88+34.02 Rt.	1 EACH
Sta. 87+96.80 to 88+34.02 Lt.	1 EACH
TOTAL	4 EACH

(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam G. R.-Flared End Treat. & Transition."

W-BEAM GUARDRAIL FLARED END TREATMENT AND TRANSITION QUANTITIES
Heart River Bridge
Sta. 85+88.37 W. Main Street
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	252



EMERGENCY VEHICLE PRE-EMPTION UNIT

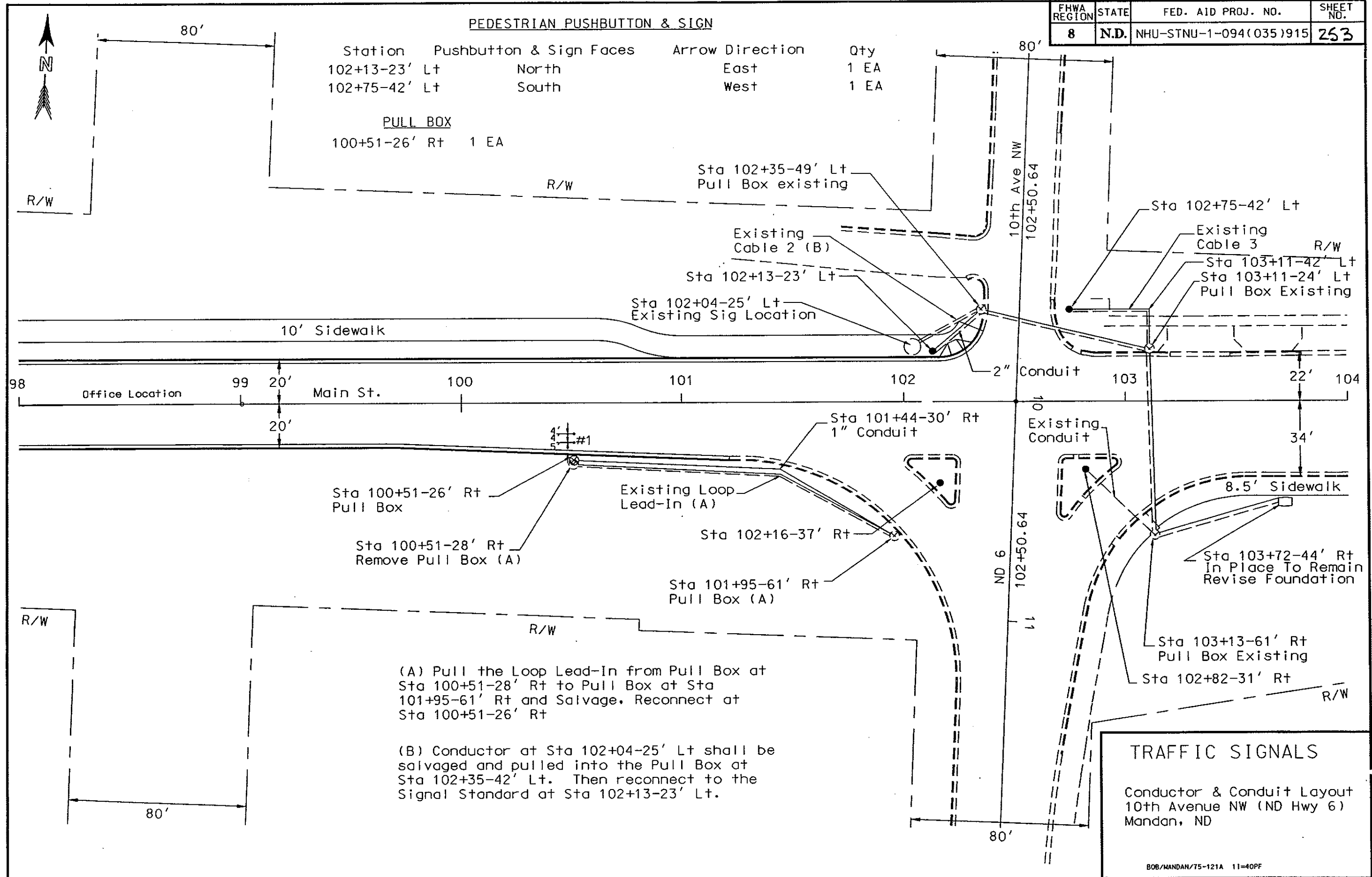
Sta 103+72-44' Rt	Phase Selector	1	EA
Sta 102+13-23' Lt	Vehicle Detector Mast Arm Mtd at 19'	1	EA
Sta 102+75-42' Lt	Vehicle Detector Mast Arm Mtd at 5'	1	EA
Sta 102+82-31' Rt	Vehicle Detector Mast Arm Mtd at 13'	1	EA
Various Location	12-2 Conductor Cable	709	LF
Various Locations	Detector Cable	709	LF

TRAFFIC SIGNALS

Traffic Signal Layout
 10th Avenue NW (ND Hwy 6)
 Mandan, ND

BOB/MANDAN/75-121A 11=40PF

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	253



STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
102+13-23' Lt to 102+35-49' Lt	33'	2"	41'	12-2 Conductor
			82'	12-2 Conductor Cable (A)
			82'	Detector Cable (B)
102+35-49' Lt to 103+11-24' Lt	79'	2"	80'	12-2 Conductor
			80'	12-2 Conductor Cable (A)
			80'	Detector Cable (B)
102+75-42' Lt to 103+11-42' Lt to 103+11-24' Lt	Existing	2"	62'	12-2 Conductor
			88'	12-2 Conductor Cable (A)
			88'	Detector Cable (B)
103+11-24' Lt to 103+13-61' Rt	84'	2"	85'	(2) 12-2 Conductor
			170'	(2) 12-2 Conductor Cable (A)
			170'	(2) Detector Cable (B)
102+82-31' Rt to 103+13-61' Rt	Existing	2"	79'	12-2 Conductor Cable (A)
			79'	Detector Cable (B)
103+13-61' Rt to 103+72-44' Rt	59'	3/2"	140'	(2) 12-2 Conductor
			210'	(3) 12-2 Conductor Cable (A)
			210'	(3) Detector Cable (B)
100+51-26' Rt to 101+44-30' Rt to 101+95-61' Rt	153'	1"		

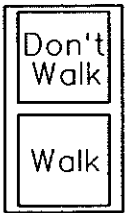
	QUANTITIES															
	Concrete Foundations - Traffic Signals	Pull Box	Pedestrian Pushbutton and Sign	1-Way, 2 Sec. Head Pedestrian Signal Post Mtd.	1" Dia. Rigid Conduit	2" Dia. Rigid Conduit	3/2" Dia. Rigid Conduit	No. 12 AWG 2 Conductor	No. 12 AWG 3 Conductor	No. 12 AWG 5 Conductor	Relocate Mast Arm Mtd. Signal Head	Relocate Combo Signal & Light Std.	Micro Loop-Double Probe Set	Remove Concrete Pull Box	Revise Concrete Foundation	Emergency Veh. Pre-Emption Unit
	Fa	Fa	Fa	Fa	LF	LF	LF	LF	LF	LF	Fa	Fa	Fa	Fa	Fa	Fa
100+51-26' Rt		1											1			
100+51-28' Rt														1		
102+13-23' Lt	1		1	1					[12]	[34]	1					
102+75-42' Lt			1	1					[12]							
102+04-25' Lt											1					
103+72-44' Rt															1	1
Var. Locations					153	196	59	408								
TOTAL	1	1	2	2	153	196	59	408	24	34	1	1	1	1	1	1

NOTE: The internal wiring in the signal standard for emergency vehicle pre-emption is included in the emergency vehicle indicator light conductor and emergency vehicle detector cable quantities.

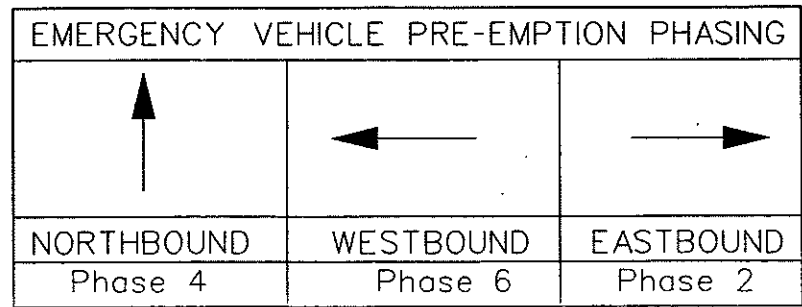
- (A) Emergency Vehicle Indicator Light Conductor
- (B) Emergency Vehicle Detector Cable

CONDUCTOR		CABLE 2 (12-12)		CABLE 3 (12-12)	
Base	Tracer	Head	Indication	Head	Indication
1	Black		Spare		Spare
2	White		Neutral		Neutral
3	Red	3,4,5	Red	6,7	Red
4	Green		Ground		Ground
5	Orange	3,4,5	Yellow	6,7	Yellow
6	Blue	3,4,5	Green	6,7	Green
7	White	Black	P3(A) Walk	P4(A) Walk	Walk
8	Red	Black	P3(A) Don't Walk	P4(A) Don't Walk	Don't Walk
9	Green	Black	3 Green		Spare
10	Orange	Black	3 Yellow		Spare
11	Blue	Black	Spare	P1	Walk
12	Black	White	Spare	P1	Don't Walk

(A) These are new pedestrian heads added to the existing cable.

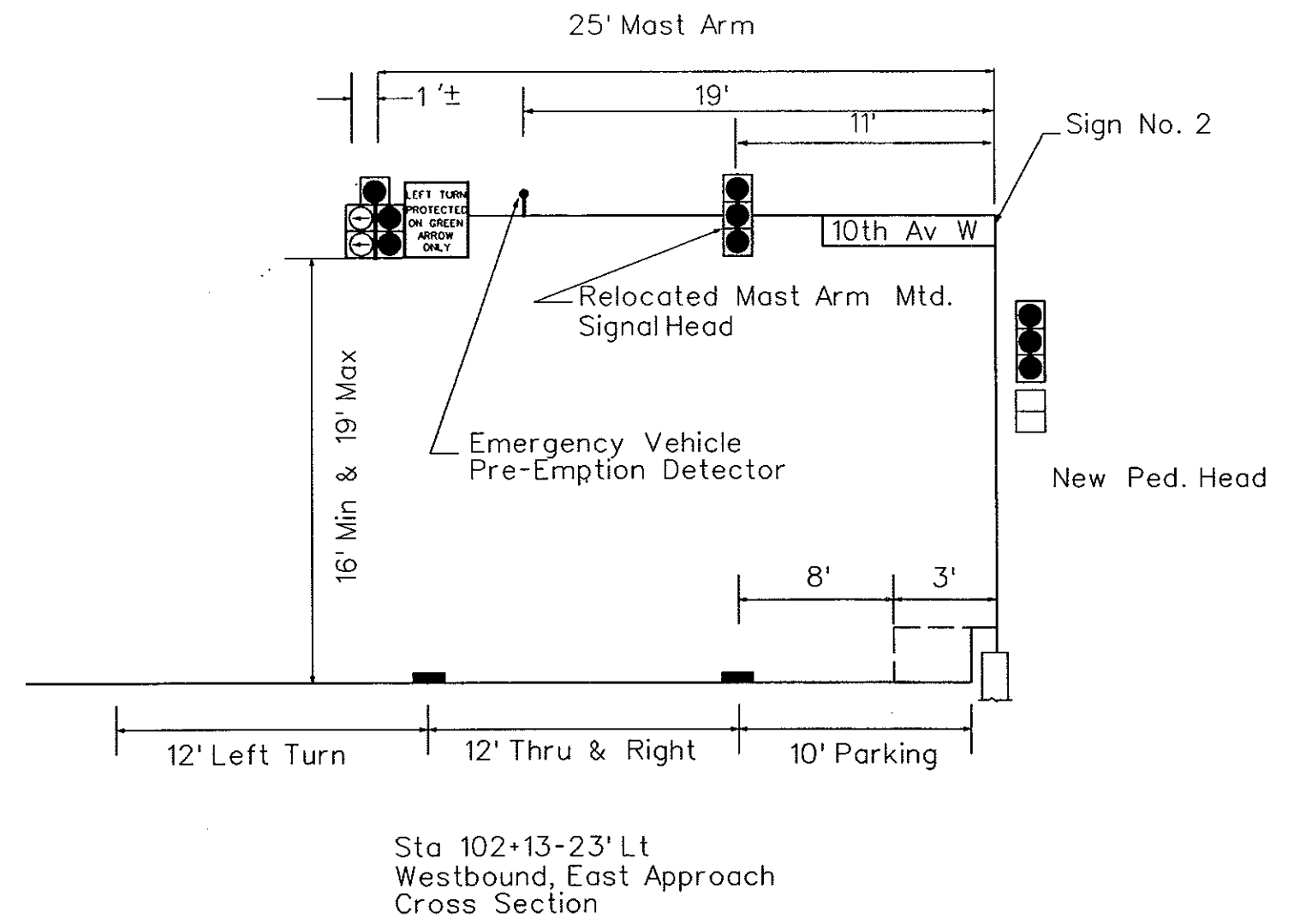
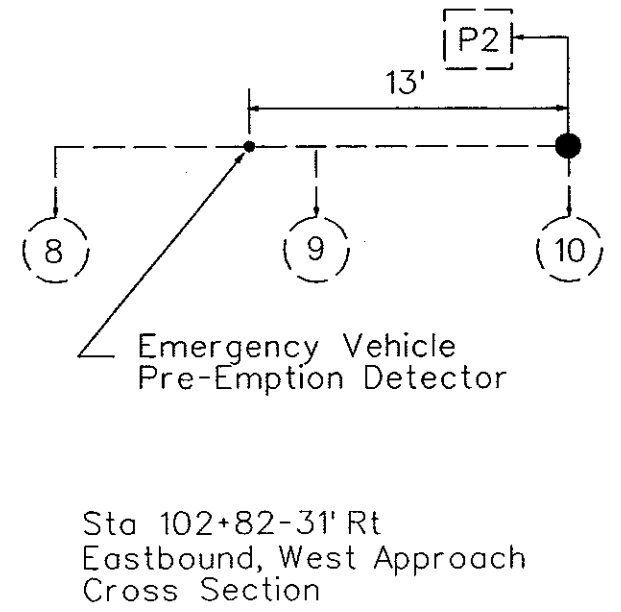
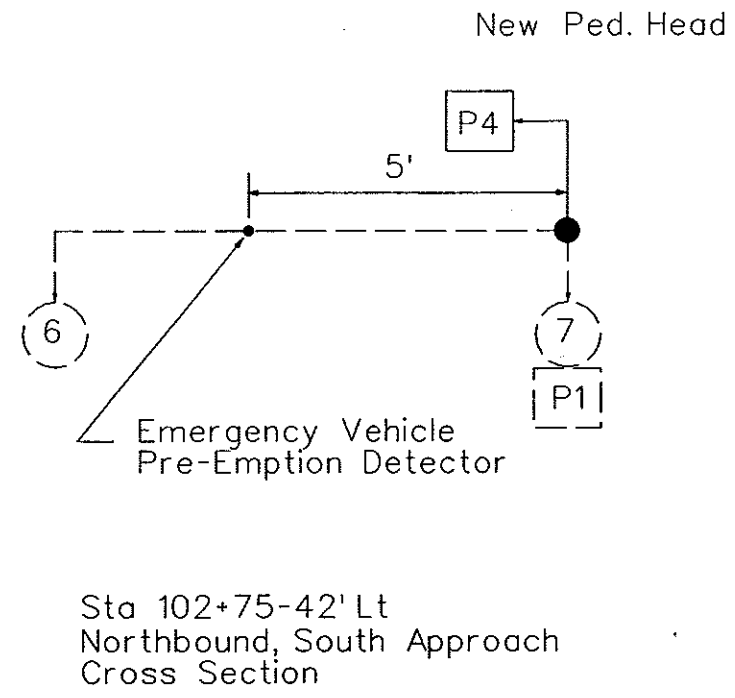


All Ped. Heads (12" Lenses)
P3, and P4 are new.



TRAFFIC SIGNALS
Summary of Quantities
10th Avenue NW (ND Hwy 6)
Mandan, ND

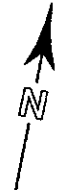
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	255



TRAFFIC SIGNALS
 Detail Sheet
 10th Avenue NW (ND Hwy 6)
 Mandan, ND

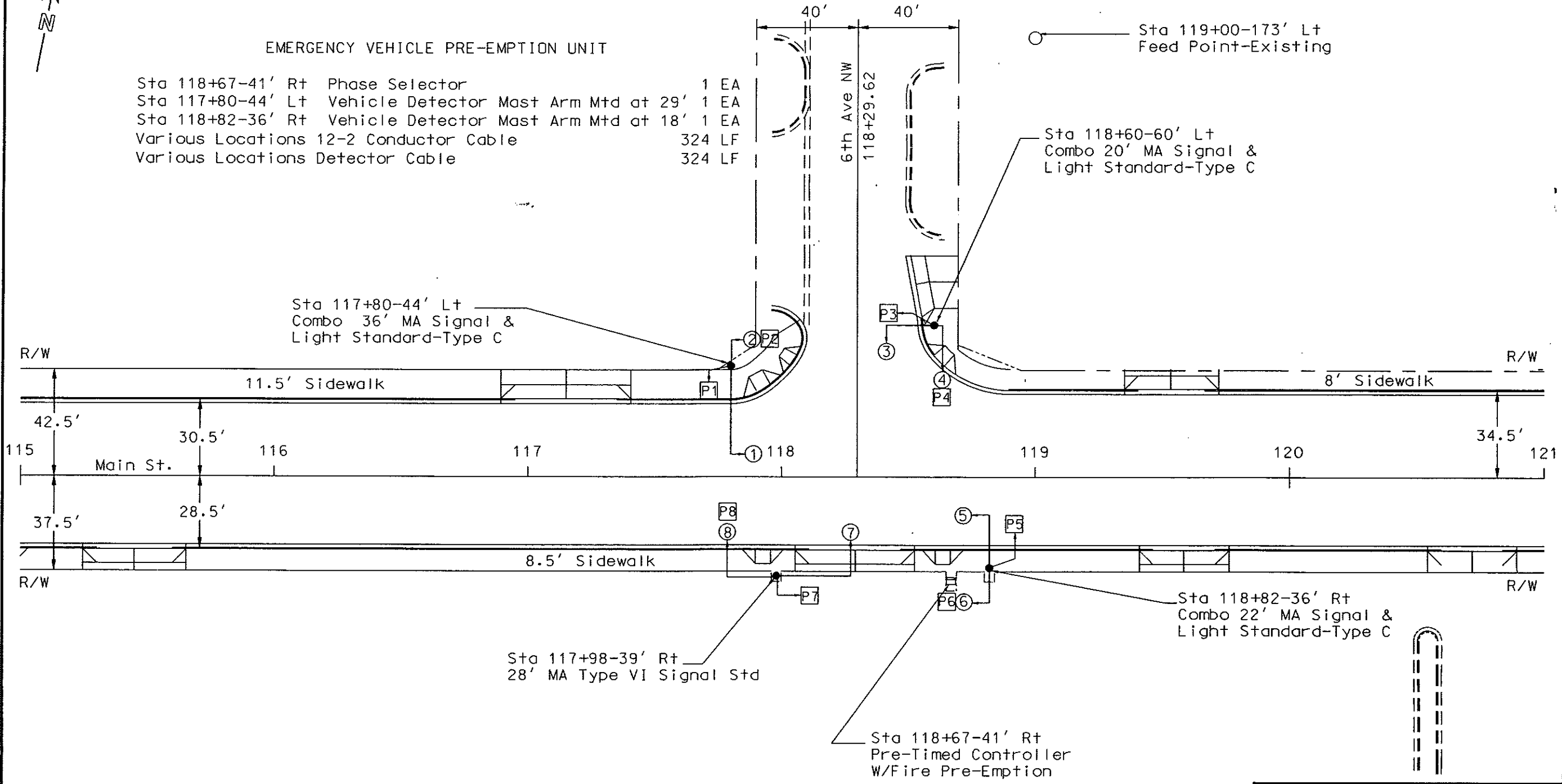
BOB\DETAIL 11-IMU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	256



EMERGENCY VEHICLE PRE-EMPTION UNIT

- Sta 118+67-41' Rt Phase Selector 1 EA
- Sta 117+80-44' Lt Vehicle Detector Mast Arm Mtd at 29' 1 EA
- Sta 118+82-36' Rt Vehicle Detector Mast Arm Mtd at 18' 1 EA
- Various Locations 12-2 Conductor Cable 324 LF
- Various Locations Detector Cable 324 LF



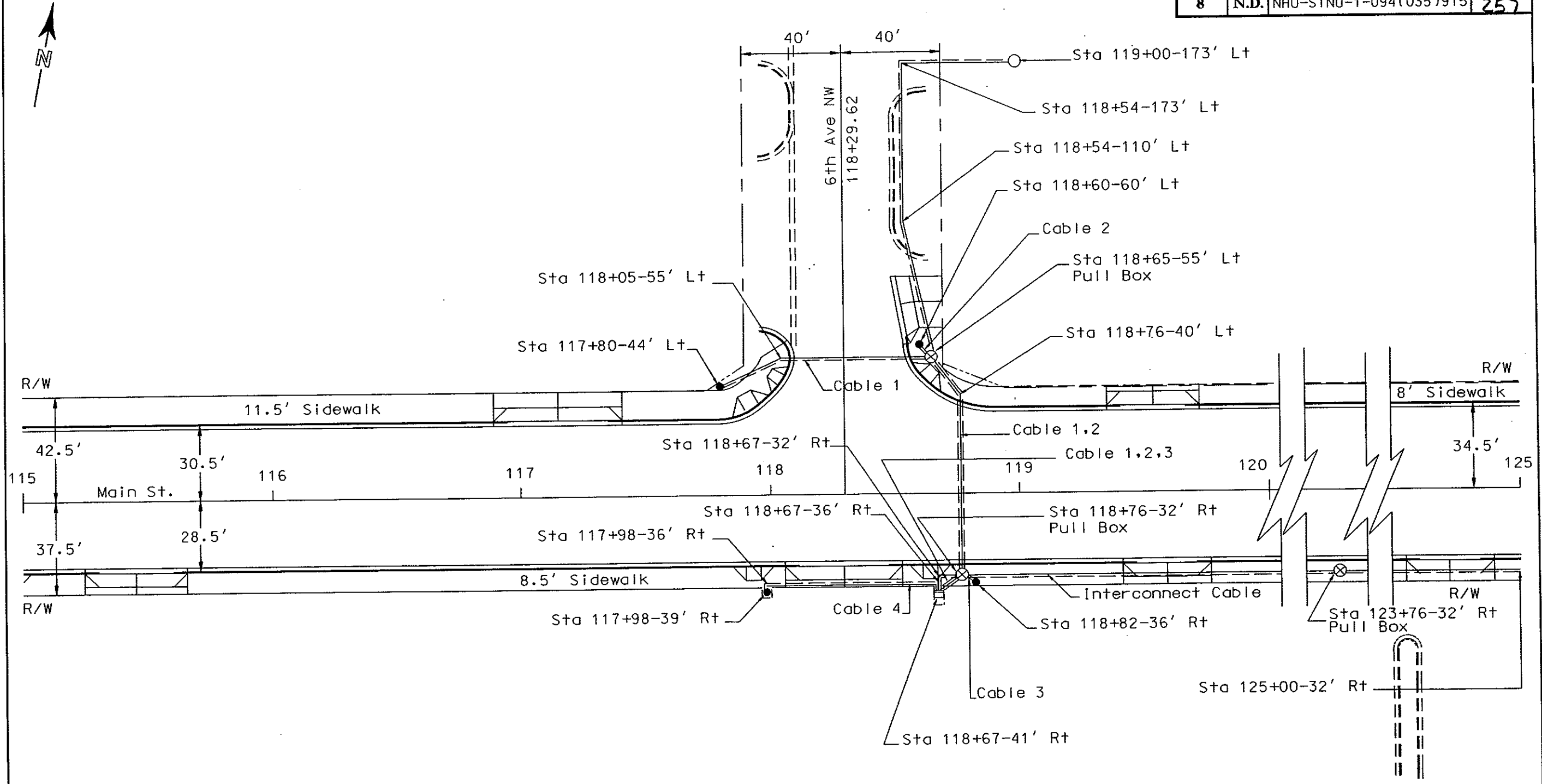
NOTE: Controller door shall face North with hinges on the East side.

TRAFFIC SIGNALS

Traffic Signal Layout
6th Avenue NW
Mandan, ND

808/MANDAN/75-121B 11-40MU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	257



TRAFFIC SIGNALS

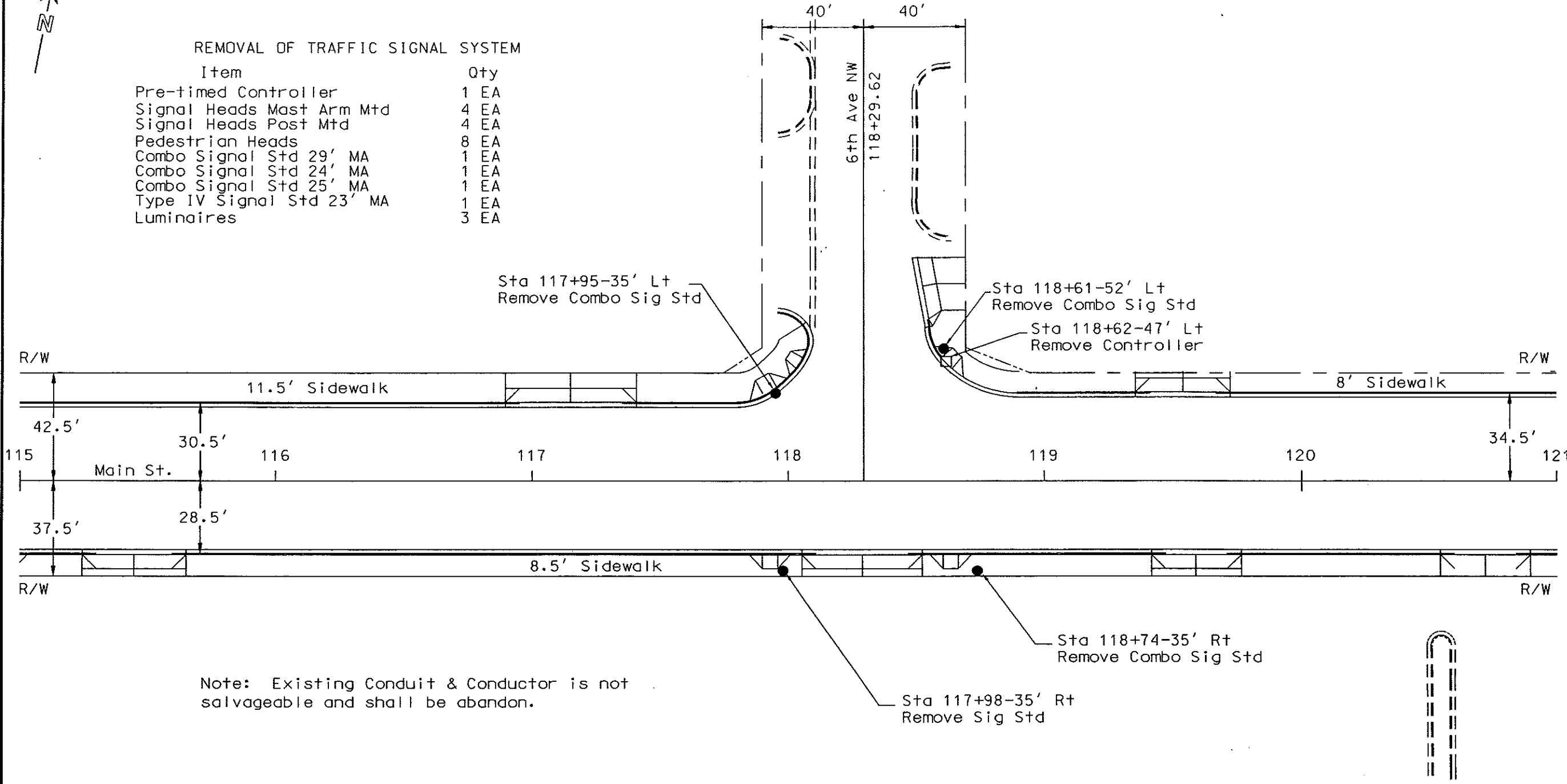
Conductor & Conduit Layout
 6th Avenue NW
 Mandan, ND

BOB/MANDAN/75-121B 11=40MU

EHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	258

REMOVAL OF TRAFFIC SIGNAL SYSTEM

Item	Qty
Pre-timed Controller	1 EA
Signal Heads Mast Arm Mtd	4 EA
Signal Heads Post Mtd	4 EA
Pedestrian Heads	8 EA
Combo Signal Std 29' MA	1 EA
Combo Signal Std 24' MA	1 EA
Combo Signal Std 25' MA	1 EA
Type IV Signal Std 23' MA	1 EA
Luminaires	3 EA



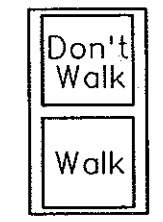
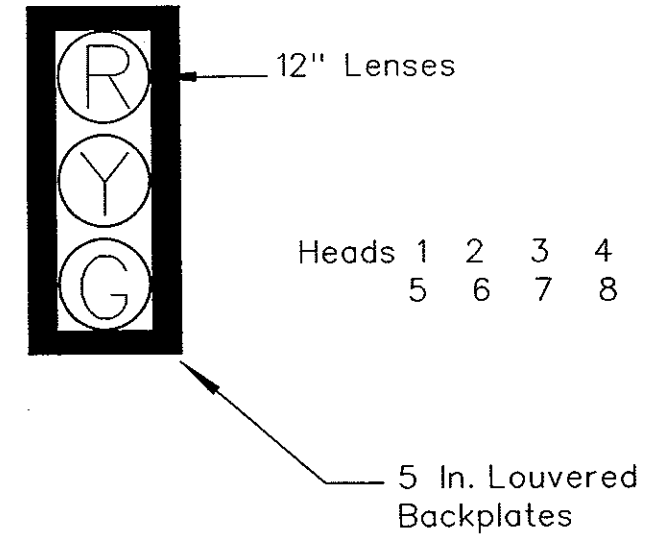
Note: Existing Conduit & Conductor is not salvageable and shall be abandon.

TRAFFIC SIGNALS

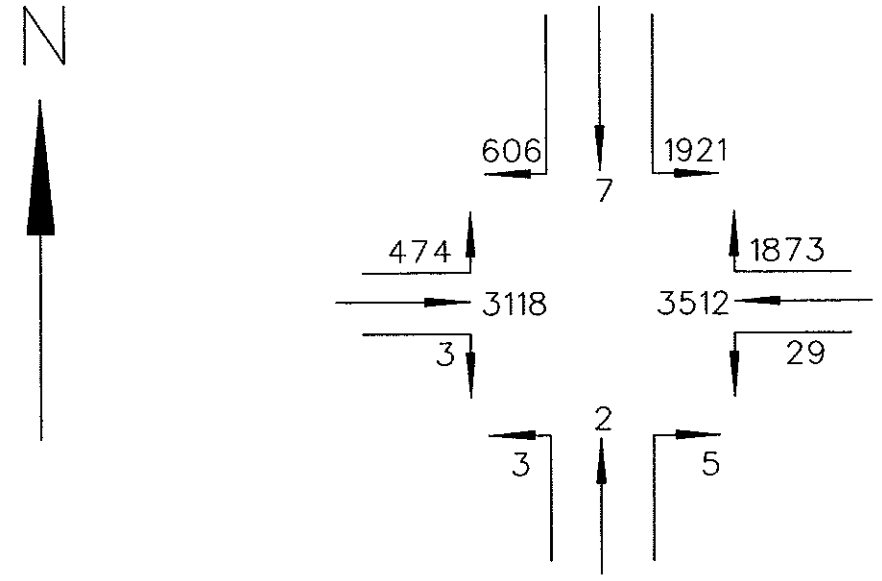
Removal of Traffic Signal System
 6th Avenue NW
 Mandan, ND

BOB/MANDAN/75-121B 11=40MU

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		CABLE 3 (12-12)		CABLE 4 (12-12)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare		Spare		Spare
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	1, 2	Red	3, 4	Red	5, 6	Red	7, 8	Red
4	Green		Ground		Ground		Ground		Ground
5	Orange	1, 2	Yellow	3, 4	Yellow	5, 6	Yellow	7, 8	Yellow
6	Blue	1, 2	Green	3, 4	Green	5, 6	Green	7, 8	Green
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	Spare		Spare		Spare		Spare
9	Green	Black	P1 Walk	P4 Walk	P5 Walk	P8 Walk			
10	Orange	Black	P1 Don't Walk	P4 Don't Walk	P5 Don't Walk	P8 Don't Walk			
11	Blue	Black	P2 Walk	P3 Walk	P6 Walk	P7 Walk			
12	Black	White	P2 Don't Walk	P3 Don't Walk	P6 Don't Walk	P7 Don't Walk			



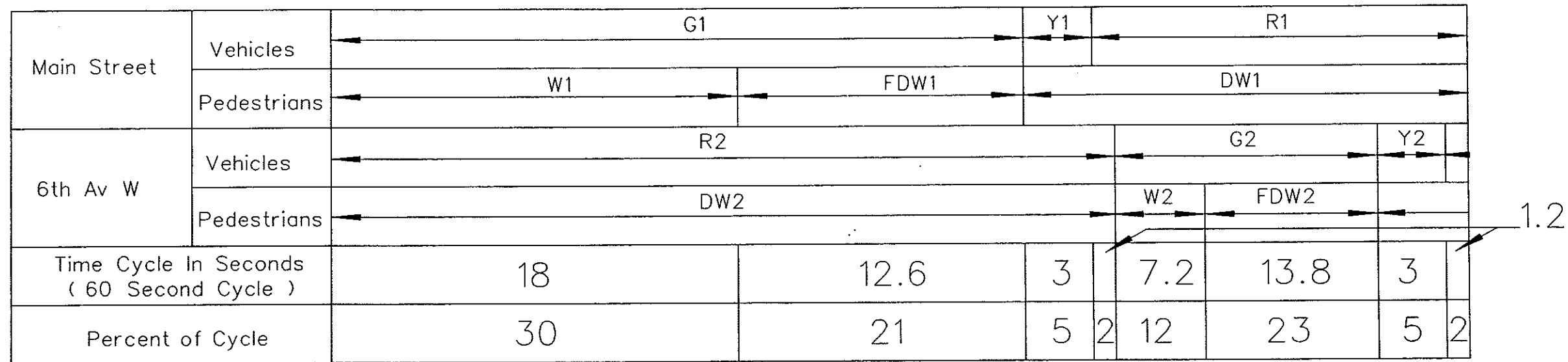
All Ped. Heads (12" Lenses)



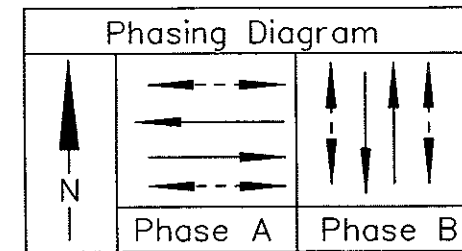
ESTIMATED 1993 ADT

EMERGENCY VEHICLE PRE-EMPTION PHASING	
←	→
WESTBOUND	EASTBOUND
PHASE A	PHASE A

TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 6th Avenue NW
 Mandan, ND



ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS														DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X			X			18	30	30
II	2			X					X				X	X		12.6	21	51
III	3				X				X	X		X				3	5	56
IV	4					X			X	X		X				1.2	2	58
V	5					X	X			X	X					7.2	12	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X		X				3	5	98
VIII	8					X			X	X		X				1.2	2	00
I	9	X	X	X					X	X		X				18	30	30
II	10			X					X			X		X		12.6	21	51
III	11				X				X	X		X				3	5	56
IV	12					X			X	X		X				1.2	2	58
V	13					X	X			X	X					7.2	12	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X		X				3	5	98
VIII	16					X			X	X		X				1.2	2	00

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
6th Av W

TRAFFIC SIGNALS

Controller Settings

6th Avenue NW

Mandan, ND

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
117+80-44' Lt to 118+05-55' Lt to 118+65-55' Lt	86'	2"	92' 142' 142'	Cable 1 12-2 Conductor (B) Detector Cable (C)
118+60-60' Lt to 118+65-55' Lt	6'	2"	12'	Cable 2
118+65-55' Lt to 118+76-40' Lt to 118+76-32' Rt	90'	2 1/2"	91' 91' 91' 91'	Cable 1 Cable 2 12-2 Conductor (B) Detector Cable (C)
118+82-36' Rt to 118+76-32' Rt	6'	2"	12' 47' 47'	Cable 3 12-2 Conductor (B) Detector Cable (C)
118+76-32' Rt to 118+67-41' Rt	12'	3 1/2"	22' 22' 22' 44' 44'	Cable 1 Cable 2 Cable 3 (2) 12-2 Conductor (B) (2) Detector Cable (C)
117+98-39' Rt to 117+98-36' Rt to 118+67-36' Rt to 118+67-41' Rt	75'	2"	91'	Cable 4
119+00-173' Lt to 118+54-173' Lt to 118+54-110' Lt to 118+65-55' Lt to 118+76-40' Lt to 118+76-32' Rt to 118+67-41' Rt	265'	2"	576' 288'	(2) No. 6 RHW (1) No. 6 THW
118+67-41' Rt to 118+67-32' Rt to 118+76-32' Rt to 123+76-32' Rt to 125+00-32' Rt	639'	2"	651'	Interconnect Cable

	QUANTITIES																					
	Concrete Foundation-Traffic Sig.	Pull Box	2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	3 1/2" Diameter Rigid Conduit	Underground Conductor No. 6-Type RHW	Underground Conductor No. 6-Type THW	No. 12 AWG 3 Conductor Cable	No. 12 AWG 5 Conductor Cable	No. 12 AWG 12 Conductor Cable	Type IV Signal Std. 28 Ft Mast Arm	Combo 20 Ft Mast Arm Sig. & Light Std.-Type C	Combo 22 Ft Mast Arm Sig. & Light Std.-Type C	Combo 36 Ft Mast Arm Sig. & Light Std.-Type C	1-Way 3 Sec. Head W/12in. Lenses Mast Arm Mounted	1-Way 3 Sec. Head W/12in. Lenses Post Mounted	1-Way 2 Sec. Head Ped. Signal Post Mounted	Pretimed Controller W/Fire Pre-Emption	Remove Traffic Signal System Interconnect Cable	Emergency Veh. Pre-Emption Unit Type I Signal Standard		
	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
117+80-44' Lt	1							[24]	[74]					1	1	1	2					
117+98-39' Rt	1							[24]	[66]		1				1	1	2					
118+60-60' Lt	1							[24]	[58]			1			1	1	2					
118+65-55' Lt		1																				
118+67-41' Rt	1																	1		1	1	
118+76-32' Rt		1																				
118+82-36' Rt	1							[24]	[60]				1		1	1	2					
123+76-32' Rt		1																				
Var. Locations			1077	90	12	576	288			455									1	651		
TOTAL	5	3	1077	90	12	576	288	96	258	455	1	1	1	1	4	4	8	1	1	651	1	1

NOTE: [] indicates quantities used for internal wiring.

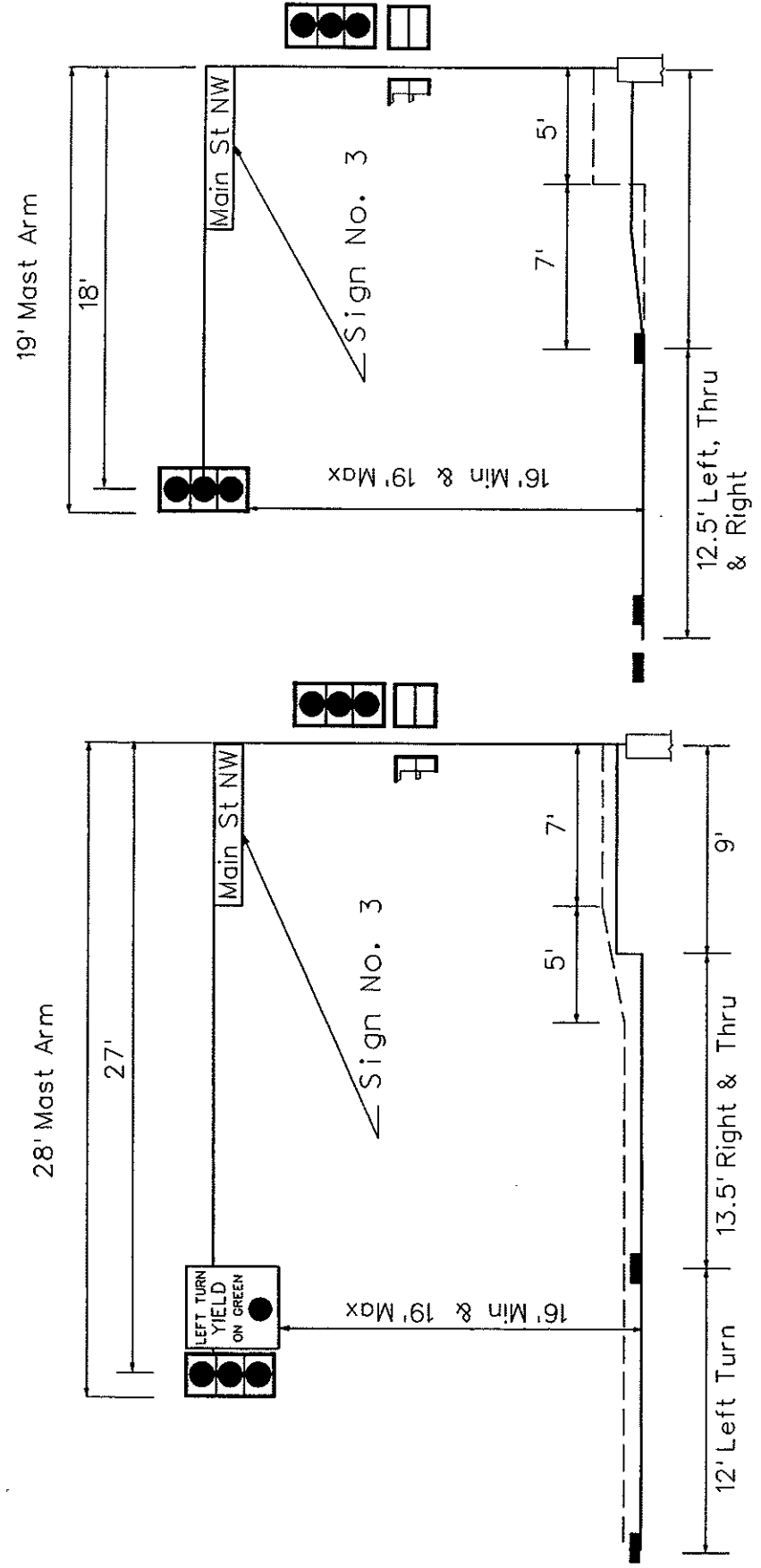
NOTE: The internal wiring in the signal standard for emergency vehicle pre-emption is included in the emergency vehicle indicator light conductor and emergency vehicle detector cable quantities.

(B) Emergency Vehicle Indicator Light Conductor

(C) Emergency Vehicle Detector Cable

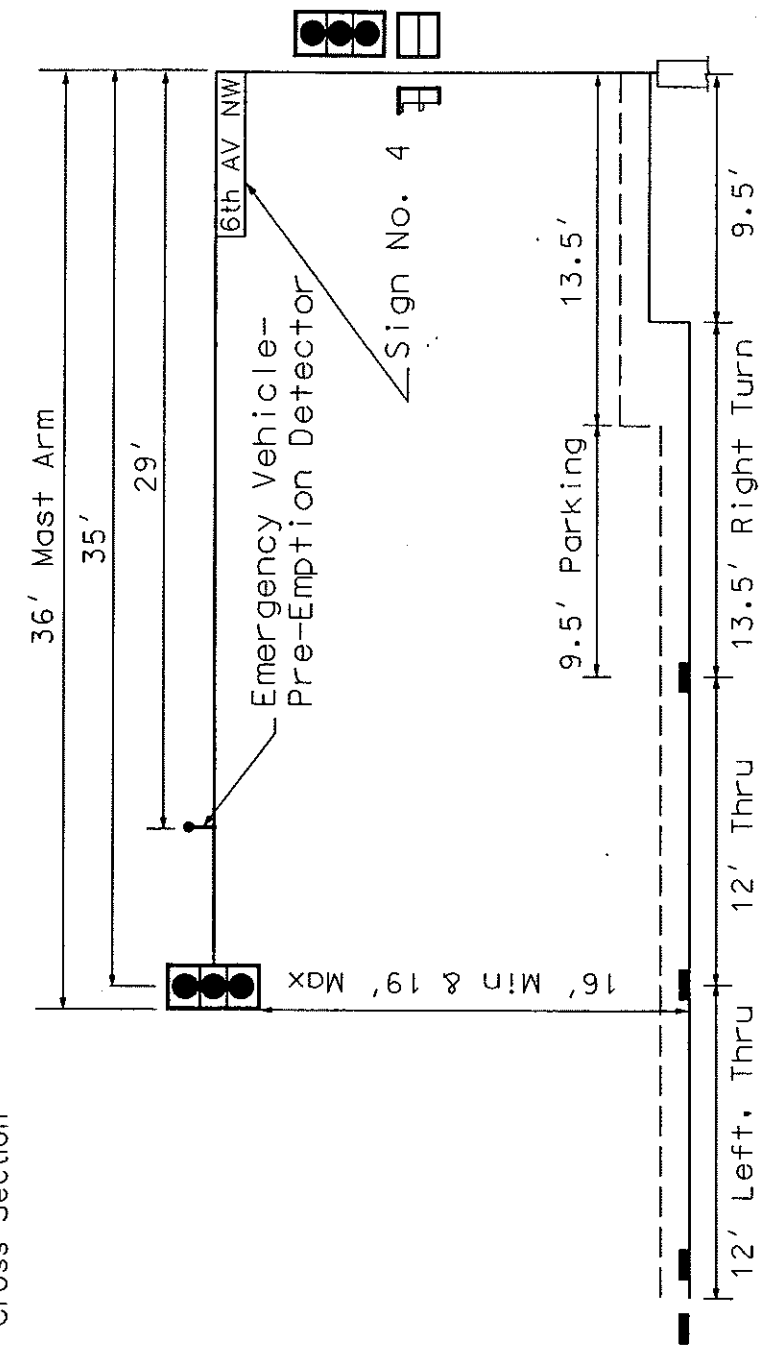
TRAFFIC SIGNALS
 Summary of Quantities
 6th Avenue NW
 Mandan, ND
 BOB\QUANTB1 11-IMU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	262



Sta 117+98-39 Rt
Southbound, North Approach
Cross Section

Sta 118+60-60 Lt
Northbound, South Approach
Cross Section

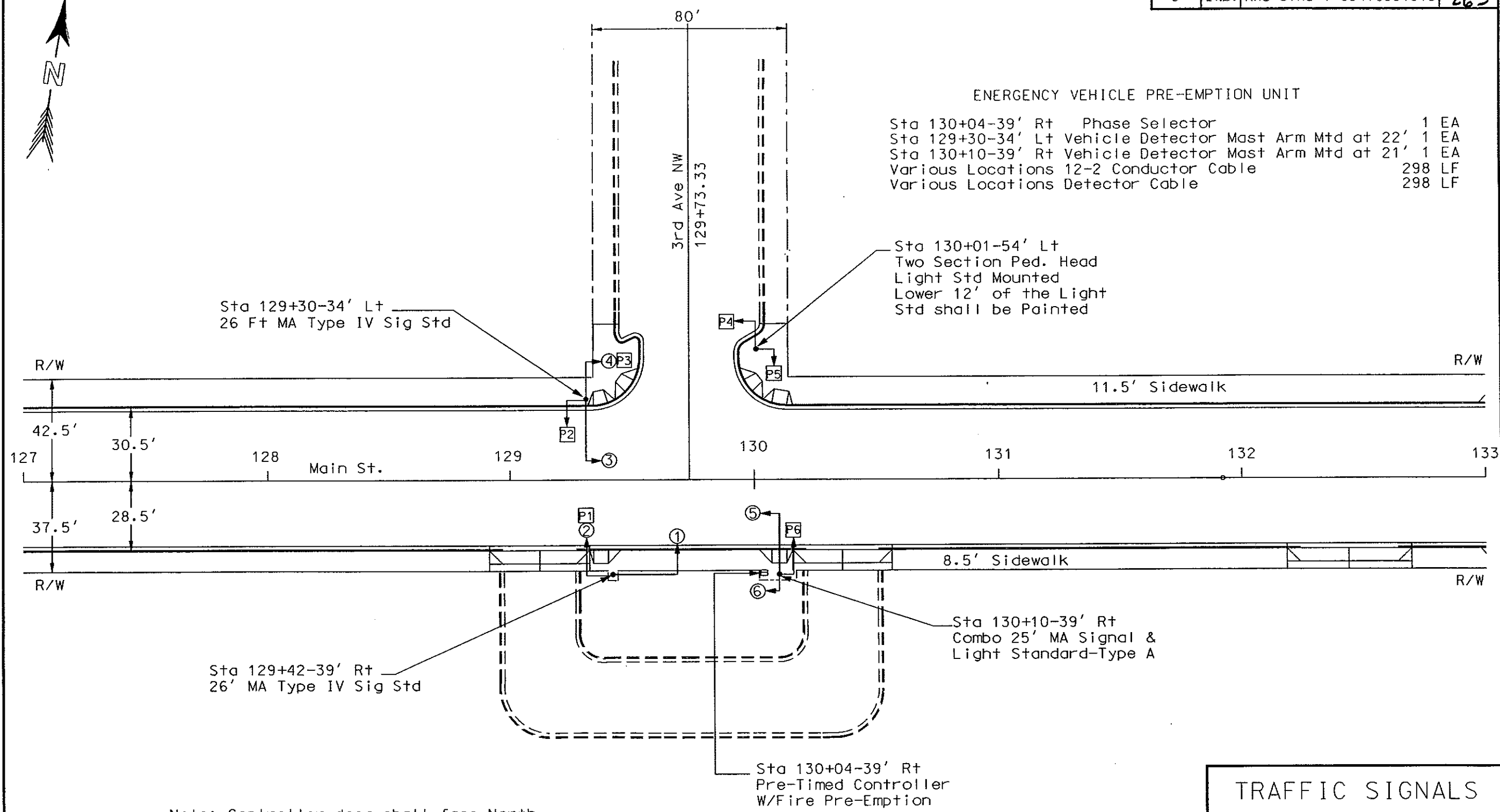
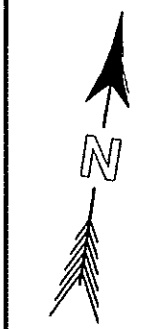


Sta 117+80-44 Lt
Westbound, East Approach
Cross Section

Sta 118+82-36 Rt
Eastbound, West Approach
Cross Section

TRAFFIC SIGNALS
Detail Sheet
6th Avenue NW
Mandan, ND
BOB/MANDAN/DETAIL1 11-IMU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	263



EMERGENCY VEHICLE PRE-EMPTION UNIT

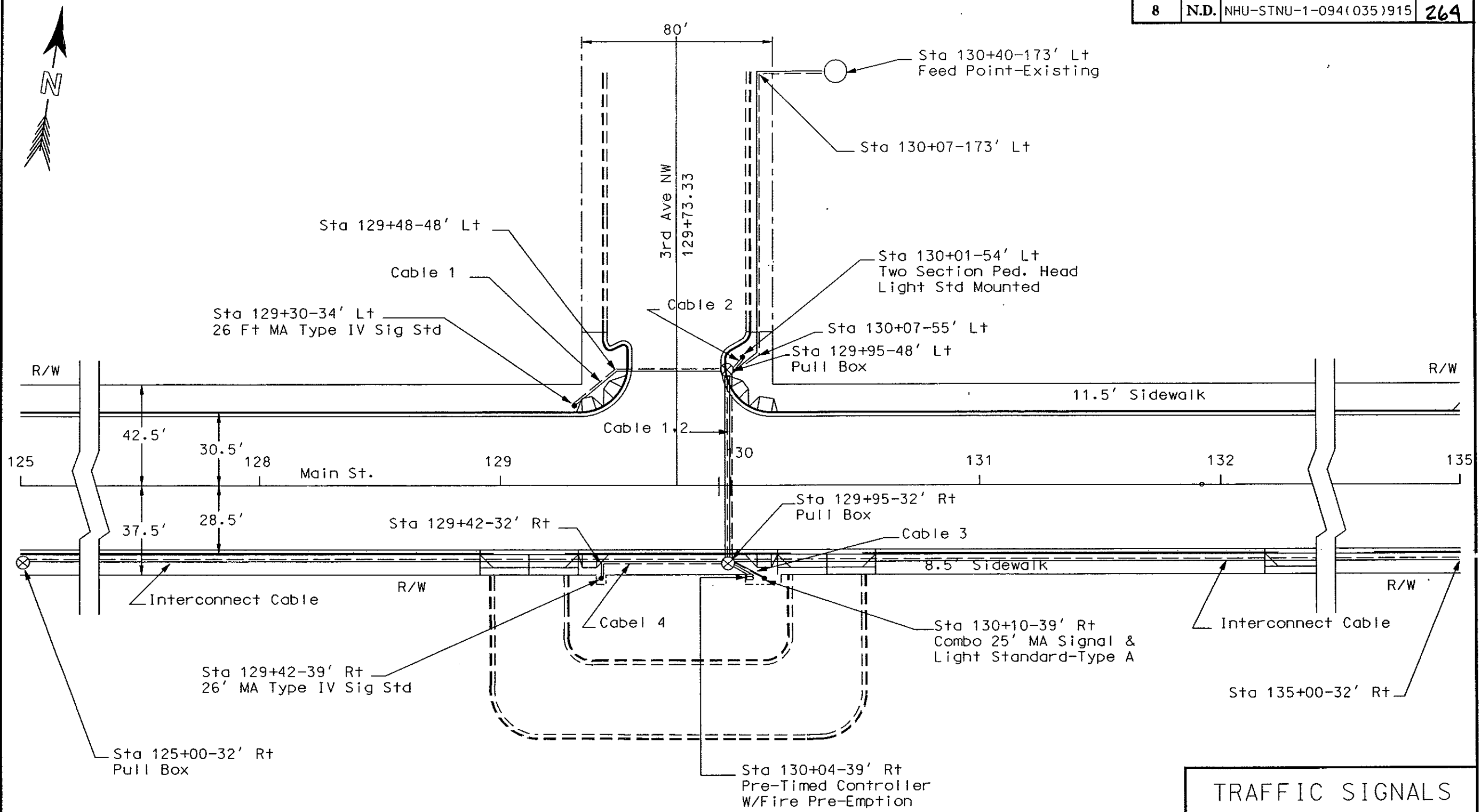
- Sta 130+04-39' Rt Phase Selector 1 EA
- Sta 129+30-34' Lt Vehicle Detector Mast Arm Mtd at 22' 1 EA
- Sta 130+10-39' Rt Vehicle Detector Mast Arm Mtd at 21' 1 EA
- Various Locations 12-2 Conductor Cable 298 LF
- Various Locations Detector Cable 298 LF

Note: Controller door shall face North with hinges on the East side.

TRAFFIC SIGNALS

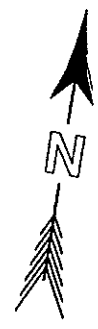
Traffic Signal Layout
3rd Avenue NW
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	264



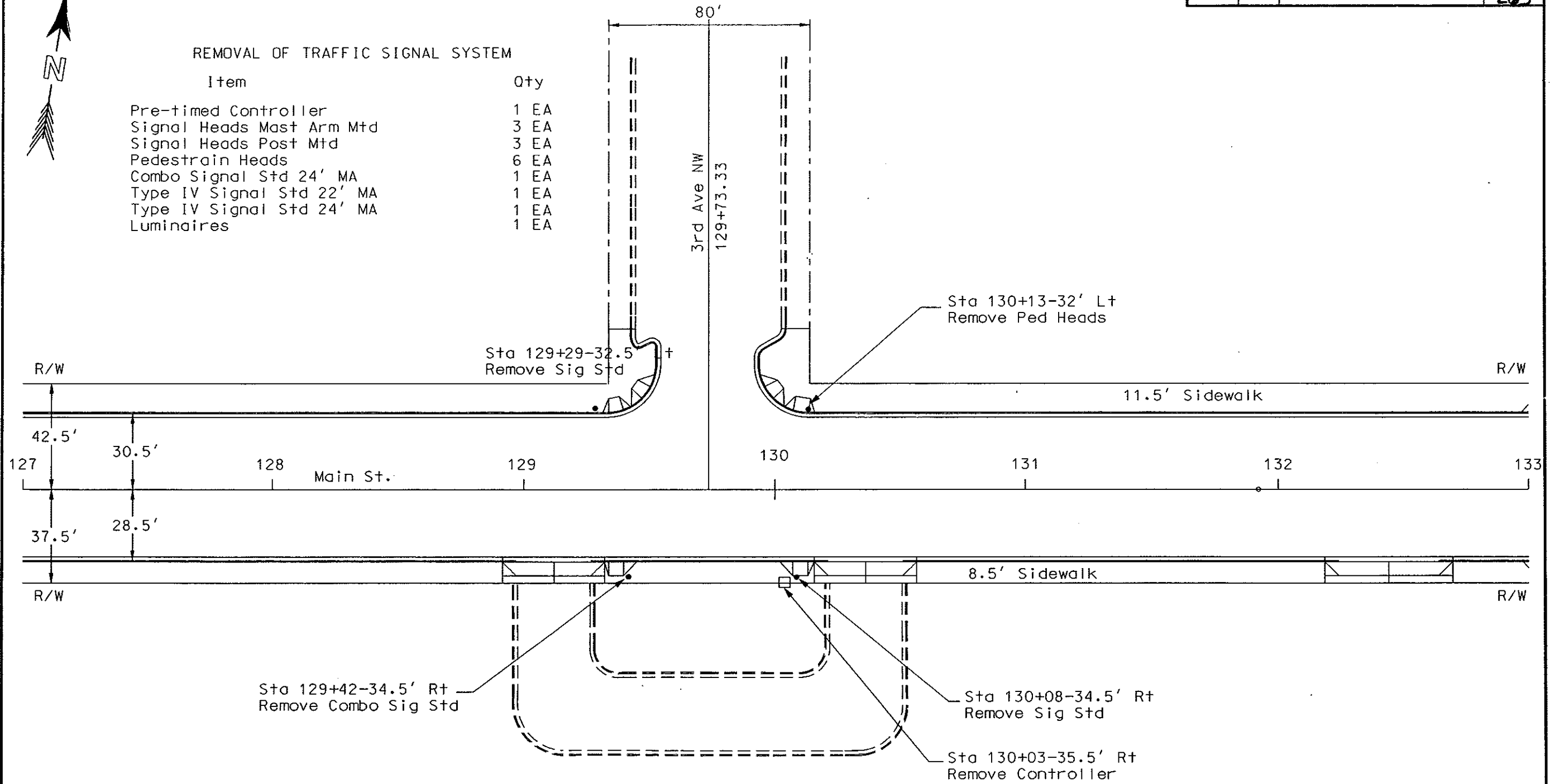
TRAFFIC SIGNALS
 Conductor & Conduit Layout
 3rd Avenue NW
 Mandan, ND

BOB/MAMDAN/75-121C



REMOVAL OF TRAFFIC SIGNAL SYSTEM

Item	Qty
Pre-timed Controller	1 EA
Signal Heads Mast Arm Mtd	3 EA
Signal Heads Post Mtd	3 EA
Pedestrian Heads	6 EA
Combo Signal Std 24' MA	1 EA
Type IV Signal Std 22' MA	1 EA
Type IV Signal Std 24' MA	1 EA
Luminaires	1 EA



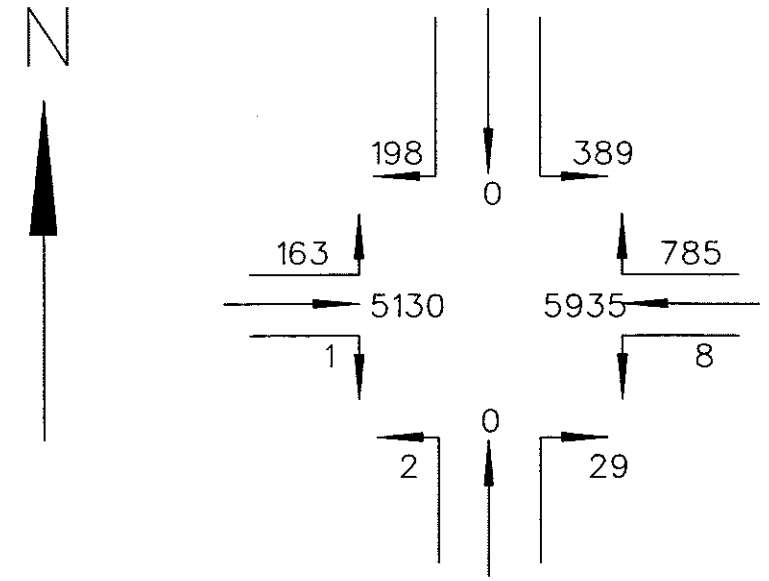
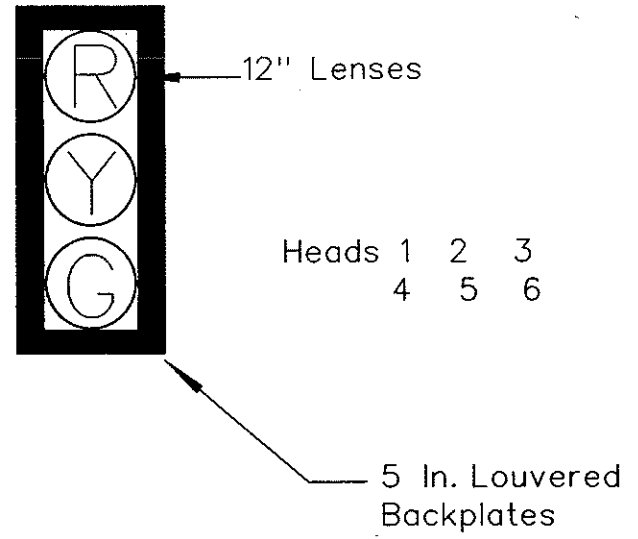
Note: Existing Conduit & Conductor is not salvageable and shall be abandon.

TRAFFIC SIGNALS

Removal of Traffic Signal System
 3rd Avenue NW
 Mandan. ND

BOB/MANDAN/75-121C 11-40MU

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		CABLE 3 (12-12)		CABLE 4 (12-12)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare		Spare		Spare
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	3, 4	Red		Spare	5, 6	Red	1, 2	Red
4	Green		Ground		Ground		Ground		Ground
5	Orange	3, 4	Yellow		Spare	5, 6	Yellow	1, 2	Yellow
6	Blue	3, 4	Green		Spare	5, 6	Green	1, 2	Green
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	Spare		Spare		Spare		Spare
9	Green	Black	P2 Walk	P4	Walk		Spare		Spare
10	Orange	Black	P2 Don't Walk	P4	Don't Walk		Spare		Spare
11	Blue	Black	P3 Walk	P5	Walk	P6	Walk	P1	Walk
12	Black	White	P3 Don't Walk	P5	Don't Walk	P6	Don't Walk	P1	Don't Walk



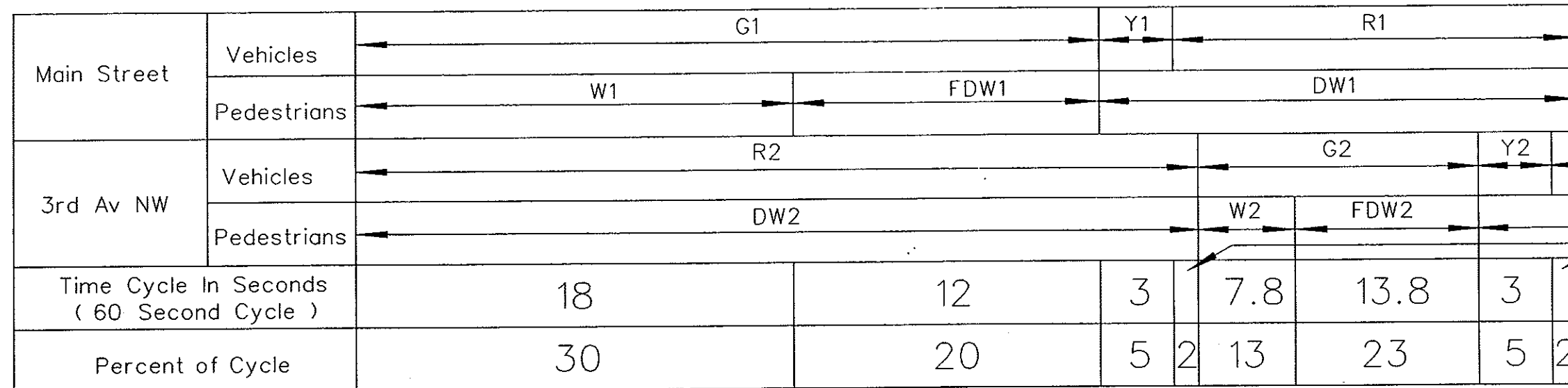
ESTIMATED 1993 ADT



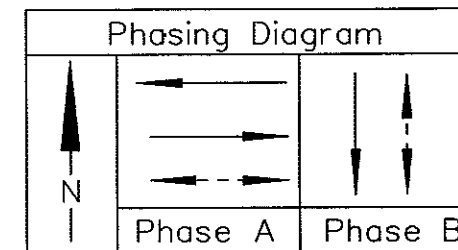
All Ped. Heads (12" Lenses)

EMERGENCY VEHICLE PRE-EMPTION PHASING	
←	→
WESTBOUND PHASE A	EASTBOUND PHASE A

TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 3rd Avenue NW
 Mandan, ND



ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS														DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X			X			18	30	30
II	2			X					X			X	X			12	20	50
III	3				X				X	X		X				3	5	55
IV	4					X			X	X		X				1.2	2	57
V	5					X	X			X	X					7.8	13	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X	X					3	5	98
VIII	8					X			X	X		X				1.2	2	00
I	9	X	X	X					X	X						18	30	30
II	10			X					X					X		12	20	50
III	11				X				X	X						3	5	55
IV	12					X			X	X						1.2	2	57
V	13					X	X			X	X					7.8	13	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X	X					3	5	98
VIII	16					X			X	X		X				1.2	2	00

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk
X-Cam Broken Out
*-Interlock (Green) Key

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
3rd Av W

TRAFFIC SIGNALS
Controller Settings
3rd Avenue NW
Mandan, ND
TIME3 11-IMU

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
129+30-34' Lt to 129+48-48' Lt to 129+95-48' Lt	69'	2"	75' 118' 118'	Cable 1 12-2 Conductor (B) Detector Cable (C)
130+01-54' Lt to 129+95-48' Lt	7'	2"	13'	Cable 2
129+95-48' Lt to 129+95-32' Rt	79'	2 1/2"	80' 80' 80' 80'	Cable 1 Cable 2 12-2 Conductor (B) Detector Cable (C)
130+10-39' Lt to 129+95-32' Rt	16'	2"	22' 60' 60'	Cable 3 12-2 Conductor (B) Detector Cable (C)
129+95-32' Rt to 130+04-39' Rt	10'	3 1/2"	20' 20' 20' 20' 40' 40'	Cable 1 Cable 2 Cable 3 Cable 4 (2) 12-2 Conductor (B) (2) Detector Cable (C)
129+42-39' Rt to 129+42-32' Rt to 129+95-32' Rt	59'	2"	65'	Cable 4
130+40-173' Lt to 130+07-173' Lt to 130+07- 55' Lt to 129+95- 48' Lt to 129+95- 32' Rt to 130+04- 39' Rt	252'	2"	546' 273'	(2) No. 6 RHW (1) No. 6 THW
125+00-32' Rt to 129+95-32' Rt to 130+04-39' Rt to 129+95-32' Rt to 135+00-32' Rt	1017'	2"	1037'	Interconnect Cable

STATION	QUANTITIES																						
	Concrete Foundation-Traffic Sig.	Pull Box	2" Diameter Rigid Conduit	2 1/2" Diameter Rigid Conduit	3 1/2" Diameter Rigid Conduit	Underground Conductor	No. 6-Type RHW	Underground Conductor	No. 6-Type THW	No. 12 AWG 3 Conductor Cable	No. 12 AWG 5 Conductor Cable	No. 12 AWG 12 Conductor Cable	Type IV Signal Std. 26 Ft Mast Arm	Combo 25 Ft Mast Arm Sig. & Light Std.-Type A	1-Way 3 Sec. Head W/12in. Lenses Mast Arm Mounted	1-Way 3 Sec. Head W/12in. Lenses Post Mounted	1-Way 2 Sec. Head Ped. Signal Post Mounted	Pretimed Controller W/Fire Pre-Emption	Remove Traffic Signal System	Interconnect Cable	Emergency Veh. Pre-Emption Unit	Type I Signal Standard	
	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA
125+00-32' Rt		1																					
129+30-34' Lt	1									[24]	[64]		1		1	1	2						
129+42-39' Rt	1									[12]	[64]		1		1	1	1						
130+00-48' Lt		1																					
130+00-32' Rt		1																					
130+01-54' Lt	1									[24]							2						
130+04-39' Rt	1																	1				1	1
130+10-39' Rt	1									[12]	[63]			1	1	1	1						
Var. Locations			1420	79	10	546	273					402							1	1037			
TOTAL	5	3	1420	79	10	546	273	72	191	402	2	1	3	3	6	1	1	1037	1	1			

NOTE: [] indicates quantities used for internal wiring.

NOTE: The internal wiring in the signal standard for emergency vehicle pre-emption is included in the emergency vehicle indicator light conductor and emergency vehicle detector cable quantities.

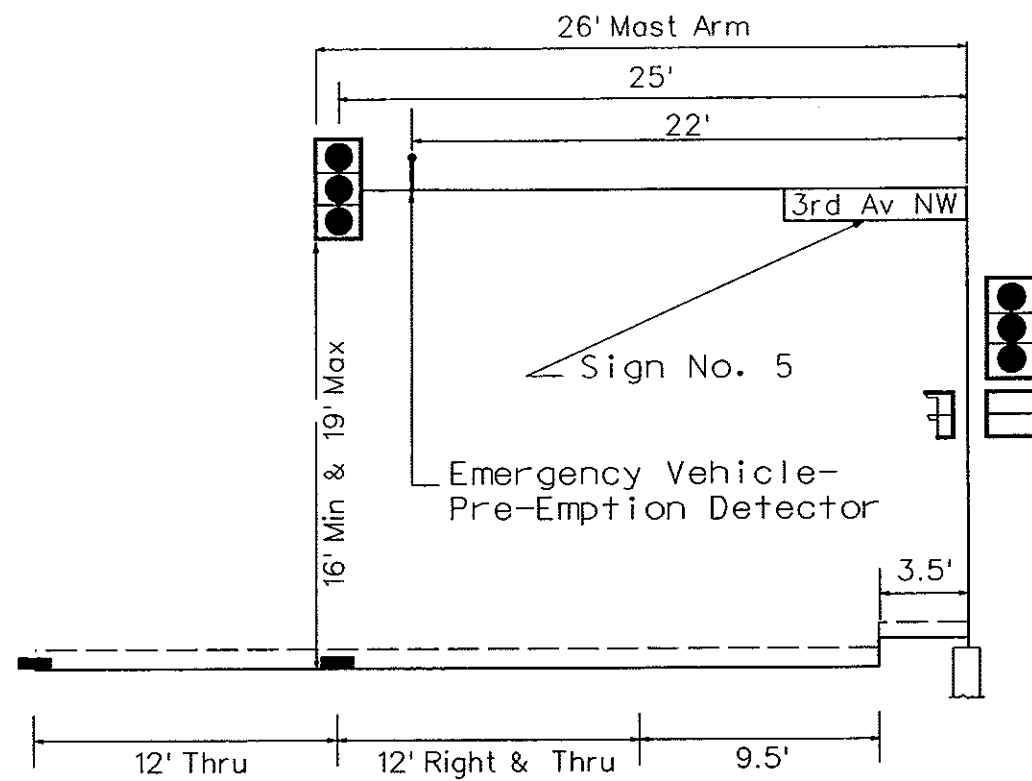
(B) Emergency Vehicle Indicator Light Conductor
(C) Emergency Vehicle Detector Cable

TRAFFIC SIGNALS

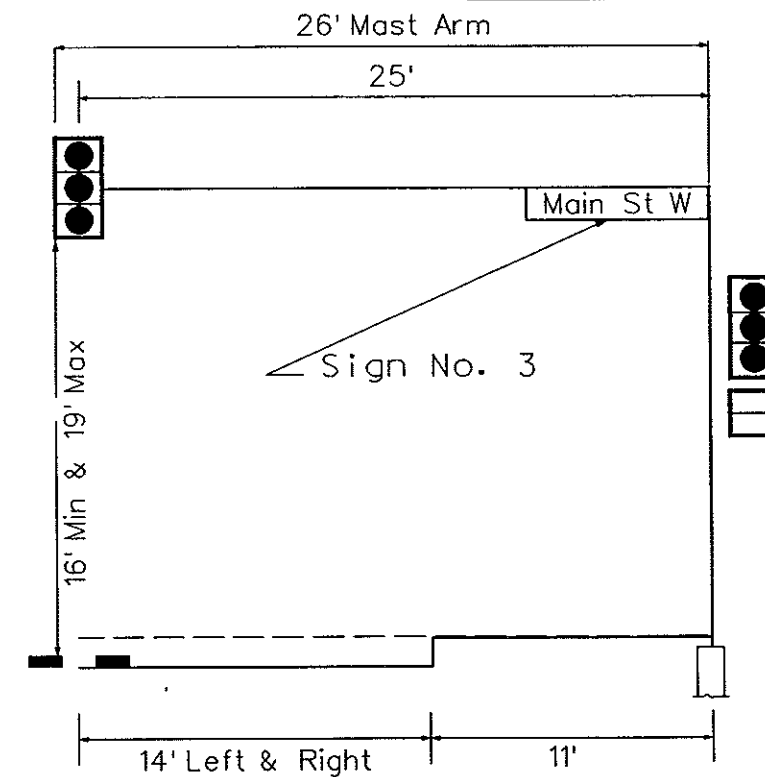
Summary of Quantities
3rd Avenue NW
Mandan, ND

BOB\CQUANTC1 11-11-95

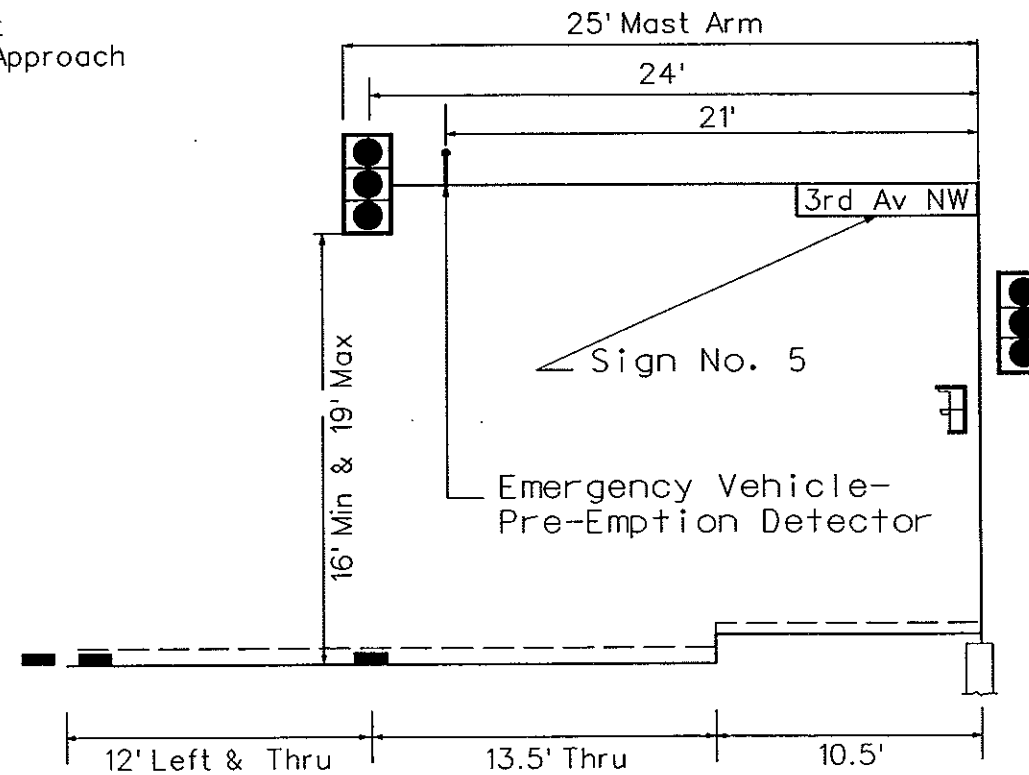
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	269



Sta 129+30-34' Lt
Westbound, East Approach
Cross Section



Sta 129+42-39' Rt
Southbound, North Approach
Cross Section



Sta 130+10-39' Rt
Eastbound, West Approach
Cross Section

TRAFFIC SIGNALS

Detail Sheet
3rd Avenue NW
Mandan, ND

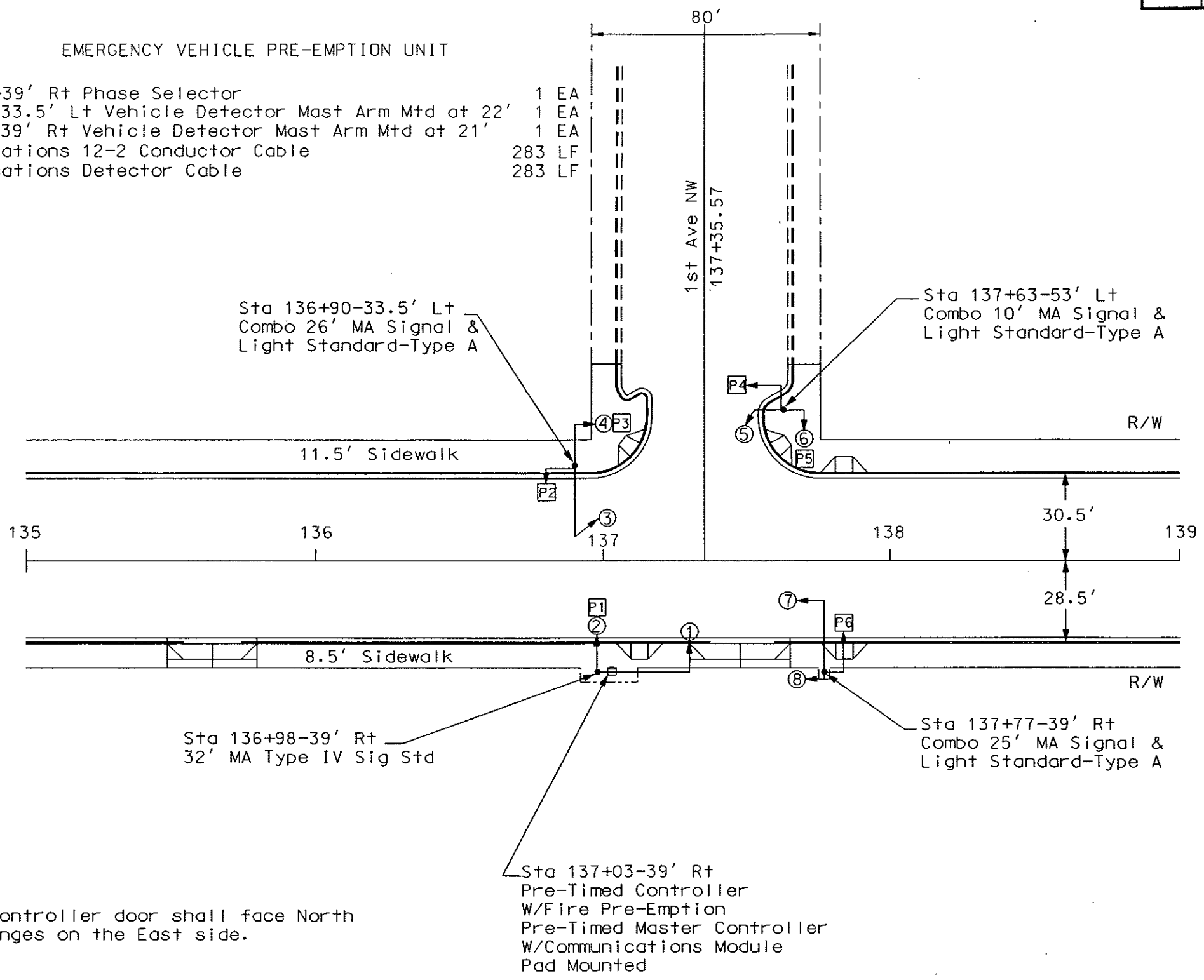
BOB/MANDAN/DETAIL2 11-IMU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	270



EMERGENCY VEHICLE PRE-EMPTION UNIT

- Sta 137+03-39' Rt Phase Selector 1 EA
- Sta 136+90-33.5' Lt Vehicle Detector Mast Arm Mtd at 22' 1 EA
- Sta 137+77-39' Rt Vehicle Detector Mast Arm Mtd at 21' 1 EA
- Various Locations 12-2 Conductor Cable 283 LF
- Various Locations Detector Cable 283 LF



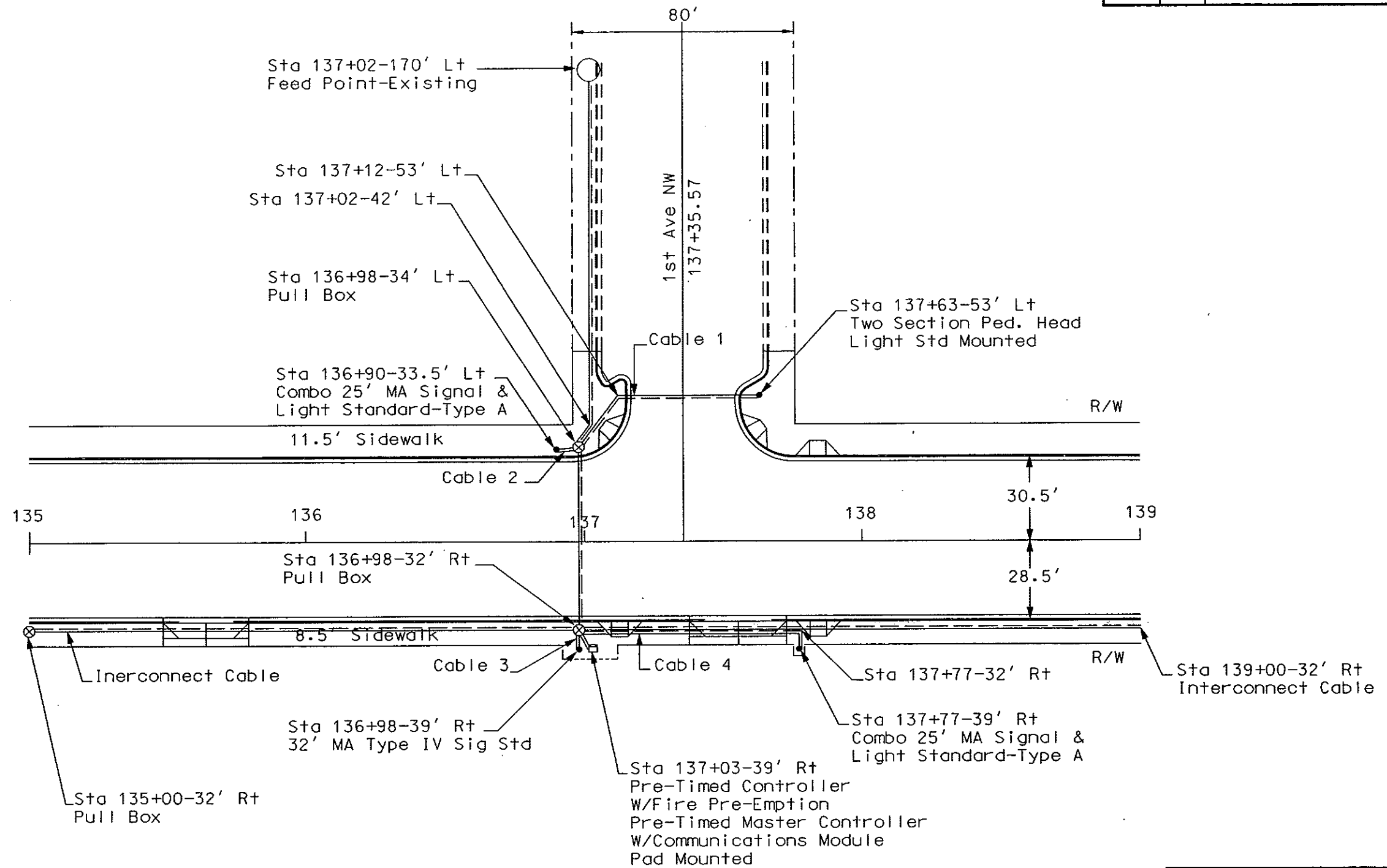
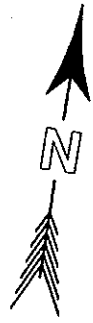
Note: Controller door shall face North with hinges on the East side.

TRAFFIC SIGNALS

Traffic Signal Layout
1st Avenue NW
Mandan, ND

B08/MANDAN/75-121D 11-40MJ

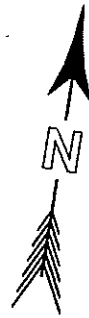
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	271



TRAFFIC SIGNALS

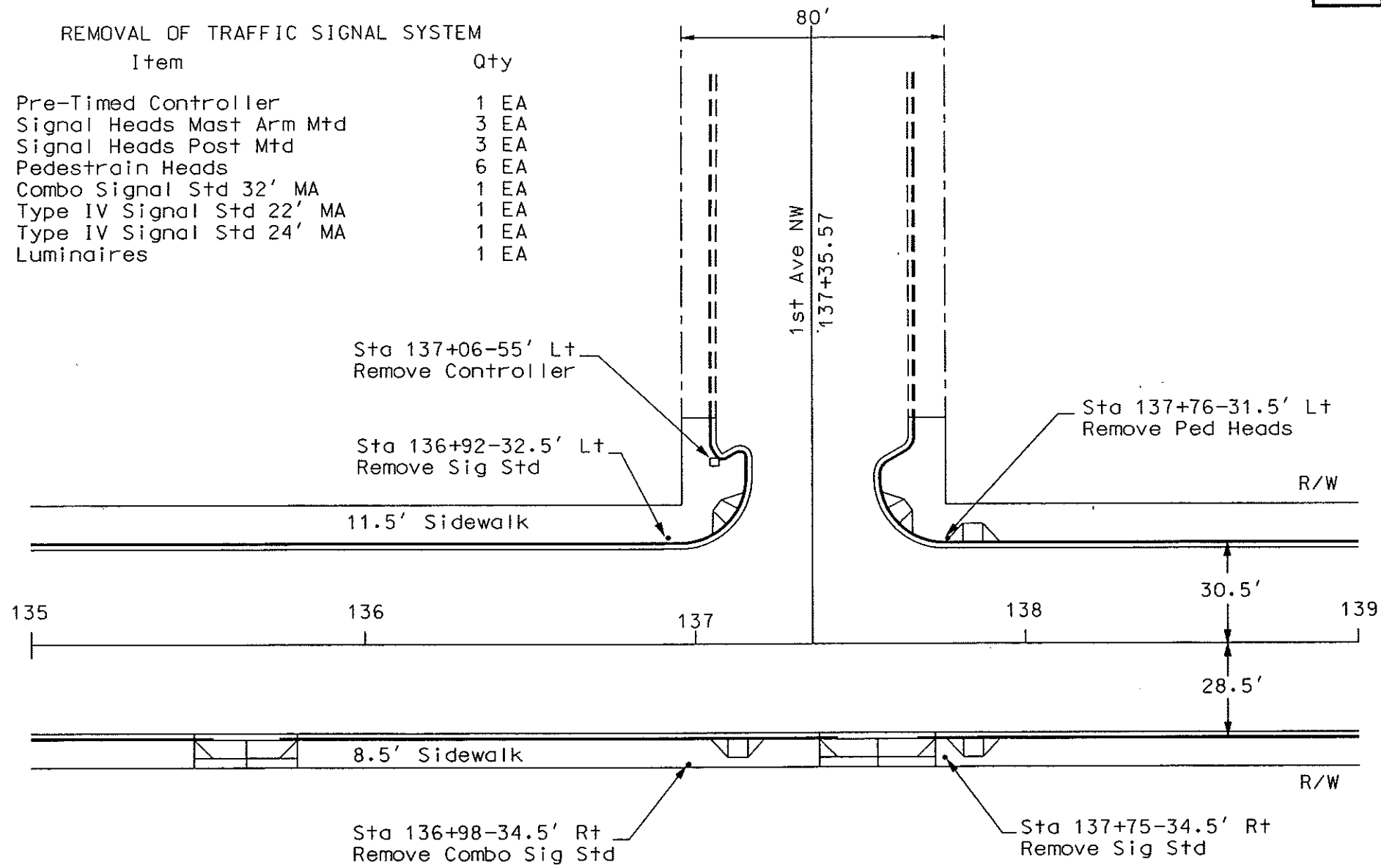
Conductor & Conduit Layout
1st Avenue NW
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	272



REMOVAL OF TRAFFIC SIGNAL SYSTEM

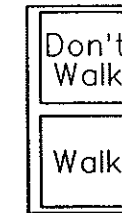
Item	Qty
Pre-Timed Controller	1 EA
Signal Heads Mast Arm Mtd	3 EA
Signal Heads Post Mtd	3 EA
Pedestrian Heads	6 EA
Combo Signal Std 32' MA	1 EA
Type IV Signal Std 22' MA	1 EA
Type IV Signal Std 24' MA	1 EA
Luminaires	1 EA



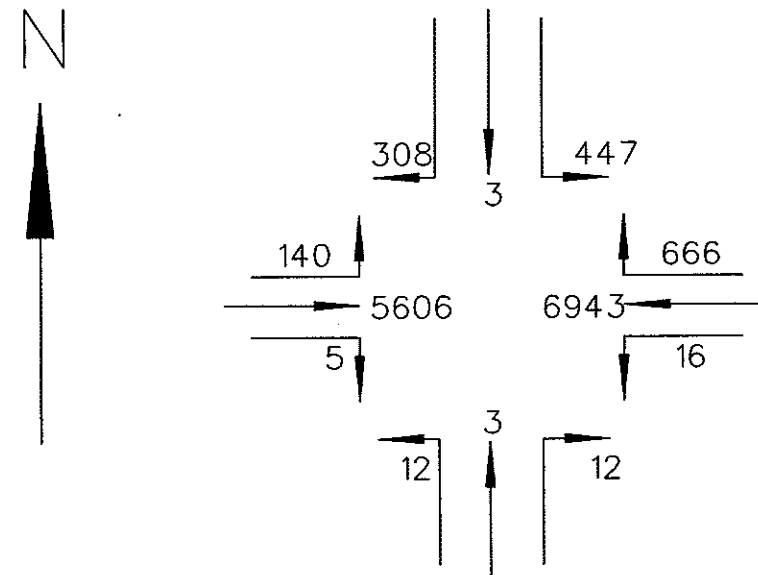
Note: Existing Conduit & Conductor is not salvageable and shall be abandon.

TRAFFIC SIGNALS
 Removal of Traffic
 Signal System
 Mandan, ND

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		CABLE 3 (12-12)		CABLE 4 (12-12)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare		Spare		Spare
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	5,6	Red	3,4	Red	1,2	Red	7,8	Red
4	Green		Ground		Ground		Ground		Ground
5	Orange	5,6	Yellow	3,4	Yellow	1,2	Yellow	7,8	Yellow
6	Blue	5,6	Green	3,4	Green	1,2	Green	7,8	Green
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	Spare		Spare		Spare		Spare
9	Green	Black	P4 Walk	P2	Walk		Spare		Spare
10	Orange	Black	P4 Don't Walk	P2	Don't Walk		Spare		Spare
11	Blue	Black	P5 Walk	P3	Walk	P1	Walk	P6	Walk
12	Black	White	P5 Don't Walk	P3	Don't Walk	P1	Don't Walk	P6	Don't Walk

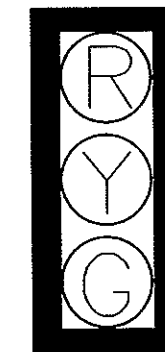


All Ped. Heads (12" Lenses)



ESTIMATED 1993 ADT

EMERGENCY VEHICLE PRE-EMPTION PHASING	
←	→
WESTBOUND PHASE A	EASTBOUND PHASE A



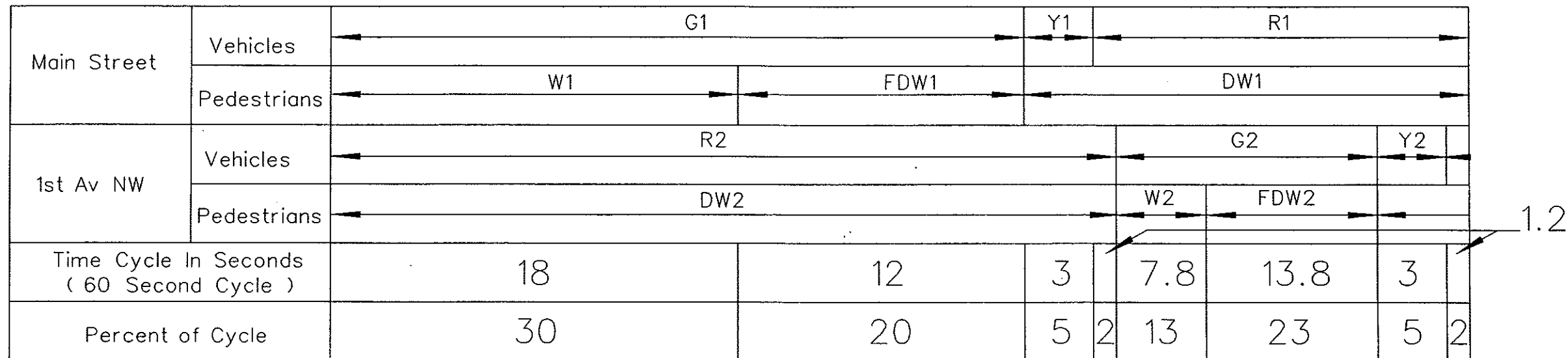
12" Lenses

Heads 1 2 3
4 5 6

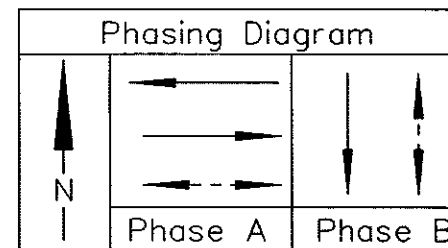
5 In. Louvered Backplates

INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
1st Avenue NW
Mandan, ND



ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS														DIAL		SETTINGS
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X						18	30	30
II	2			X					X				X	X		12	20	50
III	3				X				X	X		X	X			3	5	55
IV	4					X			X	X		X	X			1.2	2	57
V	5					X	X			X	X					7.8	13	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X	X					3	5	98
VIII	8					X			X	X		X	X			1.2	2	00
I	9	X	X	X					X	X		X	X			18	30	30
II	10			X					X			X	X	X		12	20	50
III	11				X				X	X		X	X			3	5	55
IV	12					X			X	X		X	X			1.2	2	57
V	13					X	X			X	X					7.8	13	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X	X					3	5	98
VIII	16					X			X	X		X	X			1.2	2	00

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk
X-Cam Broken Out
*-Interlock (Green) Key

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

Dial 1- 6:00 AM to 11:00 AM
Dial 2- 11:00 AM to 7:00 PM
Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
1st Av W

TRAFFIC SIGNALS

Controller Settings

1st Avenue NW

Mandan, ND

TIME1 11-IMU

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
137+63-53' Lt to 137+12-53' Lt to 136+98-34' Lt	74'	2"	80'	Cable 1
136+90-33.5' Lt to 136+98-34' Lt	7'	2"	13' 52'	Cable 2 12-2 Conductor (B) Detector Cable (C)
136+98-34' Lt to 136+98-32' Rt	65'	2 1/2"	66' 66' 66'	Cable 1 Cable 2 12-2 Conductor (B) Detector Cable (C)
136+98-39' Rt to 136+98-32' Rt	6'	2"	12'	Cable 3
137+77-39' Rt to 137+77-32' Rt to 136+98-32' Rt	85'	2"	91' 129' 129'	Cable 4 12-2 Conductor (B) Detector Cable (C)
136+98-32' Rt to 137+03-39' Rt	8'	3 1/2"	18' 18' 18' 18'	Cable 1 Cable 2 Cable 3 Cable 4
136+98-32' Rt to 137+03-39' Rt			36' 36'	(2) 12-2 Conductor (B) (2) Detector Cable (C)
137+02-170' Lt to 137+02- 42' Lt to 136+98- 34' Lt to 136+98- 32' Lt to 137+03- 39' Rt	208'	2"	462' 231'	(2) No. 6 RHW (1) No. 6 THW
135+00-32' Rt to 136+98-32' Rt to 137+03-39' Rt to 136+98-32' Rt to 139+00-32' Rt	413'	2"	436'	Interconnect Cable
137+02-170' Lt to 137+02- 42' Lt to 136+98- 34' Lt to 136+98- 32' Lt to 137+03- 39' Rt	208'	2"		(T.I.)

STATION	QUANTITIES																								
	Concrete Foundation-Traffic Sig.	Pull Box	2" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	3-1/2" Diameter Rigid Conduit	Underground Conductor	No. 6-Type RHW	Underground Conductor	No. 6-Type THW	No. 12 AWG 3 Conductor Cable	No. 12 AWG 5 Conductor Cable	No. 12 AWG 12 Conductor Cable	Type IV Signal Std. 32 Ft Mast Arm	Combo 10 Ft Mast Arm Sig. & Light Std.-Type A	Combo 26 Ft Mast Arm Sig. & Light Std.-Type A	Combo 25 Ft Mast Arm Sig. & Light Std.-Type A	1-Way 3 Sec. Head W/12in. Lenses Mast Arm Mounted	1-Way 3 Sec. Head W/12in. Lenses Post Mounted	1-Way 2 Sec. Head Ped. Signal Post Mounted	Pretimed Controller W/Fire Pre-Emption	Pre-Timed Master Controller	Remove Traffic Signal System	Interconnect Cable	Emergency Veh. Pre-Emption Unit	
	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA
135+00-32' Rt		1																							
136+90-33.5' Lt	1									24	63				1		1	1	2						
136+98-34' Lt		1									70														
136+98-32' Rt		1																							
136+98-39' Rt	1									12			1				1	1	1						
137+03-39' Rt	1																			1	1				
137+63-53' Lt	1									24	48			1			1	1	2						1
137+77-39' Rt	1									12	63					1	1	1	1						
Var. Locations			1001	65	8	462	231					400											1	436	
TOTAL	5	3	1001	65	8	462	231	72	244	400	1	1	1	1	4	4	6	1	1	1	1	1	436	1	

(B) Emergency Vehicle Indicator Light Conductor
(C) Emergency Vehicle Detector Cable

NOTE: [] indicates quantities used for internal wiring.

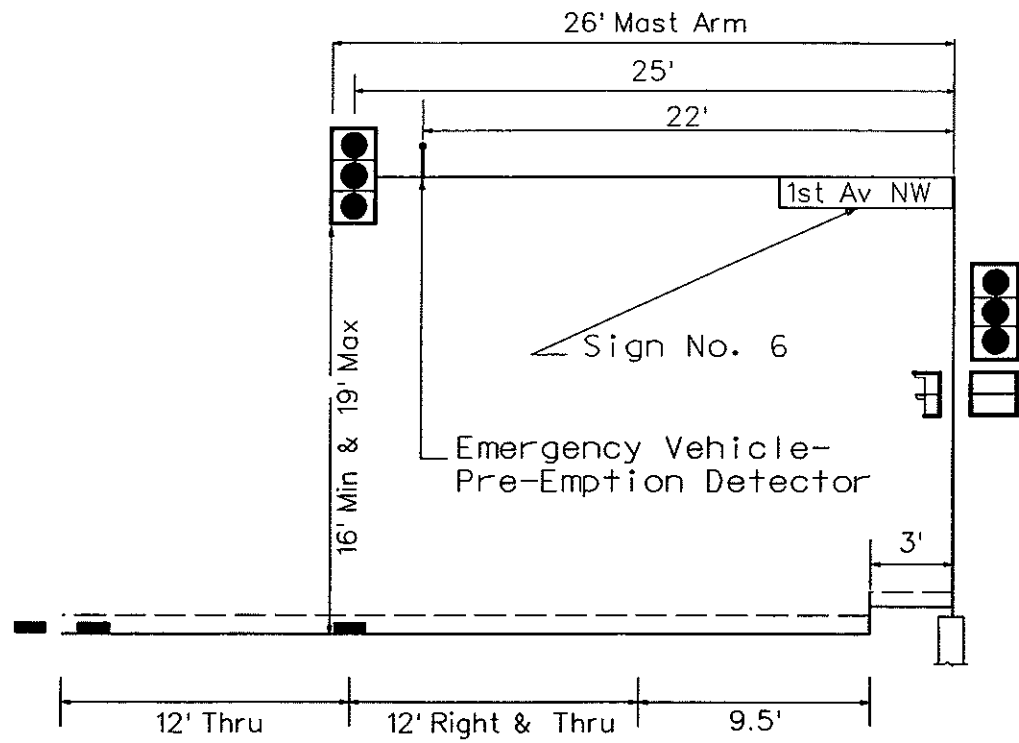
(T.I.) Provided for Telephone Interconnect

NOTE: The internal wiring in the signal standard for emergency vehicle pre-emption is included in the emergency vehicle indicator light conductor and emergency vehicle detector cable quantities.

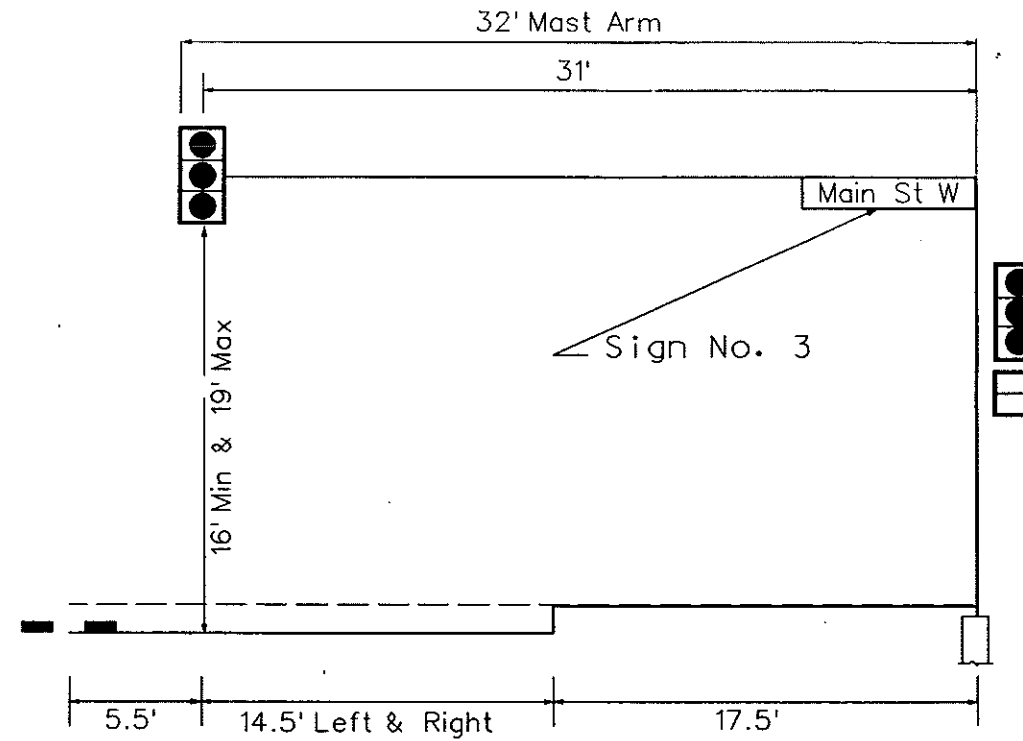
TRAFFIC SIGNALS
Summary of Quantities
1st Avenue NW
Mandan, ND

EGENQUANT01 11-11-95

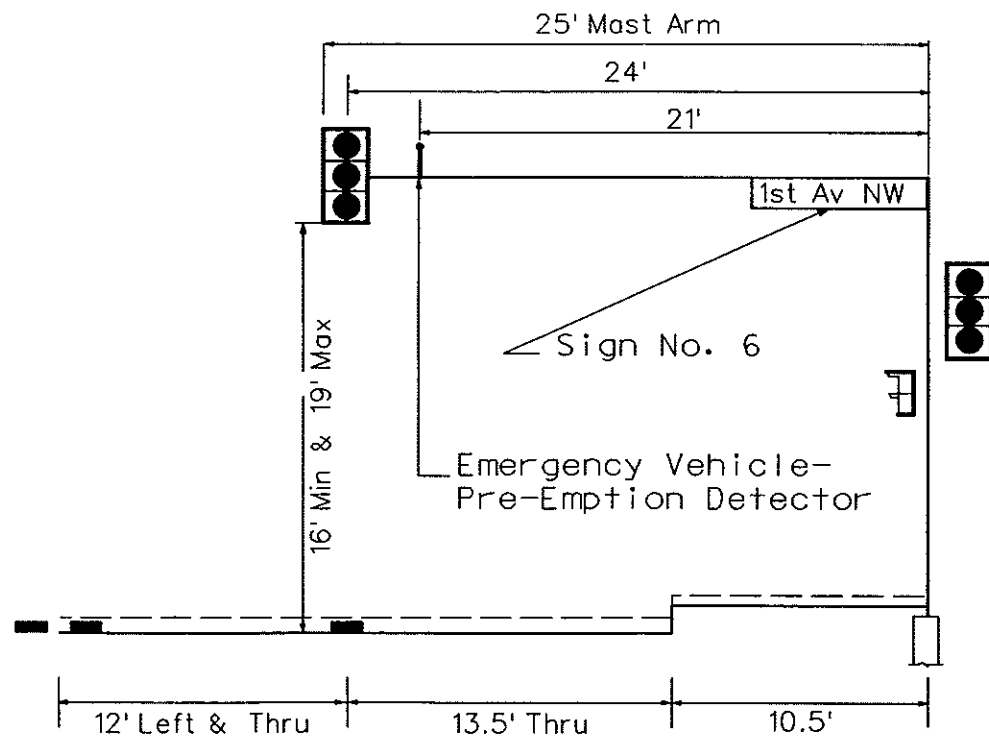
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	276



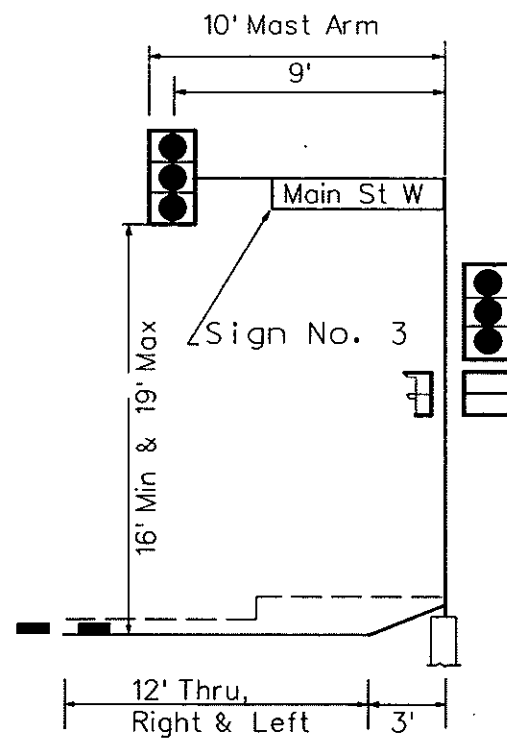
Sta 136+90-33.5' Lt
Westbound, East Approach
Cross Section



Sta 136+98-39' Rt
Southbound, North Approach
Cross Section



Sta 137+77-39' Rt
Eastbound, West Approach
Cross Section



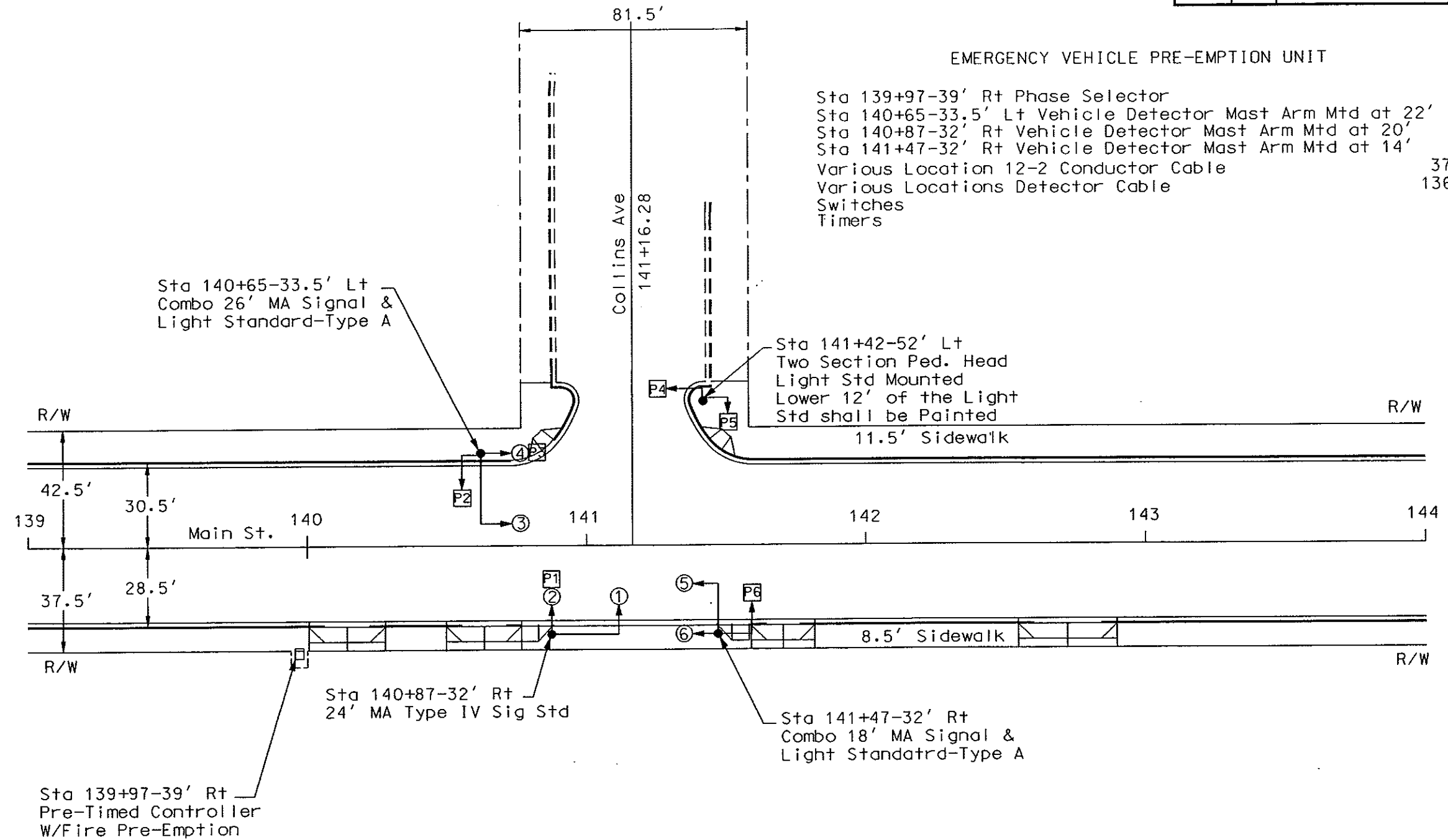
Sta 137+63-53' Lt
Northbound, South Approach
Cross Section

TRAFFIC SIGNALS

Detail Sheet
1st Avenue NW
Mandan, ND

BOE/MANDAN/DETAIL3 11-11-95

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	277



- EMERGENCY VEHICLE PRE-EMPTION UNIT
- Sta 139+97-39' Rt Phase Selector 1 EA
 - Sta 140+65-33.5' Lt Vehicle Detector Mast Arm Mtd at 22' 1 EA
 - Sta 140+87-32' Rt Vehicle Detector Mast Arm Mtd at 20' 1 EA
 - Sta 141+47-32' Rt Vehicle Detector Mast Arm Mtd at 14' 1 EA
 - Various Location 12-2 Conductor Cable 379 LF
 - Various Locations Detector Cable 1366 LF
 - Switches 4 EA
 - Timers 2 EA

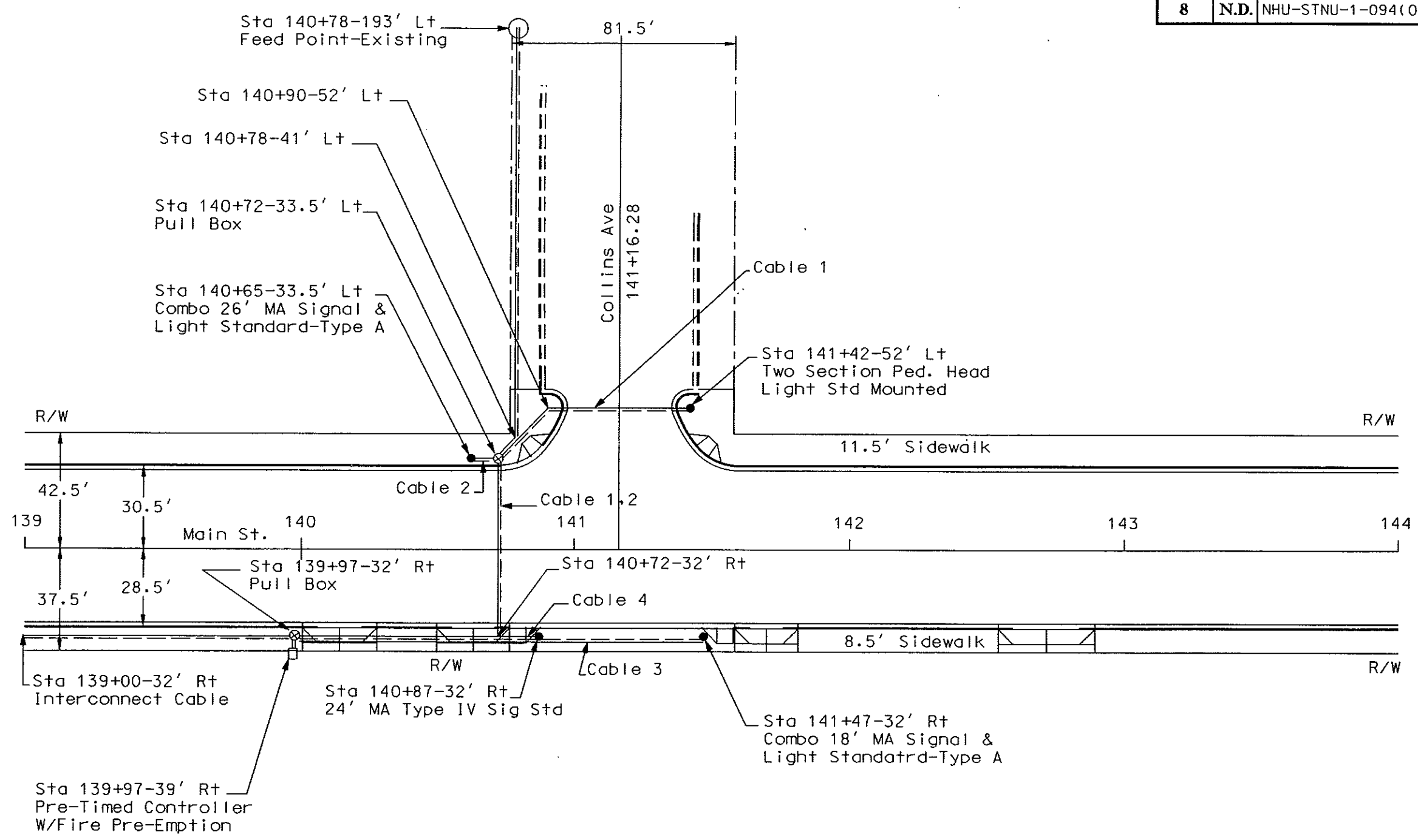
Note: Controller door shall face North with hinges on the East side.

TRAFFIC SIGNALS

Traffic Signal Layout
Collins Avenue
Mandan, ND

BOB/MANDAN/75-121E 11-40MJ

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	278

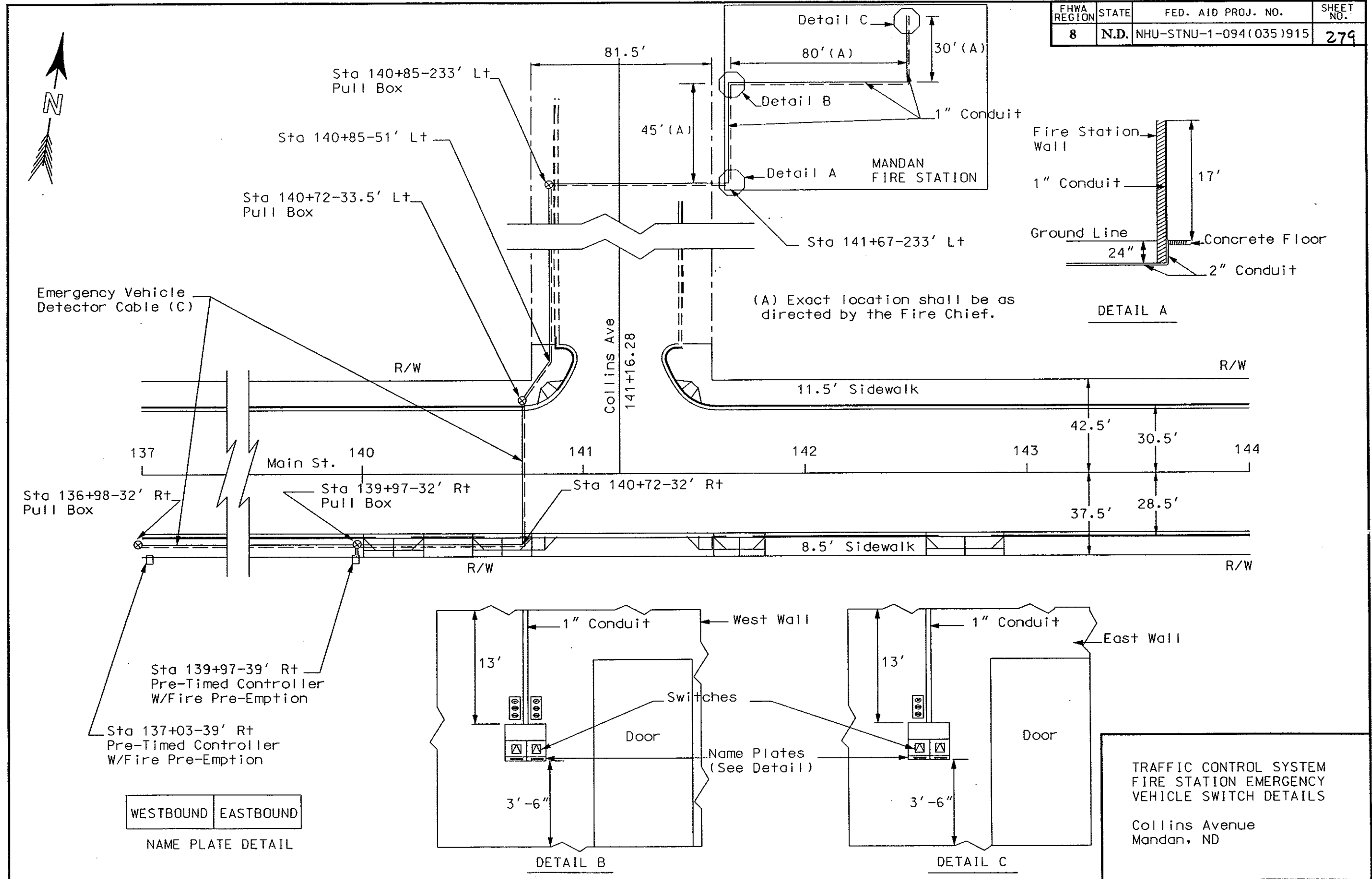


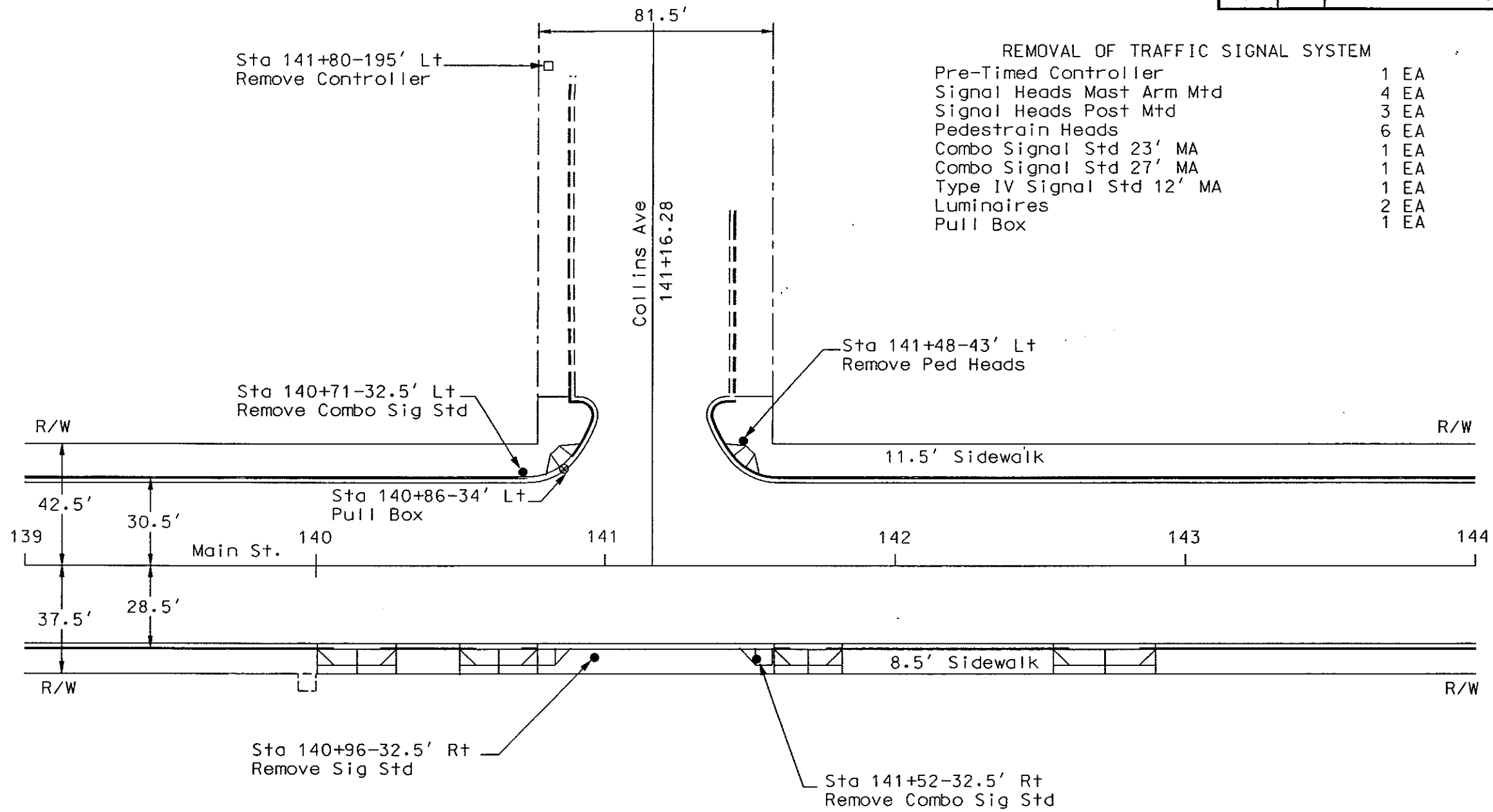
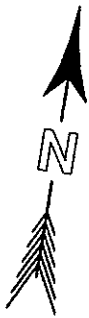
TRAFFIC SIGNALS

Conductor & Conduit Layout
Collins Avenue
Mandan, ND

BOB/MANDAN/75-121E 11=40MJ

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	279



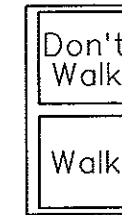


Note: Existing Conduit & Conductor is not salvageable and shall be abandon.

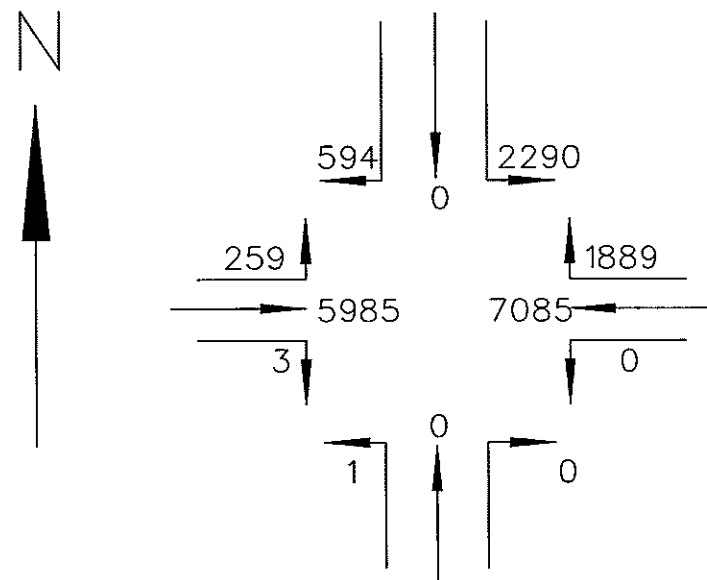
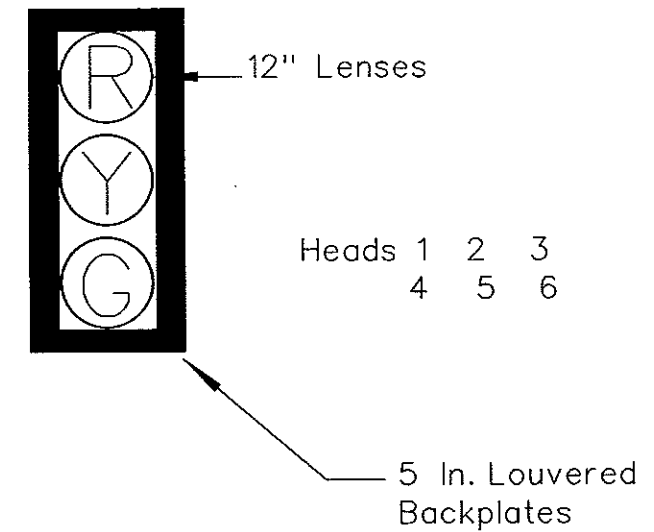
TRAFFIC SIGNALS

Removal of Traffic Signal System
Mandan, ND

CONDUCTOR		CABLE 1 (12-12)		CABLE 2 (12-12)		CABLE 3 (12-12)		CABLE 4 (12-12)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare		Spare		Spare
2	White		Neutral		Neutral		Neutral		Neutral
3	Red		Spare	3,4	Red	5,6	Red	1,2	Red
4	Green		Ground		Ground		Ground		Ground
5	Orange		Spare	3,4	Yellow	5,6	Yellow	1,2	Yellow
6	Blue		Spare	3,4	Green	5,6	Green	1,2	Green
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	Spare		Spare		Spare		Spare
9	Green	Black	P4	Walk	P2	Walk		Spare	Spare
10	Orange	Black	P4	Don't Walk	P2	Don't Walk		Spare	Spare
11	Blue	Black	P5	Walk	P3	Walk	P6	Walk	P1
12	Black	White	P5	Don't Walk	P3	Don't Walk	P6	Don't Walk	P1



All Ped. Heads (12" Lenses)

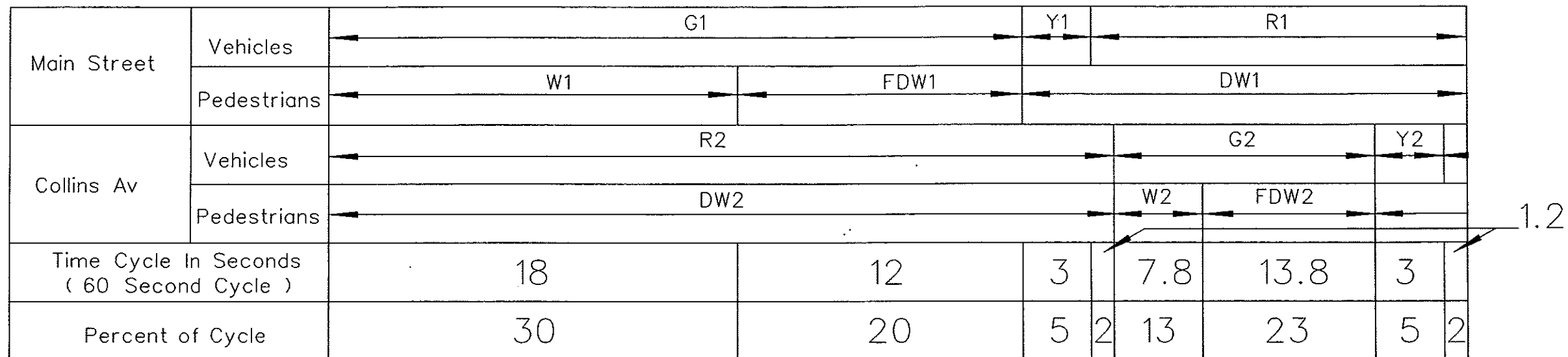


ESTIMATED 1993 ADT

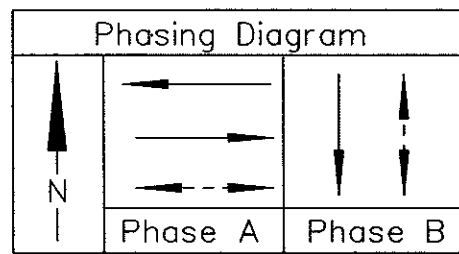
EMERGENCY VEHICLE PRE-EMPTION PHASING		
→	←	↓
EASTBOUND	WESTBOUND	SOUTHBOUND
PHASE A	PHASE A	PHASE B

TRAFFIC SIGNALS
 Conductors, Signal Heads,
 and Traffic Volumes
 Collins Avenue
 Mandan, ND

INTERME1 11-IMU



ALL DIALS



CAM BREAKOUT CHART																		
INTERNAL	CAM POSITION	CAMS													DIAL		SETTINGS	
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	W2	DW2	FDW1	FDW2	Sec.	%	Setting
I	1	X	X	X					X	X						18	30	30
II	2			X					X				X	X		12	20	50
III	3				X				X		X	X				3	5	55
IV	4					X			X		X	X				1.2	2	57
V	5					X	X			X	X					7.8	13	70
VI	6					X	X			X				X		13.8	23	93
VII	7					X		X		X		X				3	5	98
VIII	8					X			X		X	X				1.2	2	00
I	9	X	X	X					X	X			X			18	30	30
II	10			X					X				X	X		12	20	50
III	11				X				X		X	X				3	5	55
IV	12					X			X		X	X				1.2	2	57
V	13					X	X			X	X					7.8	13	70
VI	14					X	X			X				X		13.8	23	93
VII	15					X		X		X		X				3	5	98
VIII	16					X			X		X	X				1.2	2	00

Note: The suggested initial setting shown for pre-timed signals shall be trial settings. Frequent checks and studies of the signals in operation shall be made by the owner to obtain the most efficient timing schedules.

Dial settings shall be in effect as follows:

- Dial 1- 6:00 AM to 11:00 AM
- Dial 2- 11:00 AM to 7:00 PM
- Dial 3- 7:00 PM to 2:00 AM

During low volume hours such as 2 AM to 6 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW Main Street FLASHING RED Collins Av

G-Green W-Walk X-Cam Broken Out
 Y-Yellow DW-Don't Walk *-Interlock (Green) Key
 R-Red FDW-Flashing Don't Walk

TRAFFIC SIGNALS
 Controller Settings
 Collins Avenue
 Mandan, ND
 TIMEC II-IMU

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
141+42-52' Lt to 140+90-52' Lt to 140+72-33.5' Lt	77'	2"	83'	Cable 1
140+65-33.5' Lt to 140+72-33.5' Lt	6'	2"	12' 51'	Cable 2 12-2 Conductor (B) Detector Cable (C)
140+72-33.5' Lt to 140+72-32' Rt to 139+97-32' Rt	140'	2 1/2"	141' 141' 187'	Cable 1 Cable 2 12-2 Conductor (B) Detector Cable (C)
141+47-32' Rt to 139+97-32' Rt	149'	2"	155'	Cable 3
140+87-32' Rt to 139+97-32' Rt	89'	2"	95' 93'	Cable 4 12-2 Conductor (B) Detector Cable (C)
139+97-32' Rt to 139+97-39' Rt	6'	3 1/2"	16' 16' 16'	Cable 1 Cable 2 Cable 3 Cable 4
			48' 48'	(3) 12-2 Conductor (B) (3) Detector Cable (C)
140+78-193' Lt to 140+78- 41' Lt to 140+72-33.5' Lt to 140+72- 32' Rt to 139+97- 32' Rt to 139+97- 39' Rt	306'	2"	656' 328'	(2) No. 6 RHW (1) No. 6 THW
139+00-32' Rt to 139+97-32' Rt to 139+97-39' Rt	102'	2"	113'	Interconnect Cable
137+03-39' Rt to 136+98-32' Rt to 139+97-32' Rt to 139+97-39' Rt	Existing	2"	333'	Detector Cable (C)
141+67-233' Lt to 140+85-233' Lt to 140+85- 51' Lt to 140+72-33.5' Lt to 140+72- 32' Rt to 139+97- 32' Rt to 139+97- 39' Rt	430' 198'	2" 1"	443' 211'	Detector Cable (C) Detector Cable (C)

STATION	QUANTITIES																					
	Concrete Foundation-Traffic Sig.	Pull Box	1" Diameter Rigid Conduit	2" Diameter Rigid Conduit	2 1/2" Diameter Rigid Conduit	3 1/2" Diameter Rigid Conduit	Underground Conductor No. 6-Type RHW	Underground Conductor No. 6-Type THW	No. 12 AWG 3 Conductor Cable	No. 12 AWG 5 Conductor Cable	No. 12 AWG 12 Conductor Cable	Type IV Signal Std. 24 Ft Mast Arm	Combo 26 Ft Mast Arm Sig. & Light Std.-Type A	Combo 18 Ft Mast Arm Sig. & Light Std.-Type A	1-Way 3 Sec. Head W/12in. Lenses Mast Arm Mounted	1-Way 3 Sec. Head W/12in. Lenses Post Mounted	1-Way 2 Sec. Head Ped. Signal Post Mounted	Pretime Controller W/Fire Pre-Emption	Remove Traffic Signal System	Interconnect Cable	Emergency Veh. Pre-Emption Unit	Type I Signal Standard
	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA
139+97-39' Rt	1																	1			1	1
139+97-32' Rt		1																				
140+65-33.5' Rt	1									[24]	[64]		1		1	1	2					
140+72-33.5' Lt		1																				
140+87-32' Rt	1									[12]	[62]	1			1	1	1					
141+42-52' Lt	1									[24]							2					
141+47-32' Rt	1													1	1	1	1					
140+85-233' Lt		1																				
Var. Locations			198	1159	140	6	656	328			691								1	113		
TOTAL	5	3	198	1159	140	6	656	328	72	182	691	1	1	1	3	3	6	1	1	113	1	1

NOTE: [] indicates quantities used for internal wiring.

NOTE: The internal wiring in the signal standard for emergency vehicle pre-emption is included in the emergency vehicle indicator light conductor and emergency vehicle detector cable quantities.

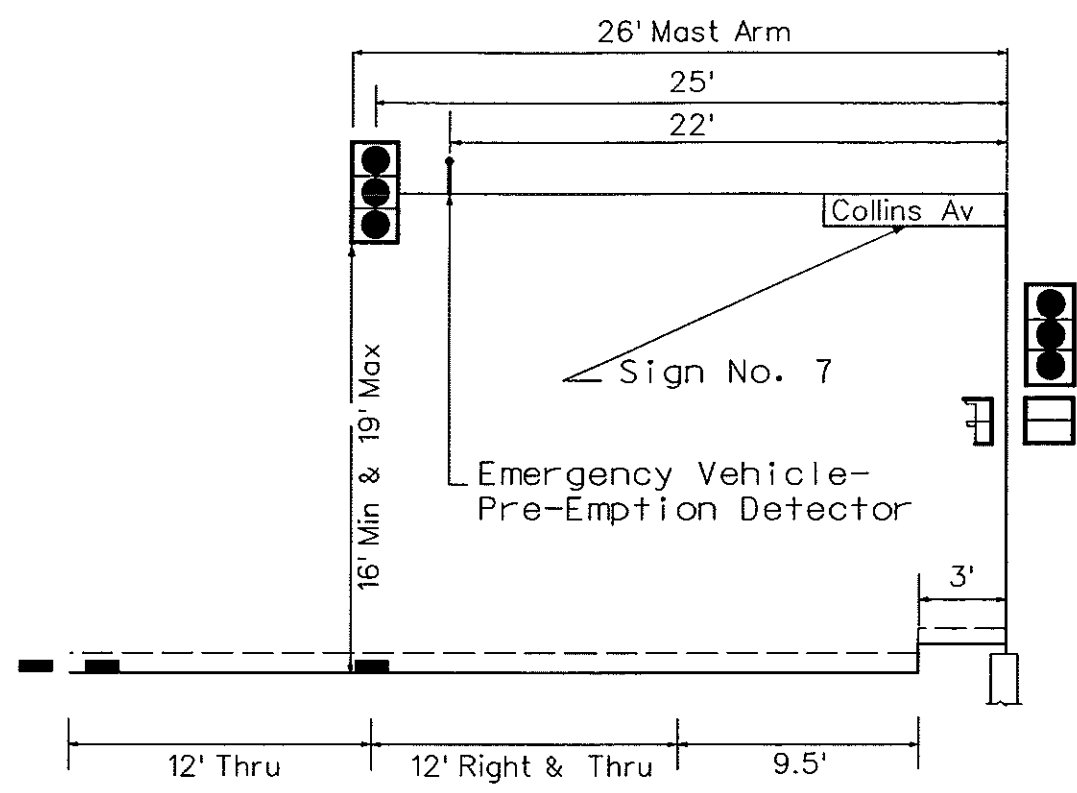
(B) Emergency Vehicle Indicator Light Conductor

(C) Emergency Vehicle Detector Cable

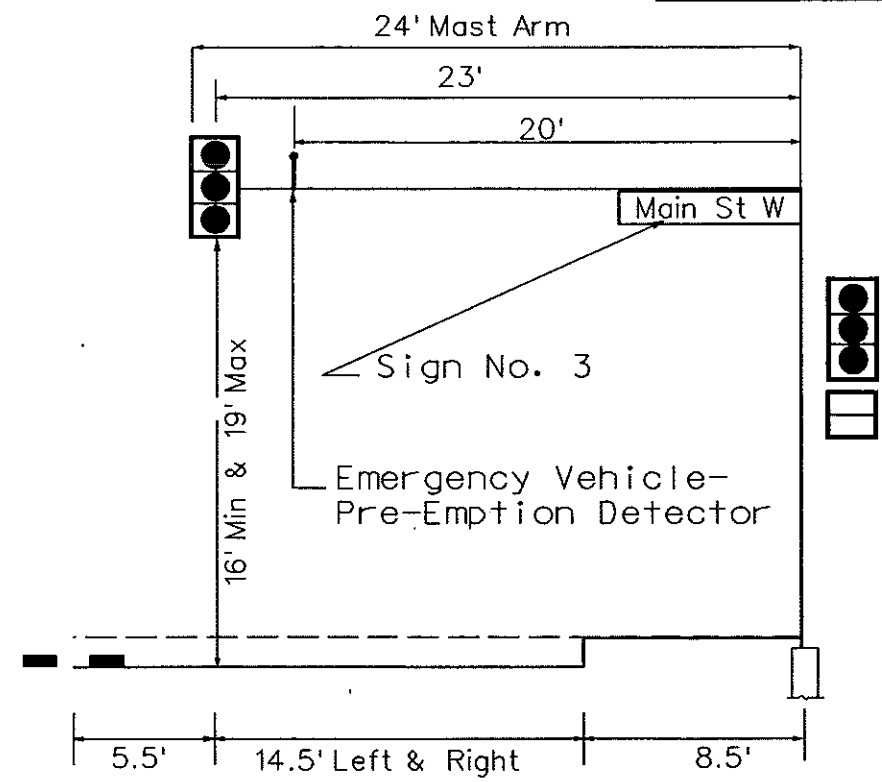
TRAFFIC SIGNALS

Summary of Quantities
Collins Avenue
Mandan, ND

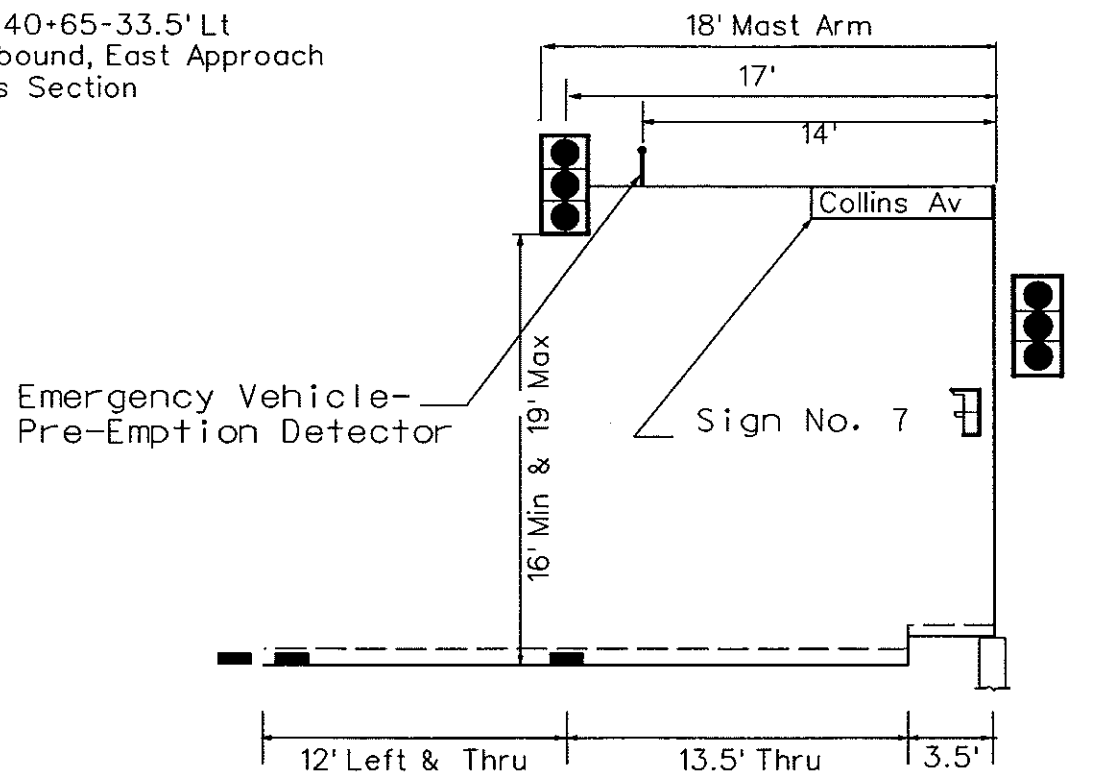
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	284



Sta 140+65-33.5' Lt
Westbound, East Approach
Cross Section



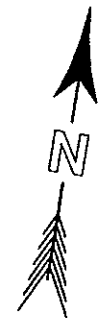
Sta 140+87-32' Rt
Southbound, North Approach
Cross Section



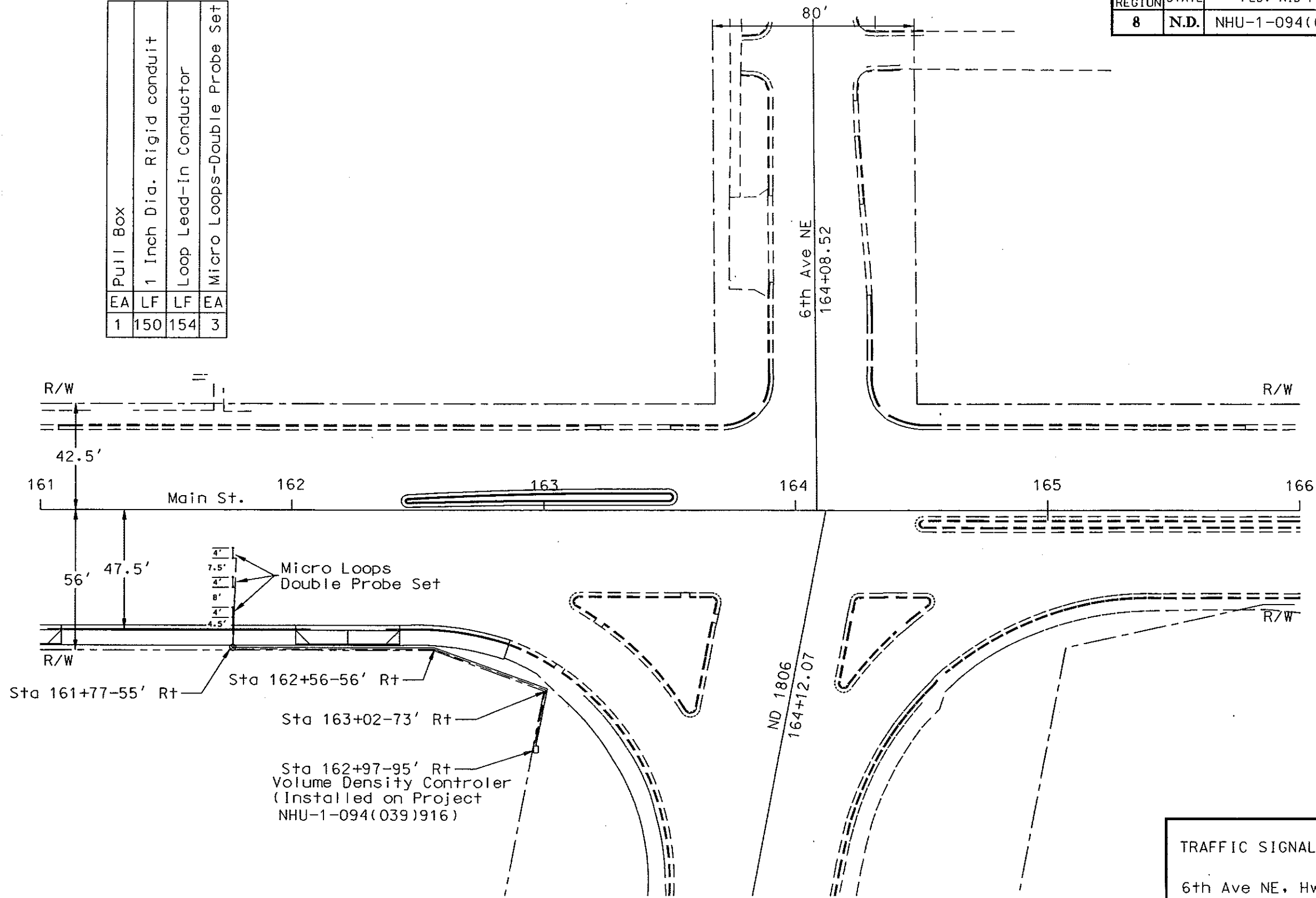
Sta 141+47-32' Rt
Eastbound, West Approach
Cross Section

TRAFFIC SIGNALS
Detail Sheet
Collins Avenue
Mandan, ND
BOB/MANDAN/DETAIL4 II-IMU

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	285



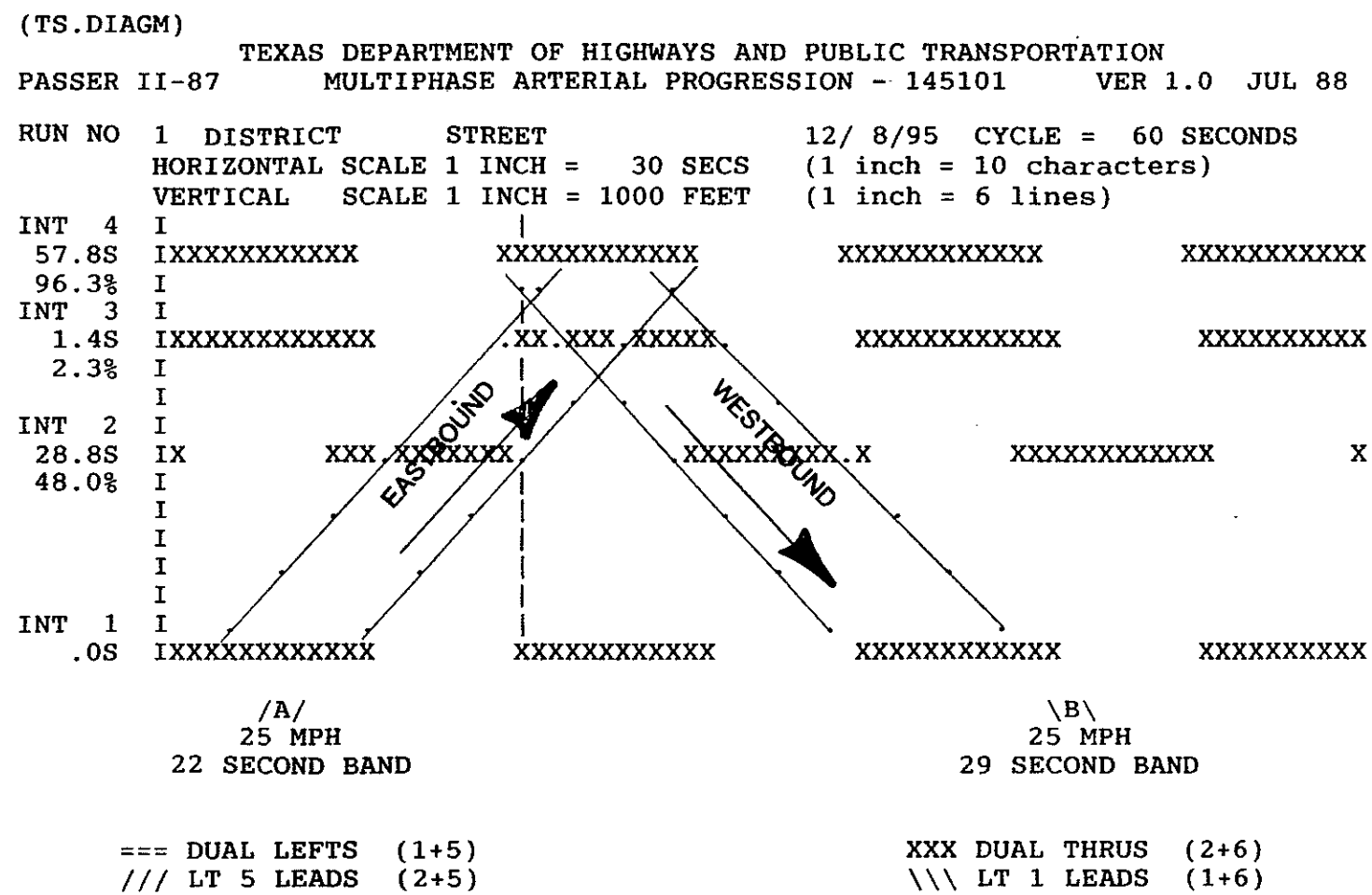
Pull Box	1 Inch Dia. Rigid conduit	Loop Lead-in Conductor	Micro Loops--Double Probe Set
EA	LF	LF	EA
1	150	154	3



TRAFFIC SIGNALS
 6th Ave NE, Hwy 1806
 Main St
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	286

INTERSECTION	CROSSROAD
1	6th Av NW
2	3rd Av NW
3	1st Av NW
4	Collins Av



TRAFFIC SIGNALS

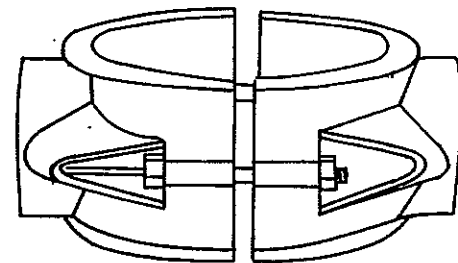
Coordination System
 Main Street
 Mandan, ND

808/MANDAN/PROGRES 11-40MJ

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	267

NOTE: A Pole Plate with Suitable banding material as approved by the Engineer in the field may be substituted for the pole clamps on round poles.

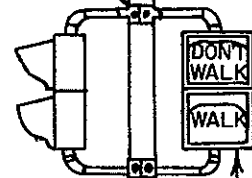
Light Std.
(Galvanized)



DETAIL "A"

ORNAMENTAL POLE CLAMP WITH TWO HUBS

See Detail "A"



8' ±

12' Shall be Painted*

Existing Curb Face

ELEVATION VIEW

Pedestrian Signal Heads Mounted on Light Standard.

Light Std.
(Galvanized)

See Detail "A"



12' Shall be Painted*

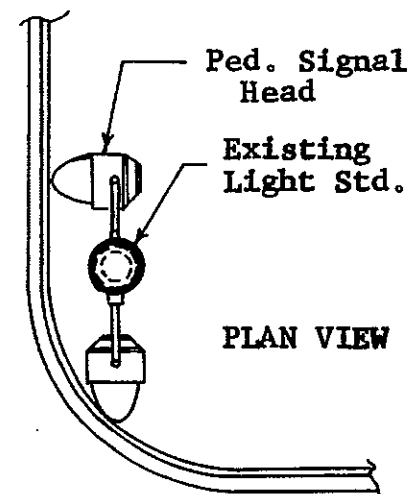
8' ±

Existing Curb Face

ELEVATION VIEW

Pedestrian Signal Heads Mounted on Light Standard

*Where pedestrian signal heads are mounted on light standards the base shall be painted and the lower 12' of the light standard shall be painted. Painting shall be done in accordance with Standard Specification TT-E-489, the latest revision. Not a separate pay item, cost to be included in the price bid for 1-way 2 section head pedestrian signal - post mounted.

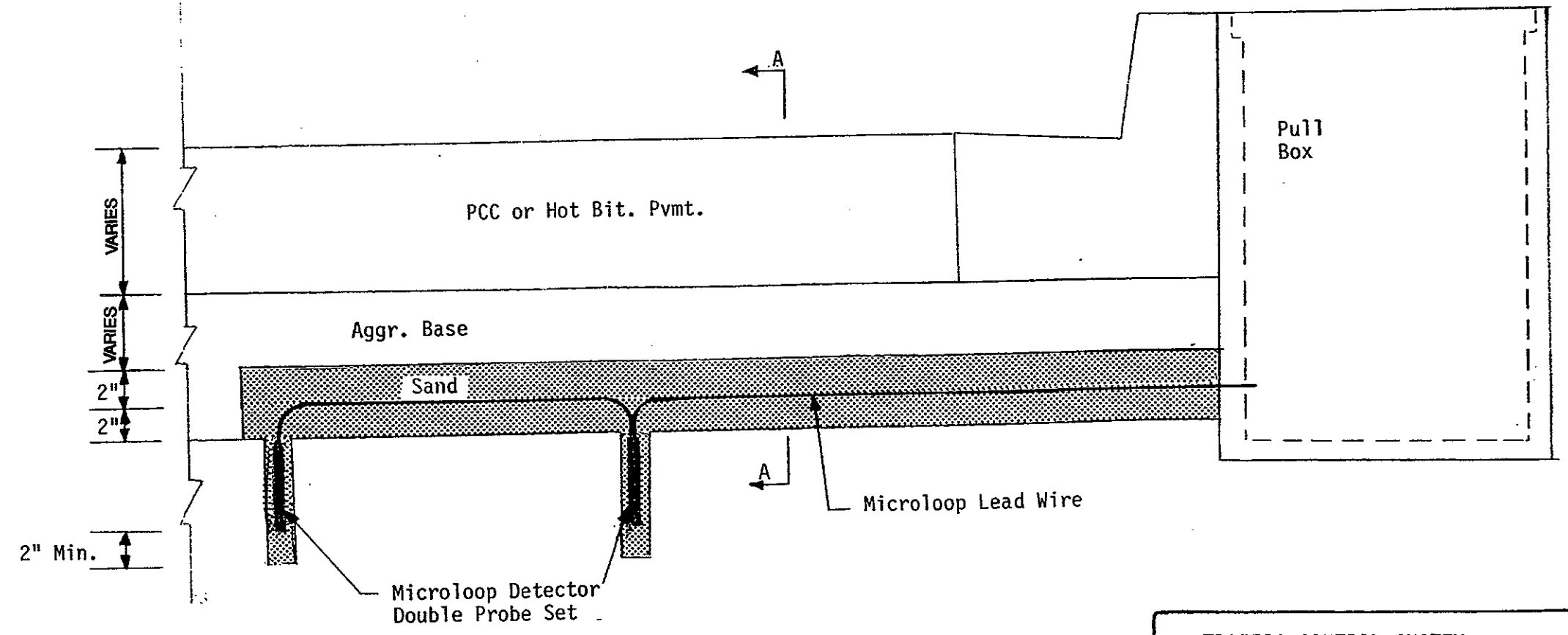
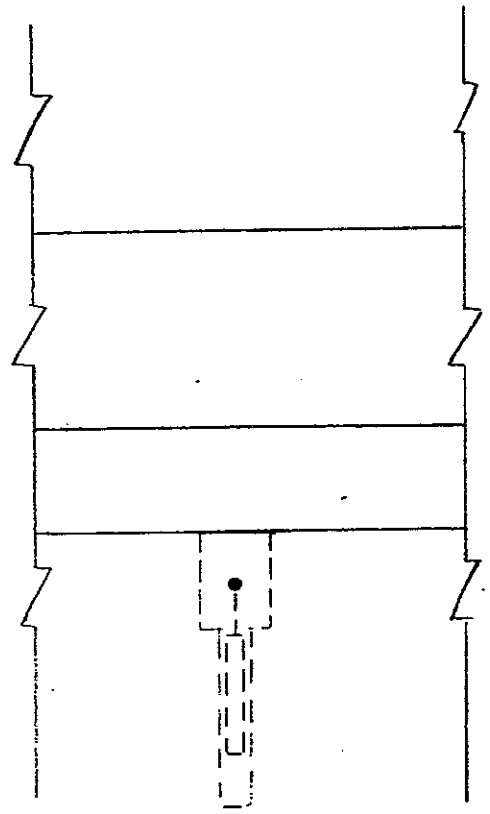
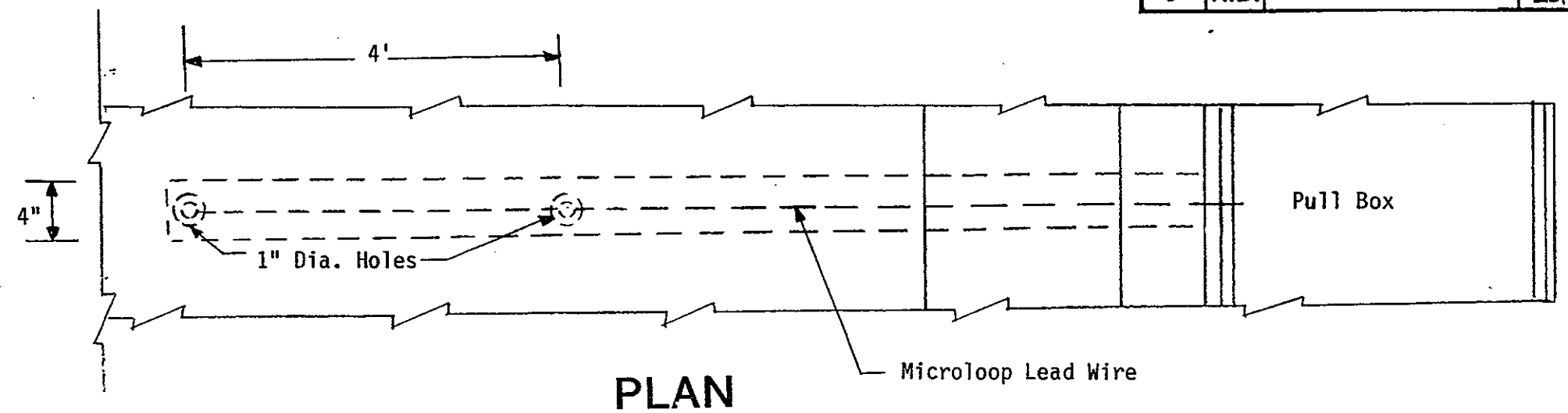


PLAN VIEW

TRAFFIC CONTROL SYSTEM
Pedestrian Heads Mounted On
Light Standard
DETAILS

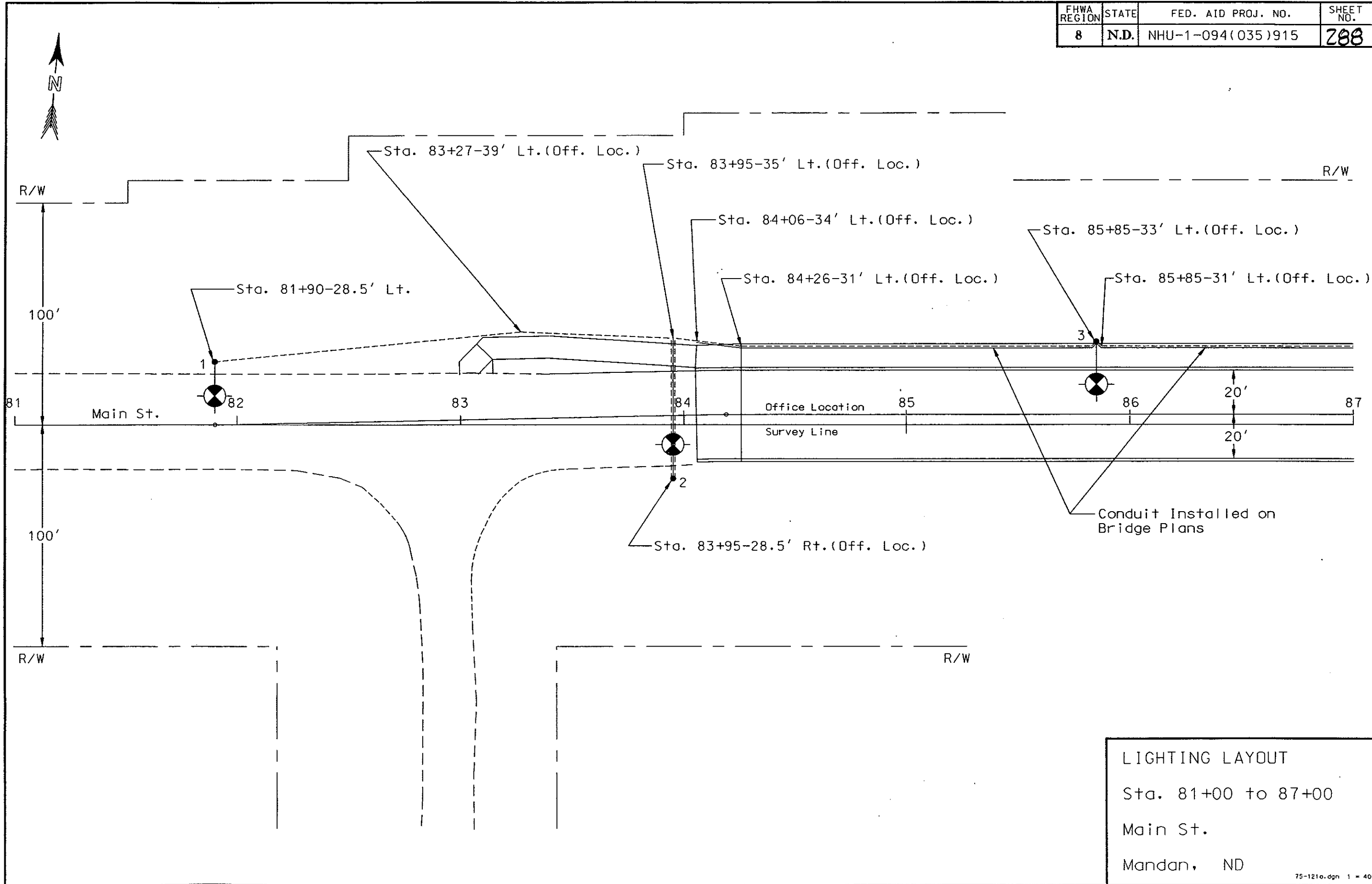
FHWA REGION	STATE	FED AID PROJ NO	SHEET NO.
8	N.D.	NHU-1-094(035)915	287A

Note: After the installation and compaction of the aggregate base, the contractor shall trench a 4" trench and drill the 1" diameter holes. The microloop detectors shall be installed, embedded in the sand as shown. The aggregate base shall be recompacted to the density of the surrounding material and the microloops shall be tested for functional operational capacities prior to the PCC or Hot. Bit. Pavement placement.



TRAFFIC CONTROL SYSTEM
Microloop Detector Details

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	288



LIGHTING LAYOUT
 Sta. 81+00 to 87+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
81+90-28.5' Lt. to 83+27-39' Lt. to 83+95-35' Lt. to 83+95-28.5' Rt.	63'	2"	136' 68'	277'	3 No. 6 USE
83+95-28.5' Rt. to 83+95-35' Lt. to 84+06-34' Lt. to 84+26-31' Lt. to 85+85-31' Lt. to 85+85-33' Lt.	20' 159' 2'	2" 2"(A) 2"(A)	11'	264'	3 No. 6 USE
85+85-33' Lt. to 85+85-31' Lt. to 87+00-31' Lt.	2' 115'	2"(A) 2"(A)		121'	3 No. 6 USE

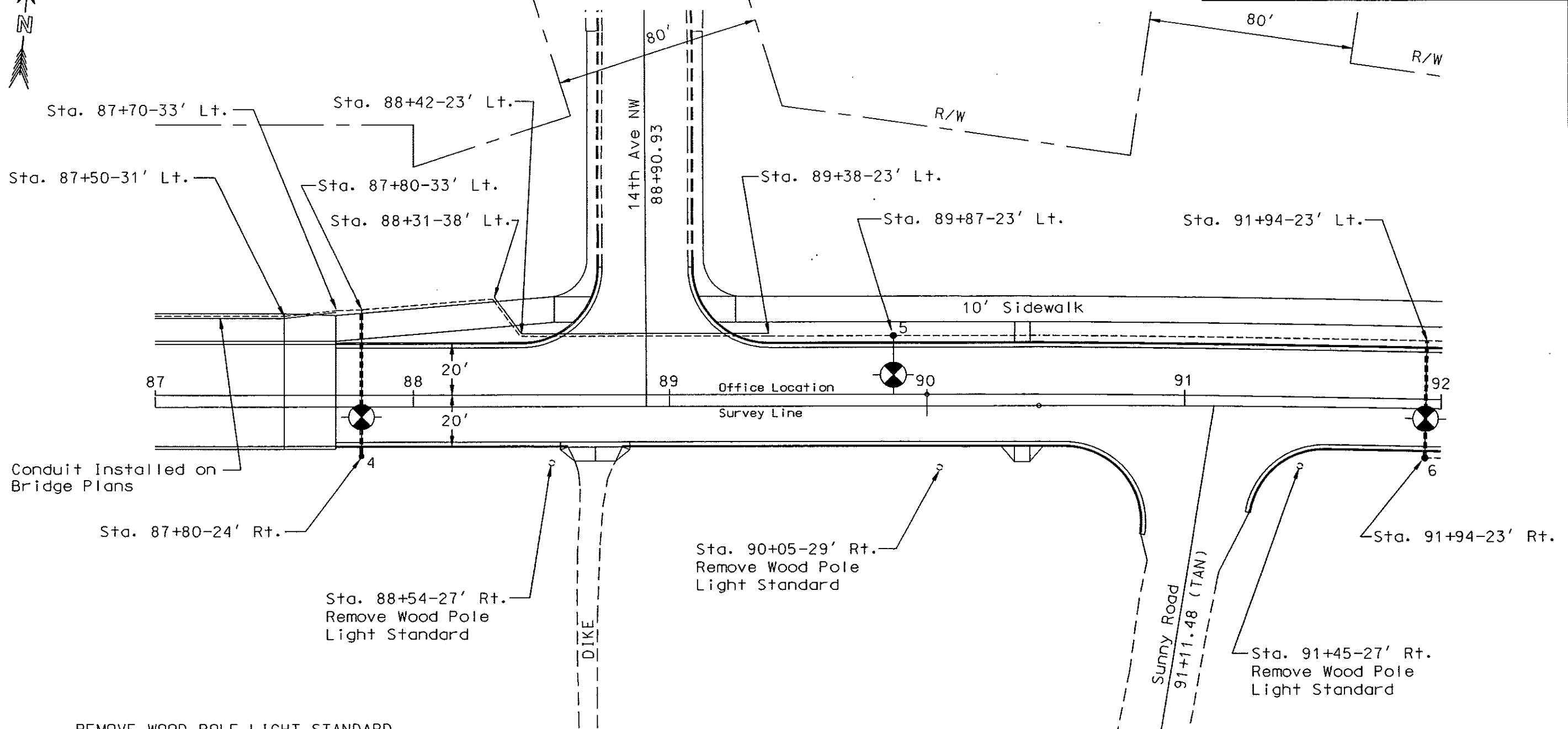
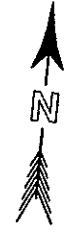
QUANTITIES										
Concrete Foundation - Highway Lighting	Cable Trench - Type II	2" Dia. Rigid Conduit	Multiple Underground Cable 3 - No. 6 Style USE	Light Standard 6 Foot M.A. 42 Foot Pole - Breakaway	Light Standard 10 Foot M.A. 40 Foot Mounting Height	H.P. Sodium Vapor Luminaire 150 Watt				
EA	LF	LF	LF	EA	EA	EA				
2	215	83	662	2	1	3				

(A) Conduit Installed on Bridge Plans

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
1	81+90	28.5' Lt.	150	A1	MSC-II	42 Ft.	6 Ft.
2	83+95	28.5' Rt.	150	A1	MSC-II	42 Ft.	6 Ft.
3	85+85	33' Lt.	150	A1	MSC-II	40 Ft.	10 Ft.

LIGHTING QUANTITIES
Sta. 81+00 to 87+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	290



Conduit Installed on Bridge Plans

REMOVE WOOD POLE LIGHT STANDARD	
Sta. 88+54-27' Rt.	1 Ea.
Sta. 90+05-29' Rt.	1 Ea.
Sta. 91+45-27' Rt.	1 Ea.
Total	3 Ea.

Note: All stationing from office location.

LIGHTING LAYOUT
 Sta. 87+00 to 92+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
87+00-31' Lt. to 87+50-31' Lt. to 87+70-33' Lt. to 87+80-33' Lt. to 87+80-24' Rt.	50' 20'	2" (A) 2"	10'	141'	3 No. 6 USE
87+80-24' Rt. to 87+80-33' Lt. to 88+31-38' Lt. to 88+42-23' Lt. to 89+38-23' Lt. to 89+87-23' Lt.	56'	2"	51'	280'	3 No. 6 USE
89+87-23' Lt. to 91+94-23' Lt. to 91+94-23' Rt.	19' 96'	2" 2"	48'	261'	3 No. 6 USE
91+94-23' Rt. to 91+94-23' Lt. to 92+00-23' Lt.	45'	2"	206'	56'	3 No. 6 USE
91+94-23' Rt. to 92+00-23' Rt.			6'	10'	3 No. 6 USE

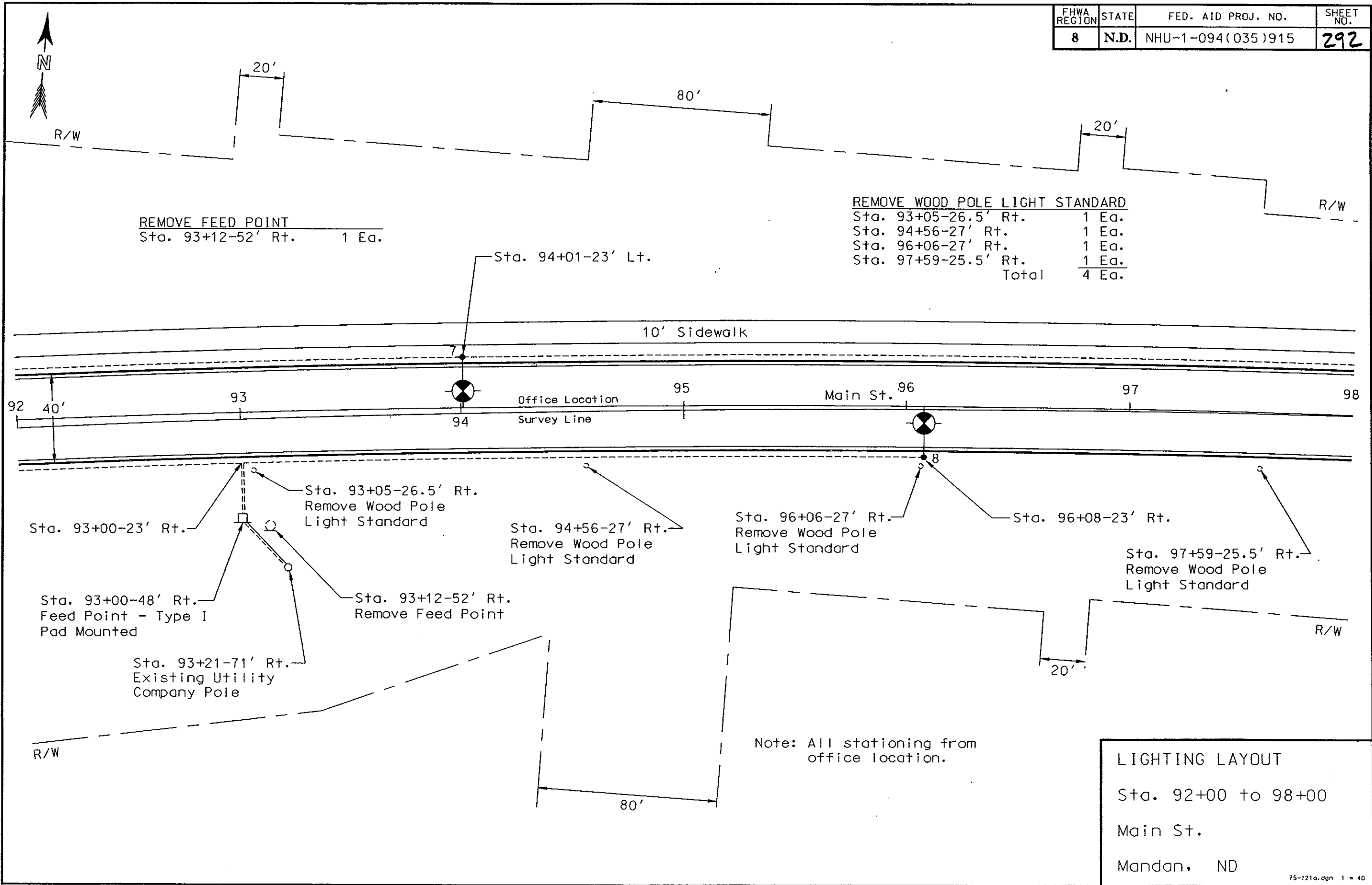
QUANTITIES										
Concrete Foundation - Highway Lighting	Cable Trench - Type II	2" Dia. Rigid Conduit	Multiple Underground Cable 3 - No. 6 Style USE	Light Standard 6 Foot M.A. 40 Foot Mounting Height	H.P. Sodium Vapor Luminaire 150 Watt	Remove Wood Pole Light Standard				
EA	LF	LF	LF	EA	EA	EA				
3	326	236	748	3	3	3				

(A) Conduit Installed on Bridge Plans

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
4	87+80	24' Rt.	150	A1	MSC-II	40 Ft.	6 Ft.
5	89+87	23' Lt.	150	A1	MSC-II	40 Ft.	6 Ft.
6	91+94	23' Rt.	150	A1	MSC-II	40 Ft.	6 Ft.

LIGHTING QUANTITIES
Sta. 87+00 to 92+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	292



STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
92+00-23' Rt. to 93+00-23' Rt. to 93+00-48' Rt.			100' 24'	135'	3 No. 6 USE
93+00-48' Rt. to 93+00-23' Rt. to 96+08-23' Rt.			305'	345'	3 No. 6 USE
92+00-23' Lt. to 94+01-23' Lt.			200'	205'	3 No. 6 USE
94+01-23' Lt. to 98+00-23' Lt.			398'	403'	3 No. 6 USE
93+21-71' Rt. to 93+00-48' Rt.	55' (C)	2"		210'	(3) No. 8 RHW

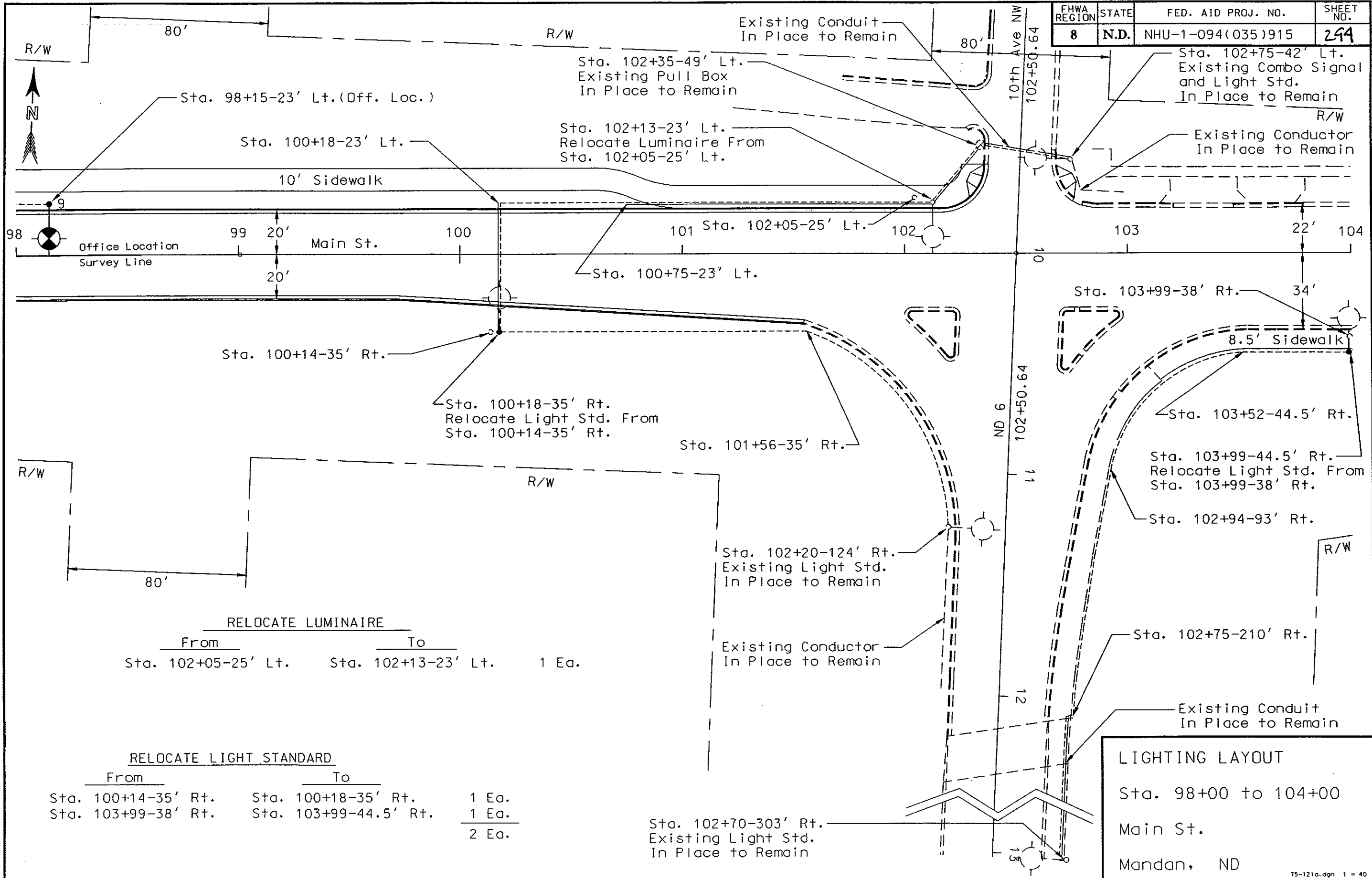
QUANTITIES											
Concrete Foundation - Highway Lighting	Concrete Foundation - Feed Point - Type B	Cable Trench - Type II	2" Dia. Rigid Conduit	Underground Conductor No. 8 RHW	Multiple Underground Cable 3 - No. 6 Style USE	Feed Point - Type I - Pad Mounted	Light Standard 6 Foot M.A. 40 Foot Mounting Height	H.P. Sodium Vapor Luminaire 150 Watt	Remove Feed Point	Remove Wood Pole Light Standard	
EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	
2	1	1027	55	210	1088	1	2	2	1	4	

(C) 25 feet of this length is pole mounted conduit.

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
7	94+01	23' Lt.	150	A1	MSC-II	40 Ft.	6 Ft.
8	96+08	23' Rt.	150	A1	MSC-II	40 Ft.	6 Ft.

LIGHTING QUANTITIES
Sta. 92+00 to 98+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	294



RELOCATE LUMINAIRE

From	To	
Sta. 102+05-25' Lt.	Sta. 102+13-23' Lt.	1 Ea.

RELOCATE LIGHT STANDARD

From	To	
Sta. 100+14-35' Rt.	Sta. 100+18-35' Rt.	1 Ea.
Sta. 103+99-38' Rt.	Sta. 103+99-44.5' Rt.	1 Ea.
		2 Ea.

LIGHTING LAYOUT

Sta. 98+00 to 104+00
Main St.
Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
98+00-23' Lt. to 98+15-23' Lt.			14'	19'	3 No. 6 USE
100+18-35' Rt. to 101+56-35' Rt. to 102+20-124' Rt.			137' 109'	524' 262'	(2) No. 6 RHW (1) No. 6 THW
102+70-303' Rt. to 102+75-210' Rt. to 102+94-93' Rt. to 103+52-44.5' Rt. to 103+99-44.5' Rt.	92'	2"(B)	119' 77' 46'	694' 347'	(2) No. 6 RHW (1) No. 6 THW
103+99-44.5' Rt. to 104+00-44.5' Rt.				16' 8'	(2) No. 6 RHW (1) No. 6 THW
100+18-35' Rt. to 100+18-23' Lt. to 100+75-23' Lt. to 102+13-23' Lt.	57' 137'	2" 2"	57'	522' 261'	(2) No. 6 RHW (1) No. 6 THW
102+13-23' Lt. to 102+35-49' Lt. to 102+75-42' Lt.	33' 40'	2" 2"(B)		166' 83'	(2) No. 6 RHW (1) No. 6 THW

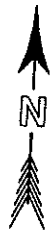
QUANTITIES											
Concrete Foundation - Highway Lighting	Cable Trench - Type I	Cable Trench - Type II	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Multiple Underground Cable 3 - No. 6 Style USE	Light Standard 6 Foot M.A. 40 Foot Mounting Height	H.P. Sodium Vapor Luminaire 150 Watt	Relocate Light Standard	Relocate Luminaire	
EA	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	
3	549	14	223	1922	961	19	1	1	2	1	

(B) Existing Conduit

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
9	98+15	23' Lt.	150	A1	MSC-II	40 Ft.	6 Ft.

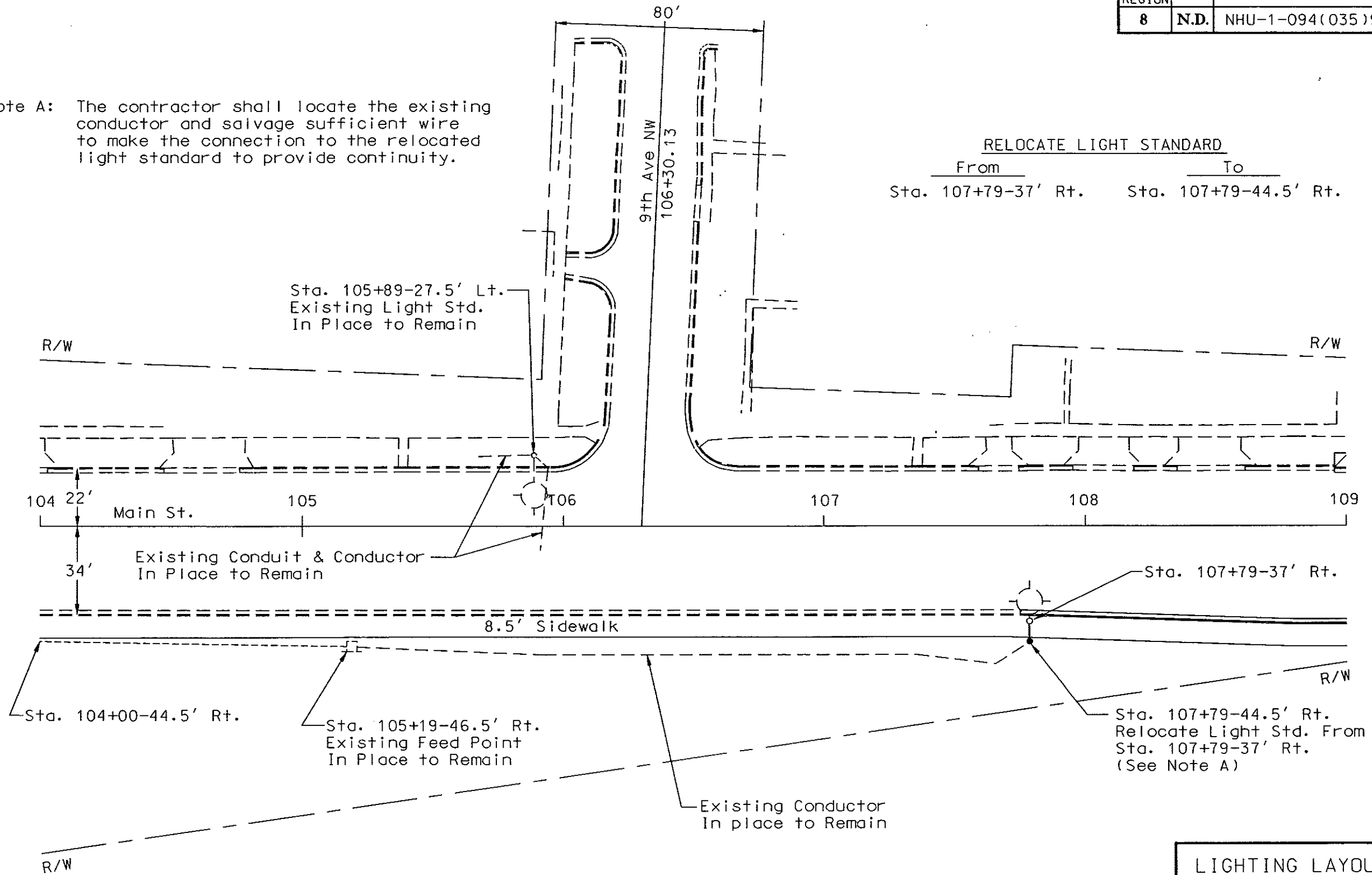
LIGHTING QUANTITIES
Sta. 98+00 to 104+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	296



Note A: The contractor shall locate the existing conductor and salvage sufficient wire to make the connection to the relocated light standard to provide continuity.

RELOCATE LIGHT STANDARD
 From _____ To _____
 Sta. 107+79-37' Rt. Sta. 107+79-44.5' Rt. 1 Ea.



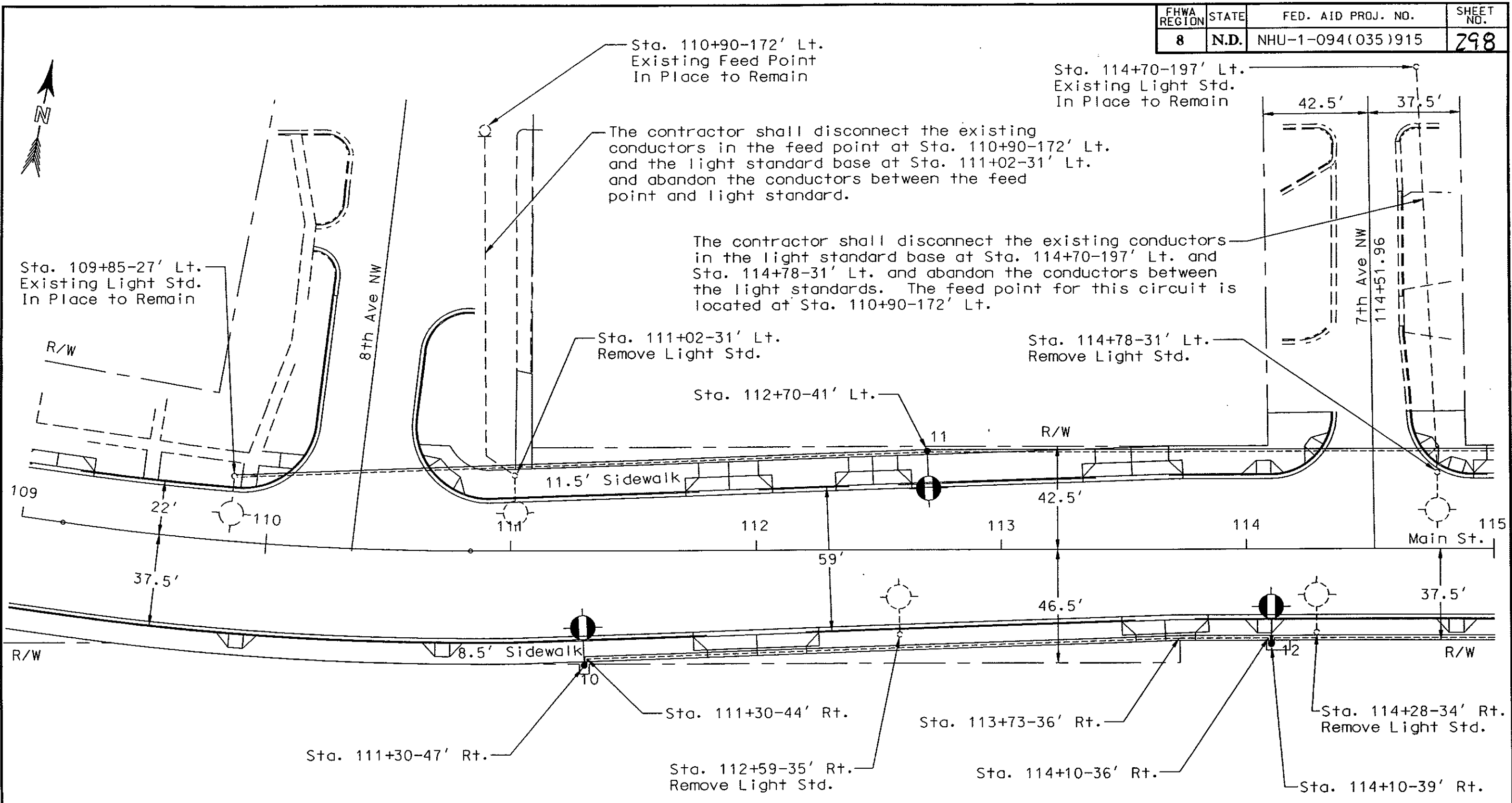
LIGHTING LAYOUT
 Sta. 104+00 to 109+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
104+00-44.5' Rt. to 105+19-46.5' Rt.			118'	258' 129'	(2) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting										
Cable Trench - Type I										
Underground Conductor No. 6 - Type RHW										
Underground Conductor No. 6 - Type THW										
Relocate Light Standard										
EA	LF	LF	LF	EA						
1	118	258	129	1						

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM

LIGHTING QUANTITIES
Sta. 104+00 to 109+00
Main St.
Mandan, ND



REMOVE LIGHT STANDARD	
Sta. 111+02-31' Lt.	1 Ea.
Sta. 112+59-35' Rt.	1 Ea.
Sta. 114+28-34' Rt.	1 Ea.
Sta. 114+78-31' Lt.	1 Ea.
Total	4 Ea.

LIGHTING LAYOUT
 Sta. 109+00 to 115+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
109+85-27' Lt. to 112+70-41' Lt.	283'	2"		586' 293'	(2) No. 6 RHW (1) No. 6 THW
112+70-41' Lt. to 115+00-41' Lt.	229'	2"		702' 234'	(3) No. 4 RHW (1) No. 6 THW
111+30-47' Rt. to 111+30-44' Rt. to 113+73-36' Rt. to 114+10-36' Rt. to 114+10-39' Rt.	2' 243' 37' 2'	2" 2" 2" 2"		882' 294'	(3) No. 4 RHW (1) No. 6 THW
114+10-39' Rt. to 114+10-36' Rt. to 115+00-36' Rt.	2' 90'	2" 2"		291' 97'	(3) No. 4 RHW (1) No. 6 THW

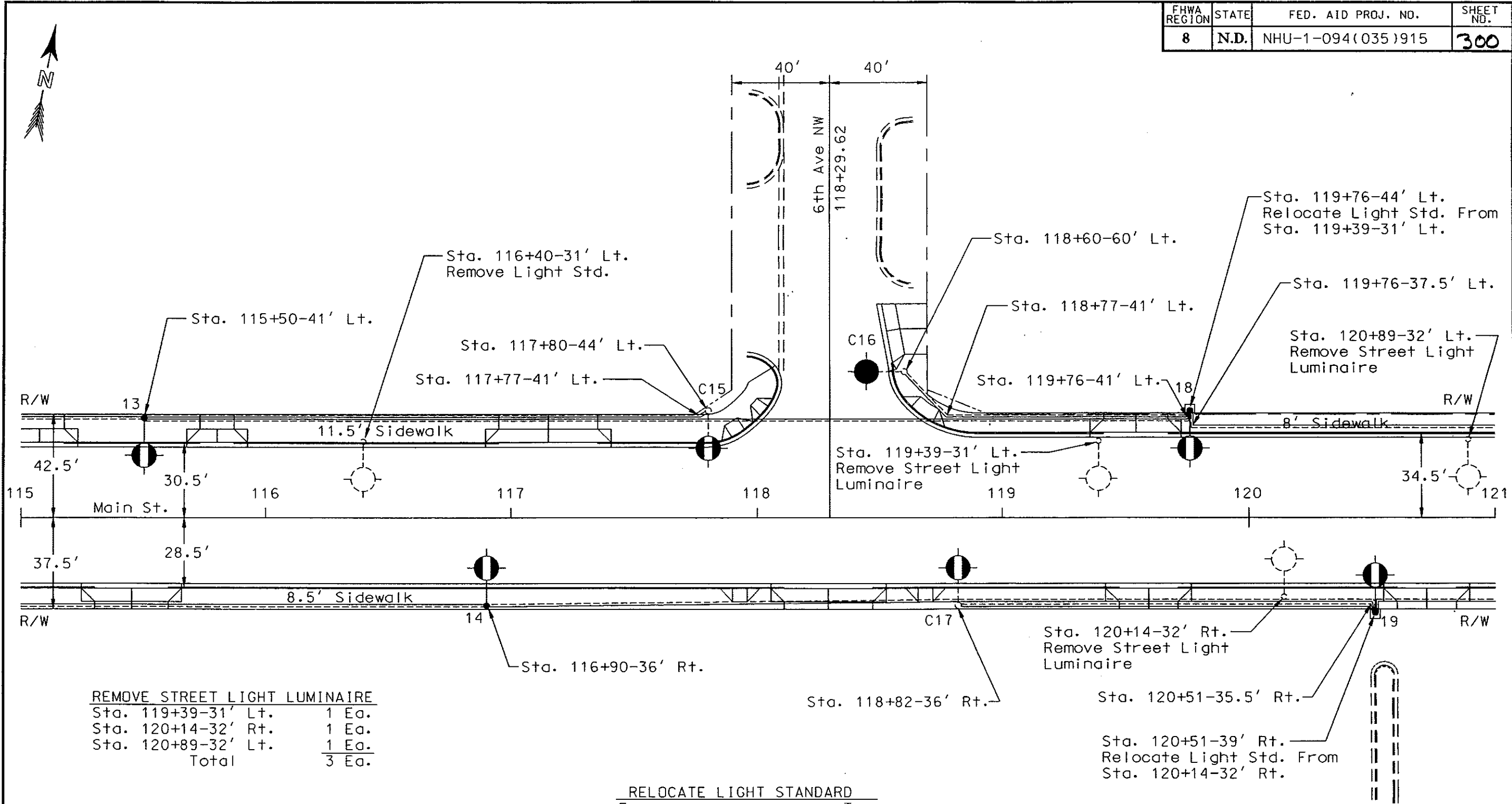
QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Light Standard 10 Foot M.A. 40 Foot Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire 200 Watt	Remove Light Standard			
EA	LF	LF	LF	LF	EA	EA	EA			
3	888	1250	586	918	3	3	4			

City Funds		625
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
(B)	109+85	27' Lt.	(B)	B1	(B)	(B)	(B)
10	111+30	47' Rt.	200	B2	MSC-III	40 Ft. (A)	10 Ft.
11	112+70	41' Lt.	200	B1	MSC-III	40 Ft. (A)	10 Ft.
12	114+10	39' Rt.	200	B2	MSC-III	40 Ft. (A)	10 Ft.

(A) Festoon
(B) Existing Light Std.

LIGHTING QUANTITIES
Sta. 109+00 to 115+00
Main St.
Mandan, ND



REMOVE STREET LIGHT LUMINAIRE	
Sta. 119+39-31' Lt.	1 Ea.
Sta. 120+14-32' Rt.	1 Ea.
Sta. 120+89-32' Lt.	1 Ea.
Total	3 Ea.

RELOCATE LIGHT STANDARD		
From	To	
Sta. 119+39-31' Lt.	Sta. 119+76-44' Lt.	1 Ea.
Sta. 120+14-32' Rt.	Sta. 120+51-39' Rt.	1 Ea.
Total		2 Ea.

REMOVE LIGHT STANDARD	
Sta. 116+40-31' Lt.	1 Ea.

LIGHTING LAYOUT
 Sta. 115+00 to 121+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
115+00-36' Rt. to 116+90-36' Rt.	189'	2"		582' 194'	(3) No. 4 RHW (1) No. 6 THW
116+90-36' Rt. to 120+51-35.5' Rt. to 120+51-39' Rt.	360' 3'	2" 2"		1119' 373'	(3) No. 4 RHW (1) No. 6 THW
118+82-36' Rt. to 120+51-35.5' Rt. to 120+51-39' Rt.	168' 3'	2" 2"		362' 181'	(2) No. 6 RHW (1) No. 6 THW
120+51-39' Rt. to 120+51-35.5' Rt. to 121+00-35.5' Rt.	3' 49'	2" 2"		171' 57'	(3) No. 4 RHW (1) No. 6 THW
115+00-41' Lt. to 115+50-41' Lt.	49'	2"		162' 54'	(3) No. 4 RHW (1) No. 6 THW
115+50-41' Lt. to 117+77-41' Lt. to 117+80-44' Lt.	226' 3'	2" 2"		478' 239'	(2) No. 6 RHW (1) No. 6 THW
115+50-41' Lt. to 119+76-41' Lt. to 119+76-44' Lt.	425' 2'	2" 2"		1311' 437'	(3) No. 4 RHW (1) No. 6 THW
118+60-60' Lt. to 118+77-41' Lt. to 119+76-41' Lt. to 119+76-44' Lt.	24' 99' 2'	2" 2" 2"		270' 135'	(2) No. 6 RHW (1) No. 6 THW
119+76-44' Lt. to 119+76-37.5' Lt. to 121+00-37.5' Lt.	6' 124'	2" 2"		405' 135'	(3) No. 4 RHW (1) No. 6 THW

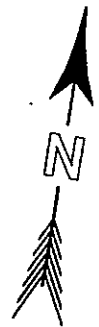
QUANTITIES											
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Light Standard 6 Foot M.A. 40 Foot Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire 200 Watt	H.P. Sodium Vapor Luminaire 250 Watt	Relocate Light Standard	Remove Light Standard	Remove Street Light Luminaire	
EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	
4	1735	2500	1110	1805	2	6	1	2	1	3	
City Funds		1250									

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
13	115+50	41' Lt.	200	B1	MSC-III	40 Ft. (A)	6 Ft.
14	116+90	36' Rt.	200	B2	MSC-III	40 Ft. (A)	6 Ft.
C15	117+80	44' Lt.	200	B1	MSC-III	Combo	6 Ft.
C16	118+60	60' Lt.	250	B1	MSC-II	Combo	6 Ft.
C17	118+82	36' Rt.	200	B2	MSC-III	Combo	6 Ft.
18	119+76	44' Lt.	200	B1	MSC-III	(C)	(C)
19	120+51	39' Rt.	200	B2	MSC-III	(C)	(C)

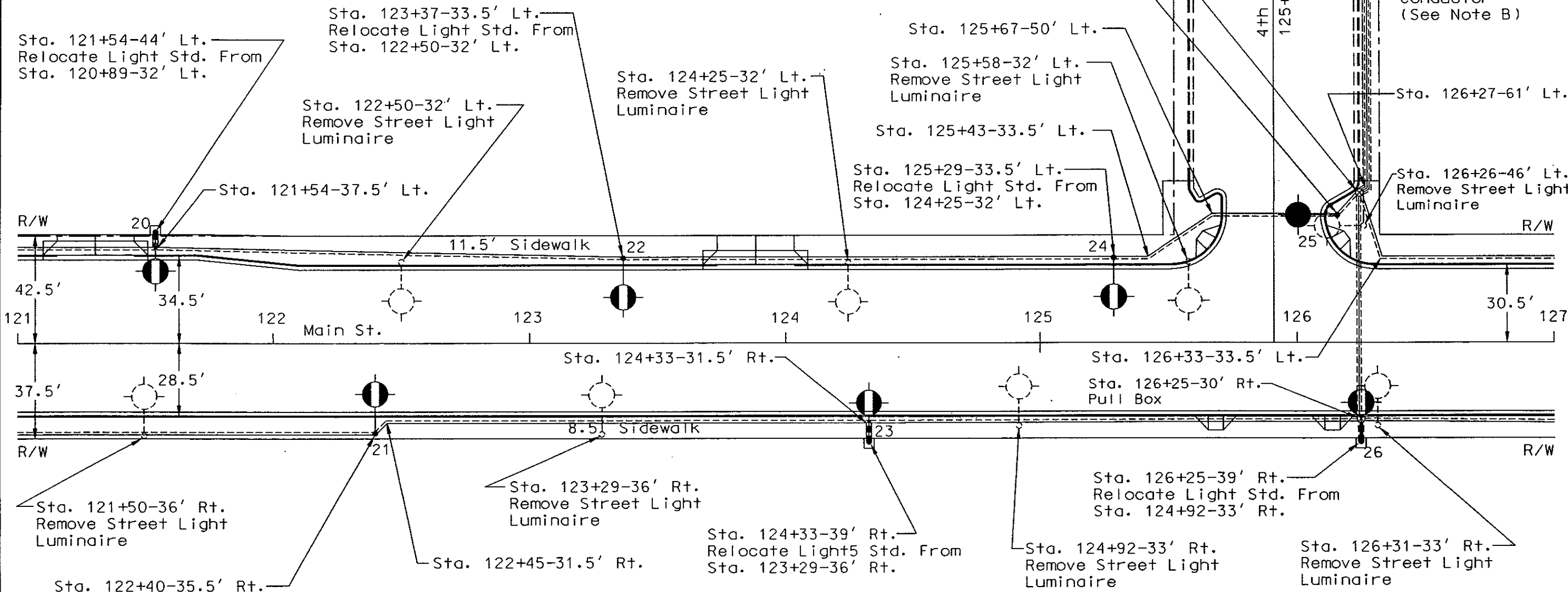
(A) Festoon
(C) Relocated Light Std.

LIGHTING QUANTITIES
Sta. 115+00 to 121+00
Main St.
Mandan, ND

Note B: The contractor shall disconnect the existing conductors in the light standard base at Sta. 126+26-196' Lt. and Sta. 126+26-46' Lt. and abandon the conductors between the light standards. The feed point for this circuit is located on the south side of 1st Street NW between 5th Av. NW and 4th Av. NW.



PULL BOX		
Sta. 126+25-59' Lt.	1 Ea.	
Sta. 126+25-30' Rt.	1 Ea.	
Total	2 Ea.	



Sta. 122+40-35.5' Rt.
Relocate Light Std. From
Sta. 121+50-36' Rt.

RELOCATE LIGHT STANDARD			
From	To		
Sta. 120+89-32' Lt.	Sta. 121+54-44' Lt.	1 Ea.	
Sta. 121+50-36' Rt.	Sta. 122+40-35.5' Rt.	1 Ea.	
Sta. 122+50-32' Lt.	Sta. 123+37-33.5' Lt.	1 Ea.	
Sta. 123+29-36' Rt.	Sta. 124+33-39' Rt.	1 Ea.	
Sta. 124+25-32' Lt.	Sta. 125+29-33.5' Lt.	1 Ea.	
Sta. 126+26-46' Lt.	Sta. 126+16-50' Lt.	1 Ea.	
Sta. 124+92-33' Rt.	Sta. 126+25-39' Rt.	1 Ea.	
Total		7 Ea.	

REMOVE STREET LIGHT LUMINAIRE		
Sta. 121+50-36' Rt.	1 Ea.	
Sta. 122+50-32' Lt.	1 Ea.	
Sta. 123+29-36' Rt.	1 Ea.	
Sta. 124+25-32' Lt.	1 Ea.	
Sta. 124+92-33' Rt.	1 Ea.	
Sta. 125+58-32' Lt.	1 Ea.	
Sta. 126+26-46' Lt.	1 Ea.	
Sta. 126+31-33' Rt.	1 Ea.	
Total	8 Ea.	

LIGHTING LAYOUT
Sta. 121+00 to 127+00
Main St.
Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
121+00-35.5' Rt. to 122+40-35.5' Rt.	139'	2"		432' 144'	(3) No. 4 RHW (1) No. 6 THW
122+40-35.5' Rt. to 122+45-31.5' Rt. to 124+33-31.5' Rt. 124+33-39' Rt.	5' 188' 7'	2" 2" 2"		630' 210'	(3) No. 4 RHW (1) No. 6 THW
124+33-39' Rt. to 124+33-31.5' Rt. to 126+25-30' Rt.	7' 192'	2" 2"		612' 204'	(3) No. 4 RHW (1) No. 6 THW
126+25-30' Rt. to 126+25-39' Rt.	8'	2"		78' 26'	(6) No. 6 RHW (2) No. 6 THW
126+25-30' Rt. to 127+00-31.5' Rt.	75'	2"		225' 75'	(3) No. 6 RHW (1) No. 6 THW
126+25-30' Rt. to 126+25-59' Lt.	88'	2"		267' 267' 178'	(3) No. 4 RHW (3) No. 6 RHW (2) No. 6 THW
121+00-37.5' Lt. to 121+54-37.5' Lt. to 121+54-44' Lt.	54' 6'	2" 2"		195' 65'	(3) No. 4 RHW (1) No. 6 THW
121+54-44' Lt. to 121+54-37.5' Lt. to 123+37-33.5' Lt.	6' 182'	2" 2"		594' 198'	(3) No. 4 RHW (1) No. 6 THW
123+37-33.5' Lt. to 125+29-33.5' Lt.	190'	2"		600' 200'	(3) No. 4 RHW (1) No. 6 THW
125+29-33.5' Lt. to 125+43-33.5' Lt. to 125+67-50' Lt. to 126+16-50' Lt.	13' 29' 48'	2" 2" 2"		300' 100'	(3) No. 4 RHW (1) No. 6 THW
126+16-50' Lt. to 126+25-59' Lt.	12'	2"		51' 17'	(3) No. 4 RHW (1) No. 6 THW
126+25-59' Lt. to 126+27-61' Lt. to 126+27-191' Lt. to 126+58-191' Lt.	3' 130' 30'	3" 3" 3"		1566' 522' 696'	(9) No. 4 RHW (3) No. 6 RHW (4) No. 6 THW
126+58-191' Lt.	30'	2"(A)		120'	(3) No. 8 RHW
126+25-59' Lt. to 126+33-33.5' Lt. to 127+00-33.5' Lt.	27' 67'	2" 2"		282' 94'	(3) No. 4 RHW (1) No. 6 THW

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
20	121+54	44' Lt.	200	B1	MSC-III	(C)	(C)
21	122+40	35.5' Rt.	200	B2	MSC-III	(C)	(C)
22	123+37	33.5' Lt.	200	B1	MSC-II	(C)	(C)
23	124+33	39' Rt.	200	B2	MSC-III	(C)	(C)
24	125+29	33.5' Lt.	200	B1	MSC-II	(C)	(C)
25	126+16	50' Lt.	250	B1	MSC-II	(C)	(C)
26	126+25	39' Rt.	200	B4	MSC-III	(C)	(C)

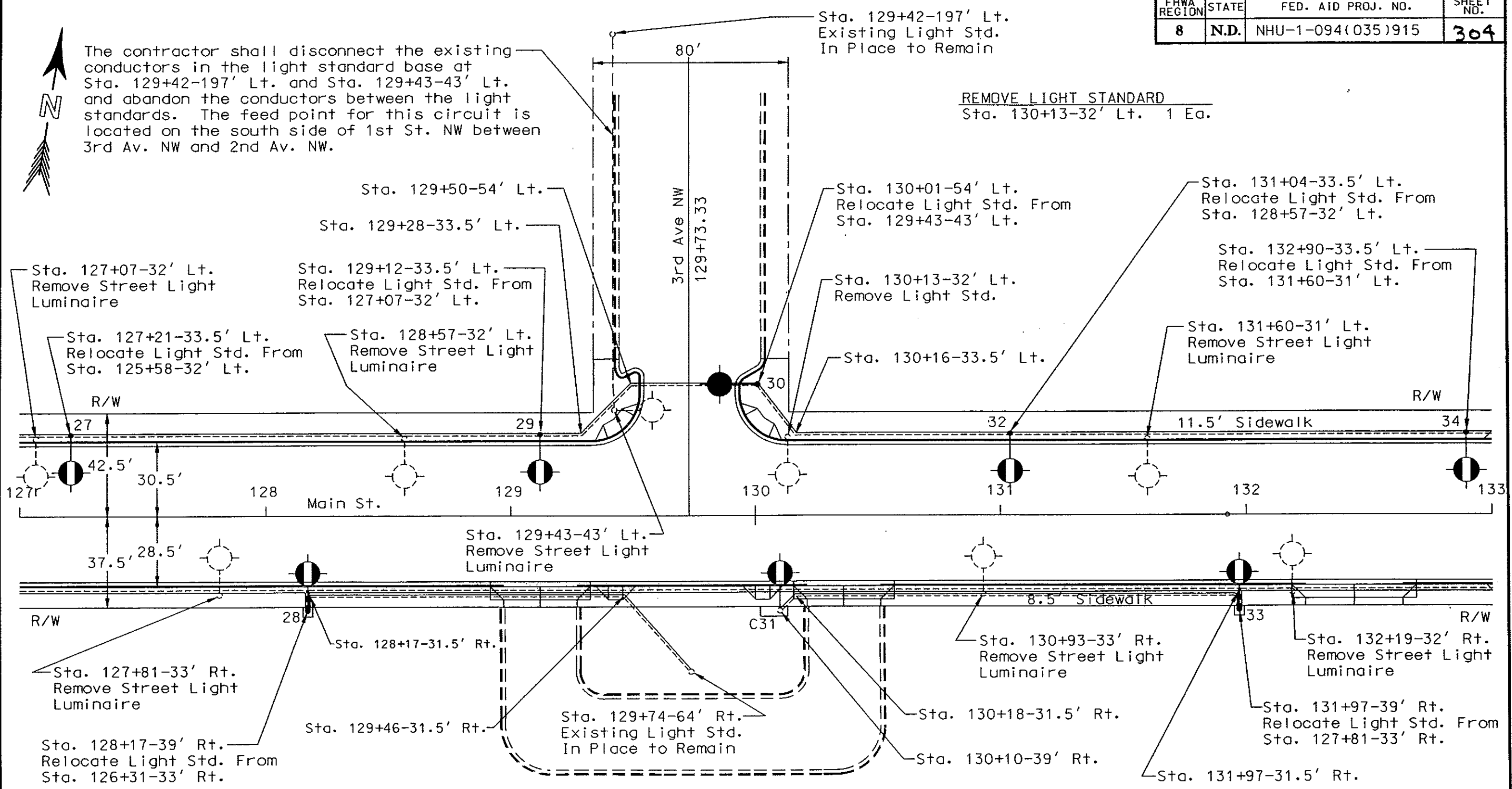
QUANTITIES												
Concrete Foundation - Highway Lighting	Pull Box	2" Dia. Rigid Conduit	3" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 8 - Type RHW	Underground Conductor No. 6 - Type THW	H.P. Sodium Vapor Luminaire 200 Watt	H.P. Sodium Vapor Luminaire 250 Watt	Relocate Light Standard	Remove Street Light Luminaire	Feed Point - Type IV - Pole Mounted
EA	EA	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA
7	2	1373	163	3686	728	120	2207	6	1	7	8	1
City Funds				1843	364							

(A) Pole Mounted Conduit
(C) Relocated Light Std.

LIGHTING QUANTITIES
Sta. 121+00 to 127+00
Main St.
Mandan, ND



The contractor shall disconnect the existing conductors in the light standard base at Sta. 129+42-197' Lt. and Sta. 129+43-43' Lt. and abandon the conductors between the light standards. The feed point for this circuit is located on the south side of 1st St. NW between 3rd Av. NW and 2nd Av. NW.



RELOCATE LIGHT STANDARD			
From		To	
Sta. 125+58-32'	Lt.	Sta. 127+21-33.5'	Lt. 1 Ea.
Sta. 126+31-33'	Rt.	Sta. 128+17-39'	Rt. 1 Ea.
Sta. 127+07-32'	Lt.	Sta. 129+12-33.5'	Lt. 1 Ea.
Sta. 128+57-32'	Lt.	Sta. 131+04-33.5'	Lt. 1 Ea.
Sta. 127+81-33'	Rt.	Sta. 131+97-39'	Rt. 1 Ea.
Sta. 129+43-43'	Lt.	Sta. 130+01-54'	Lt. 1 Ea.
Sta. 131+60-31'	Lt.	Sta. 132+90-33.5'	Lt. 1 Ea.
Total			7 Ea.

REMOVE STREET LIGHT LUMINAIRE	
Sta. 127+07-32'	Lt. 1 Ea.
Sta. 127+81-33'	Rt. 1 Ea.
Sta. 128+57-32'	Lt. 1 Ea.
Sta. 129+43-43'	Lt. 1 Ea.
Sta. 130+93-33'	Rt. 1 Ea.
Sta. 131+60-31'	Lt. 1 Ea.
Sta. 132+19+32'	Rt. 1 Ea.
Total	
7 Ea.	

LIGHTING LAYOUT
 Sta. 127+00 to 133+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
127+00-31.5' Rt. to 128+17-31.5' Rt. to 128+17-39' Rt.	117' 7'	2" 2"		387' 129'	(3) No. 6 RHW (1) No. 6 THW
128+17-39' Rt. to 128+17-31.5' Rt. to 129+46-31.5' Rt. to 129+74-64' Rt.	7' 129' 42'	2" 2" 2"		376' 188'	(2) No. 6 RHW (1) No. 6 THW
128+17-39' Rt. to 128+17-31.5' Rt. to 131+97-31.5' Rt. to 131+97-39' Rt.	7' 380' 7'	2" 2" 2"		1212' 404'	(3) No. 6 RHW (1) No. 6 THW
130+10-39' Rt. to 130+18-31.5' Rt. to 131+97-31.5' Rt. to 131+97-39' Rt.	10' 179' 7'	2" 2" 2"		412' 206'	(2) No. 6 RHW (1) No. 6 THW
131+97-39' Rt. to 131+97-31.5' Rt. to 133+00-31.5' Rt.	7' 103'	2" 2"		345' 115'	(3) No. 6 RHW (1) No. 6 THW
127+00-33.5' Lt. to 127+21-33.5' Lt.	20'	2"		75' 25'	(3) No. 4 RHW (1) No. 6 THW
127+21-33.5' Lt. to 129+12-33.5' Lt.	189'	2"		597' 199'	(3) No. 4 RHW (1) No. 6 THW
129+12-33.5' Lt. to 129+28-33.5' Lt. to 129+50-54' Lt. to 130+01-54' Lt.	15' 30' 50'	2" 2" 2"		315' 105'	(3) No. 6 RHW (1) No. 6 THW
130+01-54' Lt. to 130+16-33.5' Lt. to 131+04-33.5' Lt.	24' 87'	2" 2"		363' 121'	(3) No. 6 RHW (1) No. 6 THW
131+04-33.5' Lt. to 132+90-33.5' Lt.	184'	2"		582' 194'	(3) No. 6 RHW (1) No. 6 THW
132+90-33.5' Lt. to 133+00-33.5' Lt.	9'	2"		42' 14'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	H.P. Sodium Vapor Luminaire 200 watt	H.P. Sodium Vapor Luminaire 250 watt	Relocate Light Standard	Remove Street Light Luminaire	Remove Light Standard	
EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	
7	1610	448	2952	1700	7	1	7	7	1	

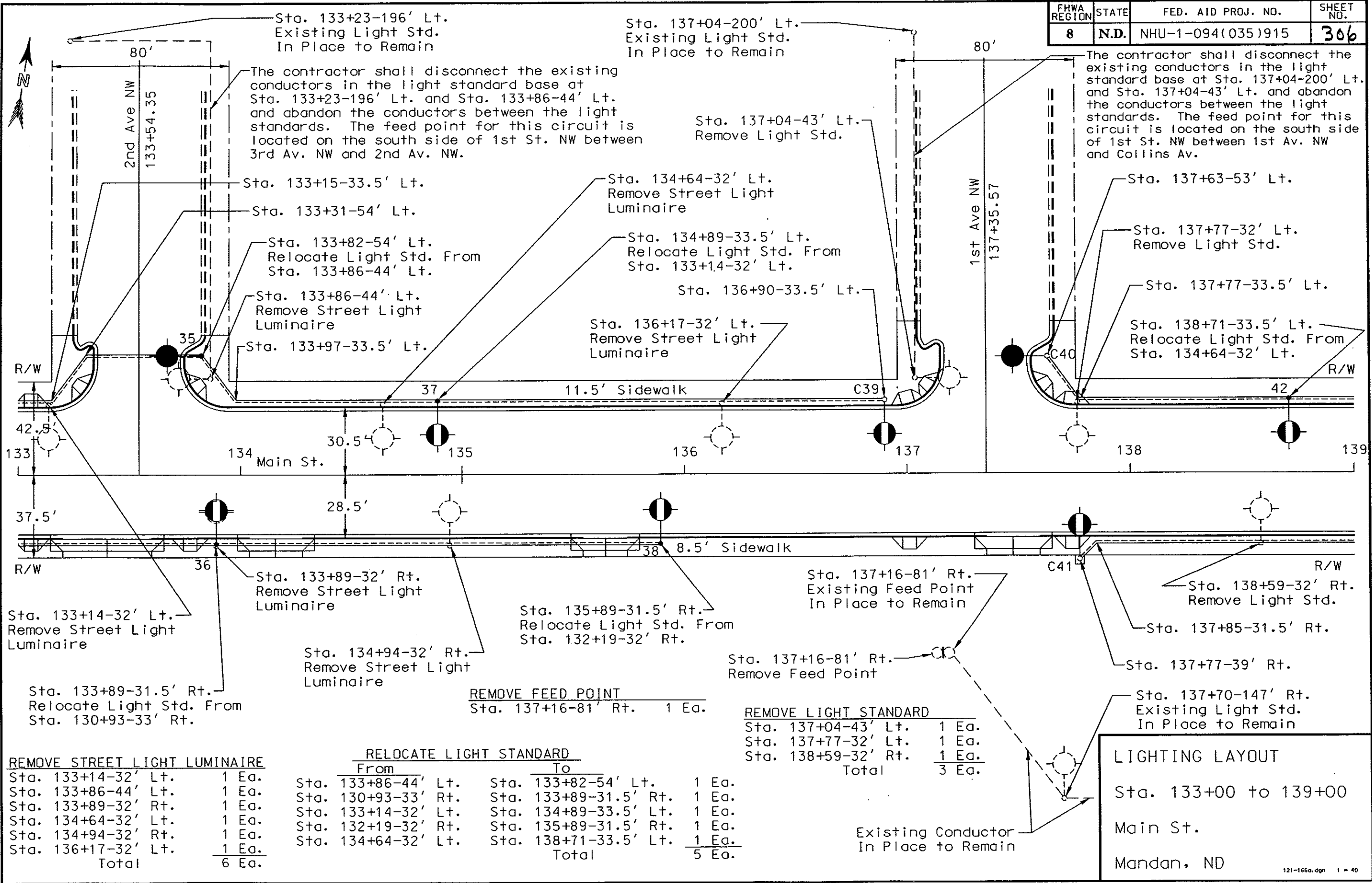
City Funds		224	1082
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
27	127+21	33.5' Lt.	200	B3	MSC-II	(C)	(C)
28	128+17	39' Rt.	200	B4	MSC-III	(C)	(C)
29	129+12	33.5' Lt.	200	B3	MSC-II	(C)	(C)
(B)	129+74	64' Rt.	(B)	B4	(B)	(B)	(B)
30	130+01	54' Lt.	250	B3	MSC-II	(C)	(C)
C31	130+10	39' Rt.	200	B4	MSC-III	Combo	6 Ft.
32	131+04	33.5' Lt.	200	B3	MSC-II	(C)	(C)
33	131+97	39' Rt.	200	B4	MSC-III	(C)	(C)
34	132+90	33.5' Lt.	200	B3	MSC-II	(C)	(C)

(B) Existing Light Std.
(C) Relocated Light Std.

LIGHTING QUANTITIES
Sta. 127+00 to 133+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	306



Sta. 133+23-196' Lt.
Existing Light Std.
In Place to Remain

The contractor shall disconnect the existing conductors in the light standard base at Sta. 133+23-196' Lt. and Sta. 133+86-44' Lt. and abandon the conductors between the light standards. The feed point for this circuit is located on the south side of 1st St. NW between 3rd Av. NW and 2nd Av. NW.

Sta. 137+04-200' Lt.
Existing Light Std.
In Place to Remain

The contractor shall disconnect the existing conductors in the light standard base at Sta. 137+04-200' Lt. and Sta. 137+04-43' Lt. and abandon the conductors between the light standards. The feed point for this circuit is located on the south side of 1st St. NW between 1st Av. NW and Collins Av.

REMOVE STREET LIGHT LUMINAIRE	
Sta. 133+14-32' Lt.	1 Ea.
Sta. 133+86-44' Lt.	1 Ea.
Sta. 133+89-32' Rt.	1 Ea.
Sta. 134+64-32' Lt.	1 Ea.
Sta. 134+94-32' Rt.	1 Ea.
Sta. 136+17-32' Lt.	1 Ea.
Total	6 Ea.

RELOCATE LIGHT STANDARD			
From	To		
Sta. 133+86-44' Lt.	Sta. 133+82-54' Lt.	1 Ea.	
Sta. 130+93-33' Rt.	Sta. 133+89-31.5' Rt.	1 Ea.	
Sta. 133+14-32' Lt.	Sta. 134+89-33.5' Lt.	1 Ea.	
Sta. 132+19-32' Rt.	Sta. 135+89-31.5' Rt.	1 Ea.	
Sta. 134+64-32' Lt.	Sta. 138+71-33.5' Lt.	1 Ea.	
Total		5 Ea.	

REMOVE LIGHT STANDARD	
Sta. 137+04-43' Lt.	1 Ea.
Sta. 137+77-32' Lt.	1 Ea.
Sta. 138+59-32' Rt.	1 Ea.
Total	3 Ea.

REMOVE FEED POINT
Sta. 137+16-81' Rt. 1 Ea.

LIGHTING LAYOUT
Sta. 133+00 to 139+00
Main St.
Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
133+00-31.5' Rt. to 133+89-31.5' Rt.	88'	2"		279' 93'	(3) No. 6 RHW (1) No. 6 THW
133+89-31.5' Rt. to 135+89-31.5' Rt.	198'	2"		624' 208'	(3) No. 6 RHW (1) No. 6 THW
137+77-39' Rt. to 137+85-31.5' Rt. to 139+00-31.5' Rt.	10' 115'	2" 2"		260' 130'	(2) No. 6 RHW (1) No. 6 THW
133+00-33.5' Lt. to 133+15-33.5' Lt. to 133+31-54' Lt. to 133+82-54' Lt.	15' 26' 50'	2" 2" 2"		288' 96'	(3) No. 6 RHW (1) No. 6 THW
133+82-54' Lt. to 133+97-33.5' Lt. to 134+89-33.5' Lt.	24' 91'	2" 2"		375' 125'	(3) No. 6 RHW (1) No. 6 THW
134+89-33.5' Lt. to 136+90-33.5' Lt.	199'	2"		418' 209'	(2) No. 6 RHW (1) No. 6 THW
137+63-53' Lt. to 137+77-33.5' Lt. to 138+71-33.5' Lt.	23' 93'	2" 2"		378' 126'	(3) No. 6 RHW (1) No. 6 THW
138+71-33.5' Lt. to 139+00-33.5' Lt.	28'	2"		99' 33'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	H.P. Sodium Vapor Luminaire 200 Watt	H.P. Sodium Vapor Luminaire 250 Watt	Relocate Light Standard	Remove Street Light Luminaire	Remove Light Standard	Remove Feed Point	
EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	
6	960	2040	1020	6	2	5	6	3	1	

City Funds		681
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
35	133+82	54' Lt.	250	B3	MSC-II	(C)	(C)
36	133+89	31.5' Rt.	200	B4	MSC-II	(C)	(C)
37	134+89	33.5' Lt.	200	B3	MSC-II	(C)	(C)
38	135+89	31.5' Rt.	200	B4	MSC-II	(C)	(C)
C39	136+90	33.5' Lt.	200	B3	MSC-II	Combo	6 Ft.
C40	137+63	53' Lt.	250	C1	MSC-II	Combo	6 Ft.
C41	137+77	39' Rt.	200	C2	MSC-III	Combo	6 Ft.
42	138+71	33.5' Lt.	200	C1	MSC-II	(C)	(C)

(C) Relocated Light Std.

LIGHTING QUANTITIES
Sta. 133+00 to 139+00
Main St.
Mandan, ND



Sta. 140+83-196' Lt.
Existing Light Std.
In Place to Remain

The contractor shall disconnect the existing conductors in the light standard base at Sta. 140+83-196' Lt. and Sta. 141+48-43' Lt. and abandon the conductors between the light standards. The feed point for this circuit is on the south side of 1st St. NW between 1st Av. NW and Collins Av.

Sta. 139+28-32' Lt.
Remove Street Light Luminaire

Sta. 140+91-52' Lt.

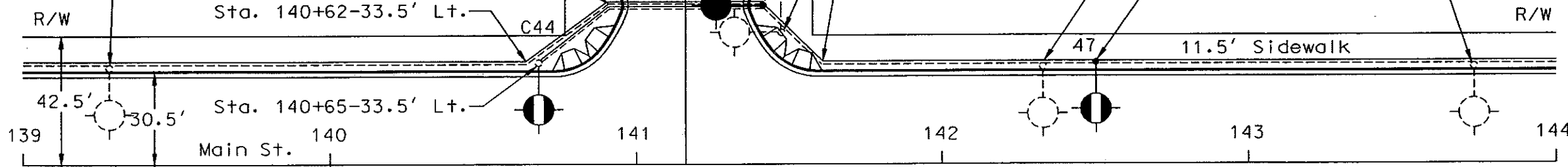
Sta. 141+42-52' Lt.
Relocate Light Std. From
Sta. 141+48-43' Lt.

Sta. 142+33-32' Lt.
Remove Light Std.

Sta. 141+48-43' Lt.
Remove Street Light Luminaire

Sta. 142+49-33.5' Lt.
Relocate Light Std. From
Sta. 136+17-32' Lt.

Sta. 143+73-32' Lt.
Remove Light Std.



Sta. 139+64-39' Rt.
Relocate Light Std. From
Sta. 133+89-32' Rt.

Sta. 140+00-33' Rt.
Remove Light Std.

Sta. 143+06-33' Rt.
Remove Light Std.

Sta. 143+50-39' Rt.
Relocate Light Std. From
Sta. 134+94-32' Rt.

Sta. 139+64-31.5' Rt.

Sta. 141+47-32' Rt.

Sta. 143+41-102.5' Rt.

Sta. 143+50-31.5' Rt.

Sta. 144+00-106' Rt.

REMOVE STREET LIGHT LUMINAIRE

Sta. 139+28-32' Lt.	1 Ea.
Sta. 141+48-43' Lt.	1 Ea.
Total	2 Ea.

REMOVE LIGHT STANDARD

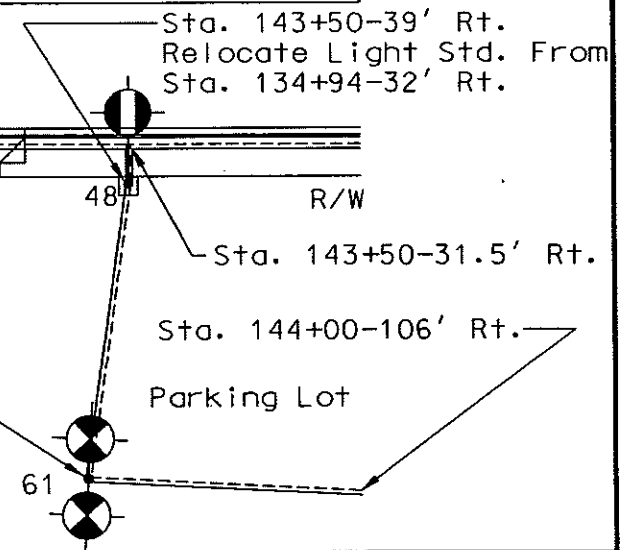
Sta. 140+00-33' Rt.	1 Ea.
Sta. 142+33-32' Lt.	1 Ea.
Sta. 143+06-33' Rt.	1 Ea.
Sta. 143+73-32' Lt.	1 Ea.
Total	4 Ea.

RELOCATE LIGHT STANDARD

From	To	
Sta. 133+89-32' Rt.	Sta. 139+64-39' Rt.	1 Ea.
Sta. 141+48-43' Lt.	Sta. 141+42-52' Lt.	1 Ea.
Sta. 136+17-32' Lt.	Sta. 142+49-33.5' Lt.	1 Ea.
Sta. 134+94-32' Rt.	Sta. 143+50-39' Rt.	1 Ea.
Total		4 Ea.

Sta. 140+20-171' Rt.
Existing Light Std.
In Place to Remain

Existing Conductor
In Place to Remain



LIGHTING LAYOUT
Sta. 139+00 to 144+00
Main St.
Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
139+00-31.5' Rt. to 139+64-31.5' Rt. to 139+64-39' Rt.	64' 7'	2" 2"		152' 76'	(2) No. 6 RHW (1) No. 6 THW
139+64-39' Rt. to 139+64-31.5' Rt. to 141+47-32' Rt.	7' 182'	2" 2"		398' 199'	(2) No. 6 RHW (1) No. 6 THW
139+64-39' Rt. to 139+64-31.5' Rt. to 143+50-31.5' Rt. to 143+50-39' Rt.	7' 386' 7'	2" 2" 2"		1230' 410'	(3) No. 6 RHW (1) No. 6 THW
143+50-39' Rt. to 143+50-31.5' Rt. to 144+00-31.5' Rt.	7' 50'	2" 2"		186' 62'	(3) No. 6 RHW (1) No. 6 THW
143+50-39' Rt. to 143+41-102.5' Rt. to	62'	2"		144' 72'	(2) No. 6 RHW (1) No. 6 THW
143+41-102.5' Rt. to 144+00-106' Rt. to	58'	2"		126' 63'	(2) No. 6 RHW (1) No. 6 THW
139+00-33.5' Lt. to 140+62-33.5' Lt. to 140+91-52' Lt. to 141+42-52' Lt.	162' 34' 60'	2" 2" 2"		783' 261'	(3) No. 6 RHW (1) No. 6 THW
140+65-33.5' Lt. to 140+91-52' Lt. to 141+42-52' Lt.	31' 50'	2" 2"		182' 91'	(2) No. 6 RHW (1) No. 6 THW
141+42-52' Lt. to 141+61-33.5' Lt. to 142+49-33.5' Lt.	26' 87'	2" 2"		369' 123'	(3) No. 6 RHW (1) No. 6 THW
142+49-33.5' Lt. to 144+00-33.5' Lt.	150'	2"		465' 155'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES											
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Light Std. Twin 6 Ft. Mast Arm 40 Ft. Mt. Ht.	H.P. Sodium Vapor Luminaire 150 Watt	H.P. Sodium Vapor Luminaire 200 Watt	H.P. Sodium Vapor Luminaire 250 Watt	Relocate Light Standard	Remove Street Light Luminaire	Remove Light Standard	
EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	
5	1437	3024	1512	1	2	5	1	4	2	4	
City Funds			1011								

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
43	139+64	39' Rt.	200	C2	MSC-III	(C)	(C)
C44	140+65	33.5' Lt.	200	C1	MSC-II	Combo	6 Ft.
45	141+42	52' Lt.	250	C1	MSC-II	(C)	(C)
C46	141+47	32' Rt.	200	C2	MSC-II	Combo	6 Ft.
47	142+49	33.5' Lt.	200	C1	MSC-II	(C)	(C)
48	143+50	39' Rt.	200	C2	MSC-III	(C)	(C)
61(D)	143+41	102.5' Rt.	150	C2	MSC-III	40 Ft.	6 Ft.
			150	C2	MSC-III		6 Ft.

(C) Relocated Light Std.

(D) The concrete foundation for the light standard at Sta. 143+41-102.5' Rt. shall have two feet of foundation above ground level with no square top. The depth of the foundation underground shall remain as shown in the standards.

LIGHTING QUANTITIES

Sta. 139+00 to 144+00

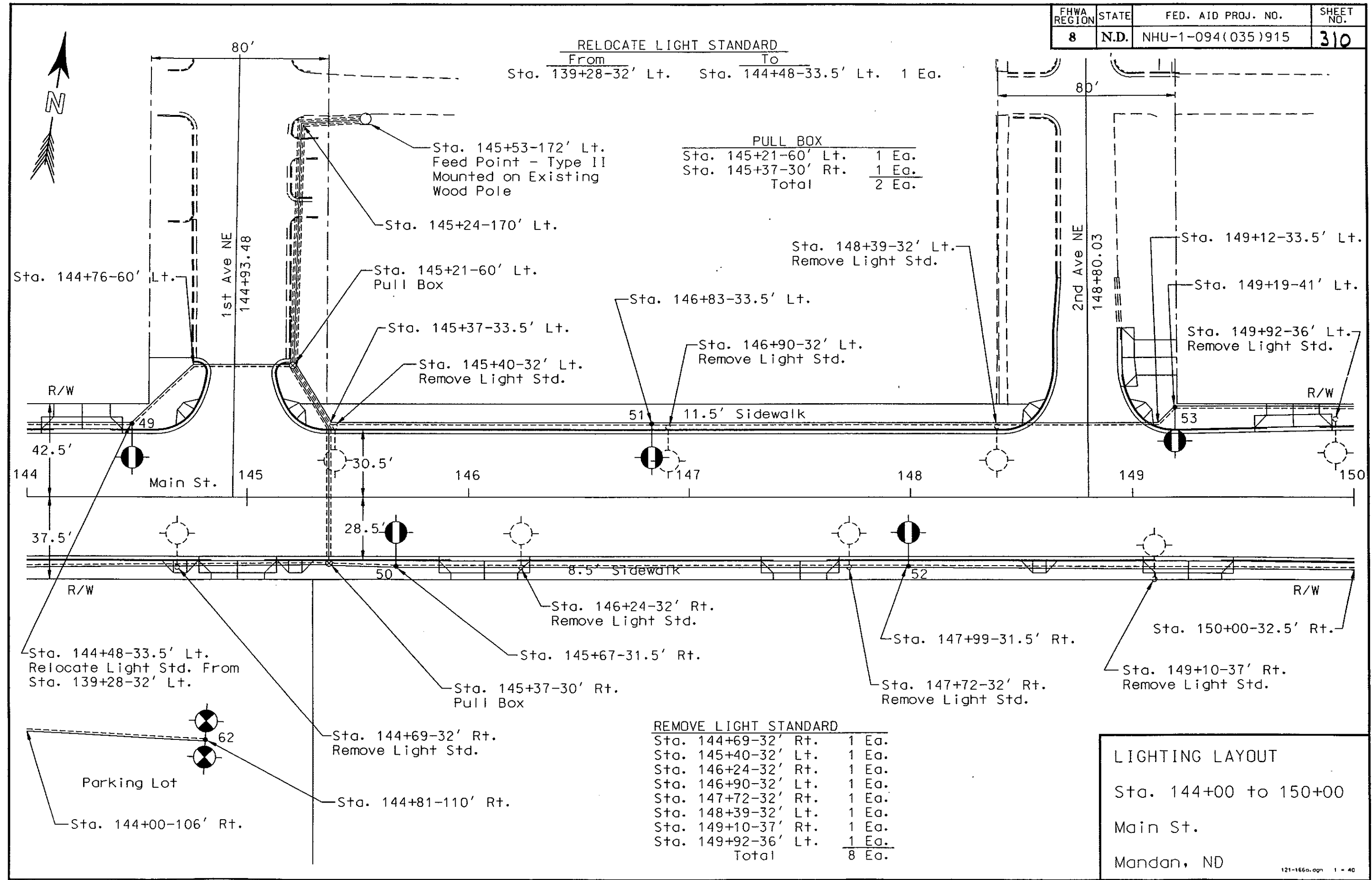
Main St.

Mandan, ND

RELOCATE LIGHT STANDARD
 From Sta. 139+28-32' Lt. To Sta. 144+48-33.5' Lt. 1 Ea.

PULL BOX
 Sta. 145+21-60' Lt. 1 Ea.
 Sta. 145+37-30' Rt. 1 Ea.
 Total 2 Ea.

REMOVE LIGHT STANDARD
 Sta. 144+69-32' Rt. 1 Ea.
 Sta. 145+40-32' Lt. 1 Ea.
 Sta. 146+24-32' Rt. 1 Ea.
 Sta. 146+90-32' Lt. 1 Ea.
 Sta. 147+72-32' Rt. 1 Ea.
 Sta. 148+39-32' Lt. 1 Ea.
 Sta. 149+10-37' Rt. 1 Ea.
 Sta. 149+92-36' Lt. 1 Ea.
 Total 8 Ea.



LIGHTING LAYOUT
 Sta. 144+00 to 150+00
 Main St.
 Mandan, ND

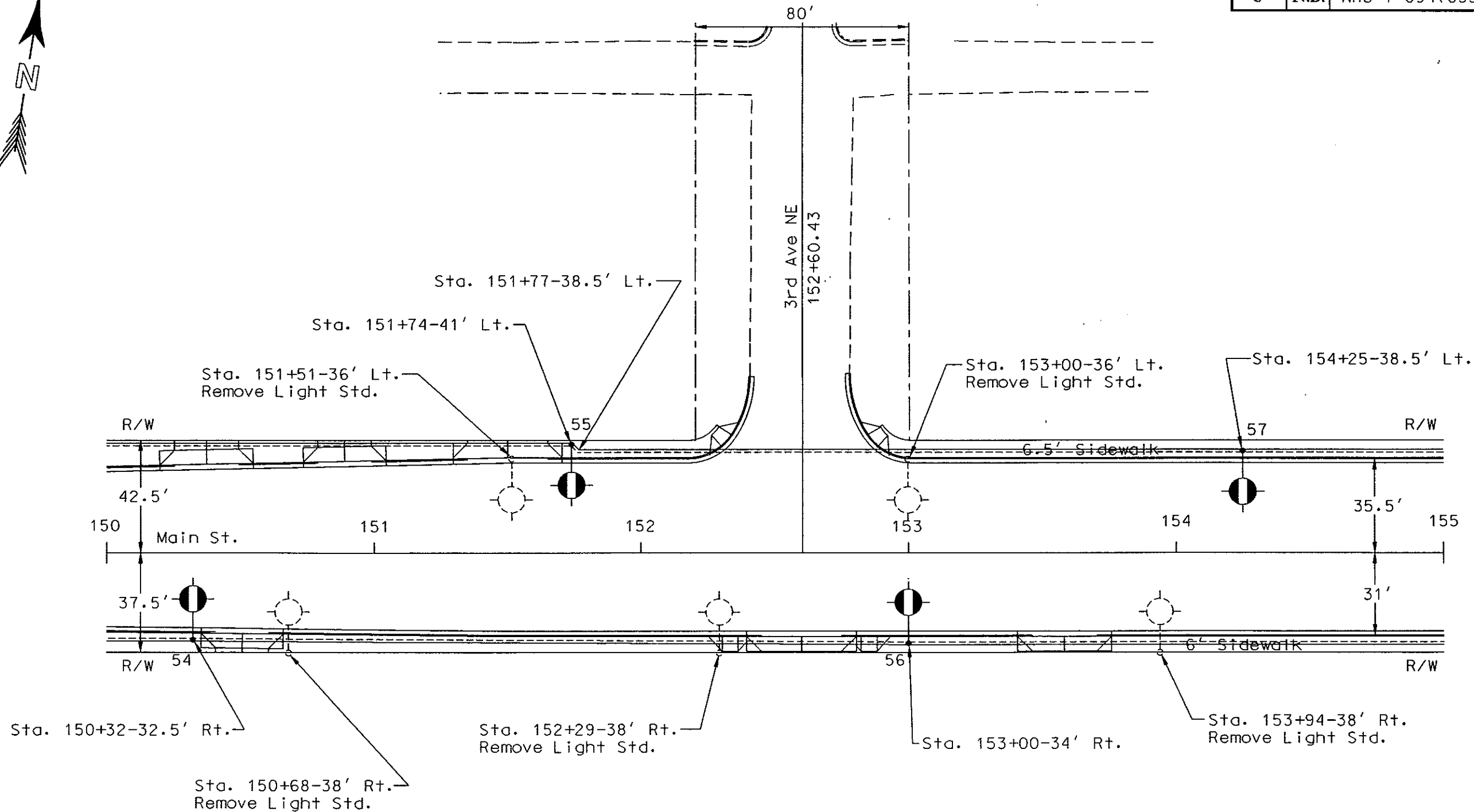
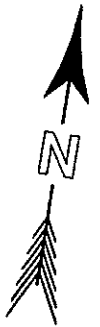
STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
144+00-106' Rt. to 144+81-110' Rt.	80'	2"		170' 85'	(2) No. 6 RHW (1) No. 6 THW
144+00-31.5' Rt. to 145+37-30' Rt.	137'	2"		411' 137'	(3) No. 6 RHW (1) No. 6 THW
145+37-30' Rt. to 145+67-31.5' Rt.	29'	2"		102' 34'	(3) No. 4 RHW (1) No. 6 THW
145+67-31.5' Rt. to 147+99-31.5' Rt.	230'	2"		720' 240'	(3) No. 4 RHW (1) No. 6 THW
147+99-31.5' Rt. to 150+00-32.5' Rt.	200'	2"		615' 205'	(3) No. 6 RHW (1) No. 6 THW
145+37-30' Rt. to 145+37-33.5' Lt. to 145+21-60' Lt.	64' 31'	2" 2"		285' 285' 190'	(3) No. 4 RHW (3) No. 6 RHW (2) No. 6 THW
144+00-33.5' Lt. to 144+48-33.5' Lt.	47'	2"		156' 52'	(3) No. 6 RHW (1) No. 6 THW
144+48-33.5' Lt. to 144+76-60' Lt. to 145+21-60' Lt.	38' 45'	2" 2"		264' 88'	(3) No. 6 RHW (1) No. 6 THW
145+21-60' Lt. to 145+24-170' Lt. to 145+53-172' Lt.	110' 28'	3" 3"		447' 1341' 596'	(3) No. 4 RHW (9) No. 6 RHW (4) No. 6 THW
145+53-172' Lt.	30'	2"(A)		120'	(3) No. 8 RHW
145+21-60' Lt. to 145+37-33.5' Lt. to 146+83-33.5' Lt.	31' 145'	2" 2"		543' 181'	(3) No. 6 RHW (1) No. 6 THW
146+83-33.5' Lt. to 149+12-33.5' Lt. to 149+19-41' Lt.	228' 9'	2" 2"		741' 247'	(3) No. 6 RHW (1) No. 6 THW
149+19-41' Lt. to 150+00-41' Lt.	80'	2"		255' 85'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES														
Concrete Foundation - Highway Lighting	Pull Box	2" Dia. Rigid Conduit	3" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 8 - Type RHW	Underground Conductor No. 6 - Type THW	Light Standard 6 Foot M.A. 40 Foot Mt. Ht. - Festoon	Light Std. Twin 6 Foot M.A. 40 Foot Mt. Ht.	H.P. Sodium Vapor Luminaire 150 watt	H.P. Sodium Vapor Luminaire 200 watt	Relocate Light Standard	Remove Light Standard	Feed Point - Type II - Pole Mounted
EA	EA	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
6	2	1424	138	1036	3244	120	2140	5	1	2	5	1	8	1
City Funds				518	1537									

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
49	144+48	33.5' Lt.	200	C1	MSC-II	(C)	(C)
50	145+67	31.5' Rt.	200	C2	MSC-III	40 Ft. (A)	6 Ft.
51	146+83	33.5' Lt.	200	C1	MSC-III	40 Ft. (A)	6 Ft.
52	147+99	31.5' Rt.	200	C2	MSC-III	40 Ft. (A)	6 Ft.
53	149+19	41' Lt.	200	C1	MSC-IV	40 Ft. (A)	6 Ft.
62(D)	144+81	110' Rt.	150	C2	MSC-III	40 Ft.	6 Ft.
			150	C2	MSC-III		6 Ft.

(A) Festoon
(A) Pole Mounted Conduit
(C) Relocated Light Std.
(D) The concrete foundation for the light standard at Sta. 144+81-110' Rt. shall have two feet of foundation above ground level with no square top. The depth of the foundation underground shall remain as shown in the standards.

LIGHTING QUANTITIES
Sta. 144+00 to 150+00
Main St.
Mandan, ND



REMOVE LIGHT STANDARD		
Sta. 150+68-38' Rt.	1 Ea.	
Sta. 151+51-36' Lt.	1 Ea.	
Sta. 152+29-38' Rt.	1 Ea.	
Sta. 153+00-36' Lt.	1 Ea.	
Sta. 153+94-38' Rt.	1 Ea.	
Total	5 Ea.	

LIGHTING LAYOUT
 Sta. 150+00 to 155+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
150+00-32.5' Rt. to 150+32-32.5' Rt.	31'	2"		108' 36'	(3) No. 6 RHW (1) No. 6 THW
150+32-32.5' Rt. to 153+00-34' Rt.	266'	2"		828' 276'	(3) No. 6 RHW (1) No. 6 THW
153+00-34' Rt. to 155+00-34' Rt.	199'	2"		612' 204'	(3) No. 6 RHW (1) No. 6 THW
150+00-41' Lt. to 151+74-41' Lt.	173'	2"		534' 178'	(3) No. 6 RHW (1) No. 6 THW
151+74-41' Lt. to 151+77-38.5' Lt. to 154+25-38.5' Lt.	3' 247'	2" 2"		780' 260'	(3) No. 6 RHW (1) No. 6 THW
154+25-38.5' Lt. to 155+00-38.5' Lt. to	74'	3"		237' 79'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES											
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Light Standard 6 Foot M.A. 40 Foot Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire 200 Watt	Remove Light Standard					
EA	LF	LF	LF	EA	EA	EA					
4	993	2066	1033	4	4	5					

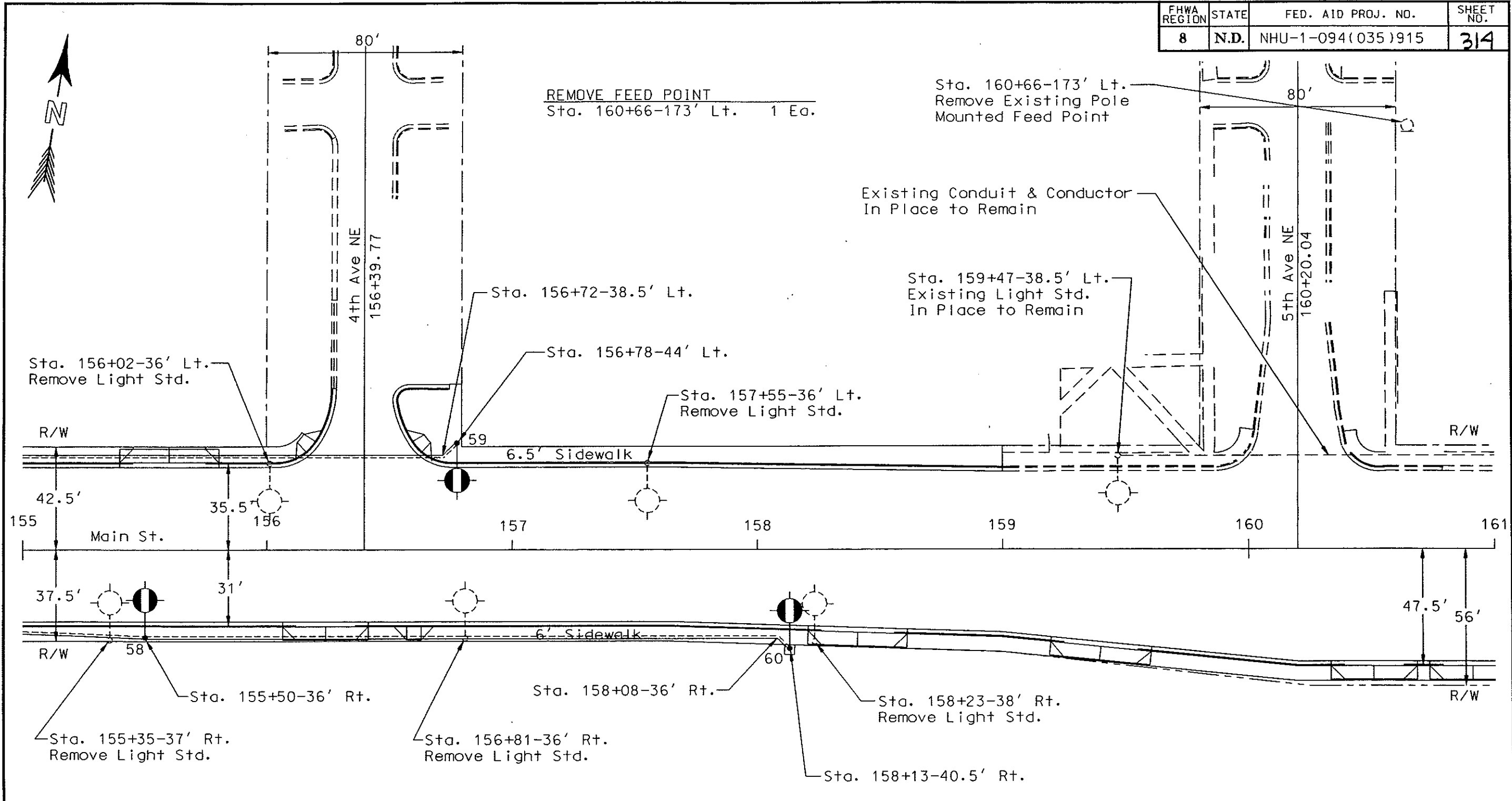
City Funds 1033

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
54	150+32	32.5' Rt.	200	C2	MSC-IV	40 Ft.ⓐ	6 Ft.
55	151+75	41' Lt.	200	C1	MSC-IV	40 Ft.ⓐ	6 Ft.
56	153+00	34' Rt.	200	C2	MSC-IV	40 Ft.ⓐ	6 Ft.
57	154+25	38.5' Lt.	200	C1	MSC-IV	40 Ft.ⓐ	6 Ft.

ⓐ Festoon

LIGHTING QUANTITIES
Sta. 150+00 to 155+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	314



REMOVE LIGHT STANDARD

Sta. 155+35-37' Rt.	1 Ea.
Sta. 156+02-36' Lt.	1 Ea.
Sta. 156+81-36' Rt.	1 Ea.
Sta. 157+55-36' Lt.	1 Ea.
Sta. 158+23-38' Rt.	1 Ea.
Total	5 Ea.

LIGHTING LAYOUT
 Sta. 155+00 to 161+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
155+00-34' Rt. to 155+50-36' Rt.	49'	2"		162' 54'	(3) No. 6 RHW (1) No. 6 THW
155+50-36' Rt. to 158+08-36' Rt. to 158+13-40.5' Rt.	257' 6'	2" 2"		819' 273'	(3) No. 6 RHW (1) No. 6 THW
155+00-38.5' Lt. to 156+72-38.5' Lt. to 156+78-44' Lt.	172' 7'	2" 2"		552' 184'	(3) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Light Standard 6 Foot M.A. 40 Foot Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire 200 Watt	Remove Light Standard	Remove Feed Point			
EA	LF	LF	LF	EA	EA	EA	EA			
3	491	1022	511	3	3	5	1			

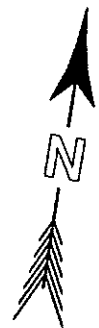
City Funds		511
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
58	155+50	36' Rt.	200	C2	MSC-IV	40 Ft. (A)	6 Ft.
59	156+78	44' Lt.	200	C1	MSC-IV	40 Ft. (A)	6 Ft.
60	158+13	40.5' Rt.	200	C2	MSC-IV	40 Ft. (A)	6 Ft.

(A) Festoon

LIGHTING QUANTITIES
Sta. 155+00 to 161+00
Main St.
Mandan, ND

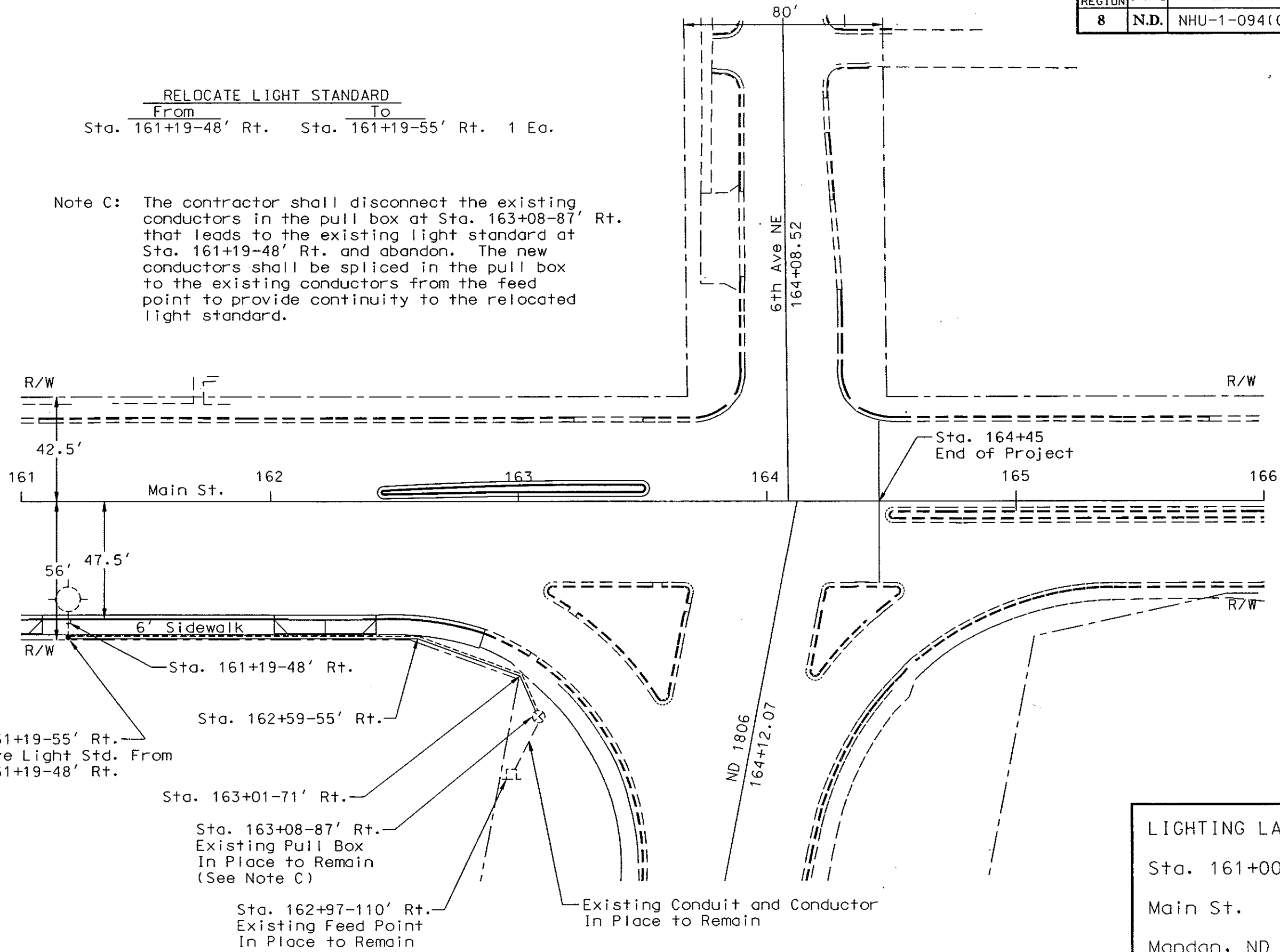
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	316



RELOCATE LIGHT STANDARD

From	To
Sta. 161+19-48' Rt.	Sta. 161+19-55' Rt. 1 Ea.

Note C: The contractor shall disconnect the existing conductors in the pull box at Sta. 163+08-87' Rt. that leads to the existing light standard at Sta. 161+19-48' Rt. and abandon. The new conductors shall be spliced in the pull box to the existing conductors from the feed point to provide continuity to the relocated light standard.



Sta. 161+19-55' Rt.
Relocate Light Std. From
Sta. 161+19-48' Rt.

Sta. 162+59-55' Rt.

Sta. 163+01-71' Rt.

Sta. 163+08-87' Rt.
Existing Pull Box
In Place to Remain
(See Note C)

Sta. 162+97-110' Rt.
Existing Feed Point
In Place to Remain

Existing Conduit and Conductor
In Place to Remain

LIGHTING LAYOUT

Sta. 161+00 to 164+45

Main St.

Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
161+19-55' Rt. to				639'	(3) No. 4 RHW
162+59-55' Rt. to	139'	2"		213'	(1) No. 6 THW
163+01-71' Rt. to	45'	2"			
163+08-87' Rt.	17'	2"			

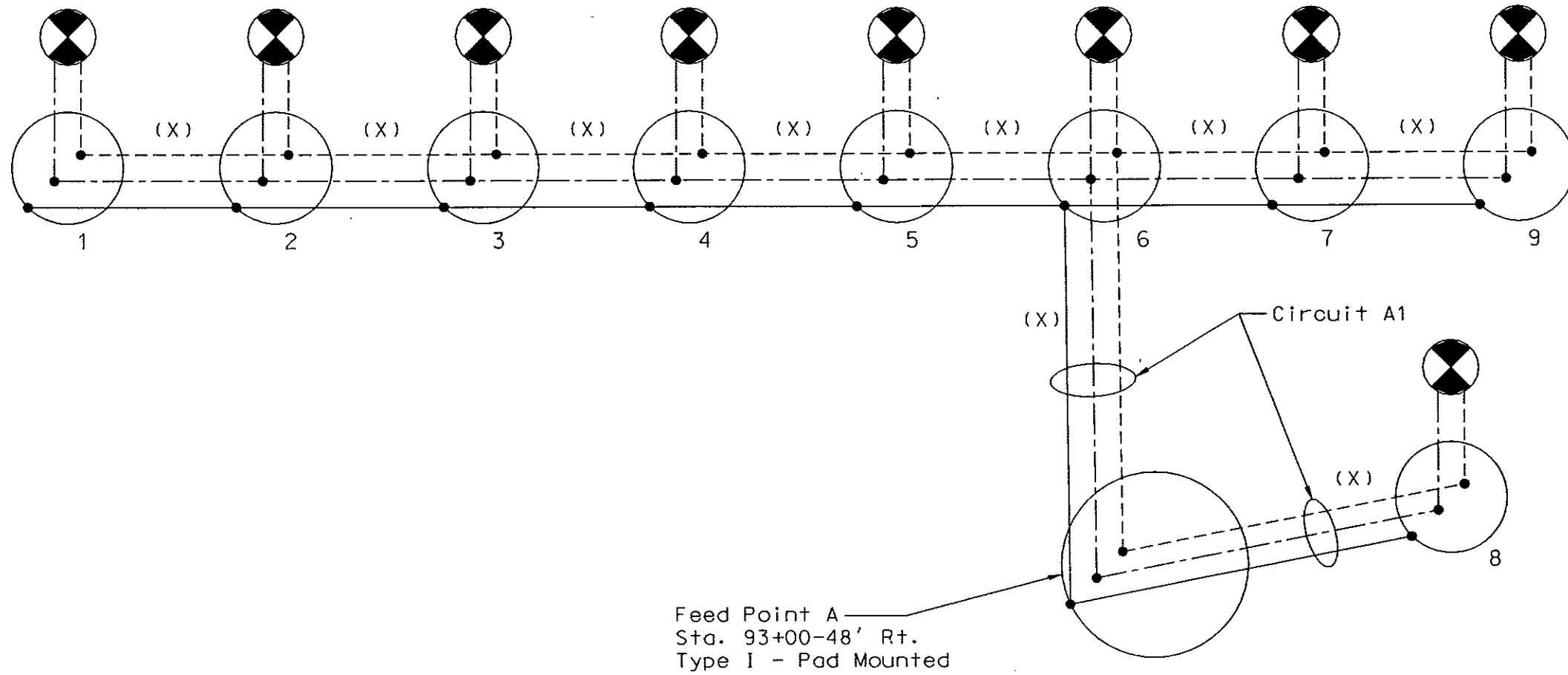
QUANTITIES										
Concrete Foundation - Highway Lighting										
2" Dia. Rigid Conduit										
Underground Conductor No. 4 - Type RHW										
Underground Conductor No. 6 - Type THW										
Relocate Light Standard										
EA	LF	LF	LF	EA						
1	201	426	213	1						

City Funds		213
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM

LIGHTING QUANTITIES
Sta. 161+00 to 164+45
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	318



Feed Point A
 Sta. 93+00-48' Rt.
 Type I - Pad Mounted

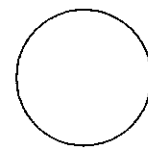
LEGEND

----- Phase Conductor
 ----- Phase Conductor
 _____ Ground Conductor

(X) 3 - No. 6 Style USE



150 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

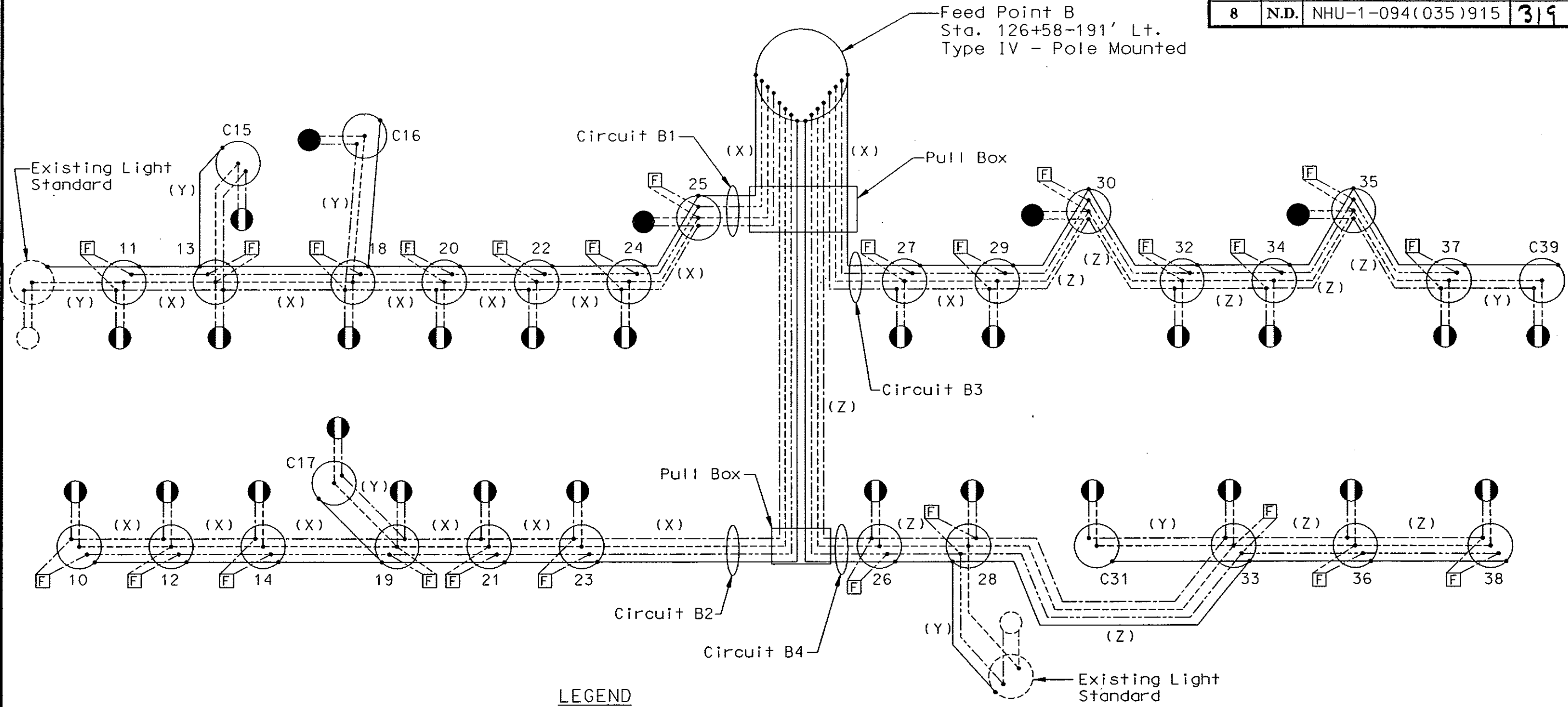


Light Standard

5 Light Standard Number

LIGHTING SCHEMATIC

Feed Point A
 Sta. 93+00-48' Rt.
 Main St.
 Mandan, ND

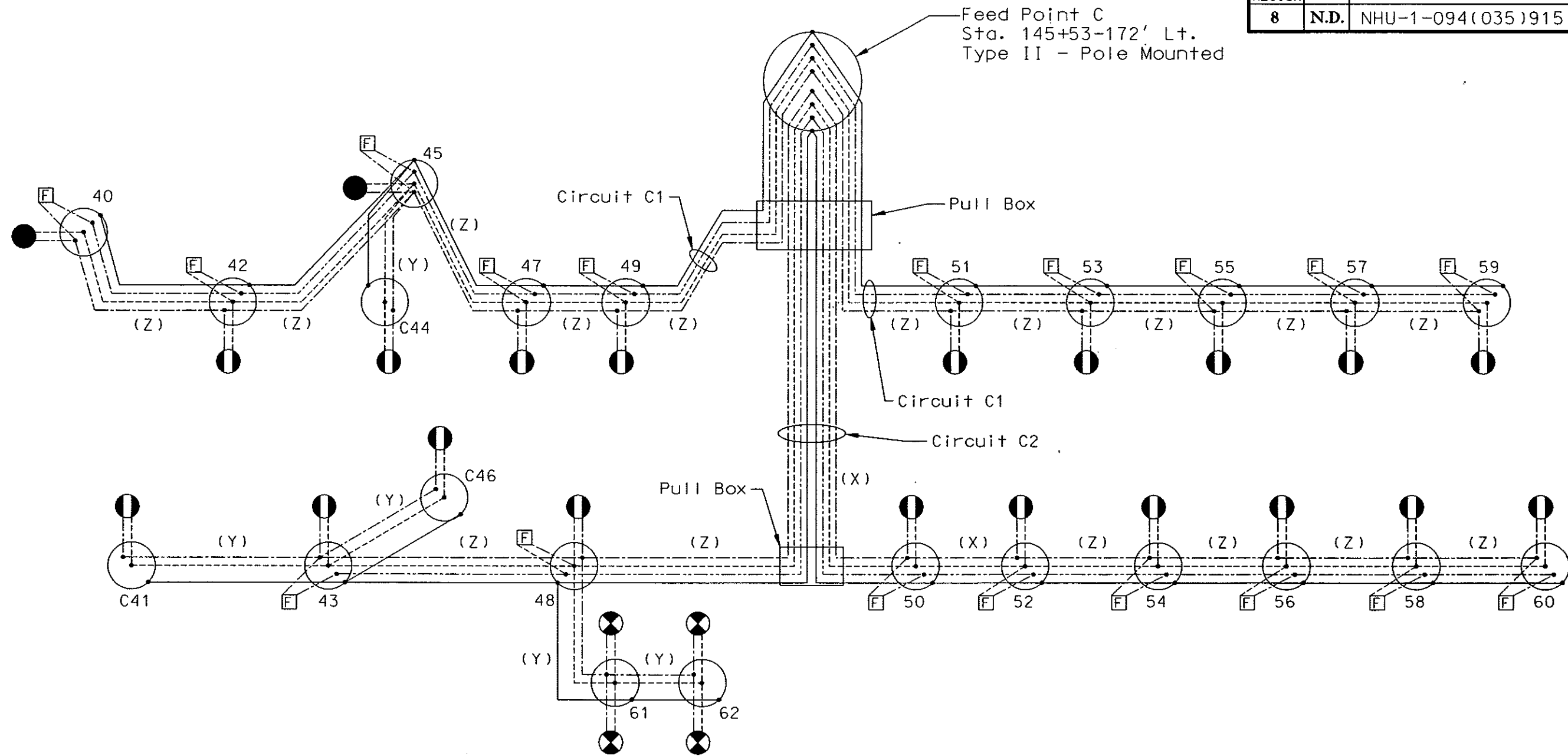


LEGEND

- Neutral Conductor
- Phase Conductor
- Phase Conductor
- Ground Conductor
- (X) (3) No. 4 RHW, (1) No. 6 THW
- (Y) (2) No. 6 RHW, (1) No. 6 THW
- (Z) (3) No. 6 RHW, (1) No. 6 THW
- 250 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 240v
- Festoon
- Light Standard
- 11 Light Standard Number
- 200 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 240v

LIGHTING SCHEMATIC
 Feed Point B
 Sta. 126+58-191' Lt.
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326



LEGEND

- Neutral Conductor
- Phase Conductor
- Phase Conductor
- Ground Conductor

- 150 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 240v
- 200 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 240v
- 250 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 240v

- Festoon
- Light Standard
- 50 Light Standard Number

LIGHTING SCHEMATIC
 Feed Point C
 Sta. 145+53-172' Lt.
 Main St.
 Mandan, ND

- (X) (3) No. 4 RHW, (1) No. 6 THW
- (Y) (2) No. 6 RHW, (1) No. 6 THW
- (Z) (3) No. 6 RHW, (1) No. 6 THW

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN FLAT TYPE 2	AREA SHEET TYPE 3A	SIGN SUPPORT POST LENGTHS				SIGN SUPPORT 1ST	SIGN SUPPORT 2ND	SLEEVE LENGTH 3RD	ANCHOR UNIT 4TH	ANCHOR SIZE	UNIT NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE- AK - AWAY BASE	MAX. LNG. FOR SUP. SIZE	
				1ST	2ND	3RD	4TH											
83+20 RT	ASM 1 RS		5.18	11.4							4.0	2.50	1	44.16			13.9	
87+80 RT	SA A RS	4.00		LIGHT STANDARD MOUNTED							4.0	2.25	1	33.44			12.9	
87+90 LT	SA A RS	4.00		9.3							4.0	2.25	1	31.02			24.3	
88+60 RT	SNS 441	4.50		8.3							4.0	2.25	1	31.02			24.3	
88+63 LT	SNS 441	4.50		8.3							4.0	2.25	1	31.02			24.3	
88+65 LT	ASM 1 RS		5.18	9.8							4.0	2.25	1	34.65			10.7	
88+91 RT	ASM 9 RS	5.00		9.8							4.0	2.25	1	34.65			11.0	
91+32 RT	ASM 1 RS		5.18	9.8							4.0	2.25	1	34.65			10.7	
91+10 LT	SNS 441	4.50		8.3							4.0	2.25	1	31.02			24.3	
91+50 RT	SNS 441	4.50		8.3							4.0	2.25	1	31.02			24.3	
96+08 RT	ASM399RM	6.19		LIGHT STANDARD MOUNTED							4.0	2.25	1	32.23			16.0	
98+00 RT	ASM 7 RS	1.50		8.8							4.0	2.25	1	34.65			11.0	
100+00 LT	ASM 9 RS		5.00	9.8							4.0	2.25	1	34.65			11.0	
100+18 RT	ASM430RM	12.19		LIGHT STANDARD MOUNTED							4.0	2.25	2	71.71			10.4	
101+00 LT	SA B	10.00		10.3 10.3							4.0	2.25	2	71.71			10.4	
101+56 LT	SIGN17GS	22.50		9.7 9.7							4.0	4.00	2	132.41		2	9.8	
101+20 RT	ASM 7 RS	1.50		8.8							4.0	2.25	1	32.23			16.0	
102+00 RT	ASM 4 RS		3.90	9.8							4.0	2.25	1	34.89			13.8	
102+05 LT	SIGN13GS	9.75		MAST ARM MOUNTED														
102+05 LT	R105A RS	16.00		MAST ARM MOUNTED														
102+20 LT	ASM 7 RS	1.50		8.8							4.0	2.25	1	32.23			16.0	
102+21 RT	SIGN 3GS	9.00		MAST ARM MOUNTED							4.0	2.25	1	32.23			16.0	
102+30 LT	ASM 7 RS	1.50		8.8							4.0	2.25	1	32.23			16.0	
102+75 LT	SIGN 3GS	9.00		MAST ARM MOUNTED														
102+84 RT	SIGN13GS	9.75		MAST ARM MOUNTED														
102+84 RT	ASM 9 RS	5.00		MAST ARM MOUNTED							4.0	2.25	1	32.23			16.0	
103+10 LT	ASM 7 RS	1.50		8.8							4.0	2.25	1	34.89			13.8	
103+14 LT	ASM 4 RS		3.90	9.8							4.0	2.25	1	34.65			11.0	
103+50 RT	ASM 9 RS	5.00		9.8							4.0	2.25	1	34.65			11.1	
104+20 LT	ASM 67GS	5.00		9.8							4.0	2.25	1	34.65			11.1	
104+49 RT	SA C RM	5.19		10.0							4.0	2.25	1	35.25			10.5	
105+30 LT	ASM431RM	14.38		11.0							2.25	4.0	2.50	1	55.90		1	12.3
105+89 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED							4.0	2.25	1	34.65			10.7	
106+10 LT	ASM 1 RS		5.18	9.8							4.0	2.25	1	31.02			24.3	
106+30 RT	SNS 441	4.50		8.3							4.0	2.25	1	31.02			24.3	

SUBTOTAL NO 1 186.45 33.52 LENGTH ALL SIZES 254.4 LGTH ALL SZ 108.0 1001.47 0 0

SIGN SUMMARY
 I-94 Business Loop
 Main Street
 Mandan, ND

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN FLAT TYPE 2	AREA SHEET TYPE 3A	SIGN SUPPORT POST LENGTHS				SIGN SUPPORT SLEEVE LENGTH				ANCHOR UNIT SIZE NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE- MAX. AK LNG. - FOR AWAY SUP. BASE SIZE		
				1ST	2ND	3RD	4TH	SIZE	1ST	2ND	3RD					4TH	SIZE
107+50 LT	ASM391RM	6.19		10.5							2.25	4.0	2.50	1	41.68		12.0
107+75 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED													
109+85 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED								4.0	2.25	1	34.65		10.7
110+05 LT	ASM 1 RS		5.18	9.8							2.00						
110+10 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
110+33 RT	SNS 441	4.50		8.3							2.00	4.0	2.25	1	31.02		24.3
111+30 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED													
112+70 LT	SA D RS	4.50		LIGHT STANDARD MOUNTED								4.0	2.25	1	34.65		10.7
114+28 LT	ASM 1 RS		5.18	9.8							2.00						
114+10 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED													
114+15 LT	SNS 441	4.50		8.3							2.00	4.0	2.25	1	31.02		24.3
114+51 RT	SNS 441	4.50		8.3							2.00	4.0	2.25	1	31.02		24.3
115+20 RT	ASM 8	3.00		9.3							2.00	4.0	2.25	1	33.44		16.3
115+50 LT	SA E RS	3.00		LIGHT STANDARD MOUNTED													
116+90 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED													
117+55 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
117+90 LT	SIGN10GS	10.50		MAST ARM MOUNTED													
117+90 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
117+90 LT	ASM 67RS	5.00		9.8							2.00	4.0	2.25	1	34.65		11.1
117+98 RT	R10-12RS	14.00		MAST ARM MOUNTED													
117+98 RT	SIGN 3GS	9.00		MAST ARM MOUNTED													
118+60 LT	SIGN 3RS	9.00		MAST ARM MOUNTED													
118+65 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
118+82 RT	SIGN10GS	10.50		MAST ARM MOUNTED													
118+84 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
119+76 LT	ASM 7 RS	1.50		LIGHT STANDARD MOUNTED													
120+51 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED													
121+05 LT	ASM 1 RS		5.18	9.8							2.00	4.0	2.25	1	34.65	1	1
121+93 LT																	
122+40 RT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
122+40 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED												1	1
122+47 LT																1	1
122+89 LT																	
123+37 LT	ASM 7 RS	1.50		8.8							2.00	4.0	2.25	1	32.23		16.0
SUBTOTAL NO	2	134.69	15.54	LENGTH ALL SIZES	144.7							LGTH ALL SZ	64.0		532.41	3	3

SIGN SUMMARY
 I-94 Business Loop
 Main Street
 Mandan, ND

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN FLAT TYPE 2	AREA SHEET TYPE 3A	SIGN SUPPORT POST LENGTHS				SIGN SUPPORT 1ST	SIGN SUPPORT 2ND	SLEEVE LENGTH 3RD	ANCHOR UNIT 4TH	LNTH	SIZE	NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN	SUP	BRE- AK AWAY BASE	MAX. LNG. FOR SUP. SIZE
				1ST	2ND	3RD	4TH												
135+83 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED								4.0	2.50	1	46.53				13.2
136+65 LT	SA G RS	6.00		12.3															
136+96 LT	SIGN 4GS	9.75		MAST ARM MOUNTED															
136+98 RT	SIGN 3GS	9.00		MAST ARM MOUNTED															
137+30 RT																1	1		
137+75 RT	SIGN 4GS	9.75		MAST ARM MOUNTED															
137+95 RT																			
138+00 LT	SA G RS	6.00		12.3							4.0	2.50	1	46.53				13.2	
138+94 RT																			
139+30 LT	SA D RS	4.50		10.8							4.0	2.25	1	37.06				12.3	
139+64 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED															
139+83 RT																			
139+93 RT	SA F RS	2.50		9.8							4.0	2.25	1	34.65				16.5	
139+91 RT																			
140+51 LT	SA F RS	2.50		9.8							4.0	2.25	1	34.65				16.5	
140+64 LT	SA D RS	3.00		10.3							4.0	2.25	1	35.86				14.2	
140+75 LT	SIGN 2GS	10.50		MAST ARM MOUNTED															
140+97 RT	SIGN 14GS	7.50		MAST ARM MOUNTED															
141+57 RT	SIGN 2GS	10.50		MAST ARM MOUNTED															
142+27 LT	ASM 7 RS	1.50		8.8							4.0	2.25	1	32.23				16.0	
142+49 LT	ASM 8 RS	3.00		LIGHT STANDARD MOUNTED															
142+94 LT	SA E RS	3.00		10.3							4.0	2.25	1	35.86				14.2	
143+50 RT	SA H RS	11.00		LIGHT STANDARD MOUNTED															
144+48 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED															
144+72 LT	ASM 1 RS		5.18	9.8							4.0	2.25	1	34.65				10.7	
145+10 RT	SNS 441	4.50		8.3							4.0	2.25	1	31.02				24.3	
145+45 LT	SA G RS	6.00		12.8							4.0	2.50	1	47.92				13.4	
146+20 LT	ASM 380RM	8.19		11.5	11.5						4.0	2.25	2	77.75				13.7	
145+67 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED															
146+83 LT	SA E RS	3.00		LIGHT STANDARD MOUNTED															
147+57 LT	ASM 371RM	6.00		10.3							4.0	2.50	1	40.99				12.2	
147+99 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED															
148+37 LT	SA D RS	4.50		10.8							4.0	2.25	1	37.06				15.3	
148+44 LT	SNS 441	4.50		8.3							4.0	2.25	1	31.02				24.3	
148+57 LT	ASM 1 RS		5.18	9.8							4.0	2.25	1	34.65				10.7	
SUBTOTAL NO 4		161.19	10.36	LENGTH ALL SIZES 176.7								LGTH ALL SZ 68.0		638.44	5	5			

SIGN SUMMARY

I-94 Business Loop

Main Street

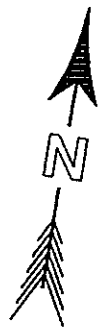
Mandan, ND

SIGN SUMMARY - PERFORATED TUBE

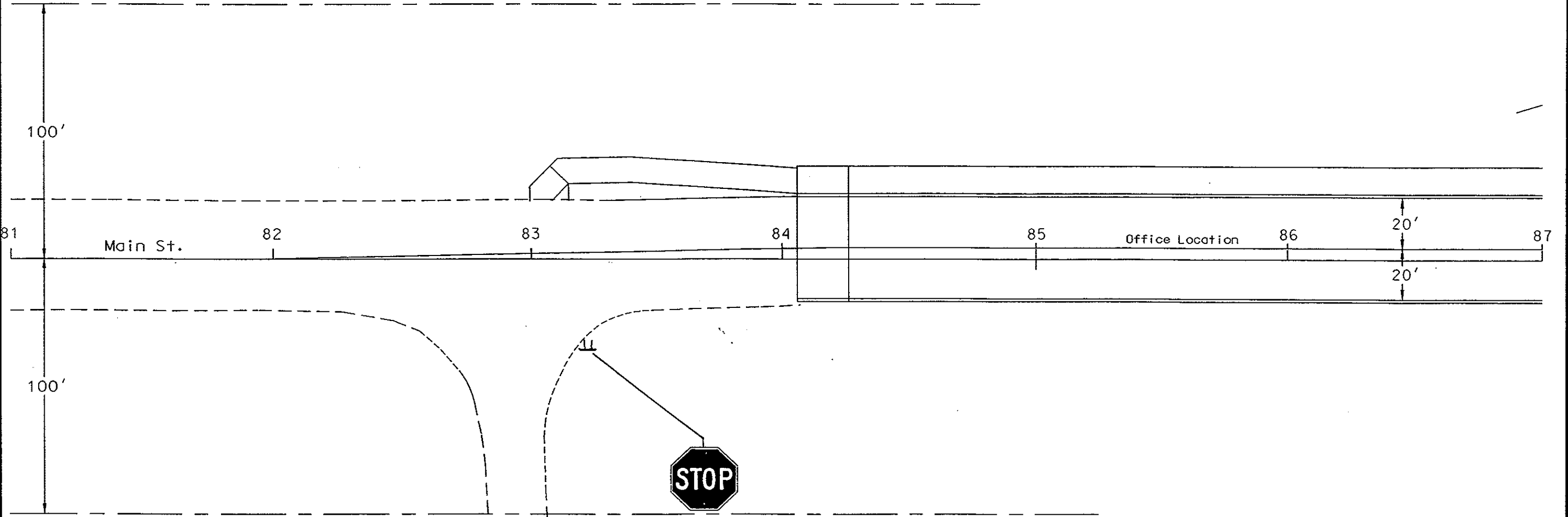
STATION	ASSEMBLY NUMBER	SIGN FLAT TYPE 2	AREA SHEET TYPE 3A	SIGN SUPPORT	POST LENGTHS 4TH	SUPPORT LENGTHS 1ST 2ND 3RD 4TH	SIGN SUPPORT SLEEVE LENGTH 4TH	ANCHOR SIZE LNTH	UNIT SIZE NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE - MAX. AK - LNG. - FOR AWAY SUP. BASE SIZE	
												2.00	24.3
148+80 RT	SNS 441	4.50			8.3			4.0	2.25	1	31.02		24.3
149+12 LT	ASM 8 RS	3.00		LIGHT STANDARD MOUNTED				4.0	2.25	1	34.65		11.0
150+00 LT	ASM 9 RS	5.00			9.8								
150+37 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED									
150+37 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED				4.0	2.25	1	32.23		16.0
150+67 LT	ASM 7 RS	1.50			8.8								
151+74 LT	ASM 8 RS	3.00		LIGHT STANDARD MOUNTED				4.0	2.25	1	31.02		24.3
152+24 LT	SNS 441	4.50			8.3								
152+35 LT	ASM 1 RS		5.18		9.8			4.0	2.25	1	34.65		10.7
153+00 RT	ASM22 RS	6.00		LIGHT STANDARD MOUNTED				4.0	2.25	1	32.23		16.0
152+91 LT	ASM 7 RS	1.50			8.8			4.0	2.25	1	37.06		12.3
153+00 LT	SA D RS	4.50			10.8								
153+00 RT	SNS 441	4.50		LIGHT STANDARD MOUNTED									
153+00 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED									
154+25 LT	SA E RS	3.00		LIGHT STANDARD MOUNTED				4.0	2.50	1	40.99		12.4
155+00 LT	ASM 22RS	6.00			10.3								
155+50 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED				4.0	2.50	1	45.15		12.8
156+00 LT	SA I RS	9.00			11.8								
156+20 LT	ASM 1 RS		5.18		9.8			4.0	2.25	1	34.65		10.7
156+50 RT	SNS 441	4.50			8.3	8.3		4.0	2.25	2	62.05		46.8
156+78 LT	SA C RS	4.50		LIGHT STANDARD MOUNTED									
156+91 RT	ASM 22RS	6.00			10.3			4.0	2.50	1	40.99		12.4
158+13 RT	SIGN 18	6.00		LIGHT STANDARD MOUNTED									
158+13 LT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED									
159+47 LT	ASM 7 RS	1.50		LIGHT STANDARD MOUNTED									
159+47 LT	ASM22 RS	6.00		LIGHT STANDARD MOUNTED									
159+85 LT	SNS 441	4.50			8.3			4.0	2.25	1	31.02		24.3
160+00 LT	ASM 1 RS		5.18		9.8			4.0	2.25	1	34.65		10.7
160+20 RT	SNS 441	4.50			8.3			4.0	2.25	1	31.02		24.3
161+19 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED									
161+35 LT	SA E RS	3.00			10.3			4.0	2.25	1	35.86		14.2
162+36 LT	ASM 7 RS	1.50			8.8			4.0	2.25	1	32.23		16.0
163+45 LT	ASM 7 RS	1.50			8.8			4.0	2.25	1	32.23		16.0
163+62 RT	ASM 5 GS	6.93		MAST ARM MOUNTED									
163+62 RT	R10-12RS	12.25		MAST ARM MOUNTED									
163+68 LT	SIGN11GS	9.00		MAST ARM MOUNTED									
163+68 LT	SIGN19RS	21.00		MAST ARM MOUNTED									
163+68 LT	R10-10RS	9.00		MAST ARM MOUNTED									
163+81 LT	ASM 7 RS	1.50			8.8			4.0	2.25	1	32.23		16.0
SUBTOTAL NO 5		189.18	15.54	LENGTH ALL SIZES	185.5			LGTH ALL SZ	80.0		685.94	0	0

SIGN SUMMARY
 I-94 Business Loop
 Main Street
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326A



R/W



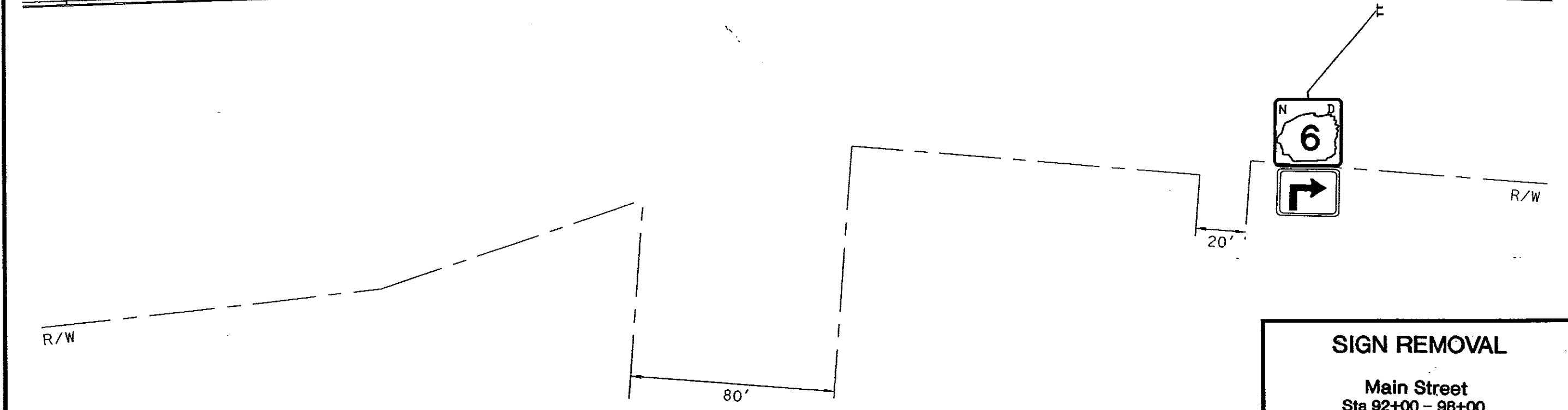
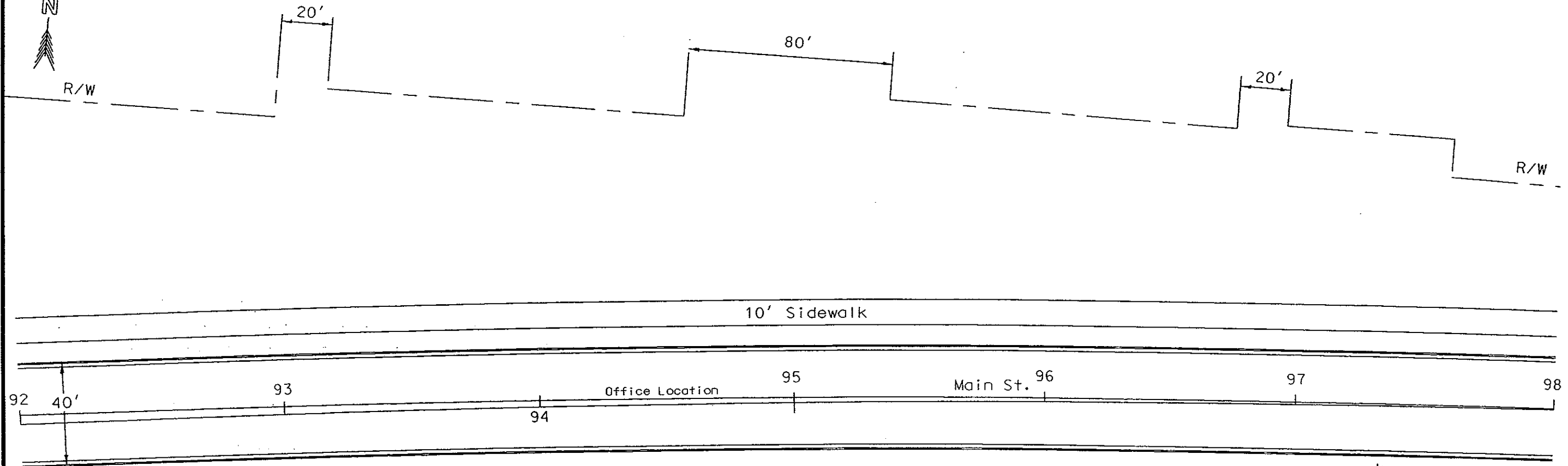
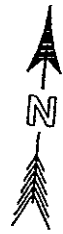
R/W

SIGN REMOVAL

Main Street
Sta 81+00 - 87+00

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 C

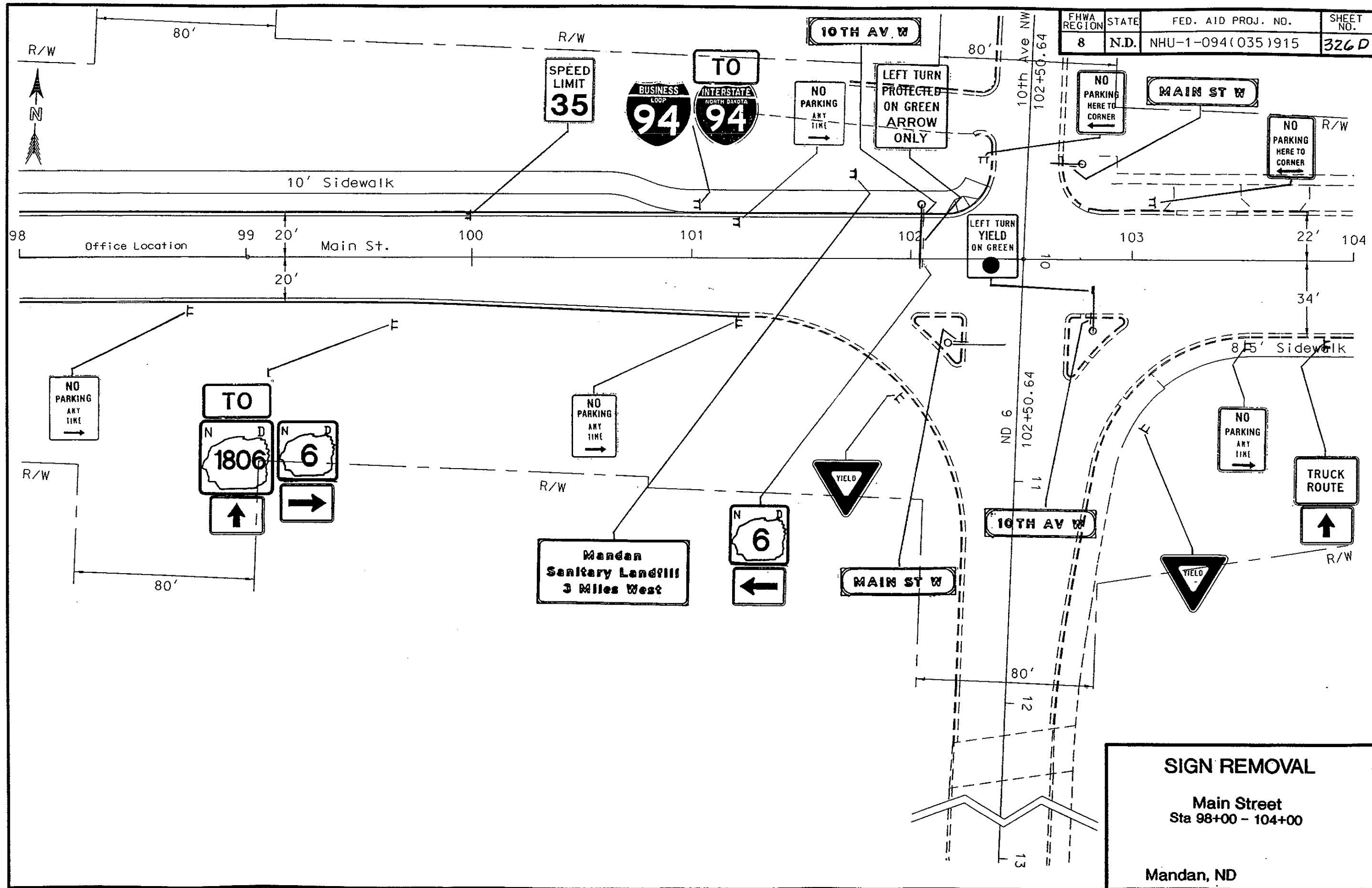


SIGN REMOVAL

Main Street
Sta 92+00 - 98+00

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326D

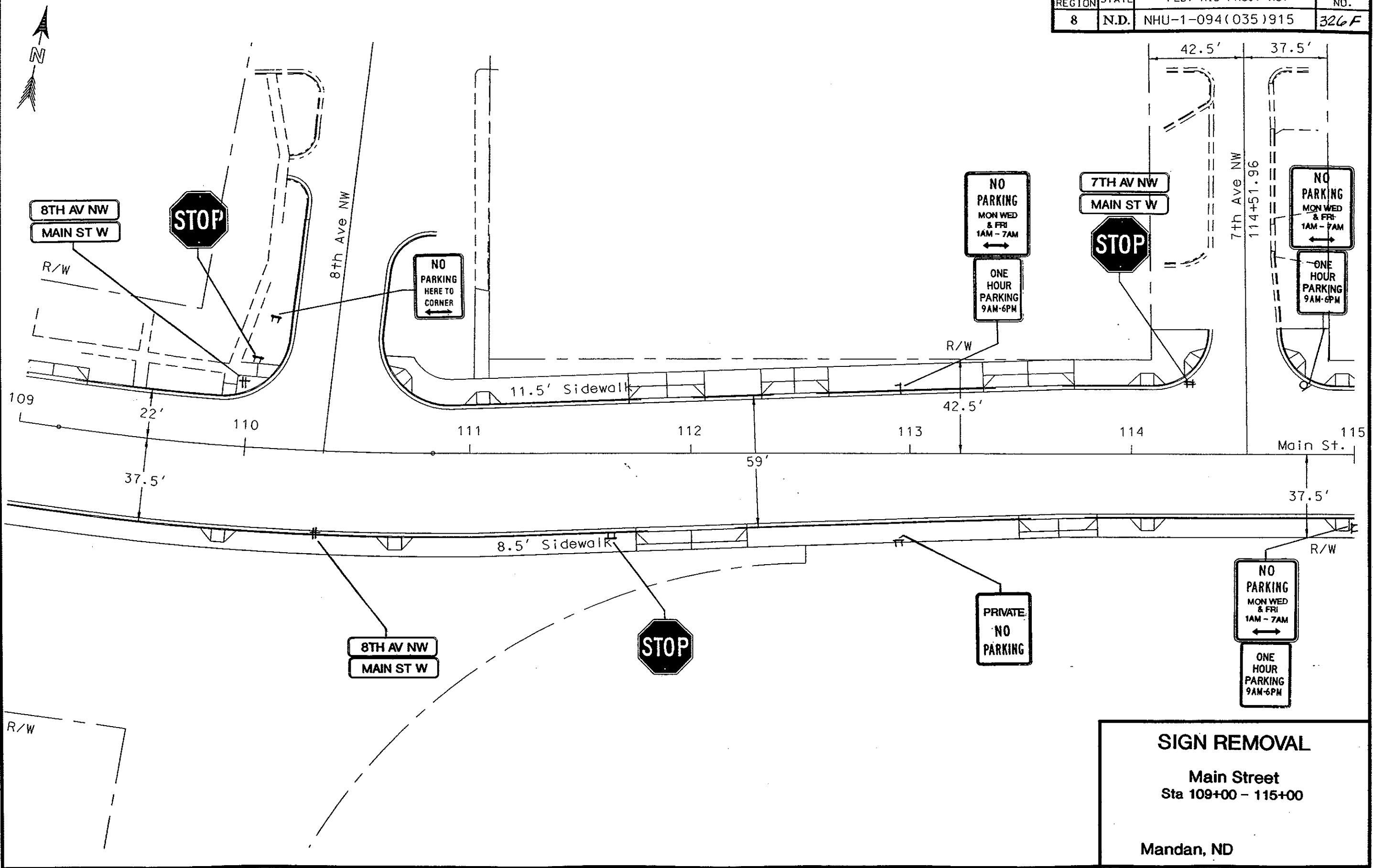


SIGN REMOVAL

Main Street
Sta 98+00 - 104+00

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326F

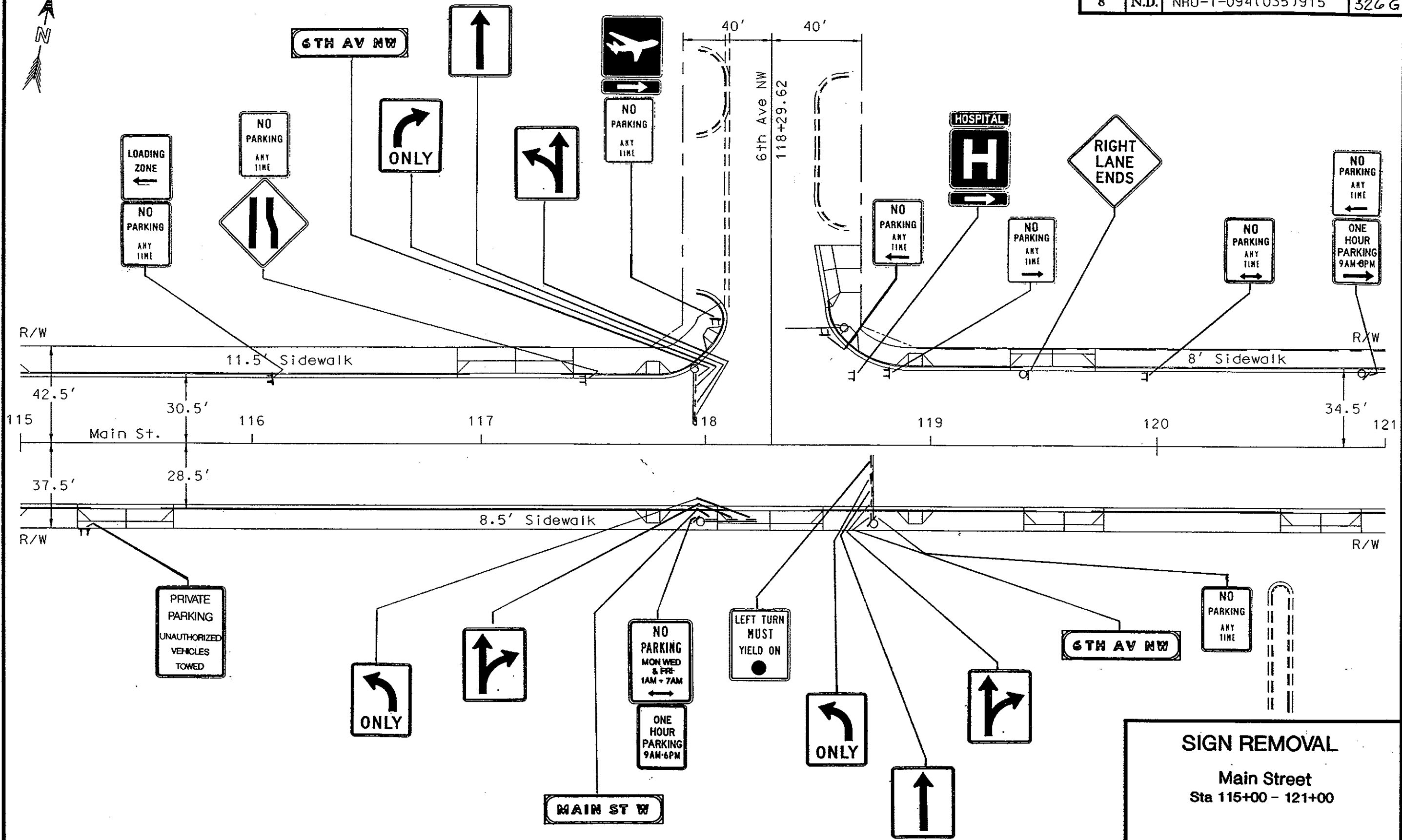
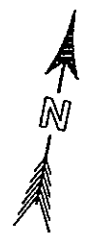


SIGN REMOVAL

Main Street
Sta 109+00 - 115+00

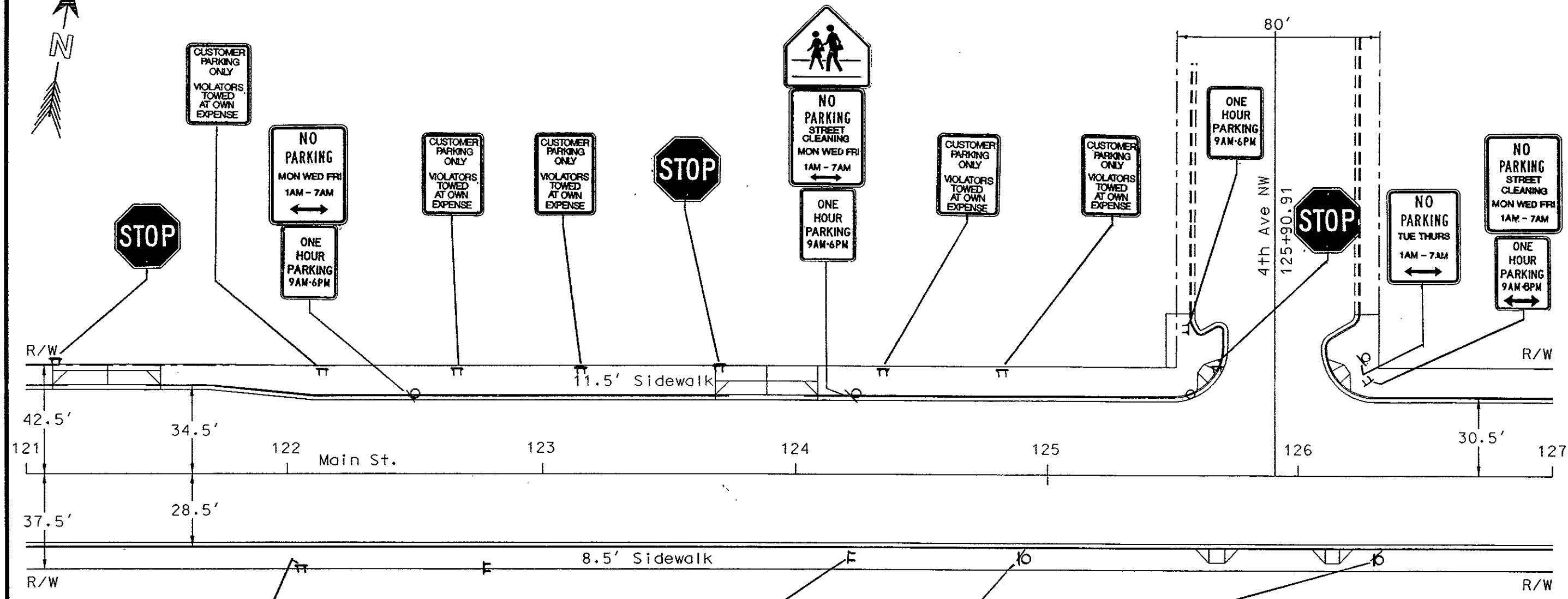
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 G



SIGN REMOVAL
 Main Street
 Sta 115+00 - 121+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 H

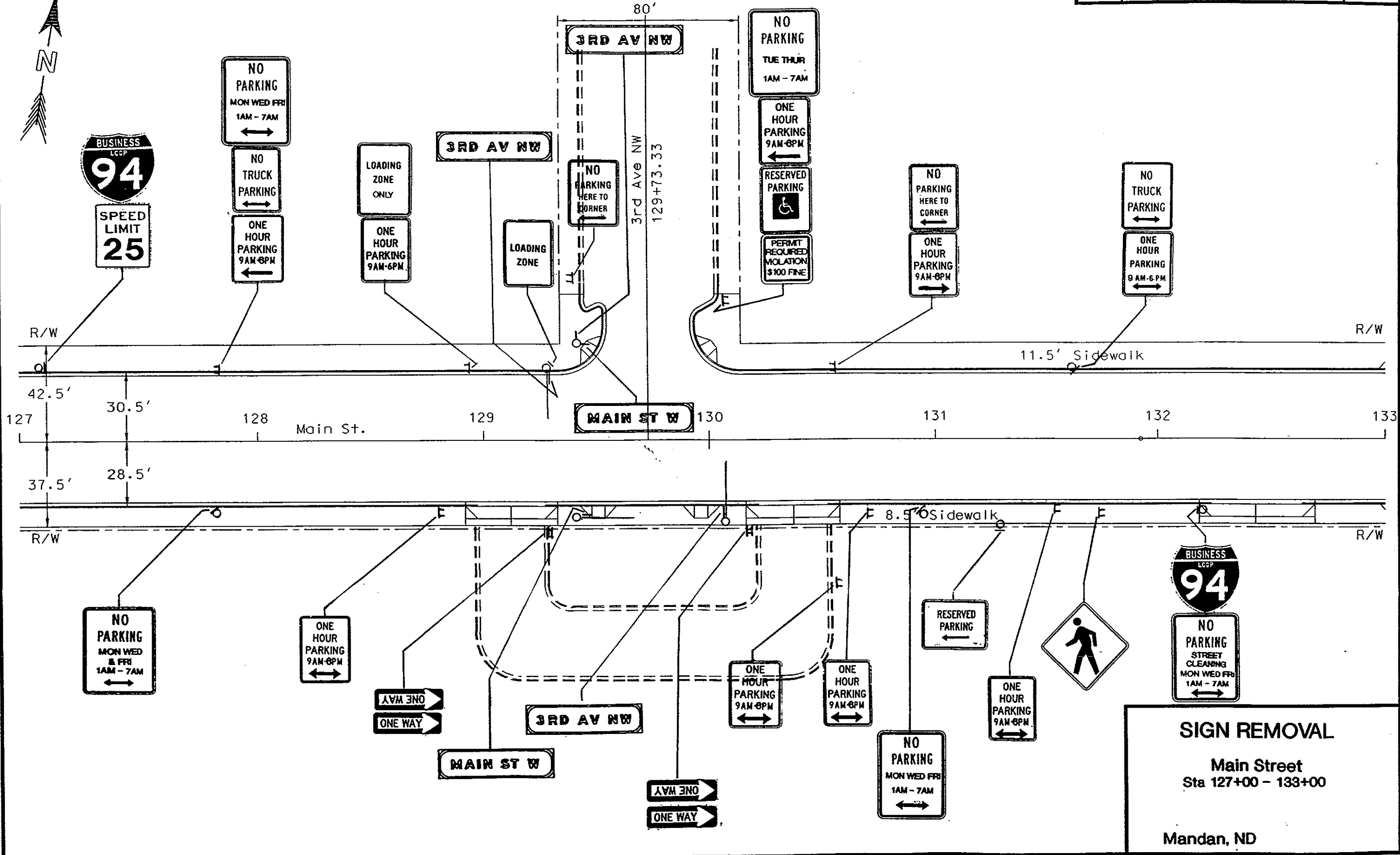
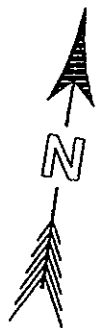


MAIN ST W



SIGN REMOVAL
 Main Street
 Sta 121+00 - 127+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 I

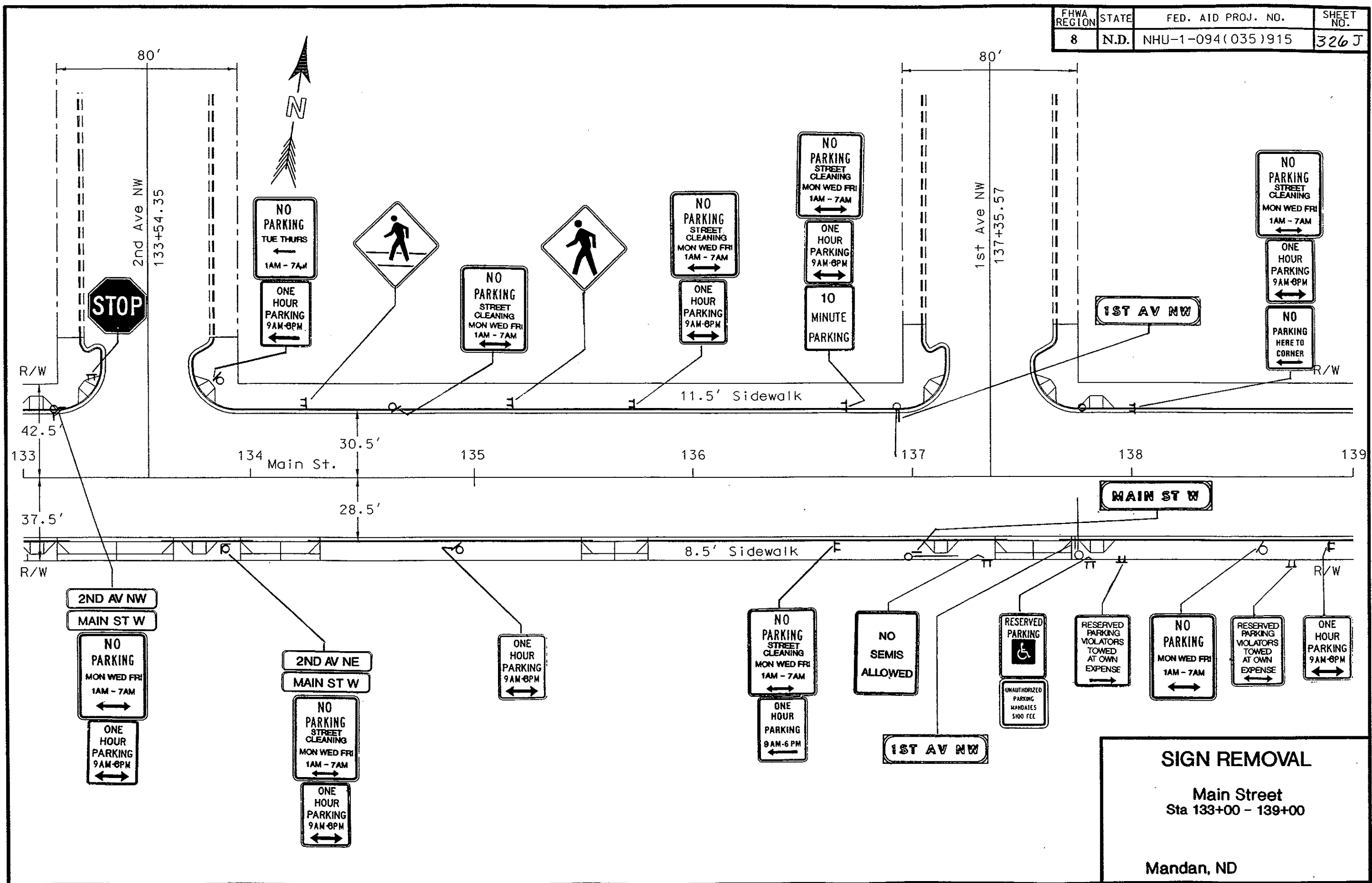


SIGN REMOVAL

Main Street
Sta 127+00 - 133+00

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 J

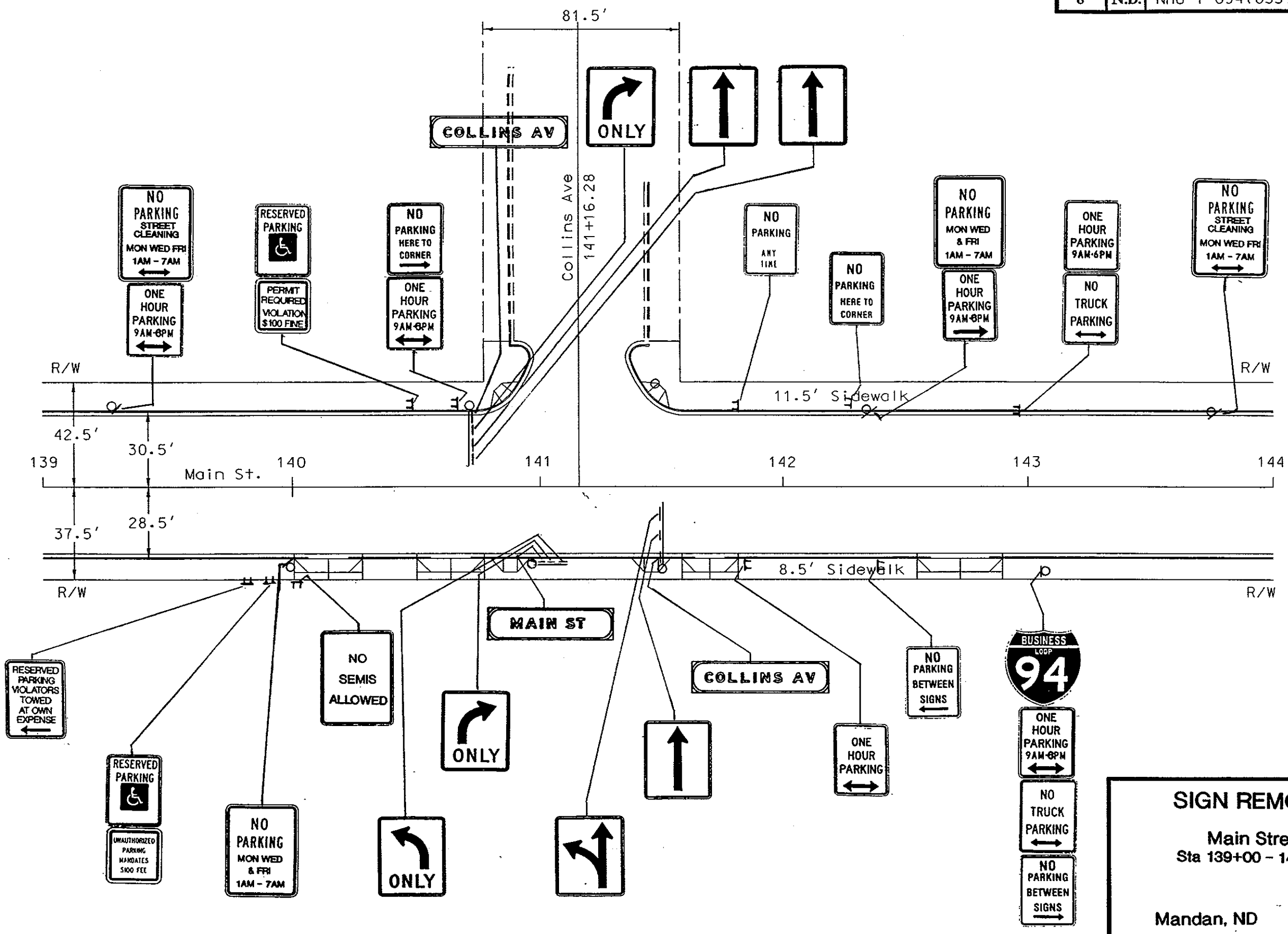
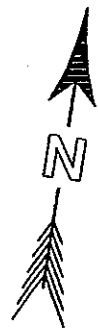


SIGN REMOVAL

Main Street
Sta 133+00 - 139+00

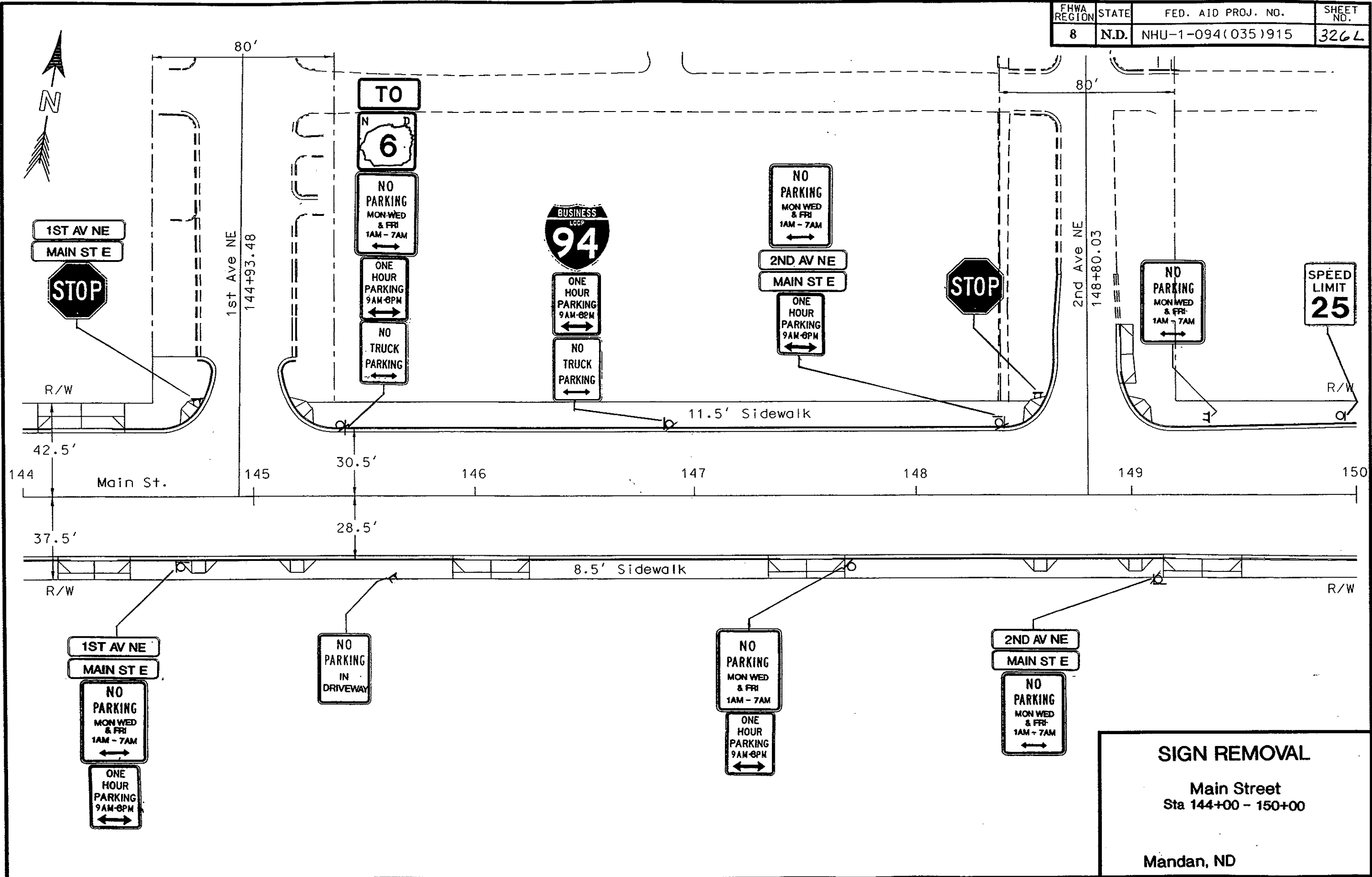
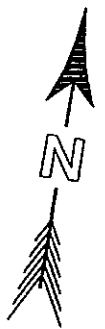
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326K



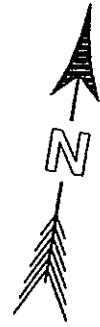
SIGN REMOVAL
 Main Street
 Sta 139+00 - 144+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326L



SIGN REMOVAL
 Main Street
 Sta 144+00 - 150+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326M



SPEED LIMIT
25

NO TRUCK
PARKING
↔

NO
PARKING
MON WED & FRI
1AM - 7AM
↔

3RD AV NE
MAIN ST E
STOP

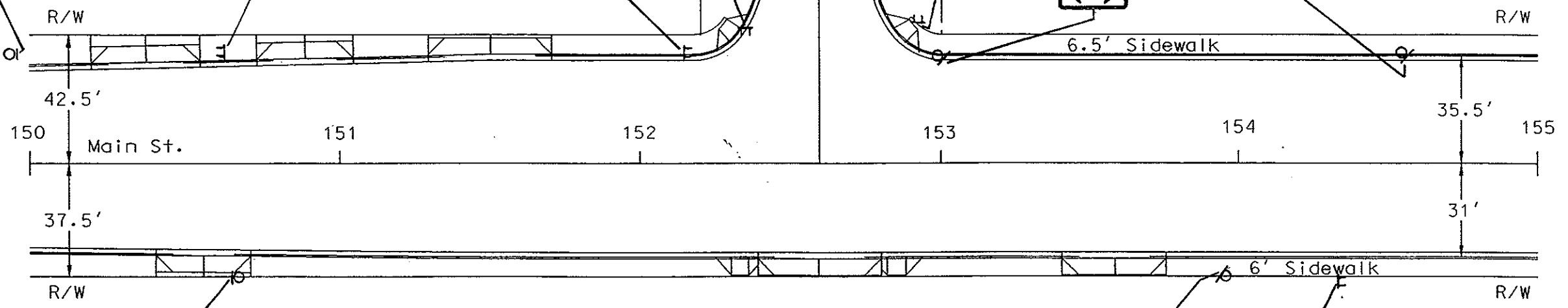
ONE HOUR
PARKING
9AM-6PM
←

NO
PARKING
STREET
CLEANING
MON WED FRI
1AM - 7AM
↔

ONE HOUR
PARKING
9AM-6PM
↔

NO TRUCK
PARKING
↔

ONE HOUR
PARKING
9AM-6PM
↔



SPEED LIMIT
25

NO
PARKING
MON WED & FRI
1AM - 7AM
↔

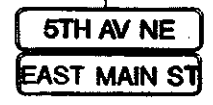
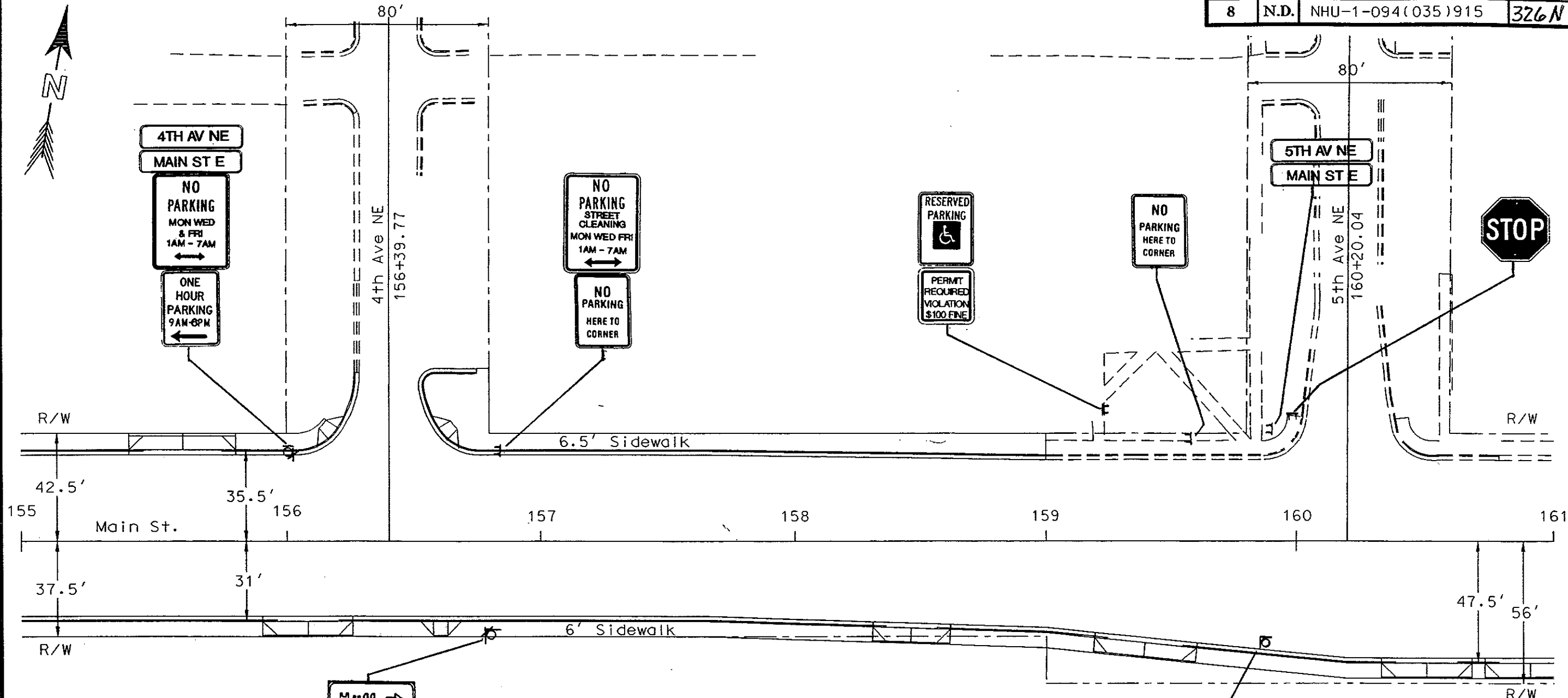
NO
PARKING
MON WED & FRI
1AM - 7AM
↔

SIGN REMOVAL

Main Street
Sta 150+00 - 155+00

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326N

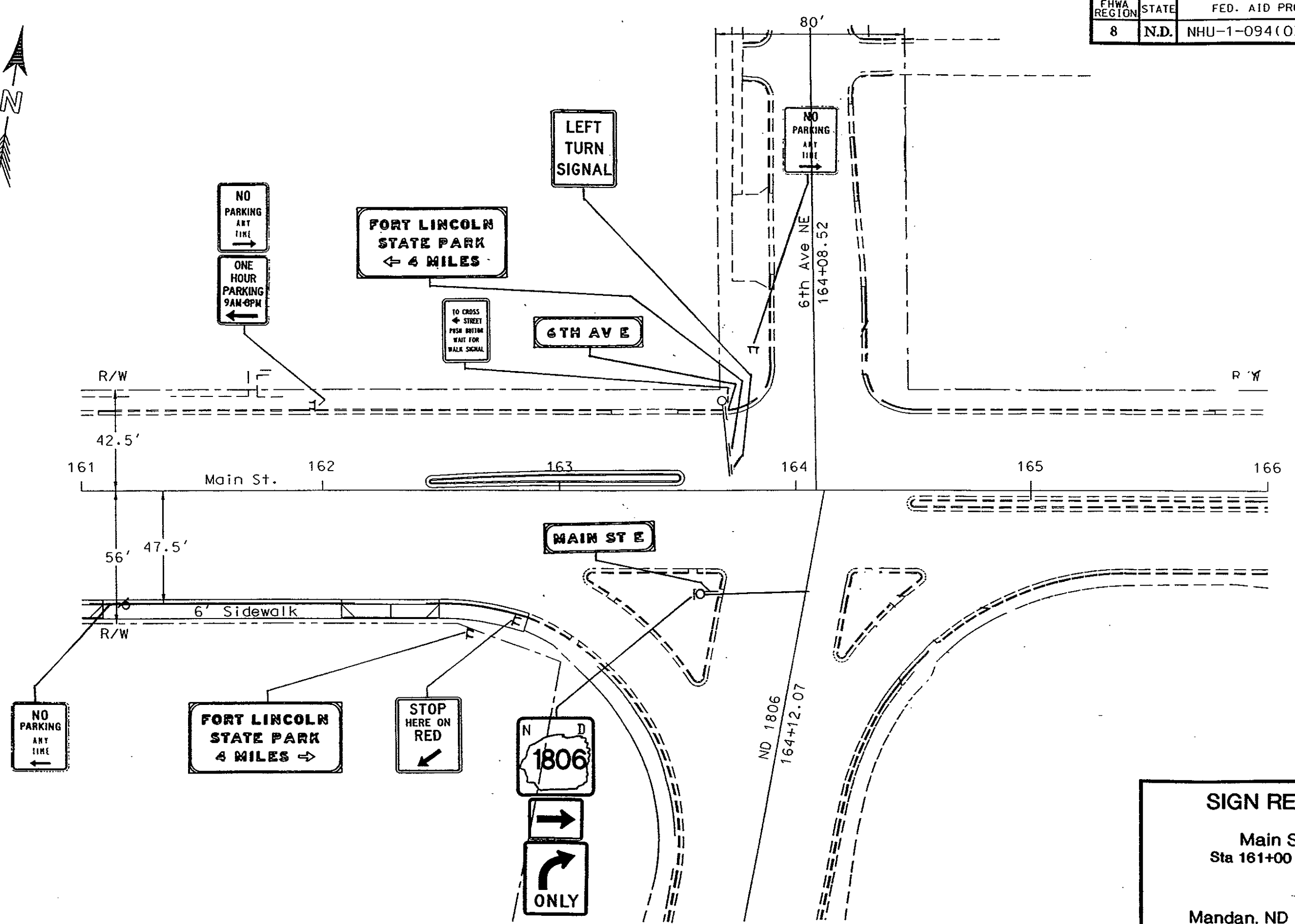


SIGN REMOVAL

Main Street
Sta 155+00 - 161+00

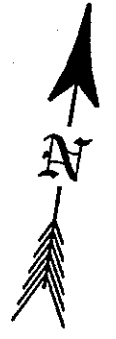
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	326 P



SIGN REMOVAL
 Main Street
 Sta 161+00 - 166+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	327



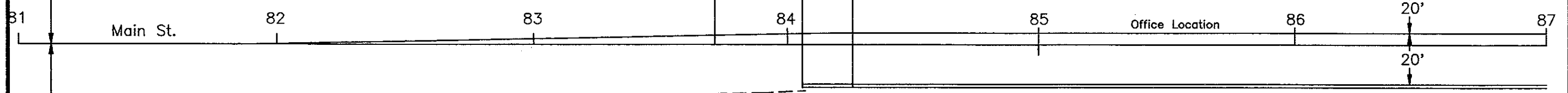
North Dakota
Youth Correctional
← Center

Sta.83+50-42' Lt.
Reset Sign and
Supports

R/W

100'

POB 83+71.31
PK NAIL



BEGIN BRIDGE 84+25.92
OVERALL LENGTH = 324.0'
ROADWAY WIDTH = 32.3'
STEEL STRINGER BRIDGE

100'

R/W

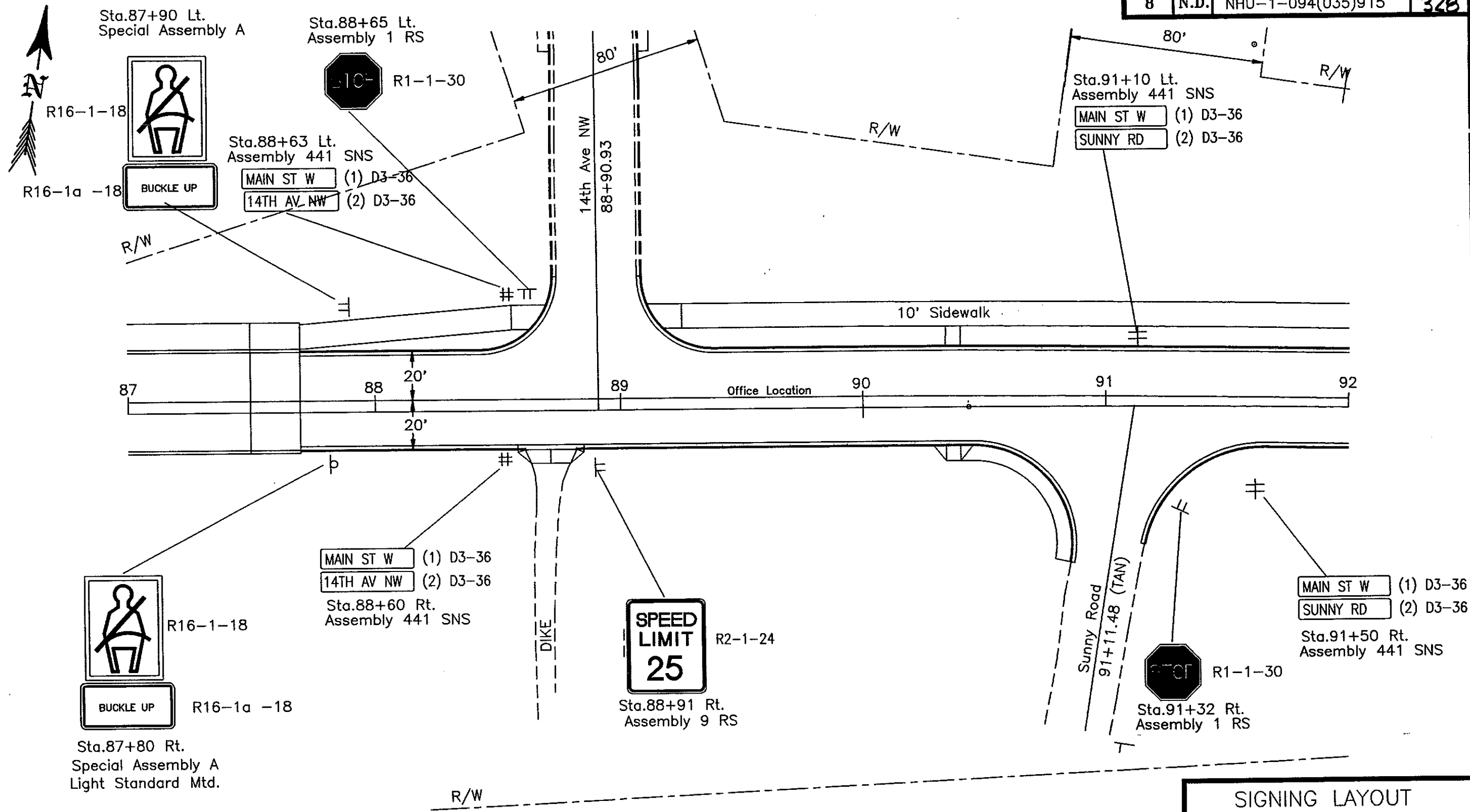
STOP R1-1-30
Sta.83+20 Rt.
Assembly 1 RS

SIGNING LAYOUT

Main Street
Sta. 81+00-87+00

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	328

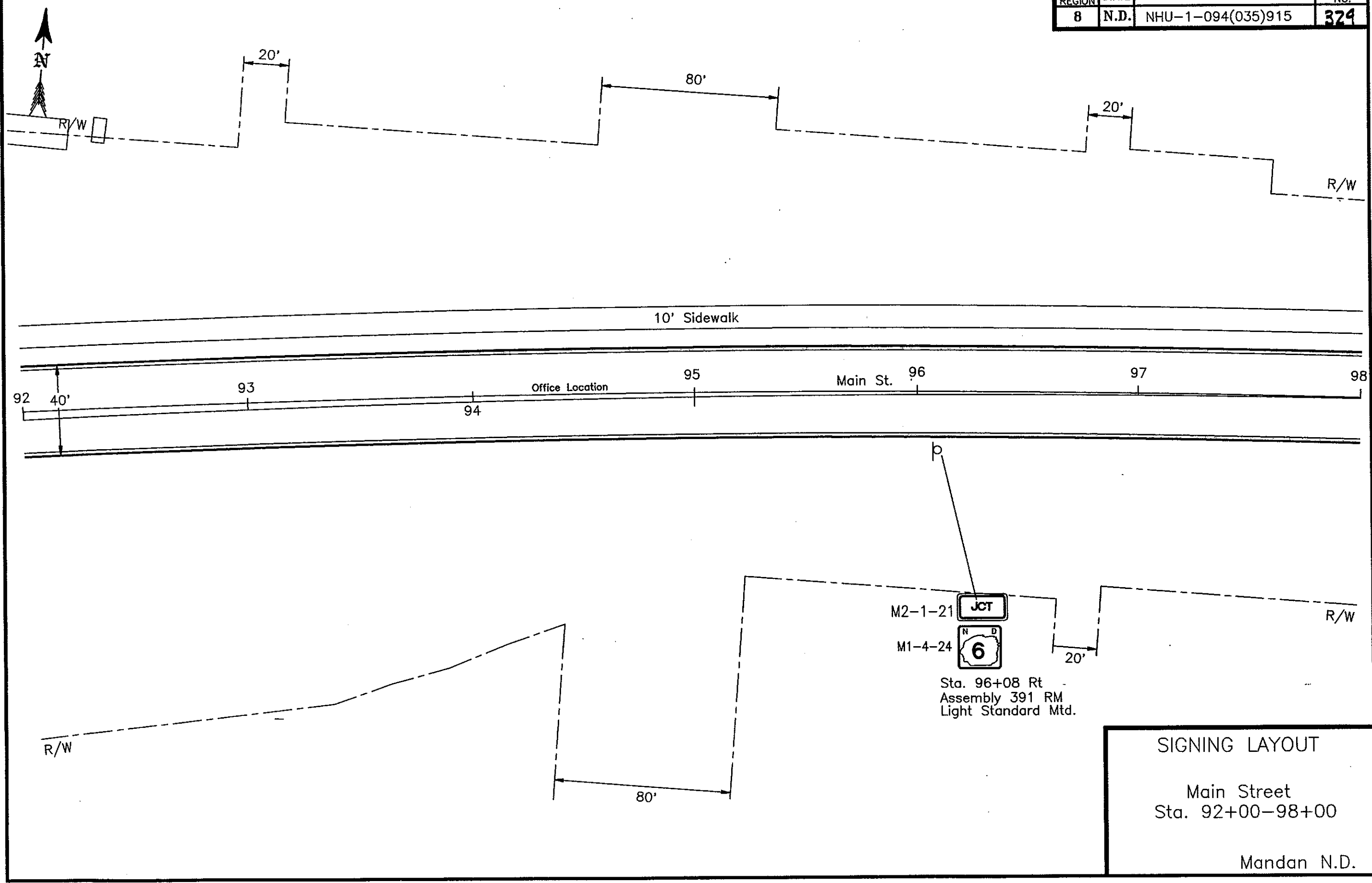


SIGNING LAYOUT

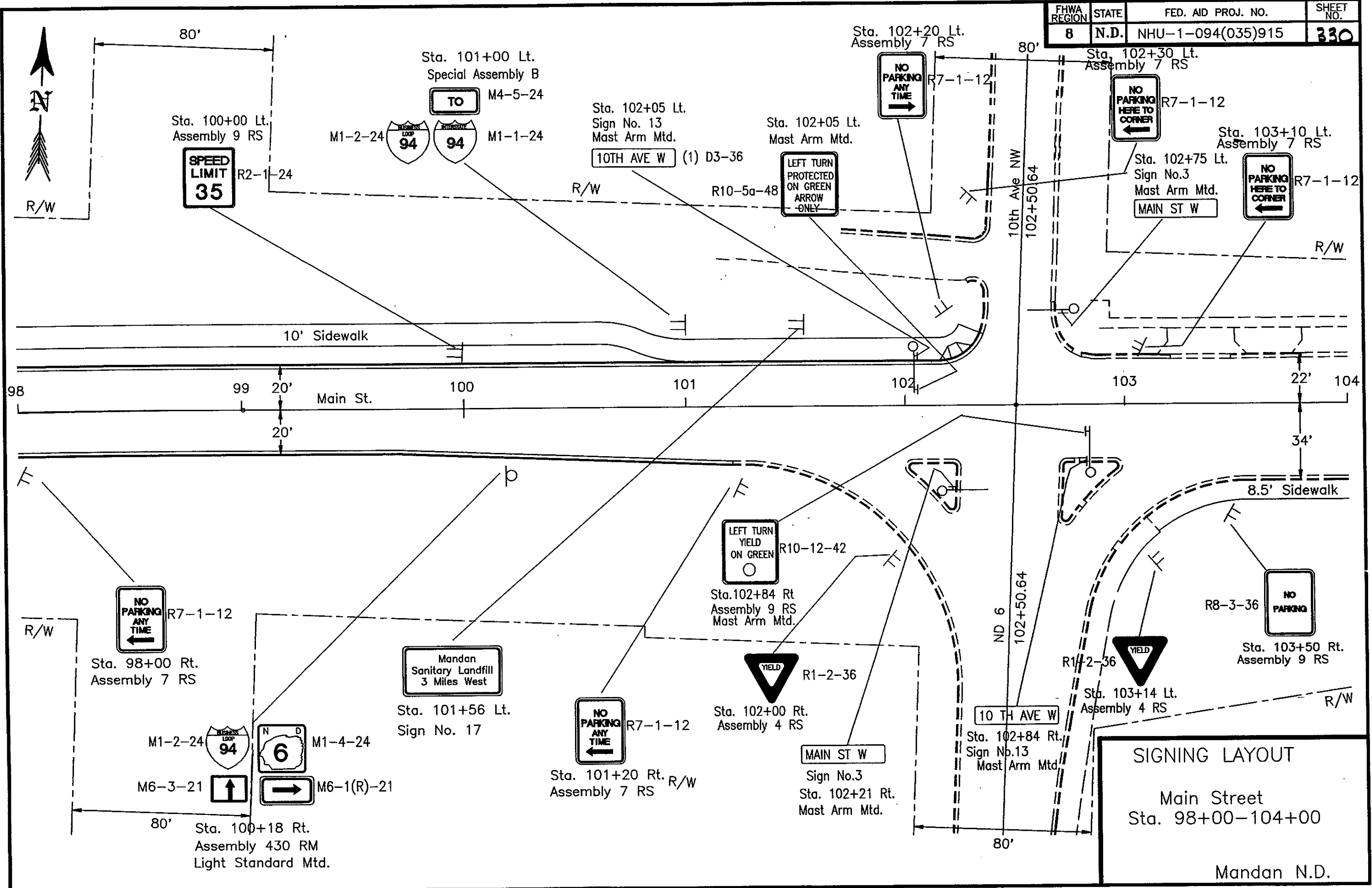
Main Street
Sta. 87+00-92+00

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	329

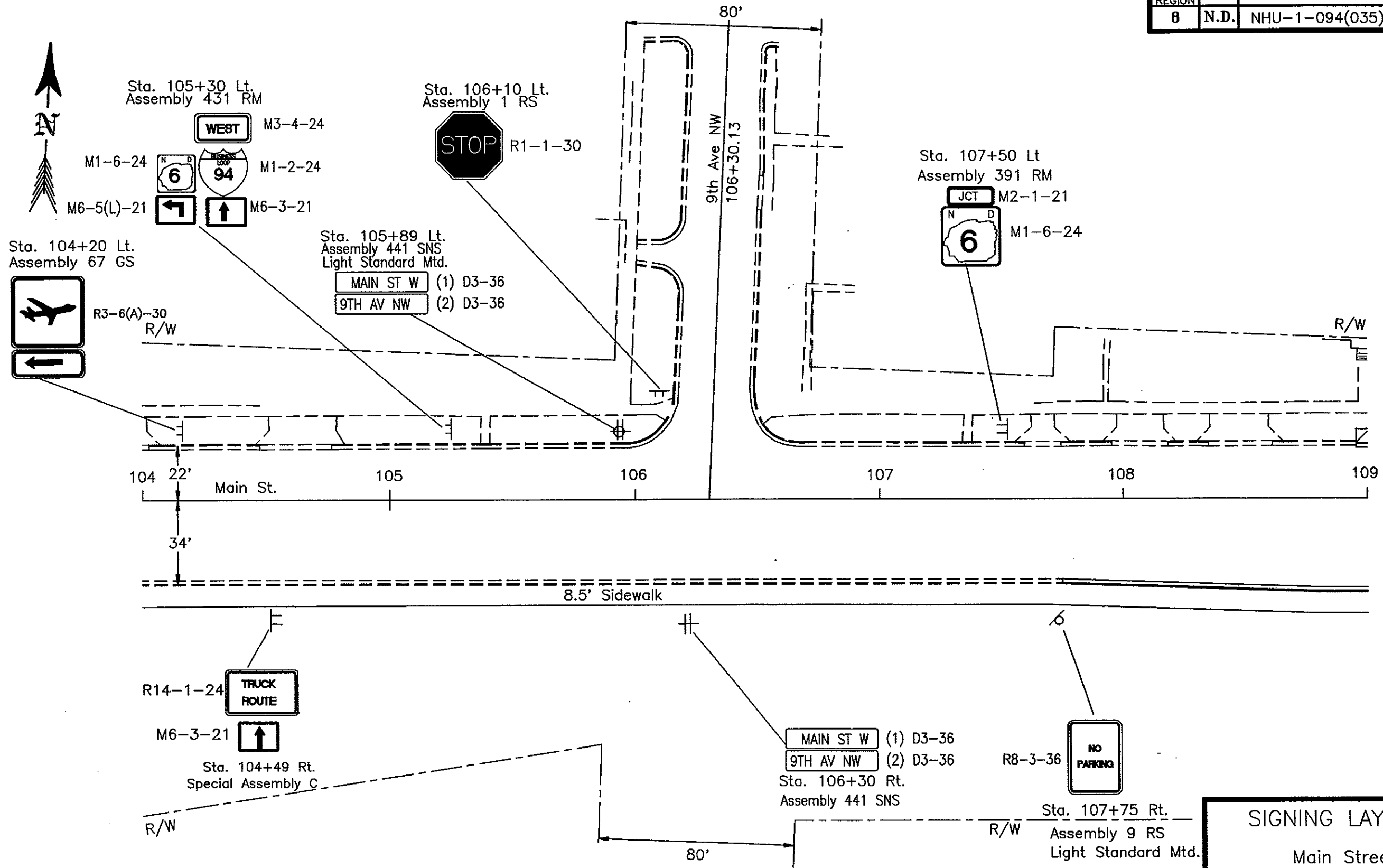


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	330



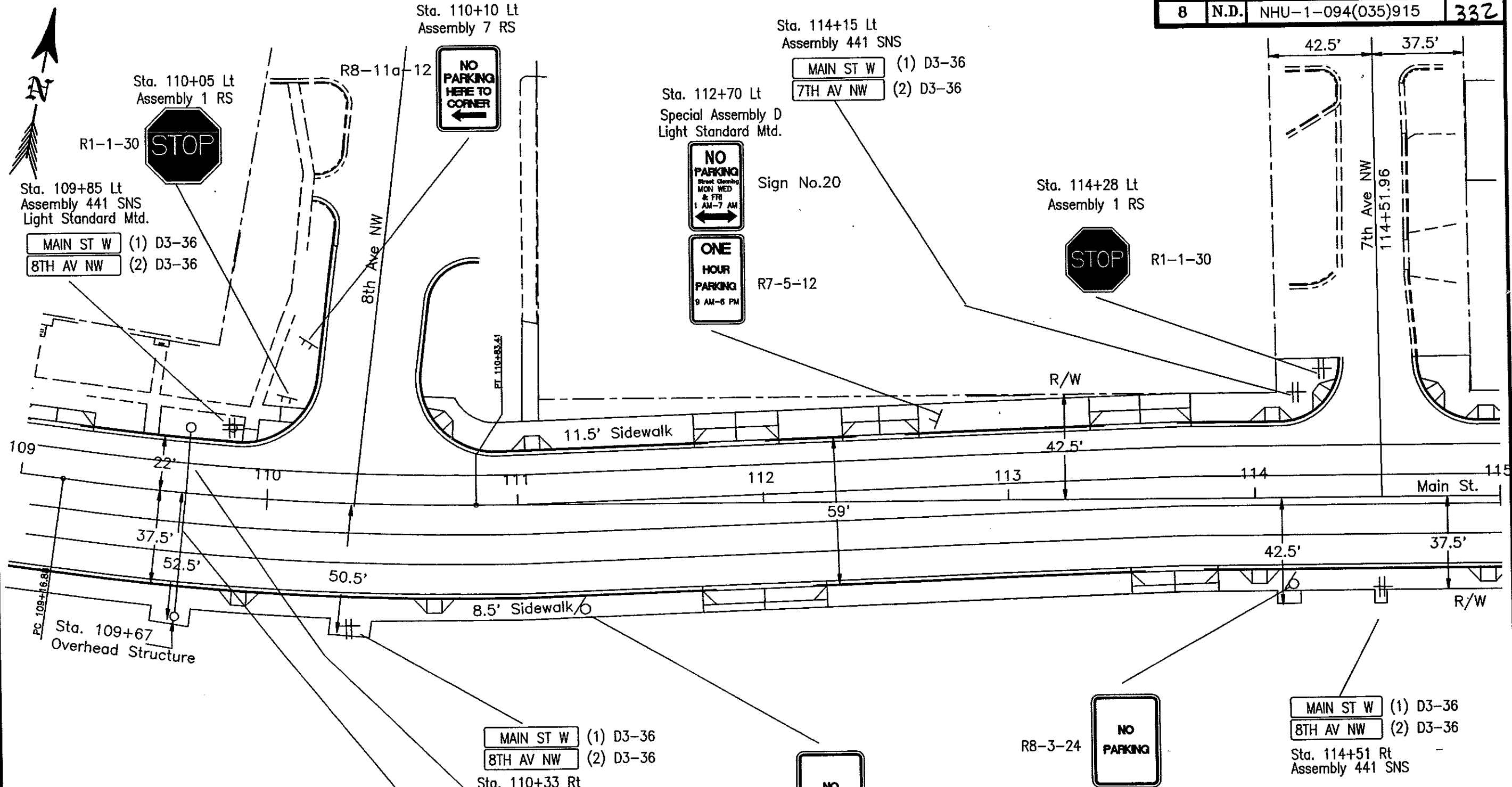
SIGNING LAYOUT
 Main Street
 Sta. 98+00-104+00
 Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	331



SIGNING LAYOUT
 Main Street
 Sta. 104+00-109+00
 Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	332



Overhead Sign Structure 76 Ft. Truss	
Sta. 109+67	1 Ea.
Extruded Aluminum Panels Type II	
Sta. 109+67	66 Sq.Ft.
Class AE Concrete Sign Foundation	
Sta. 109+67	13.95 CU. YD.

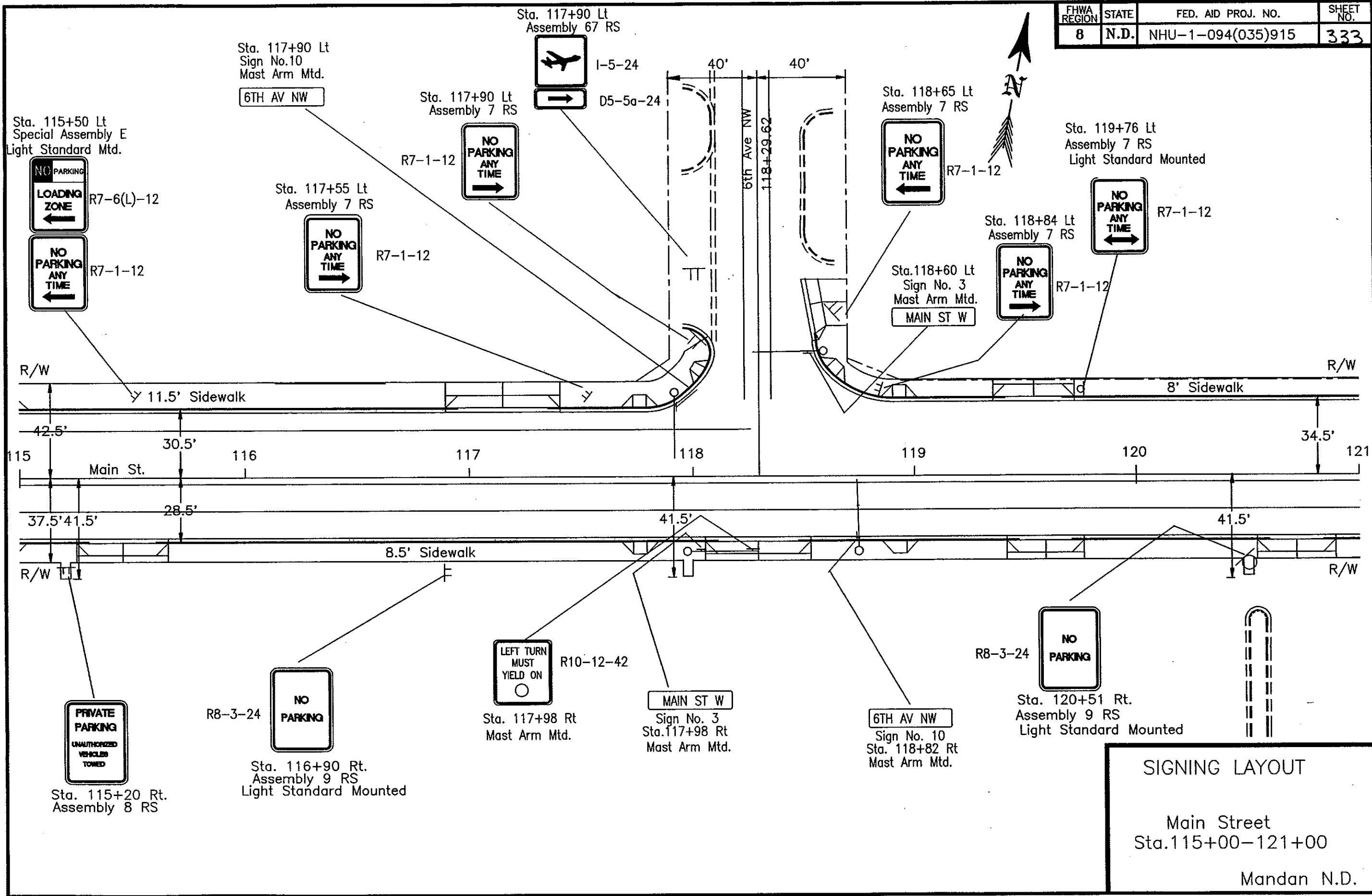
Sta. 109+67 MED Sign No. 6
 SOUTH ONLY
 TO
 Sta. 109+67 MED Sign No. 1

Sta. 111+30 Rt
 Assembly 9 RS
 Light Standard Mounted

Sta. 114+10 Rt
 Assembly 9 RS
 Light Standard Mounted

SIGNING LAYOUT
 Main Street
 Sta. 109+00-115+00
 Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	333

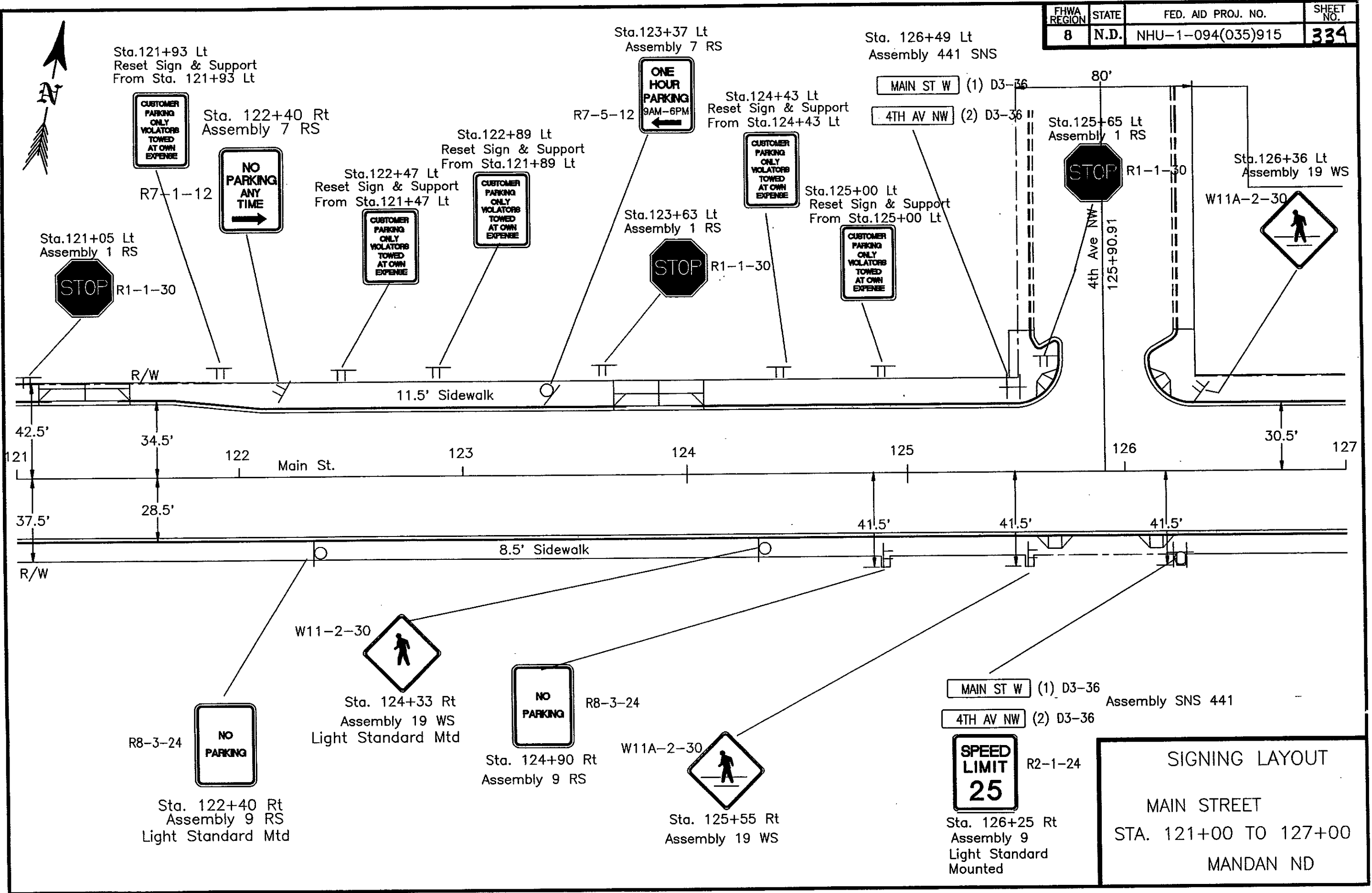


SIGNING LAYOUT

Main Street
Sta. 115+00-121+00

Mandan N.D.

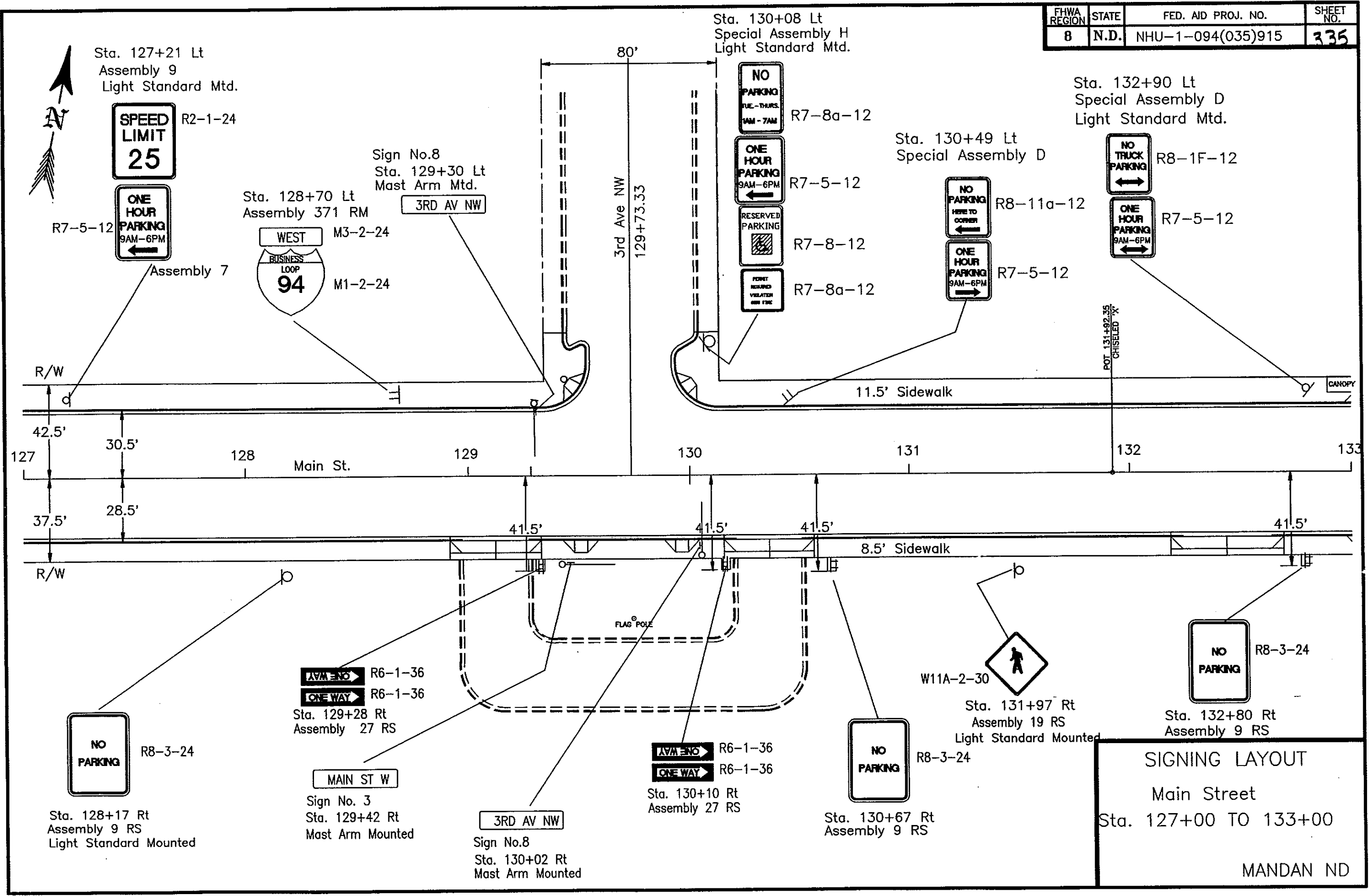
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	334

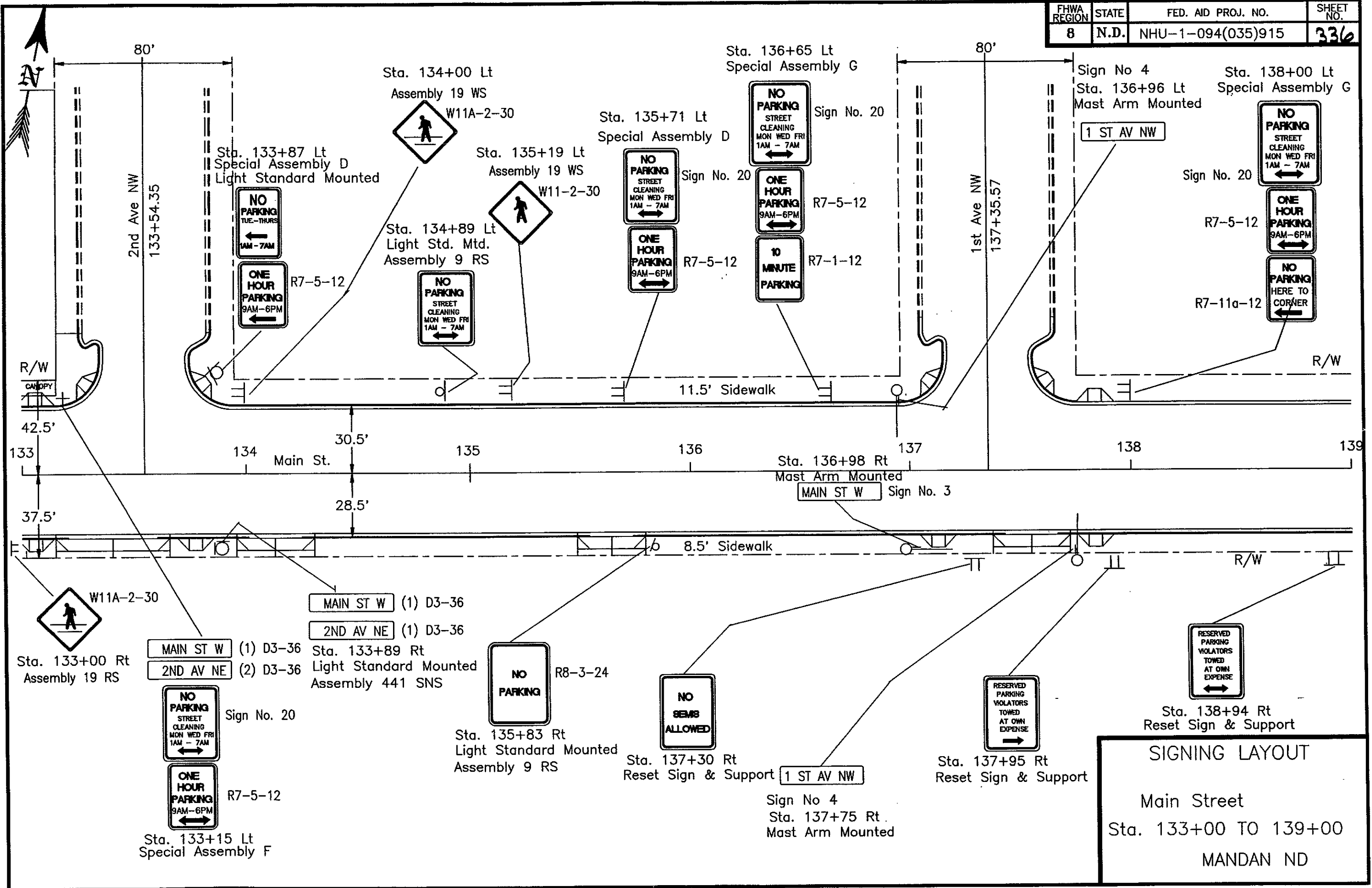


SIGNING LAYOUT

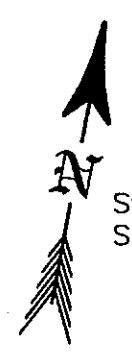
MAIN STREET
STA. 121+00 TO 127+00
MANDAN ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
B	N.D.	NHU-1-094(035)915	335





SIGNING LAYOUT
 Main Street
 Sta. 133+00 TO 139+00
 MANDAN ND

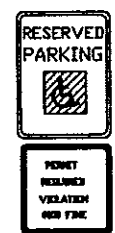


Sta. 139+30 Lt
Special Assembly D



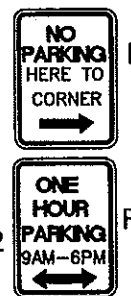
Sign No.20
R7-5-12

Sta. 140+51 Lt
Special Assembly F



R7-8-12
R7-8a-12

Sta. 140+64 Lt
Special Assembly D



R7-11a-12
R7-5-12

Sta. 140+75 Lt
Mast Arm Mounted

COLLINS AV Sign No. 2

81.5'

Collins Ave
141+16.28

Sta. 142+49 Lt.
Assembly 8 RS
Light Standard Mounted



Sign No.20

Sta. 142+94 Lt.
Special Assembly E



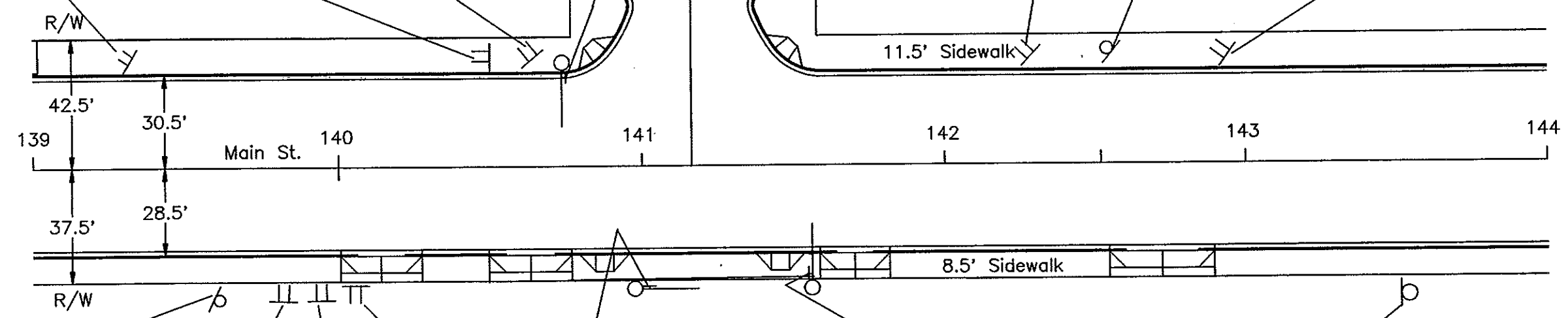
R7-5-12
R8-1F-12

Sta. 142+27 Lt.
Assembly 7 RS



R7-11a-12

11.5' Sidewalk



R8-3-24

Sta. 139+64 Rt.
Assembly 9 RS
Light Standard Mtd.



R7-8-12
R7-8a-12

Sta. 139+83 Rt. Special Assembly F
Reset Sign & Support

Sta. 139+93 Rt.



Sta. 139+91 Rt.
Reset Sign & Support

MAIN ST

Sign No. 14
Sta. 140+97 Rt.
Mast Arm Mounted

COLLINS AV

Sign No.2
Sta. 141+57 Rt.
Mast Arm Mounted

EAST

M3-3-24



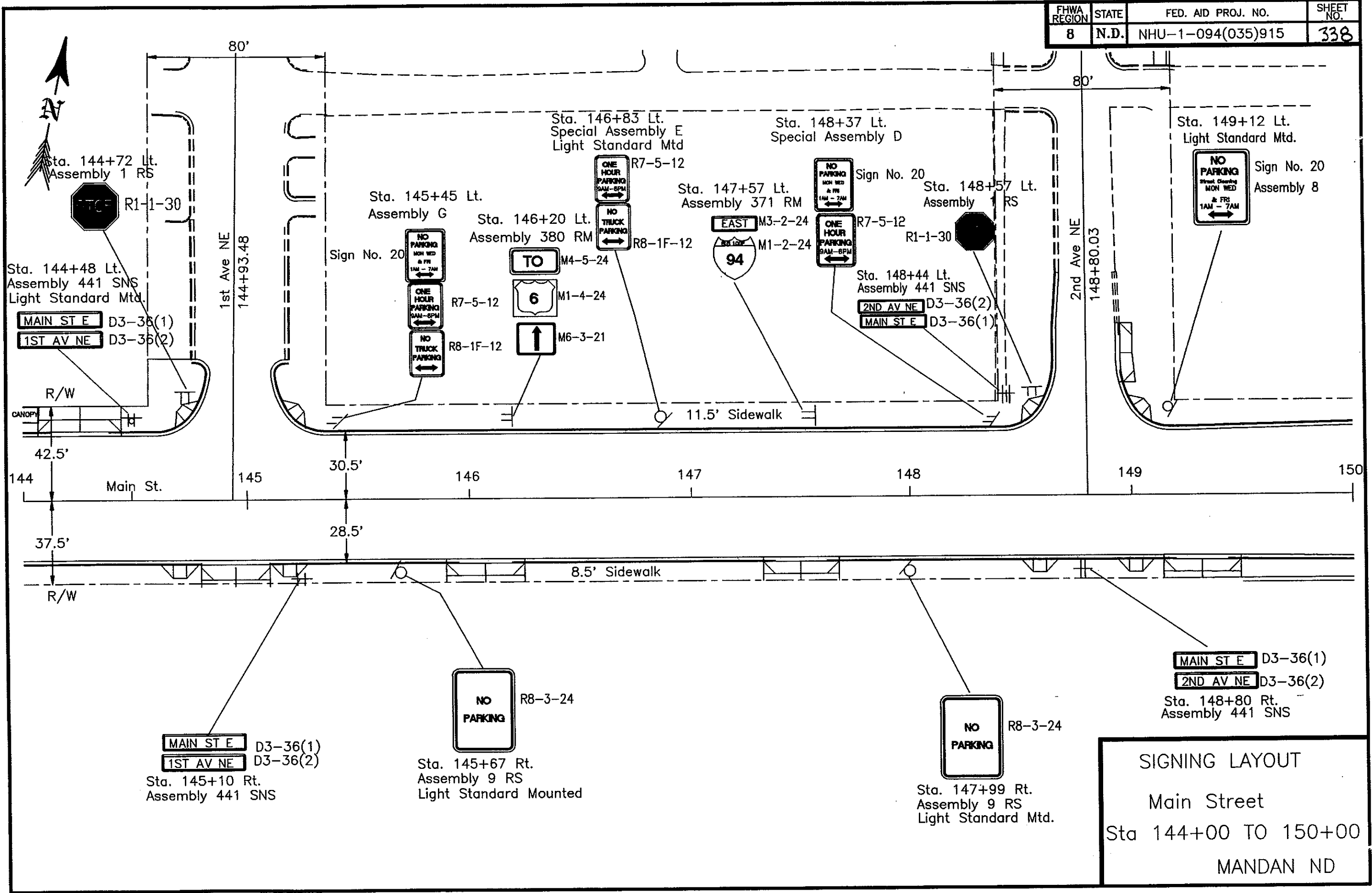
M1-1-24



R8-3-24

Sta. 143+50 Rt.
Light Standard Mtd
Special Assembly H

SIGNING LAYOUT
MAIN STREET
STA. 139+00 TO 144+00
MANDAN ND



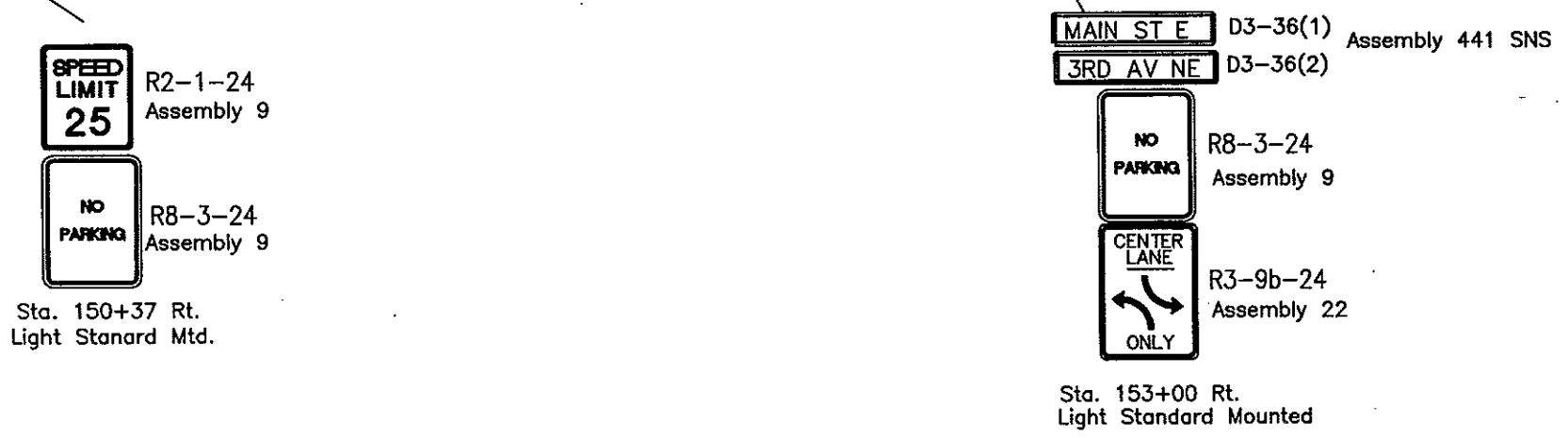
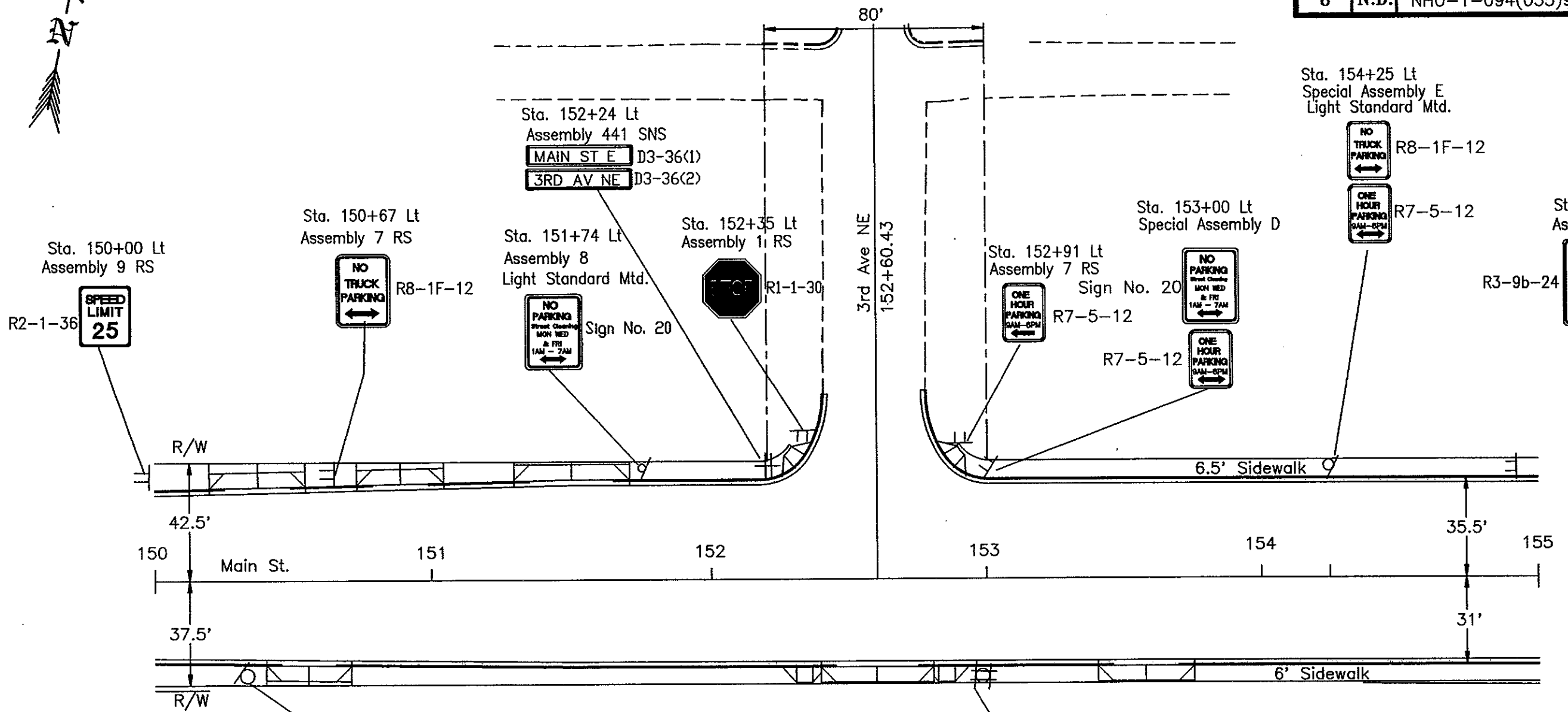
SIGNING LAYOUT

Main Street

Sta 144+00 TO 150+00

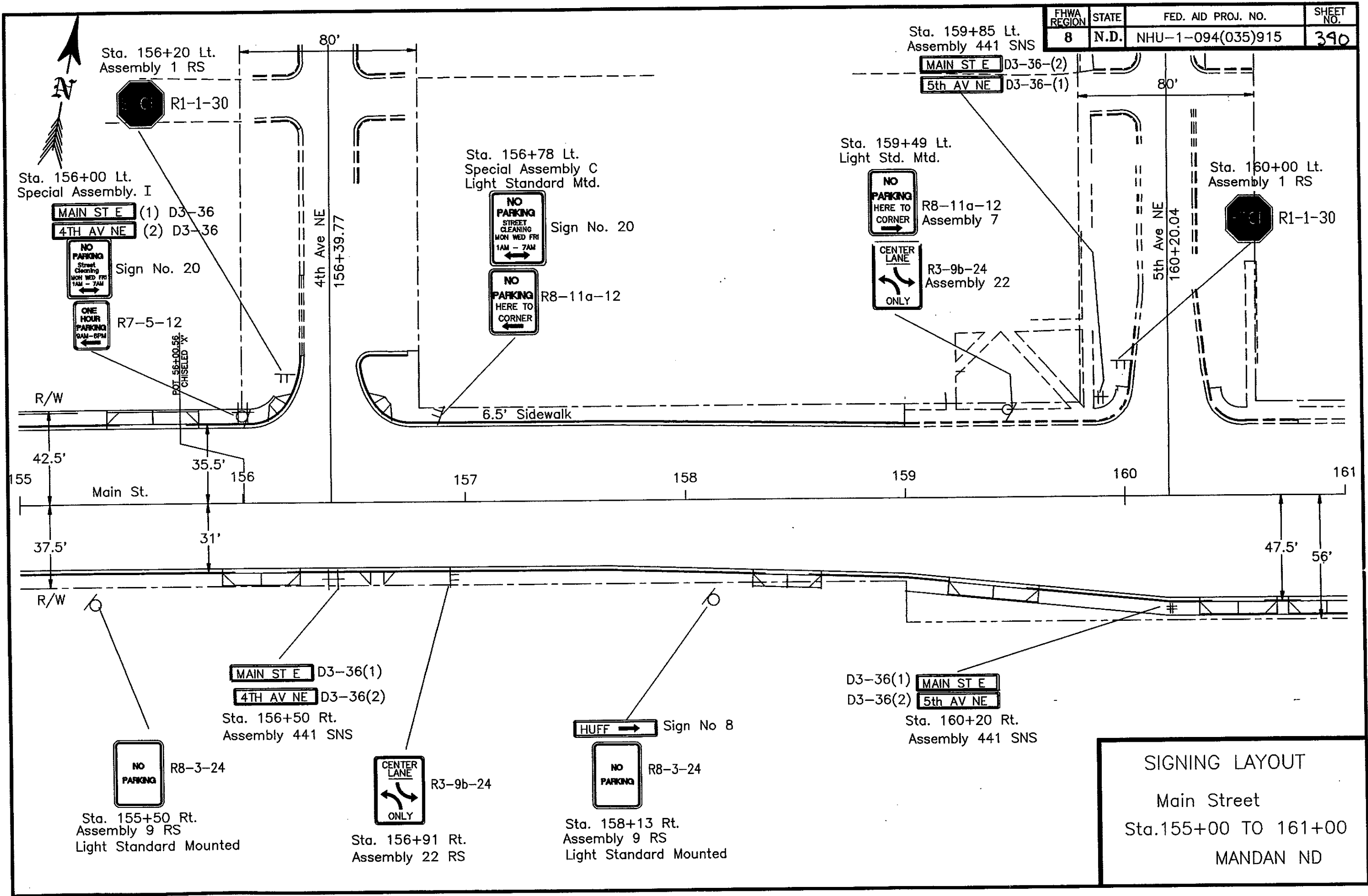
MANDAN ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	339



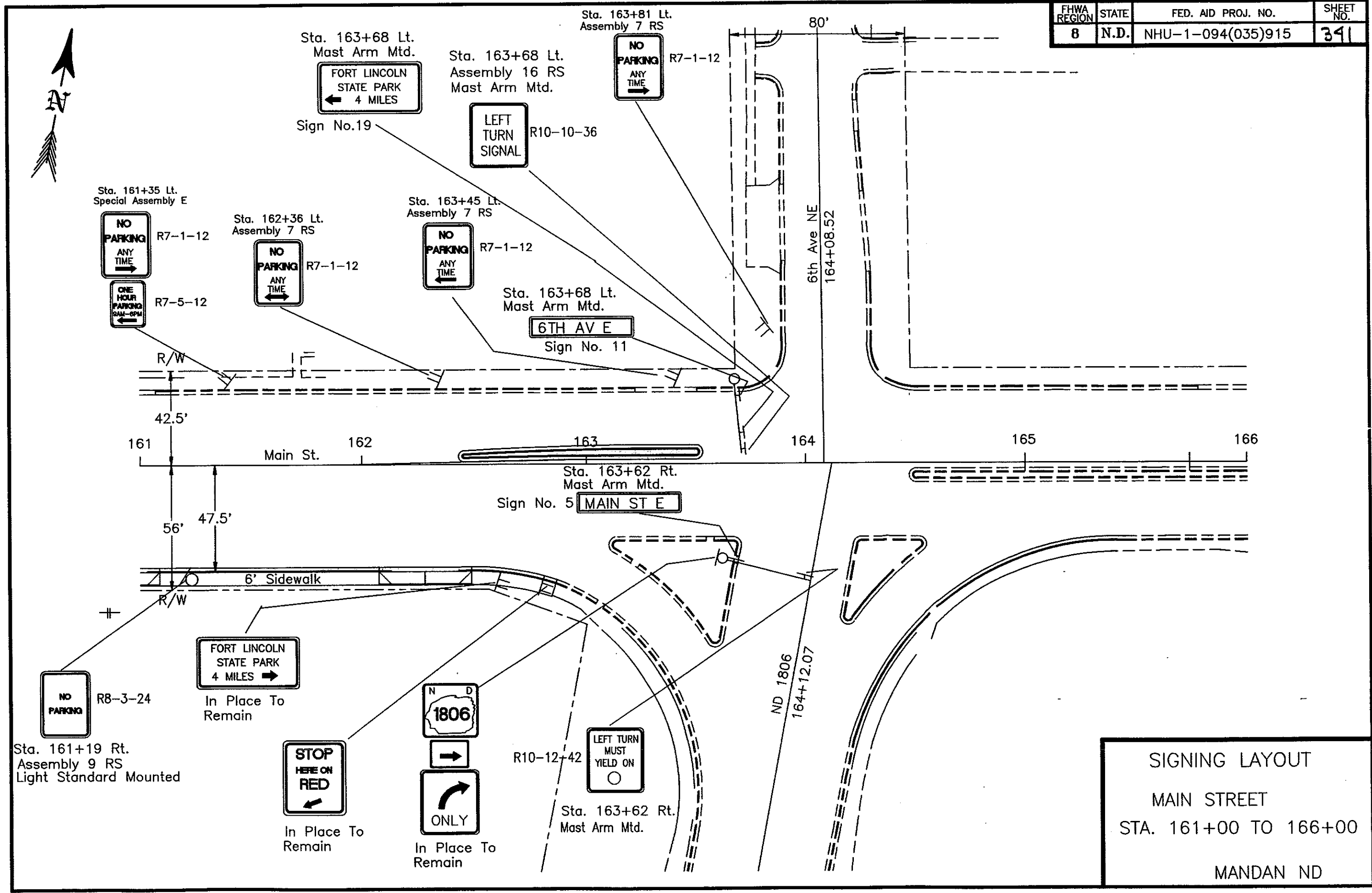
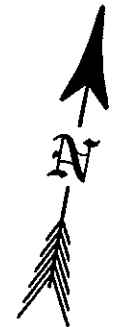
SIGNING LAYOUT
Main Street
Sta. 150+00 TO 155+00
MANDAN ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	390

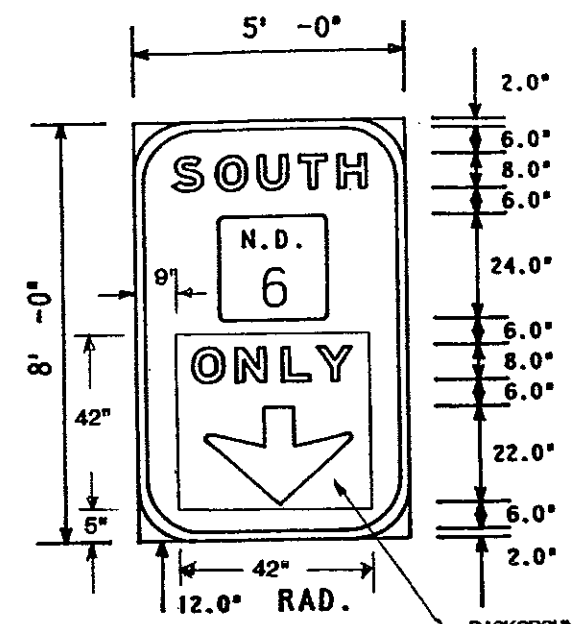


SIGNING LAYOUT
 Main Street
 Sta. 155+00 TO 161+00
 MANDAN ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	341

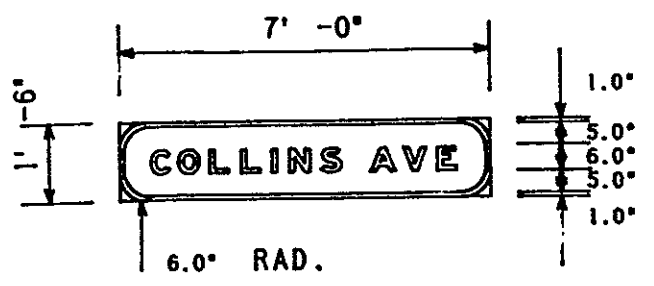


SIGNING LAYOUT
 MAIN STREET
 STA. 161+00 TO 166+00
 MANDAN ND

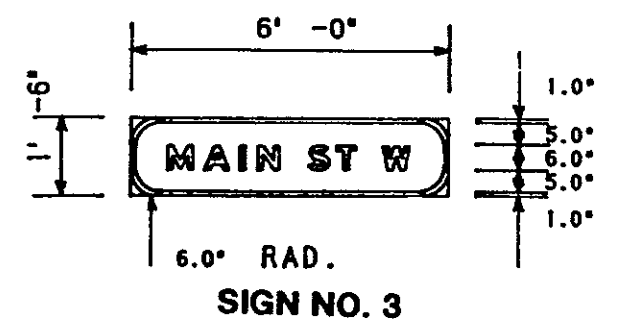


SIGN NO. 1
 AREA: 40.00 SQ.FT.
 Sta. 109+67 MED

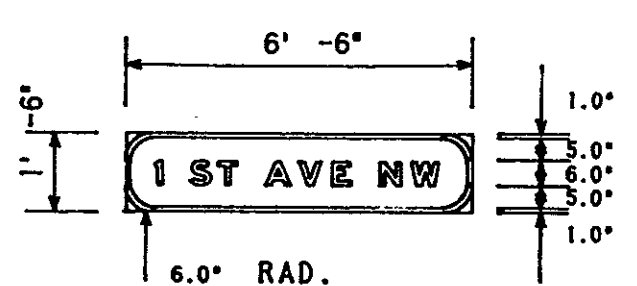
BACKGROUND - YELLOW
 LEGEND & BORDER - (NON-REFL.)



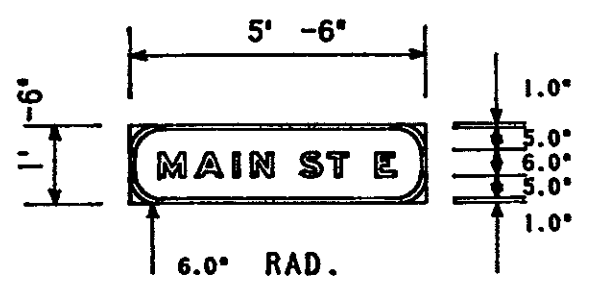
SIGN NO. 2
 AREA: 10.50 SQ.FT.
 Sta. 140+75 Lt
 Sta. 141+57 Rt



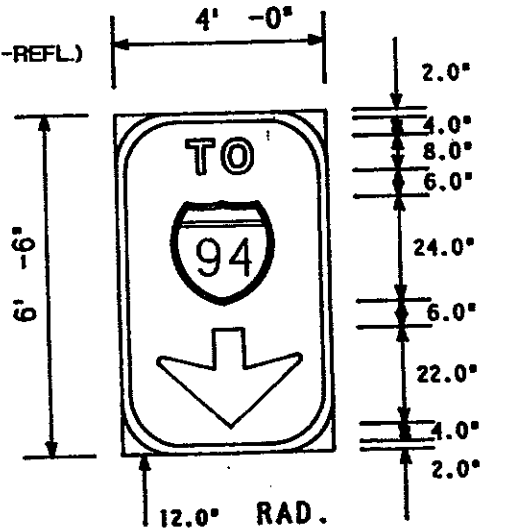
SIGN NO. 3
 AREA: 9.00 SQ.FT.
 Sta. 137+03 Rt Sta. 118+60 Lt
 Sta. 129+42 Rt Sta. 102+75 Lt
 Sta. 117+98 Rt Sta. 102+21 Rt
 Sta. 136+98 Rt



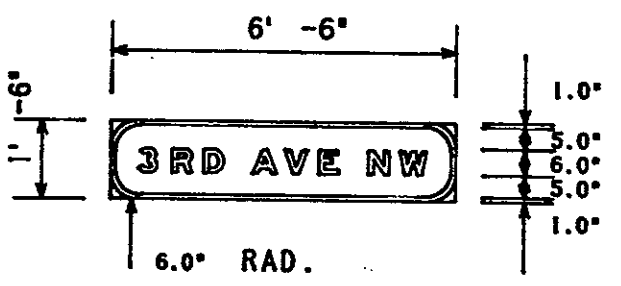
SIGN NO. 4
 AREA: 9.75 SQ.FT.
 Sta. 136+96 Lt
 Sta. 137+75 Rt



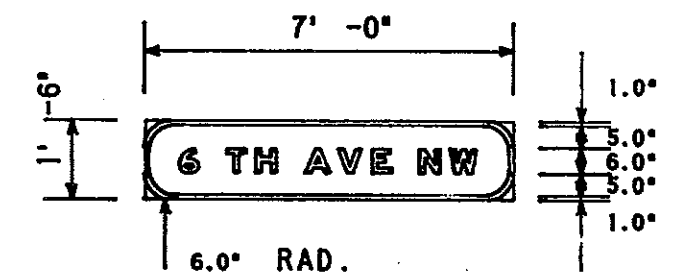
SIGN NO. 5
 AREA: 8.25 SQ.FT.
 Sta. 163+62 Rt



SIGN NO. 6
 AREA: 26.00 SQ.FT.
 Sta. 109+67 MED



SIGN NO. 8
 AREA: 9.75 SQ.FT.
 Sta. 129+30 Lt
 Sta. 130+02 Rt

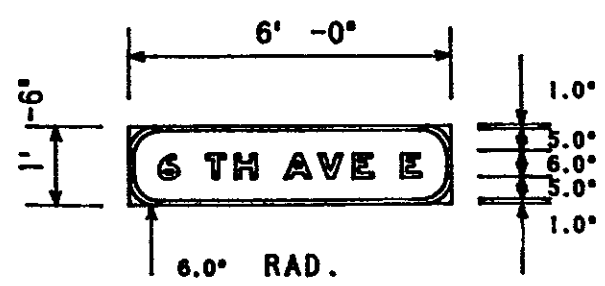


SIGN NO. 10
 AREA: 10.50 SQ.FT.
 Sta. 117+90 Lt
 Sta. 118+82 Rt

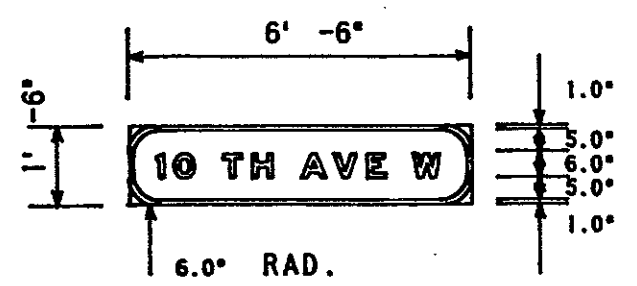
NOTE: All signs on this sheet have green background with white border and legend, except as noted.
 All letters shall be Series E modified, except as noted.

COLORS

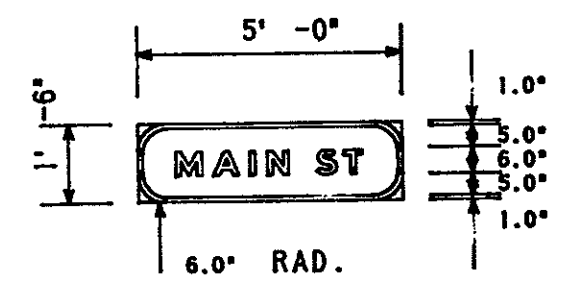
Background - Green, Type 2, Reflective Sheeting
 Legend & Border - White, Type 3A, Reflective Sheeting



SIGN NO. 11
 AREA: 9.00 SQ.FT.
 Sta. 163+68 Lt



SIGN NO. 13
 AREA: 9.75 SQ.FT.
 Sta. 102+05 Lt
 Sta. 102+84 Rt

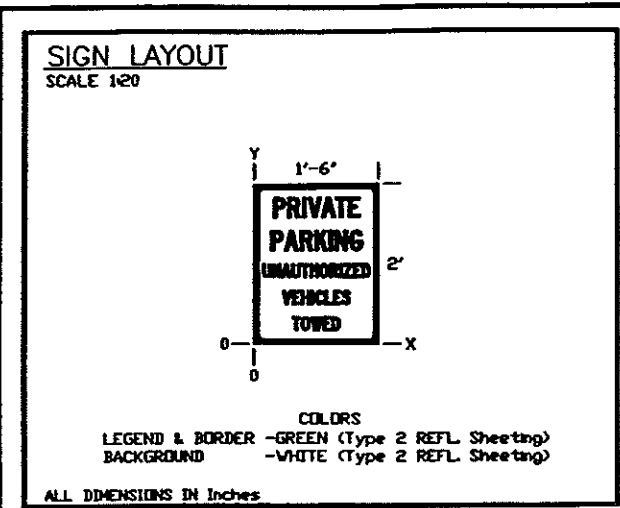


SIGN NO. 14
 AREA: 7.50 SQ.FT.
 Sta. 140+97 Rt

SIGN DETAIL SHEET

Main Street

Mandan ND

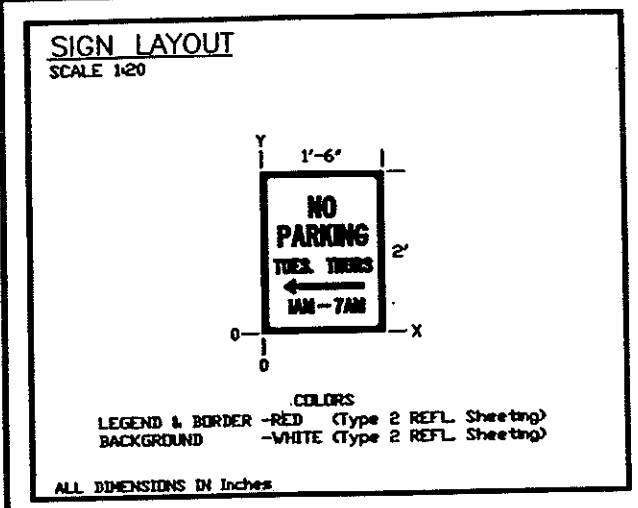
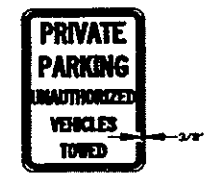


North Dakota
Department of Transportation

SIGN NUMBER	22			
WIDTH x HEIGHT	1'6" x 2'			
BORDER WIDTH	0.625"			
CORNER RADIUS	1.5"			
ALL COORDS TO LOWER LEFT CORNERS				
SYMBOL	X	Y	WID	HT

ALL DIMENSIONS IN Inches

Y FONT	LETTER POSITIONS (X)													HT LEN
19.0	P	R	I	V	A	T	E							3.0
C	2.8	4.9	7.0	7.8	9.8	11.8	13.7							12.4
14.0	P	A	R	K	I	N	G							3.0
C	2.5	4.5	6.7	8.9	10.9	11.8	13.9							13.1
10.0	U	N	A	U	T	H	O	R	I	Z	E	D		2.0
C	1.3	2.7	4.0	5.5	6.9	8.1	9.6	11.0	12.4	13.0	14.4	15.6	15.4	
5.9	V	E	H	I	C	L	E	S						2.0
C	4.2	5.6	6.9	8.3	8.9	10.2	11.5	12.7						9.7
2.0	T	O	W	E	D								2.0	
C	5.6	6.9	8.3	10.0	11.3								6.8	



North Dakota
Department of Transportation

SIGN NUMBER	23			
WIDTH x HEIGHT	1'6" x 2'			
BORDER WIDTH	0.625"			
CORNER RADIUS	1.5"			
ALL COORDS TO LOWER LEFT CORNERS				
SYMBOL	X	Y	WID	HT
ALNG_180	3.2	5.9	11.75	2.0

ALL DIMENSIONS IN Inches

Y FONT	LETTER POSITIONS (X)													HT LEN
17.2	N	O												3.0
C	7.1	9.2												3.8
13.0	P	A	R	K	I	N	G							3.0
C	2.5	4.5	6.7	8.9	10.9	11.8	13.9							13.1
9.0	T	U	E	S		T	H	U	R	S				2.0
C	1.8	3.1	4.5	5.7	7.0	9.7	10.9	12.3	13.7	15.1				14.4
3.0	I	A	M	-	7	A	M							2.0
C	3.9	4.6	6.1	8.3	10.8	12.1	13.6							11.0

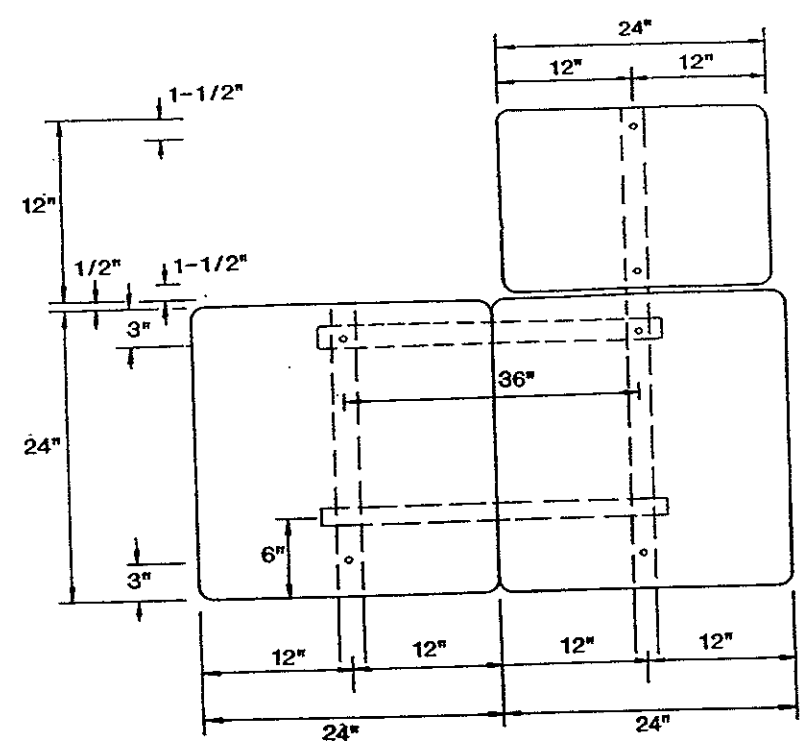


SIGN DETAIL SHEET

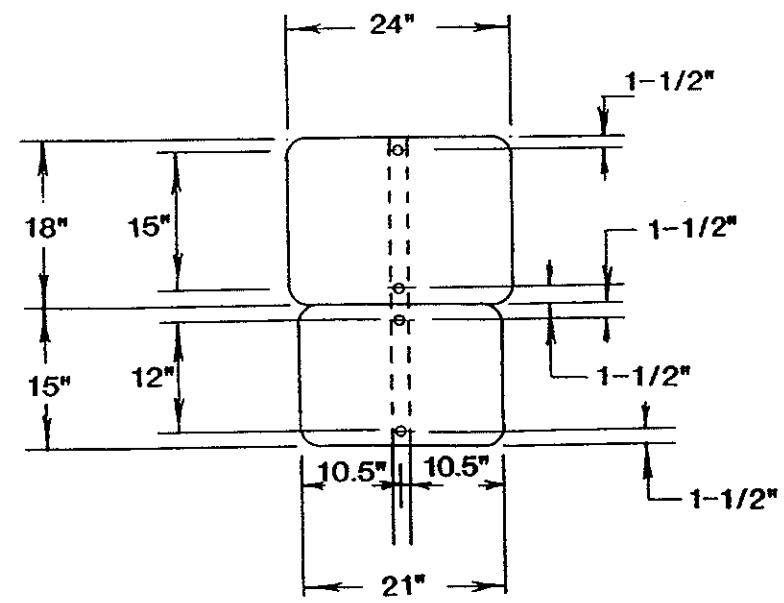
MAIN STREET

MANDAN ND

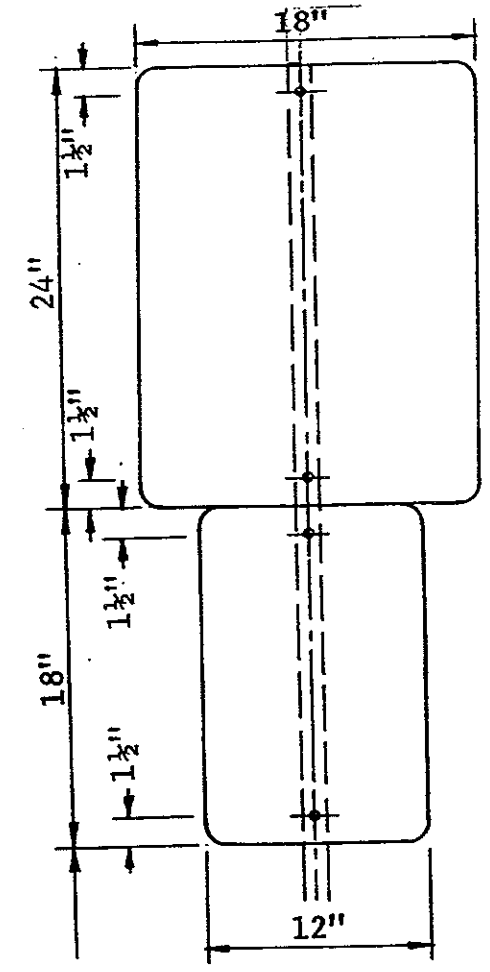
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	347



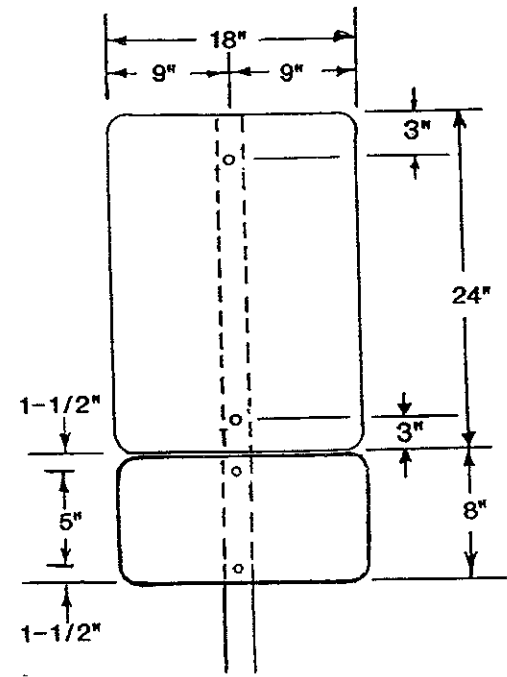
SPECIAL ASSEMBLY 'B'
Sta. 101+00 Lt



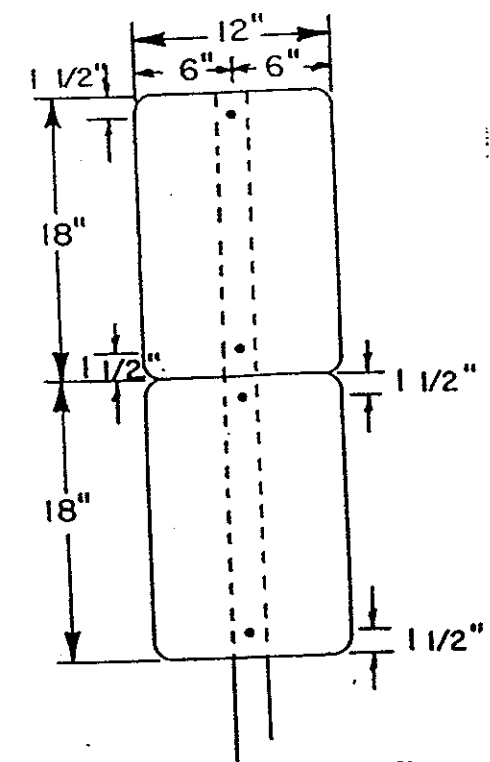
SPECIAL ASSEMBLY 'C'
Sta. 104+49 Rt



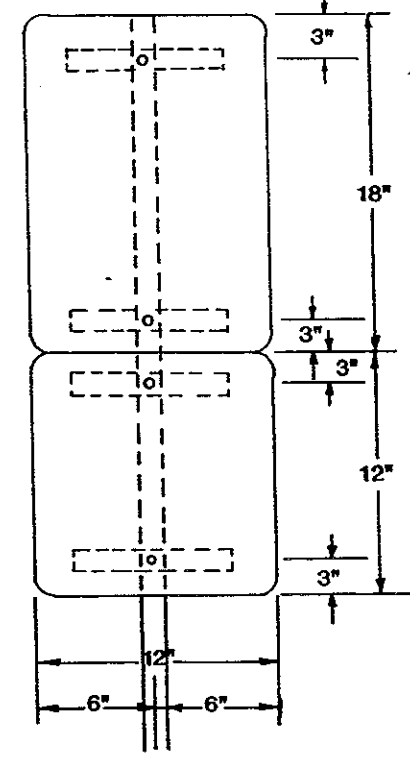
SPECIAL ASSEMBLY 'D'
Sta. 112+70 Lt
Sta. 153+00 Lt



Special Assembly A
Sta 87+80 Rt
Sta 87+90 Lt



SPECIAL ASSEMBLY 'E'
Sta. 115+50 Lt Sta. 130+49 Lt Sta. 132+30 Lt
Sta. 146+83 Lt Sta. 148+37 Lt Sta. 154+25 Lt Sta. 161+35 Lt

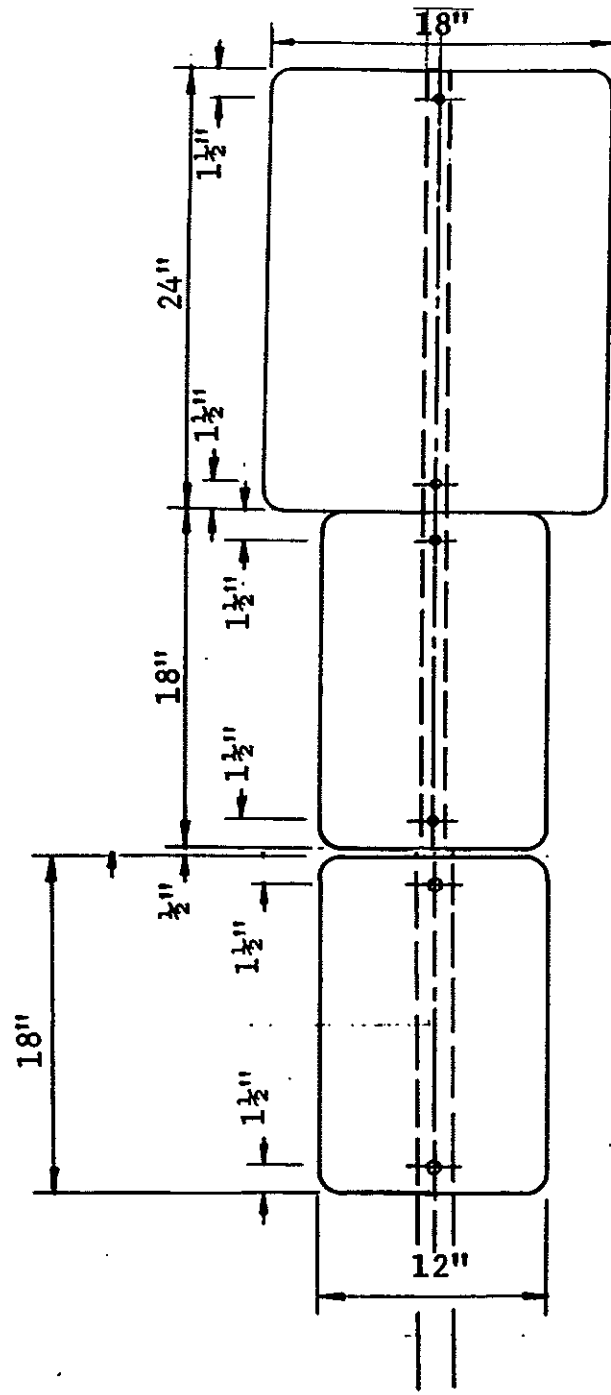


SPECIAL ASSEMBLY 'F'
Sta. 140+51 Lt Sta. 139+93 Rt Sta. 143+32 RT
Sta. 143+50 Rt Sta. 144+57 Rt Sta. 144+70 RT

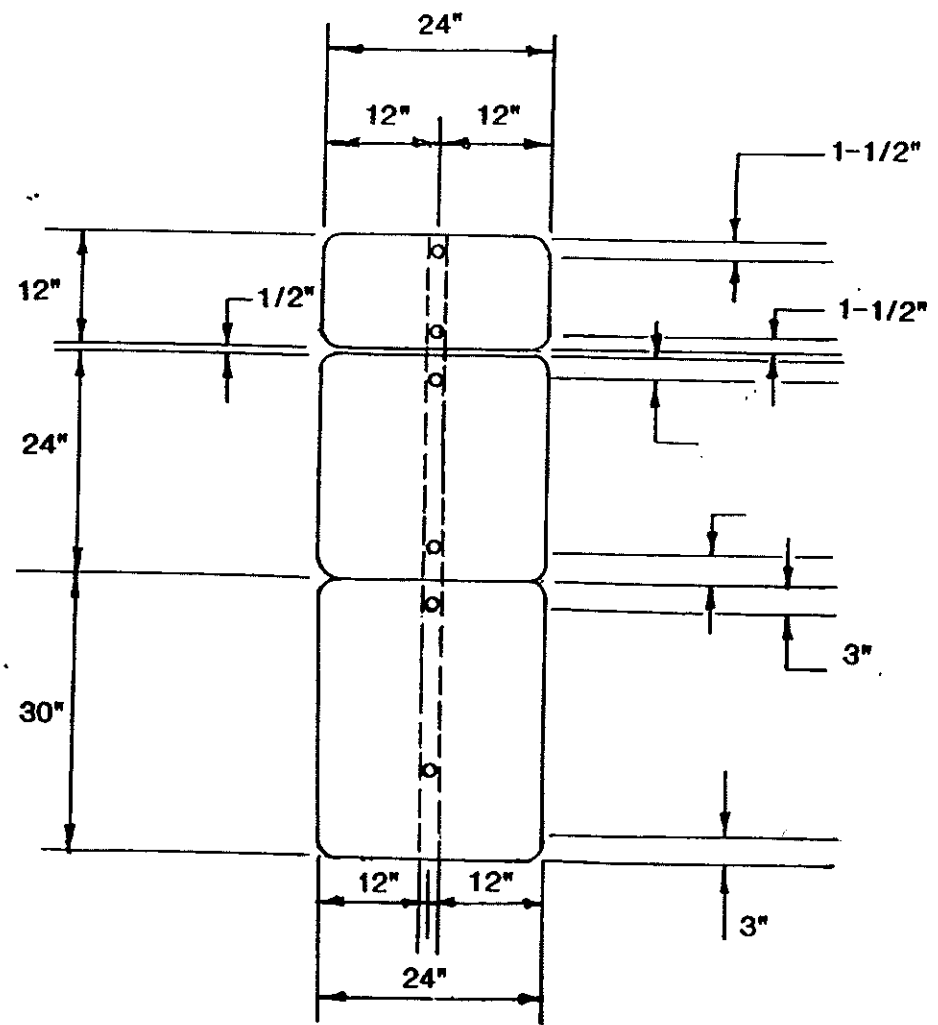
SIGN DETAIL SHEET

Main Street

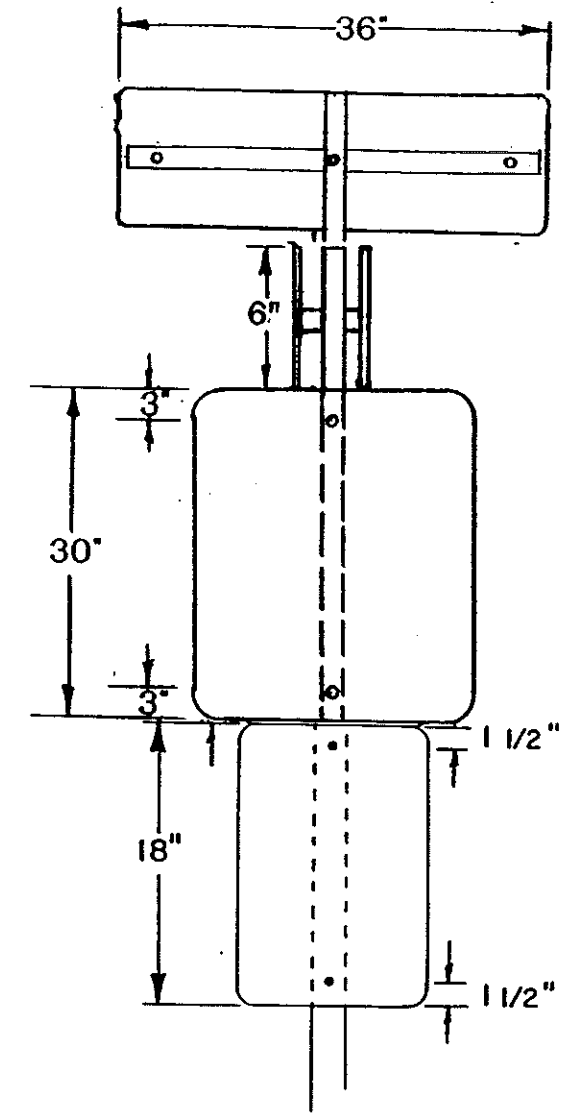
Mandan ND



Special Assembly 'G'
AREA: 9.00 Sq.Ft.
Sta. 136+65 Lt Sta. 138+00 Lt



Special Assembly 'H'
AREA: 11.00 Sq.Ft.
Sta.



Special Assembly 'I'
AREA: 11.00 Sq.Ft.
Sta. 156+00 Lt

SIGN DETAIL SHEET

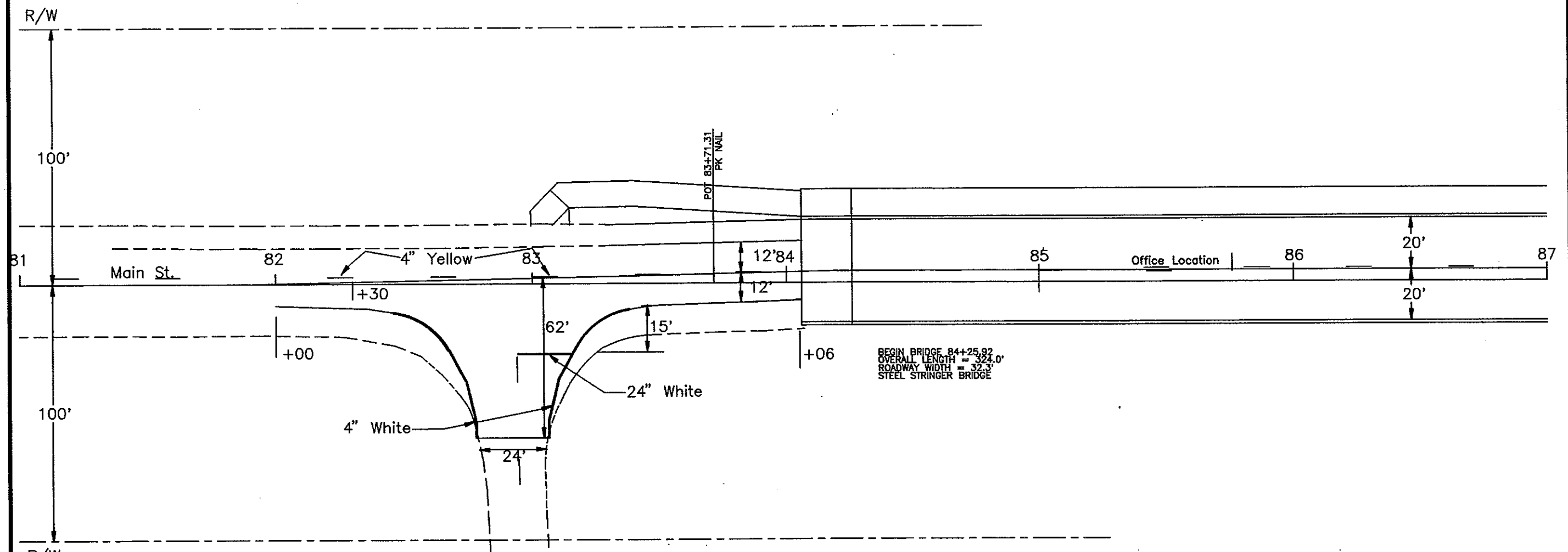
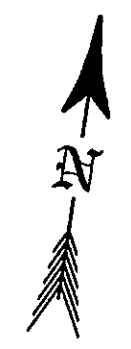
Main Street

Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	349

Plastic Pavement Marking Film- 4" Line

4" Yellow Lane Line, 10' line, 30' Skip	124 LF
Total	124 LF



Pavement Marking Painted - 4" Line

4" White Edge Line	374 LF
4" Yellow Lane Line, 10' Line, 30' Skip	20 LF
Total	394 LF

Pavement Marking Painted - 24" Line

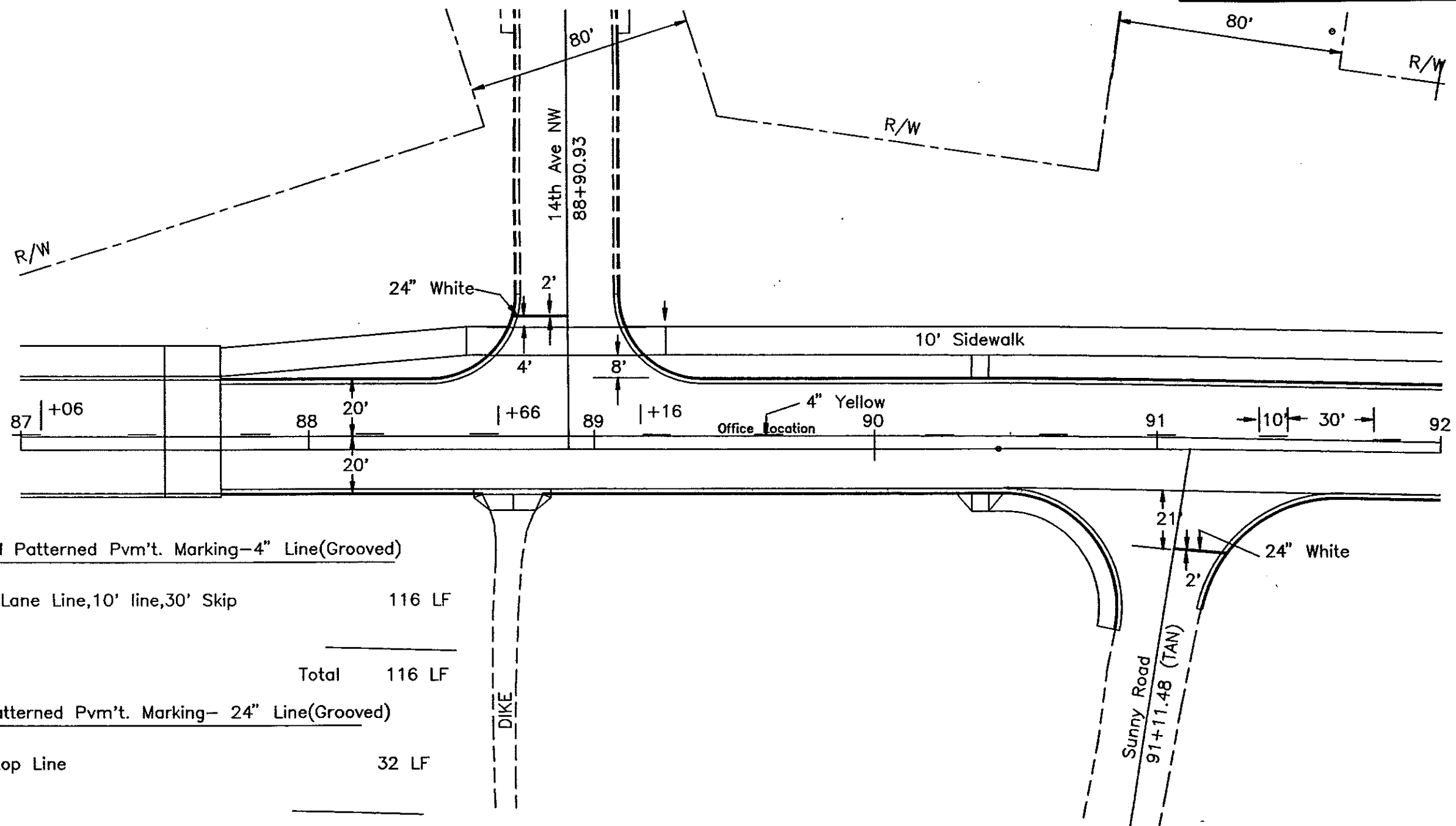
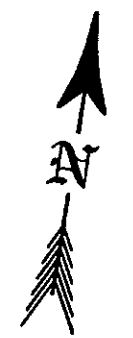
24" White Stop Line	23 LF
Total	23 LF

PAVEMENT MARKING LAYOUT

Main Street
Sta. 81+00-87+00

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	350



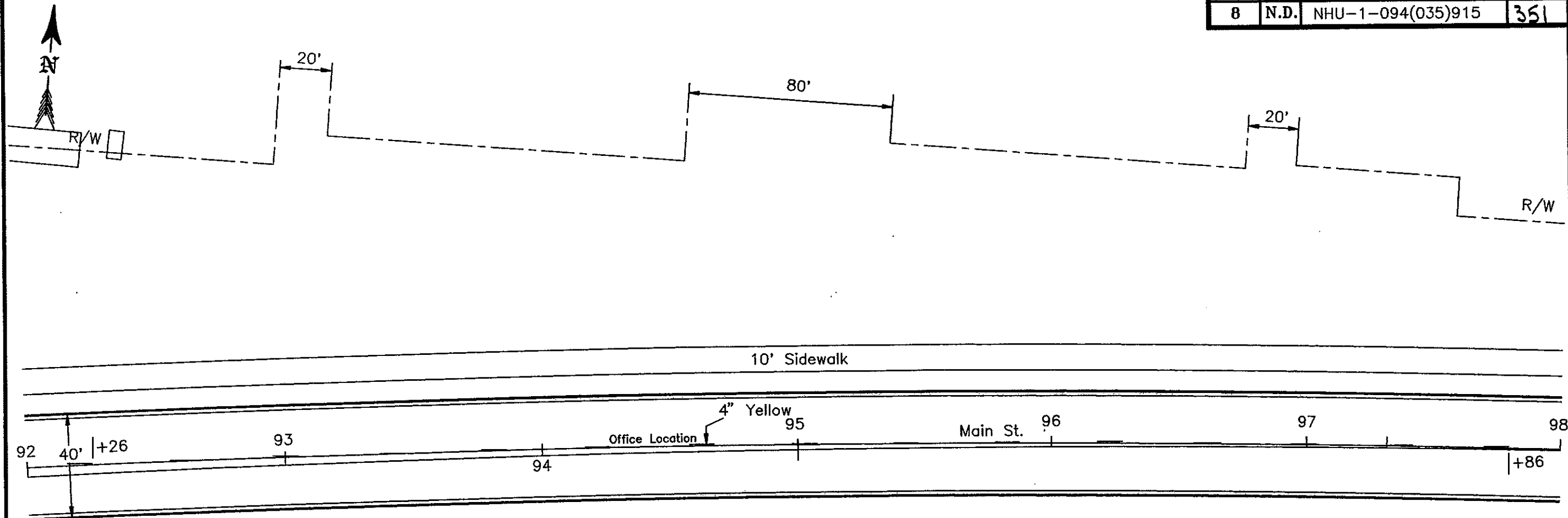
Preformed Patterned Pvm't. Marking-4" Line(Grooved)	
4" Yellow Lane Line,10' line,30' Skip	116 LF
Total	116 LF
Preformed Patterned Pvm't. Marking- 24" Line(Grooved)	
24" White Stop Line	32 LF
Total	32 LF
Preformed Patterned Pvm't. Marking- 24" Line(Grooved)	
6" White Crosswalk Line	94 LF
Total	94 LF

PAVEMENT MARKING
LAYOUT

Main Street
Sta. 87+00-92+00

Mandan N.D.

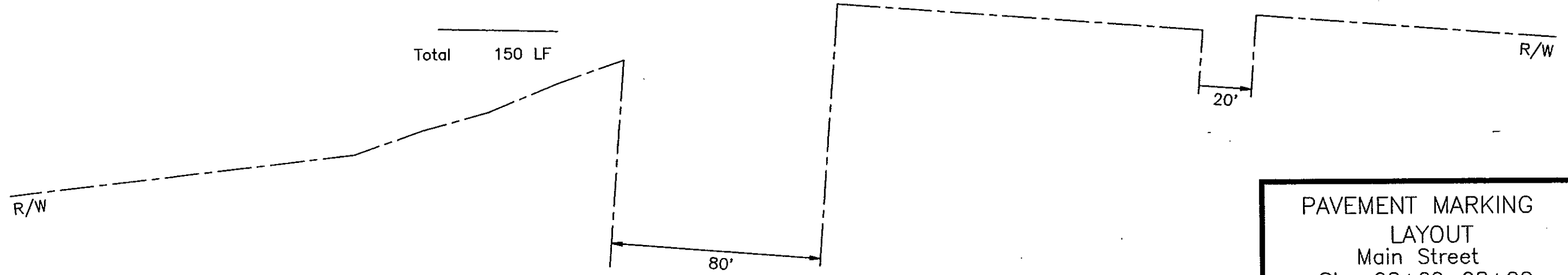
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	351



Plastic Pavement Marking Film -4" Line

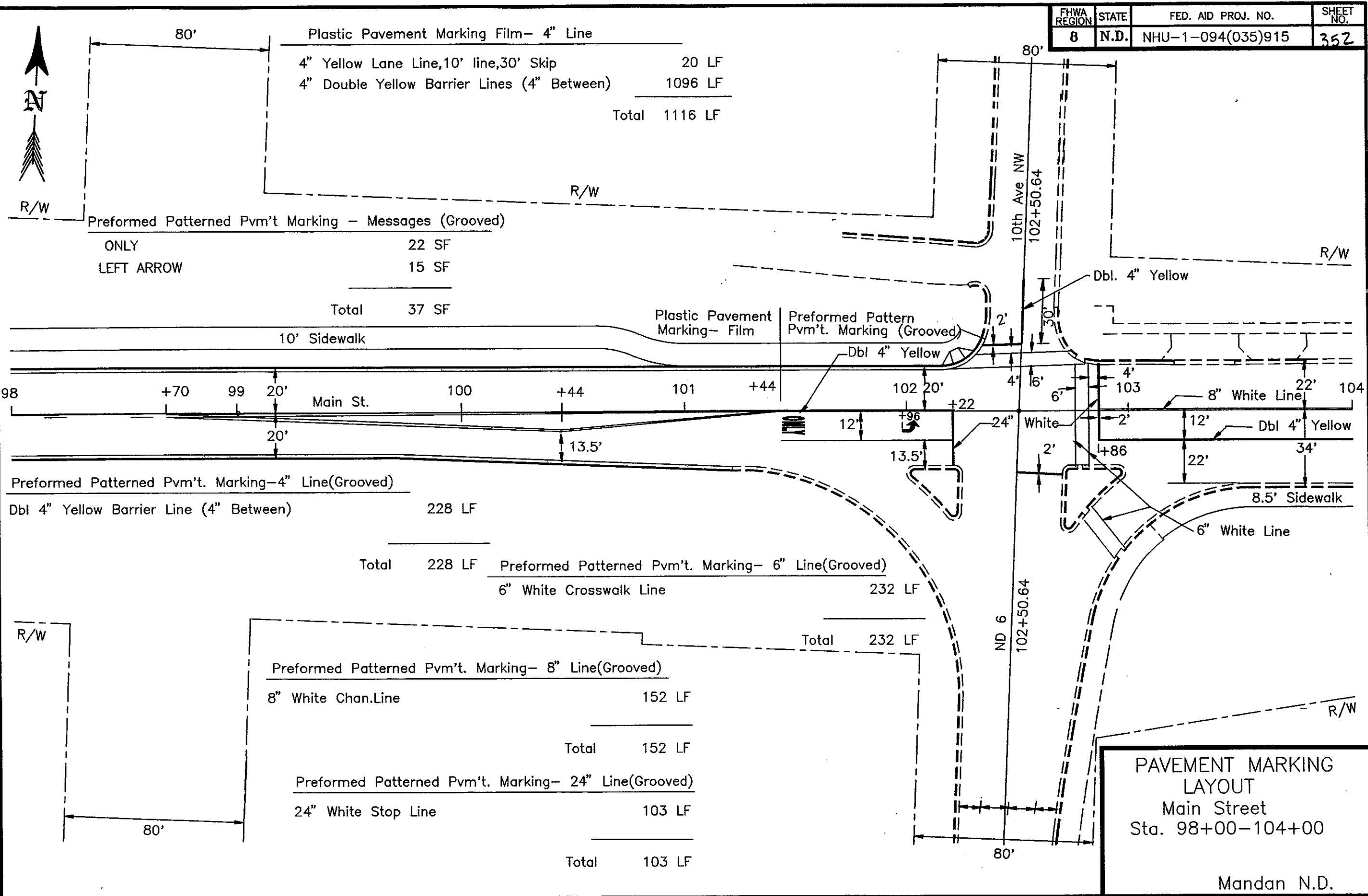
4" Yellow Lane Line, 10' line, 30' Skip 150 LF

Total 150 LF



PAVEMENT MARKING LAYOUT
Main Street
Sta. 92+00-98+00
Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	352



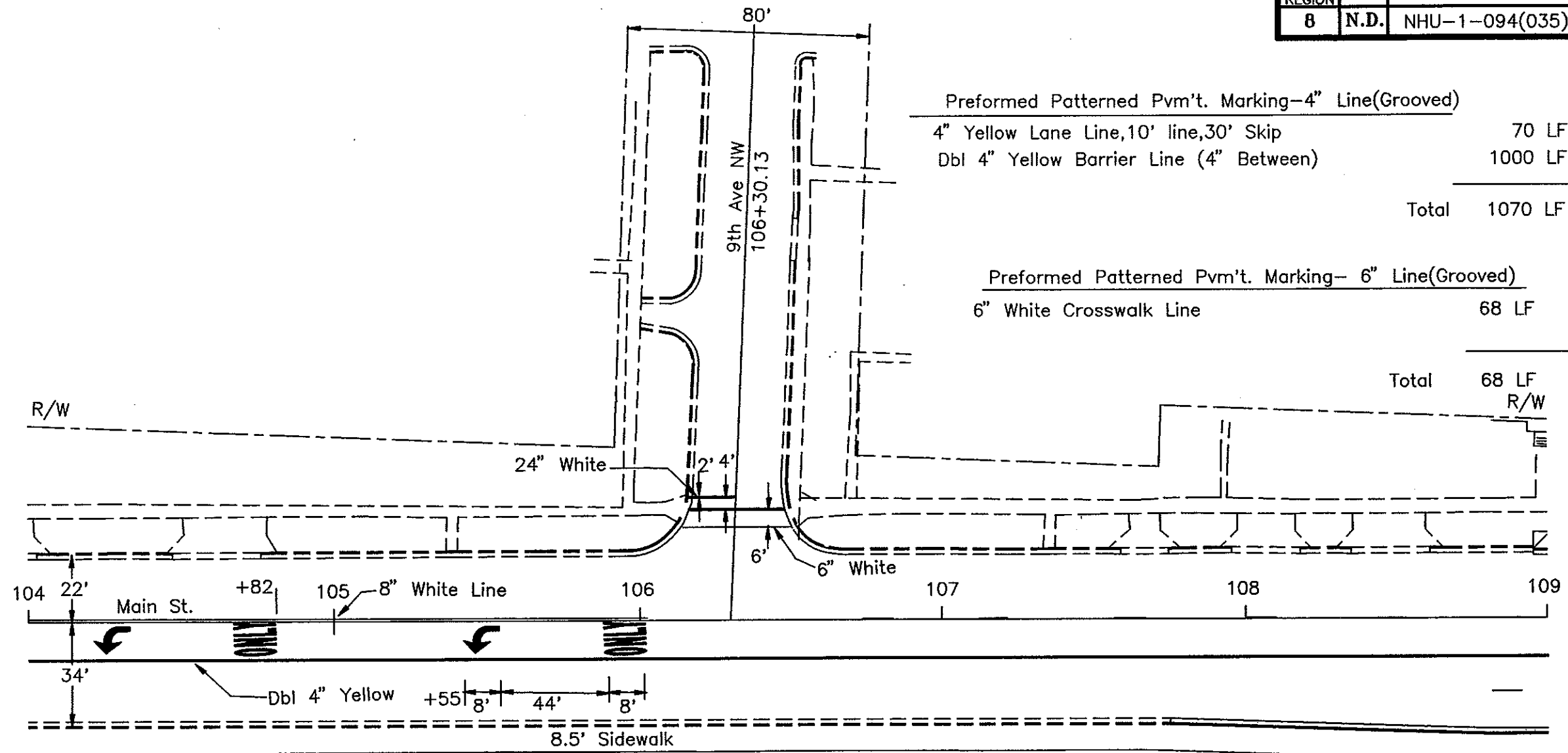
80'	Plastic Pavement Marking Film- 4" Line	
	4" Yellow Lane Line, 10' line, 30' Skip	20 LF
	4" Double Yellow Barrier Lines (4" Between)	1096 LF
	Total	1116 LF

Preformed Patterned Pvm't Marking - Messages (Grooved)	
ONLY	22 SF
LEFT ARROW	15 SF
Total	37 SF

Preformed Patterned Pvm't. Marking-4" Line(Grooved)		
Dbl 4" Yellow Barrier Line (4" Between)	228 LF	
Total	228 LF	
Preformed Patterned Pvm't. Marking- 6" Line(Grooved)		
6" White Crosswalk Line	232 LF	
Total	232 LF	

Preformed Patterned Pvm't. Marking- 8" Line(Grooved)		
8" White Chan.Line	152 LF	
Total	152 LF	
Preformed Patterned Pvm't. Marking- 24" Line(Grooved)		
24" White Stop Line	103 LF	
Total	103 LF	

PAVEMENT MARKING LAYOUT
Main Street
Sta. 98+00-104+00
Mandan N.D.



Preformed Patterned Pvm't. Marking-4" Line(Grooved)

4" Yellow Lane Line,10' line,30' Skip	70 LF
Dbl 4" Yellow Barrier Line (4" Between)	1000 LF
Total	1070 LF

Preformed Patterned Pvm't. Marking- 6" Line(Grooved)

6" White Crosswalk Line	68 LF
Total	68 LF

Preformed Patterned Pvm't Marking - Messages(Grooved)

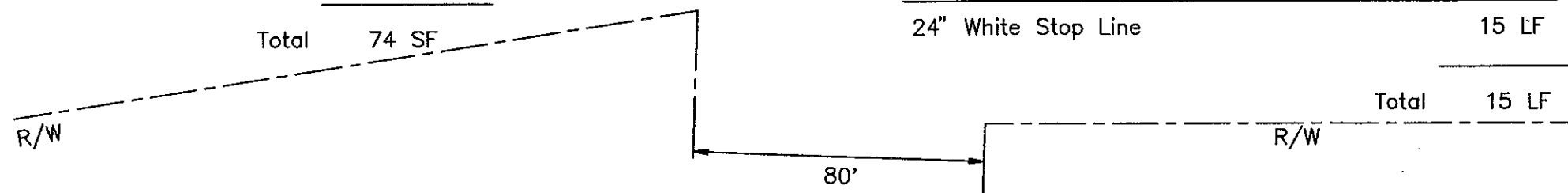
ONLY	44 SF
LEFT ARROW	30 SF
Total	74 SF

Preformed Patterned Pvm't. Marking- 8" Line(Grooved)

8" White Chan Line	203 LF
Total	203 LF

Preformed Patterned Pvm't. Marking-24" White Line(Grooved)

24" White Stop Line	15 LF
Total	15 LF



PAVEMENT MARKING LAYOUT

Main Street
Sta.104+00-109+00

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(035)915	354

Preformed Patterned Pvm't. Marking-4" Line(Grooved)

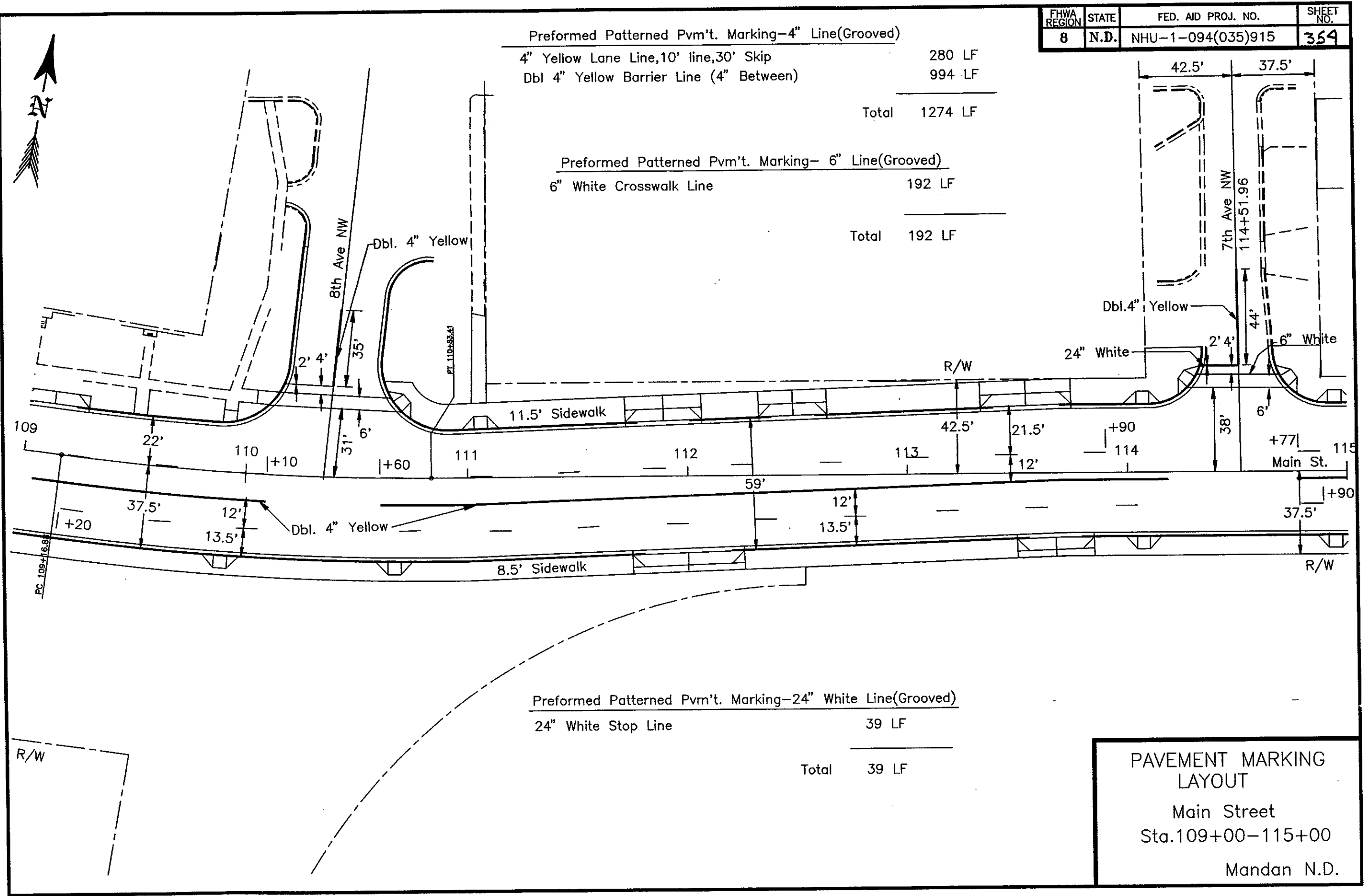
4" Yellow Lane Line,10' line,30' Skip	280 LF
Dbl 4" Yellow Barrier Line (4" Between)	994 LF
Total	1274 LF

Preformed Patterned Pvm't. Marking- 6" Line(Grooved)

6" White Crosswalk Line	192 LF
Total	192 LF

Preformed Patterned Pvm't. Marking-24" White Line(Grooved)

24" White Stop Line	39 LF
Total	39 LF



Preformed Patterned Pvm't. Marking-4" Line(Grooved)

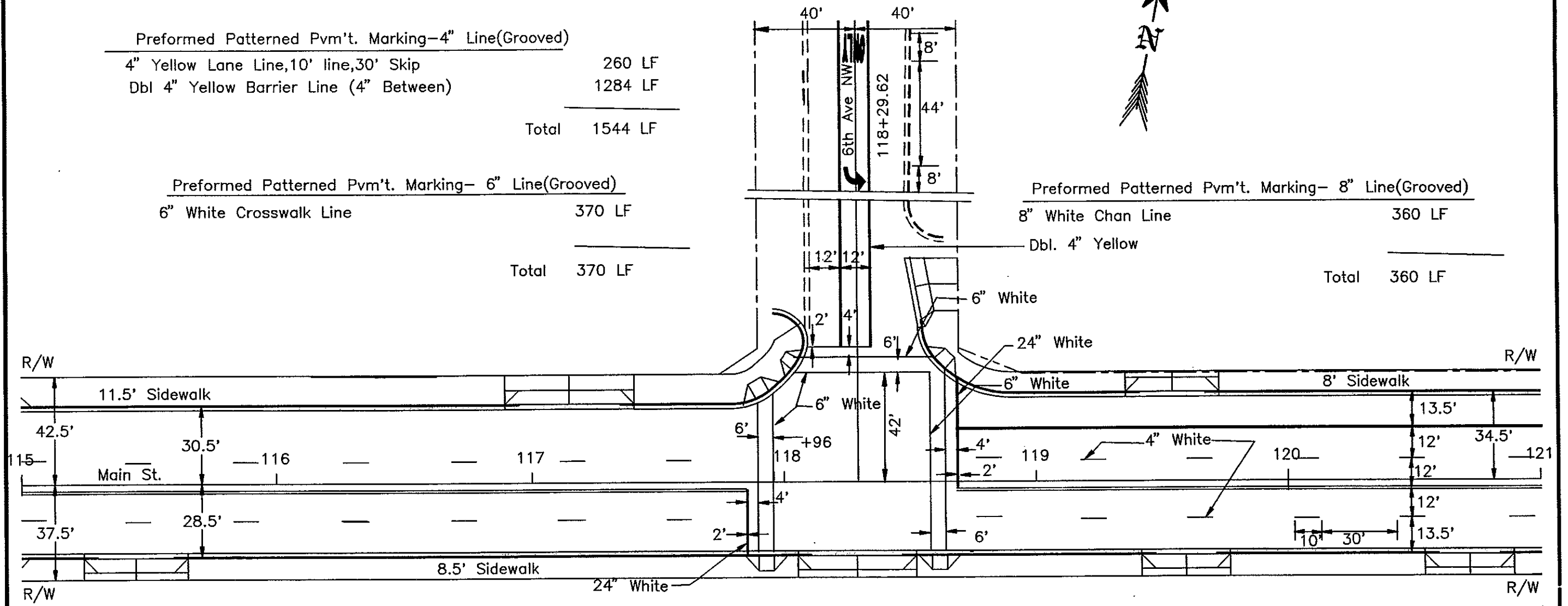
4" Yellow Lane Line,10' line,30' Skip	260 LF
Dbl 4" Yellow Barrier Line (4" Between)	1284 LF
Total	1544 LF

Preformed Patterned Pvm't. Marking- 6" Line(Grooved)

6" White Crosswalk Line	370 LF
Total	370 LF

Preformed Patterned Pvm't. Marking- 8" Line(Grooved)

8" White Chan Line	360 LF
Total	360 LF



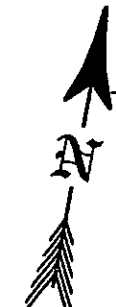
Preformed Patterned Pvm't. Marking-24" White Line(Grooved)

24" White Stop Line	39 LF
Total	39 LF

PAVEMENT MARKING LAYOUT

Main Street
Sta.115+00-121+00.

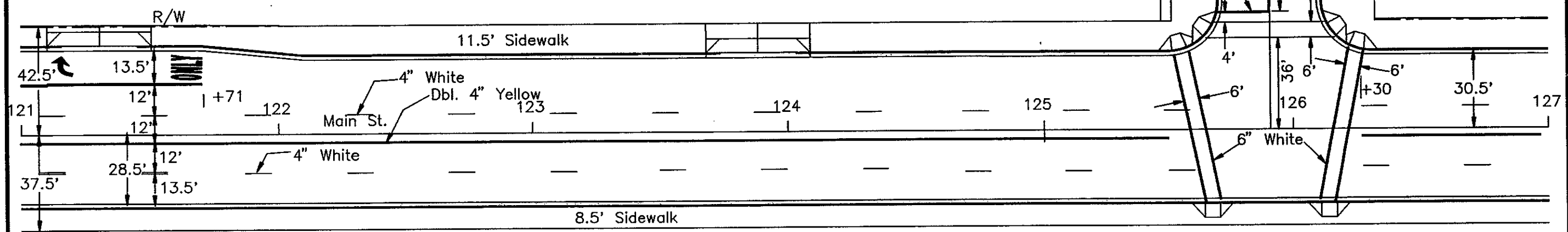
Mandan N.D.


PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)

4" White Lane Line, 10' line, 30' skip	280 LF
Dbl. 4" Yellow Barrier Line(4" Between)	1094 LF
Total	<u>1374 LF</u>

PREFORMED PATTERNED PVM'T. MARKING-MESSAGE (Grooved)

RIGHT ARROW	15 SF
ONLY	22 SF
Total	<u>37 SF</u>



PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)

6" White Crosswalk Line	330 LF
Total	<u>330 LF</u>

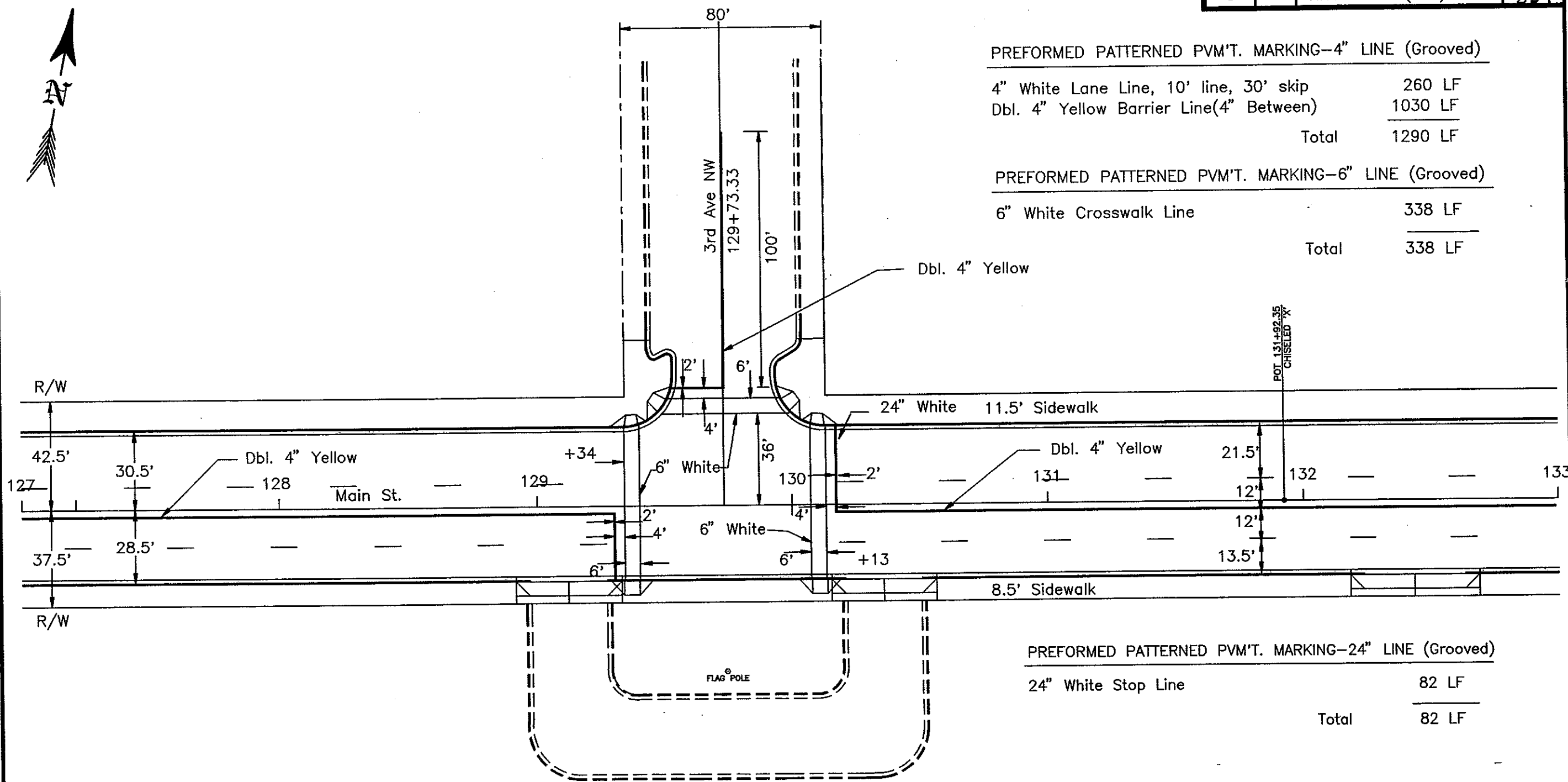
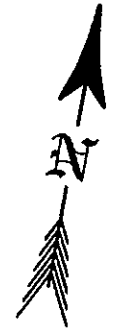
PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)

24" White Stop Line	24 LF
Total	<u>24 LF</u>

PREFORMED PATTERNED PVM'T. MARKING-8" LINE (Grooved)

8" White Channel Line	78 LF
Total	<u>78 LF</u>

PAVEMENT MARKING LAYOUT
 Main Street
 Sta. 121+00 TO 127+00
 MANDAN ND

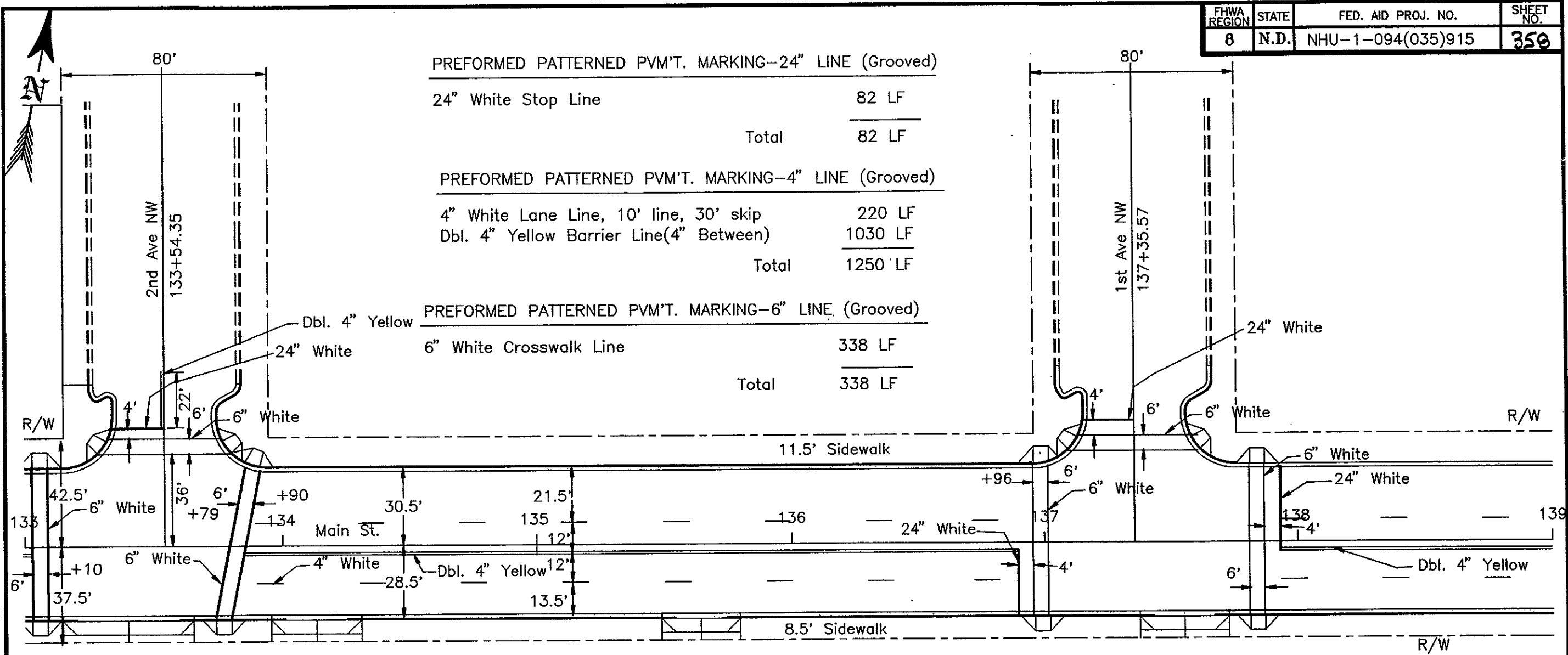


PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)	
4" White Lane Line, 10' line, 30' skip	260 LF
Dbl. 4" Yellow Barrier Line(4" Between)	1030 LF
Total	1290 LF
PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)	
6" White Crosswalk Line	338 LF
Total	338 LF

PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)	
24" White Stop Line	82 LF
Total	82 LF

PAVEMENT MARKING
LAYOUT

Main Street
Sta. 127+00 TO 133+00
MANDAN ND



PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)

24" White Stop Line	82 LF
Total	82 LF

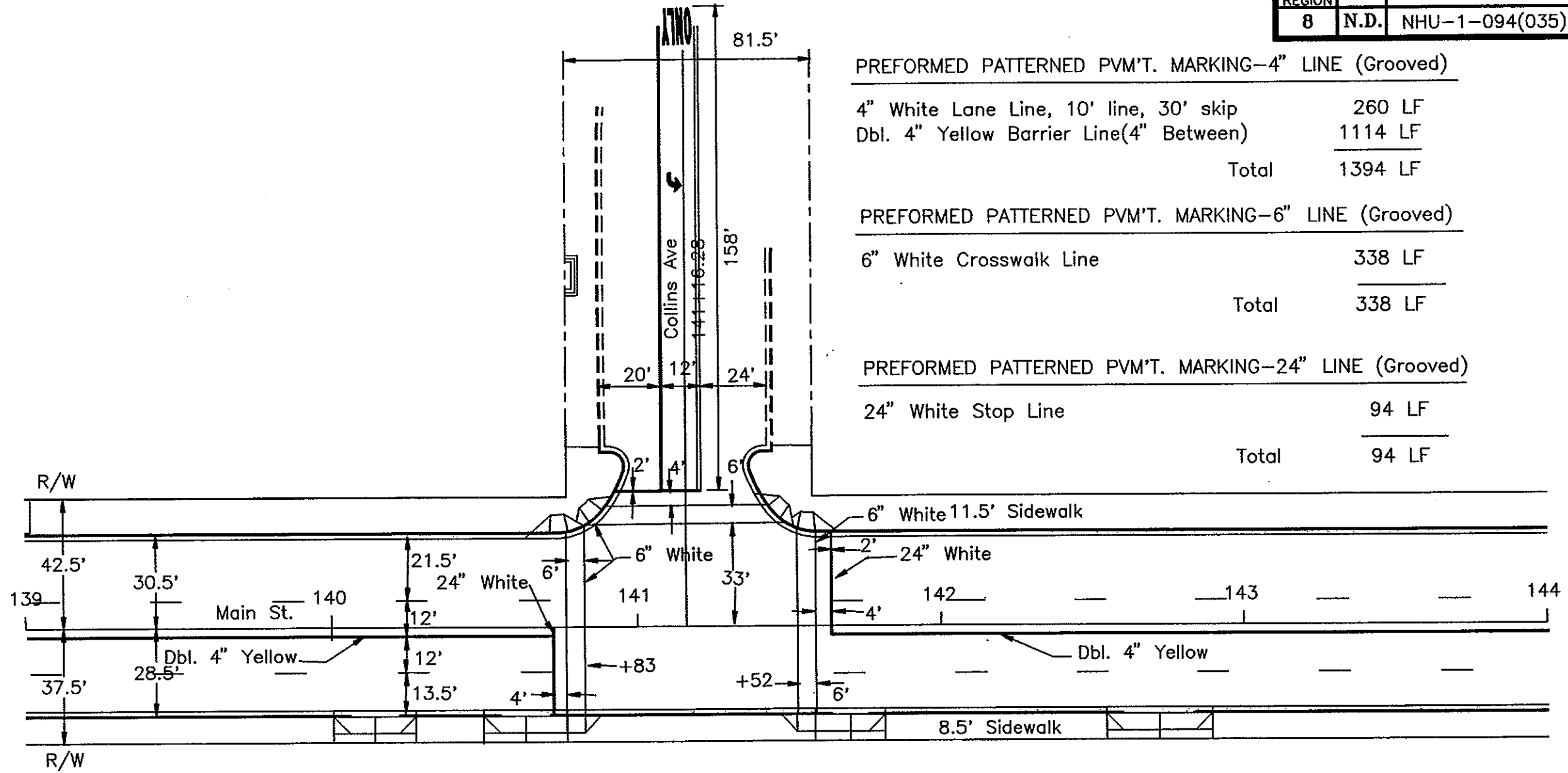
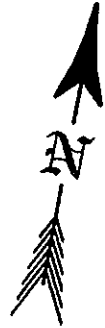
PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)

4" White Lane Line, 10' line, 30' skip	220 LF
Dbl. 4" Yellow Barrier Line(4" Between)	1030 LF
Total	1250 LF

PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)

6" White Crosswalk Line	338 LF
Total	338 LF

PAVEMENT MARKING LAYOUT
Main Street
Sta. 133+00 TO 139+00
MANDAN ND



PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)

4" White Lane Line, 10' line, 30' skip	260 LF
Dbl. 4" Yellow Barrier Line(4" Between)	1114 LF
Total	1394 LF

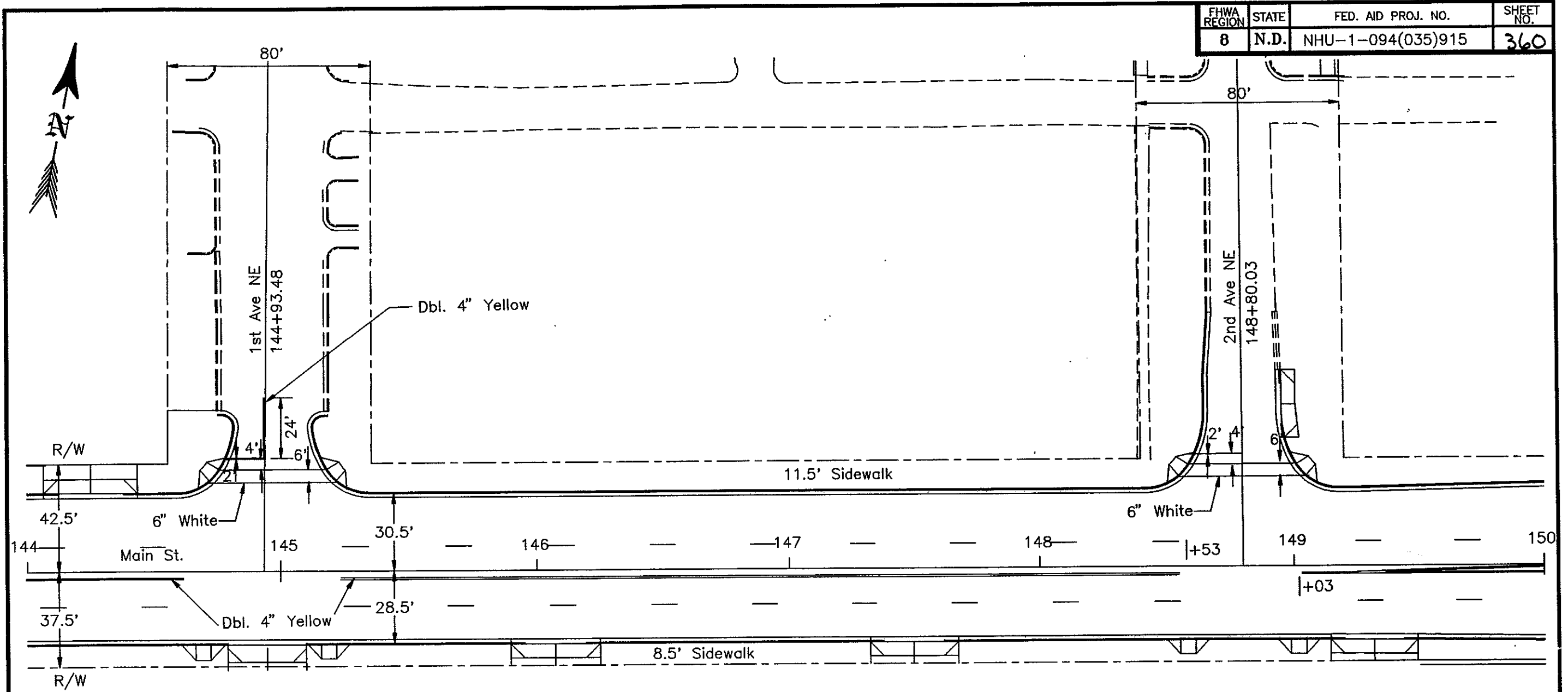
PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)

6" White Crosswalk Line	338 LF
Total	338 LF

PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)

24" White Stop Line	94 LF
Total	94 LF

PAVEMENT MARKING
LAYOUT
Main Street
Sta. 139+00 TO 144+00
MANDAN ND

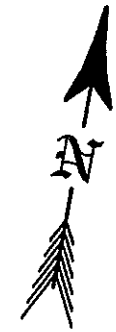


<u>PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)</u>	
4" White Lane Line, 10' line, 30' skip	290 LF
Dbl. 4" Yellow Barrier Line(4" Between)	1192 LF
Total	1482 LF

<u>PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)</u>	
6" White Crosswalk Line	184 LF
Total	184 LF

<u>PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)</u>	
24" White Stop Line	32 LF
Total	32 LF

PAVEMENT MARKING LAYOUT
 Main Street
 Sta 144+00 TO 150+00
 MANDAN ND



PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)

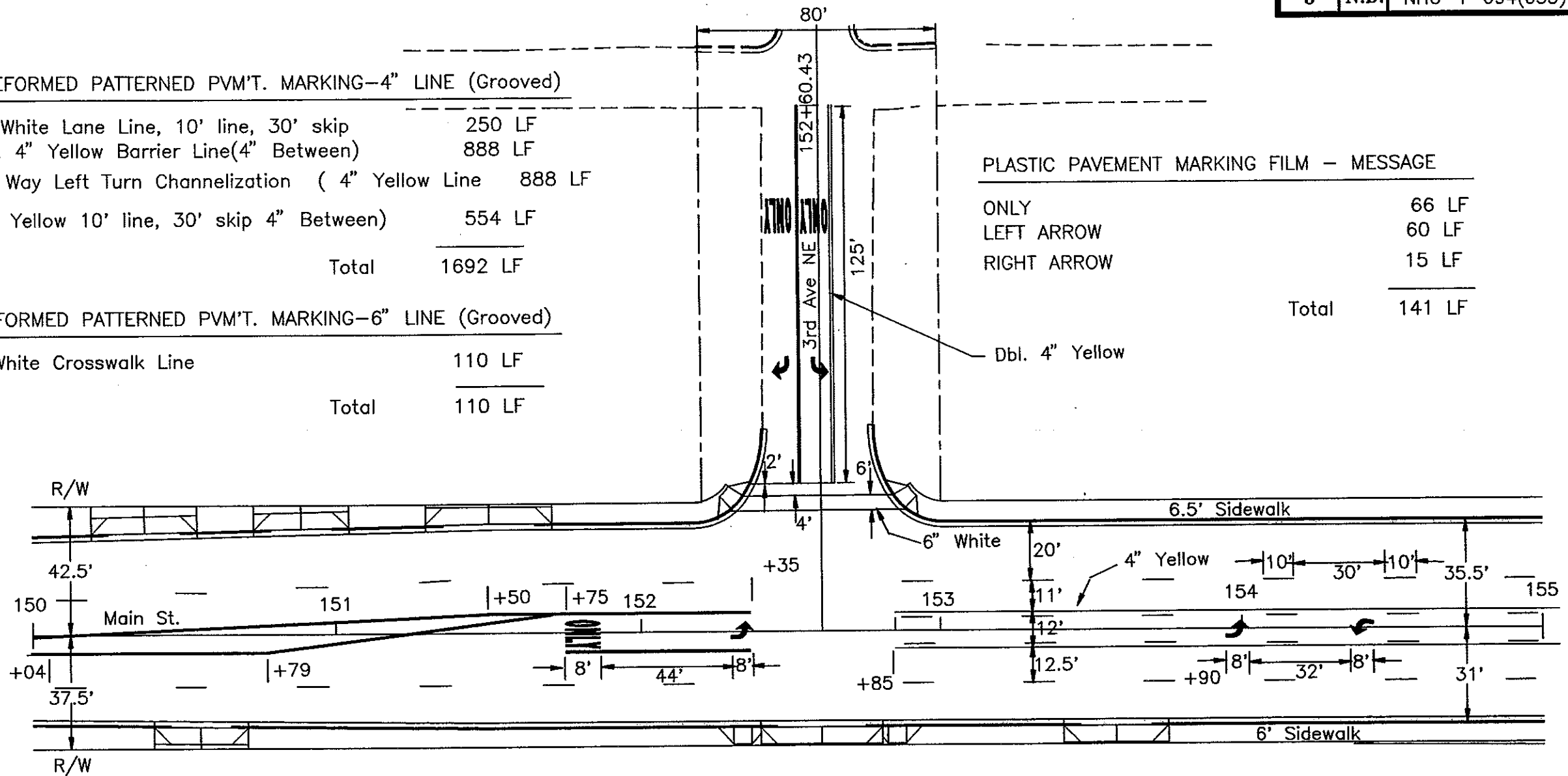
4" White Lane Line, 10' line, 30' skip	250 LF
Dbl. 4" Yellow Barrier Line(4" Between)	888 LF
Two Way Left Turn Channelization (4" Yellow Line	888 LF
4" Yellow 10' line, 30' skip 4" Between)	554 LF
Total	1692 LF

PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)

6" White Crosswalk Line	110 LF
Total	110 LF

PLASTIC PAVEMENT MARKING FILM - MESSAGE

ONLY	66 LF
LEFT ARROW	60 LF
RIGHT ARROW	15 LF
Total	141 LF



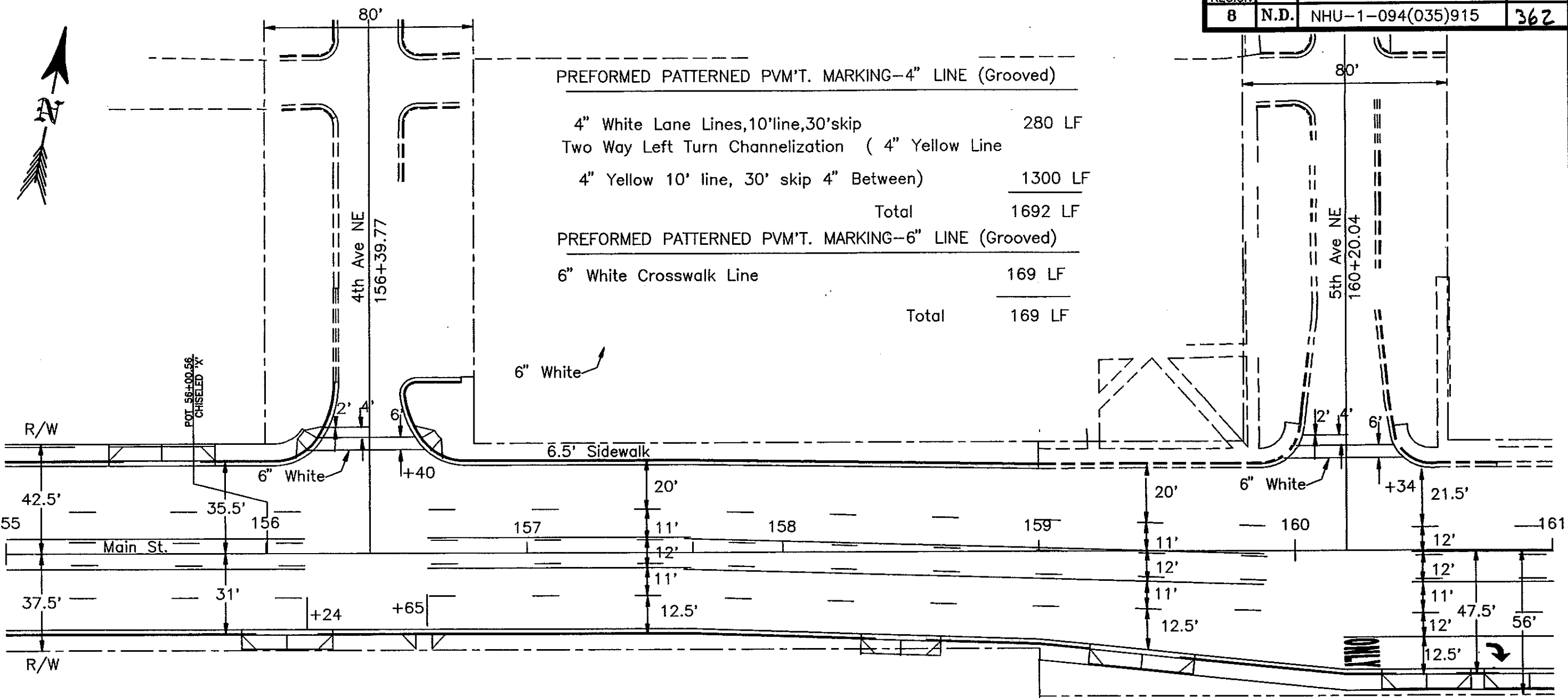
PREFORMED PATTERNED PVM'T. MARKING-8" LINE (Grooved)

8" White Channel Line	188 LF
Total	188 LF

PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)

24" White Stop Line	28 LF
Total	28 LF

PAVEMENT MARKING
LAYOUT
Main Street
Sta. 150+00 TO 155+00
MANDAN ND



PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)	
4" White Lane Lines, 10' line, 30' skip	280 LF
Two Way Left Turn Channelization (4" Yellow Line	
4" Yellow 10' line, 30' skip 4" Between)	1300 LF
Total	1692 LF
PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)	
6" White Crosswalk Line	169 LF
Total	169 LF

PREFORMED PATTERNED PVM'T. MARKING-8" LINE (Grooved)	
8" White Channel Line	84 LF
Total	84 LF

PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)	
24" White Stop Line	35 LF
Total	35 LF

PLASTIC PAVEMENT MARKING FILM-MESSAGE	
ONLY	22 LF
LEFT ARROW	15 LF
Total	37 LF

PAVEMENT MARKING
LAYOUT
Main Street
Sta. 155+00 TO 161+00
MANDAN ND

PREFORMED PATTERNED PVM'T. MARKING-4" LINE (Grooved)

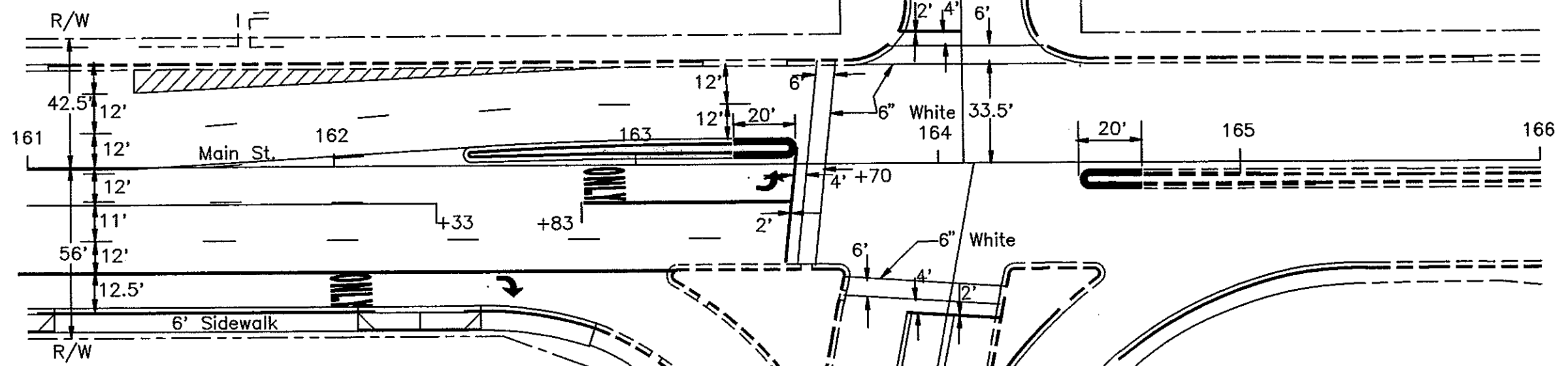
4" White Lane Lines, 10' line, 30' skip	120 LF
Dbl. 4" Yellow Barrier Line (4" Between)	262 LF
Two Way Left Turn Channelization (4" Yellow Line)	341 LF
Total	723 LF

PREFORMED PATTERNED PVM'T. MARKING-6" LINE (Grooved)

6" White Crosswalk Line	363 LF
Total	363 LF

Pavement Marking Painted Curb Top & Face

Yellow	90 LF
Total	90 LF



PREFORMED PATTERNED PVM'T. MARKING-8" LINE (Grooved)

8" White Channel Line	204 LF
Total	204 LF

PREFORMED PATTERNED PVM'T. MARKING-24" LINE (Grooved)

24" White Stop Line	109 LF
Total	109 LF

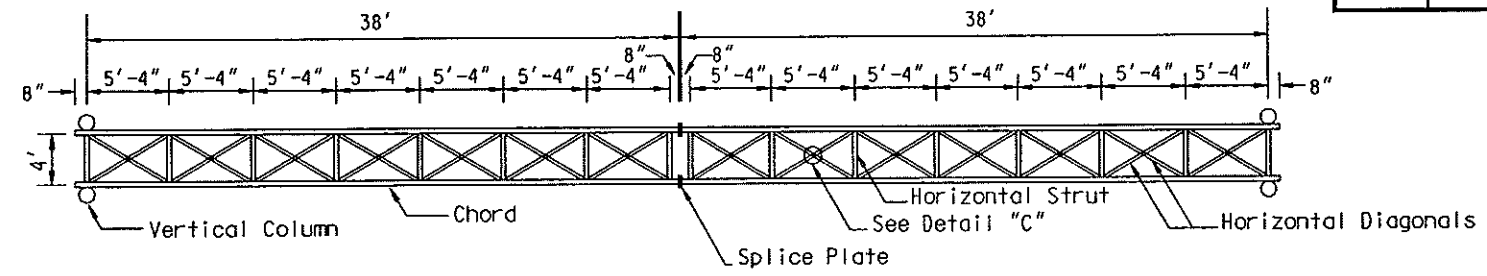
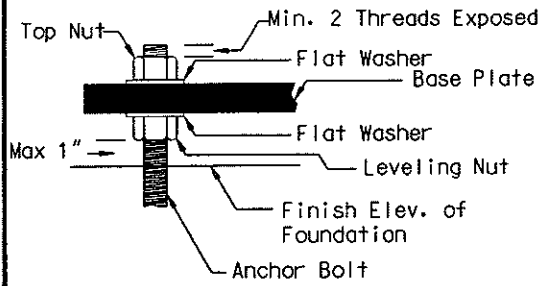
PLASTIC PAVEMENT MARKING FILM-MESSAGE

ONLY	44 SF
LEFT ARROW	30 SF
Total	74 SF

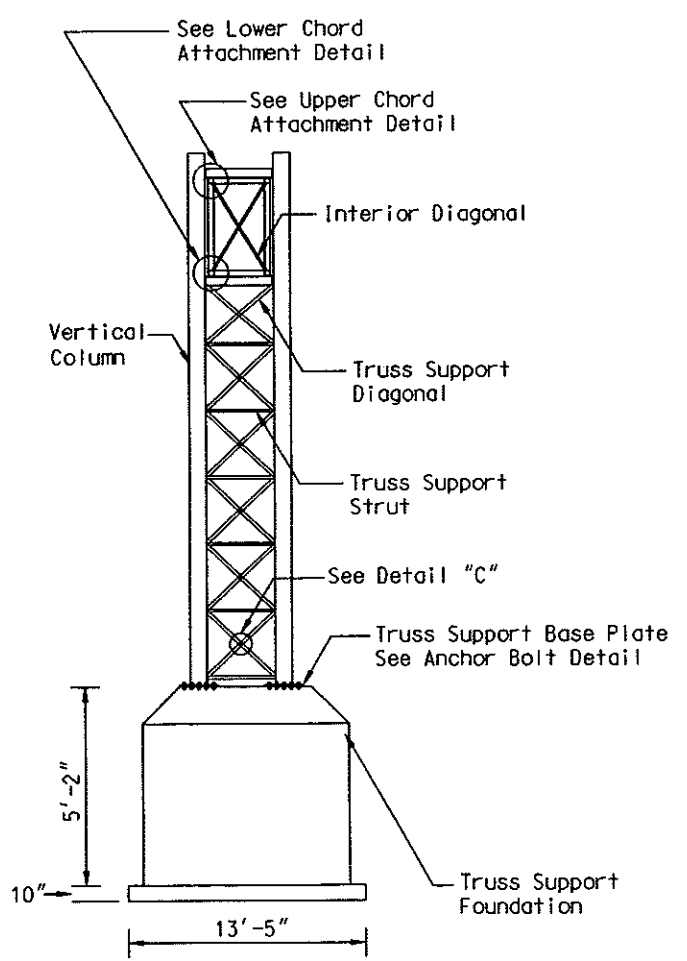
PAVEMENT MARKING LAYOUT
Main Street
STA. 161+00 TO 166+00
MANDAN ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(035)915	36A

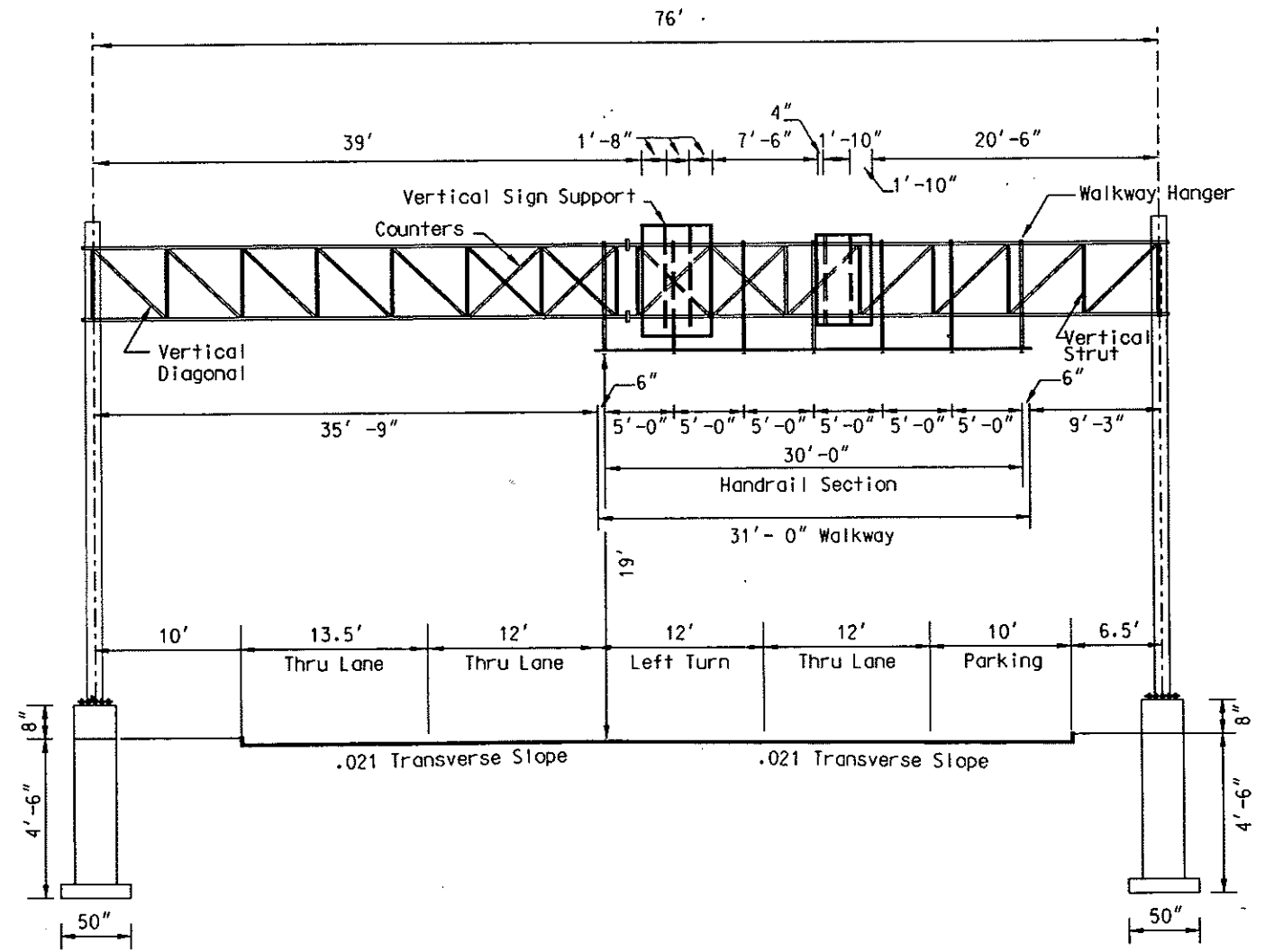
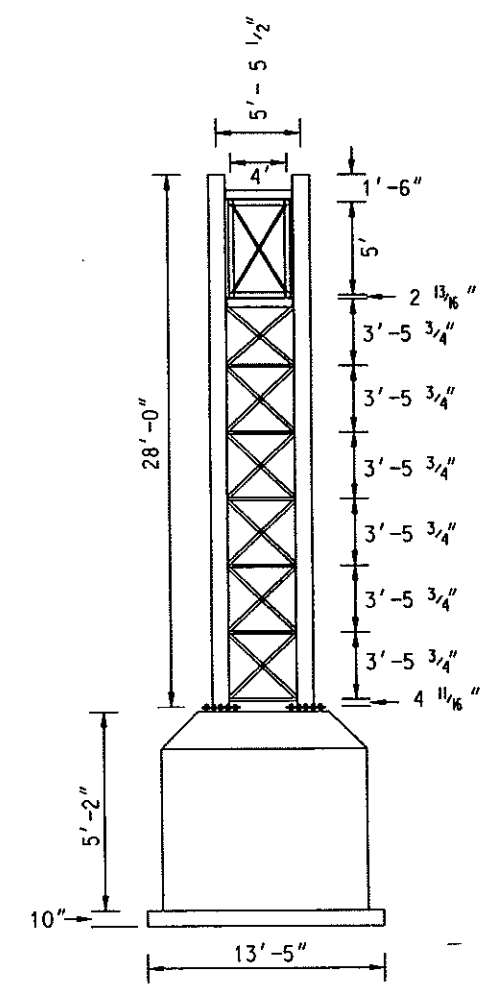
ANCHOR BOLT DETAIL



SOUTH SUPPORT AND FOUNDATION



NORTH SUPPORT AND FOUNDATION

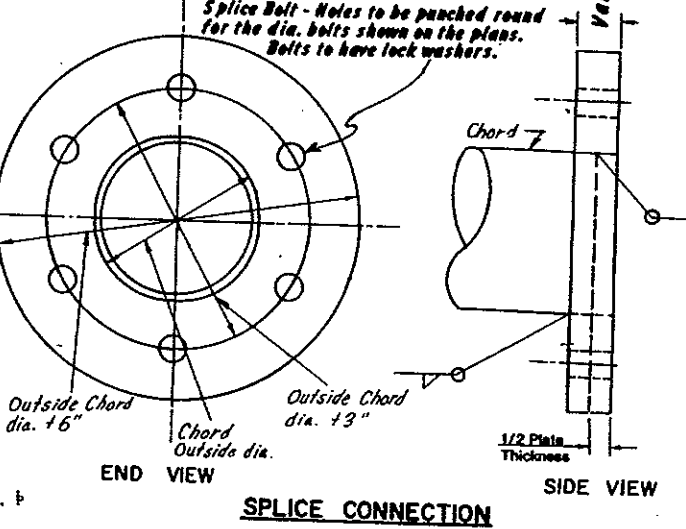
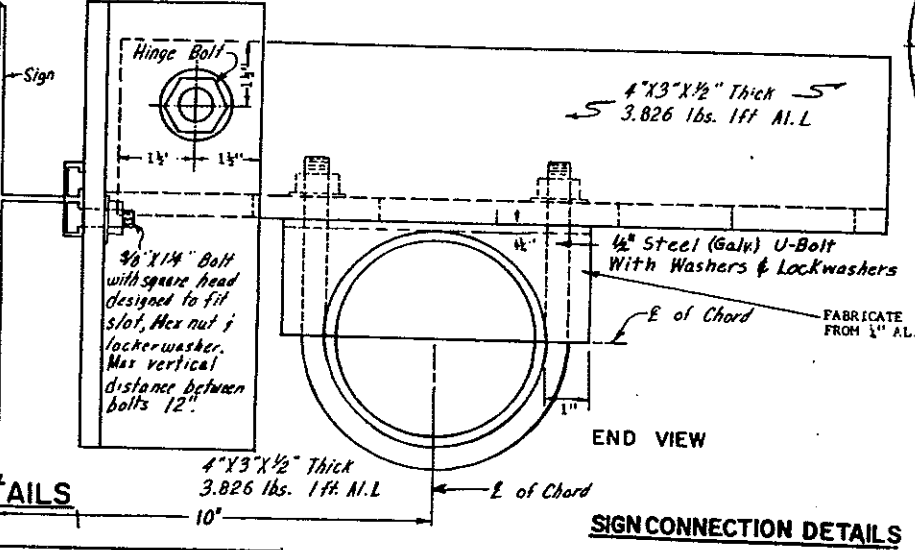
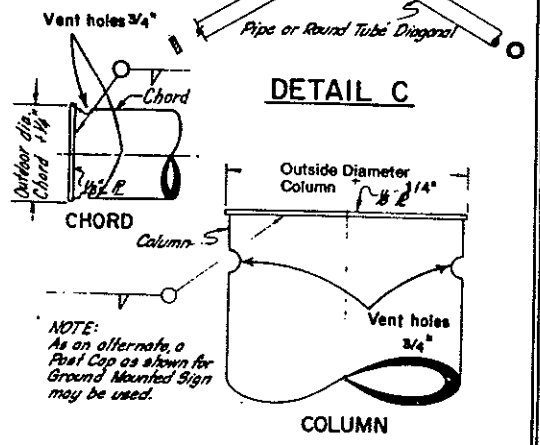
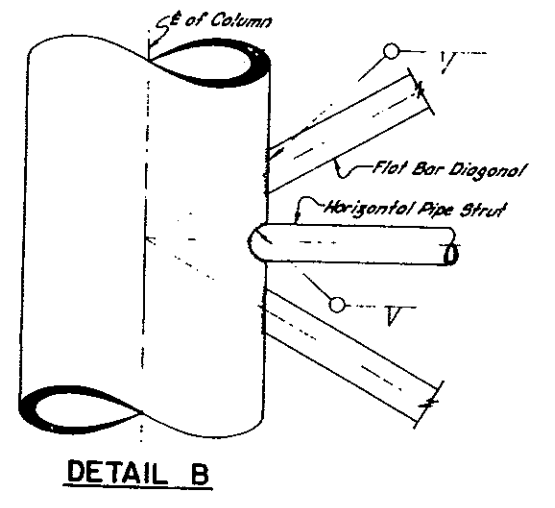
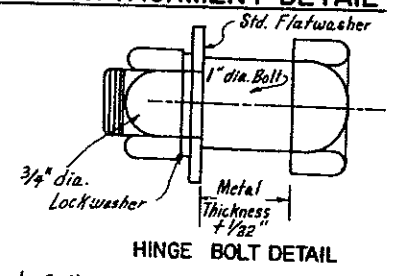
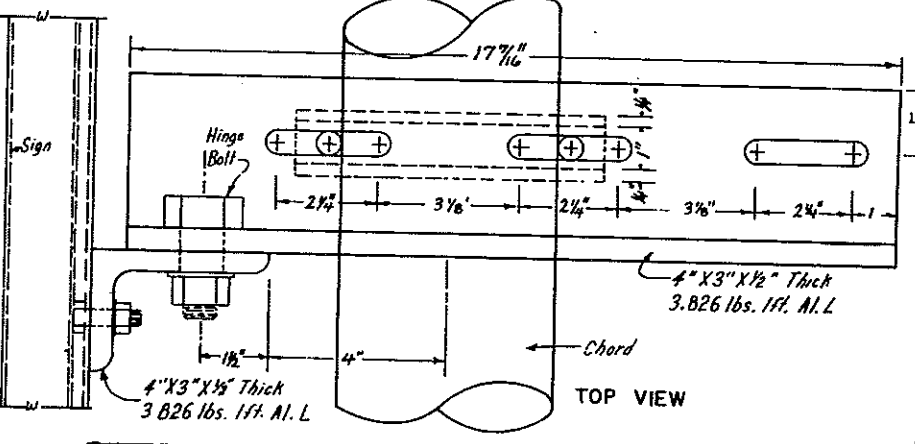
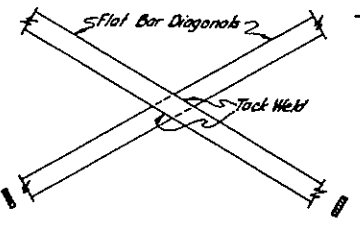
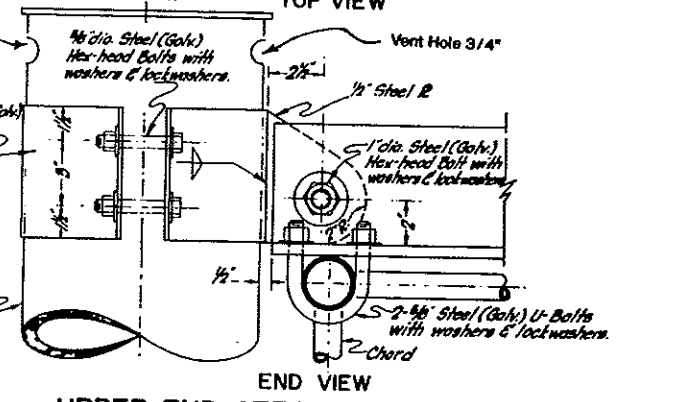
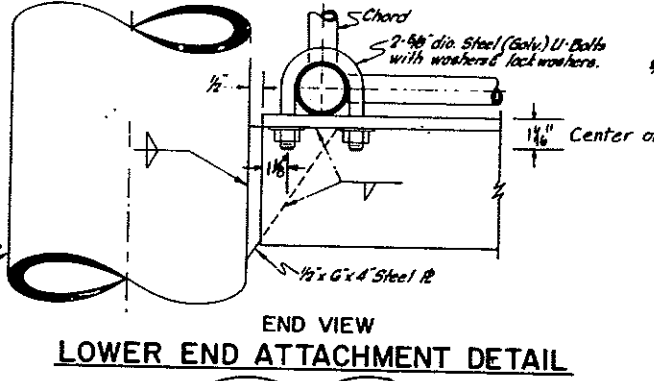
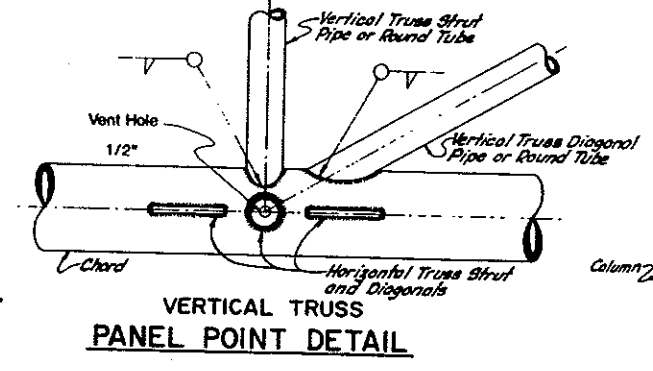
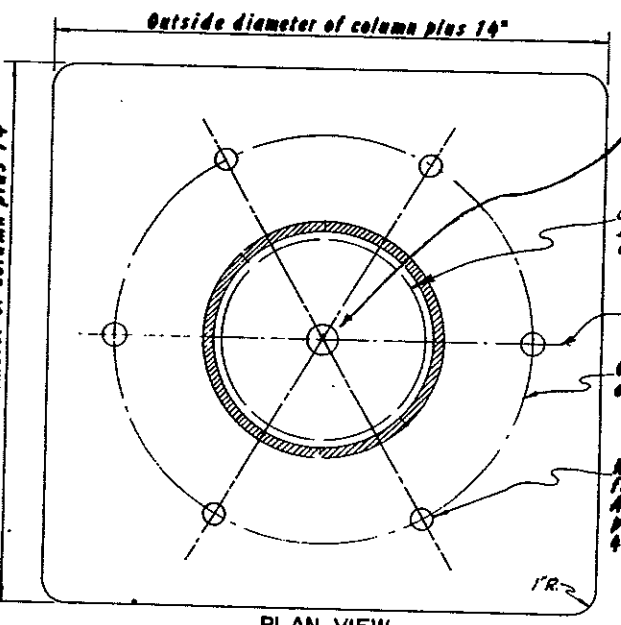
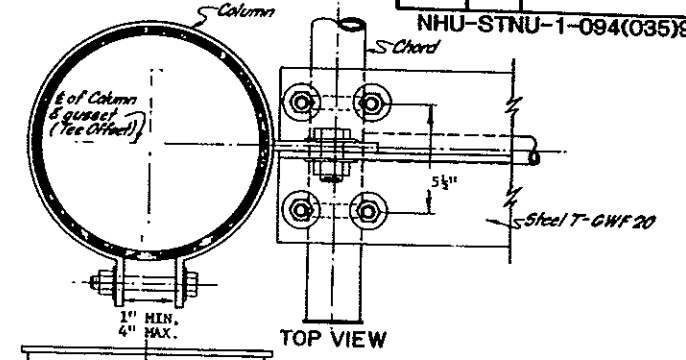
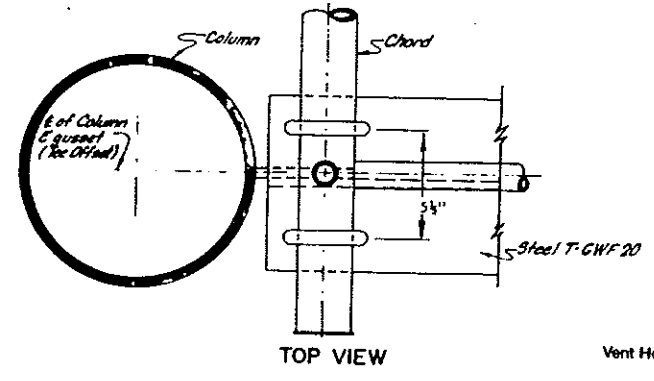
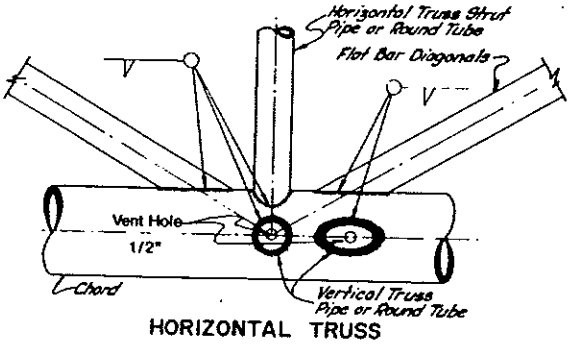
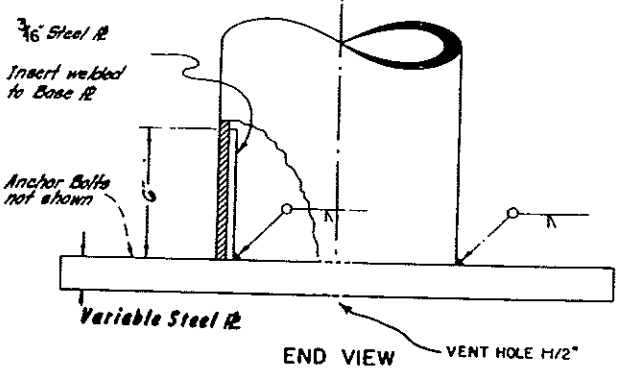


TRUSS MEMBERS								SUPPORT MEMBERS		
STEEL	CHORDS	VERTICAL STRUTS	HORIZONTAL STRUTS	VERTICAL DIAGONALS	HORIZONTAL DIAGONALS	INTERIOR DIAGONALS	COUNTERS	VERTICAL COLUMNS	SUPPORT STRUTS	SUPPORT DIAGONALS
	Standard Pipe	2 1/2" (5.79)						10" (40.48)		
	XS Pipe		1 1/4" (3.00)	1 1/4" (3.00)	1 1/4" (3.00)				1 1/2" (3.63)	
	Flat Bars				1 3/4" X 3/16" (1.12)	1" X 1/4" (0.85)	1 1/4" X 3/16" (0.80)			1 3/4" X 5/16" (1.86)

Base Plate Thickness: 1 1/4"
 Anchor Bolt Diameter: 1"
 Anchor Bolt Length: 2'-6" with 4" bend
 Flange Plate Thickness: 1 1/4"
 Flange Splice Bolt Diameter: 1/2"
 Camber: 2 3/4"

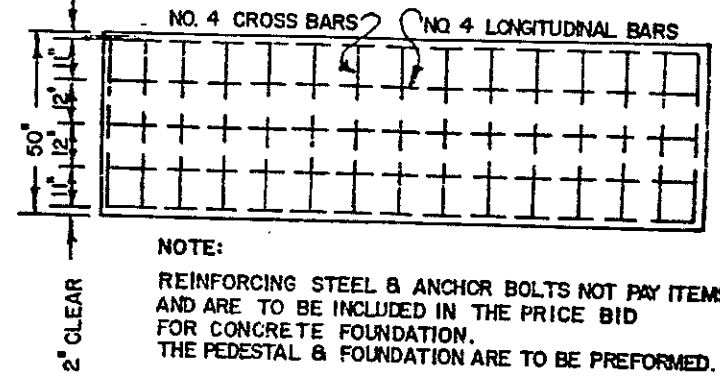
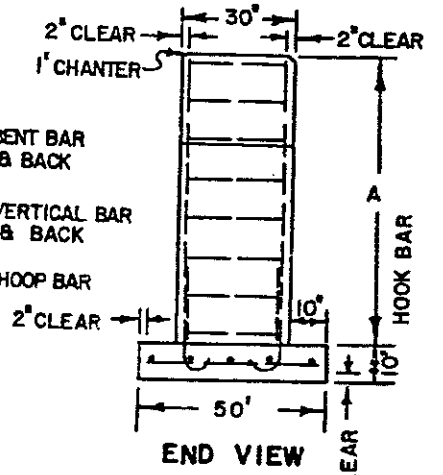
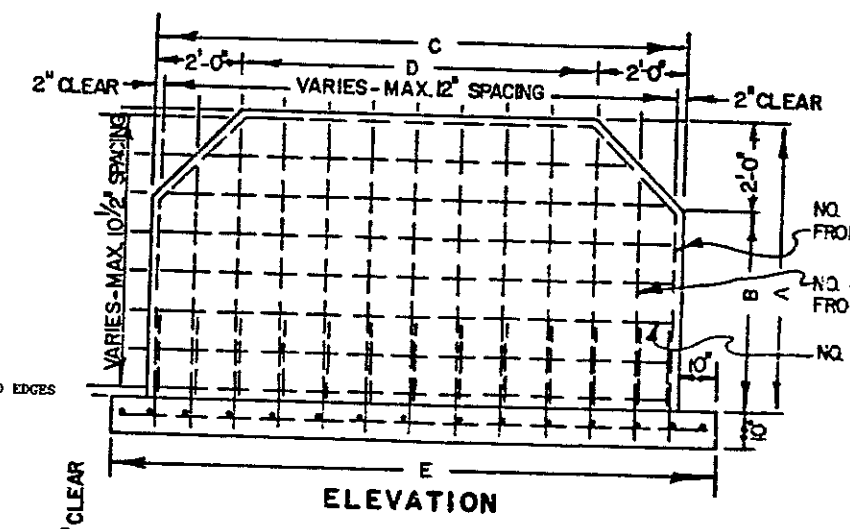
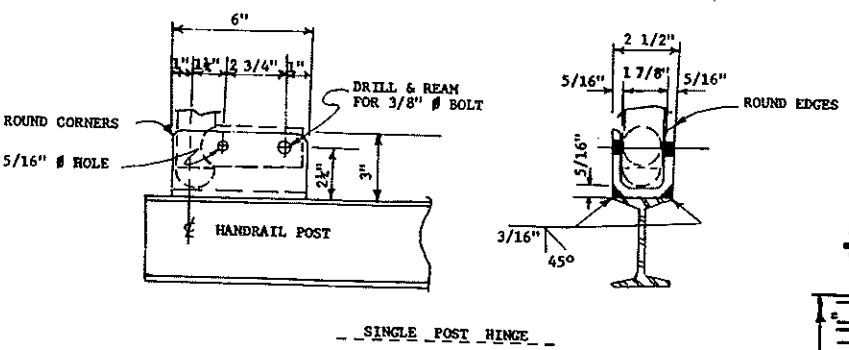
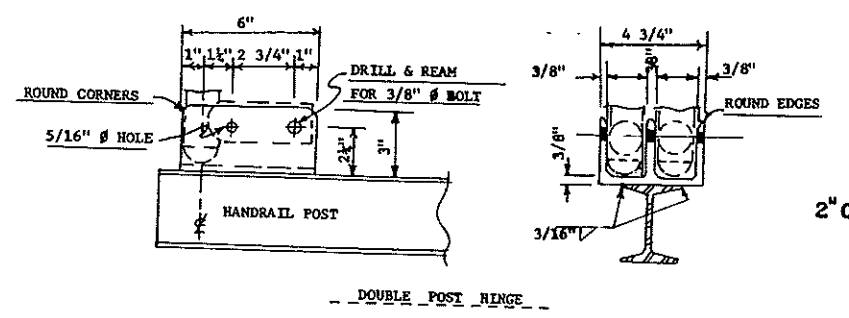
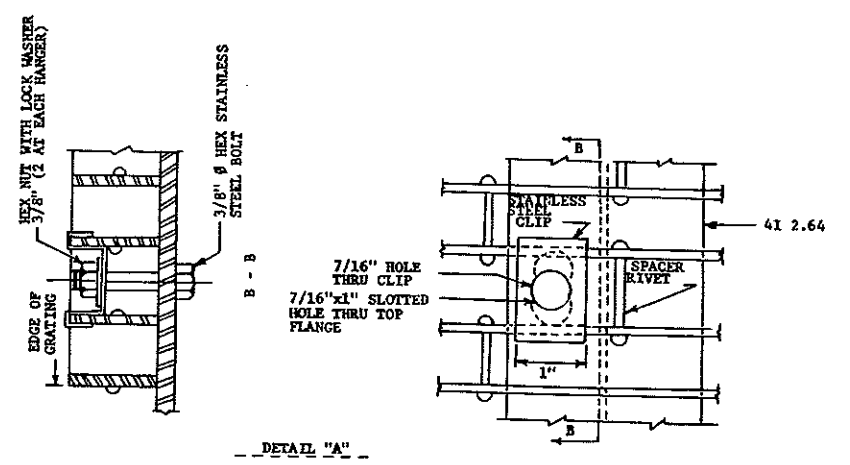
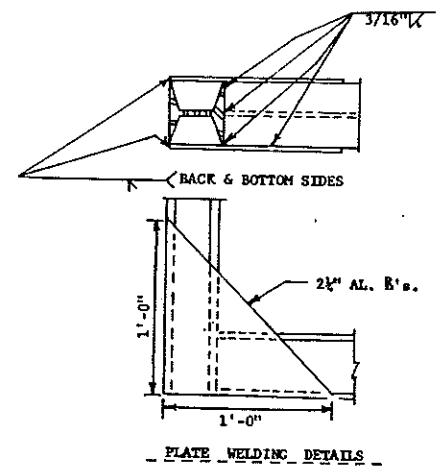
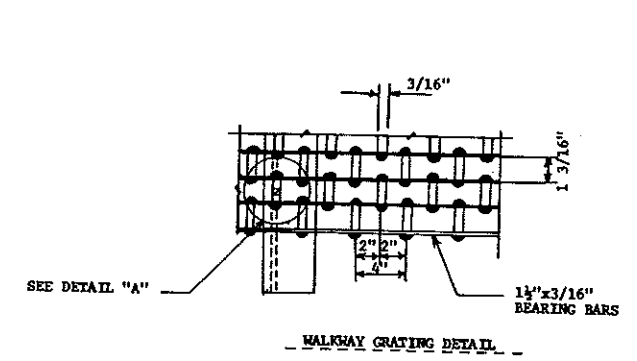
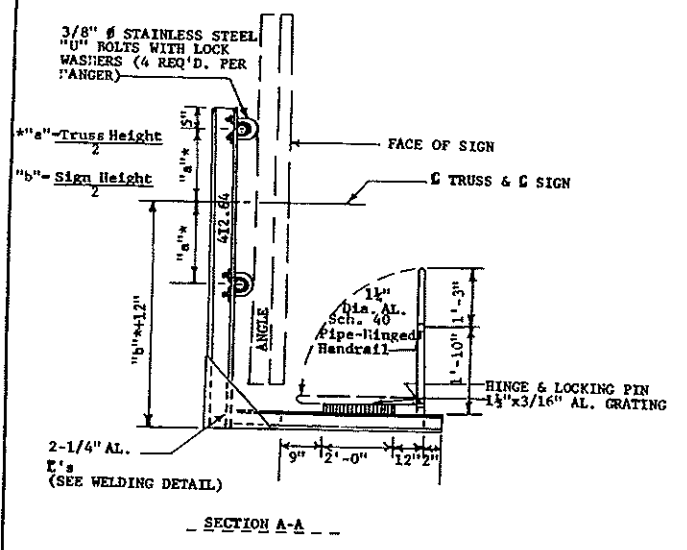
OVERHEAD SIGN STRUCTURE
 Sta 109+67
 W. Main Street
 Mandan, ND

DESIGN	MADE BY	DATE
CHECKED BY	REVISIONS	
MADE BY		
CHECKED BY		
MADE BY		
CHECKED BY		
MADE BY		
CHECKED BY		
QUANTITIES		

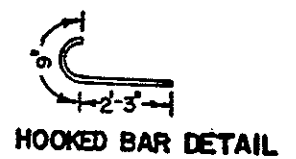
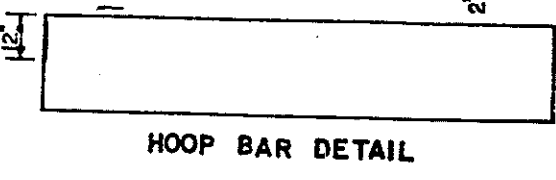


NOTE: As an alternate, a Post Cap as shown for Ground Mounted Sign may be used.

FABRICATE FROM 1\"/>



NOTE:
 REINFORCING STEEL & ANCHOR BOLTS NOT PAY ITEMS
 AND ARE TO BE INCLUDED IN THE PRICE BID
 FOR CONCRETE FOUNDATION.
 THE PEDESTAL & FOUNDATION ARE TO BE PREFORMED.

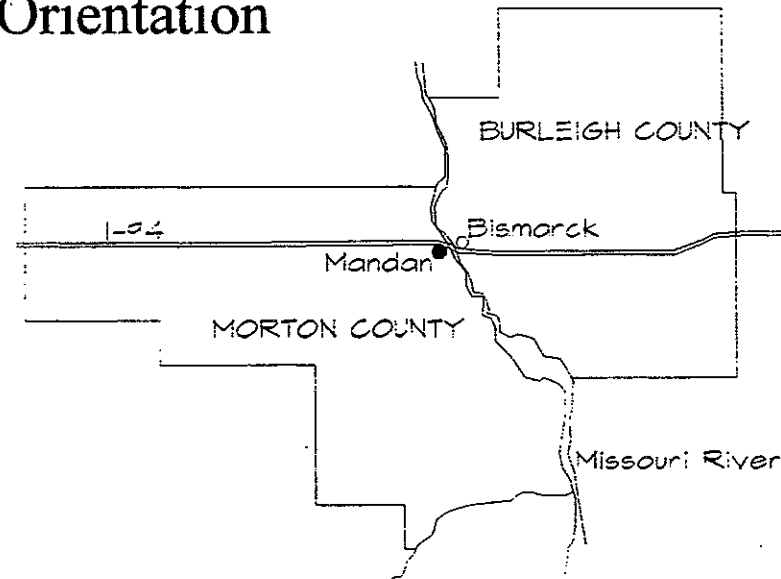


LOCATION	DIMENSION		E
	A	B	
109+67	5'-2"	3'-2"	13'-5"
			7'-9"
			11'-9"

FOUNDATION & REINFORCING DETAILS

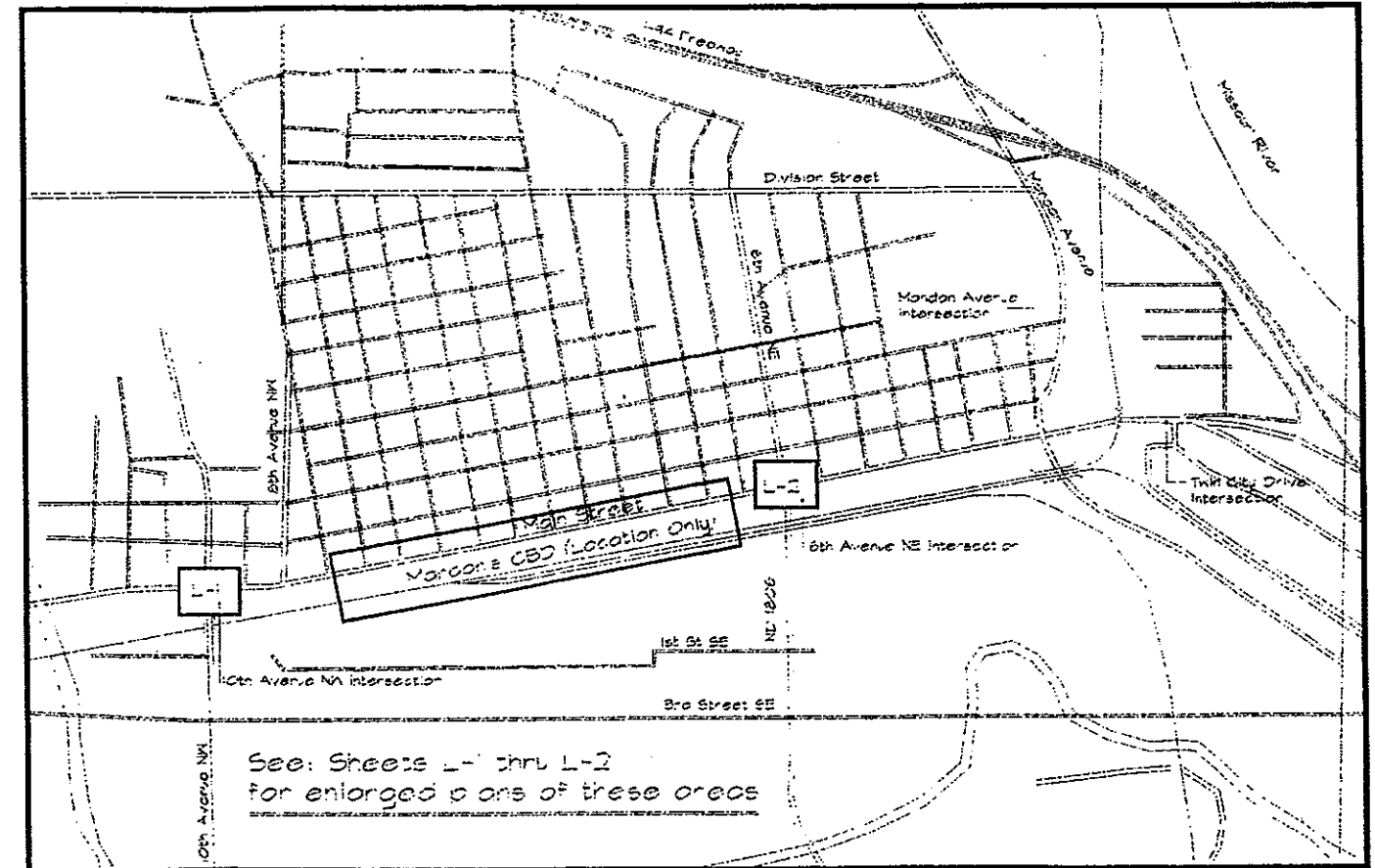
State of North Dakota
 Department of Transportation
Mandan West Main Street Landscape Enhancement Project
 STNU-1-094(035)915

Orientation



Sheet Index

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G-2	Plant Lists/ Planting Details #1
G-3	Planting Details #2
G-4	Planting Details #3
L-1	10th Avenue NW Planting Plan
L-2	6th Avenue NE Planting Plan
S-1	Sign Details



Locator Map for West Main Street Intersections

Drawn By: _____
 Revised: _____
 U.S. Department of Transportation
 Federal Highway Administration

Approved Division Administrator _____ Date _____
 Project Number: NHU-1-094(035)915
 Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation
Mandan West Main Street Landscape Enhancement
 STNU-1-094(035)915

Sheet Title:

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West Mainstreet Mandan Plant List

Deciduous Trees

#	SYMBOL	SCIENTIFIC/COMMON NAME	SIZE/CA	COMMENTS
5	AM	Acer ginnala Amur Maple	2"ca.	Container grown - Mulched ring or mulched bed
6	AL	Tilia americana American Linden	2"ca.	Container grown - Mulched ring or mulched bed

Deciduous Shrubs

#	SYMBOL	SCIENTIFIC/COMMON NAME	SIZE	COMMENTS
36	RTD	Cornus sericea 'Isanti' Isanti Red-Stripped Dogwood	2 gal.	Container grown - Mulched ring or mulched bed
55	DSH	Lonicera x brownii 'Dropmore Scarlet' Dropmore Scarlet Honeysuckle	6" pot	4" mulched bed
514	SS	Rhus glabra Smooth Sumac	2 gal.	Container grown - Mulched ring or mulched bed

Coniferous Shrubs

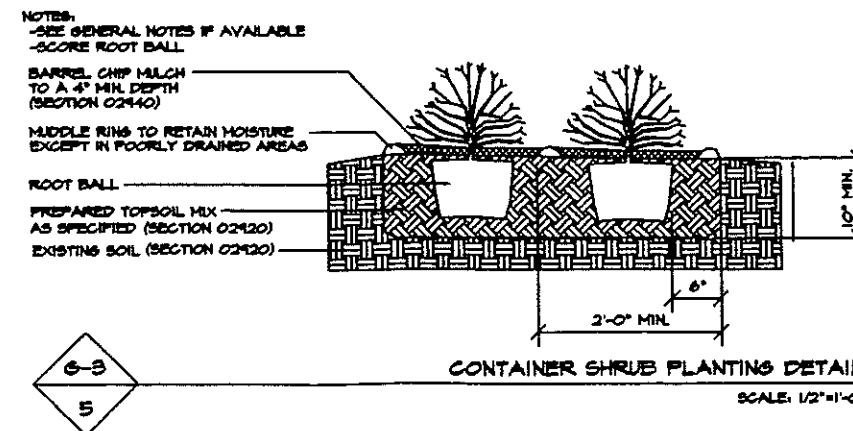
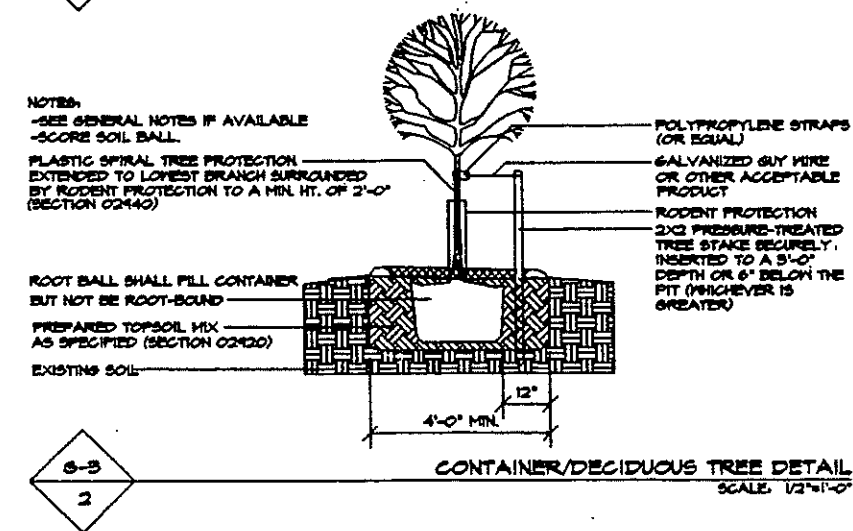
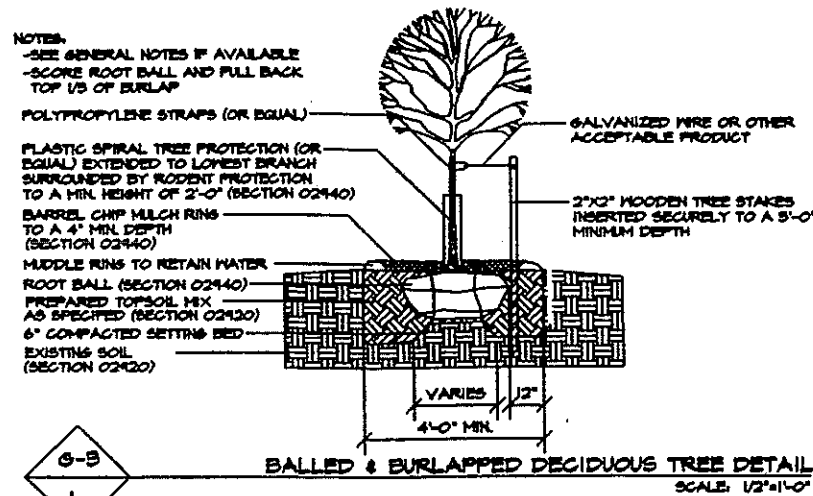
#	SYMBOL	SCIENTIFIC/COMMON NAME	SIZE	COMMENTS
54	EJ	Juniperus sabinna 'Broadmoor' Broadmoor Savin Juniper	2 gal.	Container grown - Mulched ring or mulched bed

Hardy Shrub Roses

#	SYMBOL	SCIENTIFIC/COMMON NAME	SIZE	COMMENTS
117	RR	Rosa rugosa Rugosa Rose	1 gal.	Container grown - Mulched ring or mulched bed

Perennials & Groundcovers

#	SYMBOL	SCIENTIFIC/COMMON NAME	SIZE	COMMENTS
672	MH	Heemerocallis (mixed) Red, Yellow, and Orange Daylilies	2" BR	Mixed colors (equal #) 10% orange maximum 4" mulched bed



GENERAL NOTES:

- ALL TREES OVER 1 1/2" ARE TO RECEIVE TWO TREE STAKES PER TREE. SMALLER TREES RECEIVE ONE STAKE PER TREE. (SEE STAKING DETAIL)
- PLASTIC SPIRAL TREE PROTECTION (OR EQUAL) IS TO BE APPLIED UP TO LOWEST BRANCH AND SURROUNDED BY RODENT PROTECTION AS SPECIFIED.
- WHEN NECESSARY, STAKING AND GUYING MUST BE ADJUSTED AT THE PROPER TENSION AND HEIGHT FOR NO MORE THAN THE FIRST TWO MONTHS IN ACCORDANCE WITH THE PLAN DETAILS. GUY WIRES SHOULD BE SNUG, BUT NOT TIGHT. (SEE STAKING DETAIL).
- ONLY PRUNE ALL TREES & SHRUBS IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICES. (PRUNING SHALL COMPLY SECTION 02440 - REMOVE ONLY DEAD OR BROKEN BRANCHES)
- ALL TREES SHALL COMPLY WITH THE AMERICAN STANDARDS FOR NURSERY STOCK INCLUDING TREE PIT DEPTH AND WIDTH. (SECTION 02440).
- IN SOME CASES, THE MULCH IS ONLY LISTED AS A SPECIFIED DIAMETER. SEE PLANS AND SPECIFICATIONS FOR FURTHER COORDINATION OF MULCHING (SECTION 02440).
- TREE HEIGHT AND CALIPERS VARY ACCORDING TO TREE SPECIFIED. SEE ASSOCIATED PLANS, PLANT LISTS, AND SPECIFICATIONS (SECTION 02440).
- USE MIDDLE RINGS TO RETAIN MOISTURE EXCEPT IN POORLY DRAINED AREAS OF LESS THAN 2% SLOPE. TYPICAL DIAMETERS ARE 4'-0" FOR TREES AND 2'-0" FOR SHRUBS. DO NOT PLACE MIDDLE RING ON UPSLOPE SIDE OF SLOPE HAVING A GRADIENT OF 10% OR MORE.
- NOTIFY PROJECT ENGINEER OF ANY DRAINAGE PROBLEMS.
- THE CONTRACTOR IS RESPONSIBLE FOR WATERING AND MAINTAINING ADEQUATE, BUT NOT EXCESSIVE, SOIL MOISTURE FOR NEWLY PLANTED TREES, SHRUBS, PERENNIALS, AND NATIVE GRASSES UNDER THE CONTRACT UNTIL NDDOT ACCEPTS FULL RESPONSIBILITY FOR ENSURING PROPER GROWTH AND DEVELOPMENT OF PLANTS (AFTER 2-YEAR PERIOD THAT BEGINS WHEN THE PROJECT GAINS INITIAL ACCEPTANCE).
- THE CONTRACTOR SHALL MAINTAIN ALL PLANTING AREAS IN A WEED FREE CONDITION TO REDUCE COMPETITION FOR NEWLY INSTALLED PLANTS DURING THE FIRST 2-YEARS.
- SIDES AND BOTTOM OF PITS SHOULD BE SCARIFIED (IF SMOOTH) WITH A RAKE, SHOVEL OR OTHER APPROPRIATE TOOL.
- IF NECESSARY, PLANTS MUST BE BROUGHT BACK TO A PLUMB CONDITION WITHIN 7 DAYS AFTER INSTALLATION AND THROUGH THE MAINTENANCE PERIOD.
- ADJUST PLANTING HOLE DIMENSIONS AND SHAPE TO PROPERLY CONTAIN PLANT, PLUMB AND BACKFILL SECURELY. NO AIR POCKETS SHALL REMAIN.

Drawn By:	Revised:
M.L. 7/13/14	M.L. 8/16/15
B.C. 1/8/15	M.L. 10/21/15
B.C. 3/11/15	

U.S. Department of Transportation Federal Highway Administration	
Approved Division Administrator	Date
Project Number: NBD-1-094(035)915	
Approved Chief Engineer	Date
North Dakota Dept. of Transportation	

Project Title:

State of North Dakota Department of Transportation

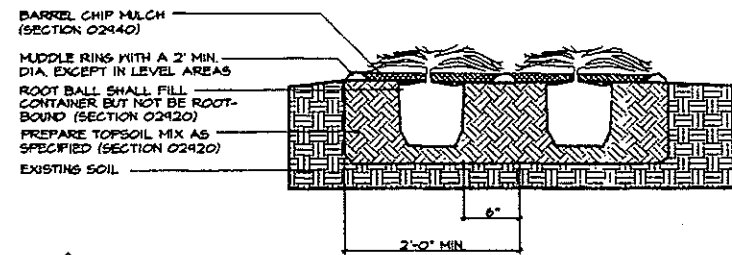
Mandan West Mainstreet Landscape Enhancement

STNU-1-094(035)915

Sheet Title:
Planting Details

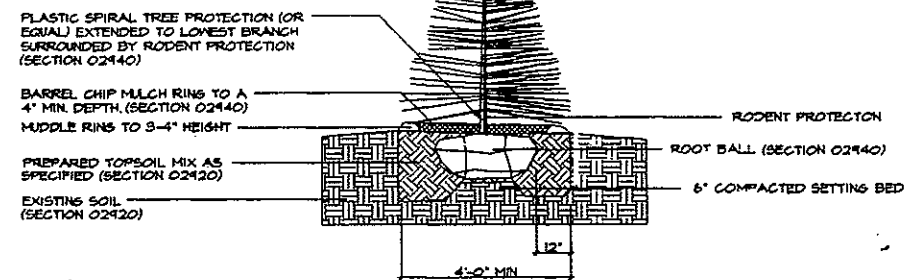
Sheet Number:
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NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCARP SIDES OF HOLE IF SMOOTH
 -SCORE ROOT BALL (SECTION 02940)
 -SET ROOT FLARE AT SAME ELEV. AS WAS GROWN IN THE NURSERY (SECTION 02940)



6-4
1
 CONTAINER CONIFEROUS SHRUB DETAIL
 SCALE: 3/4"=1'-0"

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCORE SIDES AND BOTTOM OF ROOT-BALL AND PULL BACK TOP 1/3



6-4
2
 BALLED & BURLAPPED CONIFEROUS TREE DETAIL
 SCALE: 1/2"=1'-0"

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE

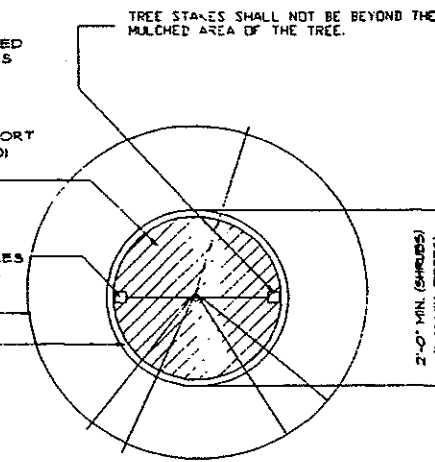
-MIDDLE RING SHOULD NOT BE PLACED ON UPSLOPE SIDE OF STEEP SLOPES WITH MORE THAN A 10% GRADIENT

-IF TREE IS OVER 1-1/4" CALIPER SUPPORT WITH 2 TREE STAKES IF TREE CALIPER IS UNDER 1-1/4" SUPPORT WITH 1 TREE STAKE (SECTION 02940)

BARREL CHIP MULCH APPLIED UNIFORMLY AT A 4" MIN DEPTH EXCEPT WHERE DRAINAGE IS POOR (SECTION 02940)

2X2 PRESSURE-TREATED TREE STAKES INSERTED TO A 3" MIN DEPTH INSIDE MIDDLE RING (SECTION 02940)

TYPICAL TREE
 MIDDLE RING CENTERED AROUND BASE OF PLANT

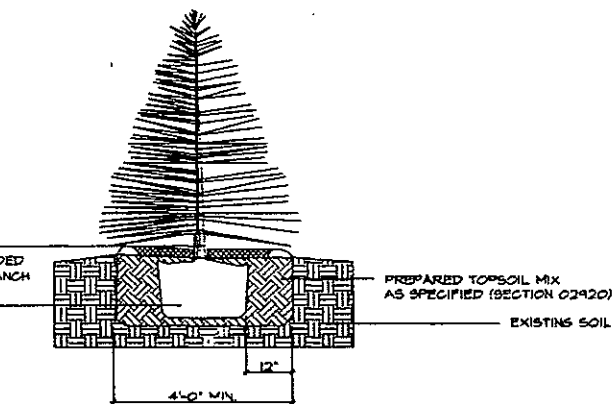


6-4
3
 MIDDLE RING AND STAKE DETAIL (PLAN)
 SCALE: 1/4"=1'-0"

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCORE SIDES AND BOTTOM OF ROOT-BALL AND PULL BACK TOP 1/3

PLASTIC SPIRAL TREE PROTECTION (OR EQUAL) EXTENDED TO LOWEST BRANCH SURROUNDED BY RODENT PROTECTION TO LOWEST BRANCH

ROOT BALL SHALL FILL CONTAINER BUT NOT BE ROOT-BOUND



6-4
4
 CONTAINER/CONIFEROUS TREE DETAIL
 SCALE: 1/2"=1'-0"

FALL		FALL	
DECIDUOUS	EVERGREEN	PERENNIALS	
October 1 to November 6	August 25 to September 25	September 1 to October 20	
planting seasons		Planting Seasons	

6-4
5
 OPTIMUM PLANTING DATES - CENTRAL N.D.

Revised:	Drawn By:

U.S. Department of Transportation
 Federal Highway Administration

Approved Division Administrator _____ Date _____
 Project Number: NHU-1-094(035)915

Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

Project Title:
 State of North Dakota Department of Transportation
Mandan West Mainstreet Landscape Enhancement
 STNU-1-094(035)915

Sheet Title:
Planting Details

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G-3

-SET ROOT FLARE AT THE SAME ELEVATION AS WAS GROWN IN THE NURSERY (SECTION 02940)
 -PLUMB AND BACKFILL SECURELY. NO AIR POCKETS

-WATER PLANT WITHIN 2 HOURS OF INSTALLATION. WATERING MUST BE SUFFICIENT TO THOROUGHLY SATURATE ROOT BALL AND PLANTING HOLE

POLYPROPYLENE STRAPS (OR EQUAL)

PLASTIC SPIRAL TREE PROTECTION (OR EQUAL) EXTENDED TO LOWEST BRANCH SURROUNDED BY RODENT PROTECTION TO A MIN. HT. OF 2'-0" (SECTION 02940)

BARREL CHIP MULCH BED TO A 4" MIN. DEPTH. (SECTION 02940)

2"x2" PRESSURE-TREATED TREE STAKES SECURELY INSERTED TO A 3'-0" MIN. DEPTH (SECTION 02940)

EXISTING GRADE

PREPARED TOPSOIL MIX AS SPECIFIED (SECTION 02920)

6" COMPACTED SETTING BED

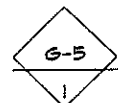
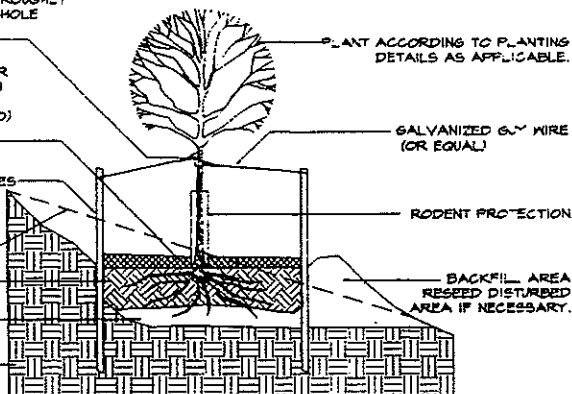
EXISTING SOIL

NOTES:

-SEE GENERAL NOTES IF AVAILABLE

-KEEP ROOTS MOIST AT ALL TIMES

-IT IS RECOMMENDED THAT THE CONTRACTOR PRUNE OFF OF THE ROOT ENDS OVER 1/2" DIA. TO STIMULATE NEW ROOT GROWTH GENERATION AT THAT POINT



PLANTING DETAIL FOR STEEP SLOPES

SCALE: 1/2"=1'-0"

NOTES:

-SEE GENERAL NOTES IF AVAILABLE

-SCORE ROOT BALL

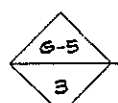
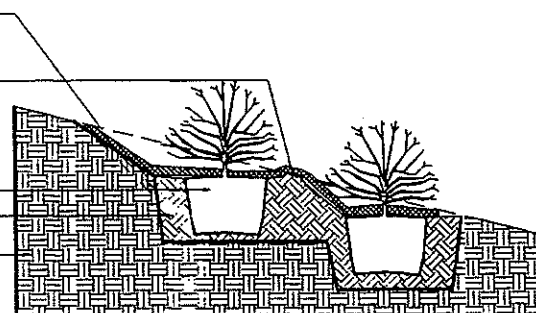
BARREL CHIP MULCH TO A 4" MIN. DEPTH (SECTION 02940)

MIDDLE RINGS TO RETAIN MOISTURE EXCEPT IN POORLY DRAINED AREAS

SHRUB ROOT BALL

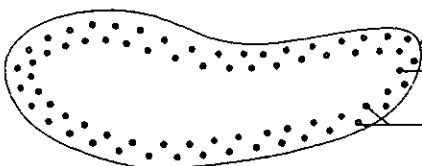
PREPARED TOPSOIL MIX AS SPECIFIED (SECTION 02920)

EXISTING SOIL (SECTION 02920)



SLOPED SHRUB PLANTING TYPICAL DETAIL

SCALE: 1/2"=1'-0"

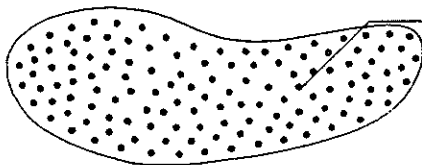


SHRUB BED EDGE AS PER DRAWINGS WITH 1'-6" MOVING STRIP REMAINING AT MATURITY

TYPICAL SHRUB INSTALLED IN A STAGGERED FASHION. SPACING VARIES ACCORDING TO SHRUB SPECIES.

INSTALL PERIMETER ROWS FIRST IN A STAGGERED FASHION N.T.D.C. AS SPECIFIED

NOTE: ALL TREES PLANTED IN MULCHED BED WILL HAVE A 3' X 3' CLEAR AREA AROUND THE TREE TRUNK.



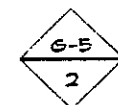
INSTALL REMAINING PLANTS IN THE INTERIOR OF THE BED.

ADJUST THE SPACING AND OR QUANTITIES IF NECESSARY TO CONFORM TO THE PREPARED PLANTING BED SIZE.

PLANTING BED SOIL SHALL BE FINE-GRADED AND LEVELED WITH HAND TOOLS PRIOR TO PLACING OF ANY MULCH.

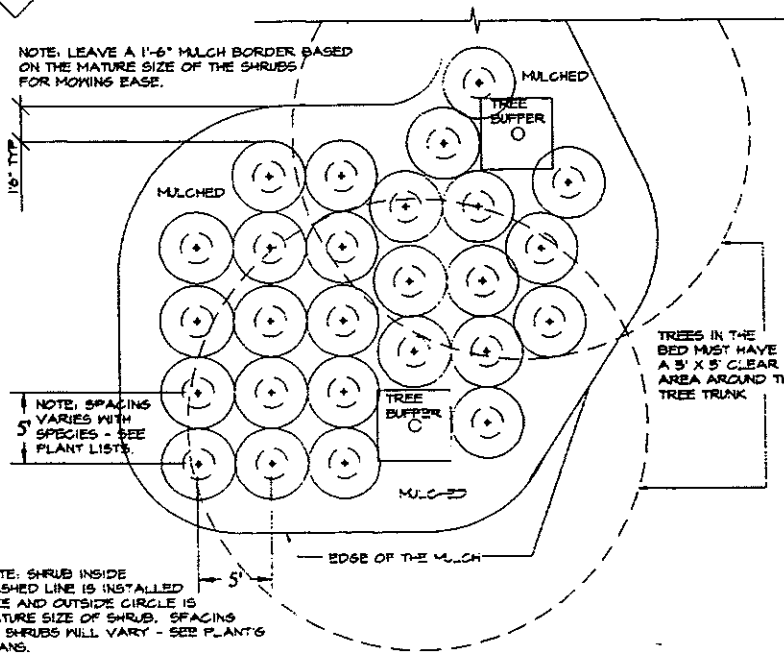
TREES SHOULD BE PLANTED IN PLANTING BEDS BEFORE SHRUBS AND GROUNDCOVERS.

NOTE: Provide at least a 1'-6" spacing between mature shrub and mulch edge for future mowing ease



MASS SHRUB/TREE PLANTING BED DETAIL

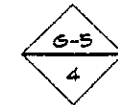
NO SCALE



NOTE: LEAVE A 1'-6" MULCH BORDER BASED ON THE MATURE SIZE OF THE SHRUBS FOR MOWING EASE.

NOTE: SPACING VARIES WITH SPECIES - SEE PLANT LISTS

NOTE: SHRUB INSIDE DASHED LINE IS INSTALLED. SIZE AND OUTSIDE CIRCLE IS MATURE SIZE OF SHRUB. SPACING OF SHRUBS WILL VARY - SEE PLANTING PLANS.



TYPICAL MASS SHRUB PLANT SPACING

NO SCALE

Revised:	Drawn By:

U.S. Department of Transportation
 Federal Highway Administration

Approved Division Administrator Date
 Project Number: NHU-1-094(035)915

Approved Chief Engineer Date
 North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation

Mandan West Mainstreet Landscape Enhancement

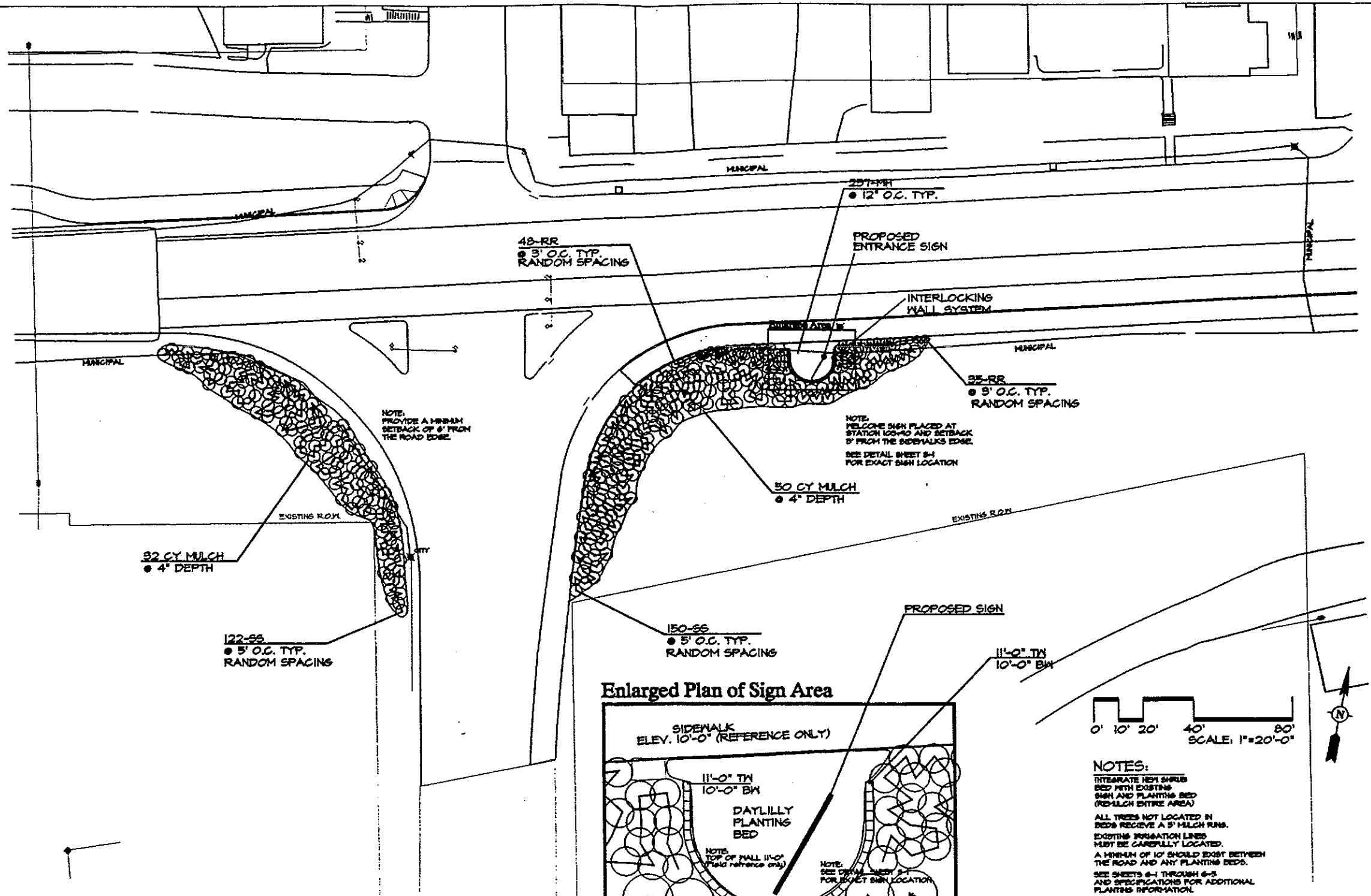
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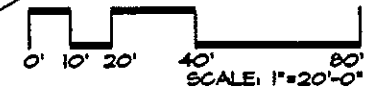
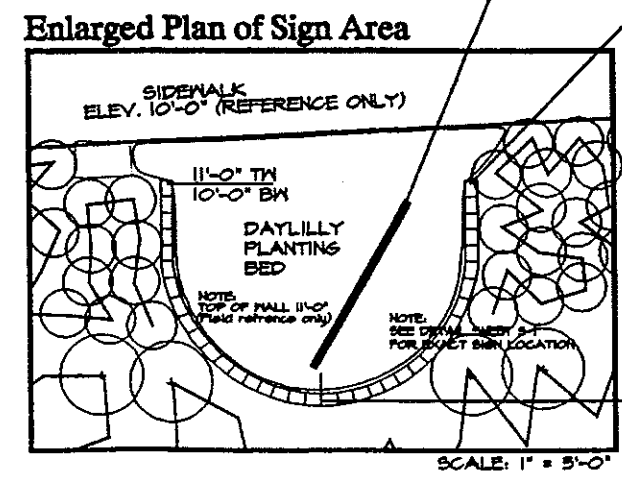
Planting Details

Sheet Number:

G-4



Tenth Avenue NW



NOTES:
 INTEGRATE NEW SHRUB BED WITH EXISTING SIGN AND PLANTING BED (RED-MULCH ENTIRE AREA)
 ALL TREES NOT LOCATED IN BEDS RECEIVE A 3\"/>

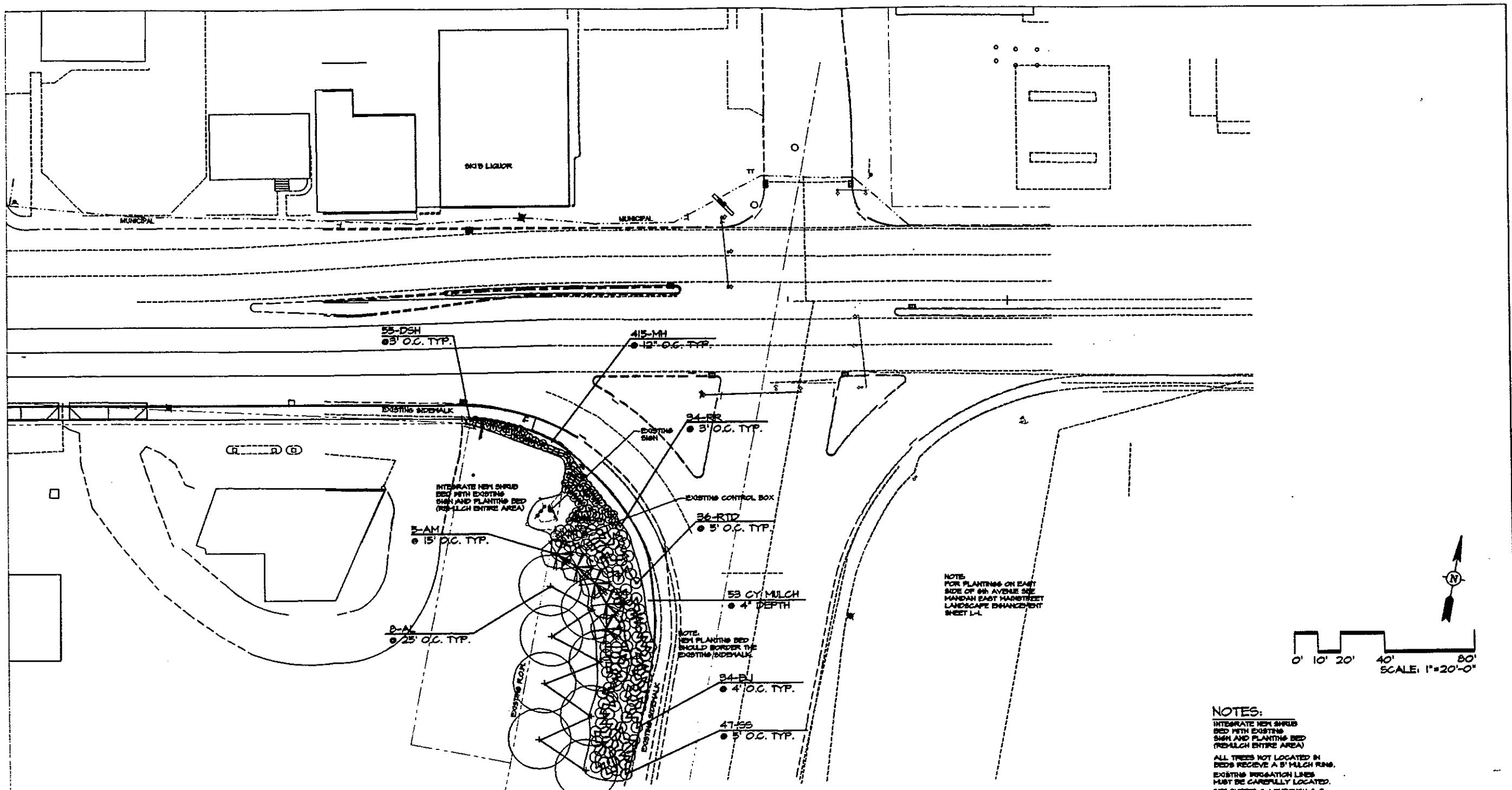
Drawn By: M.L. 7/24/14, M.L. 8/26/15, M.L. 10/7/15, M.L. 3/21/16
 Revised: M.L. 8/26/15, M.L. 10/21/15
 I. Dennis C. Galtman, AIA, a Landscape Architect, certifies that these plans and specifications are in accordance with good landscape architecture practice.

U.S. Department of Transportation
 Federal Highway Administration
 Approved Division Administrator: _____ Date: _____
 Project Number: NEHU-1-094(035)915
 Approved Chief Engineer: _____ Date: _____
 North Dakota Dept. of Transportation

Project Title: State of North Dakota Department of Transportation
Mandan West Mainstreet Landscape Enhancement
 STNU-1-094(035)915

Sheet Title: 10th Avenue NW

Sheet Number: L-1



Sixth Avenue NE

NOTES:
 INTEGRATE NEW SHRUB BED WITH EXISTING SIGN AND PLANTING BED (RE-MULCH ENTIRE AREA)
 ALL TREES NOT LOCATED IN BEDS RECEIVE A 3' MULCH RING.
 EXISTING IRRIGATION LINES MUST BE CAREFULLY LOCATED.
 SEE SHEETS 6-1 THROUGH 6-5 AND SPECIFICATIONS FOR ADDITIONAL PLANTING INFORMATION.
 A NUMBER OF DIMENSIONS HAVE BEEN PROVIDED ON THE INDIVIDUAL DRAWING SHEETS WHERE POSSIBLE, BUT A MORE ACCURATE LAYOUT CAN BE ACHIEVED BY USING THE PLANTING PLANS FOR MEASUREMENT. A TYPICAL SPACING AND PATTERN IS INDICATED FOR ALL PLANT MATERIALS. THE CONTRACTOR WILL BE RESPONSIBLE FOR PLANT LOCATION STAKING PRIOR TO INSTALLATION.

Drawn By:	Revised:
M.L. 7/24/14	M.L. 8/26/15
M.L. 1/2/15	M.L. 10/21/15
M.L. 8/21/15	

U.S. Department of Transportation
 Federal Highway Administration

Approved Division Administrator _____ Date _____
 Project Number: NEU-1-094(035)915

Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation

Mandan West Mainstreet Landscape Enhancement

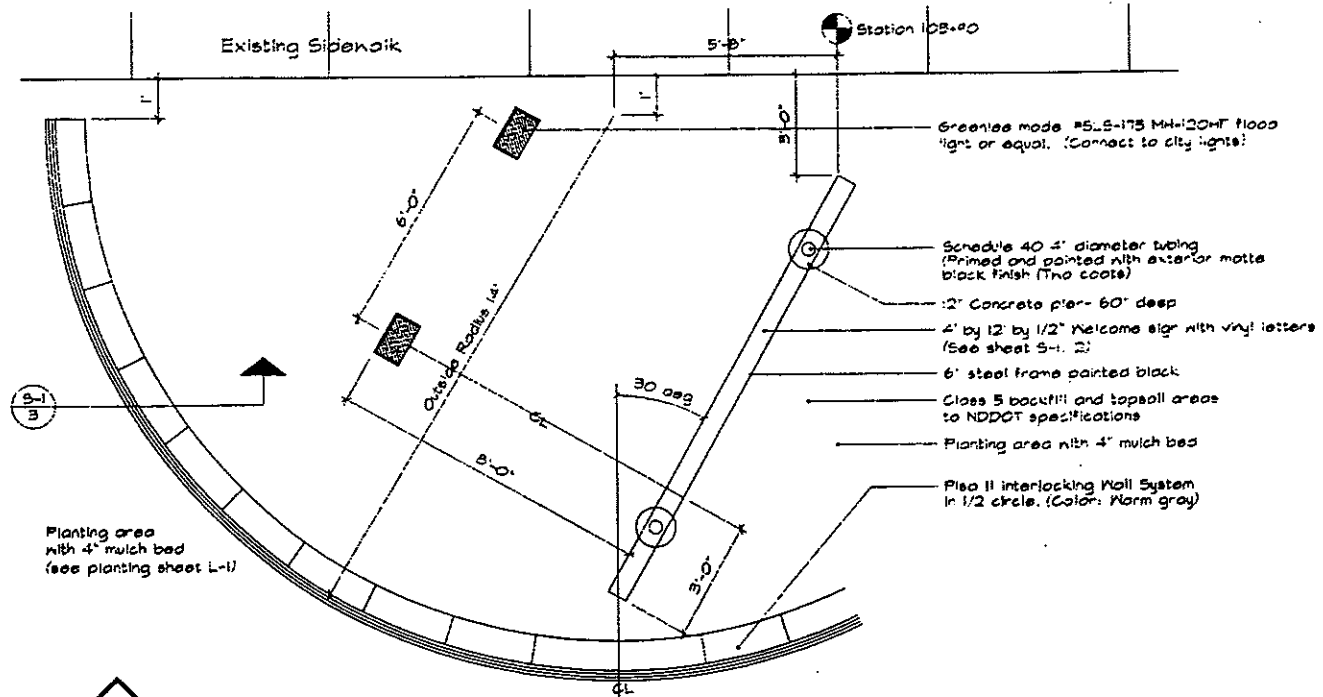
STNU-1-094(035)915

Sheet Title:

6th Avenue NE

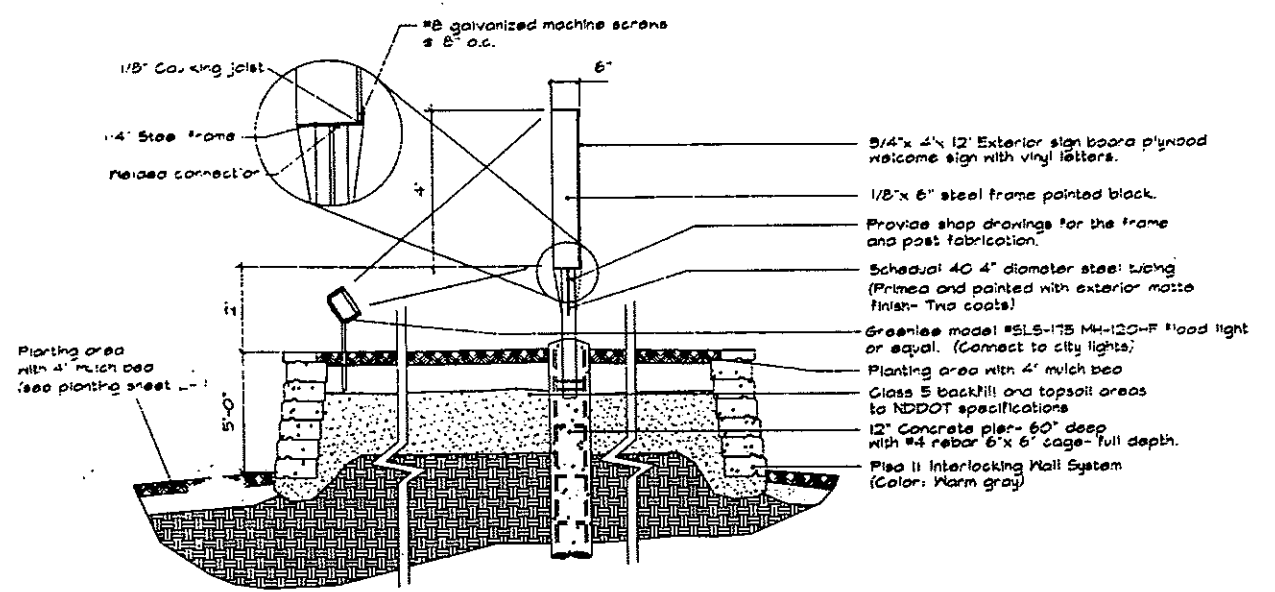
Sheet Number:

L-2



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1

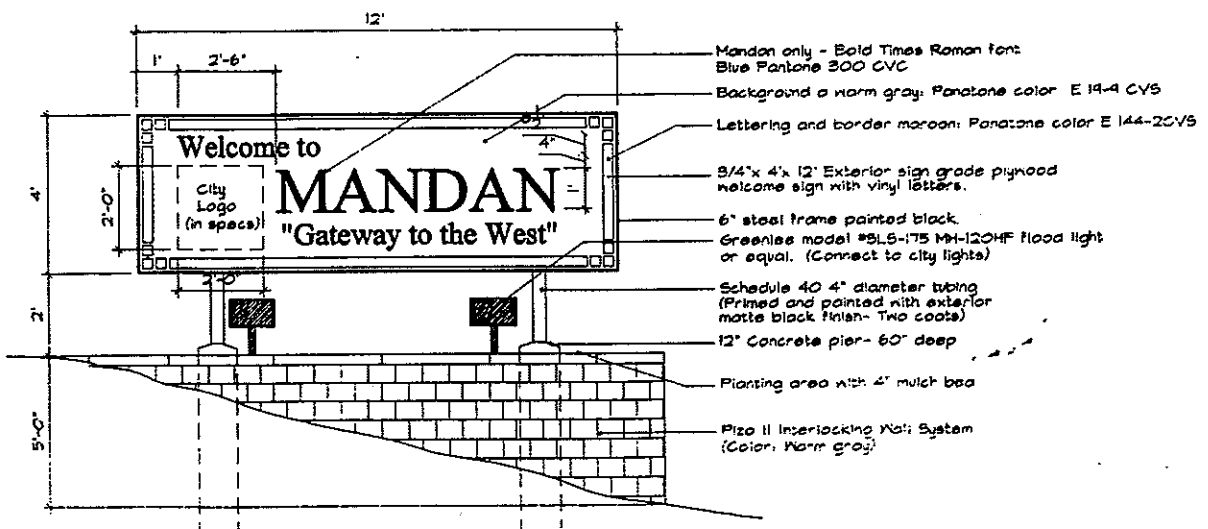
Plan of Entrance Sign Detail
Scale: 1/2"=1'-0"



NOTE: Provide shop drawings of frame fabrication to Project Engineer prior to construction.

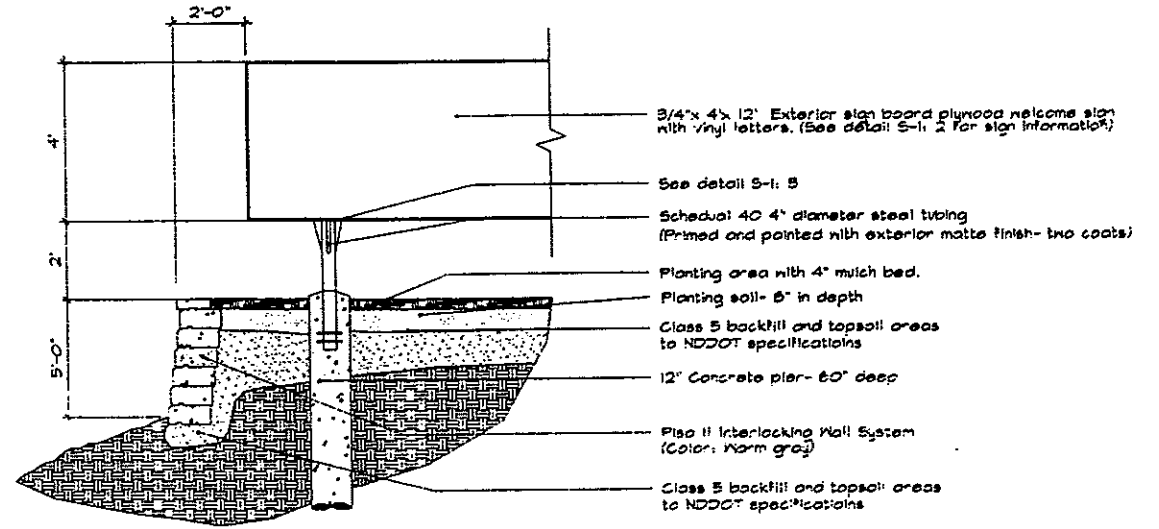
S-1
3

Section of Entrance Sign Detail
Scale: 1/2"=1'-0"



S-1
2

Elevation of Entrance Sign Detail
Scale: 1/2"=1'-0"



NOTE: Provide shop drawings of frame fabrication to Project Engineer prior to construction.

S-1
4

Elevation of Entrance Sign Detail
Scale: 1/2"=1'-0"

Revised:	Drawn By:

U.S. Department of Transportation
Federal Highway Administration

Approved Division Administrator _____ Date _____
Project Number: NHU-1-094(035)915

Approved Chief Engineer _____ Date _____
North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation

Mandan West Mainstreet Landscape Enhancement

STNU-1-094(035)915

Sheet Title:

Sign Details

Sheet Number:

S-1

CITY OF MANDAN, NORTH DAKOTA

MAIN STREET WATER AND SANITARY SEWER IMPROVEMENTS

DISTRICT #39 WATER AND SEWER IMPROVEMENT PROJECT 96-2, PHASE II

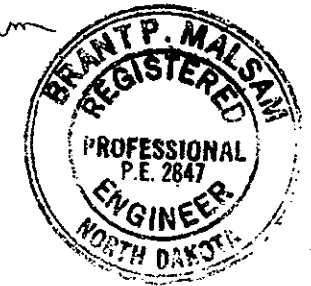
GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota Department of Transportation September 1992, Standard Drawings currently in effect, and other Contract Provisions submitted herein.

ENGINEER'S CERTIFICATE

I, BRANT P. MALSAM, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH DAKOTA, HEREBY CERTIFY THAT THE PLANS FOR DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 96-2, PHASE II, MANDAN, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Brant P. Malsam
 BRANT P. MALSAM, P.E.
 REGISTERED PROFESSIONAL ENGINEER
 NORTH DAKOTA REGISTRATION NO. 2847



APPROVAL OF DISTRICT ENGINEER

I, THOMAS R. LITTLE, CITY ENGINEER FOR THE CITY OF MANDAN, NORTH DAKOTA, HEREBY APPROVE THESE PLANS FOR DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 96-2 PHASE II, MANDAN, NORTH DAKOTA, AS SHOWN ON THE THE ACCOMPANYING PLANS.

Thomas R. Little
 THOMAS R. LITTLE, P.E.
 CITY ENGINEER
 MANDAN, NORTH DAKOTA

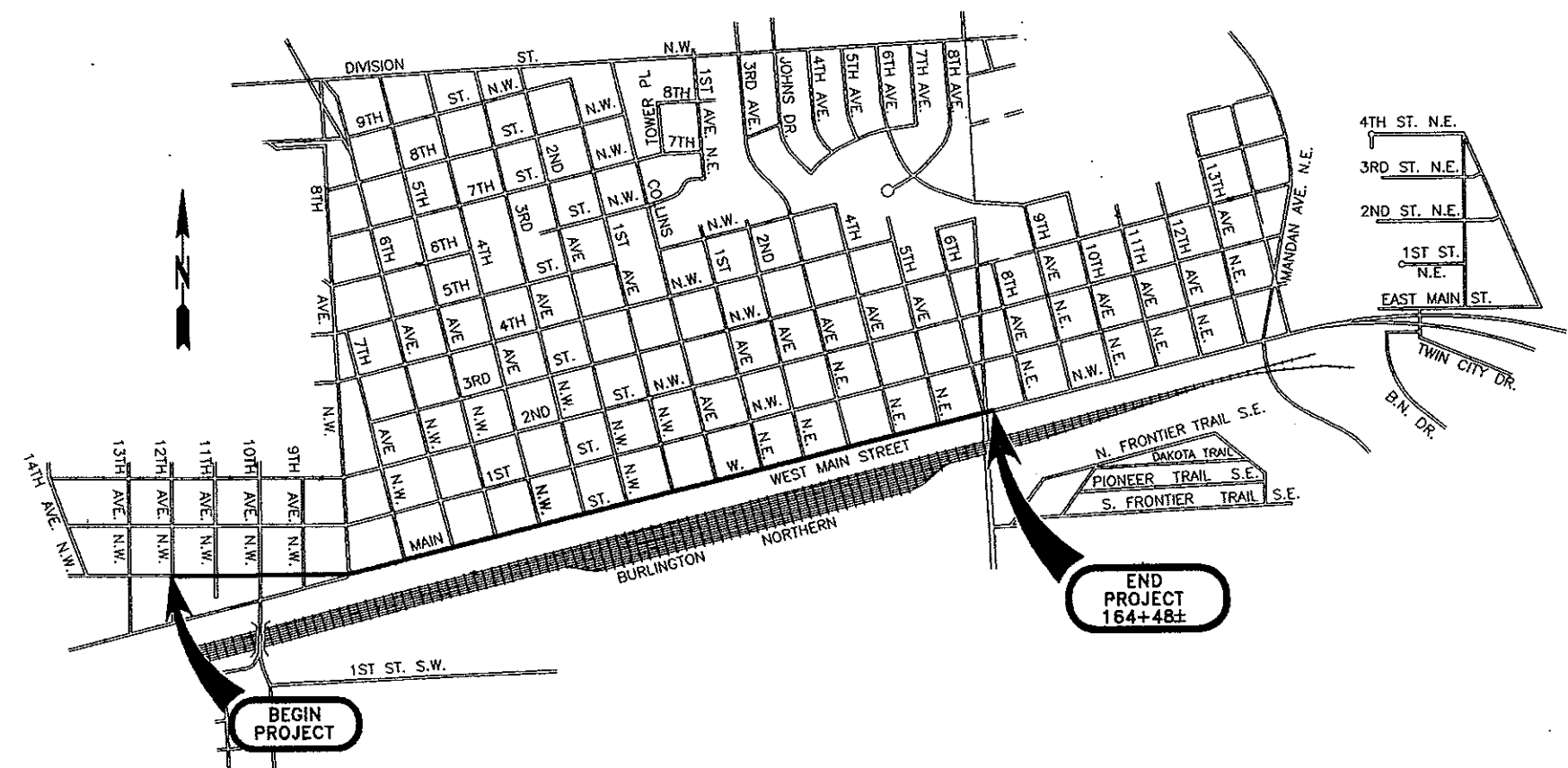


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GENERAL NOTES

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P01

QUESTIONS: ALL TECHNICAL QUESTIONS PRIOR TO BIDDING OR AFTER BID AWARD IN REGARDS TO DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 96-2, PHASE II ARE TO BE DIRECTED TO ULTEIG ENGINEERS, INC., 1701 SOUTH 12TH STREET, BOX 2041, BISMARCK, ND. TELEPHONE 701-258-6507. FAX 701-224-1163.

100
P02

PROJECT OVERVIEW AND SPECIAL COORDINATION REQUIREMENTS: DISTRICT #39, WATER AND SEWER IMPROVEMENTS PROJECT 96-2, PHASE II SHALL BE BID AND CONSTRUCTED IN CONJUNCTION WITH NDDOT PROJECT NHU-1-094(035)915. NDDOT'S PROJECT WILL BE CONSTRUCTED IN PHASES WITH THE NORTH HALF OF MAIN STREET BEING RECONSTRUCTED FIRST. CONSTRUCTION OF WATER AND SEWER IMPROVEMENTS WILL REQUIRE SPECIAL COORDINATION AND PLANNING DUE TO THE PHASED RECONSTRUCTION OF MAIN STREET AND THE NEED TO MAINTAIN WATER SERVICE TO USERS ON BOTH SIDES OF THE STREET. SPECIAL REQUIREMENTS ARE AS FOLLOWS:

1. EXISTING 4" & 6" WATERMANS WITHIN CONSTRUCTION SEGMENTS TO REMAIN IN SERVICE UNTIL SERVICES AND FIRE HYDRANTS CAN BE SWITCHED OVER TO NEW 12" WATERMAIN, CONTRACTOR MAY SUBMIT FOR APPROVAL A DETAILED PLAN TO PROVIDE TOTAL BYPASSING OF WATER TO USERS ON THE NORTH AND SOUTH SIDE OF MAIN STREET INSTEAD OF KEEPING OLD MAINS IN SERVICE. BYPASSING PLAN MUST BE CAREFULLY THOUGHT OUT AND PROVIDE FIRE PROTECTION COMPARABLE TO EXISTING. ANY BYPASSING COSTS SHALL BE INCIDENTAL. NEW 12" WATERMAIN WILL NEED TO BE INSTALLED IN SEGMENTS.
2. CONTRACTOR MAY BE REQUIRED TO INSTALL TEMPORARY PLUGS IN EXISTING WATERMANS TO ALLOW SYSTEMATIC WATERMAIN CONSTRUCTION TO OCCUR. LOCATIONS REQUIRE ENGINEER'S APPROVAL. COSTS INCIDENTAL.
3. ADEQUATE NOTICE TO BE GIVEN TO ALL USERS PRIOR TO DISRUPTING WATER SERVICE. WATER SERVICE CANNOT BE DISRUPTED MORE THAN 8 HOURS. CONTRACTOR WILL DISTRIBUTE NOTICES TO AFFECTED USERS 24 HOURS IN ADVANCE OF ANY WATER SHUT DOWNS. NOTICES MUST BE GIVEN NOT ONLY TO USERS WITHIN THE CONSTRUCTION AREA BUT TO ANY USER AFFECTED BY DISRUPTIONS. CONTRACTOR MUST COORDINATE CLOSELY WITH OWNER TO DETERMINE WHO THE AFFECTED USERS ARE.
4. SERVICE LINE WORK WILL INCLUDE INSTALLING NEW COPPER SERVICE LINES FROM NEW 12" MAIN TO EXISTING CURB STOP, REPLACING EXISTING CURB STOPS, AND CONNECTING TO EXISTING SERVICE LINE.
5. ONCE THE NEW WATERMAIN IS INSTALLED, TESTED, ETC., SERVICES NEED TO BE CONNECTED TO NEW MAIN. IF ALL SERVICES WITHIN A VALVED SEGMENT CANNOT BE CONNECTED WITHIN 8 HOURS, THE CONTRACTOR MUST PROVIDE TEMPORARY SERVICE OR SHUT OFF, CRIMP, CAP OR PLUG THE EXISTING SERVICE LINES WHERE THE NEW ONES CONNECT. THE COST OF PROVIDING TEMPORARY WATER SERVICE SHALL BE INCIDENTAL TO THE PRICE BID FOR OTHER ITEMS. SCHEDULING OF WORK REQUIRING CLOSURE OF ANY WATERMANS SHALL BE COORDINATED WITH THE CITY. ANY OPERATIONS OF WATERMAIN VALVES WILL BE DONE BY THE CITY OF MANDAN. METHOD OF PROVIDING TEMPORARY WATER SERVICE REQUIRES THE ENGINEER'S APPROVAL. CITY OF MANDAN WILL FURNISH WATER FOR TEMPORARY SERVICES AT NO CHARGE. CONTRACTOR WILL BE REQUIRED TO FURNISH ALL PIPING, CONNECTIONS TO USERS FACILITIES, CONNECTIONS TO EXISTING HYDRANTS AND OTHER INCIDENTALS.

6. CONTRACTOR MUST PREPARE AND SUBMIT A WRITTEN PLAN FOR COMPLETING THE WORK TO THE ENGINEER FOR APPROVAL. PLAN WILL BE PREPARED AFTER CONTRACTOR HAS MET WITH OWNER AND ENGINEER TO DISCUSS PROJECT.
7. CONTRACTOR WILL BE REQUIRED TO ASSURE THAT ALL EXISTING USERS ARE RECONNECTED TO THE NEW 12" WATERMAIN.
8. BETWEEN ±158+75 AND ±162+00 CONTRACTOR WILL BE REQUIRED TO PROVIDE TEMPORARY BYPASS OF EXISTING WATER BECAUSE OF THE NEW PIPE AND EXISTING PIPE BEING IN APPROXIMATELY THE SAME LOCATION. ALL COSTS FOR THIS SHALL BE INCIDENTAL TO OTHER ITEMS.

714
P01

ADDITIONAL WORK REQUIRED WITH SSMH #6 BEING INSTALLED AT 117+17 - 33' RT INCLUDES THE FOLLOWING: REMOVAL AND DISPOSAL OF EXISTING MANHOLE, BYPASSING SEWAGE DURING INSTALLATION OF NEW MANHOLE, CONSTRUCTING INTERIOR DROPS AT ALL INCOMING PIPES TO WITHIN 1' OF THE INVERT, RECONNECTING ALL PIPES, GROUTING INVERT AND OTHER INCIDENTALS. ALL COSTS FOR THIS ADDITIONAL WORK TO BE INCLUDED IN THE UNIT PRICE BID FOR SANITARY MANHOLE.

722
P01

SANITARY MANHOLES: THE PRICE BID FOR SANITARY MANHOLE SHALL BE FULL COMPENSATION FOR ALL WORK AND MATERIALS ASSOCIATED WITH THE INSTALLATION OF A SANITARY SEWER MANHOLE INCLUDING, BUT NOT LIMITED TO: EXCAVATION, SETTING THE MANHOLE BASE, RISER SECTIONS, CASTING AND COVER. CONSTRUCTION OF THE FLOWLINES AND SETTING THE CASTING AND COVER TO FINAL GRADE ARE ALSO INCIDENTAL.

722
P02

ABANDON EXISTING SANITARY MANHOLES AND EXISTING VALVE BOXES: WHERE CALLED FOR ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN THE FIELD, THE ABANDONMENT OF EXISTING SANITARY MANHOLES SHALL INCLUDE REMOVING AND DISPOSING OF ALL CASTINGS, ADJUSTMENT RINGS AND TOP MANHOLE SECTION, PLUGGING ALL PIPE OPENINGS WITH CONCRETE AND FILLING REMAINDER OF MANHOLE WITH COMPACTED GRANULAR MATERIAL (CLASS 5). THE AMOUNT TO BE PAID SHALL BE AT THE UNIT PRICE BID PER EACH ABANDON EXISTING MANHOLE. ALL EXISTING VALVE BOXES THAT ARE NO LONGER NEEDED ONCE EXISTING MAINS ARE ABANDONED SHALL BE ABANDONED AS FOLLOWS: REMOVE TOP SECTION OF VALVE BOX AND FILL REMAINING VALVE BOX WITH PEA ROCK THAT IS SLICED, TAMPED AND CONSOLIDATED TO THE ENGINEER'S SATISFACTION. THE AMOUNT TO BE PAID SHALL BE AT THE UNIT PRICE BID PER EACH ABANDON EXISTING VALVE BOX.

GENERAL NOTES

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P01

WATERMAIN, VALVES, FITTINGS AND HYDRANTS: GATE VALVES SHALL BE REQUIRED WITH A GATE HAVING A RESILIENT (VULCANIZED SYNTHETIC RUBBER COATING) SEAT ATTACHED TO THE WEDGE, MANUFACTURED AND DESIGNED IN ACCORDANCE WITH THE LATEST REVISIONS OF AWWA STANDARD C-509. RESILIENT-SEATED GATE VALVE BODY AND BONNET SHALL BE COATED, INSIDE AND OUT, WITH A FUSION BONDED EPOXY IN ACCORDANCE WITH AWWA C-550. THE RESILIENT RUBBER SEAT SHALL BE MOLDED AND BONDED TO THE WEDGE. THE WATERWAY SHALL HAVE A FULL UNOBSTRUCTED FLOW WITHOUT RECESSES IN THE BOTTOM.

THE MINIMUM BARREL LENGTH OF HYDRANTS SHALL BE 18 INCHES FROM LOWEST NOZZLE TO FUTURE GROUND LINE WITH 8 FEET OF COVER OVER THE TOP OF THE HYDRANT LEAD.

ALL BOLTS CONNECTING THE BARREL TO THE FOOT ELBOW SHALL BE STAINLESS STEEL.

BOLTS FOR MECHANICAL JOINT FITTINGS SHALL BE ALTERNATED WITH ONE-HALF STAINLESS STEEL AND ONE-HALF LOW ALLOY STEEL. LOW ALLOY STEEL BOLTS SHALL CONTAIN A MAXIMUM CONTENT OF CARBON AT 0.2 PERCENT, MANGANESE AT 1.25 PERCENT AND SULFUR AT 0.05 PERCENT AND A MINIMUM CONTENT OF NICKEL AT 0.25 PERCENT, COPPER AT 0.20 PERCENT, AND A COMBINED CONTENT OF NICKEL, COPPER, AND CHROMIUM AT 1.25 PERCENT.

WEIGHTS SHOWN FOR FITTINGS ARE FOR DUCTILE IRON MECHANICAL JOINT FITTINGS. DUCTILE IRON SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI C153/A21.53 WITH A WORKING PRESSURE OF 350 PSI. THE WEIGHT TO BE PAID FOR SHALL NOT INCLUDE THE POUNDAGE FOR FITTING ACCESSORIES, i.e., BOLTS, FLANGES, ETC. THE COST FOR THESE ITEMS SHALL BE INCIDENTAL TO OTHER ITEMS.

WATERMAIN PIPE SHALL BE POLYVINYL CHLORIDE PIPE AND SHALL MEET THE REQUIREMENTS OF AWWA C-900 OR THE LATEST REVISION THEREOF AND SHALL BE FURNISHED IN CAST IRON PIPE EQUIVALENT OUTSIDE DIAMETERS WITH ELASTOMERIC JOINTS. THE PRESSURE CLASS OF THE PVC PIPE SHALL BE CLASS 150 WITH A SDR OF 18.

ANY ADAPTORS NECESSARY TO ADAPT FROM AN EXISTING WATERMAIN PIPE TO THE SPECIFIED WATERMAIN PIPE OR TO THE WATERMAIN PIPE SELECTED SHALL BE CONSIDERED INCIDENTAL TO THE UNIT PRICE BID FOR WATERMAIN PIPE.

ALL FITTINGS, VALVES, AND HYDRANT SHOES SHALL BE INSTALLED WITH A POLYETHYLENE ENCASMENT CONFORMING TO AWWA C-150, ANSI A21.5 WITH AN 8 MIL NOMINAL FILM THICKNESS. NOT A SEPARATE PAY ITEM. COST TO BE INCLUDED IN PRICE BID FOR WATERMAIN PIPE.

ALL PIPE JOINTS WITHIN THREE FULL PIPE LENGTHS OF ANY FITTING, VALVE, COUPLING, PLUG OR OTHER SUCH ELEMENT SHALL BE MECHANICALLY RESTRAINED BY USE OF RESTRAINT DEVICES. ALL FITTING JOINTS, COUPLINGS, VALVES, AND PLUGS SHALL ALSO BE RESTRAINED. ALL PIPE JOINTS AND HYDRANTS ON HYDRANT LEADS SHALL ALSO BE RESTRAINED. RESTRAINT DEVICES SHALL BE AS MANUFACTURED BY EBAA IRON, UNI-FLANGE, CERTA-LOK, OR OTHER ENGINEER APPROVED DEVICES. ALL COSTS FOR RESTRAINING DEVICES SHALL BE INCIDENTAL TO OTHER BID ITEMS.

724
P02

PRESSURE TESTING OF NEW WATERMAIN: INSPECTION AND TESTS MUST BE MADE BY THE MANUFACTURER ON ALL PIPE AND COMPONENT PARTS BEFORE SHIPMENT. SUCH TESTS SHALL BE MADE BY A TESTING LABORATORY SATISFACTORY TO THE ENGINEER AND SUCH TESTS SHALL BE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN SOCIETY FOR TESTING MATERIALS. TESTS AND DOCUMENTARY EVIDENCE THAT THE MATERIALS HAVE PASSED SUCH INSPECTIONS MUST BE FURNISHED TO THE ENGINEER BEFORE THE DELIVERY OF THE MATERIALS ON THE JOB. ANY MATERIALS WHICH DO NOT PROVE SATISFACTORY AFTER BEING PLACED IN THE WORK MUST BE REMOVED FROM THE PREMISES AND REPLACED WITH SATISFACTORY MATERIAL. THE COST OF FOUNDRY INSPECTION SHALL BE PAID BY THE CONTRACTOR. AFTER THE PIPE HAS BEEN INSTALLED AND THE TRENCH PARTIALLY BACKFILLED, OR COMPLETELY BACKFILLED AT CONTRACTOR'S OPTION, ALL NEW PIPE OR ANY VALVED SECTION THEREOF SHALL BE SUBJECT TO HYDROSTATIC PRESSURE TEST UNDER THE SUPERVISION OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIALS AND DOING ALL TAPPING. THE TEST SECTION SHALL BE FILLED WITH WATER AND SUBJECTED TO EXAMINATION. AFTER THE EXAMINATION THE PRESSURE SHALL BE GRADUALLY INCREASED. IF DEFECTS ARE FOUND, THE CONTRACTOR SHALL IMMEDIATELY MAKE THE NECESSARY REPAIRS AT HIS OWN EXPENSE. THE FINAL PRESSURE TEST SHALL BE 150 POUNDS PER SQUARE INCH AND SHALL BE HELD AT LEAST TWO HOURS. IN ADDITION THE CONTRACTOR MUST COMPLY WITH ALL OF THE HYDROSTATIC TESTINGS OF AWWA C600-87. THE CONTRACTOR SHALL FURNISH ALL TOOLS, EQUIPMENT AND MATERIAL NECESSARY TO MAKE THE PRESSURE TEST.

724
P03

CHLORINATION OF NEW MAINS: AFTER THE NEW MAINS AND VALVED EXTENSIONS HAVE BEEN TESTED THEY SHALL BE FLUSHED UNTIL ALL FOREIGN MATERIAL HAS BEEN REMOVED. CHLORINATION APPLICATIONS SHALL BE MADE UNDER THE SUPERVISION OF THE ENGINEER. WATER SHALL BE FED INTO THE NEW LINE WITH CHLORINE APPLIED IN AMOUNTS TO MAINTAIN A CHLORINE SOLUTION WITH A CHLORINE RESIDUAL OF 50 MILLIGRAMS PER LITER FOR 24 HOURS OR CHLORINE RESIDUAL OF 200 MILLIGRAMS PER LITER FOR 3 HOURS. ALL VALVES AND HYDRANTS IN THE SECTION TREATED SHALL BE OPERATED DURING THIS TIME IN ORDER TO DISINFECT THE APPURTENANCE. THE CHLORINE SHALL BE FLUSHED FROM THE MAIN THROUGH HYDRANTS UNTIL ALL EXCESS CHLORINE HAS BEEN REMOVED. NO CHLORINATION WATER WILL BE PERMITTED IN THE WATERMAIN TRENCH. THE CONTRACTOR SHALL FURNISH ALL TOOLS, EQUIPMENT AND MATERIAL TO CHLORINATE.

AFTER THE CHLORINATED WATER HAS BEEN FLUSHED FROM THE WATERMAIN, THE WATERMAIN SHALL BE TESTED FOR BACTERIOLOGICAL QUALITY IN ACCORDANCE WITH AWWA C651 LATEST REVISION THEREOF. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 24 HOURS PRIOR TO THE TIME THAT COLLECTION OF THE SAMPLES IS TO OCCUR. AT LEAST THREE SAMPLES SHALL BE COLLECTED FROM EACH SEGMENT OF THE PIPELINE BEING TESTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRANSPORTING ALL SAMPLES TO THE NORTH DAKOTA STATE DEPARTMENT OF HEALTH AND CONSOLIDATED LABORATORIES AND PAYING THE APPROPRIATE FEE. A COPPER TUBE GOOSENECK COMPLETE WITH A COPPER TUBE GOOSENECK ASSEMBLY SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. IF THE INITIAL DISINFECTION FAILS TO PRODUCE SATISFACTORY BACTERIOLOGICAL RESULTS, THE WATERMAIN MUST BE REFLUSHED AND RESAMPLED. IF CHECK SAMPLES SHOW THE PRESENCE OF COLIFORM ORGANISMS, THE MAIN SHALL THEN BE RECHLORINATED AND PROCEDURES REPEATED UNTIL SATISFACTORY RESULTS ARE OBTAINED. THE GOOSENECK ASSEMBLY SHALL BE REMOVED AND REUSED AT EACH SAMPLING LOCATION.

GENERAL NOTES

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P04

WATER SERVICE CONNECTIONS: CURB STOPS SHALL BE MUELLER NO. H-15164, WITHOUT DRAIN, OR APPROVED EQUAL. CURB BOXES SHALL BE MEULLER NO. H-10300 (1 1/4" DIAMETER UPPER SECTION) FOR ONE (1) INCH CURB STOPS AND MUELLER NO. H-10340 (2" DIAMETER UPPER SECTION) FOR ONE AND ONE-QUARTER (1 1/4) INCH THROUGH TWO (2) INCH CURB STOPS, OR AN APPROVED EQUAL. THE LENGTH OF THE CURB BOXES SHALL VARY OR BE MODIFIED AT NO ADDITIONAL COST TO ACCOMODATE EXISTING CONDITIONS. THERE WILL BE NO SEPERATE PAYMENT FOR ADJUSTING CURB BOXES TO FINAL GRADE, ALL COSTS FOR ADJUSTING CURB BOXES TO FINAL GRADE ARE INCIDENTAL.

COPPER WATER PIPE SHALL CONFORM TO A.S.T.M. B88, TYPE K.

CORPORATION STOPS SHALL BE MUELLER NO. H-15000 FOR COPPER WATER PIPE OR APPROVED EQUAL.

ALL CORPORATION TAPS MADE INTO ALL SIZES AND CLASSES OF PVC FOR TESTING OR PERMANENT CONNECTIONS SHALL BE REINFORCED WITH A TAPPING SADDLE. TAPPING SADDLES USED ON PVC WATERMAIN SHALL PROVIDE FULL SUPPORT AROUND THE CIRCUMFERENCE OF THE PIPE AND PROVIDE A BEARING AREA OF SUFFICIENT WIDTH ALONG THE AXIS OF THE PIPE, 2 INCHES MINIMUM, ENSURING THAT THE PIPE WILL NOT BE DISTORTED WHEN A SADDLE IS TIGHTENED. TAPPING SADDLES SHALL BE ONE OF THE FOLLOWING: A DOUBLE STRAP BRONZE (NOT TO BE USED WITH PVC), A STAINLESS STEEL OR AN EPOXY COATED MALLEABLE IRON. ACCEPTABLE MANUFACTURER'S FOR THESE SADDLES ARE MUELLER, ROCKWELL, SUPERIOR, FORD, ROMAC AND CASCADE OR AN APPROVED EQUAL. THE MAXIMUM SIZE TAP INTO A SIX (6) INCH IN DIAMETER WATERMAIN IS 1 1/2 INCHES, HOWEVER A STAINLESS STEEL SLEEVE MAY BE USED FOR A 2 INCH TAP INTO A 6 INCH MAIN.

CONTRACTOR WILL BE REQUIRED TO TAP WATERMANS FOR ALL WATER SERVICE CONNECTIONS. TAPS WILL NOT BE MADE BY THE CITY OF MANDAN.

ALL WATER SERVICE LINE STUBOUTS SHALL BE THOROUGHLY FLUSHED PRIOR TO TESTING OF MAINS OR STUBOUTS. CURB STOPS SHALL BE INSTALLED ON A 1/2 SQUARE FOOT BY 4 INCH THICK CONCRETE OR BRICK PAD.

ON WATERMAIN REPLACEMENT CONSTRUCTION ALL TAPS TO THE NEW WATERMANS SHALL BE 1-1/2 INCH UNLESS OTHERWISE SPECIFIED ON THE PLANS. CONNECTION TO THE EXISTING WATER SERVICE LINES MAY REQUIRE A REDUCER AND SHALL BE CONSIDERED INCIDENTAL TO OTHER BID ITEMS. ALL CONNECTIONS AND FITTINGS REQUIRED TO CONNECT THE NEW COPPER WATER SERVICE LINES TO THE EXISTING WATER SERVICE LINES SHALL BE CONSIDERED INCIDENTAL. EXISTING SERVICE LINES SHALL BE REPLACED UP TO AND INCLUDING THE CURB STOP. ALL CONNECTIONS AND FITTINGS REQUIRED TO CONNECT THE NEW CURB STOP TO THE EXISTING WATER SERVICE LINE SHALL BE CONSIDERED INCIDENTAL.

724
P05

SANITARY SERVICE CONNECTIONS: AFTER SEWERMANS HAVE BEEN INSTALLED OR SECTIONS OF SEWERMANS HAVE BEEN REPLACED, SANITARY SEWER SERVICE CONNECTIONS SHALL BE INSTALLED OR RECONNECTED AT THE LOCATIONS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER. PVC WYES SHALL BE 6" SADDLE TYPE W/SS BANDS.

724
P05
CONT.

ON SANITARY SEWER SERVICES TO BE RECONNECTED, THE EXISTING PIPE SHALL BE CUT SMOOTHLY AND VERTICALLY BY APPROVED CUTTING EQUIPMENT. ALL ROOTS, OBSTRUCTIONS, AND DEBRIS, AT CONNECTION PIPE SHALL BE REMOVED PRIOR TO MAKING CONNECTION. ALL DISRUPTED SERVICES ON A REPLACED SECTION OF SEWERMAIN SHALL BE RECONNECTED PRIOR TO REPLACING ANOTHER SECTION OF SEWERMAIN.

NEW 6" SERVICE PIPE SHALL BE CONNECTED TO EXISTING SERVICE LINES BY USE OF FERNCO ADAPTERS OR APPROVED EQUAL. ADAPTERS SHALL BE OF THE SIZE REQUIRED.

THE AMOUNT TO BE PAID SHALL BE AT THE CONTRACT UNIT PRICE BID PER EACH (EA) SANITARY SEWER SERVICE CONNECTION COMPLETE IN PLACE AND ACCEPTABLE TO THE ENGINEER. THIS SHALL INCLUDE ALL EXCAVATION, SAND BEDDING AND ENCASEMENT, BACKFILLING, COMPACTION, SADDLE WYE OF THE SIZE REQUIRED, SDR 35 PVC SEWER SERVICE PIPE OF THE LENGTH SHOWN OR AS REQUIRED FOR RECONNECTIONS, NECESSARY PVC BENDS AND FERNCO ADAPTERS.

724
P06

ANY COSTS FOR THE DISPOSAL OF EXCESS EXCAVATION FROM THE TRENCHES OF WATERMANS, SEWERMANS OR OTHER UNDERGROUND PIPING ASSOCIATED WITH THESE PLANS SHALL BE INCLUDED IN THE PRICE BID FOR THE RESPECTIVE ITEM.

724
P07

GATE VALVES: PAYMENT FOR GATE VALVES SHALL BE FULL COMPENSATION FOR INSTALLING GATE VALVES AND INCIDENTALS INCLUDING BUT NOT LIMITED TO THE VALVE BOX. ADJUSTMENT OF THE VALVE BOX TO FINAL GRADE SHALL ALSO BE INCLUDED IN THE PRICE BID FOR "GATE VALVE".

724
P07

THE UNIT PRICE BID FOR TAPPING SLEEVES SHALL INCLUDE ALL COSTS FOR FURNISHING AND INSTALLING THE FLXMJ VALVE AND BOX.

744
P01

POLYSTYRENE INSULATION: A QUANTITY OF POLYSTYRENE INSULATION HAS BEEN PROVIDED TO ALLOW INSULATION OF WATERMAIN OR WATER SERVICE CROSSINGS WITHIN THREE (3) FEET OF ANY STORM SEWER LINE OR STRUCTURE. THE INSULATION SHALL BE IN TWO (2) INCH THICK SHEETS. ONE LAYER SHALL BE USED FOR A THREE FOOT SEPERATION BETWEEN LINES. ADDITIONAL LAYERS SHALL BE PLACED FOR SEPERATIONS LESS THAN THREE FEET, AS DIRECTED BY THE ENGINEER. INSULATION SHALL CONFORM TO ASTM C578-85, TYPE VII AND SHALL BE VERY HIGH DENSITY RIGID EXTRUDED POLYSTYRENE WITH A COMPRESSIVE STRENGTH OF 60 PSI (NOTE - MATERIAL COMES IN 2' WIDTHS).

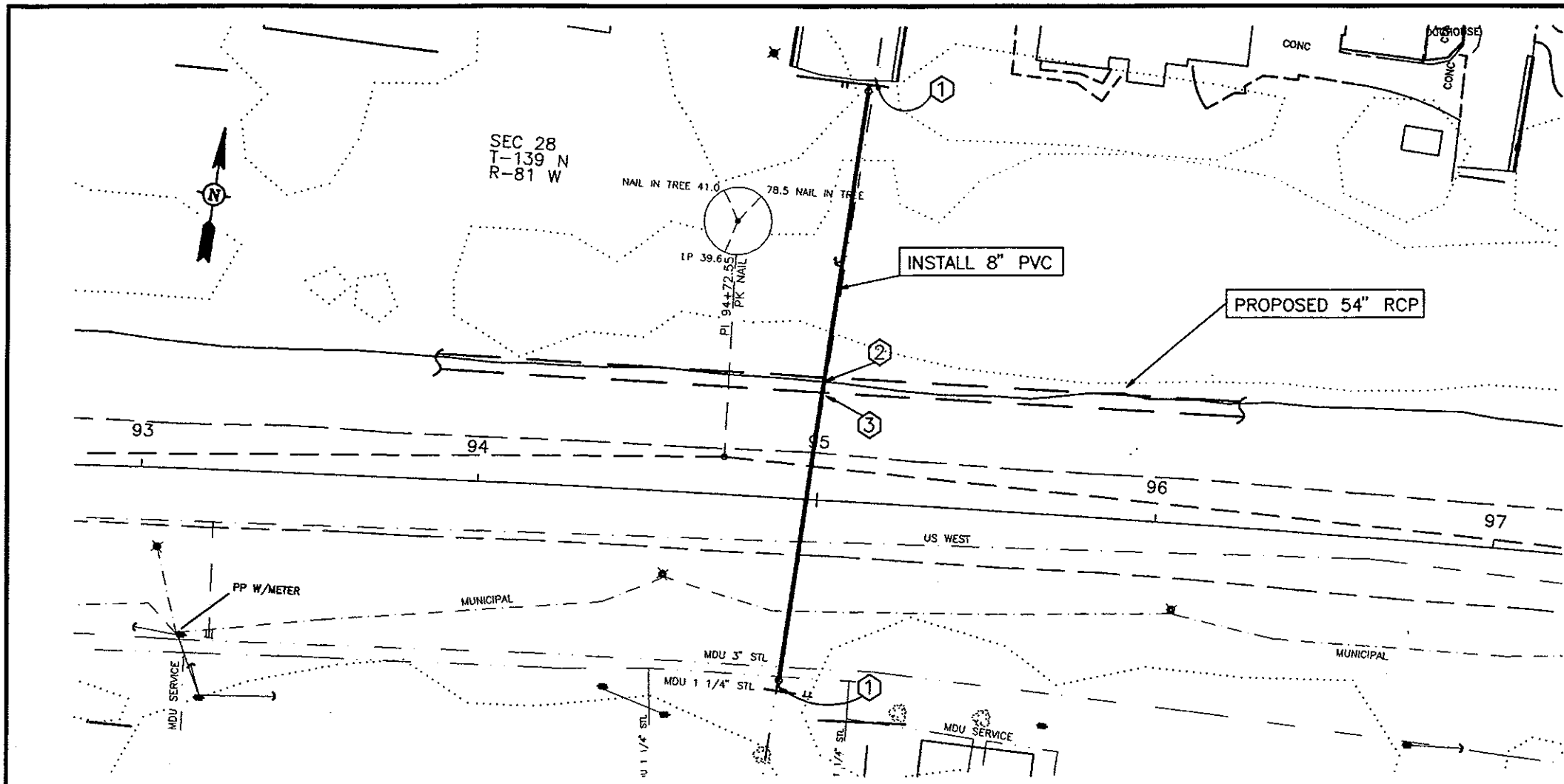
910
P01

WHERE CALLED FOR ON THE PLANS, THE EXISTING 24" RCP SEWER LINE SHALL BE FILLED WITH A GROUT MATERIAL. GROUT MATERIAL SHALL BE A MIXTURE OF WATER, CEMENT, SAND AND FLYASH THAT PROVIDES A COMPRESSIVE STRENGTH OF 300 PSI IN SEVEN DAYS. CONTRACTOR SHALL PUMP MATERIAL TO ASSURE THAT THE ENTIRE 24" RCP IS FILLED.

THE AMOUNT TO BE PAID SHALL BE AT THE CONTRACT UNIT PRICE BID PER LINEAL FOOT (LF) FOR GROUT 24" RCP. THIS SHALL INCLUDE ALL MATERIALS, LABOR AND OTHER INCIDENTALS REQUIRED TO COMPLETE THE WORK.

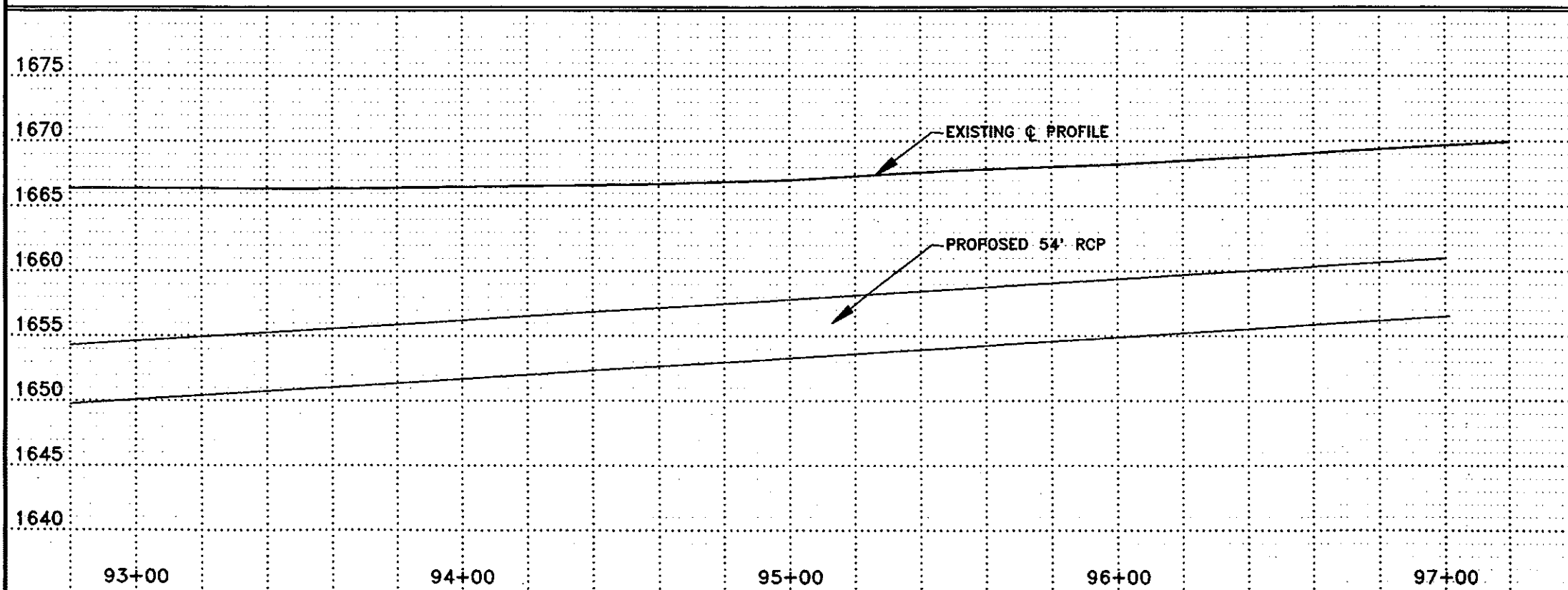
QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	NHU FUNDS	CITY FUNDS	TOTAL
202	0112	REMOVAL OF CONCRETE, SIDEWALK	SY		122	122
202	0114	REMOVAL OF CONCRETE, PAVEMENT	SY		1050	1050
202	0130	REMOVAL OF CURB & GUTTER	LF		144	144
202	0137	REMOVAL OF PAVEMENT, ASPHALT	SY		380	380
408	9650	HBP CL 27 SUBBASE PRIME TACK	TON		150	150
408	0320	120-150 ASPH. CEMENT	TON		10	10
550	0710	10 INCH CONCRETE PAVEMENT REPAIR	SY		1050	1050
714	7168	PIPE, PVC 24" SEWER	LF		991	991
714	7040	SANITARY SEWER SERVICE CONNECTION	EA		2	2
722	3291	ABANDON SANITARY SEWER MANHOLE	EA		3	3
722	0300	MANHOLE, SANITARY	EA		6	6
724	0210	FITTINGS, DUCTILE IRON	LBS		9206	9206
724	0300	GATE VALVE & BOX, 6 INCH	EA		25	25
724	0310	GATE VALVE & BOX, 8 INCH	EA		11	11
724	0315	GATE VALVE & BOX, 10 INCH	EA		1	1
724	0320	GATE VALVE & BOX, 12 INCH	EA		13	13
724	0400	HYDRANT, INSTALL 6 INCH	EA		17	17
724	0430	REMOVE HYDRANT	EA		13	13
724	0579	20" X 12" TAPPING SLEEVE & 1 - 12" VALVE BOX	EA		2	2
724	0605	WATER SERVICE PIPE, 1-1/2 INCH COPPER	LF		1919	1919
724	0607	WATER SERVICE PIPE, 2 INCH COPPER	LF		358	358
724	0810	WATERMAIN, 6 INCH PVC	LF		977	977
724	0830	WATERMAIN, 8 INCH PVC	LF		627	627
724	0840	WATERMAIN, 10 INCH PVC	LF		50	50
724	0850	WATERMAIN, 12 INCH PVC	LF		5223	5223
724	0907	CURB STOP AND BOX, 1-1/2 INCH	EA		86	86
724	0910	CURB STOP AND BOX, 2 INCH	EA		8	8
724	0958	WATER SERVICE CONNECTION, 1-1/2 INCH	EA		86	86
724	0960	WATER SERVICE CONNECTION, 2 INCH	EA		8	8
724	6013	ABANDON EXISTING VALVE BOX	EA		25	25
724	6426	HYDRANT EXTENSION	LF		17	17
724	8100	16" X 12" TAPPING CROSS & 2 - 12" VALVES	EA		1	1
744	0100	POLYSTYRENE INSULATION	BDFT		256	256
748	0140	CURB & GUTTER TYPE I	LF		144	144
750	0100	SIDEWALK CONCRETE	SY		122	122
910	0910	GROUT 24" RCP SEWER	LF		916	916

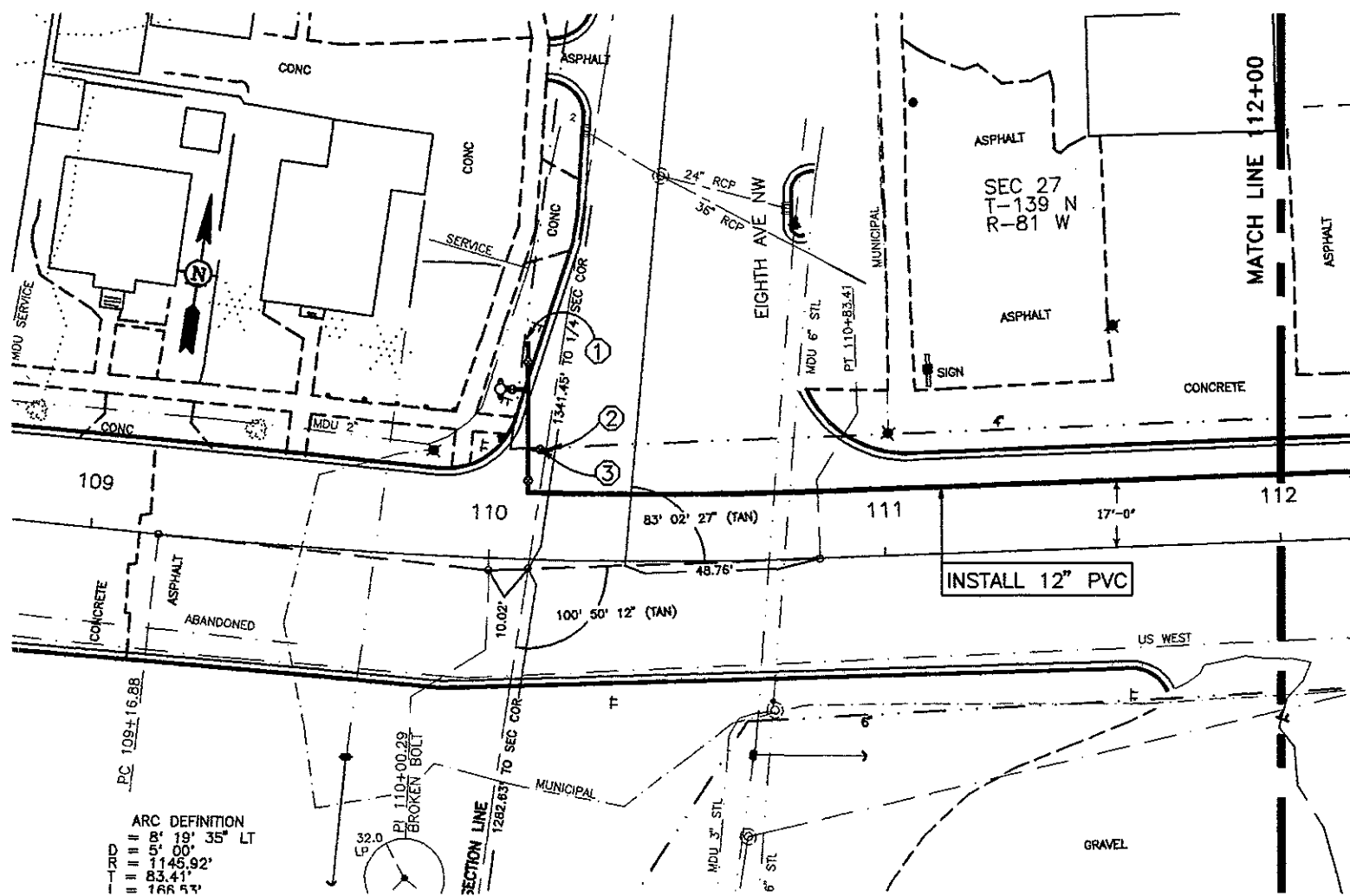


WATERMAIN, 6" PVC		
95+00 - 50' LT	TO 95+00 - 25' LT	25 LF
WATERMAIN, 8" PVC		
94+92 - 56' RT	TO 95+08 - 124' LT	180 LF
GATE VALVE AND BOX, 8"		
94+92 - 54' RT		1 EA
95+06 - 122' LT		1 EA
FITTINGS, DUCTILE IRON		
95+00 - 25' LT	2 - 8" 1/8 BEND	90 LBS
95+00 - 25' LT	2 - 6" 1/8 BEND	62 LBS
95+00 - 50' LT	2 - 8" 1/8 BEND	90 LBS
95+00 - 50' LT	2 - 6" 1/8 BEND	62 LBS
94+92 - 56' RT	2 - 8" 1/8 BENDS	90 LBS
95+06 - 124' LT	2 - 8" 1/8 BENDS	90 LBS
94+92 - 56' RT	6" X 8" REDUCER	32 LBS
95+06 - 124' LT	6" X 8" REDUCER	32 LBS

- CONSTRUCTION NOTES**
- ① CONNECT NEW 8" TO EXISTING 6"
 - ② INSTALL NEW 8" ADJACENT TO EXISTING 6"
 - ③ LOWER EXISTING 6" W.M. AND PROPOSED 8" W.M. UNDER PROPOSED 54" RCP. PLACE INSULATION BETWEEN W.M. AND RCP, INCIDENTAL.



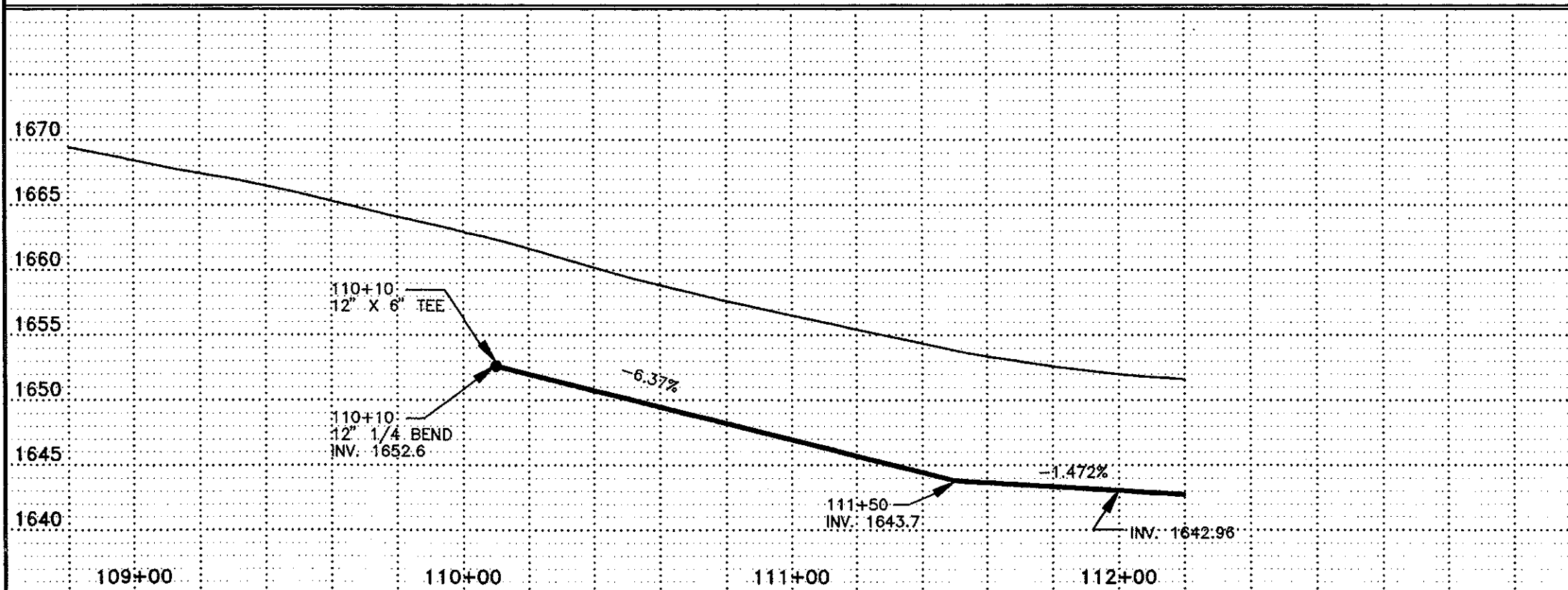
REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT ASS. WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE 2			
STA 95+00±			
ULTEIG ENGINEERS, INC.			
DRAWN BY: W.J.H.	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 7 of 29	
APPROVED BY: BPM			



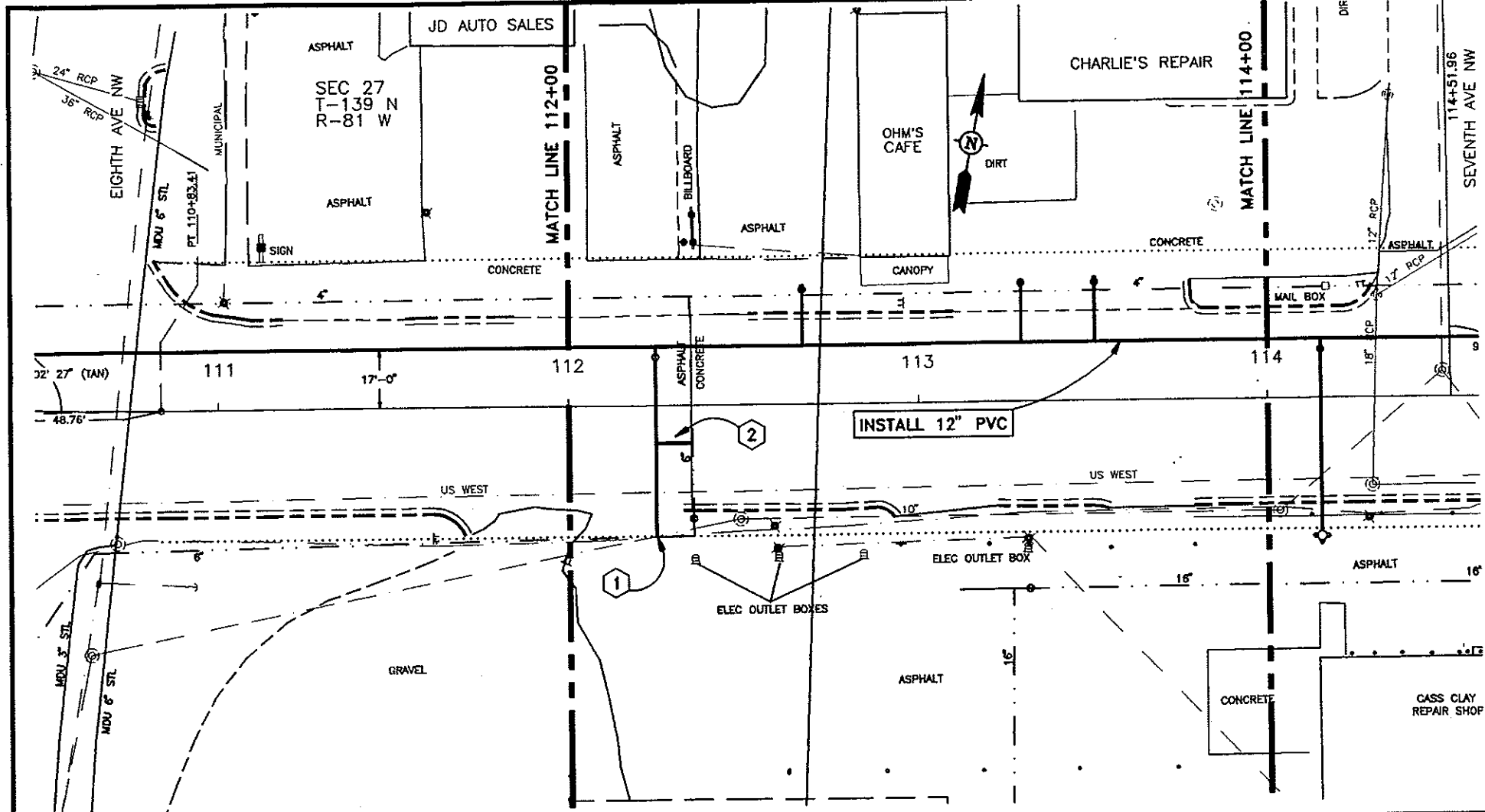
6" HYDRANT		
110+03 - 43' LT	1	EA
GATE VALVE AND BOX, 6"		
110+06 - 43' LT	1	EA
110+13 - 28' LT	1	EA
GATE VALVE AND BOX, 12"		
110+10 - 20' LT	1	EA
110+10 - 50' LT	1	EA
WATERMAIN, 6" PVC		
110+03 - 43' LT TO 110+09 - 43' LT	6	LF
110+10 - 28' LT TO 110+16 - 28' LT	6	LF
WATERMAIN, 12" PVC		
110+10 - 17' LT TO 110+00 - 55' LT	28	LF
110+10 - 17' LT TO 112+00 - 17' LT	190	LF
FITTINGS, DUCTILE IRON		
110+09 - 43' LT	12" X 6" TEE	123 LBS
110+10 - 15' LT	12" 1/4 BEND	117 LBS
110+08 - 55' LT	12" TO 4" REDUCER	52 LBS
110+10 - 28' LT	12" X 6" TEE	123 LBS
110+15 - 28' LT	6" TO 4" REDUCER	22 LBS
110+16 - 28' LT	4" PLUG	22 LBS

CONSTRUCTION NOTES

- ① CONNECT NEW 12" TO EXISTING 4"
- ② CONNECT NEW 6" TO EXISTING 4"
- ⚠-③ CLOSE VALVE AND INSTALL PLUG EAST OF VALVE ONCE 4" LINE CAN BE ABANDONED.



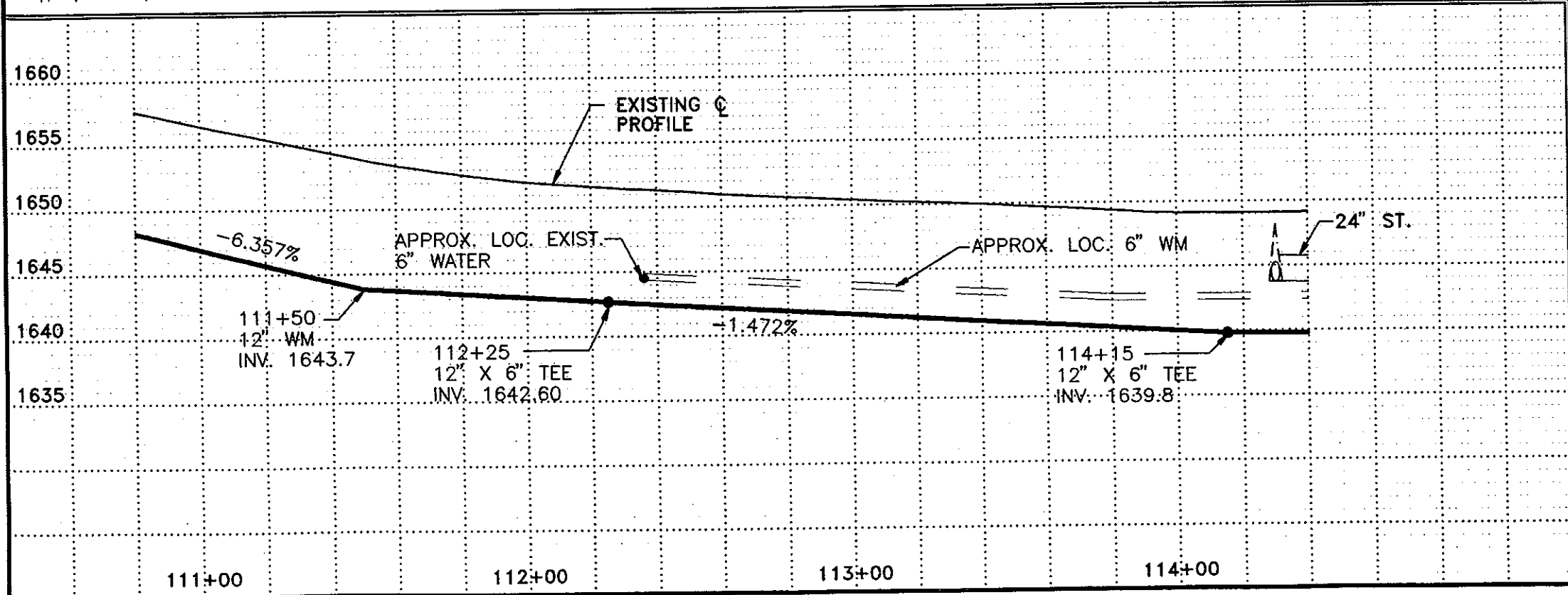
REV.	DATE	DESCRIPTION	BY
▲	1-05-97	ADDED PLUG	KEX
▲			
▲			
CITY OF MANDAN			
DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 98-2, PHASE II			
STA 110+10 TO STA 112+00			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS RESEARCH & BUREAU • MINNEAPOLIS			
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 8 of 29	
APPROVED BY: BPM			



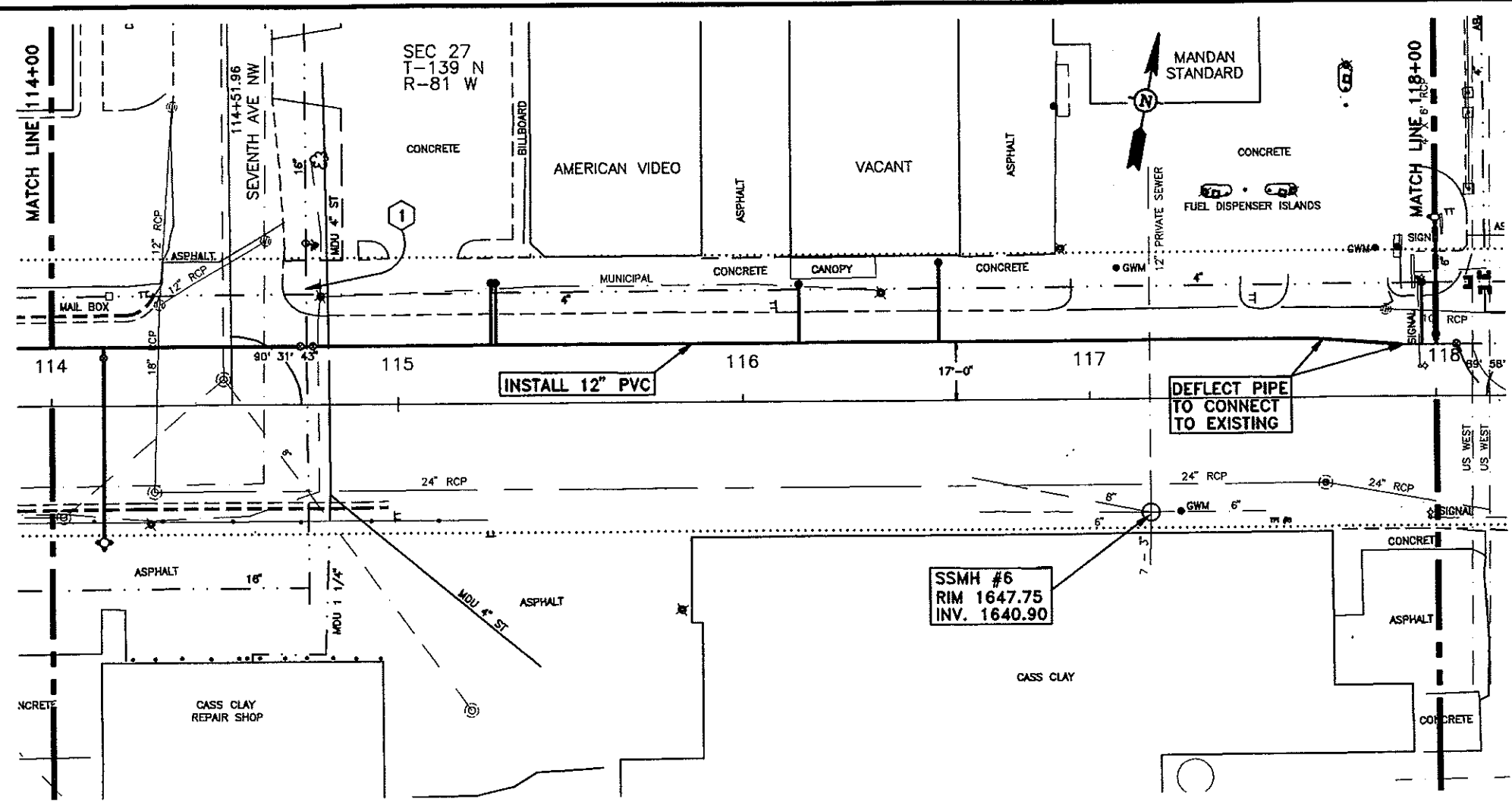
GATE VALVE AND BOX, 6"	
112+25 - 14' LT	1 EA
WATERMAIN, 6" PVC	
112+25 - 17' LT TO 112+25 - 40' RT	57 LF
WATERMAIN, 12" PVC	
112+00 - 17' LT TO 114+00 - 17' LT	200 LF
FITTINGS, DUCTILE IRON	
112+25 - 17' LT 12" X 6" TEE	123 LBS
112+25 - 40' RT 2 EA 6" 1/8 BENDS	80 LBS
WATER SERVICE LINE 1-1/2" COPPER	
112+67 - 17' LT TO 112+67 - 33' LT	16 LF
113+29 - 17' LT TO 113+29 - 34' LT	17 LF
113+51 - 17' LT TO 113+51 - 34' LT	17 LF
WATER SERVICE CONNECTION 1-1/2"	
112+67 - 17' LT	1 EA
113+29 - 17' LT	1 EA
113+51 - 17' LT	1 EA
CURB STOP AND BOX 1-1/2"	
112+67 - 33' LT	1 EA
113+29 - 34' LT	1 EA
113+51 - 34' LT	1 EA

CONSTRUCTION NOTES

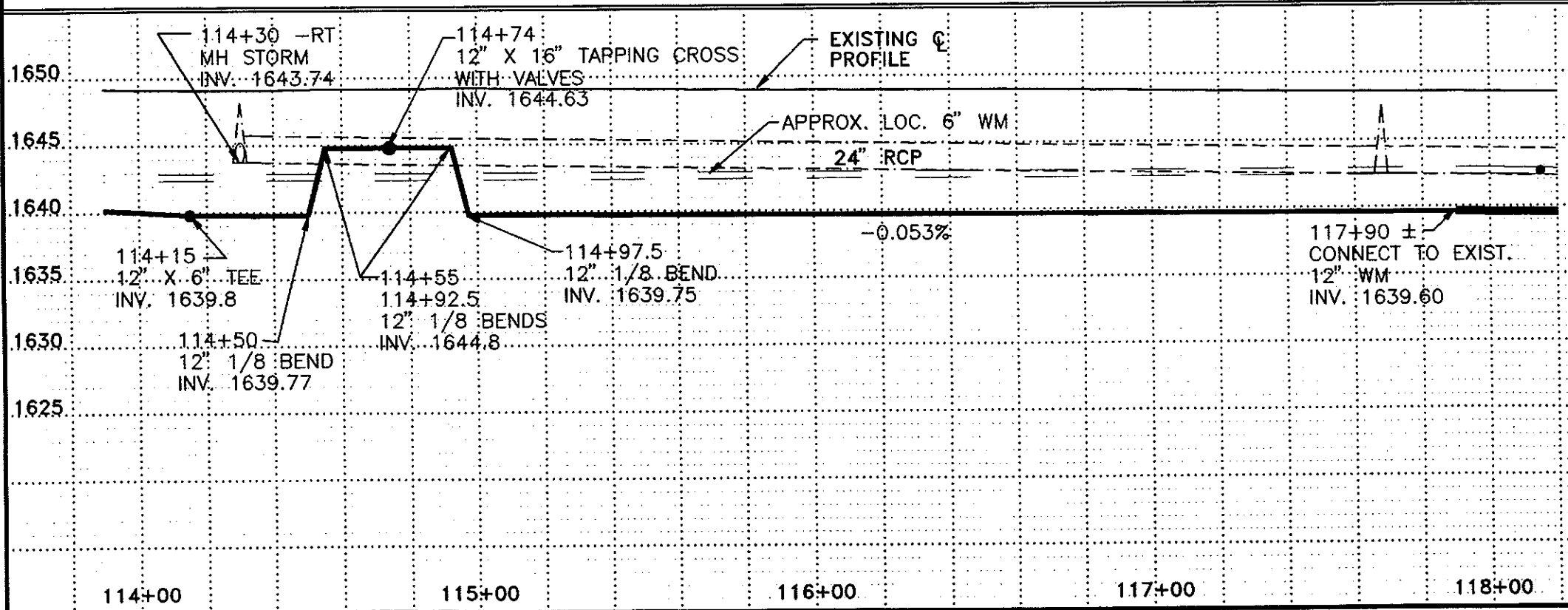
- ① CONNECT NEW 6" TO EXISTING 6". INSTALL FITTINGS AS NECESSARY TO MAKE CONNECTION.
- ② PROVIDE TEMPORARY 6" TIE DURING PHASE I RECONSTRUCTION OF MAIN STREET.



CITY OF MANDAN			
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II			
STA 112+00 TO STA 114+00			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS 2000 W. WYOMING AVE. MINNEAPOLIS, MN 55425			
DRAWN BY: M/JH	SCALE: 1" = 40'	PROJECT NO. 85834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 9 OF 29	
APPROVED BY: BPM			



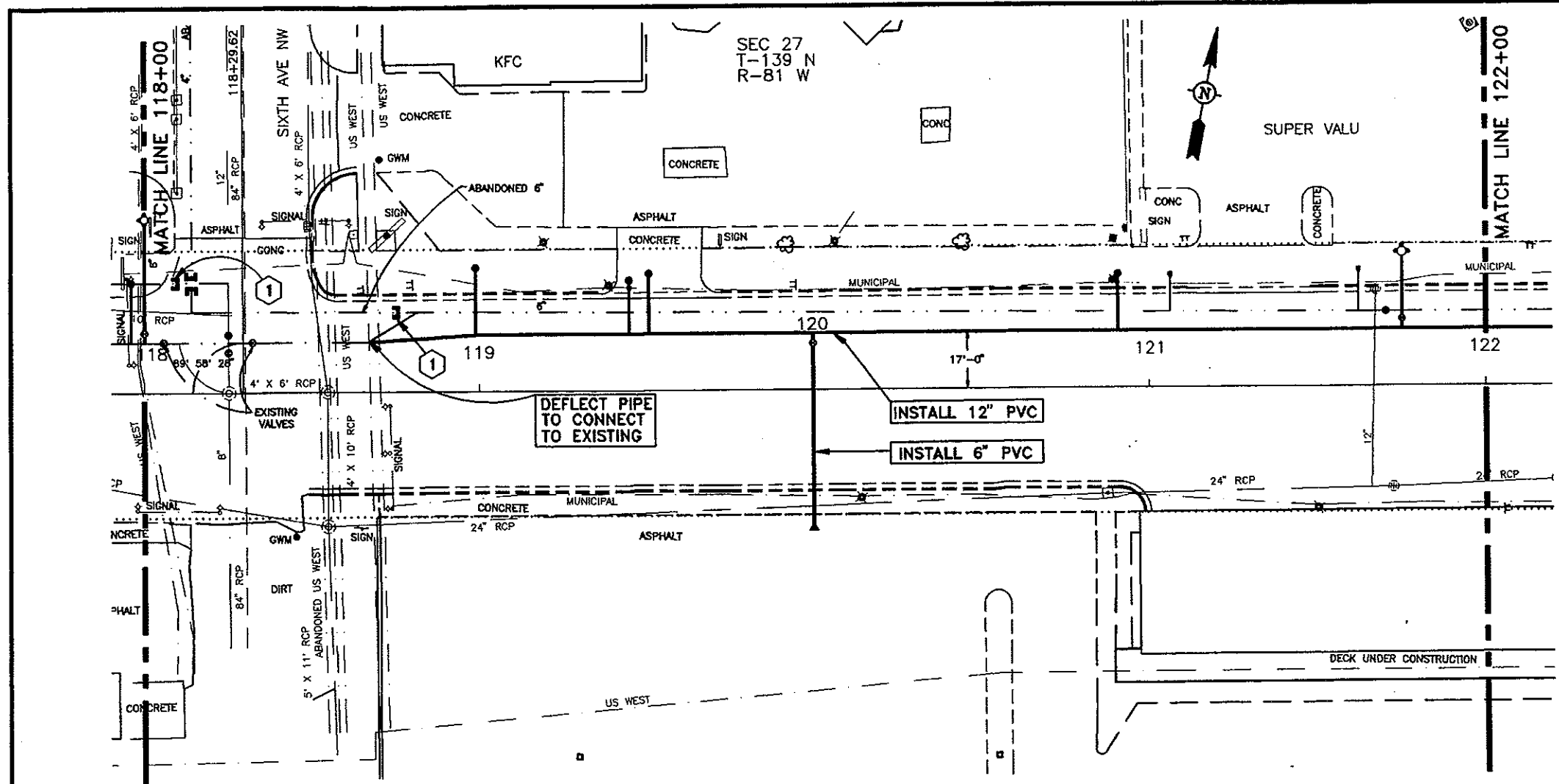
6" HYDRANT		
114+15 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
114+15 - 14' LT	1 EA	
16" X 12" TAPPING CROSS & 2-12" VALVES		
114+74 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
114+15 - 17' LT TO 114+15 - 39.5' RT	56.5 LF	
WATERMAIN, 12" PVC		
114+00 - 17' LT TO 118+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
114+15 - 17' LT	12" X 6" TEE	123 LBS
114+50 - 17' LT	12" 1/8 BEND	92 LBS
114+55 - 17' LT	12" 1/8 BEND	92 LBS
114+92.5 - 17' LT	12" 1/8 BEND	92 LBS
114+97.5 - 17' LT	12" 1/8 BEND	92 LBS
WATER SERVICE LINE 1-1/2" COPPER		
115+27 - 17' LT TO 115+27 - 35' LT	18 LF	
115+28 - 17' LT TO 115+28 - 35' LT	18 LF	
116+16 - 17' LT TO 116+16 - 34' LT	17 LF	
116+56 - 17' LT TO 116+56 - 40' LT	23 LF	
117+96 - 17' LT TO 117+96 - 33' LT	16 LF	
WATER SERVICE CONNECTION 1-1/2"		
115+27 - 17' LT	1 EA	
115+28 - 17' LT	1 EA	
116+16 - 17' LT	1 EA	
116+56 - 17' LT	1 EA	
117+96 - 17' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
115+27 - 35' LT	1 EA	
115+28 - 35' LT	1 EA	
116+16 - 34' LT	1 EA	
116+56 - 40' LT	1 EA	
117+96 - 33' LT	1 EA	
SANITARY MANHOLE		
117+17 - 33' RT	1 EA	
REMOVE HYDRANT		
114+76 - 46' LT	1 EA	



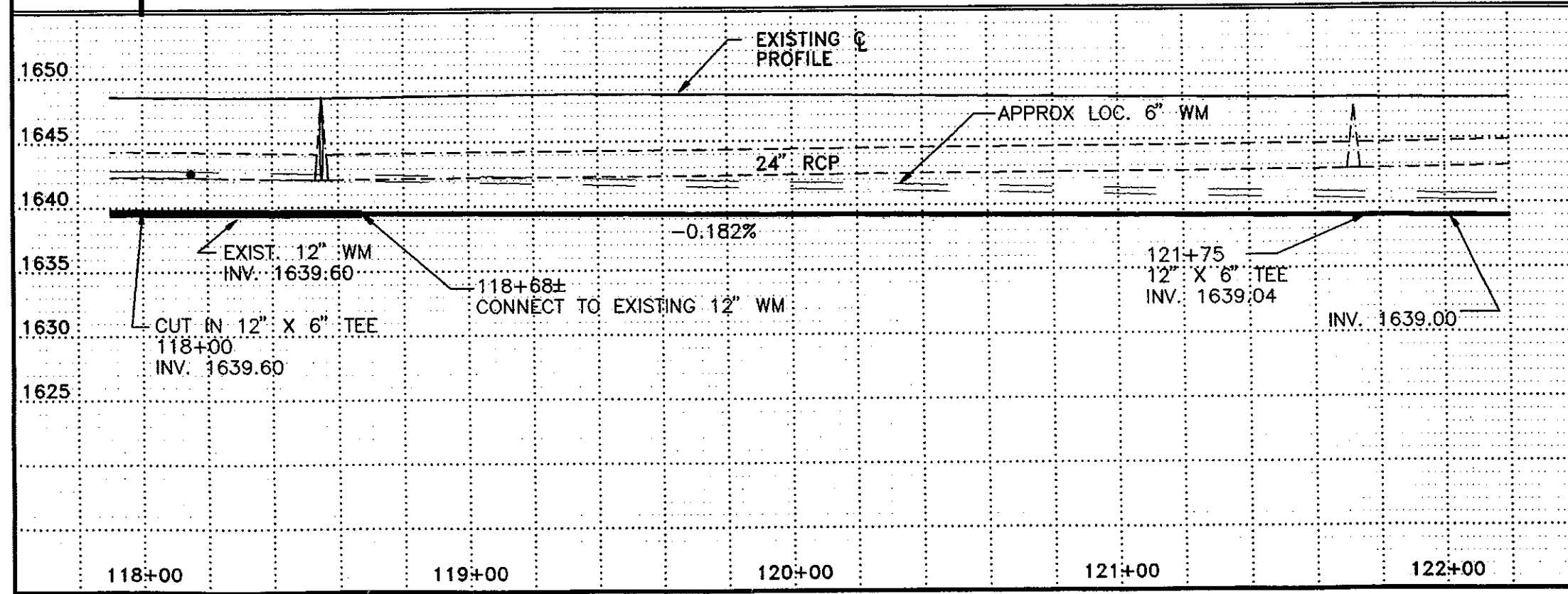
CONSTRUCTION NOTES

① IF EXISTING 4" IS CONNECTED TO 16". THEN DISCONNECT 4" BOTH SIDES OF 16" AND PLUG OR CAP ALL OPENINGS IN ALL PIPES. COSTS INCIDENTAL.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 04-2, PHASE II			
STA 114+00 TO STA 118+00			
ULTEIG ENGINEERS, INC.			
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO.: 95B34	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 10 of 29	
APPROVED BY: BPM			



6" HYDRANT			
118+00 - 52' LT	1 EA		
121+75 - 20' LT	1 EA		
GATE VALVE AND BOX, 6"			
118+00 - 18' LT	1 EA		
120+00 - 14' LT	1 EA		
121+75 - 20' LT	1 EA		
WATERMAIN, 6" PVC			
118+00 - 15' LT TO 118+00 - 52' LT	37 LF		
120+00 - 17' LT TO 120+00 - 40' RT	57 LF		
121+75 - 17' LT TO 121+75 - 40' LT	23 LF		
WATERMAIN, 12" PVC			
118+70 - 17' LT TO 122+00 - 17' LT	330 LF		
FITTINGS, DUCTILE IRON			
118+00 - ±15' LT	12" X 6" TEE	123 LBS	
120+00 - 17' LT	12" X 6" TEE	123 LBS	
120+00 - 40' RT	6" PLUG	15 LBS	
121+75 - 17' LT	12" X 6" TEE	123 LBS	
WATER SERVICE LINE 1-1/2" COPPER			
118+99 - 17' LT TO 118+99 - 37' LT	20 LF		
119+45 - 17' LT TO 119+45 - 33' LT	16 LF		
119+51 - 17' LT TO 119+51 - 35' LT	18 LF		
120+91 - 17' LT TO 120+91 - 34' LT	17 LF		
WATER SERVICE CONNECTION 1-1/2"			
118+99 - 17' LT	1 EA		
119+45 - 17' LT	1 EA		
119+51 - 17' LT	1 EA		
120+91 - 17' LT	1 EA		
CURB STOP AND BOX 1-1/2"			
118+99 - 37' LT	1 EA		
119+45 - 33' LT	1 EA		
119+51 - 35' LT	1 EA		
120+91 - 34' LT	1 EA		

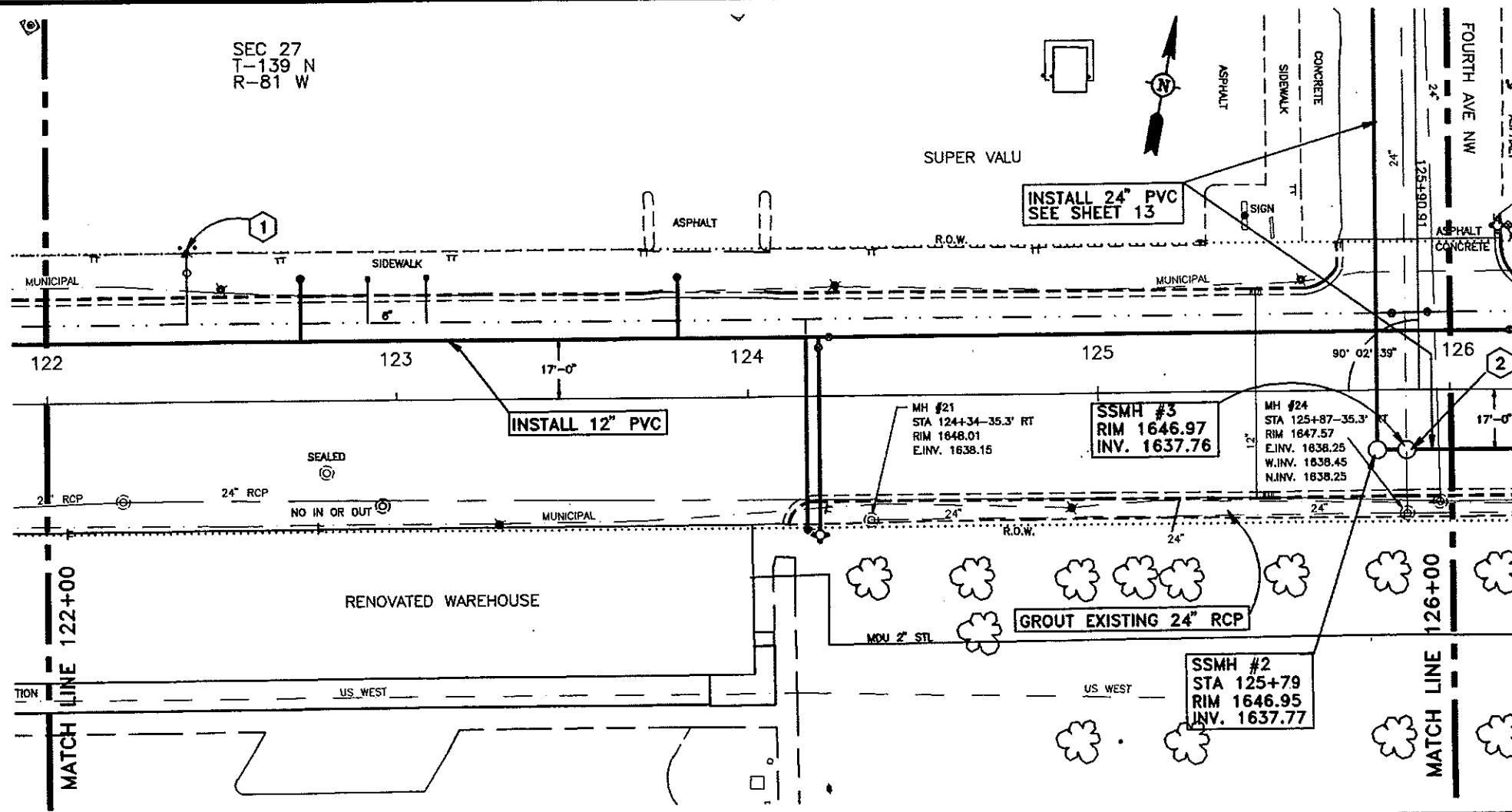


CONSTRUCTION NOTES

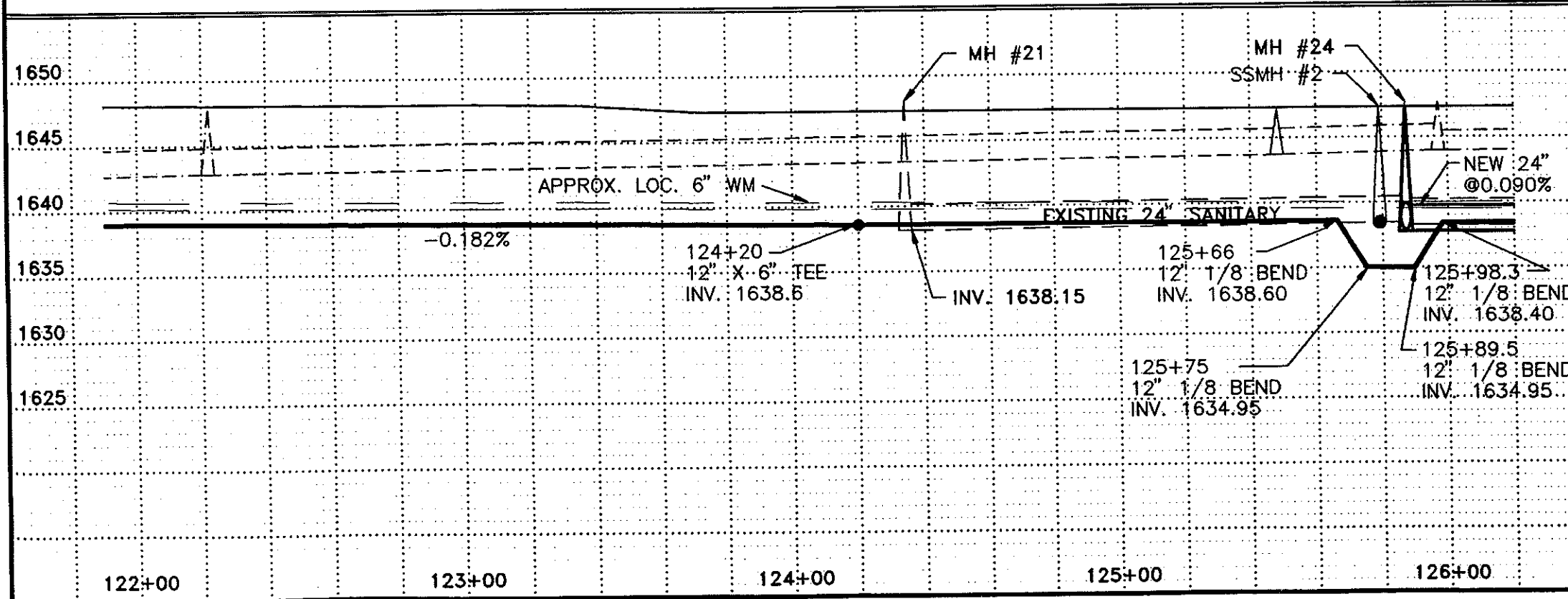
① PLUG EXISTING 6" ONCE NEW 12" CONNECTED TO EXISTING 12".

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 89-2, PHASE II			
STA 118+00 TO STA 122+00			
ULTENG ENGINEERS, INC.			
DESIGNED BY: MJH	SCALE: 1" = 40'	PROJECT NO: 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 11 of 29	
APPROVED BY: BPM			

SEC 27
T-139 N
R-81 W



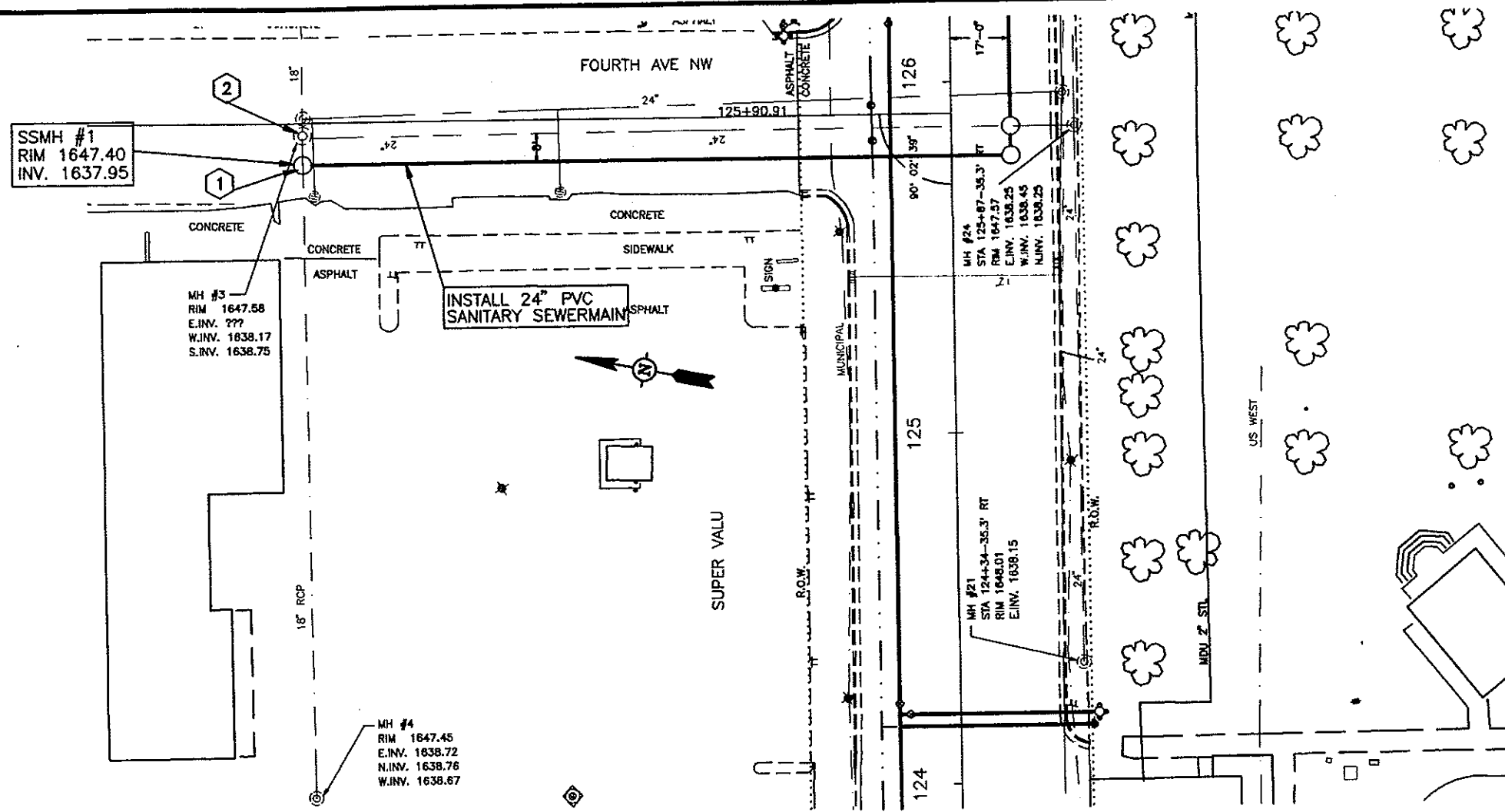
6" HYDRANT		
124+20 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
124+20 - 14' LT	1 EA	
GATE VALVE AND BOX, 12"		
124+23 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
124+20 - 17' LT TO 124+20 - 39.5' RT	56.5 LF	
WATERMAIN, 12" PVC		
122+00 - 17' LT TO 126+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
124+20 - 17' LT	12" X 6" TEE	123 LBS
125+66 - 17' LT	12" 1/8 BEND	92 LBS
125+75 - 17' LT	12" 1/8 BEND	92 LBS
125+89.5 - 17' LT	12" 1/8 BEND	92 LBS
125+98.3 - 17' LT	12" 1/8 BEND	92 LBS
WATER SERVICE LINE 2" COPPER		
122+73 - 17' LT TO 122+73 - 35' LT	18 LF	
123+80 - 17' LT TO 123+80 - 35' LT	18 LF	
124+17 - 17' LT TO 124+17 - 38' RT	55 LF	
WATER SERVICE CONNECTION 2"		
122+73 - 17' LT	1 EA	
123+80 - 17' LT	1 EA	
124+17 - 17' LT	1 EA	
CURB STOP AND BOX 2"		
122+73 - 35' LT	1 EA	
123+80 - 35' LT	1 EA	
124+17 - 38' RT	1 EA	
REMOVE HYDRANT		
122+40 - 42' LT	1 EA	
SANITARY MANHOLE		
125+79 - 17' RT	1 EA	
125+87 - 17' RT	1 EA	
ABANDON MANHOLE		
124+34 - 35.3' RT	1 EA	
125+87 - 35.3' RT	1 EA	
SEWERMAIN, 24" PVC		
125+79 - 17' RT TO 126+00 - 17' RT	21 LF	
GROUT 24" RCP		
124+34 - 35' RT TO 126+00 - 35.3' RT	166 LF	



CONSTRUCTION NOTES

- ① REMOVE EXISTING HYDRANT ONCE 6" IS ABANDONED. TYPICAL ALL REMOVAL LOCATIONS.
- ② SET MH OVER EXISTING 24" RCP PIPE. DO NOT REMOVE 24" RCP WITHIN MANHOLE UNTIL NEW 24" PVC IS READY TO BE PUT IN SERVICE. REMOVE AND PLUG EXISTING 24" RCP WITH CONCRETE ONCE NEW 24" PVC IS IN SERVICE.

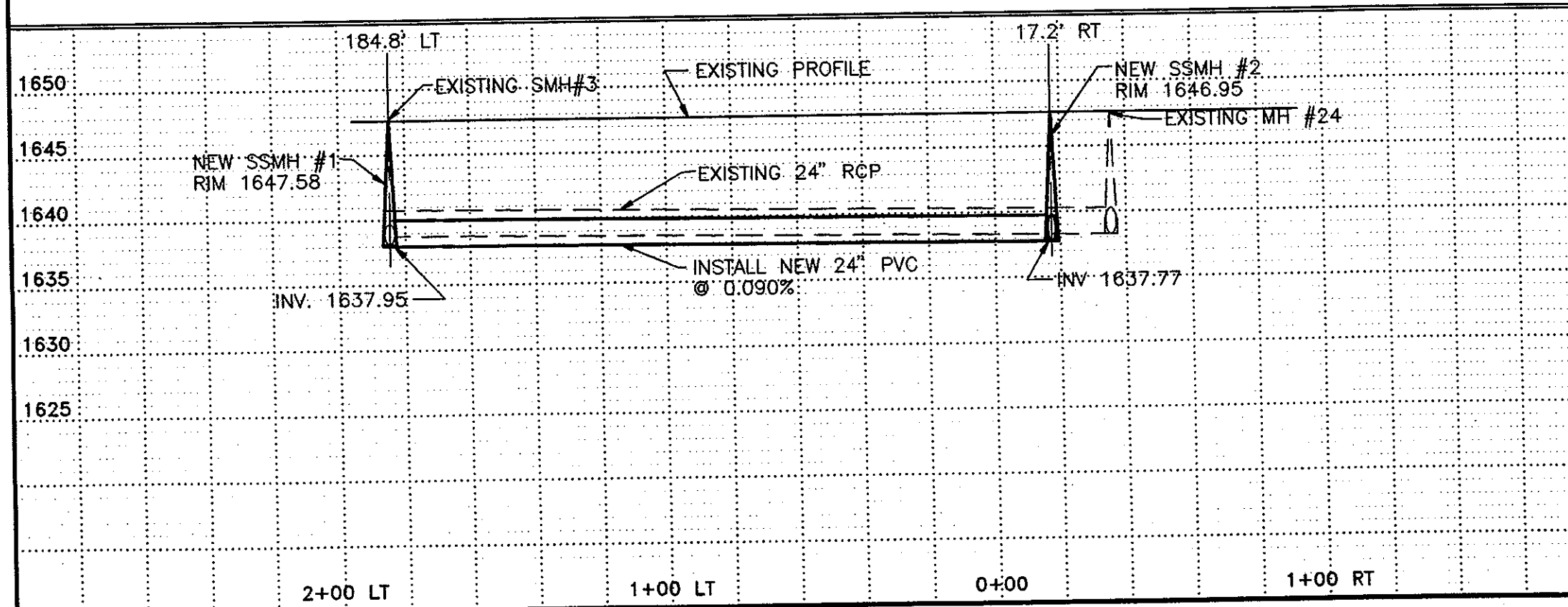
REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE B			
STA 122+00 TO STA 126+00			
ULTERG ENGINEERS, INC. CONSULTING ENGINEERS 2000 14TH ST. S.W. SUITE 200 MANDAN, ND 58542			
DESIGNED BY: M.J.H.	SCALE: 1" = 40'	PROJECT NO.: 85834	
CHECKED BY: BPM	DATE: MAY 17, 1985	SHEET: 12 OF 29	
APPROVED BY: BPM			



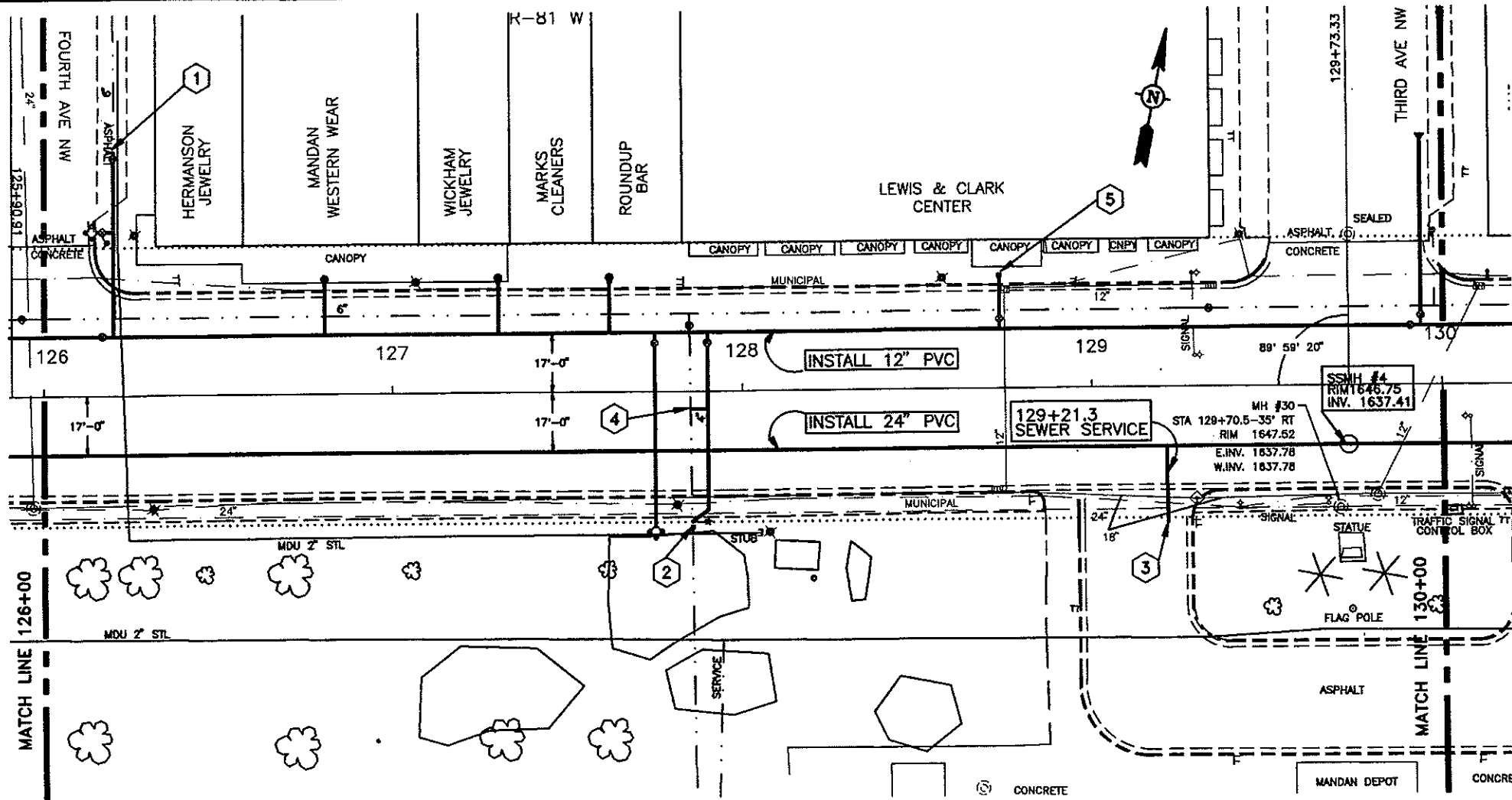
SANITARY MANHOLE	125+79 - 188' LT	1 EA
SEWERMAIN, 24" PVC	125+79 - 185' LT TO 125+79 - 17' RT	202 LF
REMOVE ASPHALT PAVEMENT	125+79 - 195' LT TO 125+79 - 25' LT	380 SY

- CONSTRUCTION NOTES**
- ① SET NEW MH OVER EXISTING 18" RCP. DO NOT BREAK EXISTING LINE UNTIL NEW 24" PVC READY TO BE PUT INTO SERVICE. GROUT INVERT PRIOR TO REMOVING 18" PIPE.
 - ② PLUG EXISTING 24" RCP TO THE SOUTH ONCE NEW 24" PVC LINE IN SERVICE. COSTS INCIDENTAL.
 - ③ VERTICALLY CUT FULL DEPTH ALL ASPHALT PAVEMENT PRIOR TO REMOVAL. REPLACE REMOVED PAVEMENT WITH 6" OF NEW ASPHALT PAVEMENT PLACED IN 2 - 3" LIFTS.

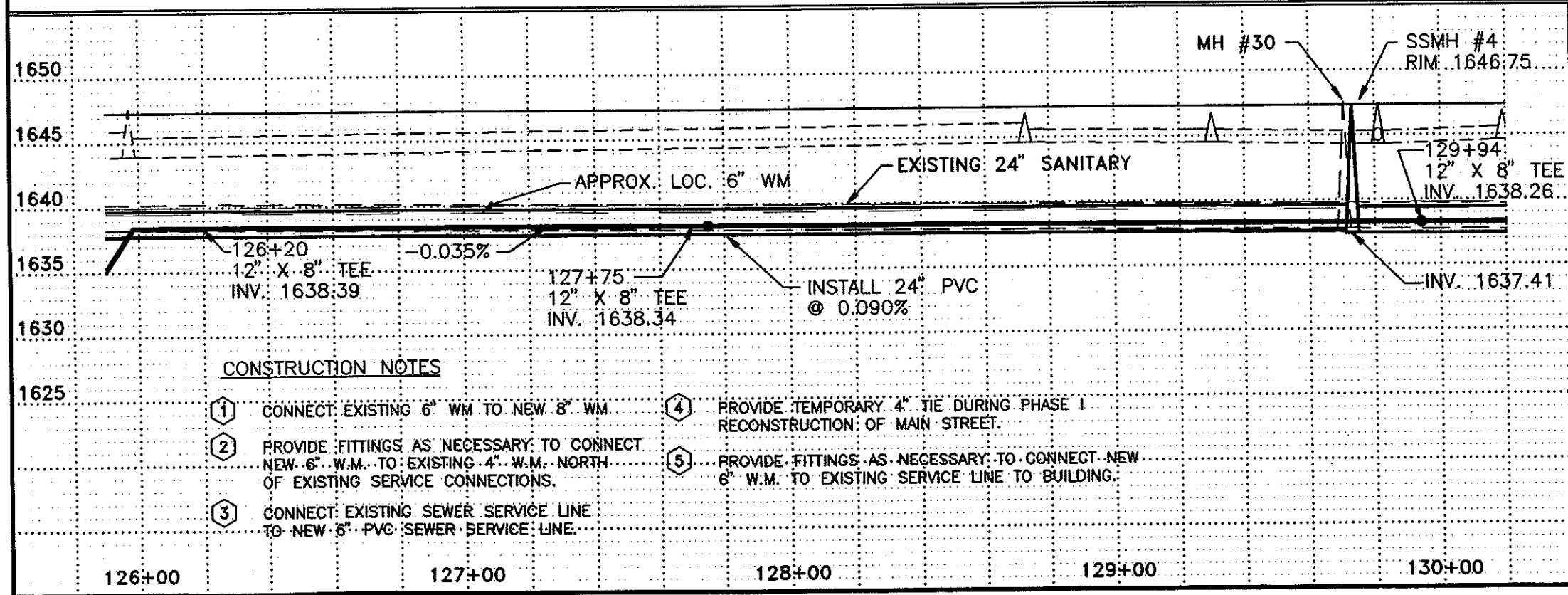
NEW PAVEMENT TO BE PLACED ON 6" OF CL5 MATERIAL OVER COMPACTED SUBGRADE. ALL COSTS FOR CL5 AND SUBGRADE PREPARATION INCIDENTAL TO OTHER ITEMS.



NO.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #88, WATER AND SEWER IMPROVEMENT PROJECT 84-2, PHASE II			
STA 125+79 - 185' LT TO STA 125+79 - 17' RT			
ULTEIG ENGINEERS, INC. 1000 W. WASHINGTON ST. MINNEAPOLIS, MN 55402			
DRAWN BY: MJM	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 13 OF 29	
APPROVED BY: BPM			



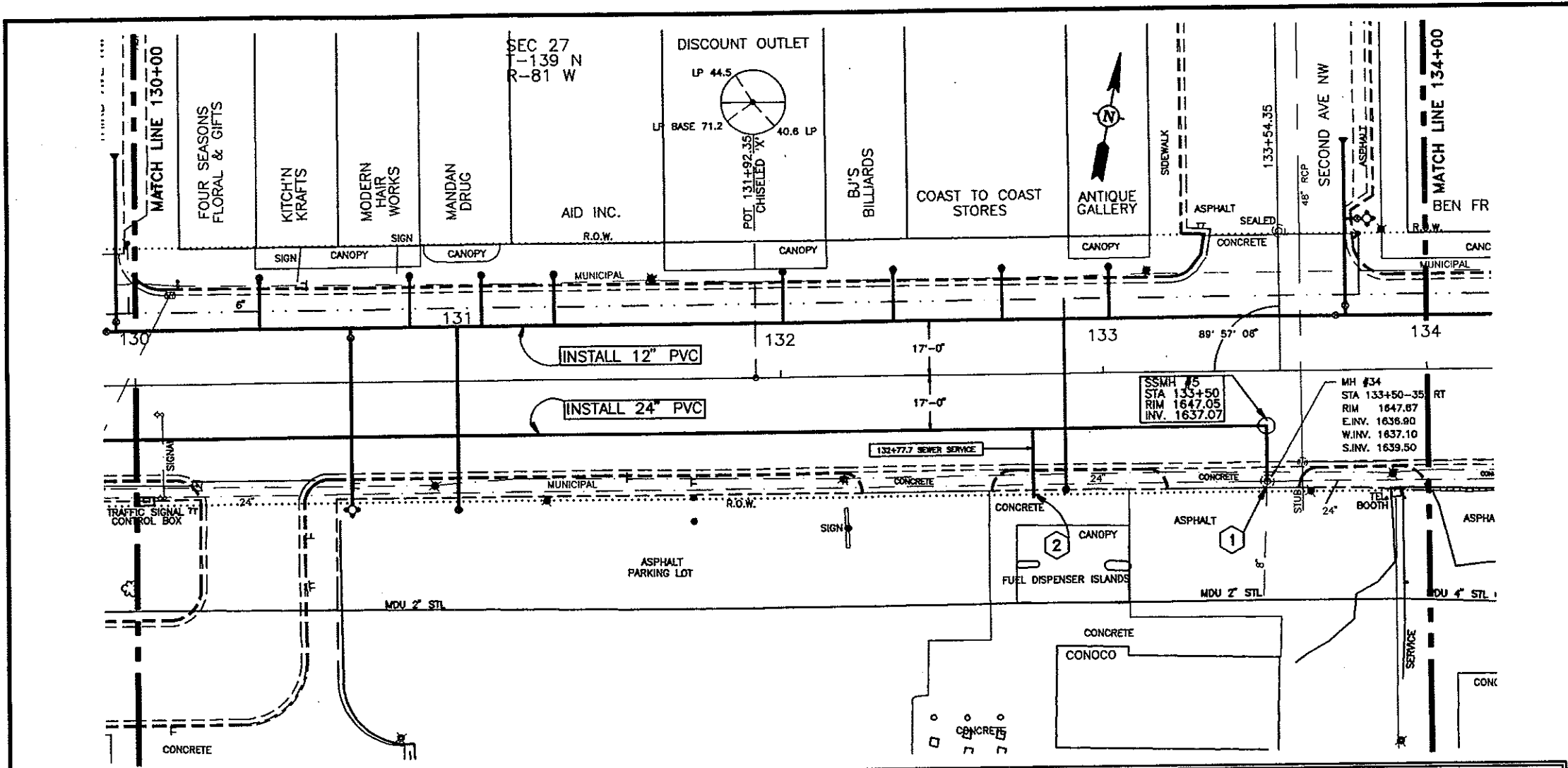
6" HYDRANT	
126+14 - 47' LT 1 EA	127+75 - 40' RT 1 EA
GATE VALVE AND BOX, 6"	
126+17 - 47' LT 1 EA	127+90 - 14' LT 1 EA
127+75 - 14' LT 1 EA	128+73 - 20' LT 1 EA
GATE VALVE AND BOX, 8"	
126+20 - 68' LT 1 EA	129+94 - 20' LT 1 EA
GATE VALVE AND BOX, 12"	
126+17 - 17' LT 1 EA	
129+91 - 17' LT 1 EA	
WATERMAIN, 6" PVC	
126+14 - 47' LT TO 126+20 - 47' LT	6 LF
127+75 - 17' LT TO 127+75 - 40' RT	57 LF
127+90 - 17' LT TO 127+90 - 40' RT	57 LF
128+73 - 17' LT TO 128+73 - 33' LT	16 LF
WATERMAIN, 8" PVC	
126+20 - 17' LT TO 126+20 - 70' LT	53 LF
129+94 - 17' LT TO 129+94 - 70' LT	53 LF
WATERMAIN, 12" PVC	
126+00 - 17' LT TO 130+00 - 17' LT	400 LF
FITTINGS, DUCTILE IRON	
126+20 - 17' LT	12" X 8" TEE 137 LBS
126+20 - 47' LT	8" X 6" TEE 73 LBS
126+20 - 70' LT	8" X 6" REDUCER 32 LBS
127+75 - 17' LT	12" X 6" TEE 123 LBS
127+85 - 5' RT	4" X 4" TEE LBS
127+90 - 5' RT	6" X 4" TEE LBS
127+90 - 17' LT	12" X 6" TEE 123 LBS
127+90 - 40' RT	2 - 6" 1/8 BENDS LBS
128+73 - 17' LT	12" X 6" TEE 123 LBS
129+94 - 70' LT	8" PLUG 49 LBS
129+94 - 17' LT	12" X 8" TEE 137 LBS
WATER SERVICE LINE 1-1/2" COPPER	
126+81 - 17' LT TO 126+81 - 33' LT	16 LF
127+31 - 17' LT TO 127+31 - 33' LT	16 LF
127+62 - 17' LT TO 127+62 - 33' LT	16 LF
WATER SERVICE CONNECTION 1-1/2"	
126+81 - 17' LT	1 EA
127+31 - 17' LT	1 EA
127+62 - 17' LT	1 EA
CURB STOP AND BOX 1-1/2"	
126+81 - 33' LT	1 EA
127+31 - 33' LT	1 EA
127+62 - 33' LT	1 EA
SEWERMAIN, 24" PVC	
126+00 TO 130+00	400LF
GROUT 24" RCP	
126+00 - 35' RT TO 130+00 - 35' RT	400LF
SANITARY MANHOLE	
129+75 - 17' RT	1 EA
ABANDON MANHOLE	
129+70.5 - 35' RT	1 EA
SANITARY SEWER SERVICE CONNECTION	
129+21 - 17' RT TO 37' RT	1 EA
REMOVE HYDRANT	
127+90 - 37' RT	1 EA
126+18 - 28' LT	1 EA



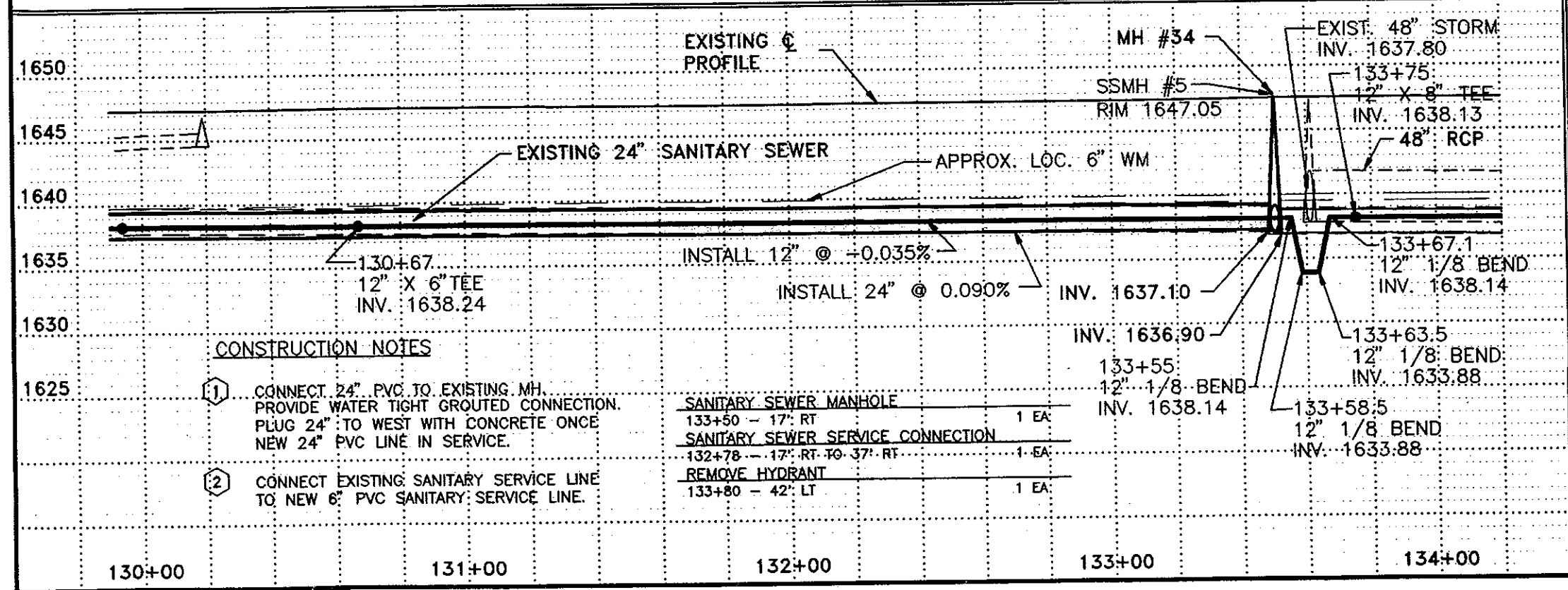
CONSTRUCTION NOTES

- ① CONNECT EXISTING 6" WM TO NEW 8" WM
- ② PROVIDE FITTINGS AS NECESSARY TO CONNECT NEW 6" W.M. TO EXISTING 4" W.M. NORTH OF EXISTING SERVICE CONNECTIONS.
- ③ CONNECT EXISTING SEWER SERVICE LINE TO NEW 6" PVC SEWER SERVICE LINE.
- ④ PROVIDE TEMPORARY 4" TIE DURING PHASE I RECONSTRUCTION OF MAIN STREET.
- ⑤ PROVIDE FITTINGS AS NECESSARY TO CONNECT NEW 6" W.M. TO EXISTING SERVICE LINE TO BUILDING.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT #8-2, PHASE I			
STA 126+00 TO STA 130+00			
ULTEIG ENGINEERS, INC.			
DESIGNED BY: MJH	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 14 OF 29	
APPROVED BY: BPM			



6" HYDRANT		
130+67 - 39.5' RT	1 EA	
133+82 - 47' LT	1 EA	
GATE VALVE AND BOX, 6"		
130+67 - 14' LT	1 EA	
133+79 - 47' LT	1 EA	
GATE VALVE AND BOX, 8"		
133+75 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
133+72 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
130+67 - 17' LT TO 130+67 - 39.5' RT	56.5 LF	
133+75 - 47' LT TO 133+82 - 47' LT	7 LF	
WATERMAIN, 8" PVC		
133+75 - 17' LT TO 133+75 - 70' LT	53 LF	
WATERMAIN, 12" PVC		
130+00 - 17' LT TO 134+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
130+67 - 17' LT	12" X 6" TEE	123 LBS
130+67 - 12' RT	6" 1/8 BEND	31 LBS
130+67 - 15.5' RT	6" 1/8 BEND	31 LBS
133+55 - 17' LT	12" 1/8 BEND	92 LBS
133+58.5 - 17' LT	12" 1/8 BEND	92 LBS
133+63.5 - 17' LT	12" 1/8 BEND	92 LBS
133+67.1 - 17' LT	12" 1/8 BEND	92 LBS
133+75 - 17' LT	12" X 8" TEE	137 LBS
133+75 - 47' LT	8" X 6" TEE	73 LBS
133+75 - 70' LT	8" PLUG	26 LBS
WATER SERVICE LINE 1-1/2" COPPER		
130+39 - 17' LT TO 130+39 - 33' LT	16 LF	
130+85 - 17' LT TO 130+85 - 33' LT	16 LF	
131+08 - 17' LT TO 131+08 - 33' LT	16 LF	
131+30 - 17' LT TO 131+30 - 33' LT	16 LF	
132+01 - 17' LT TO 132+01 - 33' LT	16 LF	
132+35 - 17' LT TO 132+35 - 33' LT	16 LF	
132+69 - 17' LT TO 132+69 - 33' LT	16 LF	
133+02 - 17' LT TO 133+02 - 33' LT	16 LF	
WATER SERVICE LINE 2" COPPER		
131+00 - 17' LT TO 131+00 - 40' RT	57 LF	
132+88 - 17' LT TO 132+88 - 36' RT	53 LF	
WATER SERVICE CONNECTION 1-1/2"		
130+39 - 17' LT	1 EA	
130+85 - 17' LT	1 EA	
131+08 - 17' LT	1 EA	
131+30 - 17' LT	1 EA	
132+01 - 17' LT	1 EA	
132+35 - 17' LT	1 EA	
132+69 - 17' LT	1 EA	
133+02 - 17' LT	1 EA	
WATER SERVICE CONNECTION, 2"		
131+00 - 17' LT	1 EA	
132+88 - 17' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
130+39 - 33' LT	1 EA	
130+85 - 33' LT	1 EA	
131+08 - 33' LT	1 EA	
131+30 - 33' LT	1 EA	
132+01 - 33' LT	1 EA	
132+35 - 33' LT	1 EA	
132+69 - 33' LT	1 EA	
133+02 - 33' LT	1 EA	
CURB STOP AND BOX 2"		
131+00 - 40' RT	1 EA	
132+88 - 36' RT	1 EA	
SANITARY SEWER, 24" PVC		
130+00 - 17' RT TO 133+50 - 35' RT	368 LF	
GROUT 24" RCP		
130+00 - 35' RT TO 133+50 - 35' RT	350 LF	

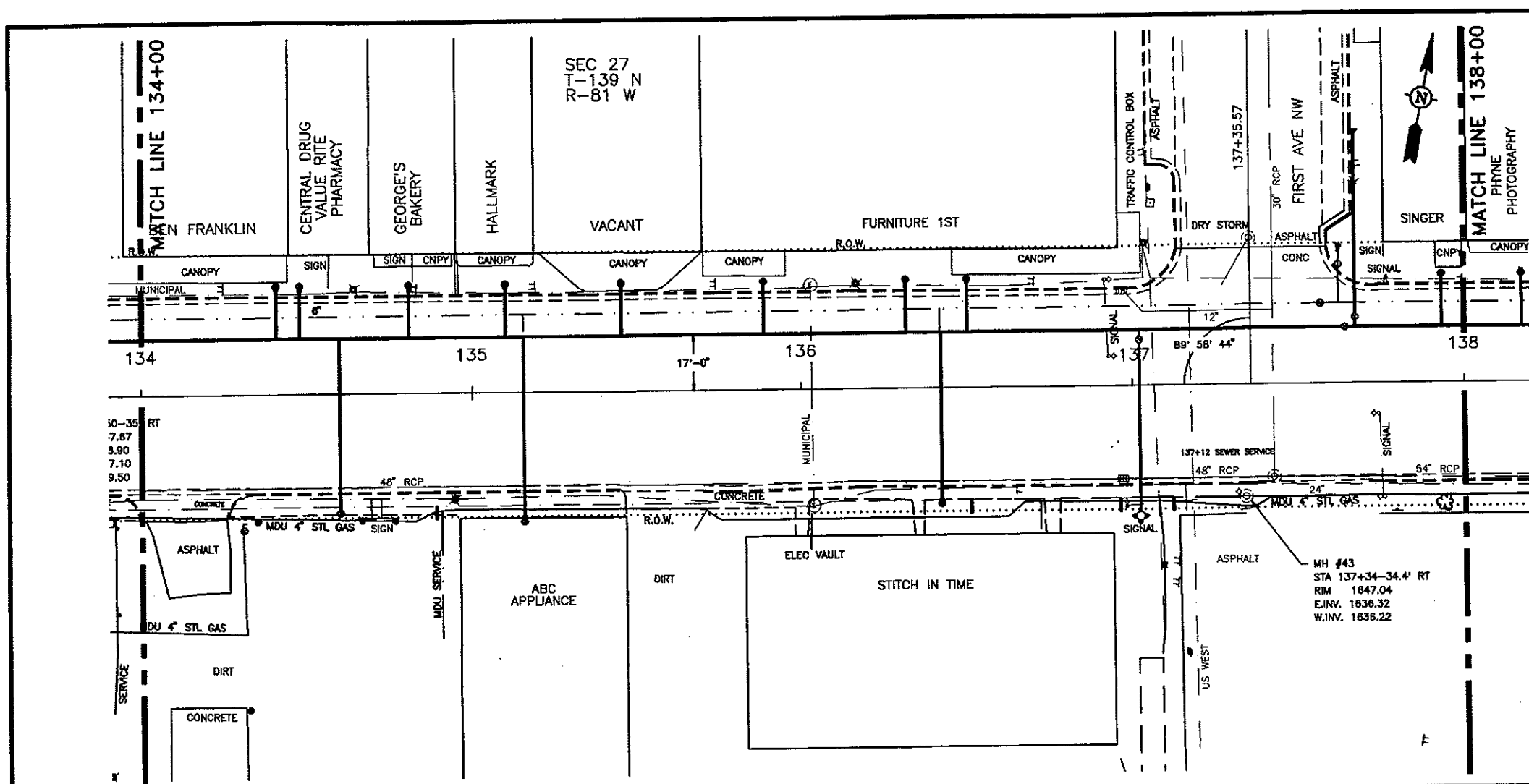


- CONSTRUCTION NOTES**
- CONNECT 24" PVC TO EXISTING MH. PROVIDE WATER TIGHT GROUTED CONNECTION. PLUG 24" TO WEST WITH CONCRETE ONCE NEW 24" PVC LINE IN SERVICE.
 - CONNECT EXISTING SANITARY SERVICE LINE TO NEW 6" PVC SANITARY SERVICE LINE.

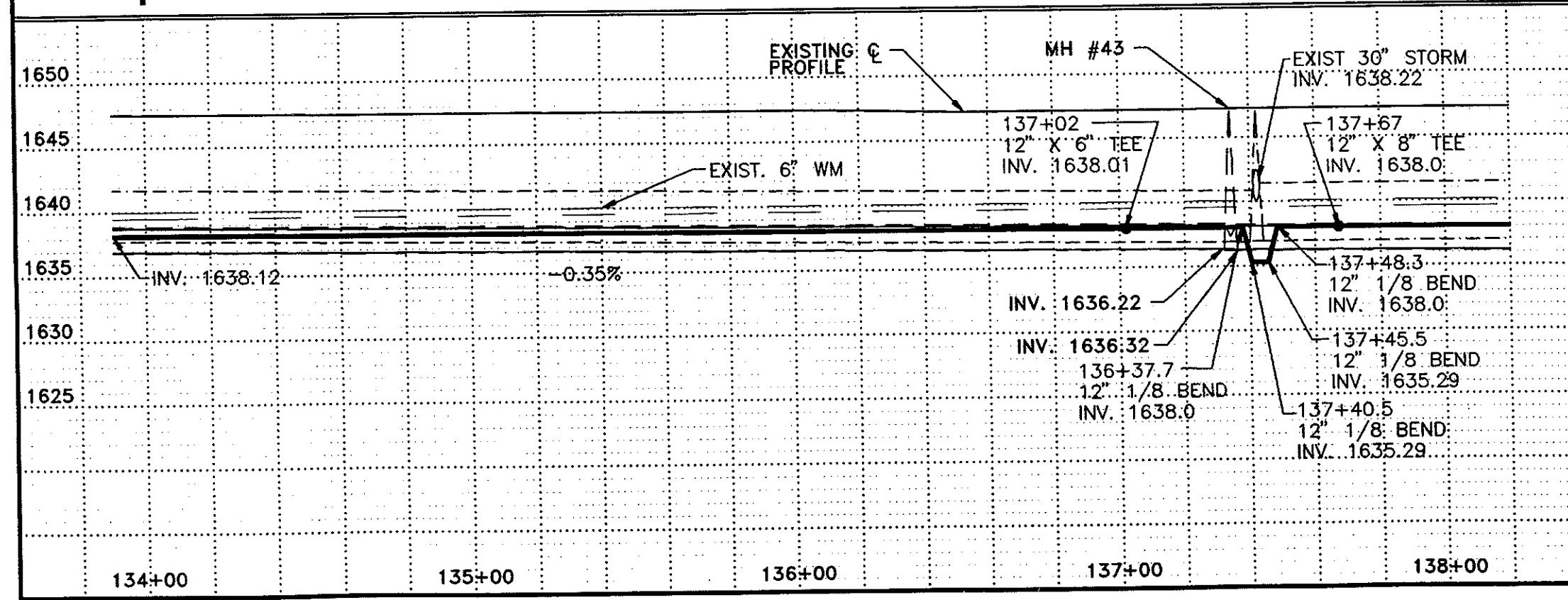
SANITARY SEWER MANHOLE	
133+50 - 17' RT	1 EA
SANITARY SEWER SERVICE CONNECTION	
132+78 - 17' RT TO 37' RT	1 EA
REMOVE HYDRANT	
133+80 - 42' LT	1 EA

132+01 - 17' LT	1 EA
132+35 - 17' LT	1 EA
132+69 - 17' LT	1 EA
133+02 - 17' LT	1 EA
WATER SERVICE CONNECTION, 2"	
131+00 - 17' LT	1 EA
132+88 - 17' LT	1 EA
CURB STOP AND BOX 1-1/2"	
130+39 - 33' LT	1 EA
130+85 - 33' LT	1 EA
131+08 - 33' LT	1 EA
131+30 - 33' LT	1 EA
132+01 - 33' LT	1 EA
132+35 - 33' LT	1 EA
132+69 - 33' LT	1 EA
133+02 - 33' LT	1 EA
CURB STOP AND BOX 2"	
131+00 - 40' RT	1 EA
132+88 - 36' RT	1 EA
SANITARY SEWER, 24" PVC	
130+00 - 17' RT TO 133+50 - 35' RT	368 LF
GROUT 24" RCP	
130+00 - 35' RT TO 133+50 - 35' RT	350 LF

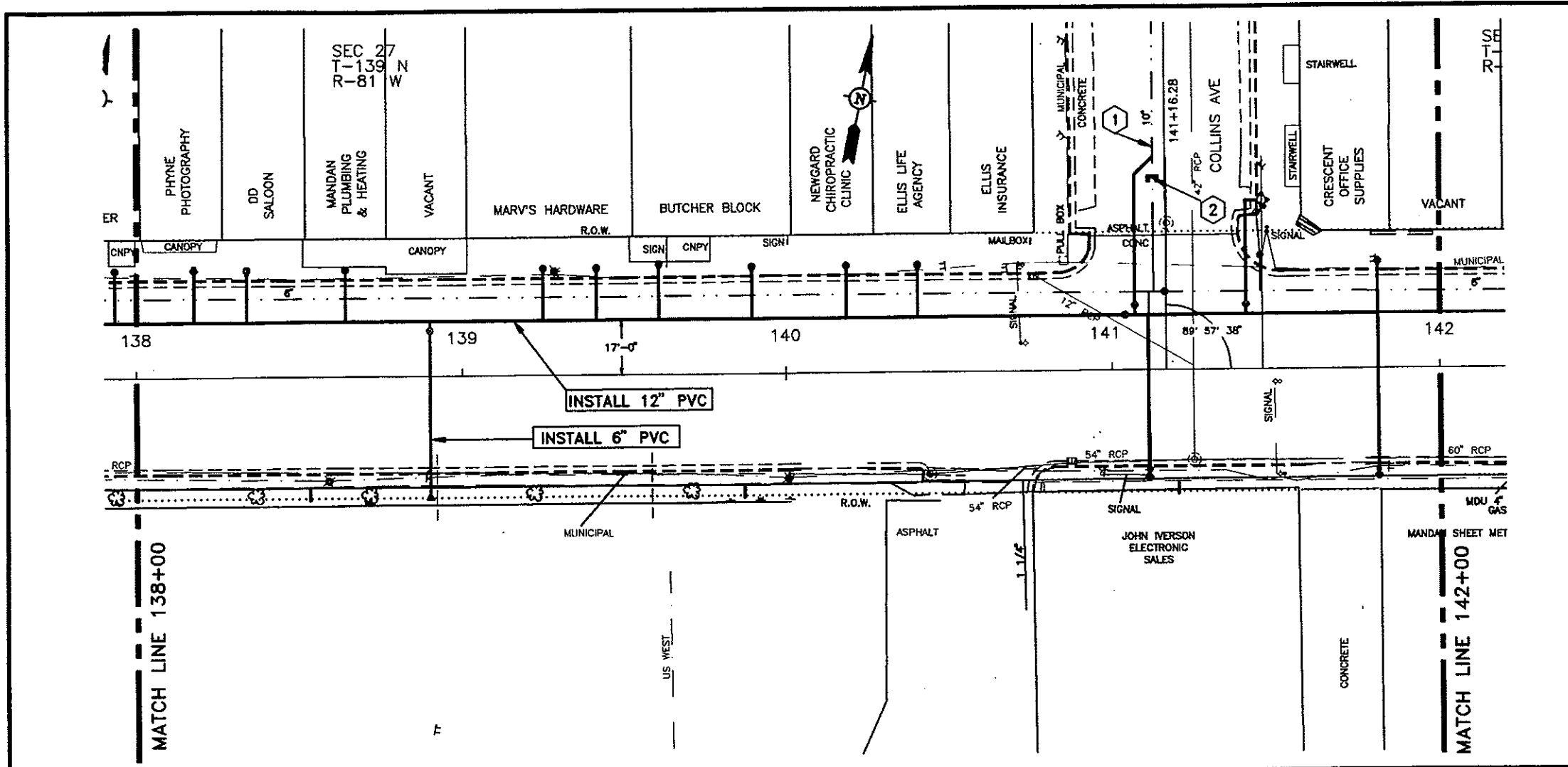
CITY OF MANDAN			
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT 86-2, PHASE B			
STA 130+00 TO STA 134+00			
ULTEIG ENGINEERS, INC.			
CONVERTING ENGINEER	PROJECT NO.	95834	
DRAWN BY: MJH	SCALE:	1" = 40'	
CHECKED BY: BPM	DATE:	MAY 17, 1995	
APPROVED BY: BPM	DATE:	MAY 17, 1995	
		SHEET 15 OF 29	



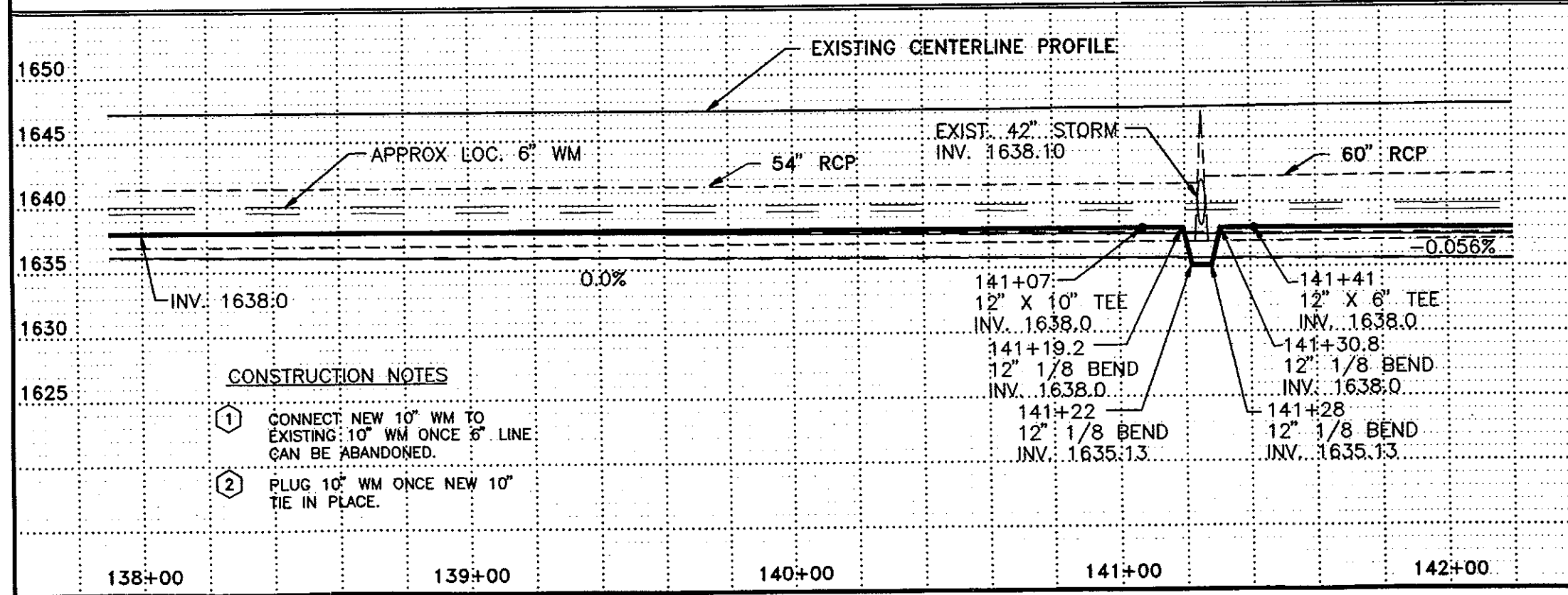
6" HYDRANT		
137+02 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
137+02 - 14' LT	1 EA	
GATE VALVE AND BOX, 8"		
137+67 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
137+64 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
137+02 - 17' LT TO 137+02 - 39.5' RT	56.5 LF	
WATERMAIN, 8" PVC		
137+67 - 17' LT TO 137+67 - 75' LT	58 LF	
WATERMAIN, 12" PVC		
134+00 - 17' LT TO 138+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
137+02 - 21.5' RT	6" 1/8 BEND	31 LBS
137+02 - 25.7' RT	6" 1/8 BEND	31 LBS
137+02 - 17' LT	12" X 6" TEE	123 LBS
137+37.7 - 17' LT	12" 1/8 BEND	92 LBS
137+40.5 - 17' LT	12" 1/8 BEND	92 LBS
137+45.5 - 17' LT	12" 1/8 BEND	92 LBS
137+48.3 - 17' LT	12" 1/8 BEND	92 LBS
137+67 - 17' LT	12" X 8" TEE	137 LBS
137+67 - 75' LT	8" PLUG	26 LBS
WATER SERVICE LINE 1-1/2" COPPER		
134+41 - 17' LT TO 134+41 - 33' LT	16 LF	
134+48 - 17' LT TO 134+48 - 33' LT	16 LF	
134+60 - 17' LT TO 134+60 - 36' RT	53 LF	
134+81 - 17' LT TO 134+81 - 33' LT	16 LF	
135+10 - 17' LT TO 135+10 - 33' LT	16 LF	
135+15 - 17' LT TO 135+15 - 39' RT	56 LF	
135+45 - 17' LT TO 135+45 - 33' LT	16 LF	
135+89 - 17' LT TO 135+89 - 33' LT	16 LF	
136+32 - 17' LT TO 136+32 - 33' LT	16 LF	
136+42 - 17' LT TO 136+42 - 35' RT	52 LF	
136+50 - 17' LT TO 136+50 - 33' LT	16 LF	
137+93 - 17' LT TO 137+93 - 33' LT	16 LF	
WATER SERVICE CONNECTION 1-1/2"		
134+41 - 17' LT	1 EA	
134+48 - 17' LT	1 EA	
134+60 - 17' LT	1 EA	
134+81 - 17' LT	1 EA	
135+10 - 17' LT	1 EA	
135+15 - 17' LT	1 EA	
135+45 - 17' LT	1 EA	
135+89 - 17' LT	1 EA	
136+32 - 17' LT	1 EA	
136+42 - 17' LT	1 EA	
136+50 - 17' LT	1 EA	
137+93 - 17' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
134+41 - 33' LT	1 EA	
134+48 - 33' LT	1 EA	
134+60 - 36' RT	1 EA	
134+81 - 33' LT	1 EA	
135+10 - 33' LT	1 EA	
135+15 - 39' LT	1 EA	
135+45 - 33' LT	1 EA	
135+89 - 33' LT	1 EA	
136+32 - 33' LT	1 EA	
136+42 - 35' RT	1 EA	
136+50 - 33' LT	1 EA	
137+93 - 33' LT	1 EA	
REMOVE HYDRANT		
137+63 - 41' LT	1 EA	



REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 98-2, PHASE B			
STA 134+00 TO STA 138+00			
ULTEG ENGINEERS, INC.		CONSULTING ENGINEERS 1000 1/2 AVENUE S MANDAN, ND 58542	
DRAWN BY: M.J.H.	SCALE: 1" = 40'	PROJECT NO.: 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 16 of 29	
APPROVED BY: BPM			



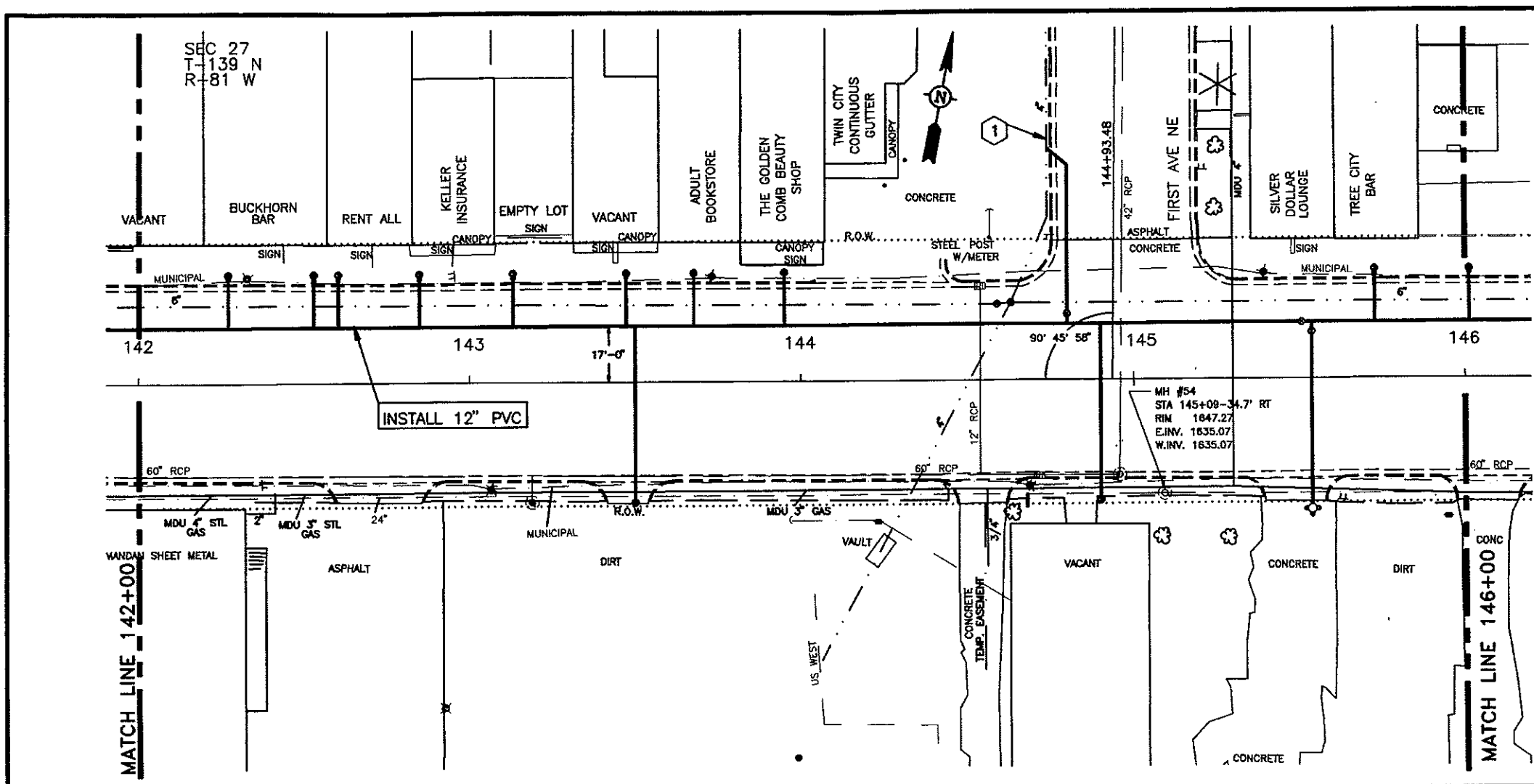
6" HYDRANT		
141+46 - 52' LT	1 EA	
GATE VALVE AND BOX, 6"		
138+90 - 14' LT	1 EA	
141+41 - 20' LT	1 EA	
GATE VALVE AND BOX, 10"		
141+07 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
141+04 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
138+90 - 17' LT TO 138+90 - 36' RT	53 LF	
141+41 - 17' LT TO 141+41 - 52' LT	35 LF	
141+41 - 52' LT TO 141+46 - 52' LT	5 LF	
WATERMAIN, 10" PVC		
141+07 - 17' LT TO 141+12 - 65' LT	50 LF	
WATERMAIN, 12" PVC		
138+00 - 17' LT TO 142+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
138+90 - 17' LT	12" X 6" TEE	123 LBS
138+90 - 36' RT	6" PLUG	15 LBS
141+07 - 20' LT	12" X 10" TEE	151 LBS
141+07 - 60' LT	10" 1/8 BEND	69 LBS
141+12 - 65' LT	10" 1/8 BEND	69 LBS
141+12 - 60' LT	10" PLUG	38 LBS
141+19.2 - 17' LT	12" 1/8 BEND	92 LBS
141+22 - 17' LT	12" 1/8 BEND	92 LBS
141+28 - 17' LT	12" 1/8 BEND	92 LBS
141+30.8 - 17' LT	12" 1/8 BEND	92 LBS
141+41 - 17' LT	12" X 6" TEE	123 LBS
141+41 - 52' LT	6" 1/4 BEND	39 LBS
WATER SERVICE LINE 1-1/2" COPPER		
138+18 - 17' LT TO 138+18 - 33' LT	16 LF	
138+34 - 17' LT TO 138+34 - 33' LT	16 LF	
138+64 - 17' LT TO 138+64 - 33' LT	16 LF	
139+25 - 17' LT TO 139+25 - 33' LT	16 LF	
139+41 - 17' LT TO 139+41 - 33' LT	16 LF	
139+60 - 17' LT TO 139+60 - 34' LT	17 LF	
139+90 - 17' LT TO 139+90 - 33' LT	16 LF	
140+19 - 17' LT TO 134+19 - 33' LT	16 LF	
140+40 - 17' LT TO 140+40 - 33' LT	16 LF	
141+11 - 17' LT TO 141+11 - 33' RT	50 LF	
141+81 - 17' LT TO 141+80 - 33' LT	16 LF	
141+81 - 17' LT TO 141+41 - 33' RT	50 LF	



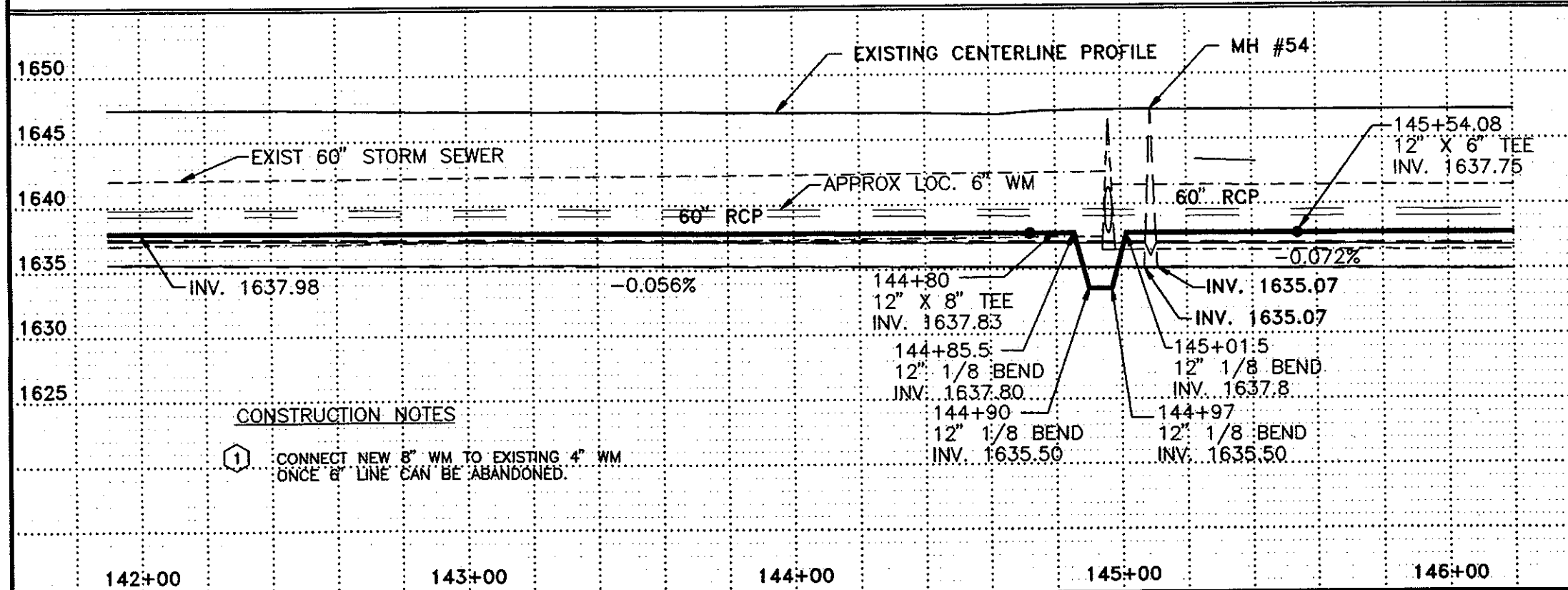
WATER SERVICE CONNECTION 1-1/2"			
138+18 - 17' LT	1 EA	139+90 - 17' LT	1 EA
138+34 - 17' LT	1 EA	140+19 - 17' LT	1 EA
138+64 - 17' LT	1 EA	140+40 - 17' LT	1 EA
139+25 - 17' LT	1 EA	141+11 - 17' LT	1 EA
139+41 - 17' LT	1 EA	141+81 - 17' LT	2 EA
139+60 - 17' LT	1 EA		
CURB STOP AND BOX 1-1/2"			
138+18 - 33' LT	1 EA	139+90 - 33' LT	1 EA
138+34 - 33' LT	1 EA	140+19 - 33' LT	1 EA
138+64 - 33' LT	1 EA	140+40 - 33' LT	1 EA
139+25 - 33' LT	1 EA	141+11 - 33' RT	1 EA
139+41 - 33' LT	1 EA	141+81 - 33' LT	1 EA
139+60 - 34' LT	1 EA	141+81 - 33' RT	1 EA
REMOVE HYDRANT			
141+46 - 50' LT	1 EA		

- CONSTRUCTION NOTES**
- CONNECT NEW 10" WM TO EXISTING 10" WM ONCE 6" LINE CAN BE ABANDONED.
 - PLUG 10" WM ONCE NEW 10" TIE IN PLACE.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #50, WATER AND SEWER IMPROVEMENT PROJECT 98-2, PHASE II			
STA 138+00 TO STA 142+00			
ULTEG ENGINEERS, INC.		CONSULTING ENGINEER	
DRAWN BY: MJH		PROJECT NO. 95834	
CHECKED BY: BPM		SCALE: 1" = 40'	
APPROVED BY: BPM		DATE: MAY 17, 1995	
		NEXT: 17 OF 29	



6" HYDRANT		
145+54.08 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
145+54.08 - 14' LT	1 EA	
GATE VALVE AND BOX, 6"		
144+80 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
145+51 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
145+54.08-17' LT TO 145+54.08-39.5' RT	56.5 LF	
WATERMAIN, 8" PVC		
144+80 - 17' LT TO 144+74 - 70' LT	53 LF	
WATERMAIN, 12" PVC		
142+00 - 17' LT TO 146+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
144+80 - 17' LT	12" X 8" TEE	137 LBS
144+80 - 50' LT	2 - 8" 1/8 BENDS	90 LBS
144+80 - 50' LT	8" TO 4" REDUCER	29 LBS
144+85.5 - 17' LT	12" 1/8 BEND	92 LBS
144+90 - 17' LT	12" 1/8 BEND	92 LBS
144+97 - 17' LT	12" 1/8 BEND	92 LBS
145+01.5 - 17' LT	12" 1/8 BEND	92 LBS
145+54.08 - 17' LT	12" X 6" TEE	123 LBS
145+54.08 - 21' RT	6" 1/8 BEND	39 LBS
145+54.08 - 25' RT	6" 1/8 BEND	39 LBS
WATER SERVICE LINE 1-1/2" COPPER		
142+27 - 17' LT TO 142+27 - 33' LT	16 LF	
142+53 - 17' LT TO 142+63 - 33' LT	16 LF	
142+60 - 17' LT TO 142+60 - 33' LT	16 LF	
142+85 - 17' LT TO 142+85 - 33' LT	16 LF	
143+13 - 17' LT TO 143+13 - 33' LT	16 LF	
143+47 - 17' LT TO 143+47 - 33' LT	16 LF	
143+50 - 17' LT TO 143+50 - 37' RT	54 LF	
143+68 - 17' LT TO 143+68 - 33' LT	16 LF	
143+95 - 17' LT TO 143+95 - 33' LT	16 LF	
144+90 - 17' LT TO 144+90 - 37' RT	54 LF	
145+73 - 17' LT TO 145+73 - 33' LT	16 LF	
WATER SERVICE CONNECTION 1-1/2"		
142+27 - 17' LT	1 EA	
142+53 - 17' LT	1 EA	
142+60 - 17' LT	1 EA	
142+85 - 17' LT	1 EA	
143+13 - 17' LT	1 EA	
143+47 - 17' LT	1 EA	
143+50 - 17' LT	1 EA	
143+68 - 17' LT	1 EA	
143+95 - 17' LT	1 EA	
144+90 - 17' LT	1 EA	
145+73 - 17' LT	1 EA	

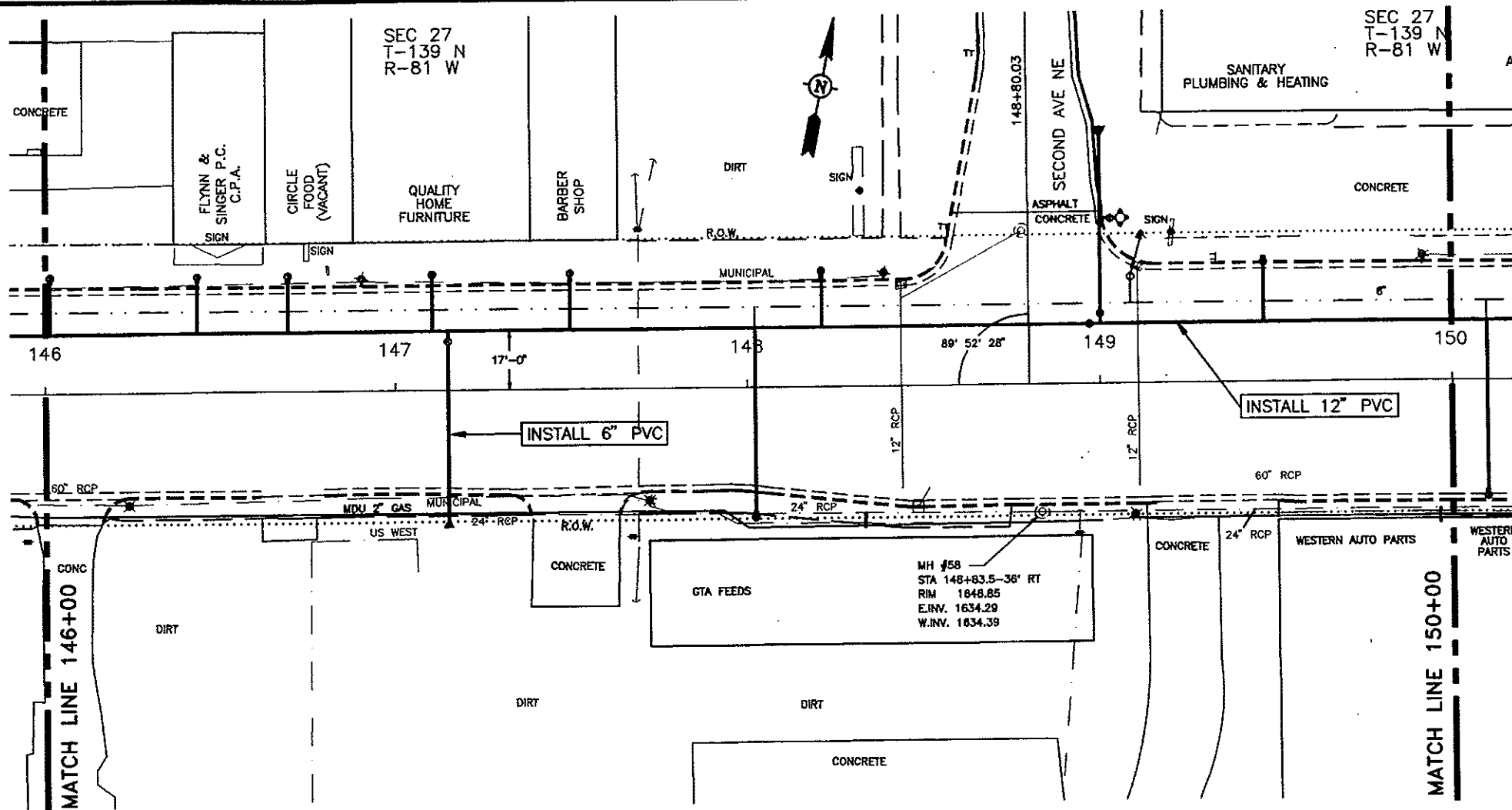


CURB STOP AND BOX 1-1/2"		
142+27 - 33' LT	1 EA	
142+53 - 33' LT	1 EA	
142+60 - 33' LT	1 EA	
142+85 - 33' LT	1 EA	
143+13 - 33' LT	1 EA	
143+47 - 33' LT	1 EA	
143+50 - 37' RT	1 EA	
143+68 - 33' LT	1 EA	
143+95 - 33' LT	1 EA	
144+90 - 37' RT	1 EA	
145+73 - 33' LT	1 EA	

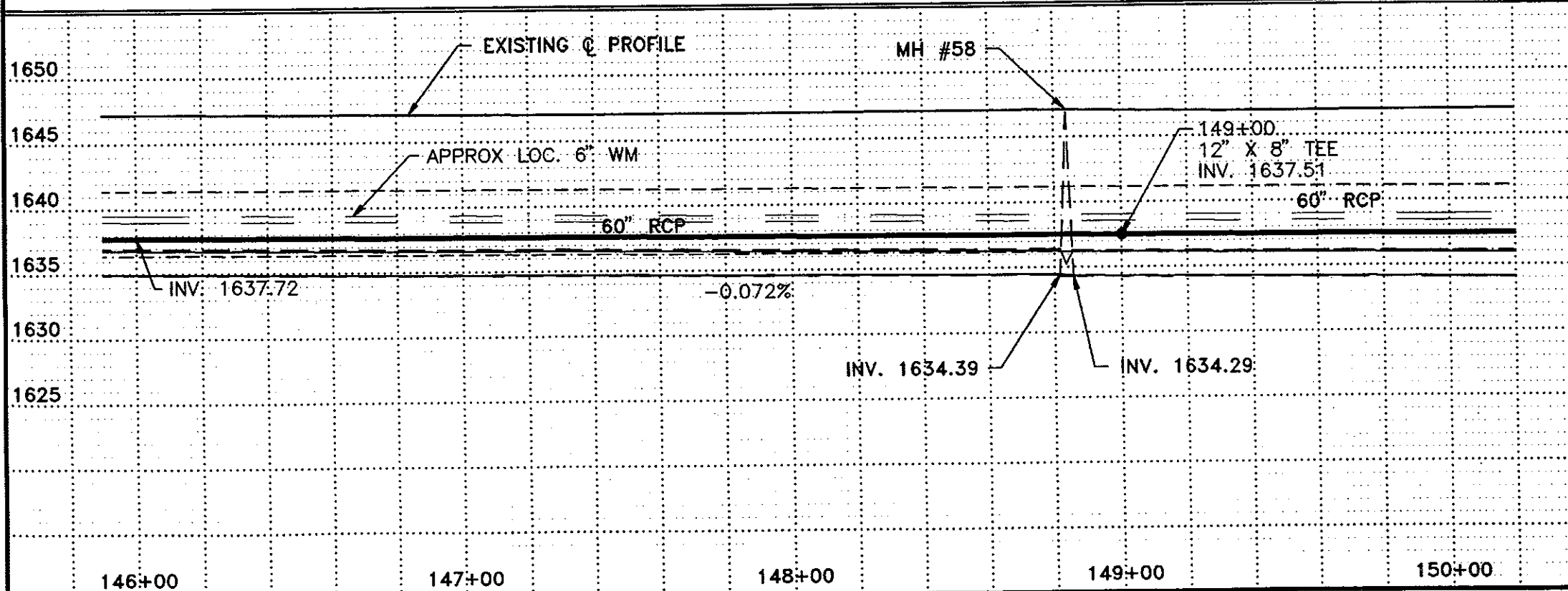
CONSTRUCTION NOTES

1. CONNECT NEW 8" WM TO EXISTING 4" WM ONCE 6" LINE CAN BE ABANDONED.

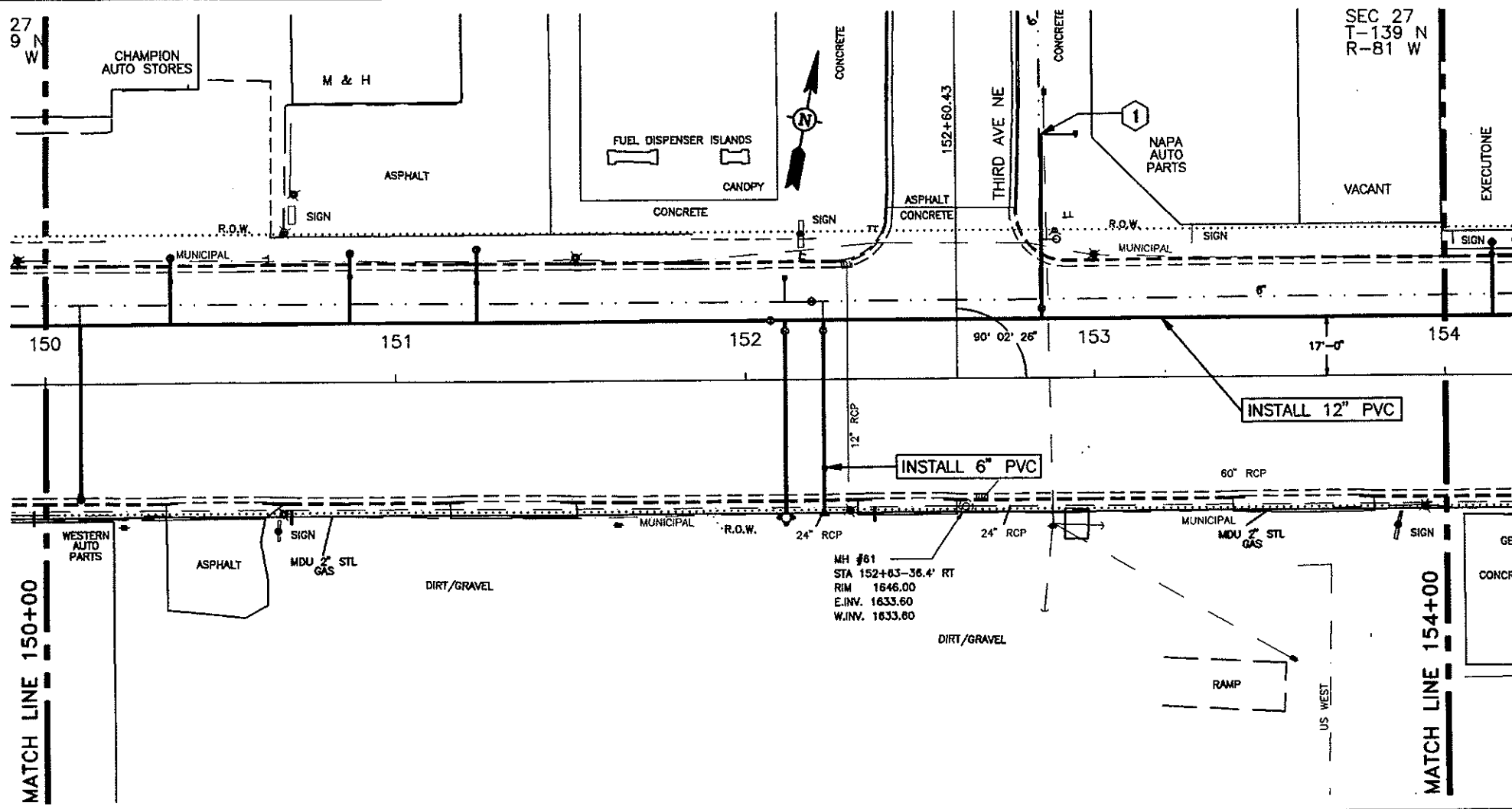
REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II			
STA 142+00 TO STA 146+00			
ULTEYO ENGINEERS, INC.			
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO. 85834	
CHECKED BY: BPM	DATE: MAY 17, 1985	SHEET 18 OF 29	
APPROVED BY: BPM			



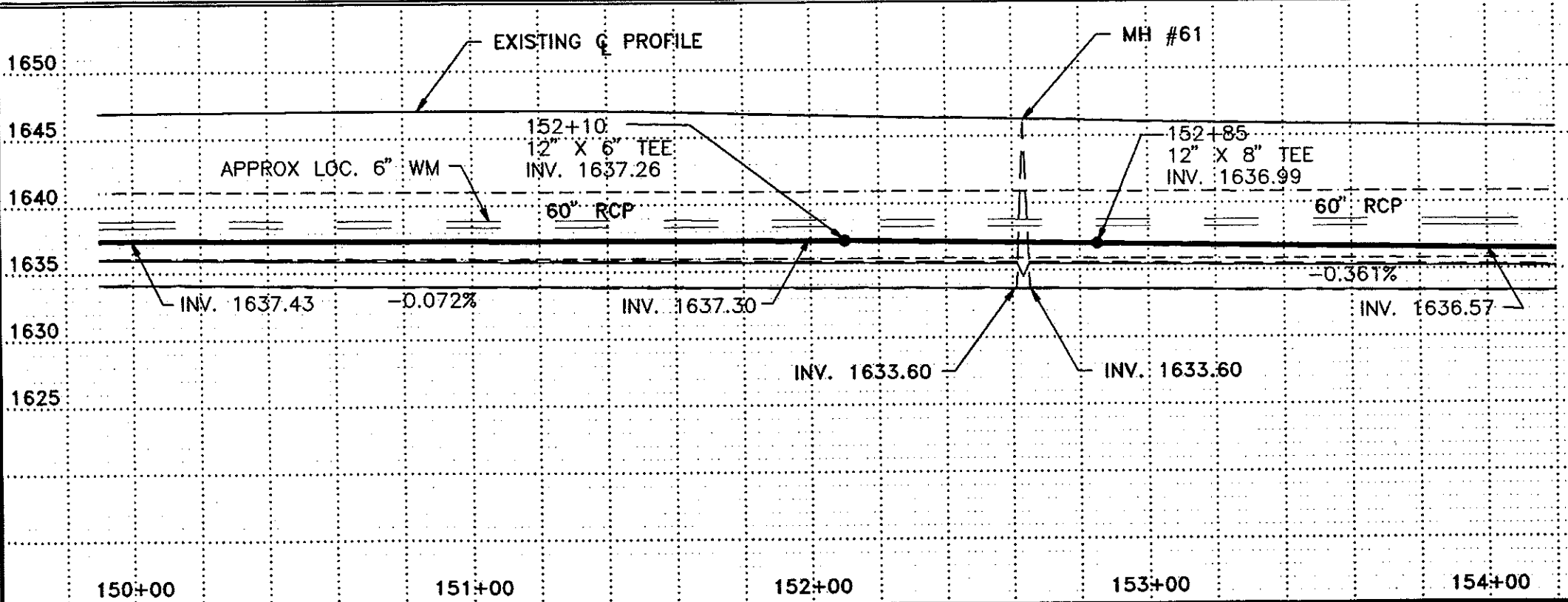
6" HYDRANT		
149+06 - 47' LT	1 EA	
GATE VALVE AND BOX, 6"		
147+15 - 14' LT	1 EA	
149+03 - 47' LT	1 EA	
GATE VALVE AND BOX, 8"		
149+00 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
148+97 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
147+15 - 17' LT TO 147+15 - 37' RT	54 LF	
149+00 - 47' LT TO 149+06 - 47' LT	6 LF	
WATERMAIN, 8" PVC		
149+00 - 17' LT TO 149+00 - 70' LT	53 LF	
WATERMAIN, 12" PVC		
146+00 - 17' LT TO 150+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
147+15 - 17' LT	12" X 6" TEE	123 LBS
147+15 - ±25' RT	2 - 6" 1/8 BENDS	62 LBS
147+15 - 37' RT	6" PLUG	15 LBS
149+00 - 17' LT	12" X 8" TEE	137 LBS
149+00 - 47' LT	8" X 6" TEE	73 LBS
149+00 - 70' LT	8" PLUG	26 LBS
WATER SERVICE LINE 1-1/2" COPPER		
146+01 - 17' LT TO 146+01 - 33' LT	16 LF	
146+43 - 17' LT TO 146+43 - 33' LT	16 LF	
146+70 - 17' LT TO 146+70 - 33' LT	16 LF	
147+11 - 17' LT TO 147+11 - 33' LT	16 LF	
147+50 - 17' LT TO 147+50 - 33' LT	16 LF	
148+02 - 17' LT TO 148+02 - 37' RT	54 LF	
148+21 - 17' LT TO 148+21 - 33' LT	16 LF	
149+47 - 17' LT TO 149+47 - 34' LT	17 LF	
WATER SERVICE CONNECTION 1-1/2"		
146+01 - 17' LT	1 EA	
146+43 - 17' LT	1 EA	
146+70 - 17' LT	1 EA	
147+11 - 17' LT	1 EA	
147+50 - 17' LT	1 EA	
148+02 - 17' LT	1 EA	
148+21 - 17' LT	1 EA	
149+47 - 17' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
146+01 - 33' LT	1 EA	
146+43 - 33' LT	1 EA	
146+70 - 33' LT	1 EA	
147+11 - 33' LT	1 EA	
147+50 - 33' LT	1 EA	
148+02 - 37' RT	1 EA	
148+21 - 33' LT	1 EA	
149+47 - 34' LT	1 EA	
REMOVE HYDRANT		
149+11 - 42' LT	1 EA	



REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #59, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II			
STA 146+00 TO STA 150+00			
ULTEG ENGINEERS, INC. CONSULTING ENGINEERS & ARCHITECTS			
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1985	SHEET: 19 of 29	
APPROVED BY: BPM			



6" HYDRANT		
152+11 - 39.5' RT	1	EA
GATE VALVE AND BOX, 6"		
152+11 - 14' LT	1	EA
152+22 - 14' LT	1	EA
GATE VALVE AND BOX, 8"		
152+85 - 20' LT	1	EA
GATE VALVE AND BOX, 12"		
152+07 - 17' LT	1	EA
WATERMAIN, 6" PVC		
152+11 - 17' LT TO 152+11 - 39.5' RT	56.5	LF
152+22 - 17' LT TO 152+22 - 37' RT	54	LF
WATERMAIN, 8" PVC		
152+85 - 17' LT TO 152+85 - 70' LT	53	LF
WATERMAIN, 12" PVC		
150+00 - 17' LT TO 154+00 - 17' LT	400	LF
FITTINGS, DUCTILE IRON		
152+10 - 17' LT	12" X 6" TEE	123 LBS
152+11 - 23.5' RT	6" 1/8 BEND	31 LBS
152+11 - 29' RT	6" 1/8 BEND	31 LBS
152+22 - 17' LT	12" X 6" TEE	123 LBS
152+22 - 37' RT	6" PLUG	15 LBS
152+22 - ±25' LT	2 - 6" 1/8 BENDS	62 LBS
152+85 - 17' LT	12" X 8" TEE	137 LBS
152+85 - 70' LT	8" TO 6" REDUCER	32 LBS
WATER SERVICE LINE 1-1/2" COPPER		
150+10 - 17' LT TO 150+10 - 33' RT	50	LF
150+36 - 17' LT TO 150+36 - 36' LT	19	LF
150+87 - 17' LT TO 150+87 - 37' LT	20	LF
151+23 - 17' LT TO 151+23 - 38' LT	21	LF
WATER SERVICE CONNECTION 1-1/2"		
150+10 - 17' LT	1	EA
150+36 - 17' LT	1	EA
150+87 - 17' LT	1	EA
151+23 - 17' LT	1	EA
CURB STOP AND BOX 1-1/2"		
150+10 - 33' RT	1	EA
150+36 - 36' LT	1	EA
150+87 - 37' LT	1	EA
151+23 - 38' LT	1	EA
REMOVE HYDRANT		
152+88 - 42' LT	1	EA



CONSTRUCTION NOTES

① CONNECT EXISTING 6" WM TO NEW 8" WM.


REV	DATE	DESCRIPTION	BY

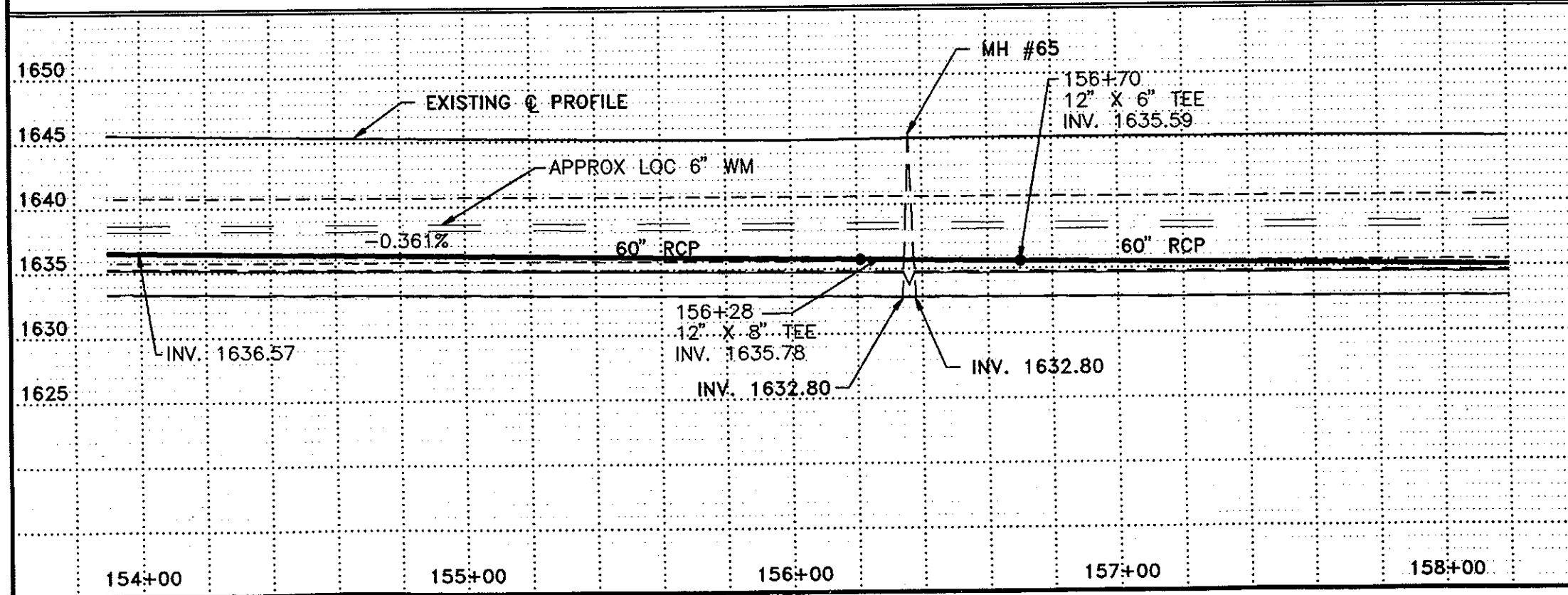
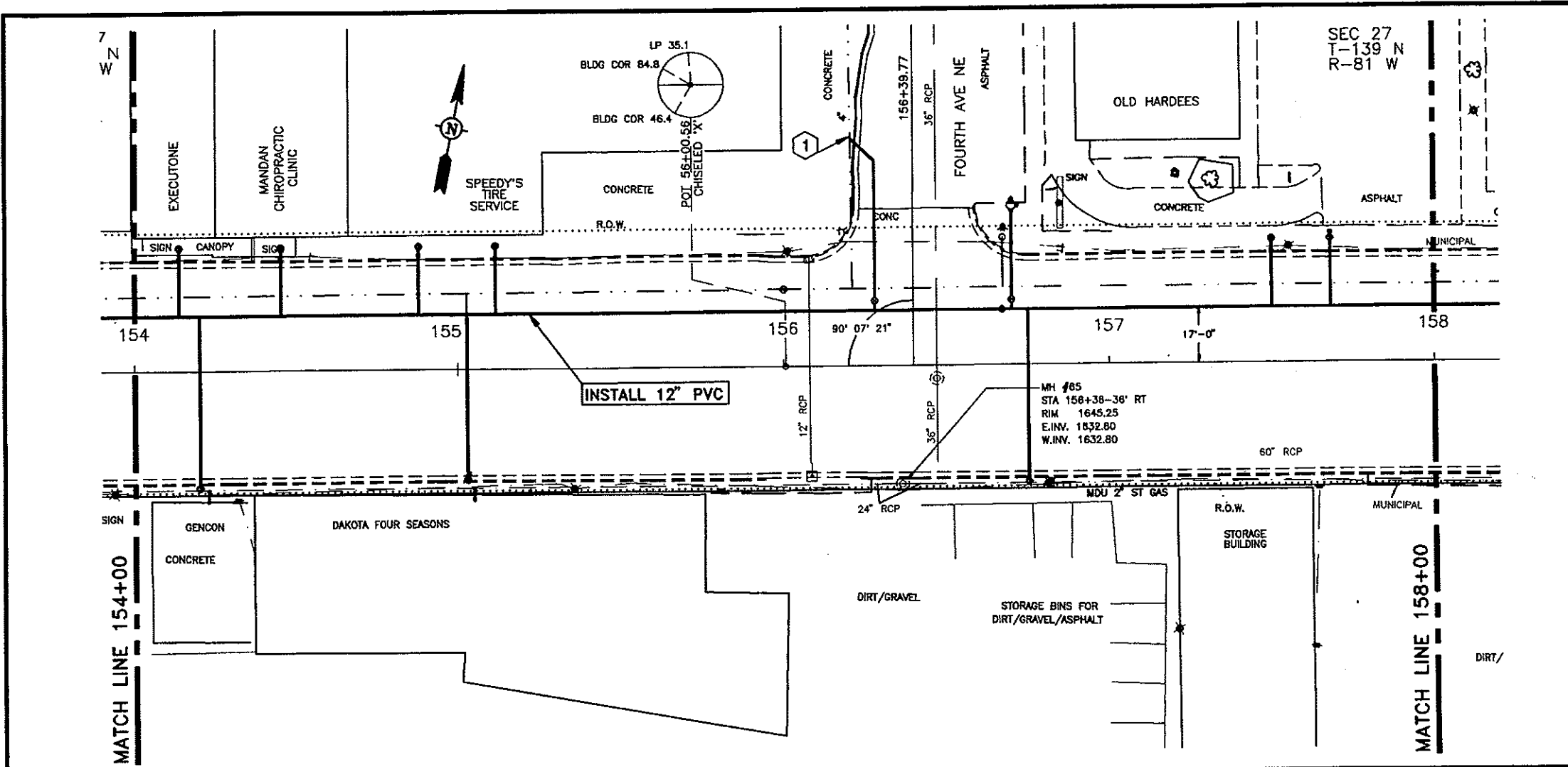
CITY OF MANDAN
DISTRICT #33, WATER AND SEWER IMPROVEMENT PROJECT 96-2, PHASE II

STA 150+00 TO STA 154+00

ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS
1000 W. WASHINGTON ST. SUITE 200 • MINNEAPOLIS, MN 55402

DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO.: 95834
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 20 OF 29
APPROVED BY: BPM		



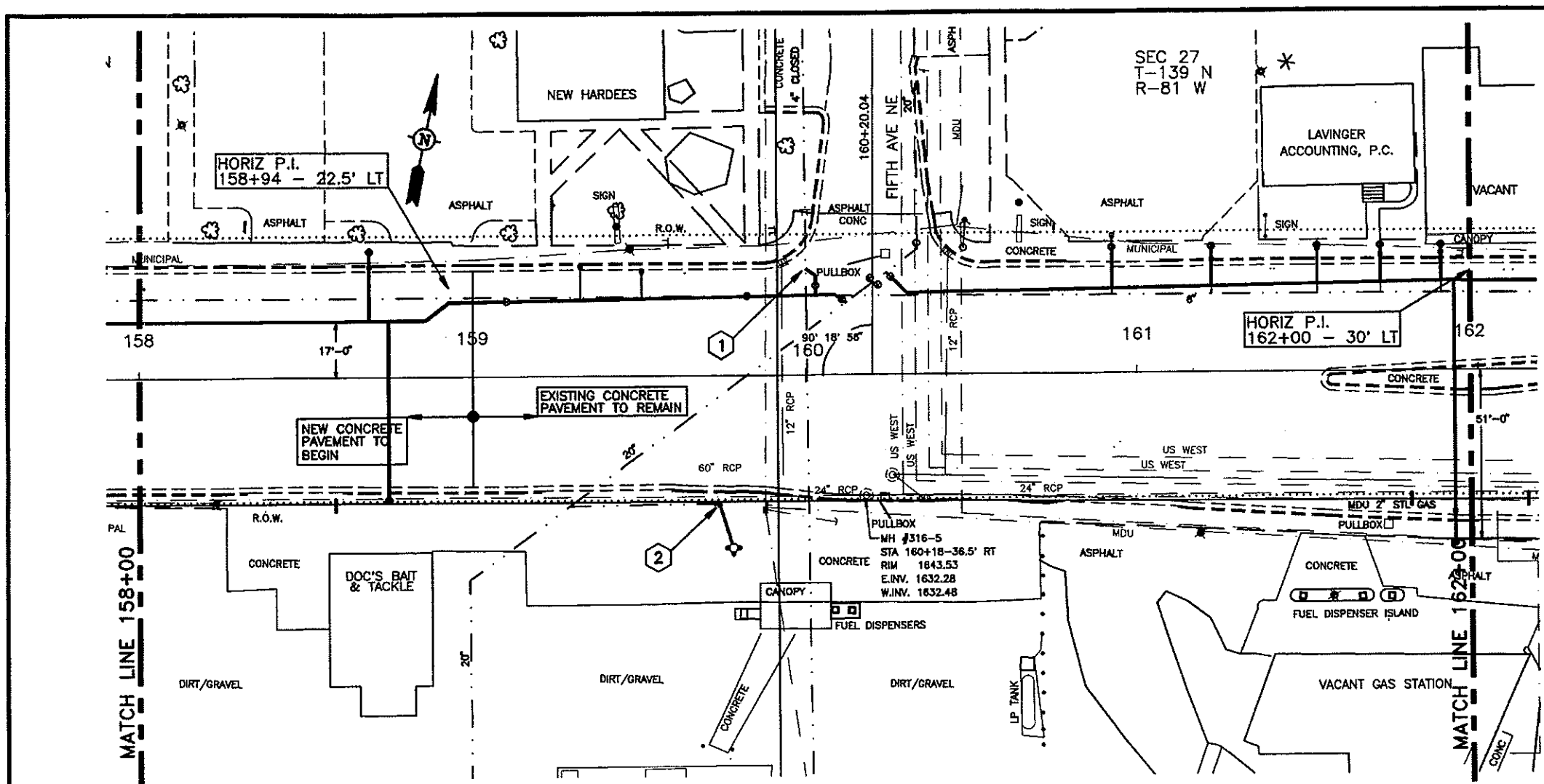


6" HYDRANT		
156+70 - 49' LT	1 EA	
GATE VALVE AND BOX, 6"		
156+70 - 20' LT	1 EA	
GATE VALVE AND BOX, 8"		
156+28 - 20' LT	1 EA	
GATE VALVE AND BOX, 12"		
156+67 - 17' LT	1 EA	
WATERMAIN, 6" PVC		
156+70 - 17' LT TO 156+70 - 49' LT	32 LF	
WATERMAIN, 8" PVC		
156+28 - 17' LT TO 156+21 - 70' LT	53 LF	
WATERMAIN, 12" PVC		
154+00 - 17' LT TO 158+00 - 17' LT	400 LF	
FITTINGS, DUCTILE IRON		
156+21 - 70' LT	8" TO 4" REDUCER	29 LBS
156+21 - 70' LT	8" 1/8 BEND	45 LBS
156+28 - 17' LT	12" X 8" TEE	137 LBS
156+28 - 63' LT	8" 1/8 BEND	45 LBS
156+70 - 17' LT	12" X 6" TEE	123 LBS
WATER SERVICE LINE 1-1/2" COPPER		
154+14 - 17' LT TO 154+14 - 38' LT	21 LF	
154+20 - 17' LT TO 154+20 - 36' RT	53 LF	
154+45 - 17' LT TO 154+45 - 38' LT	21 LF	
154+88 - 17' LT TO 154+88 - 38' LT	21 LF	
155+03 - 17' LT TO 155+03 - 34' RT	51 LF	
155+12 - 17' LT TO 155+12 - 38' LT	21 LF	
156+75 - 17' LT TO 156+75 - 36' RT	53 LF	
157+50 - 17' LT TO 157+50 - 38' LT	21 LF	
157+68 - 17' LT TO 157+68 - 38' LT	21 LF	
WATER SERVICE CONNECTION 1-1/2"		
154+14 - 17' LT	1 EA	
154+20 - 17' LT	1 EA	
154+45 - 17' LT	1 EA	
154+88 - 17' LT	1 EA	
155+03 - 17' LT	1 EA	
155+12 - 17' LT	1 EA	
156+75 - 17' LT	1 EA	
157+50 - 17' LT	1 EA	
158+68 - 17' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
154+14 - 38' LT	1 EA	
154+20 - 36' RT	1 EA	
154+45 - 38' LT	1 EA	
154+88 - 38' LT	1 EA	
155+03 - 34' RT	1 EA	
155+12 - 38' LT	1 EA	
156+75 - 36' RT	1 EA	
157+50 - 38' LT	1 EA	
157+68 - 38' LT	1 EA	
REMOVE HYDRANT		
156+67 - 42' LT	1 EA	

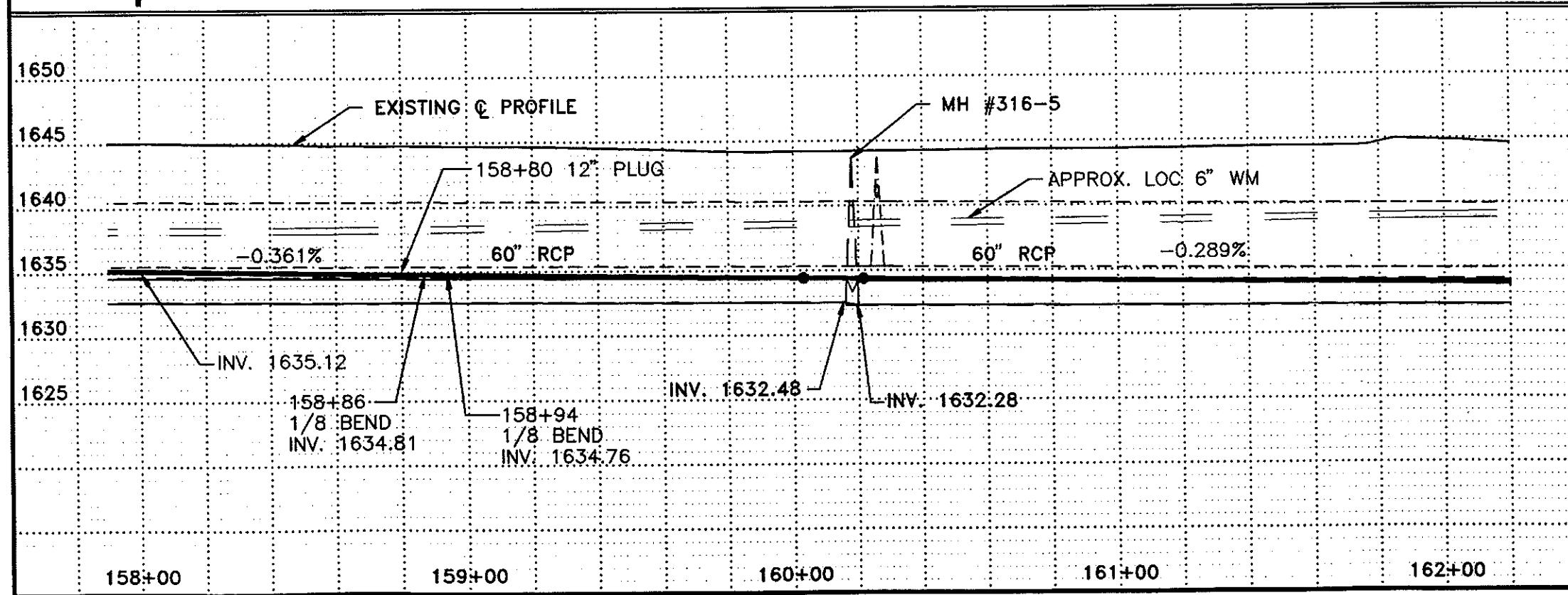
CONSTRUCTION NOTES

① CONNECT NEW 8" WM TO EXISTING 4" WM.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT #6-2, PHASE II			
STA 154+00 TO STA 158+00			
ULTIG ENGINEERS, INC. ENGINEERS ARCHITECTS & LANDSCAPE ARCHITECTS			
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO: 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 21 OF 29	
APPROVED BY: BPM			

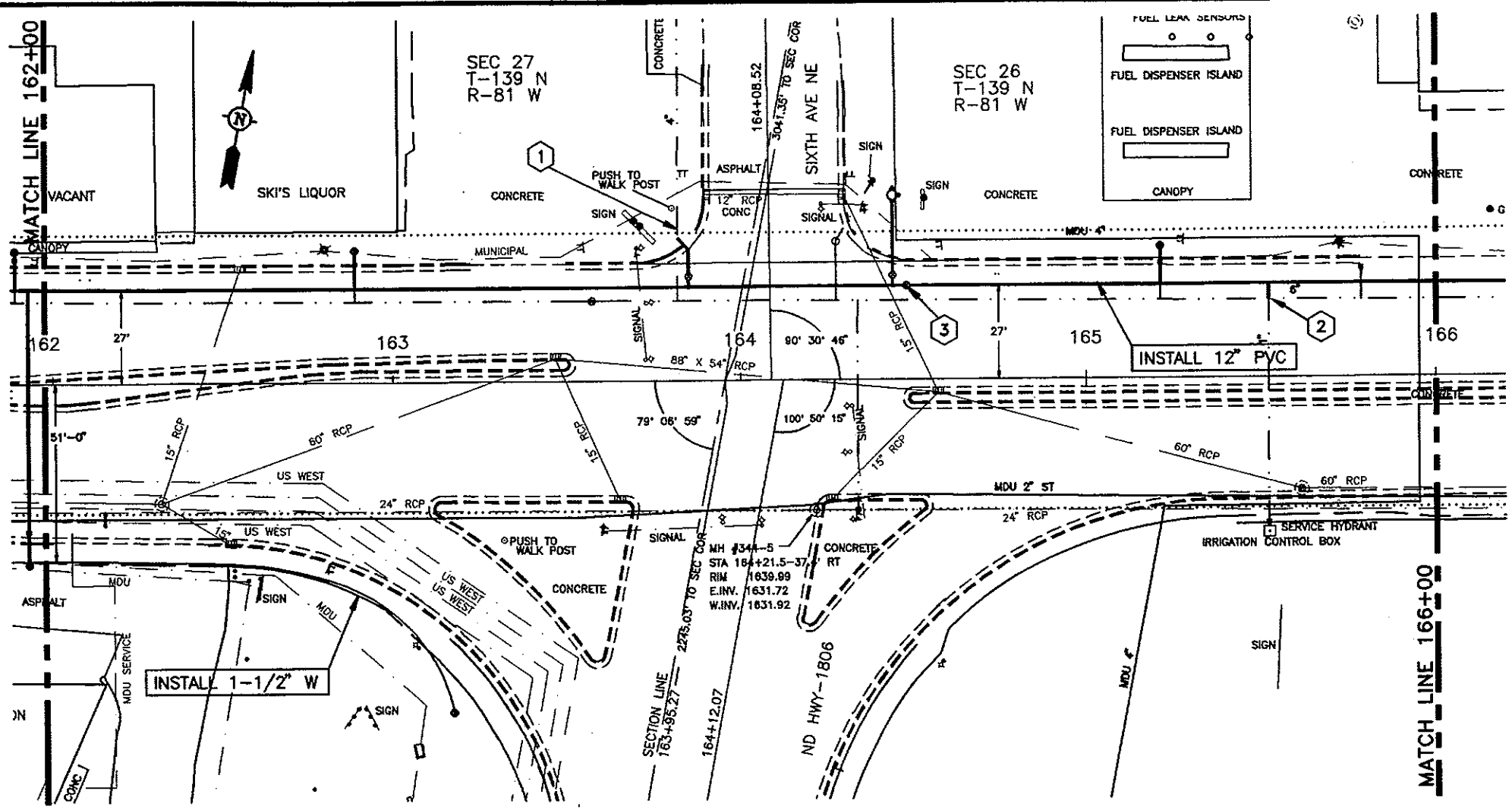


6" HYDRANT		
159+78 - 52' RT	1 EA	
TAPPING SLEEVE AND 12" VALVE, 20" X 12"		
160+11 - 21' LT	1 EA	
160+29 - 34' LT	1 EA	
GATE VALVE AND BOX, 6"		
160+03 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
159+73 - 40' RT TO 159+78 - 52' RT	14 LF	
160+03 - 24' LT TO 160+03 - 30' LT	6 LF	
WATERMAIN, 12" PVC		
158+00 - 17' LT TO 162+00 - 27' LT	400 LF	
FITTINGS, DUCTILE IRON		
158+86 - 17' LT	12" 1/8 BEND	117 LBS
158+94 - 22.5' LT	12" 1/8 BEND	117 LBS
159+82 - 30' RT	6" 1/8 BEND	31 LBS
160+03 - 27' LT	12" X 6" TEE	123 LBS
160+03 - 33' LT	2 - 6" 1/8 BENDS	62 LBS
160+08 - 27' LT	12" 1/8 BEND	117 LBS
160+33 - 27' LT	12" 1/8 BEND	117 LBS
WATER SERVICE LINE 1-1/2" COPPER		
160+93 - 26' LT TO 160+93 - 38' LT	12 LF	
161+22 - 26' LT TO 161+22 - 38' LT	12 LF	
161+54 - 27' LT TO 161+54 - 38' LT	11 LF	
161+73 - 27' LT TO 161+73 - 38' LT	11 LF	
161+92 - 27' LT TO 161+92 - 38' LT	11 LF	
161+95 - 51' RT TO 162+00 - 51' RT	5 LF	
WATER SERVICE LINE 2" COPPER		
158+69 - 17' LT TO 158+69 - 38' LT	21 LF	
158+75 - 17' LT TO 158+75 - 37' RT	54 LF	
161+95 - 27' LT TO 161+95 - 52' RT	82 LF	
WATER SERVICE CONNECTION		
158+69 - 17' LT	1 EA - 2" CONNECTION	
158+75 - 17' LT	1 EA - 2" CONNECTION	
160+93 - 26' LT	1 EA	
161+22 - 26' LT	1 EA	
161+54 - 27' LT	1 EA	
161+73 - 27' LT	1 EA	
161+92 - 27' LT	1 EA	
161+95 - 27' LT	1 EA - 2" CONNECTION	
CURB STOP AND BOX 1-1/2"		
160+93 - 38' LT	1 EA	161+73 - 38' LT 1 EA
161+22 - 38' LT	1 EA	161+92 - 38' LT 1 EA
161+54 - 38' LT	1 EA	
CURB STOP AND BOX 2"		
158+69 - 38' LT	1 EA	
158+75 - 37' RT	1 EA	
161+95 - 52' RT	1 EA	
REMOVE HYDRANT		
159+73 - 40' RT	1 EA	
160+48 - 48' LT	1 EA	

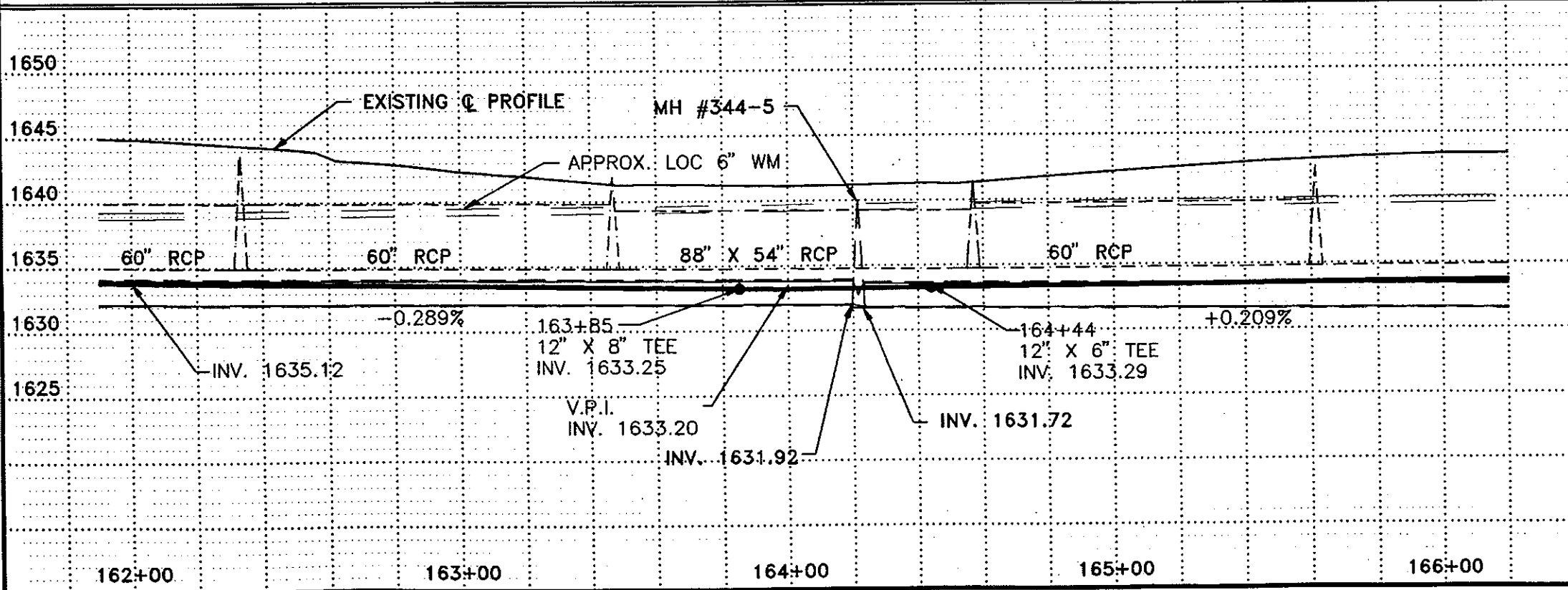


CONSTRUCTION NOTES		
1	CONNECT EXISTING 4" WATERMAIN TO NEW 6" WATERMAIN.	
2	EXTEND EXISTING LINE TO NEW HYDRANT LOCATION.	

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #88, WATER AND SEWER IMPROVEMENT PROJECT 98-2, PHASE II			
STA 158+00 TO STA 162+00			
ULTEG ENGINEERS, INC.			
DESIGNED BY: MJH	SCALE: 1" = 40'	PROJECT NO.: 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET: 22 of 29	
APPROVED BY: BPM			



6" HYDRANT		
164+44 - 53' LT	1 EA	
GATE VALVE AND BOX, 6"		
164+44 - 30' LT	1 EA	
GATE VALVE AND BOX, 8"		
163+85 - 30' LT	1 EA	
GATE VALVE AND BOX, 12"		
164+48 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
164+44 - 27' LT TO 164+44 - 53' LT	26 LF	
WATERMAIN, 8" PVC		
163+85 - 27' LT TO 163+82 - 45' LT	18 LF	
WATERMAIN, 12" PVC		
162+00 - 27' LT TO 164+48 - 27' LT	248 LF	
FITTINGS, DUCTILE IRON		
163+82 - 45' LT	8" 1/8 BEND	45 LBS
163+82 - 45' LT	8" TO 4" REDUCER	29 LBS
163+85 - 39' LT	8" 1/8 BEND	45 LBS
163+85 - 27' LT	12" X 8" TEE	137 LBS
164+44 - 27' LT	12" X 6" TEE	123 LBS
164+53 - 27' LT	12" PLUG	49 LBS
WATER SERVICE LINE 1-1/2" COPPER		
162+00 - 51' RT TO 163+17 - 95' RT	115 LF	
162+89 - 27' LT TO 162+89 - 38' LT	11 LF	
WATER SERVICE CONNECTION		
162+89 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
162+89 - 38' LT	1 EA	
163+17 - 95' RT	1 EA	
REMOVE HYDRANT		
164+40 - 58' LT	1 EA	

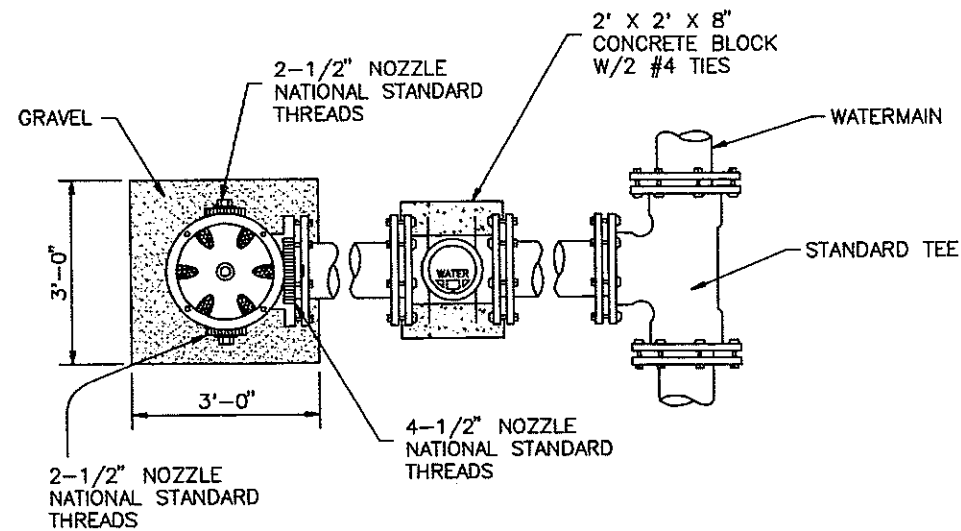
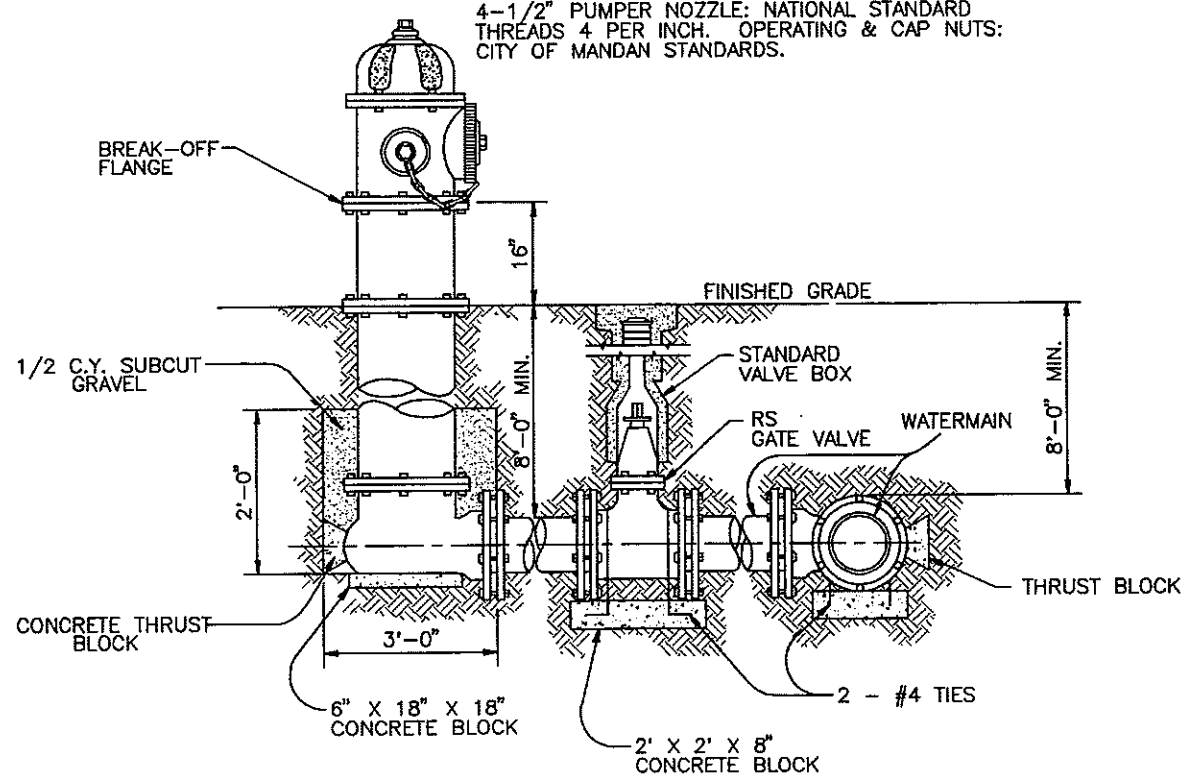


- CONSTRUCTION NOTES**
- ① CONNECT EXISTING 4" W.M. TO NEW 8" W.M.
 - ② CONNECT NEW 1-1/2" COPPER TO EXISTING 1" COPPER
 - ③ QUANTITIES FOR THIS PROJECT END AT 164+48. INSTALL 12" VALVE AND BOX AND PLUG IF PHASE III CONTRACTOR HAS NOT COMPLETED WORK IN THIS AREA. IF PHASE III CONTRACTOR HAS COMPLETED WORK IN THIS AREA, REMOVE PLUG AND CONNECT TO 12" WATERMAIN.

CITY OF MANDAN	
DISTRICT #38, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II	
STA 162+00 TO STA 164+48	
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS 5500 W. WISCONSIN AVE. SUITE 200 MINNEAPOLIS, MN 55412	
DRAWN BY: M.J.H.	SCALE: 1" = 40'
CHECKED BY: BPM	PROJECT NO.: 95834
APPROVED BY: BPM	DATE: MAY 17, 1995
	SHEET 23 OF 29

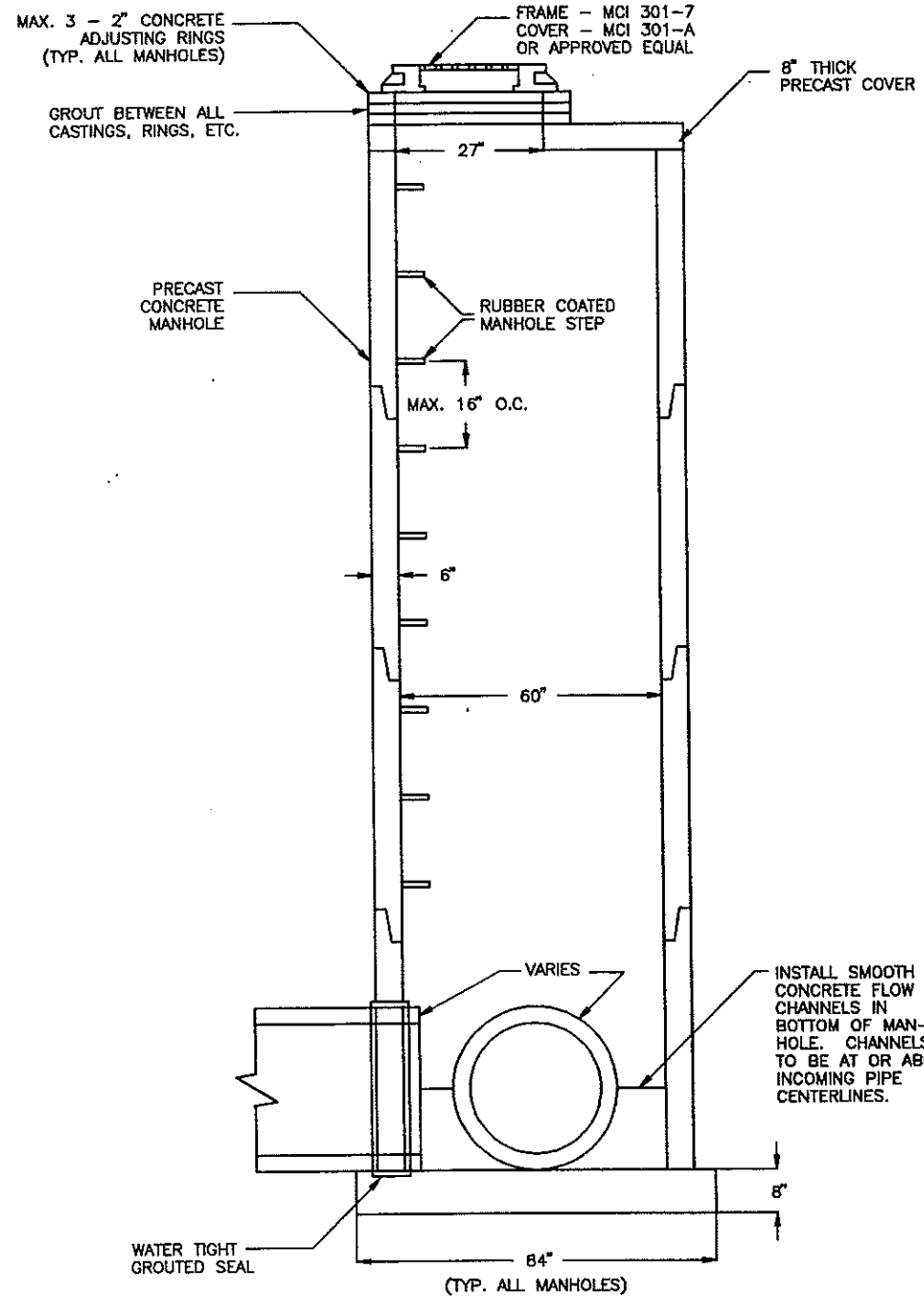
2-1/2" HOSE NOZZLES: NATIONAL STANDARD THREADS, 2-1/16" O.D. MALE THREADS, 7-1/2 THREADS PER INCH L.H. THREADS.

4-1/2" PUMPER NOZZLE: NATIONAL STANDARD THREADS 4 PER INCH. OPERATING & CAP NUTS: CITY OF MANDAN STANDARDS.



HYDRANT & VALVE DETAIL

NOT TO SCALE



SANITARY MANHOLE DETAIL

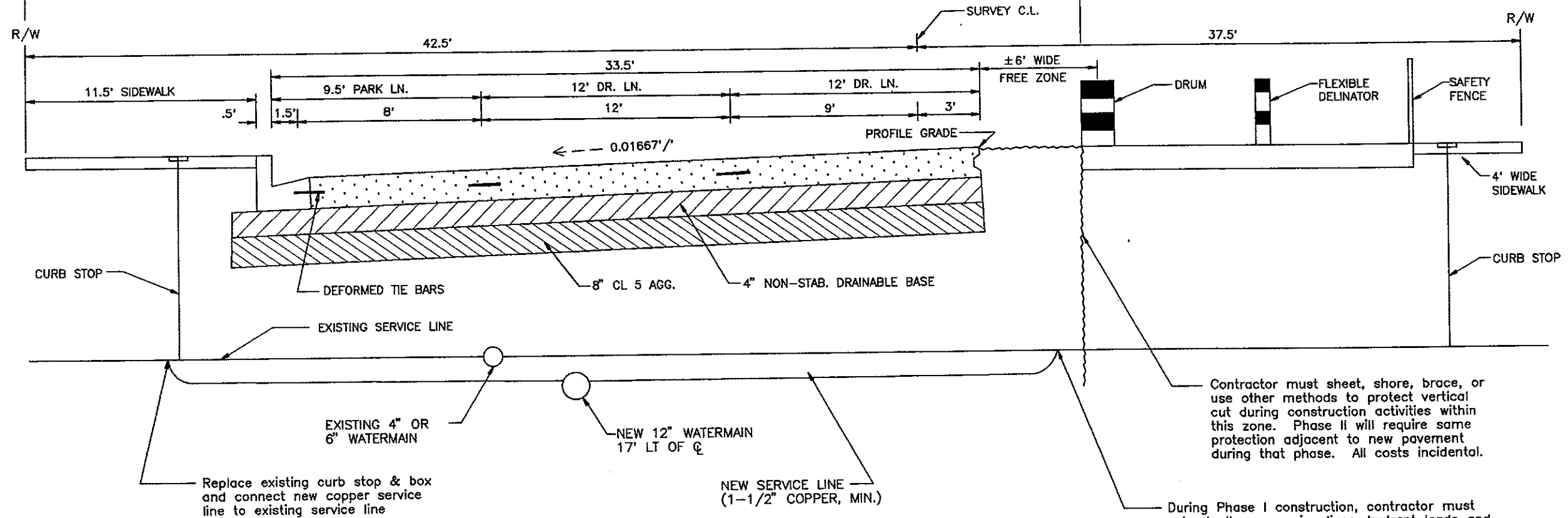
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY

CITY OF MANDAN	
DISTRICT #39, WATER & SEWER IMPROVEMENT PROJECT 86-2, PHASE II	
DETAILS	
ULTEIG ENGINEERS, INC.	
DRAWN BY: MJH	SCALE: NO SCALE
CHECKED BY: BPM	PROJECT NO. 95834
APPROVED BY: BPM	DATE: MAY 17, 1995
SHEET 24 of 29	



PHASE I CONSTRUCTION ZONE FOR STREET RECONSTRUCTION



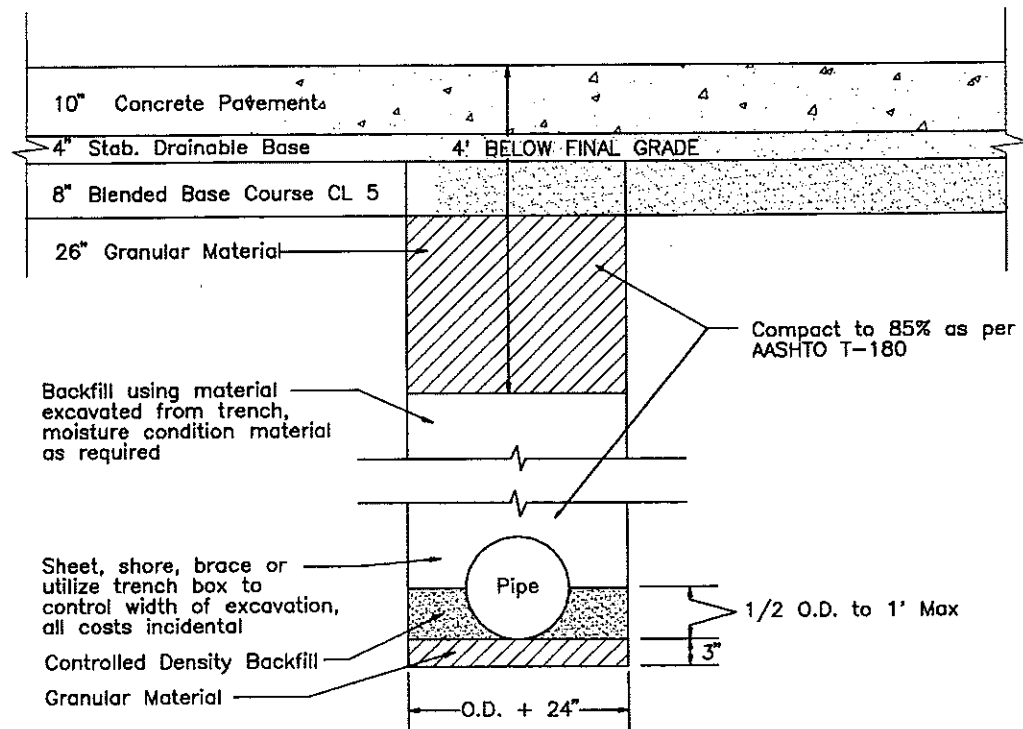
Contractor must sheet, shore, brace, or use other methods to protect vertical cut during construction activities within this zone. Phase II will require same protection adjacent to new pavement during that phase. All costs incidental.

During Phase I construction, contractor must extend all new service lines, hydrant leads and all other water or sewer related piping into this zone. New lines must be connected to existing lines within this area so that services are maintained to all users on the south side of main street. All costs for connections incidental.

Replace existing curb stop & box and connect new copper service line to existing service line

NEW SERVICE LINE (1-1/2" COPPER, MIN.)

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT #89, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II			
PHASING DETAILS			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS FARGO • BISMARCK • MINNEAPOLIS			
DRAWN BY: DMS	SCALE: NO SCALE	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: SEPT. 27, 1995	SHEET 25 of 29	
APPROVED BY: BPM			

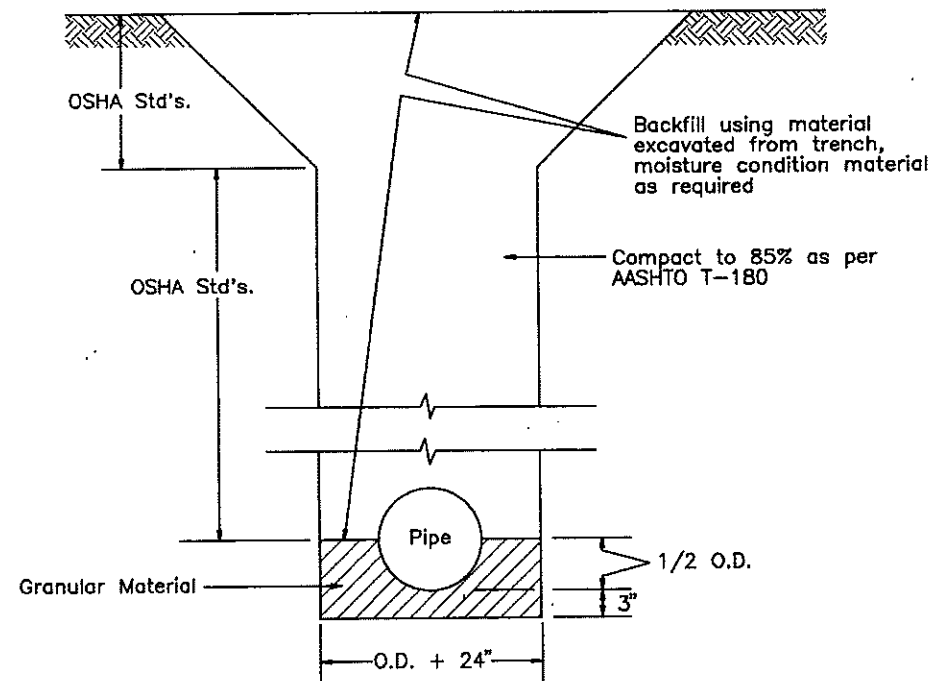


BEDDING AND BACKFILL FOR PIPE UNDER THE ROADWAY

CONTROLLED DENSITY BACKFILL:

Shall be a blend of cement, water, pozzolanic materials and fillers. The material shall be fluid on placement to flow around and fill voids around pipes in the backfill area. The material shall be able to support normal loads after six hours and shall have a compressive strength in the range of 75 psi. to 125 psi. at 28 days. the material shall be such that it lends itself to easy removal with a tractor backhoe. The contractor shall provide mix design and compression strength test results of the material to the engineer for approval five days prior to placement. Two typical mix designs are shown below. Both mix designs yield approximately one cubic yard of flowable mortar.

Mix No. 1		Mix No. 2	
Sand	3000 lbs.	Cement	100 lbs.
Water	450 lbs.	Fly Ash	300 lbs.
Fly Ash	250 lbs.	Fine Aggregate	2600 lbs.
Cement	30 lbs.	Water	70 gals.

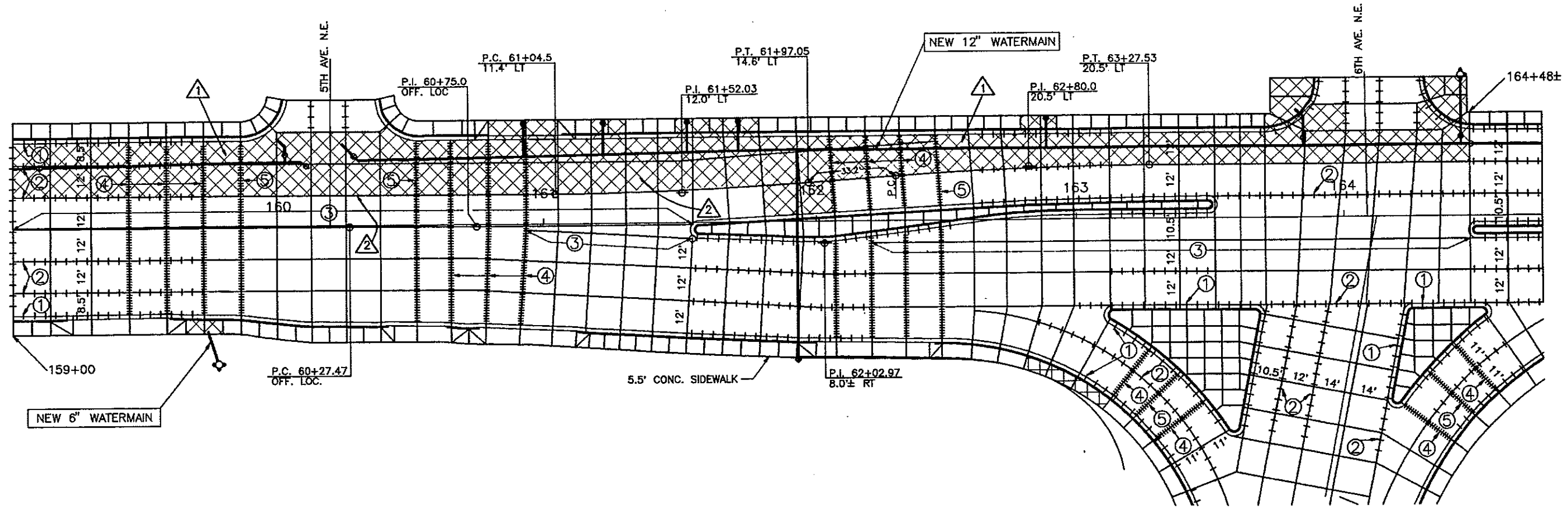


BEDDING AND BACKFILL FOR PIPE NOT UNDER ROADWAY

NOTES:

- 1) All granular material shall be class 5.
- 2) The cost for all backfill material, to include granular material, controlled density backfill, moisture conditioned existing soils, etc., shall be included in the price bid for the pipe.
- 3) Four (4) feet below final grade the moisture content of material excavated from trench and used for backfill can not be higher or lower than what will allow compaction to the specified density. The moisture content of the upper four (4) feet shall be from optimum to +5%.
- 4) These notes are applicable to both types of trenches.

▲			
▲			
▲			
▲			
REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT 438, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II			
TRENCH DETAILS			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS FARGO • MINNAPOLIS • MANITOWISH			
DRAWN BY: DMS	SCALE: NO SCALE	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: SEPT. 27, 1995	SHEET 26 of 29	
APPROVED BY: BPM			



CONSTRUCTION NOTES

- ① REMOVE AND REPLACE CROSS-HATCHED 10" THICK CONCRETE PAVEMENT IN ORDER TO INSTALL NEW 12" WATERMAIN. PROTECT ALL EXISTING CURB & GUTTER AND SIDEWALK ALONG NORTH SIDE OF STREET EXCEPT WHERE THEY NEED TO BE REMOVED TO INSTALL SERVICE LINES. SAW PAVEMENT FULL DEPTH ALONG JOINTS WHERE REMOVAL IS TO TAKE PLACE. COSTS FOR SAWING INCIDENTAL TO REMOVAL OF CONCRETE PAVEMENT. INSTALL REPLACEMENT 10" CONCRETE PAVEMENT ON 12" THICK CL5 SUBBASE. COSTS FOR CL5 SUBBASE INCIDENTAL TO 10" CONCRETE PAVEMENT REPAIR. ALL NEW PANELS TO MATCH EXISTING WIDTHS AND LENGTHS.
- ② DRILL AND EPOXY NO. 3 X 1'-6" TIE BARS INTO FACE OF EXISTING GUTTER AND ALONG NORTH EDGE OF EXISTING PAVEMENT PRIOR TO REPLACING CONCRETE PAVEMENT. RESTORE ALL OTHER LONGITUDINAL AND TRANSVERSE JOINTS TO MATCH EXISTING. ALL COSTS FOR JOINTS INCIDENTAL TO 10" CONCRETE PAVEMENT REPAIR.
- ③ WIDEN AND SEAL ALL JOINTS WITH SILICONE. COSTS INCIDENTAL TO 10" CONCRETE PAVEMENT REPAIR.
- ④ 5TH AVE. NE AND 6TH AVE. NE CANNOT BE CLOSED AT THE SAME TIME.
- ⑤ REMOVE AND REPLACE SIDEWALK AND CURB AND GUTTER AS NEEDED TO INSTALL SERVICE CONNECTIONS OR HYDRANTS.

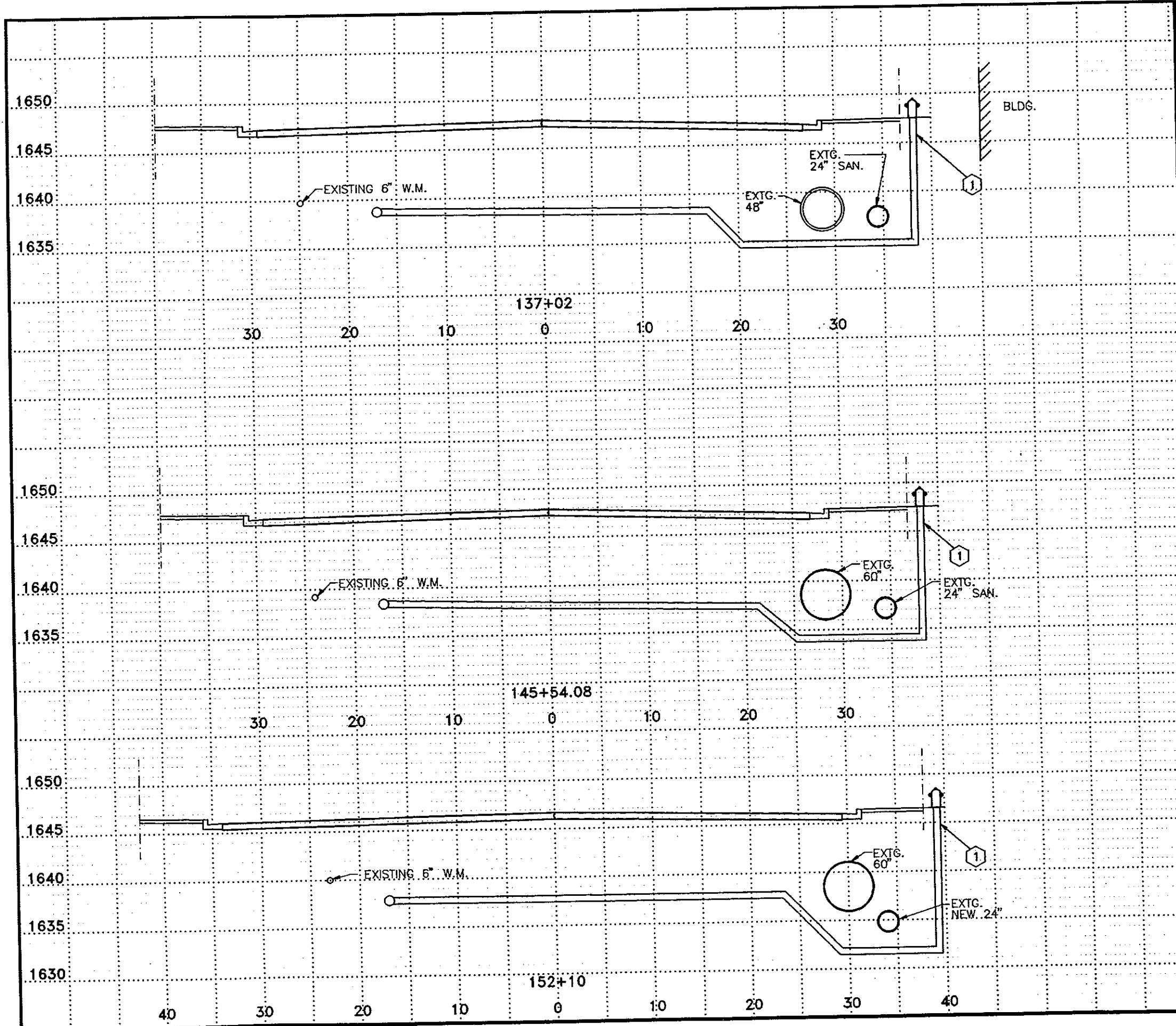
EXISTING JOINT KEY

- ① NO. 3 X 1'-6" TIE BAR @ 4'-0" C-C (CONTINUOUS)
- ② NO. 4 X 2'-6" TIE BAR @ 4'-0" C-C (CONTINUOUS)
- ③ KEYED JOINT (SILICONE SEAL)
- ④ DOWELED CONTRACTION JOINT
- ⑤ DOWELED EXPANSION JOINT

QUANTITIES

REMOVE CONCRETE, SIDEWALK	122 SY
REMOVE CONCRETE, PAVEMENT	1050 SY
10" CONCRETE PAVEMENT	1050 SY
REMOVE CURB AND GUTTER	144 LF
SIDEWALK	122 SY
CURB AND GUTTER	144 LF

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #30, WATER AND SEWER IMPROVEMENT PROJECT 98-2, PHASE I			
PAVEMENT LAYOUT STA 159+00 TO 164+48±			
ULTEIG ENGINEERS, INC. 800.525.8888			
DRAWN BY: DMS	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: SEPT. 27, 1995	REV. 27 of 29	
APPROVED BY: BPM	DATE: SEPT. 27, 1995	REV. 27 of 29	



CONSTRUCTION NOTES

- ① INSTALL HYDRANT EXTENSIONS AS REQUIRED TO BRING TOP OF HYDRANT TO PROPER GRADE
- ② PROTECT EXISTING PIPES, COSTS INCIDENTAL


REV.	DATE	DESCRIPTION	BY

CITY OF MANDAN
DISTRICT #58, WATER AND SEWER IMPROVEMENT PROJECT 88-2, PHASE II

CROSS-SECTIONS

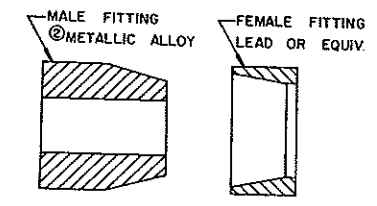
ULTEIG ENGINEERS, INC. ENGINEERING SERVICES
1000 14TH AVENUE S.W. BISMARCK, ND 58103

DRAWN BY: DMS	SCALE: AS SHOWN	PROJECT NO: 85834
CHECKED BY: BPM	DATE: SEPT. 27, 1995	SHEET 29 OF 29
APPROVED BY: BPM		

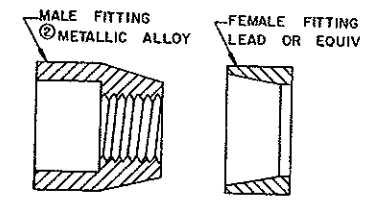


STANDARD ANCHORAGE UNITS

D-550-1



SINGLE UNIT WITHOUT THREADS



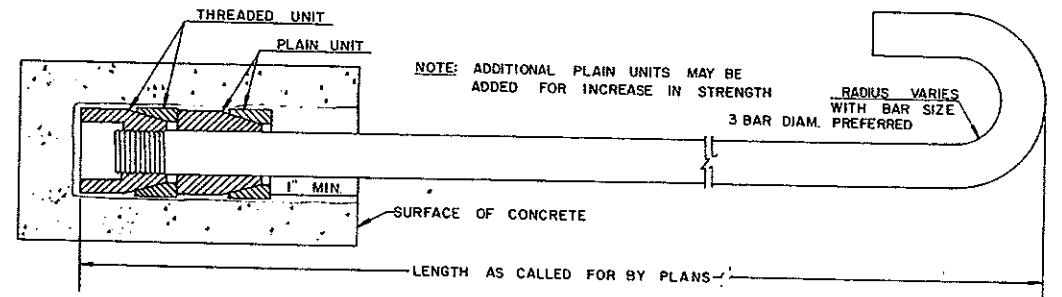
SINGLE UNIT WITH THREADS

Before any anchorage units are installed the contractor shall furnish two copies of a certificate from the Manufacturer stating that the anchorage unit will withstand the design load requirements with a minimum factor of safety of 4. These two copies of the affidavit must be forwarded to the Testing Engineer, Testing Laboratory, North Dakota Department of Transportation, Bismarck, North Dakota.

The plain and threaded units must be made of a rust-proof material

The diameter of the drilled hole shall be as required to develop the anchorage for the units furnished.

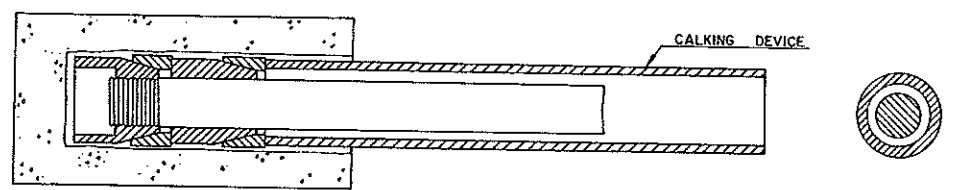
Other types of anchorage units may be substituted for the type detailed provided they meet the design load requirements as specified on this sheet and are approved by the Bridge Engineer



NOTE: ADDITIONAL PLAIN UNITS MAY BE ADDED FOR INCREASE IN STRENGTH

RADIUS VARIES WITH BAR SIZE
3 BAR DIAM. PREFERRED

DOUBLE UNIT



STANDARD DRIVING PROCEDURE

ALLOWABLE DESIGN LOADS & MINIMUM STRENGTHS										
BOLT SIZE	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
① BREAKING STRENGTH OF BOLT (LBS.)	1750	4400	8200	13150	19650	27250	35800	45100	57800	84100
MINIMUM NO. OF UNITS	2	2	2	3	3	3	3	3	3	3
② ALLOWABLE TENSION (LBS.)	400	1000	2000	3000	4500	5500	7000	9000	9000	9000
③ ALLOWABLE SHEAR BEARING (LBS.)	200	500	900	1200	1350	1500	1700	2000	2000	2000

① BASED ON ULTIMATE STRESS OF 65,000 LBS./SQ. IN.
 UNITS USED MUST HAVE MINIMUM SAFETY FACTOR OF 4
 ② STRENGTH: TENSILE 47,600 LBS./SQ. IN.; SHEARING 38,000 LBS./SQ. IN.;
 COMPRESSIVE 87,000 LBS./SQ. IN.
 ③ ALLOWABLE SAFE LOADS IN 3000 LB. CONCRETE.

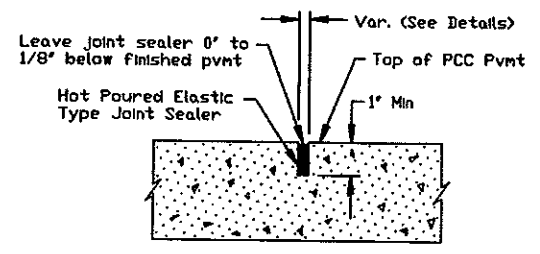
10-1-86 REVISIONS	
DATE	CHANGE
4-15-93	No of certificates

NORTH DAKOTA STATE HIGHWAY DEPARTMENT
 APPROVED: *[Signature]*
 DESIGN ENGINEER

H-0502

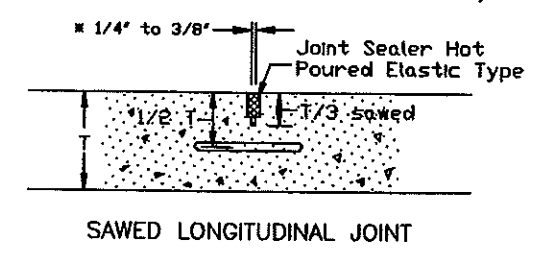
TIED JOINTS
(With Hot Poured Elastic Seal)

LONGITUDINAL JOINT DETAILS

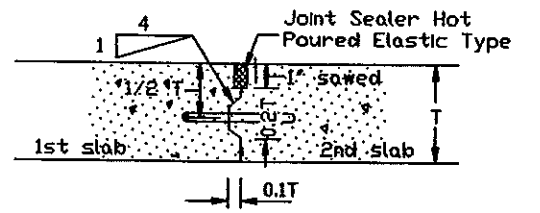


JOINT SEALER DETAIL
Applies to sawed joints

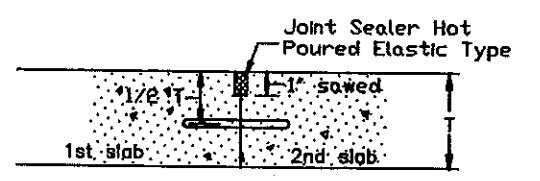
* Width requirement for top 1' only; bottom portion of sawcut may be narrower.



SAWED LONGITUDINAL JOINT

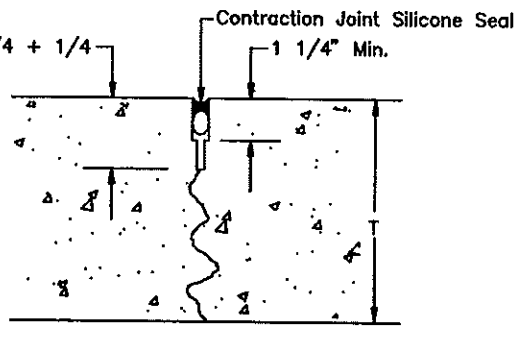
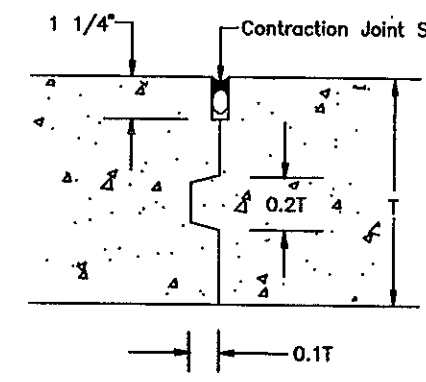


**LONGITUDINAL CONSTRUCTION JOINT
(KEYED TIED JOINT)**

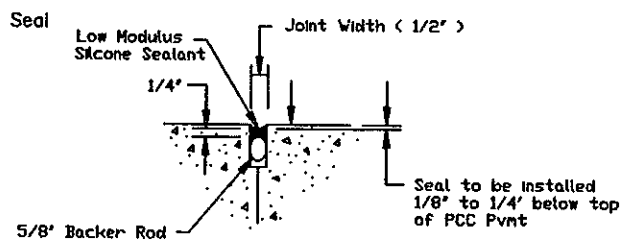


**LONGITUDINAL CONSTRUCTION JOINT
(TIED BUTT JOINT)**

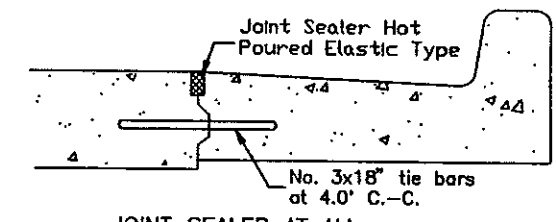
UNTIED JOINTS
(With Silicone Seal)



SAWED LONGITUDINAL JOINTS



CONTRACTION JOINT SILICONE SEAL



**JOINT SEALER AT ALL
CURB & GUTTER SECTIONS**

NOTES

1. The hot poured elastic type joint sealer shall be in accordance with Section 826.02A.2 of the Standard Specifications.
2. The tied longitudinal joints and hot poured seal shall be included in the price bid for the pavement.
3. Tie bars shall not be placed within 15 (fifteen) inches of a transverse square joint or 18 (eighteen) inches of a transverse skew joint.
4. Where tiebars are installed bent and later straightened, Grade 40 Steel shall be used.
5. Tiebar spacing can be increased up to 10% to facilitate construction.

48 In maximum spacing
Warp joint: a sawed joint or a construction joint with a keyway.
Butt joint: a construction joint with no keyway

PAY ITEM:

LONGITUDINAL JOINT SILICONE SEAL- L.F.T.

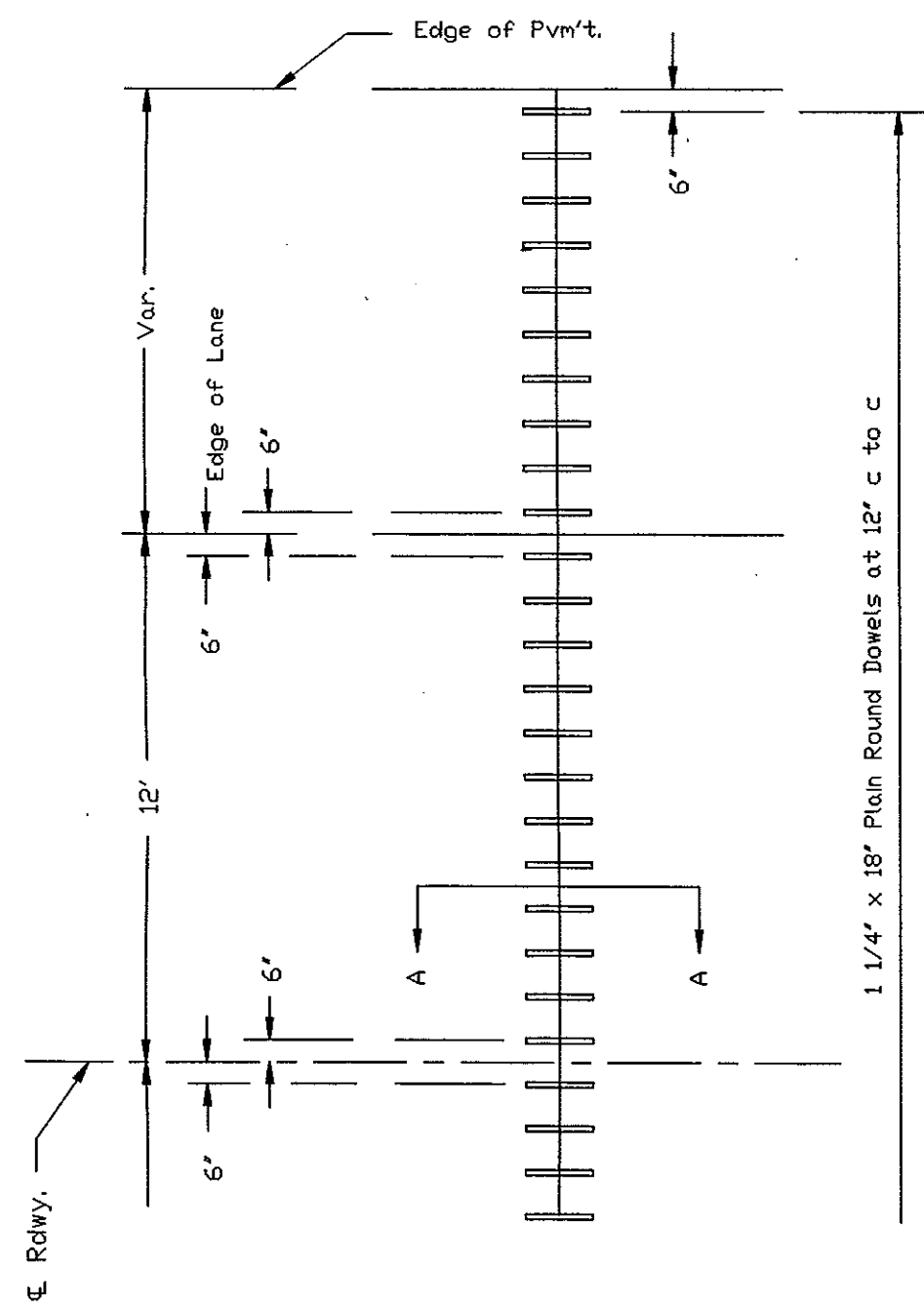
TIEBAR SPACINGS (In.)

BAR SIZE
GRADE STEEL
LENGTH OF BAR
DIST. TO FREE EDGE (FT)
TYPE OF JOINT
P.V.M.T. THICKNESS

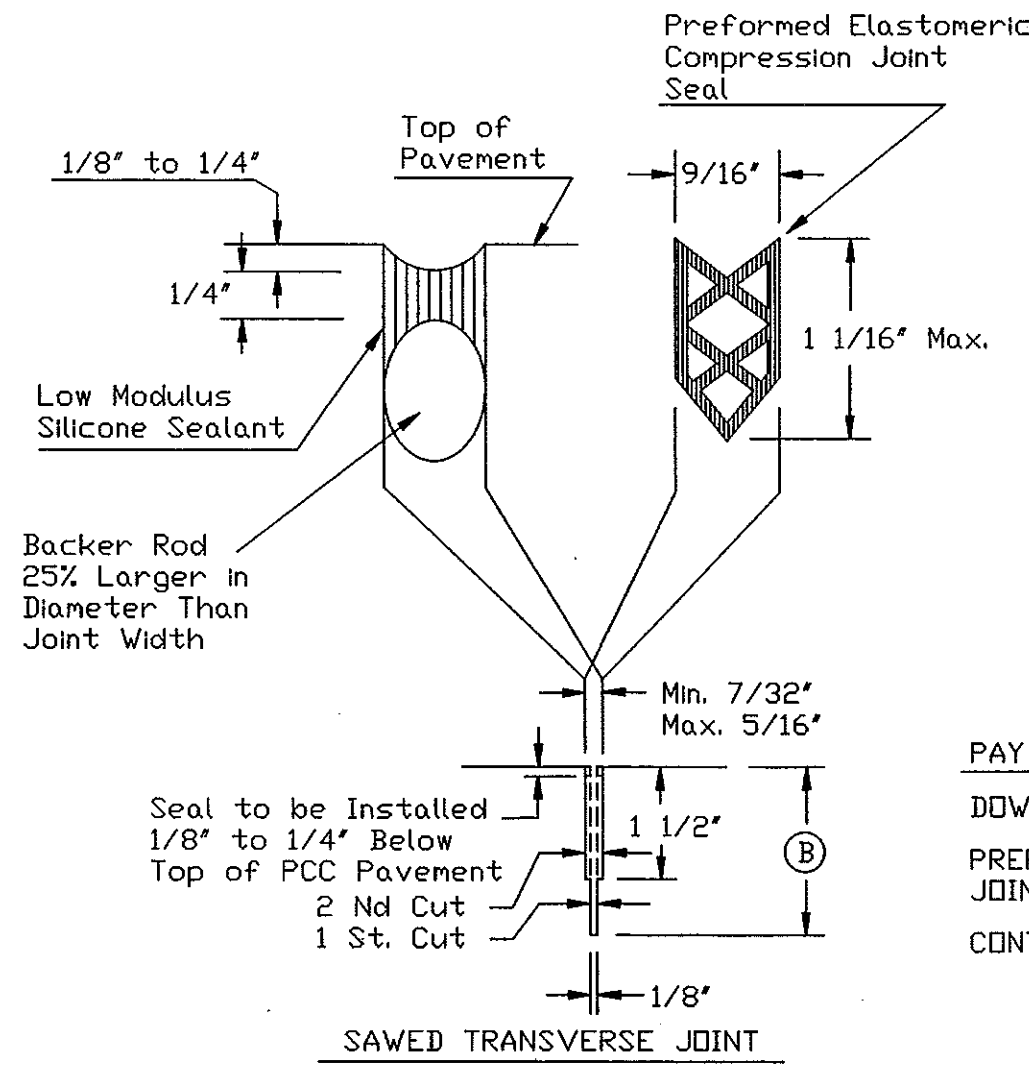
P.V.M.T. THICKNESS	TYPE OF JOINT	# 3 BAR						# 4 BAR						# 5 BAR																	
		GRADE 40			GRADE 60			GRADE 40			GRADE 60			GRADE 40			GRADE 60														
		24"	30"	36"	24"	30"	36"	24"	30"	36"	24"	30"	36"	24"	30"	36"															
8"	WARP	48	40	24	20	15	48	48	35	29	22	42	35	26	19	18	48	48	39	28	26	48	48	41	30	28	48	48	44	41	
	BUTT	48	26	19	16	13	46	38	23	20	16	28	24	17	13	12	44	38	27	20	18	46	38	28	21	19	48	48	43	32	29
9"	WARP	48	35	21	18	13	48	48	32	26	19	37	31	23	17	16	48	47	35	25	23	48	48	36	26	24	48	48	48	40	36
	BUTT	40	24	17	15	12	42	34	22	18	14	26	22	16	12	11	40	34	25	18	16	42	35	26	19	17	48	48	39	29	26
10"	WARP	47	31	19	16	12	48	47	28	24	18	34	28	22	16	14	48	42	32	23	20	48	44	33	24	22	48	48	48	36	32
	BUTT	36	22	16	14	11	38	30	20	17	13	24	20	16	11	10	36	30	23	16	14	38	31	24	17	16	48	47	35	26	23
11"	WARP	43	29	17	14	11	48	43	25	21	16	31	25	20	15	13	47	38	29	21	19	48	40	30	22	20	48	48	44	32	30
	BUTT	33	20	15	13	10	34	27	19	15	12	22	18	14	11	9	34	27	21	15	14	34	29	21	16	14	48	43	31	23	21
12"	WARP	40	26	16	13	10	48	39	24	19	15	28	23	18	13	12	42	35	27	19	18	44	36	28	20	18	48	48	41	30	28
	BUTT	29	19	14	12	9	31	25	18	14	11	20	16	13	9	9	30	25	19	14	13	31	26	20	14	13	47	39	29	21	20

11-1-92		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION <i>David K. Olson</i> APPROVED: DESIGN ENGINEER
REVISIONS		
DATE	CHANGE	
12-8-95	JOINT DEPTH	

TRANSVERSE CONTRACTION JOINT DETAILS



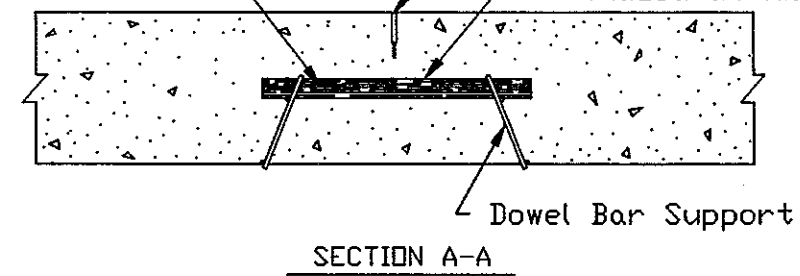
CONTRACTION JOINT DOWEL BAR ASSEMBLY
(1/2 Roadway Shown)



SAWED TRANSVERSE JOINT

(B) $T/4 + 1/4$ For AE or YE Non Dowelled Concrete Pavement or
 $T/3$ For High Early Concrete Pavement & Dowelled Pavement
 Sawed Transverse Contraction Joint

Coat Entire Length of Dowel Bars With Multipurpose Lithium Grease
 1 1/4" x 18" Plain Round Dowels
 1 1/2" For 10" or Thicker Pavement
 Placed at Midpoint of Slab



Notes: Preformed Compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer. Preformed inserts used to form grooves for transverse joints will not be allowed.

The joint Seal details apply to both doweled and plain (non-doweled) transverse joints.

All Dowels shall be epoxy coated in accordance with AASHTO M-254 TYPE B.

T = Thickness of Pavement

PAY ITEMS

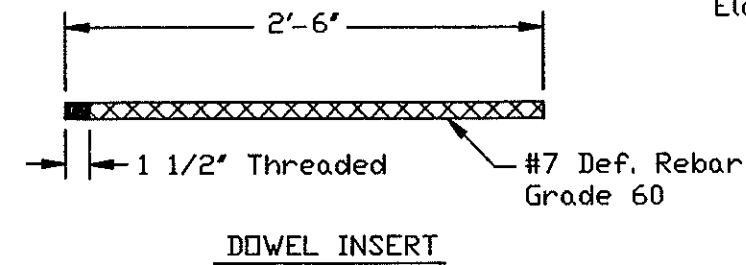
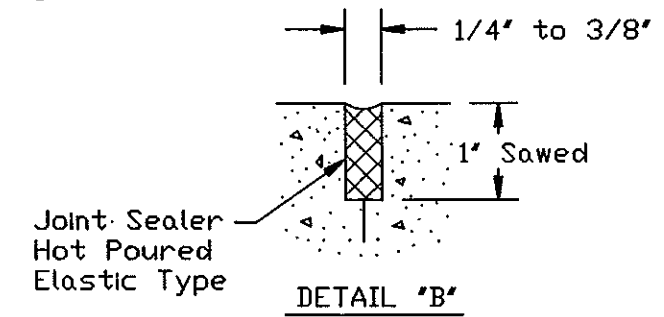
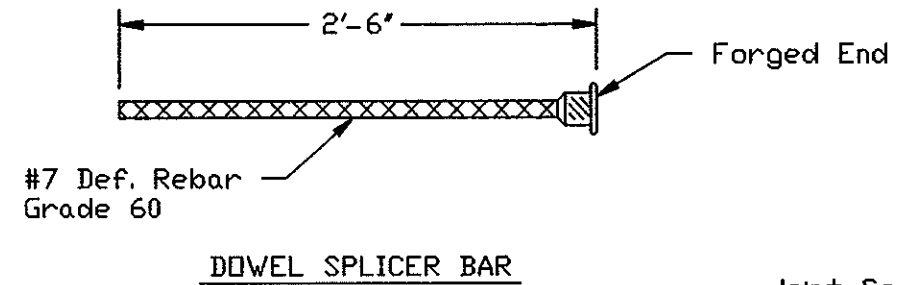
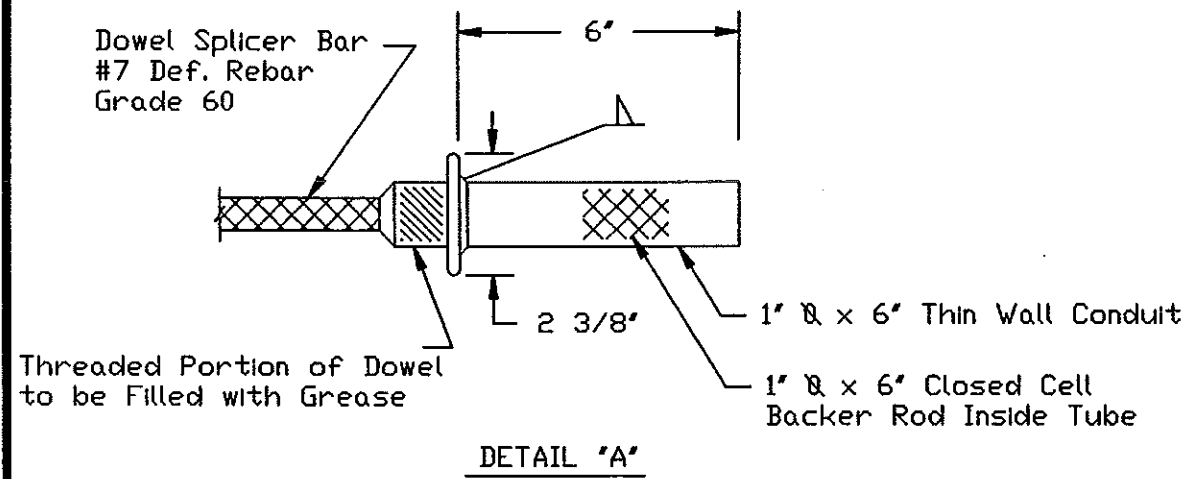
- DOWELED CONTRACTION JOINT ASSEMBLY-L.F.T.
- PREFORMED ELASTOMERIC COMPRESSION JOINT SEAL 9/16"- L.F.T.
- CONTRACTION JOINT SILICONE SEAL- L.F.T.

11-1-92	
REVISIONS	
DATE	CHANGE
4-1-93	Jt. Dim.
3-9-94	Dowel Coating

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
David K. Lee
 APPROVED: DESIGN ENGINEER

TRANSVERSE CONSTRUCTION JOINT

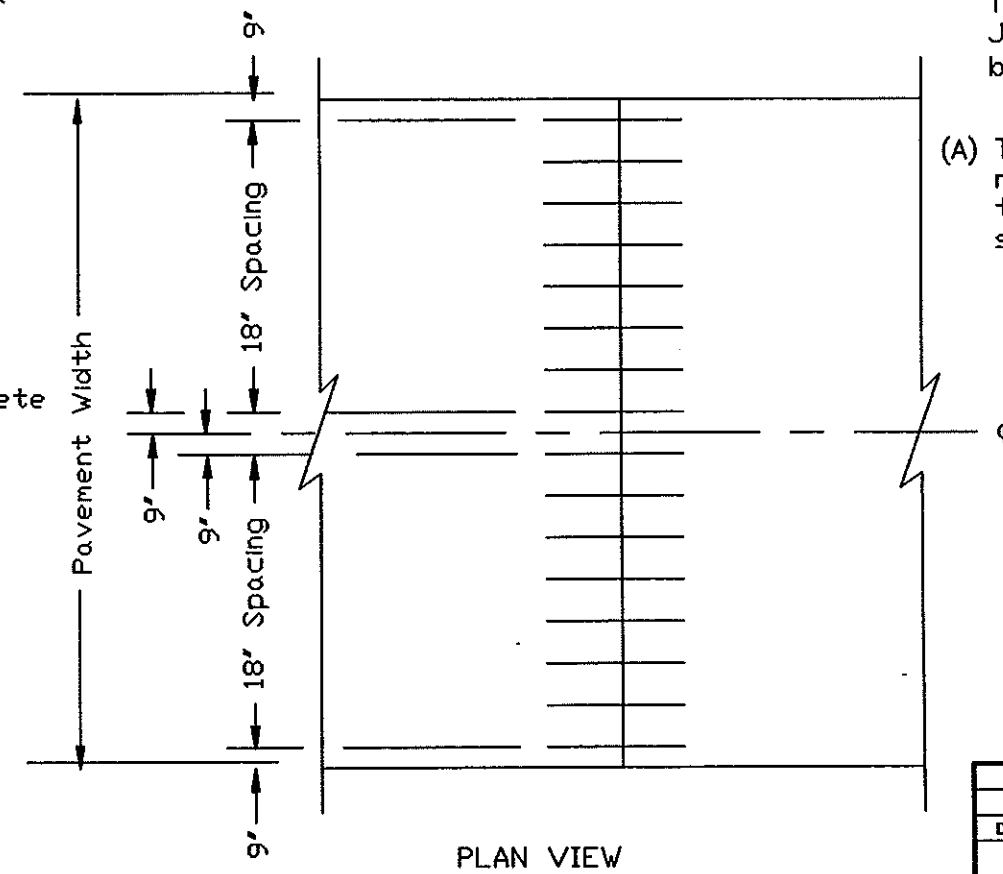
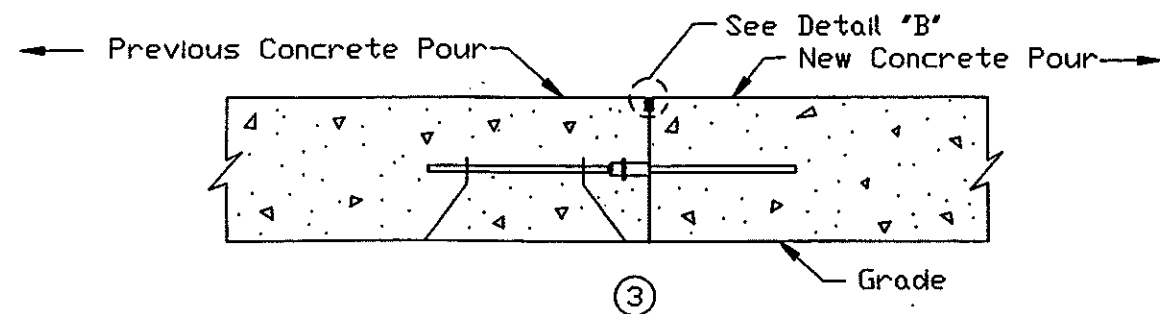
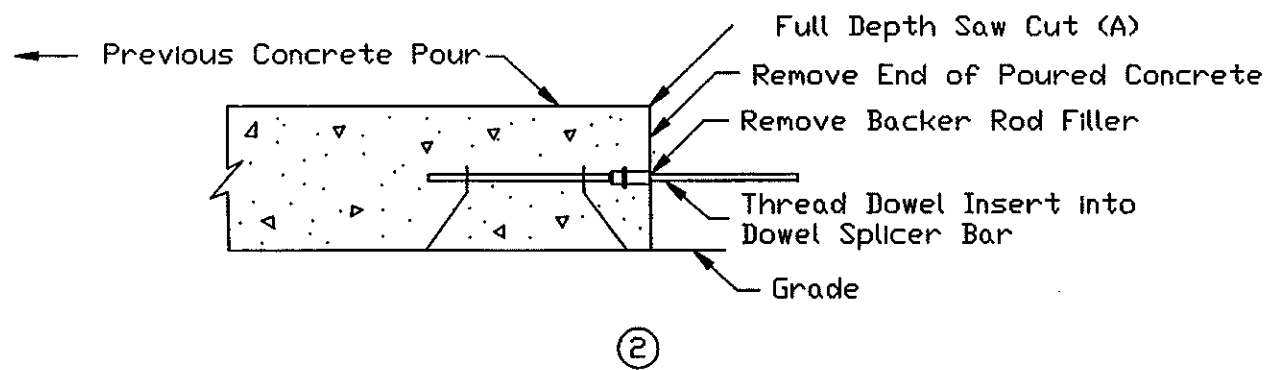
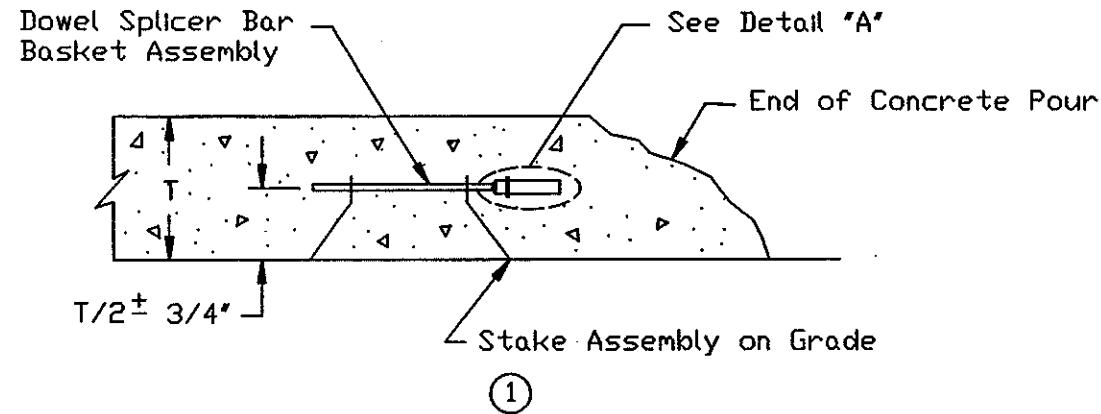
D-550-5



Notes:
Construction Joints Shall Be Sawn to a Depth of 1" & a Width of 1/4" to 3/8" & Sealed.

The Transverse Construction Joint shall be included in price bid for P.C.C. Pavement

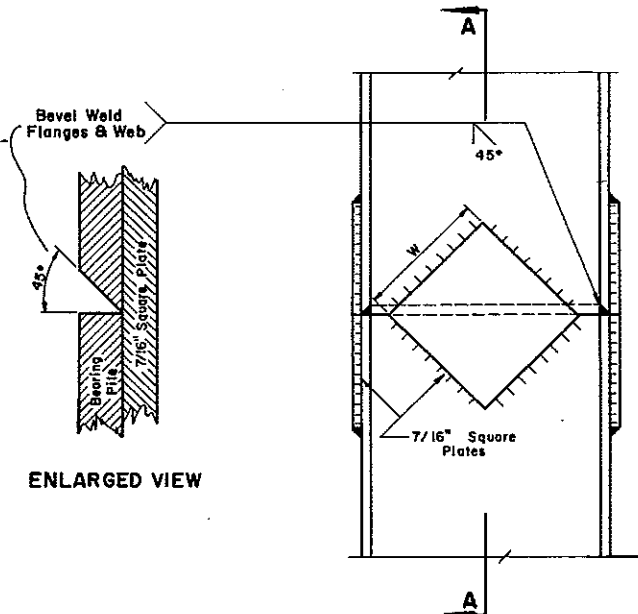
(A) The contractor shall not saturate the subgrade during the sawing operation



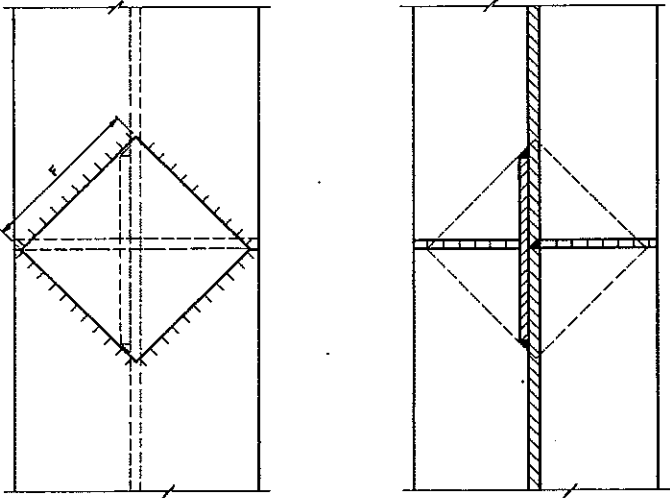
11-1-92	
REVISIONS	
DATE	CHANGE

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
Kenneth B. Birt
APPROVED: DESIGN ENGINEER

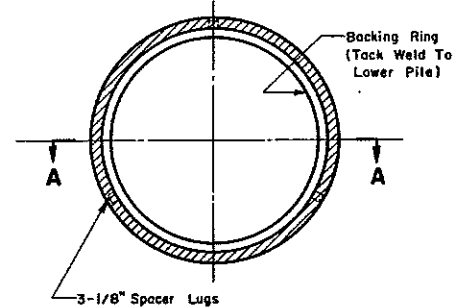
DESIGN	MADE BY	REVISIONS	MADE BY	CHK'D BY	DATE
DF-115	MADE BY	Revised & Revised	RL	J.C.	11-19-66
T. G	CHECKED BY	Added Alternate H-Pile Splice Detail	RL	J.C.	6-7-82
QUANTITIES	MADE BY				
	CHECKED BY				



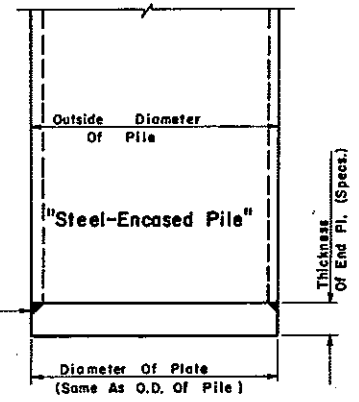
ENLARGED VIEW



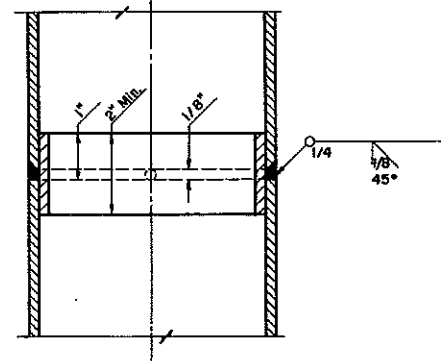
A - A
Flame Scarf Inside Of Both Flanges And One Side Of Web Of Upper Section



Backing Ring may be made from pile cut-offs or other material of a like quality.

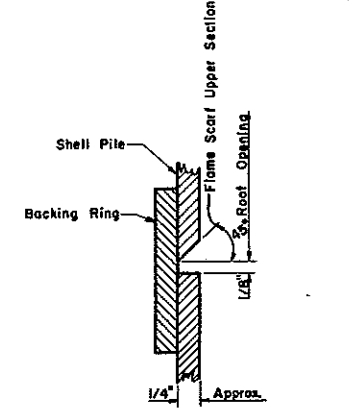


END PLATE DETAIL

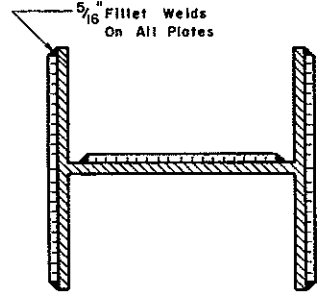


A-A

SHELL PILE SPLICE DETAIL

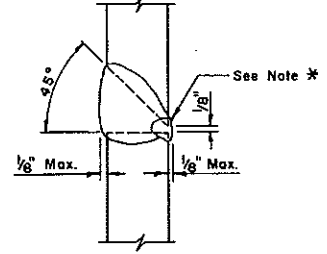


ENLARGED VIEW



PILE	8"	10"	12"	14"
F FLANGE	5"	6 1/2"	8"	10"
W WEB	4"	5 1/2"	6 1/2"	8"

H-PILE SPLICE DETAIL



ALTERNATE H-PILE SPLICE DETAIL

Steel H-Pile may be spliced with complete penetration groove welds in both flanges and web in lieu of using the 7/16" reinforcing plates.
AWS classification E70XX low hydrogen electrodes shall be used.

*Welds made without the use of backing material shall have the root gouged to sound metal and welded from the second side.

All welding shall conform to the current specification for "Welded Highway and Railway Bridges of the American Welding Society"

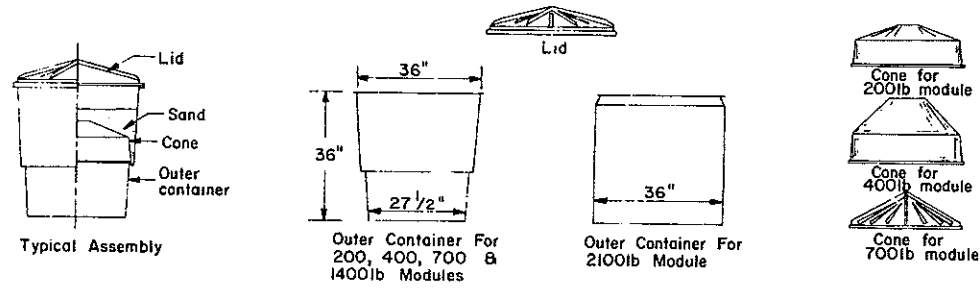
10-1-86	
REVISIONS	
DATE	CHANGE

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *[Signature]*
BRIDGE ENGINEER

PILE SPLICE
DETAILS

ATTENUATION DEVICE

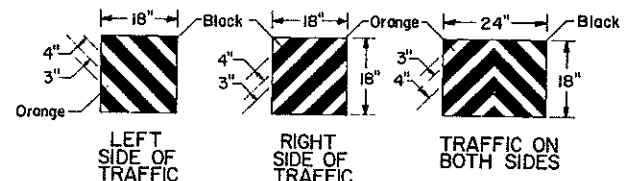
D-704-1



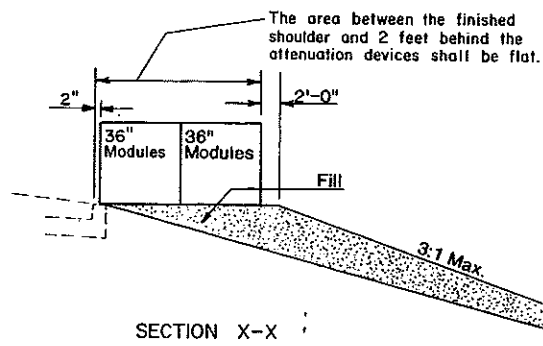
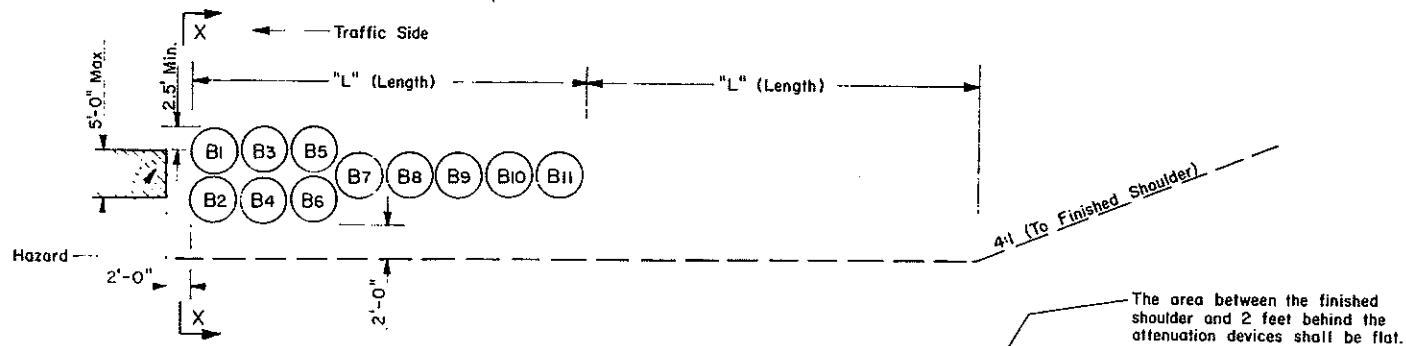
TYPICAL MODULE CONSTRUCTION DETAIL

SAND FILL CHART
Module Weights (lbs)

INCHES FROM TOP EDGE	200	400	700	1400	2100
8"	3 1/2"	4 1/2"	3"	3 1/2"	



The last attenuation device toward traffic shall have reflective sheet directly applied to the outer container, or applied to a thin aluminum or other material and attached using rivets or other approved fasteners. The reflective material shall have the markings as shown in the Detail. The reflective sheeting shall be Type III B or C as specified in section 894 of the Standard Specifications.



TYPE B

MODULE NO.	DASH NUMBER								
	65	60	55	50	45	40	35	30	25
MODULE WEIGHTS									
B1	2100	2100	2100	2100	2100	2100	2100	2100	2100
B2	2100	2100	2100	2100	2100	2100	2100	2100	2100
B3	1400	1400	1400	1400	1400	1400	1400	1400	1400
B4	1400	1400	1400	1400	1400	1400	1400	1400	1400
B5	700	700	700	700	700	700	700	700	700
B6	700	700	700	700	700	700	700	700	700
B7	700	700	700	700	700	700	700	700	700
B8	400	400	400	400	400	400	400	400	400
B9	200	200							
B10	200	200							
B11	200								
(L) Length	24'	21'	18'	18'	18'	18'	18'	18'	18'
REPLACEMENT MODULES									
2100	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1
200	2	1	1	1	1	1	1	1	1

NOTES:

MATERIALS The modules shall be manufactured from a frangible polyethylene material which will shatter upon impact. The modules shall be provided in two sizes to contain either 2, 4, 7, 14, or 21 cubic feet containers of volume as a minimum. The module for the 2 to 7 cubic foot container shall consist of three basic components:

1. An outer container (14 cubic foot size) (yellow)
2. A black lid which locks securely over top lip of container.

3. A cone-shaped supporting insert which is varied to allow three different sizes of modules to support 200, 400, 700 pounds of sand masses. The cone inserts shall be placed inside the 14 cubic foot size container.

The module for the 14 cubic foot container shall consist of two components:

1. A outer container yellow in color and 36 inch height, 36 inch width at top and 27 1/2 inch width at bottom.
2. A black lid which locks securely over top of container.

The module for the 21 cubic foot container shall consist of two parts:

1. A outer container yellow in color 36 inch height, 36 inch width at top and bottom.
2. A black lid which locks securely over top of container.

The modules shall be manufactured by Energy Absorption Systems, Inc of Chicago, Illinois, or an approved equal.

SAND The sand placed into the modules shall meet the requirements for fine aggregate for concrete as stated in Sec. 816.01 of the Standard Specifications. The sand unit weight shall be 100 pounds per cubic foot. Sand left over winter shall have an antifreeze chemical added.

The contractor shall provide the required modules for Type B Layouts as required on the plans. The contractor shall also provide and have available on the project additional replacement modules (shown in the chart) for each layout location up to a maximum of 20 Module Per Project.

The cost for providing and having additional replacement modules available on the project for the project duration shall be included in the price bid for Type B Attenuation Device. The contractor shall also maintain the modules in each layout. Any modules damaged shall be replaced by the contractor.

The Department will reimburse the contractor for damaged modules (material only) based on invoice price of the module plus applicable mark-ups for materials and subcontracting identified in Section 104-14. All other cost for labor, equipment and materials required to maintain and replace damaged modules shall be included in the price bid for Type B Attenuation Device. Upon completion of the project, all remaining modules in the construction zone and the replacement stock shall become the property of the contractor.

The attenuation device may be placed on individual pallets to facilitate maintenance. These pallets shall have a maximum thickness of 3 1/2".

Fill The material used for fill may be obtained from an area within the right of way as designated by the engineer. Upon completion of the work, the attenuation device and the fill shall be removed and the area restored to its original condition and reseeded. The fill shall be disposed of as directed by the engineer.

The price bid for the item Attenuation Device-Type B will be measured by the number installed. The bid shall include material, equipment, relocation if required, labor and removal and shall be full compensation to complete the work.

6-1-89		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED <i>[Signature]</i> DESIGN ENGINEER
11-20-89	NOTE	
7-1-90	NOTE & ATTENUATION DEVICE	
7-1-91	NOTE	
5-1-92	GENERAL REVISIONS	
4-1-93	DELETED TYPE A	
06-02-95	General Revisions	

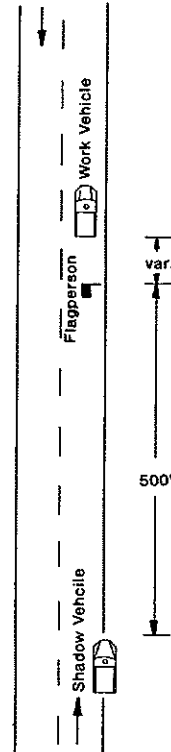
**TRAFFIC CONTROL
CORING OF HOT BITUMINOUS PAVEMENT
TWO LANE, TWO WAY ROADWAYS**

FLAGS: When warning signs are in urban areas with curb and gutter, flags shall be installed. The flags shall be 24" square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp, it will not touch the sign. Portable warning signs will not require flags. Rural areas will not require flags.

DAYLIGHT USE ONLY AT
GOOD VISIBILITY LOCATIONS

NOTE:

1. The work vehicle shall display a 360° flashing beacon.
2. The shadow vehicle shall display a 360° flashing beacon, proper advance signs and a Type B or Type C flashing caution panel.
3. Type B flashing caution panel should be used on lower speed facility. 40 MPH or less
4. Type C flashing caution panel should be used on high speed facility. Over 40 MPH speeds
5. Signs shall have black letters on orange background.
6. A flagger shall be used to protect the work area and to warn the driver.



W20-7a-48

SIGN COLORS

- Black Legend (Non Reflectorized)
- Orange Background (Reflectorized)

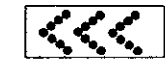
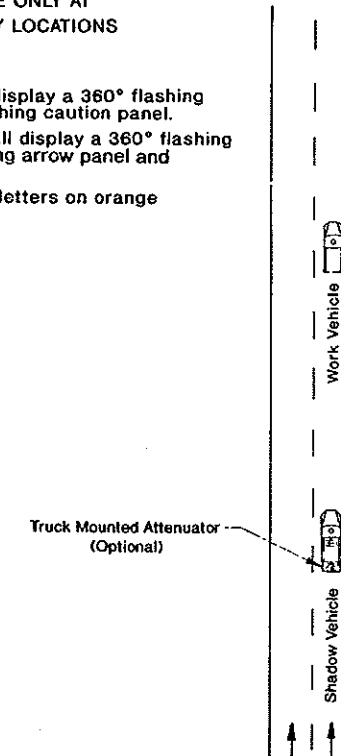
Typical application-Daytime coring-Lane closure for mobile operations-High speed two lane-two way street or highway

**TRAFFIC CONTROL
CORING OF HOT BITUMINOUS PAVEMENT
MULTILANE ROADWAY**

DAYLIGHT USE ONLY AT
GOOD VISIBILITY LOCATIONS

NOTE:

1. The work vehicle shall display a 360° flashing beacon and a Type C flashing caution panel.
2. The shadow vehicle shall display a 360° flashing beacon, Type C sequencing arrow panel and proper advance signs.
3. Signs shall have black letters on orange background.



SEQUENCING ARROW PANEL
TYPE C

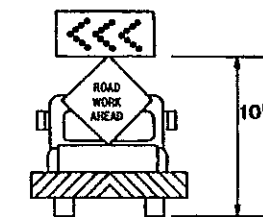


W21-4-48

SIGN COLORS

- Black Legend (Non Reflectorized)
- Orange Background (Reflectorized)

Typical application-Daytime coring-Lane closure for mobile operations-High speed Multilane Highway



Typical Shadow Vehicle
With Left DIRECTIONAL
Sequencing Arrow Panel

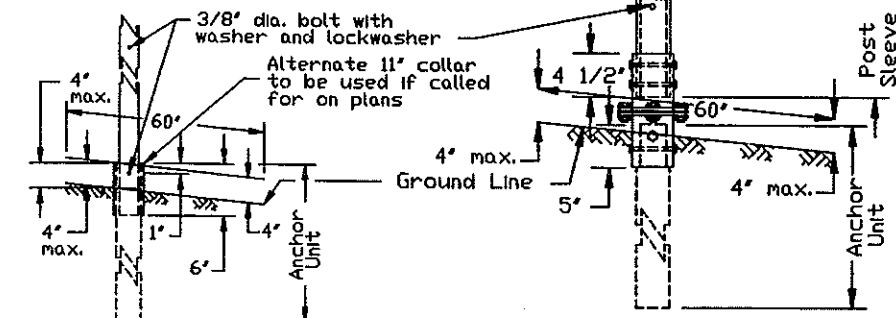
3-1-90		REVISIONS	DATE	CHANGE
6-2-90	Sign			
11-10-93	Flag Note			
6-6-95	Typical Shadow Vehicle & Flag Note			

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
APPROVED: _____	DESIGN ENGINEER

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

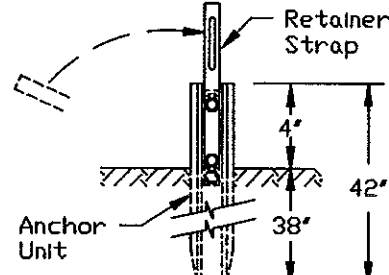
PERFORATED TUBE



ANCHOR UNIT AND POST SLEEVE ASSEMBLY

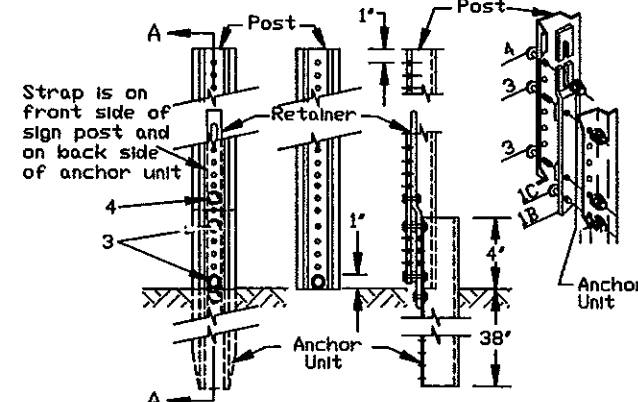
SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY

FLANGED CHANNEL



1. A - Drive anchor unit to within 12' of ground level.
B - Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C - Assemble strap to back of anchor unit using 3/8" -16 UNC x 2.0" long bolt & lock washer & nut.
D - Rotate strap 90° to left.
2. A - Drive anchor unit to 4' dimension.
B - Rotate strap to vertical position.

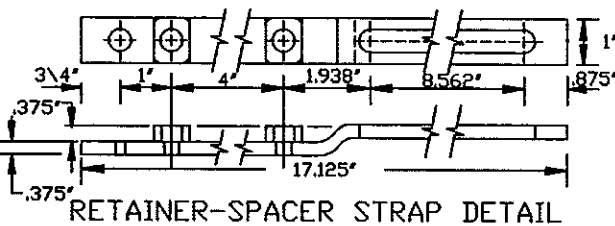
ANCHOR UNIT & STRAP ASSEMBLY DETAIL



SECTION A-A SIGNPOST ASSEMBLY DETAIL

3. A - Place 3/8"-16 UNC x 2.0" bolt & lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit. (This coincides with bottom 3/4" slot in strap)
- B - Alternately tighten two connector bolts.
4. A - Complete assembly by tightening 3/8"-16 UNC x 2.0" long retainer bolt. (This fastens sign post to retainer spacer strap.)

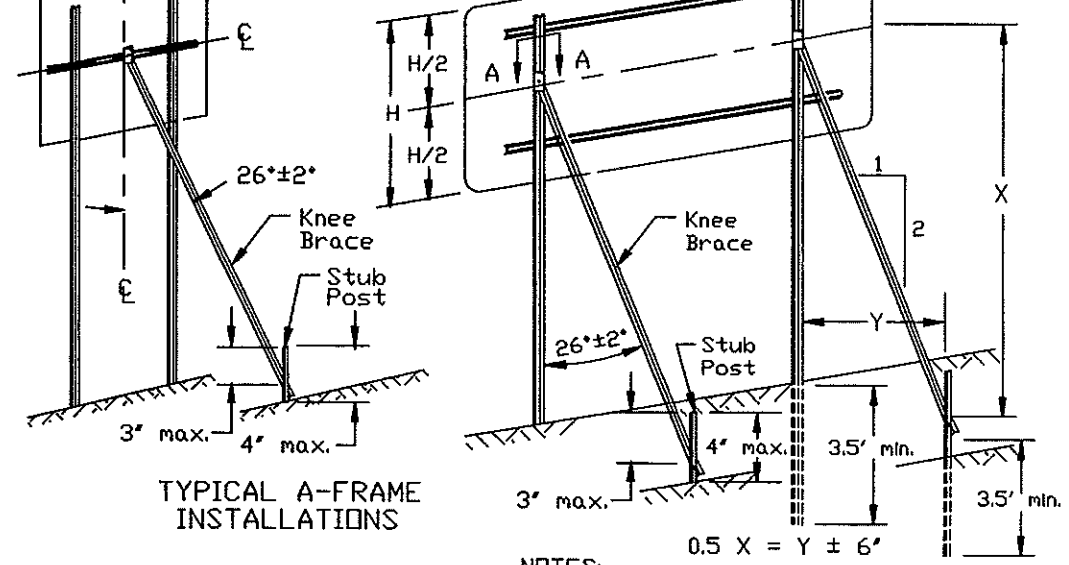
The base post, strap & sign post shall be properly nested. Proper nesting is achieved when all flat surfaces of the base post, strap & sign post at the bolts have full contact across their entire width.



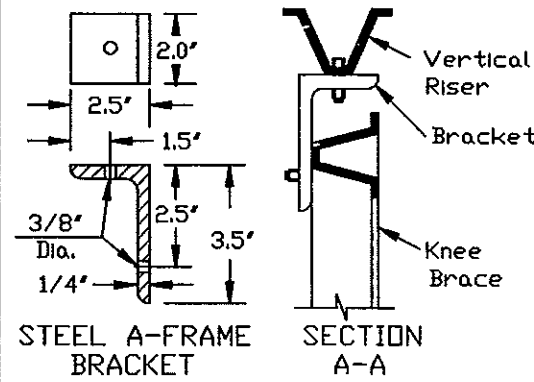
RETAINER-SPACER STRAP DETAIL

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. 2	SECTION MODULUS IN. 3
1.516 x 3.125	.116	2.00	.179	.590	.225
1.532 x 3.125	.124	2.25	.201	.648	.254
1.562 x 3.125	.132	2.50	.233	.748	.289
1.578 x 3.125	.140	2.75	.271	.819	.329
1.750 x 3.500	.150	3.00	.372	.918	.403
1.750 x 3.500	.175	4.00	.500	1.190	.560

3 LB/FT U POSTS (A FRAME)



TYPICAL A-FRAME INSTALLATIONS



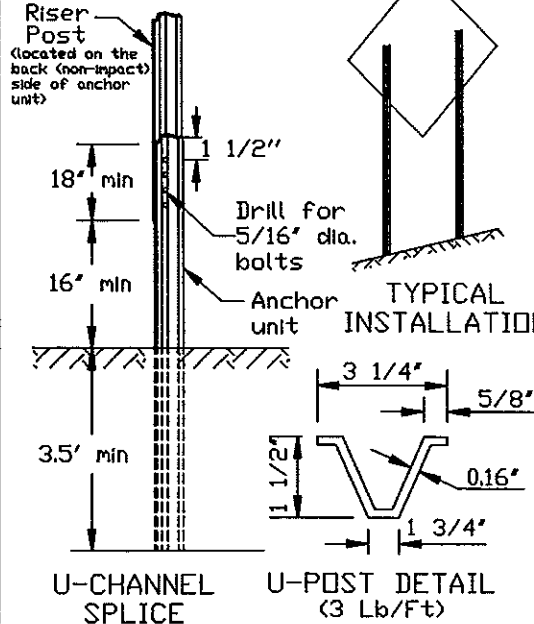
STEEL A-FRAME BRACKET

SECTION A-A

NOTES:

1. USE 3 LB/FT RISER STUB POSTS, RISERS, STRINGERS, KNEE BRACES, LATERAL BRACES AND KNEE BRACE STUB POSTS.
2. OFFSET KNEE BRACE STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST.
3. USE 5/16" BOLTS, WASHERS AND NUTS FOR ALL CONNECTIONS. A SPLICE SHALL OVERLAP 12" MIN. AND HAVE BOLTS IN THE TOP AND BOTTOM HOLES OF THE SPLICE.
4. DRIVEN RISER STUB POSTS SHALL BE AT LEAST 7' LONG AND EMBEDDED AT LEAST 3.5'. BRACING STUBS SHALL BE NO MORE THAN 4' ABOVE GROUND AND EMBEDDED AT LEAST 3.5'.

3# U POST



TYPICAL INSTALLATION

U-CHANNEL SPLICE

U-POST DETAIL (3 Lb/Ft)

NOTES:

1. USE 3 LB/FT RISER STUB POSTS AND RISERS.
2. DRIVEN RISER STUB POSTS SHALL BE AT LEAST 7' LONG AND EMBEDDED AT LEAST 3.5'.
3. USE 5/16" BOLTS, WASHERS AND NUTS FOR ALL CONNECTIONS. A SPLICE SHALL OVERLAP 18" MINIMUM.
4. ANCHOR POSTS FOR GUY WIRES SHALL BE NO MORE THAN 4' ABOVE-GROUND AND EMBEDDED AT LEAST 3.5'.

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.

TELESCOPING PERFORATED TUBES-TYPE I						
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
1 1/2 x 1 1/2	.105	12	1.702	.129	.380	.172
2 x 2	.105	12	2.416	.372	.590	.372
2 1/4 x 2 1/4	.105	12	2.773	.561	.695	.499
2 3/16 x 2 3/16	.135	10	3.432	.605	.841	.590
2 1/2 x 2 1/2	.105	12	3.141	.804	.803	.643
2 1/2 x 2 1/2	.135	10	4.006	.979	1.010	.785
3 x 3	3/16	3/16	6.870	2.60	2.020	1.73

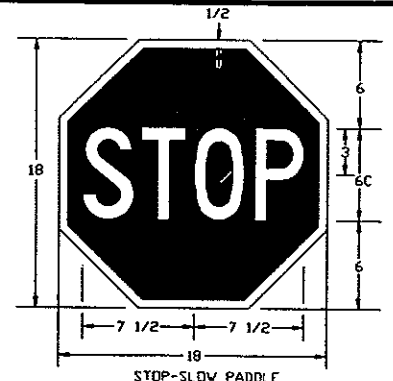
TELESCOPING PERFORATED TUBES TYPE I										SQUARE TELESCOPING STEEL POSTS TYPE II			
NUMBER OF POSTS	POST SIZE	WALL THICKNESS GAUGE	SLEEVE SIZE	ANCHOR SIZE	WALL THICKNESS GAUGE	SLIP BASE	POST SIZE	WALL THICKNESS GAUGE	SLEEVE SIZE	ANCHOR SIZE	WALL THICKNESS GAUGE	SLIP BASE	
1	2	12		2 1/4	12	NO	1 3/4	12		2	12	NO	
1	2 1/4	12		2 1/2	12	NO	2	12		2 1/4	12	NO	
1	2 3/16	10		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO	
1	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO	
1	2 1/2	10		3	3/16	YES	2 1/2	12		2 1/2	12	YES	
1	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES	
1	2 1/2	12	2 1/4	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES	
2	2	12		2 1/4	12	NO	1 3/4	12		2	12	NO	
2	2 1/4	12		2 1/2	12	NO	2	12		2 1/4	12	NO	
2	2 3/16	10		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO	
2	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO	
2	2 1/2	10		3	3/16	YES	2 1/2	12		2 1/2	12	YES	
2	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES	
2	2 1/2	12	2 1/4	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES	
3 & 4	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/4	12	YES	
3 & 4	2 1/2	10		3	3/16	YES	2 1/2	12		2 1/2	12	YES	
3 & 4	2 1/2	12	2	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES	
3 & 4	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES	
3 & 4	2 1/2	10	2	3/16	3	YES	2 1/2	12	2 1/4	2 1/2	12	YES	

SLIP BASE ASSEMBLY DETAILS

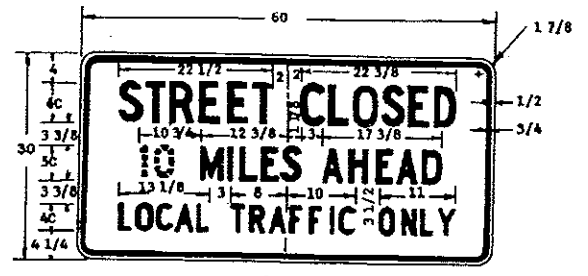
NOTE: Slip base bolts shall be torqued as specified by the manufacturer.

7-28-93 REVISIONS	
DATE	CHANGE
5-11-94	U-POST
7-19-95	U-POST SPLICE

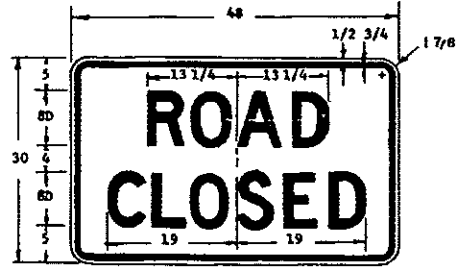
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *Karel K. Lee* DESIGN ENGINEER



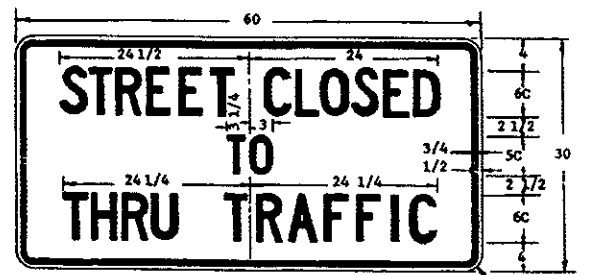
STOP-SLOW PADDLE
RED & WHITE
FLAGPERSON PADDLE



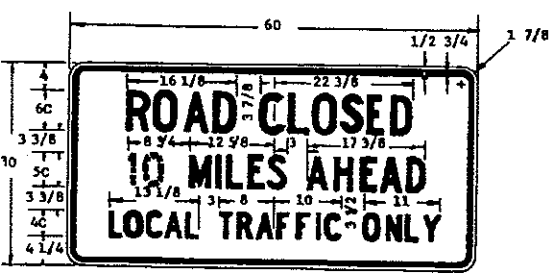
R11-3c-60
BLACK & WHITE



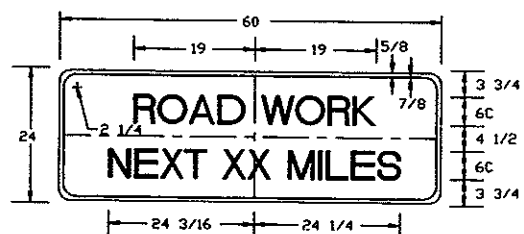
R11-2-48
BLACK & WHITE



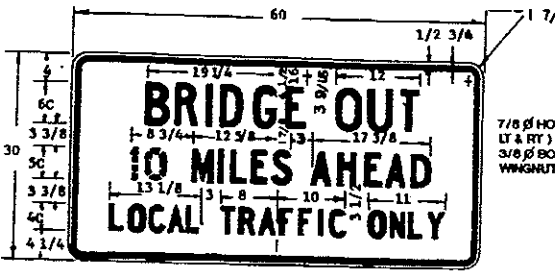
R11-4a-60
BLACK & WHITE



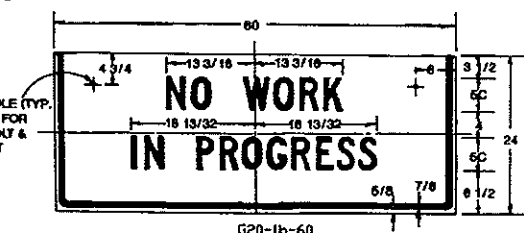
R11-3a-60
BLACK & WHITE



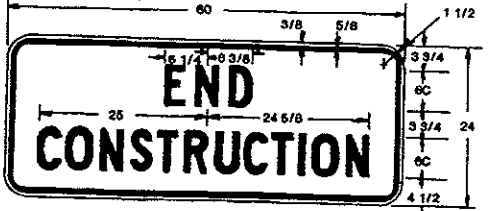
G20-1a-60
BLACK & ORANGE



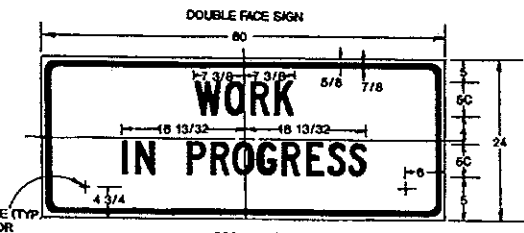
R11-3b-60
BLACK & WHITE



G20-1b-60
DOUBLE FACE SIGN
LEGEND: BLACK (NON-REFL)
BACKGROUND: ORANGE

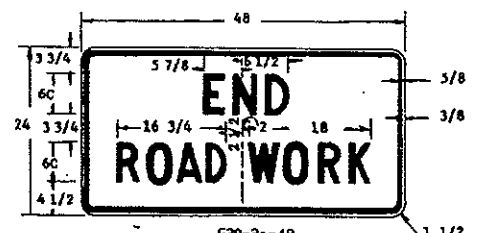


G20-2-60
BLACK & ORANGE

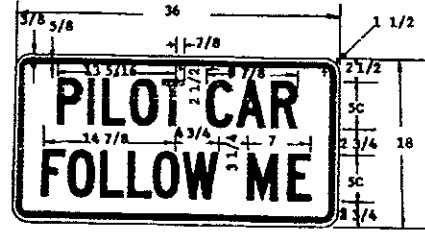


G20-1c-60
LEGEND: BLACK (NON-REFL)
BACKGROUND: ORANGE

CONSTRUCTION SIGN DETAILS



G20-2a-48
BLACK & ORANGE

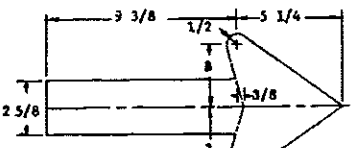


G20-4-36
BLACK & ORANGE

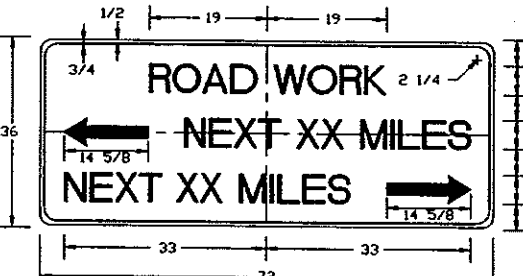
PILOT CAR SIGN SHALL BE MOUNTED ON REAR OF A VEHICLE USED FOR GUIDING CONTROLLED ONE-WAY TRAFFIC THROUGH A CONSTRUCTION AREA.



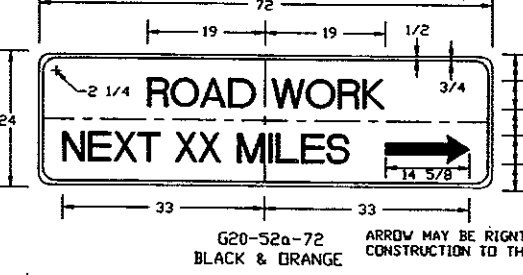
G20-8-48
BLACK & ORANGE



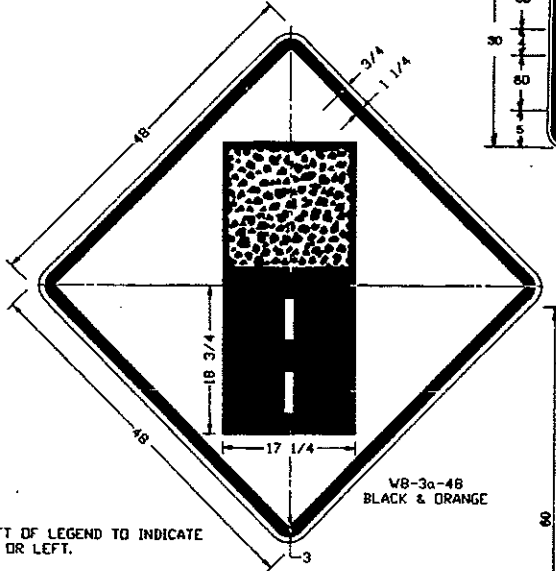
ARROW DETAIL FOR SIGN NO. 72
G20-50a-72 & G20-52a-72



G20-50a-72
BLACK & ORANGE



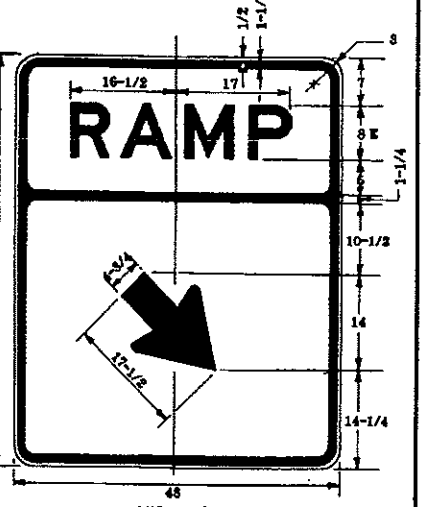
G20-52a-72
BLACK & ORANGE
ARROW MAY BE RIGHT OR LEFT OF LEGEND TO INDICATE CONSTRUCTION TO THE RIGHT OR LEFT.



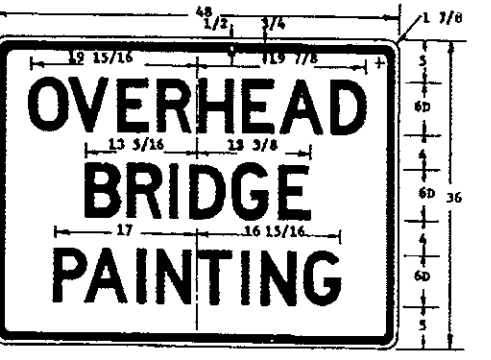
W8-3a-48
BLACK & ORANGE



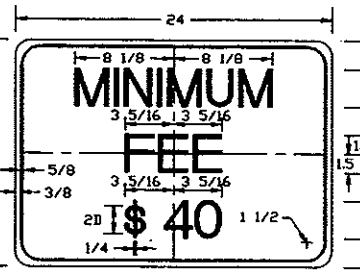
R11-2A-48
BLACK & WHITE



W13-4-48
BLACK & ORANGE



G20-54-48
BLACK & ORANGE

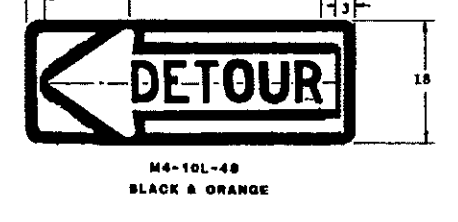
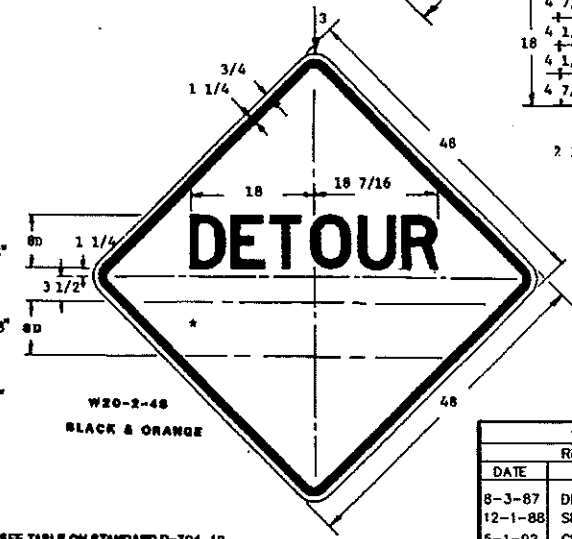
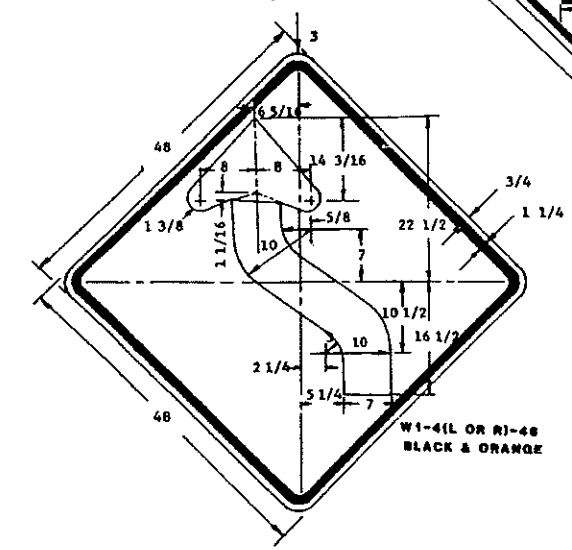
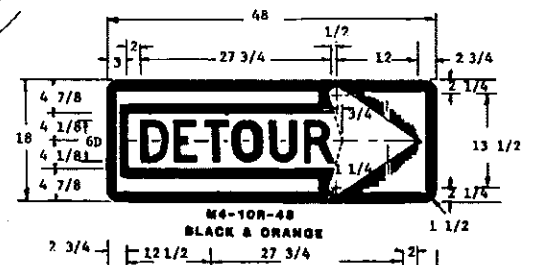
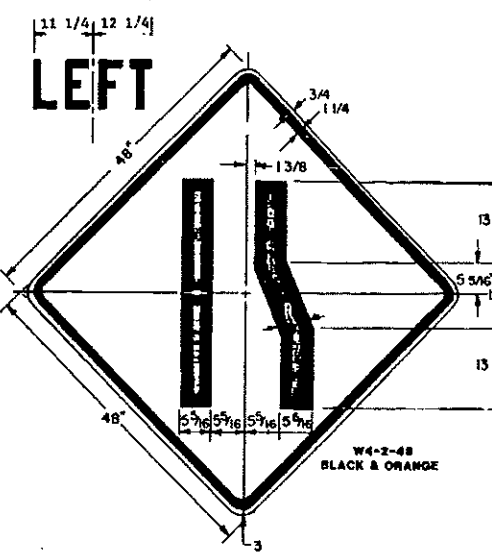
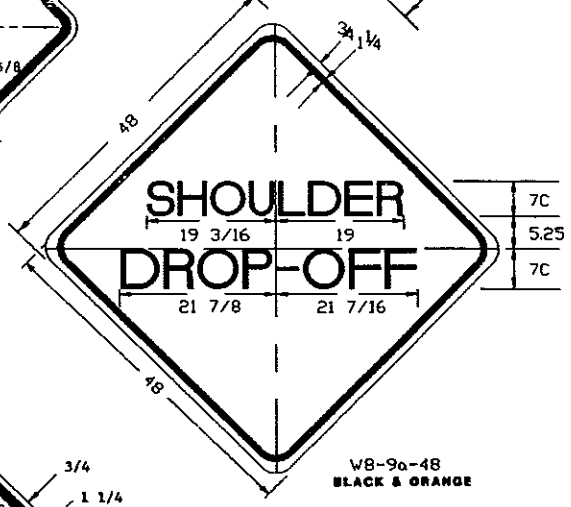
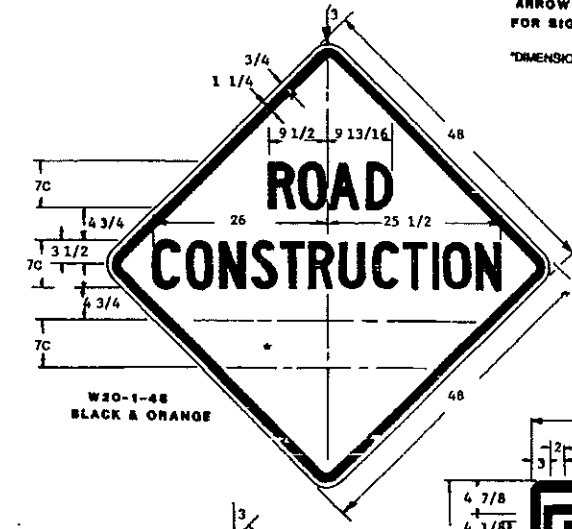
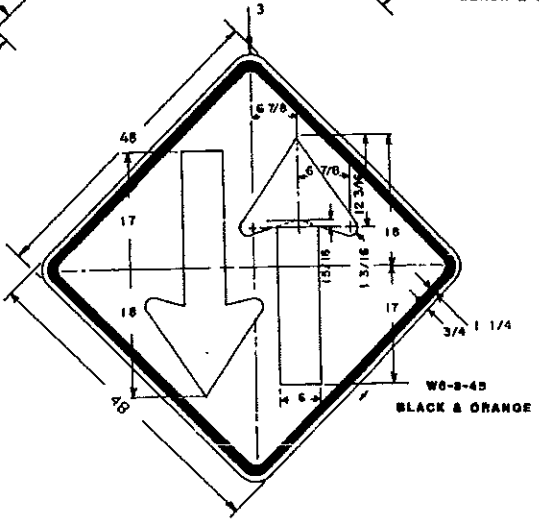
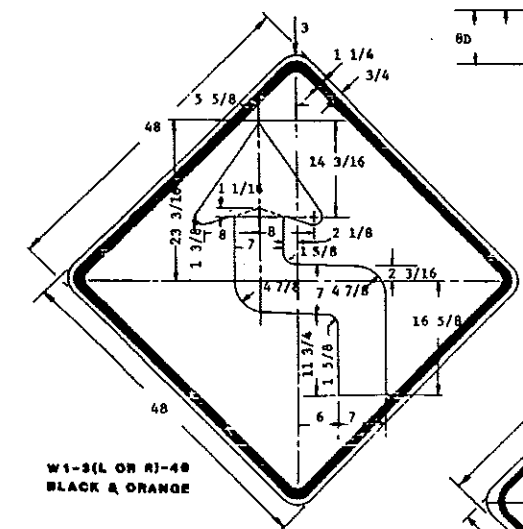
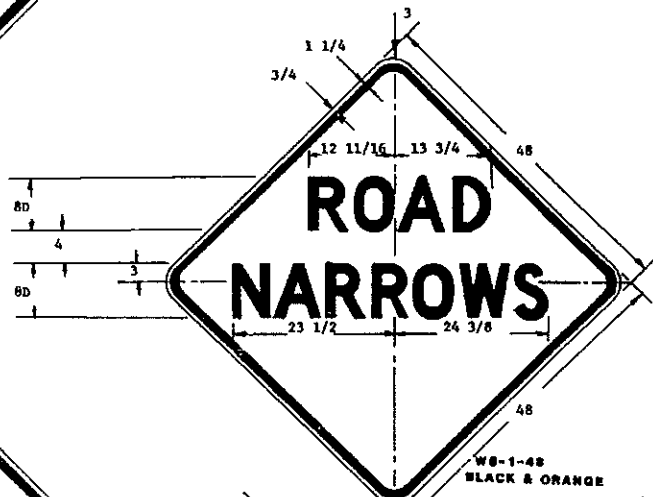
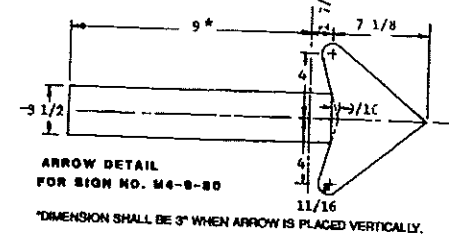
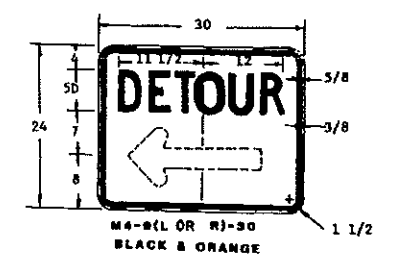
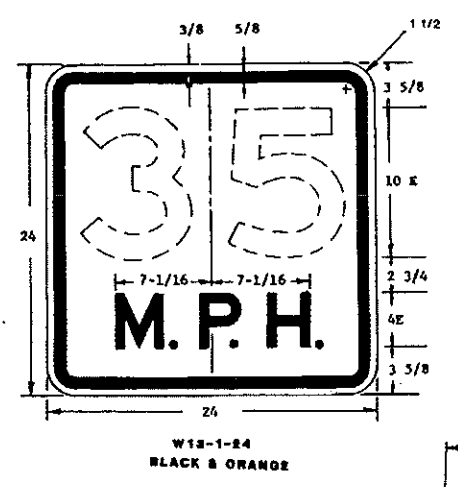
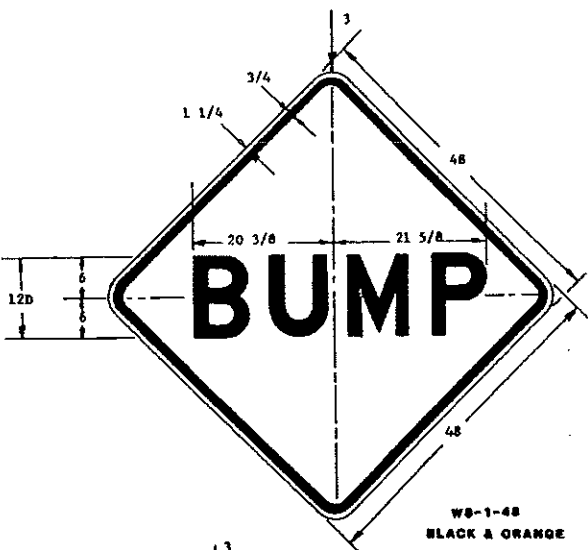
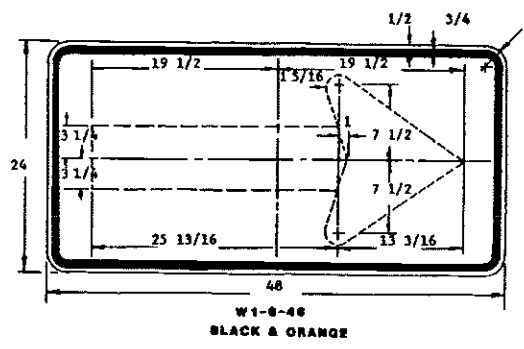
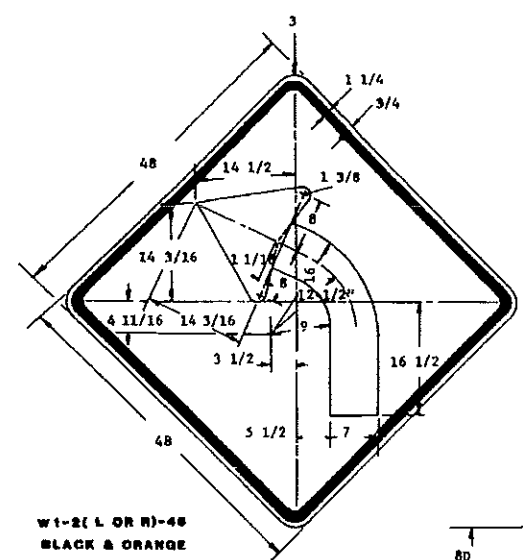


R2-1a-24
BLACK & WHITE

10-1-86 REVISIONS	
DATE	CHANGE
5-1-92	GENERAL REVISIONS
7-26-95	ADD SIGNS G20-1a, G20-50a, & R2-1a

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *[Signature]*
DESIGN ENGINEER

CONSTRUCTION SIGN DETAILS

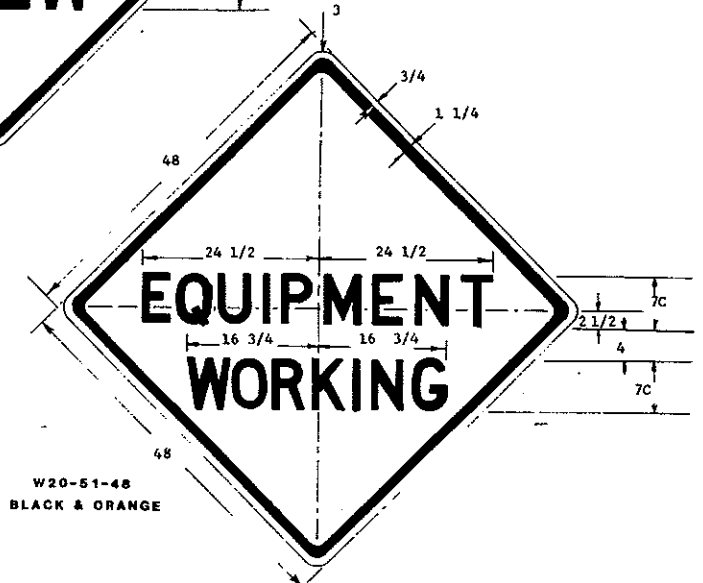
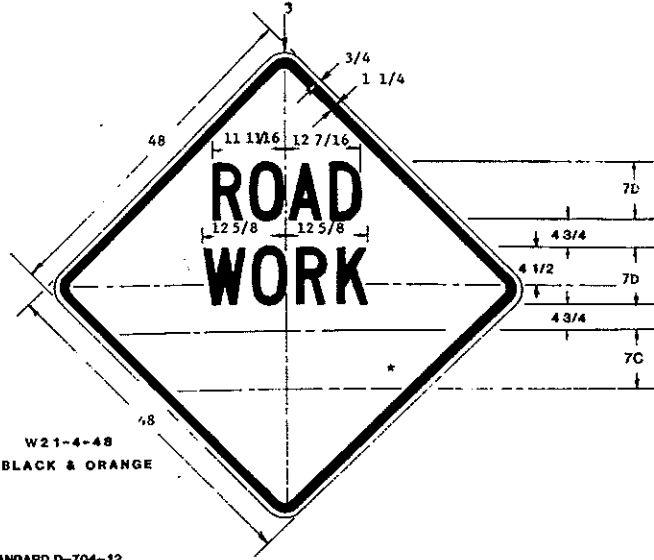
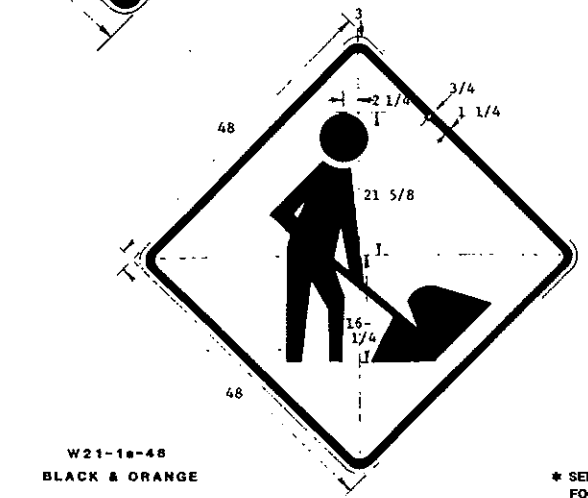
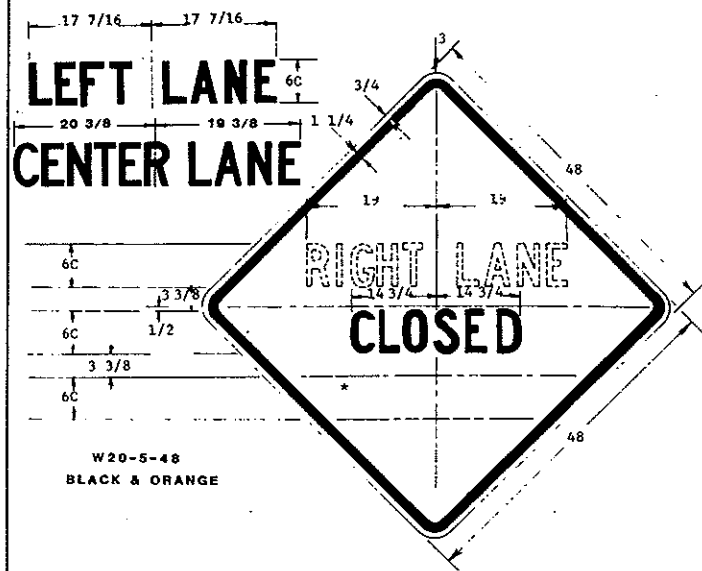
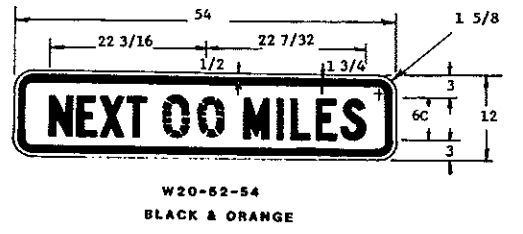
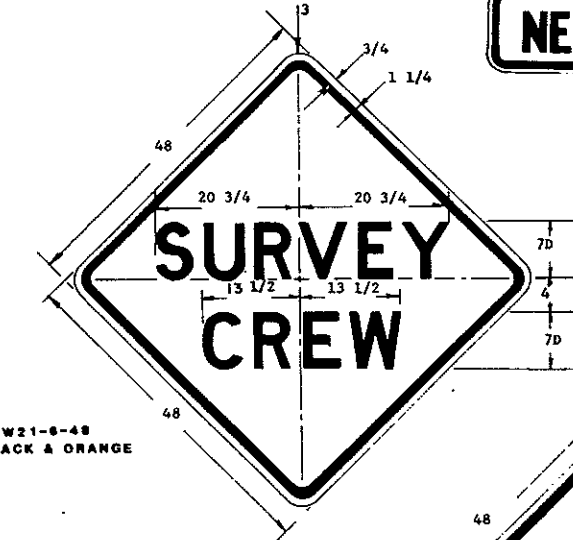
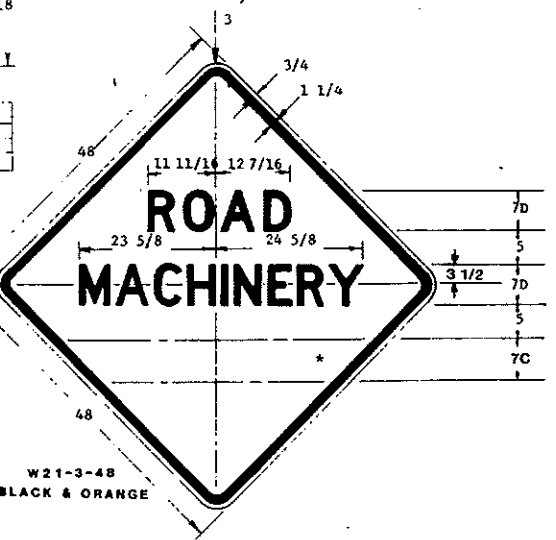
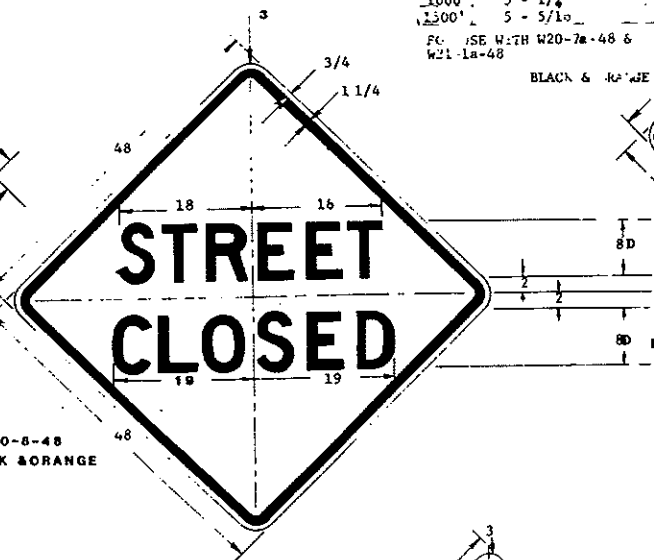
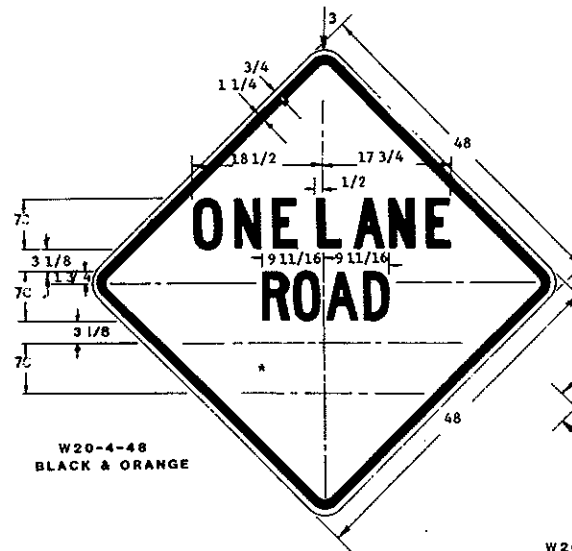
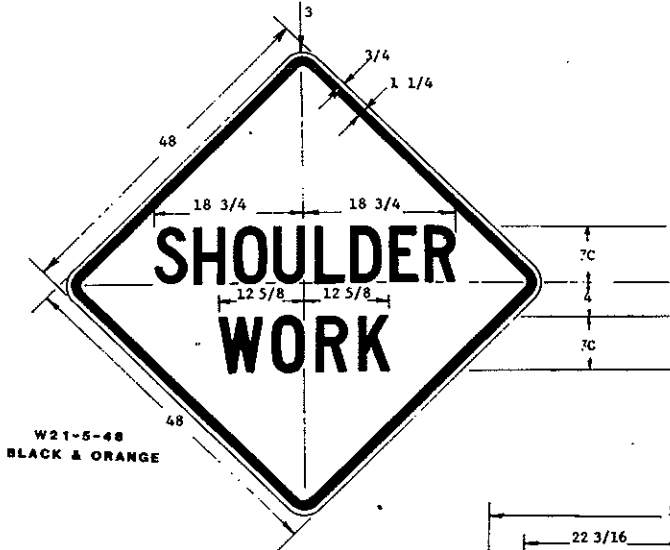
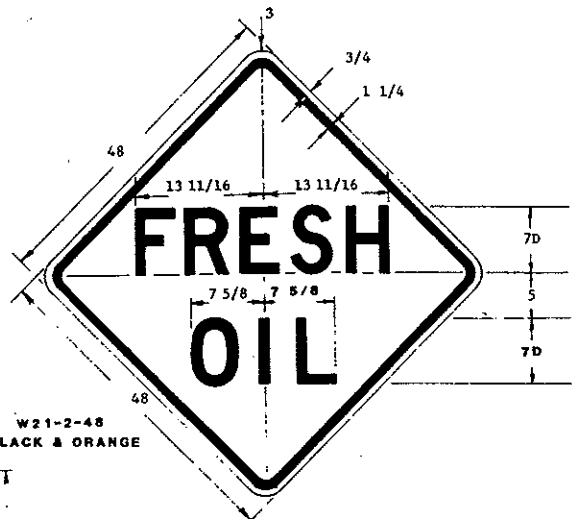
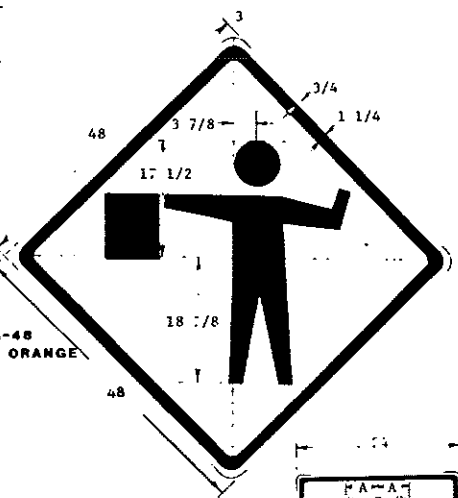
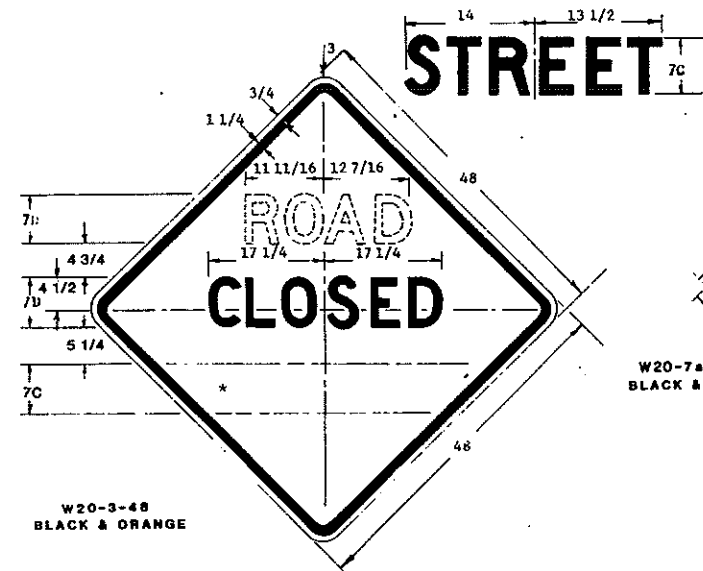


10-1-86 REVISIONS	
DATE	CHANGE
8-3-87	DETOUR NO.
12-1-88	SHOULDER DROP OFF
5-1-92	GENERAL REVISIONS
2-3-95	WB-9a-48

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. O'Brien*
DESIGN ENGINEER

* SEE TABLE ON STANDARD D-704-12 FOR MESSAGES AND DIMENSIONS.

CONSTRUCTION SIGN DETAILS



SIGN	DIMENSION (INCHES)
300'	4 - 11/16
1000'	5 - 1/4
1500'	5 - 5/16

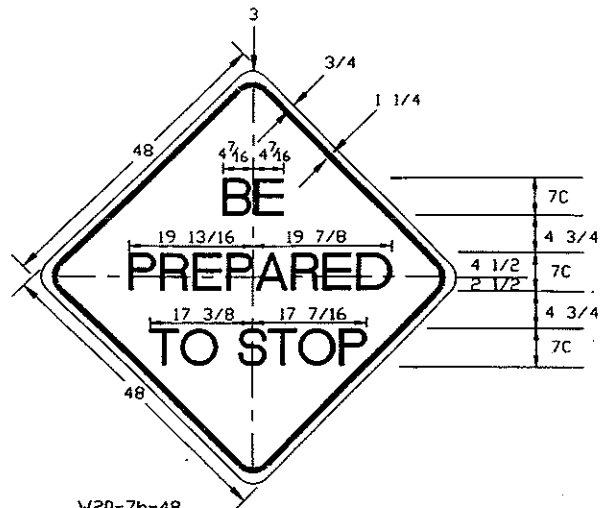
FO. USE WITH W20-7a-48 & W21-1a-48
BLACK & ORANGE

* SEE TABLE ON STANDARD D-704-12 FOR MESSAGES AND DIMENSIONS.

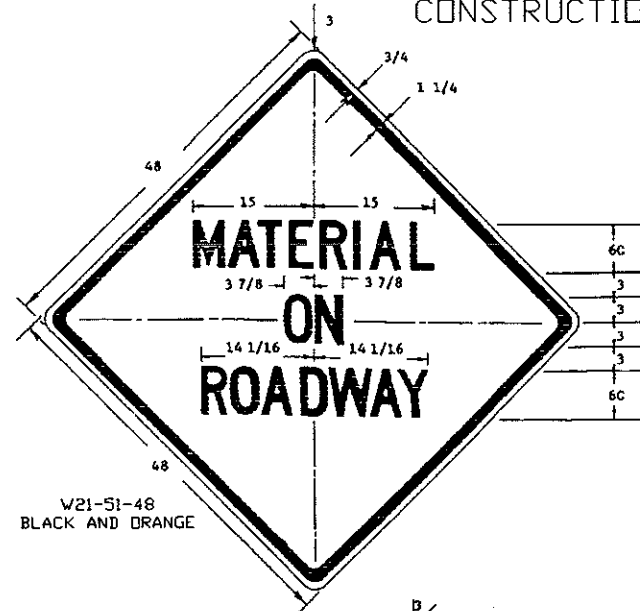
10-1-86 REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGE	
5-1-92	GENERAL REVISIONS	APPROVED: <i>David H. Beer</i> DESIGN ENGINEER
6-9-95	Chg 7D to 7C (Dwg W20-3, W21-3 & W21-4)	

CONSTRUCTION SIGN DETAILS

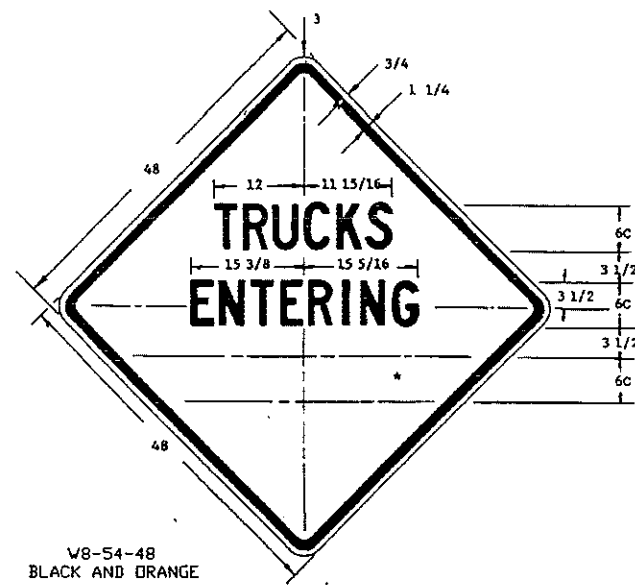
D-704-12



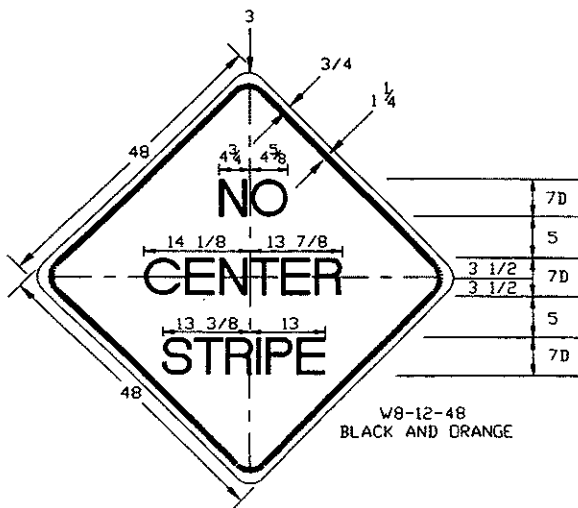
W20-7b-48
BLACK AND ORANGE



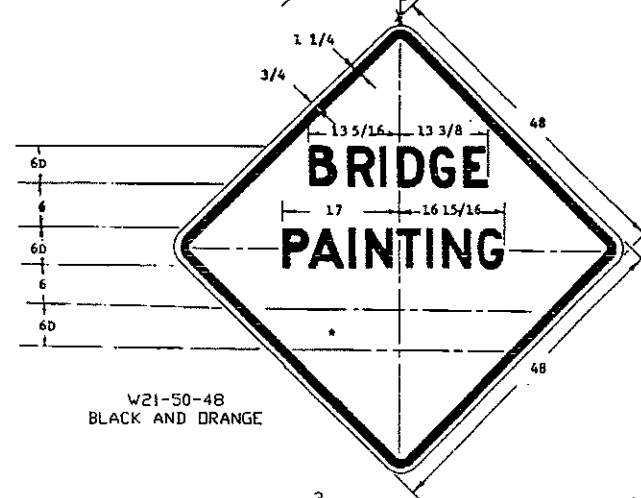
W21-51-48
BLACK AND ORANGE



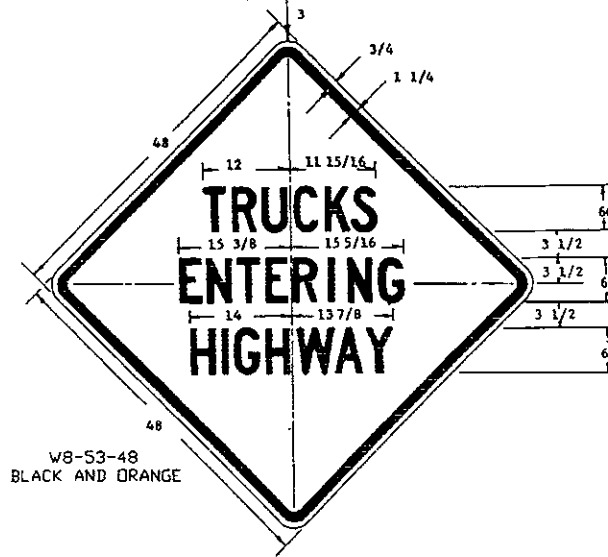
W8-54-48
BLACK AND ORANGE



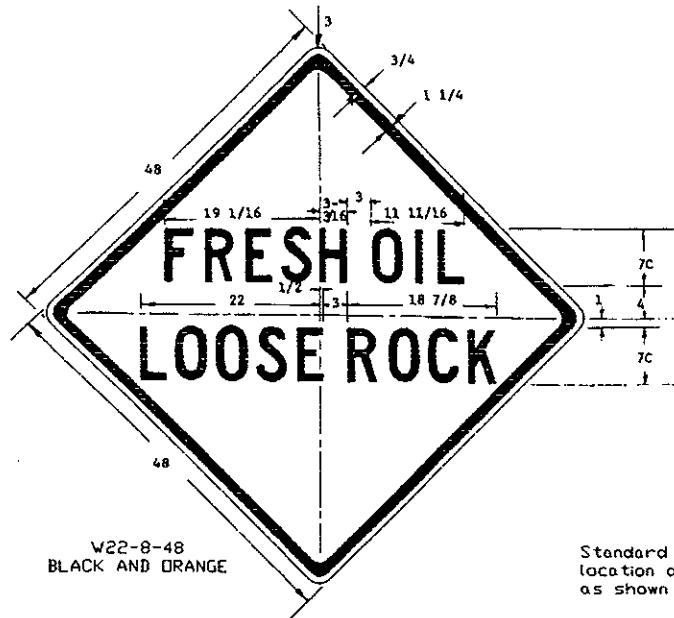
W8-12-48
BLACK AND ORANGE



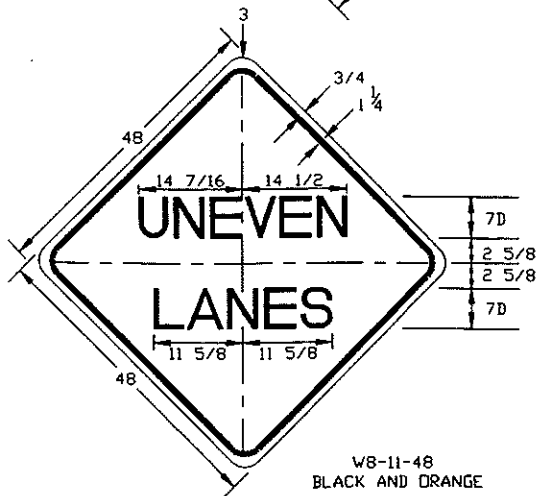
W21-50-48
BLACK AND ORANGE



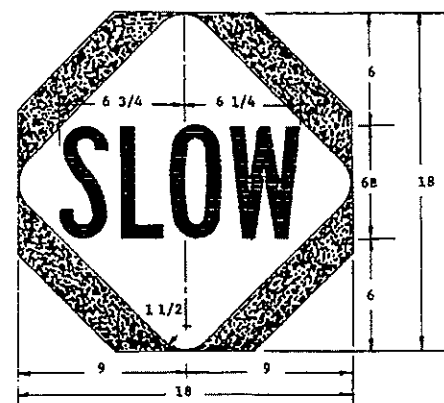
W8-53-48
BLACK AND ORANGE



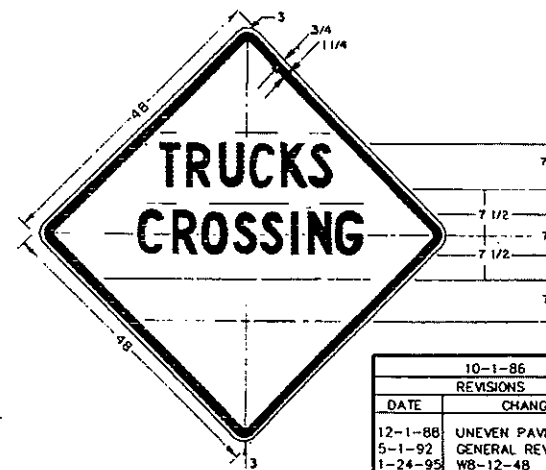
W22-8-48
BLACK AND ORANGE



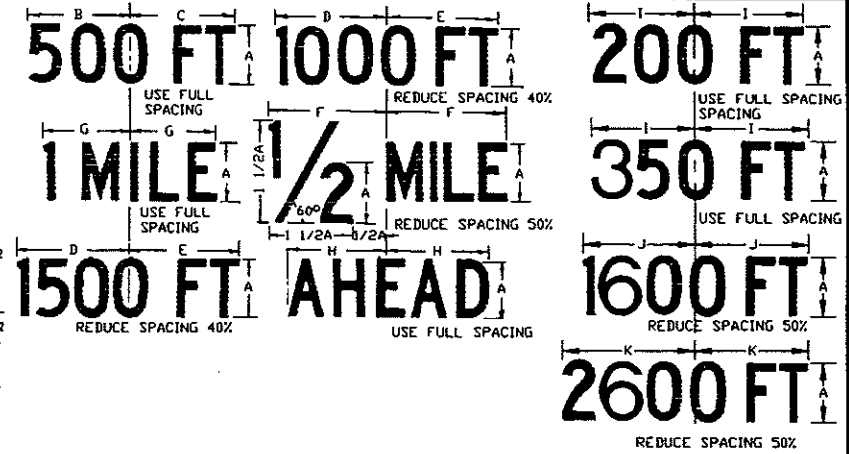
W8-11-48
BLACK AND ORANGE



SLOW-STOP PADDLE
BLACK & ORANGE
FLAGPERSON PADDLE



W8-55-48
BLACK AND ORANGE



DIMENSIONS (INCHES)										
A	B	C	D	E	F	G	H	I	J	K
4C	6 7/8	7	7 1/2	8	8 5/16	6 1/16	7	8 5/16	9 1/8	9 3/4
5C	8 3/4	8 13/16	9 3/8	10	10 7/16	7 5/8	8 3/4	10 7/16	11 7/16	12 3/16
6C	10 3/8	10 1/2	11 1/4	12	12 1/2	9 1/8	10 1/2	12 1/2	13 3/4	14 5/8
7C	12	12 3/16	13 1/8	14	14 9/16	10 5/8	12 1/4	14 9/16	15	15 5/8
8C	13 3/4	14	15	16	16 5/8	12 1/8	14	16 3/4	18 1/4	19 1/2
4D	8 1/8	8 5/8	8 1/2	9	9	7 3/16	8 11/16	9 3/4	10 3/4	11 3/8
5D	10 3/16	10 13/16	11 5/8	11 1/4	11 1/4	9 1/2	10 7/8	12 1/8	13 1/4	14 1/4
6D	12 3/16	12 15/16	12 3/4	13 1/2	13 1/2	11 13/16	13 1/8	14 9/16	14 7/8	15 1/2
7D	14 1/4	15 1/8	14 7/8	15 3/4	15 3/4	13 1/16	15 1/2	15 1/8	15 1/2	16 7/8
8D	16 1/4	17 1/4	17	18	18	14 3/8	17 7/16	19 1/4	17 3/4	19 5/16

10-1-86	
REVISIONS	
DATE	CHANGE
12-1-88	UNEVEN PAVEMENT
5-1-92	GENERAL REVISIONS
1-24-95	W8-12-48
2-3-95	W-8-11-48
6-15-95	GENERAL REVISIONS

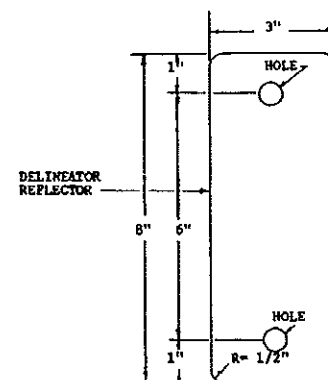
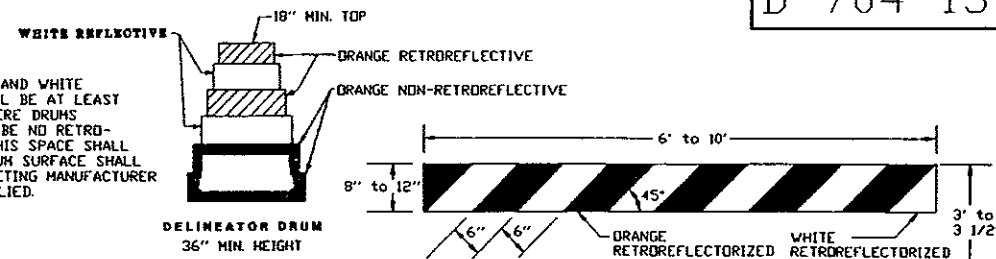
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. Leon*
DESIGN ENGINEER

Standard signs that are shown in the construction sign and barricade location details shall be fabricated in the shape, color, and dimensions as shown in the standard signs layout booklet.

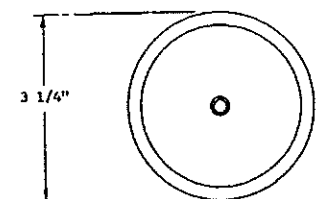
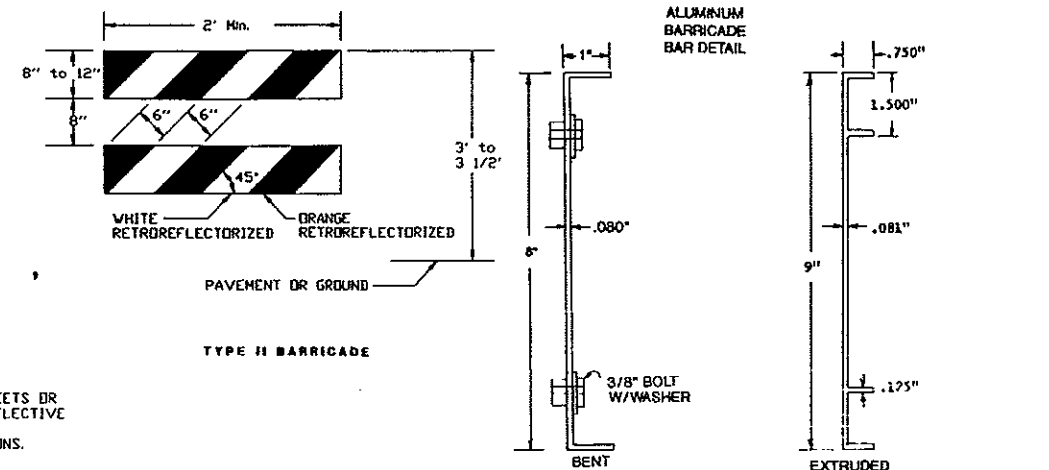
BARRICADE DETAILS

D-704-13

DELINEATOR DRUMS
 THE MARKINGS ON DRUMS SHALL BE ORANGE AND WHITE STRIPES 4 TO 6 INCHES WIDE. THERE SHALL BE AT LEAST TWO ORANGE AND TWO WHITE STRIPES. WHERE DRUMS HAVE RIBS OR INDENTATIONS, THERE SHALL BE NO RETRO-REFLECTORIZED SHEETING IN THIS AREA. THIS SPACE SHALL BE NO MORE THAN 2 INCHES WIDE. THE DRUM SURFACE SHALL BE PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE RETROREFLECTIVE SHEETING IS APPLIED.

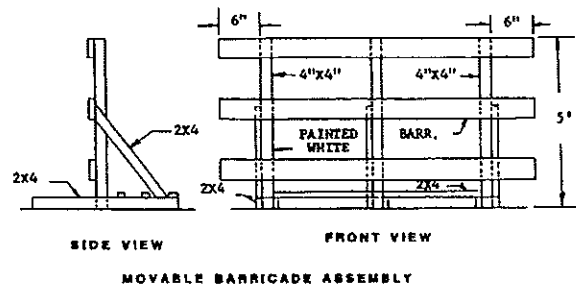
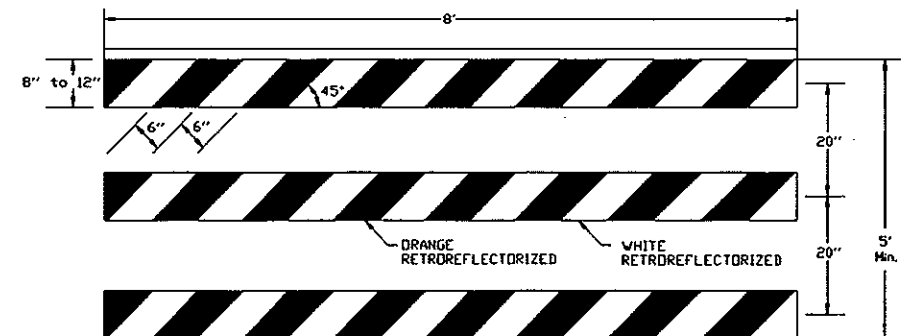


3" x 8" - 18 GAUGE GALVANIZED STEEL SHEETS OR .080" ALUMINUM PLATE WITH WHITE RETROREFLECTIVE SHEETING (TYPE 3A OR 3B) AS SPECIFIED IN SECTION 894 OF THE STANDARD SPECIFICATIONS.

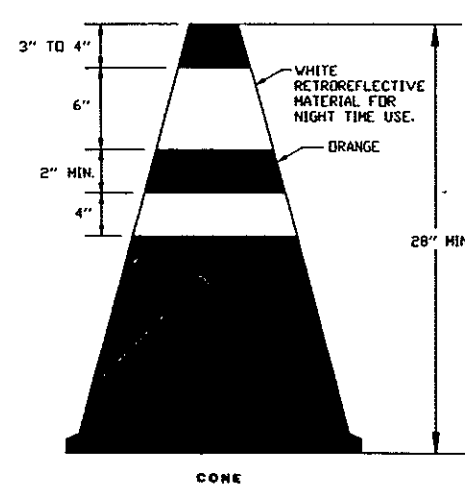
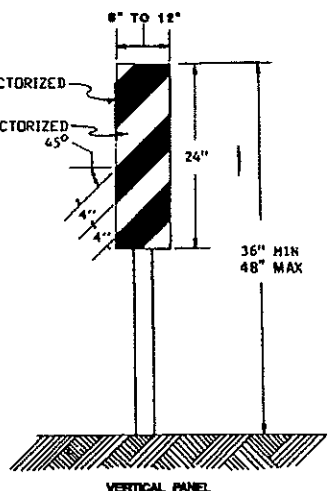
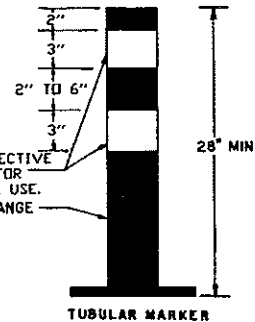
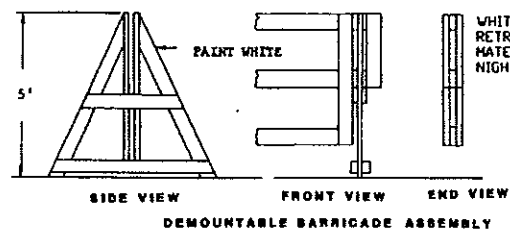
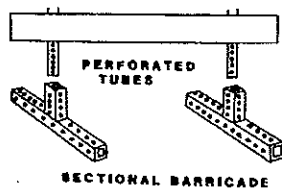
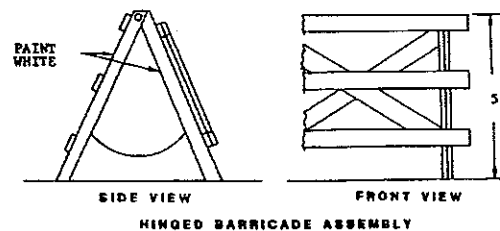


ACRYLIC PLASTIC REFLECTOR
 DELINEATOR REFLECTOR SHALL MEET THE REQUIREMENTS OF SECTION 894.

NOTE: VERTICAL PANELS USED ON THE EXPRESSWAYS OR OTHER HIGH SPEED ROADWAYS SHALL BE 12" BY 24".



NOTE: EACH MOVABLE BARRICADE SHALL BE WEIGHED DOWN BY A SUFFICIENT NUMBER OF SAND BAGS SO THAT IT WILL NOT BE BLOWN OVER BY THE WIND UNLESS THE MOVABLE SUPPORTING STRUCTURE IS CONSTRUCTED IN SUCH A MANNER THAT THE WIND CANNOT BLOW IT OVER. WEIGHT USED SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. THE STRIPES SHALL SLANT DOWNWARD TOWARD THE SIDE WHICH TRAFFIC IS TO PASS. BARRICADES USED AT THE BEGINNING OF A PROJECT SHALL FACE TRAFFIC ENTERING THAT PROJECT.



BARRICADES: NUMBER OF RETROREFLECTORIZED RAIL FACES

TYPE I	TYPE II	TYPE III
2 (One Each Direction)	4 (Two Each Direction)	6 (Facing in two Directions)

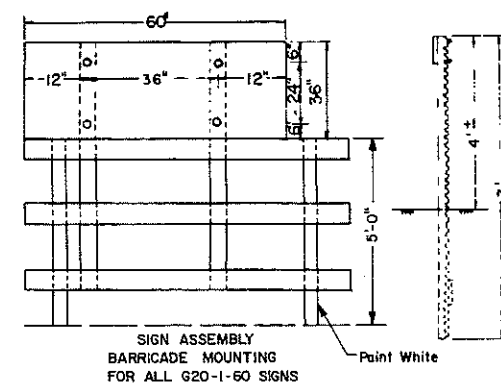
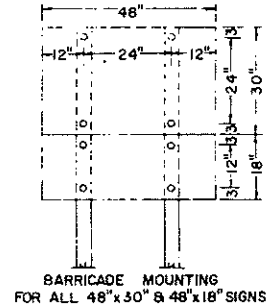
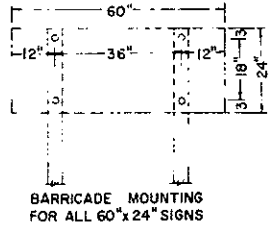
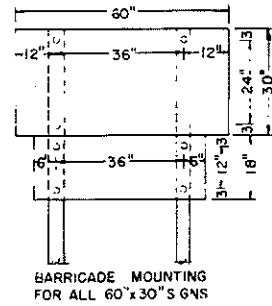
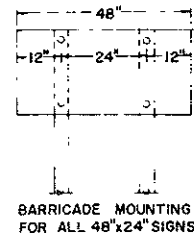
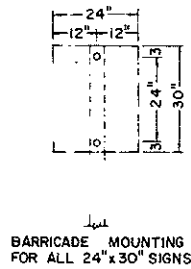
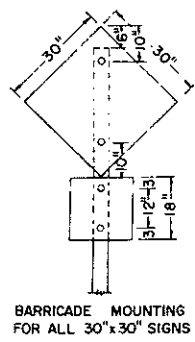
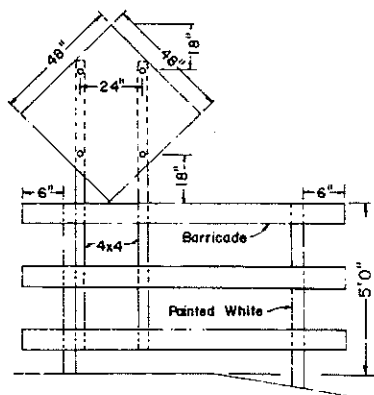
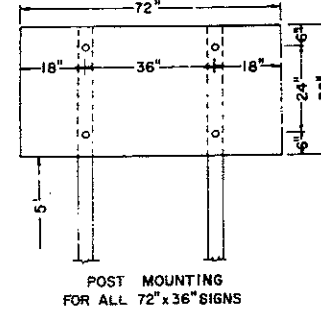
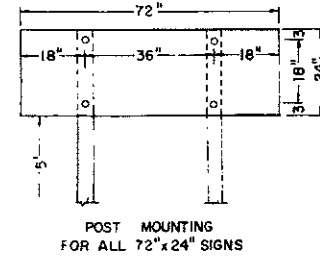
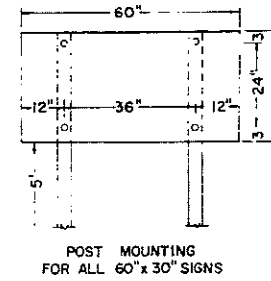
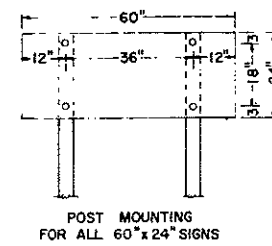
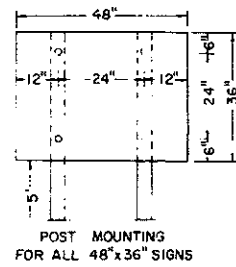
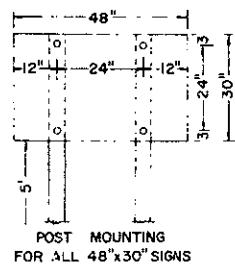
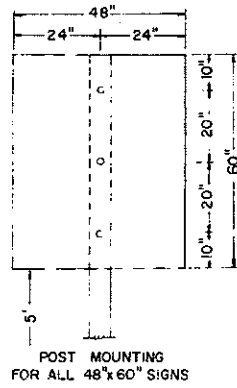
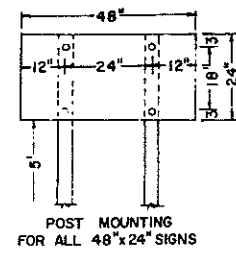
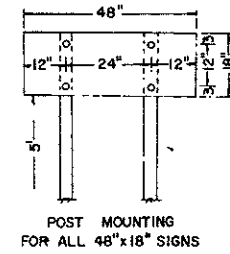
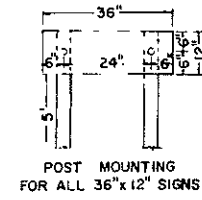
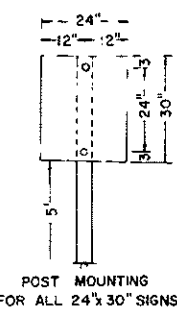
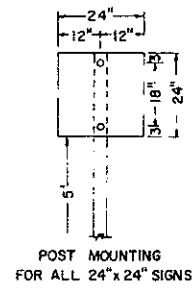
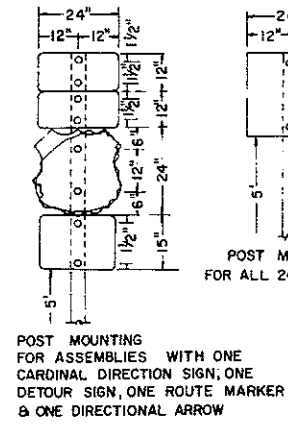
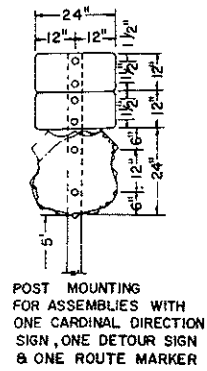
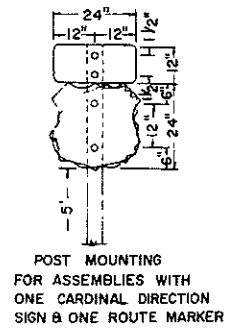
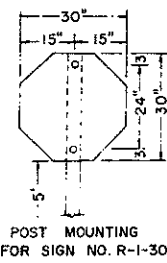
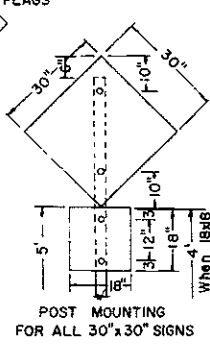
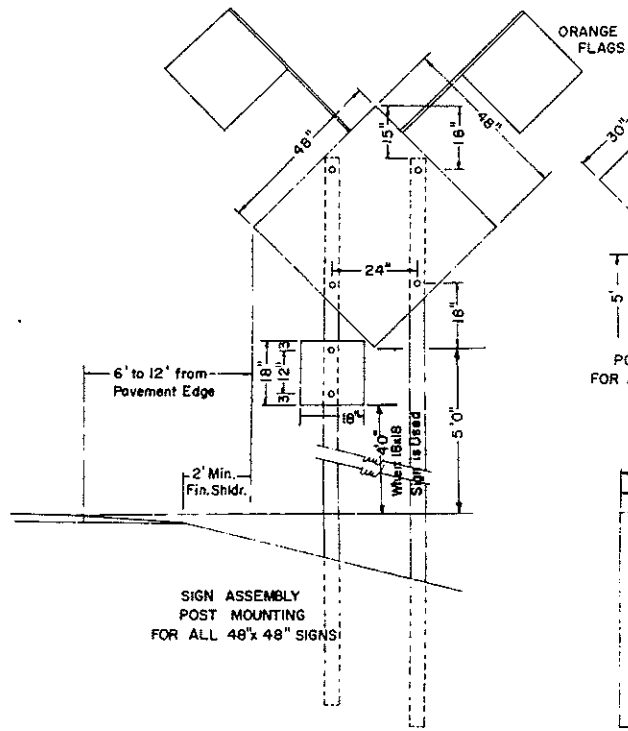
BARRICADE RAIL MATERIAL MAY BE 1" NOMINAL THICKNESS STANDARD LUMBER OR 3/4" PLYWOOD AND PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE RETROREFLECTIVE SHEETING IS APPLIED.

DATE	REVISIONS
8-3-87	TYPE SHEETING
10-1-87	DELINEATOR DRUM NOTE
6-9-88	BARRICADES TYPE III
5-1-92	GENERAL REVISIONS
6-10-93	GENERAL REVISIONS
9-23-93	VERTICAL PANEL
6-9-95	RETROREFLECTIVE SHEETING

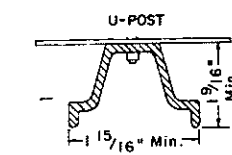
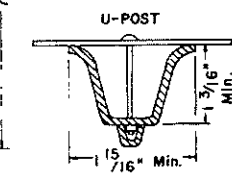
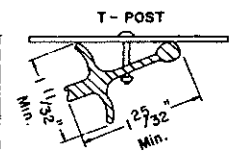
NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
 APPROVED *David K. O. Olson*
 DESIGN ENGINEER

CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS

D-704-14



DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS



NOTE:
In Urban Areas the vertical clearance shall be increased to 7 feet on all signs, except when supplemental signs are placed below main signs. The supplemental signs shall be placed at a 6'-0" minimum clearance.

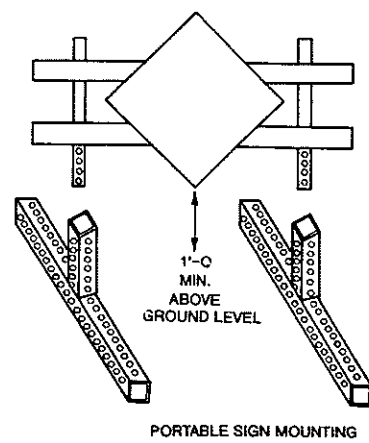
NOTES:
Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.
ADVANCE WARNING FLASHING OR SEQUENCING ARROW PANELS: The minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which shall be as high as practicable.

NOTES:
DELINEATOR POSTS: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
BARRICADE MOUNTING SIGNS: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4x4 min. SFS or equivalent steel posts. See Sids. D-704-13 thru D-704-21 for construction sign and barricade location details. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.

SIGN SUPPORTS: Sign supports shall be 4"x4" min. SFS or equivalent steel posts. The anchor for steel supports shall have a stub height of 4" or less. Wood posts more than 4"x4" shall be breakaway. Sign supports shall be imbedded to a sufficient depth so that signs will remain plumb throughout duration of project. It is suggested that wood posts have a min. depth of embedment of 50" and steel posts be embedded a min. 3'6".
MATERIAL: All signs shall be .100" aluminum, 12 gage galv. steel, 1/2" plywood or other approved mat'l.

HOLES: All holes to be punched round for 3/8" bolts.

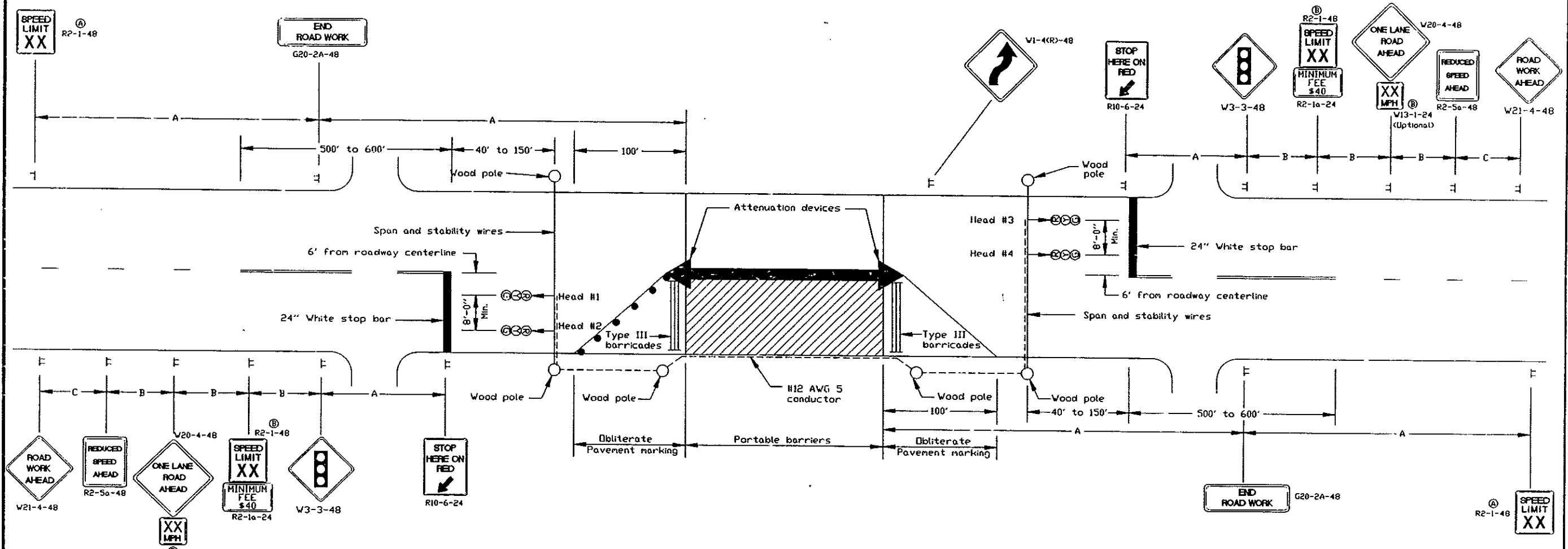
ALTERNATE MESSAGES: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate without a border and this plate installed and removed as required.



10-1-86 REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGE	
8-1-88	SIGN ASSEMBLY	APPROVED <i>David K. Lean</i> DESIGN ENGINEER
5-1-92	SIGN ASSEMBLY	
3-30-93	SIGN SUPPORTS NOTE	

TYPICAL CONSTRUCTION SIGNAL LAYOUT

D-704-16



SUGGESTED TIMING AND SIGNAL SEQUENCE

Heads 1 & 2	Green	Yellow	Red		
Heads 3 & 4		Red	Green	Yellow	Red
Time Cycle length 90 sec.	18.0	4.5	22.5	18.0	4.5
Percent of cycle	20	5	25	20	5

- NOTES:**
1. Conductor is to be overhead span between poles except on bridge where it is to be attached and supported by the bridge structure in such a way as not to interfere with bridge construction. Conductor is shown attached to side of bridge. It may be installed on either side of the bridge as determined by field personnel.
 2. The controller may be located on any of the wood poles in the cable run between the signal heads for through traffic movements.
 3. The timing schedule is suggested trial setting. Frequent checks of signals in operation shall be made to obtain the most efficient timing schedule.
 4. The wood poles shall be placed a minimum of 16 feet from the edge of the driving lane. The wood poles shall be of sufficient length to provide a minimum of 16 to 19 feet of clearance from the centerline of the roadway to the bottom of traffic signal heads suspended over the roadway.
 5. Traffic signal heads shall have 12 inch red, yellow, and green lenses. The signal heads shall have 5 inch louvered backplates.
 6. For interim traffic signal construction detail, see Standard D-772-6.

- KEY**
- ▲ CONES
 - ▨ WORK AREA
 - ▬ TYPE III BARRICADE
 - ⊢ SIGN
 - DELINEATOR DRUM
 - ▬ CONCRETE MEDIAN BARRIER

Road Type / Speed Limit	Distance between signs (ft.)		
	A	B	C
Urban to 25 MPH	200	200	200
Urban 26 to 45 MPH	350	350	350
Rural 46 to 55 MPH	500	500	500
Expressway/Freeway 40 to 65 MPH	1,000	1,600	2,600

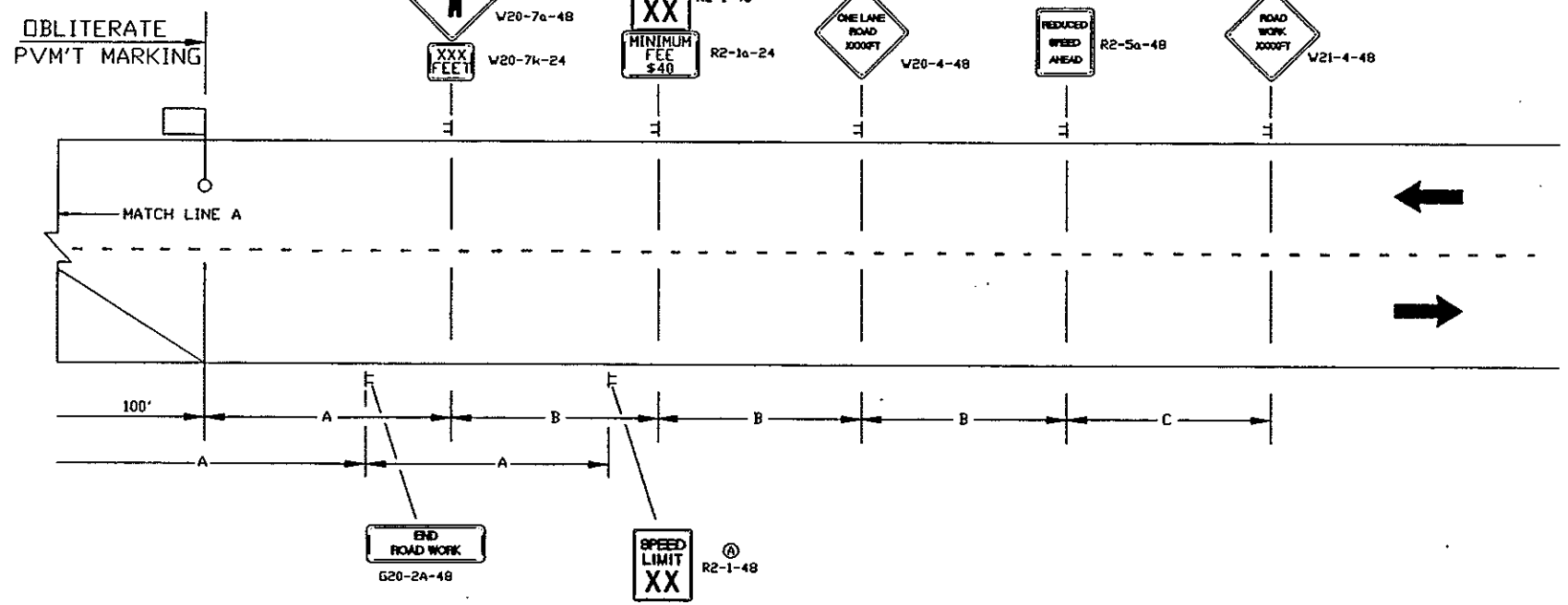
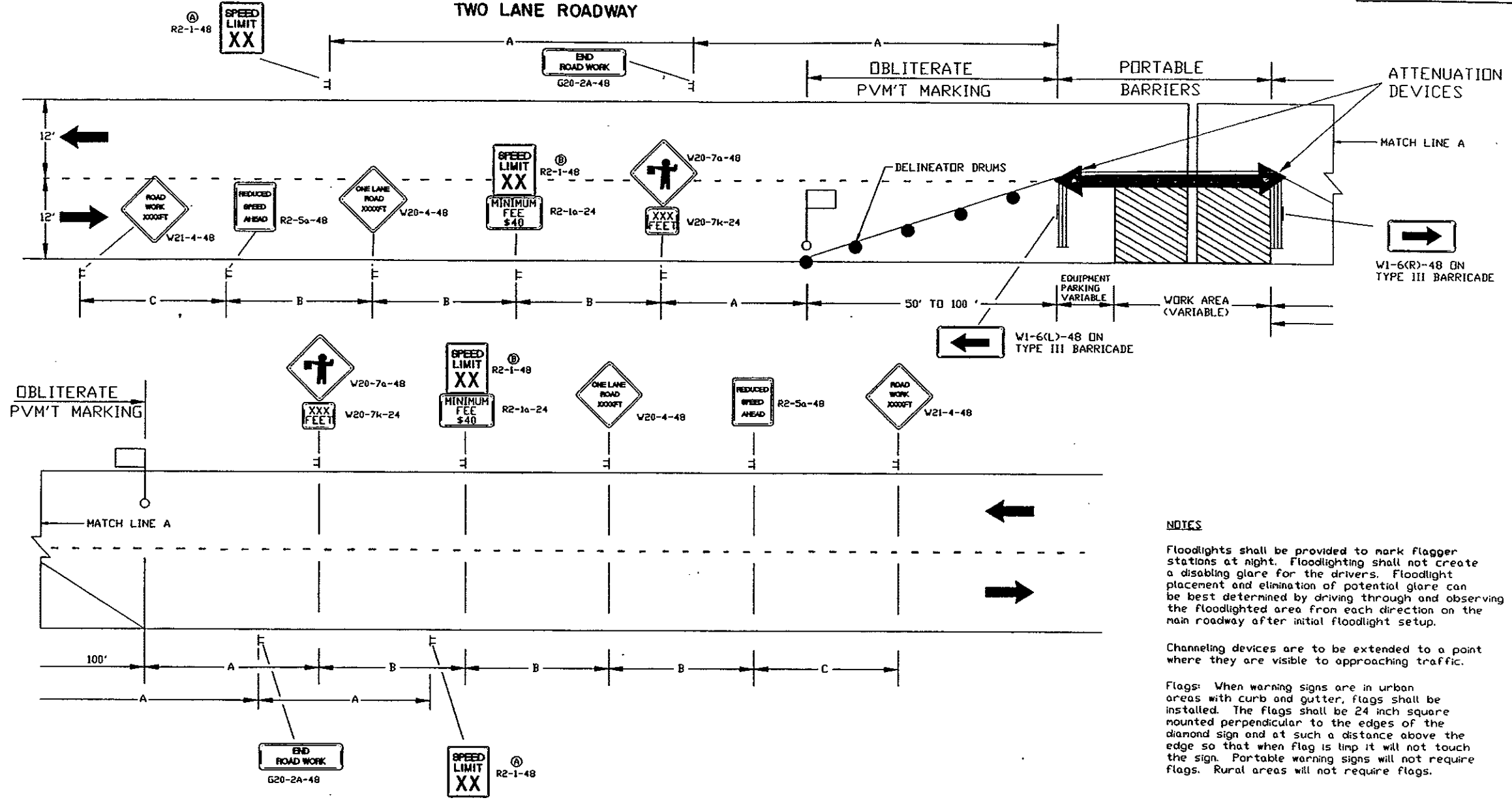
Flags: When warning signs are in urban areas with curb and gutter, flags shall be installed. The flags shall be 24 inch square mounted perpendicular to the edges of the diamond sign and at such a distance above the edge so that when flag is limp it will not touch the sign. Portable warning signs will not require flags. Rural areas will not require flags.

- Ⓐ The speed limit shall be re-established. The exact speed limit shall be determined in the field dependent on location and conditions.
- Ⓑ The speed limit shall be determined by the engineer in the field.

3-1-88	
REVISIONS	
DATE	CHANGE
2-2-95	ROADWAY CENTERLINE SIGN
3-17-95	WARNING SIGNS
6-16-95	REDUCE SPEED AHEAD
8-4-95	REVISE NOTE
9-20-95	ADD NOTE
10-9-95	

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. Lee*
DESIGN ENGINEER

SIGN LAYOUT FOR ONE LANE CLOSURE
TWO LANE ROADWAY



NOTES

Floodlights shall be provided to mark flagger stations at night. Floodlighting shall not create a disabling glare for the drivers. Floodlight placement and elimination of potential glare can be best determined by driving through and observing the floodlighted area from each direction on the main roadway after initial floodlight setup.

Channeling devices are to be extended to a point where they are visible to approaching traffic.

Flags: When warning signs are in urban areas with curb and gutter, flags shall be installed. The flags shall be 24 inch square mounted perpendicular to the edges of the diamond sign and at such a distance above the edge so that when flag is limp it will not touch the sign. Portable warning signs will not require flags. Rural areas will not require flags.

- KEY**
- ▲ CDNES
 - T SIGN
 - DELINEATOR DRUM
 - ▬ TYPE III BARRICADE
 - ▨ WORK AREA

Road Type / Speed Limit	Distance between signs (ft.)		
	A	B	C
Urban to 25 MPH	200	200	200
Urban 26 to 45 MPH	350	350	350
Rural 46 to 55 MPH	500	500	500
Expressway/Freeway 40 to 65 MPH	1,000	1,600	2,600

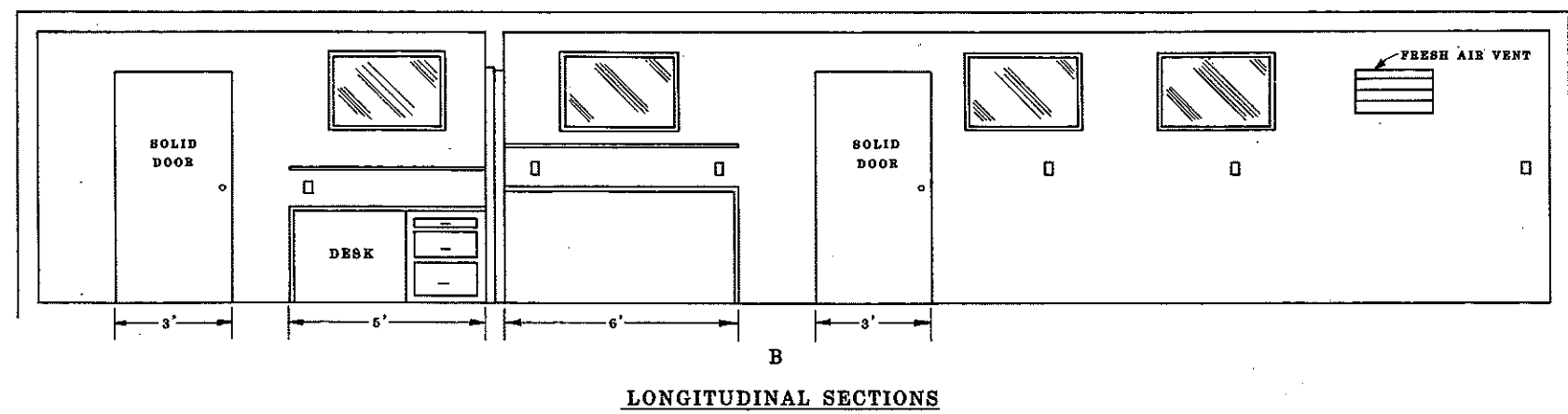
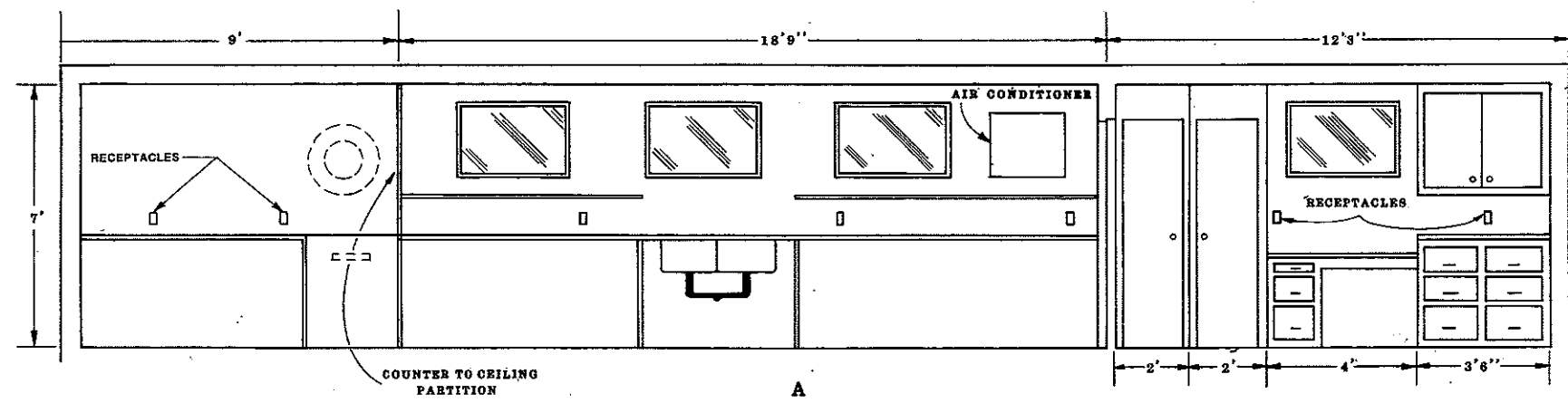
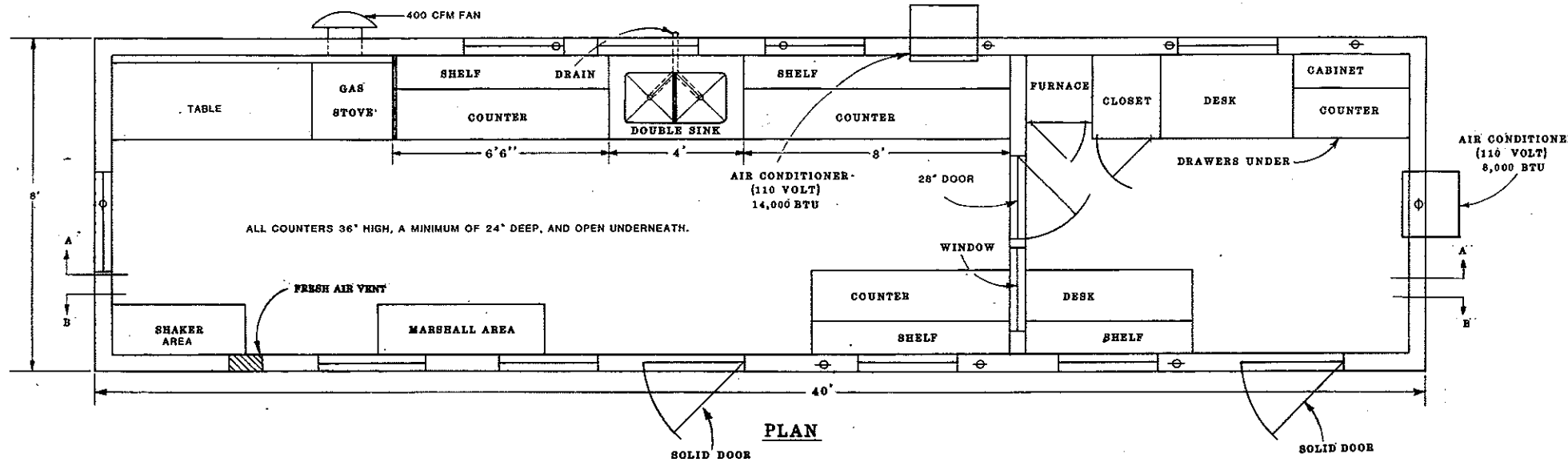
- Ⓐ The speed limit shall be re-established. The exact speed limit shall be determined in the field dependent on location and conditions.
- Ⓑ The speed limit shall be determined by the engineer in the field.

3-1-88		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED <i>David K. [Signature]</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	
7-21-93	GENERAL REVISIONS	
11-10-93	FLAG NOTE	
10-3-94	SPEED ZONE	
2-2-95	SPEED LIMIT	
6-15-95	General Revisions	

TYPE C FIELD LABORATORY

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

D-706-1



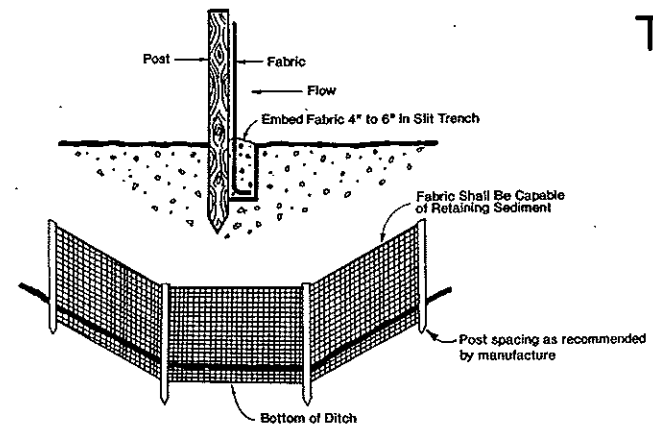
LONGITUDINAL SECTIONS

- NOTES:**
- There shall be a minimum of 6 exterior ventilated casement or double hung windows. The minimum total area of opening shall be 34 square feet. The number, size, and location of windows may be adjusted to fit conditions. Suggested locations are shown on drawing.
 - The sink shall be double compartment stainless steel. Each compartment shall be a minimum of 16"x14"x10" deep. The sink shall be drained to an outside waste line. A trap is not required. Water service lines shall be copper or plastic having a diameter of 1/2 inch.
 - The lab shall be equipped with an exhaust fan capable of removing inside air at a rate of 400 CFM.
 - The fresh air vent shall be hinged to open or close manually.
 - 24" x 48" table shall be provided capable of holding a 200 lb. masonry saw. The table shall have a minimum clearance of 36" overhead.
 - The water supply tank shall have a capacity of 500 gallons.
 - Steps shall be provided for each of two entrance doors. Steps for each area shall be made of, or covered with, a material providing for a non-slip surface. They shall be heavy duty steps that are capable withstanding heavy loadings and extensive use.
 - The pressure tank on the pump shall be 20 gallon capacity.
 - Locks, latches and hinges for main doors shall be heavy duty type to withstand the intense use in service.
 - The wall between the office and the work area shall be properly insulated to prevent the transmission of heat & noise.
 - The floor beneath the marshall area shall be heavily reinforced.
 - The lab shall be equipped with steel cable tie downs and ground anchors at each corner of the lab.
 - Electrical service entrance shall be wired for 100 amps, and have separate circuits for air conditioners. Convenience outlets shall have a minimum spacing of 4 feet in counter areas.

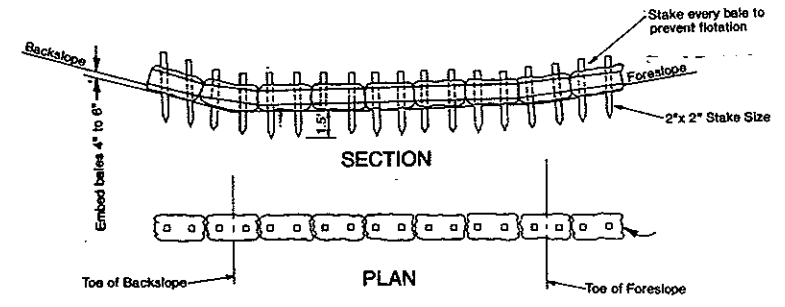
10-1-86	
REVISIONS	
DATE	CHANGE
5/5/88	Drawing and Notes

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
APPROVED: *David K. Lee*
Design Engineer

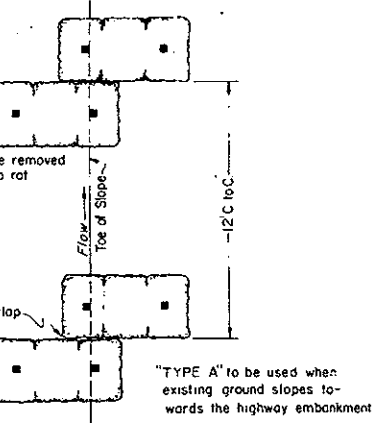
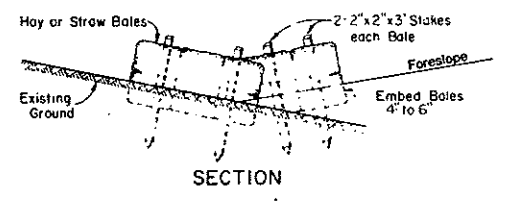
TEMPORARY EROSION AND SILTATION CONTROLS



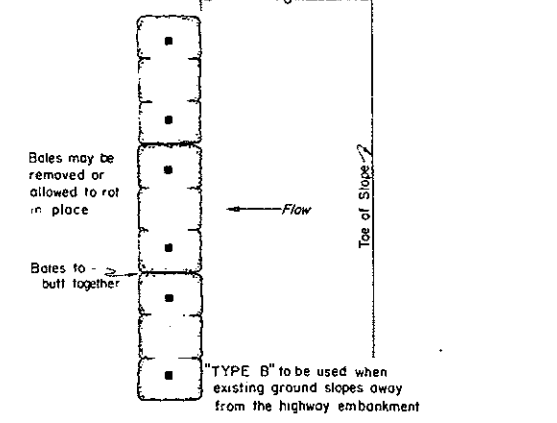
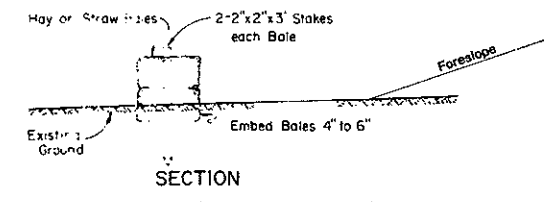
SEDIMENT CONTROL FENCING



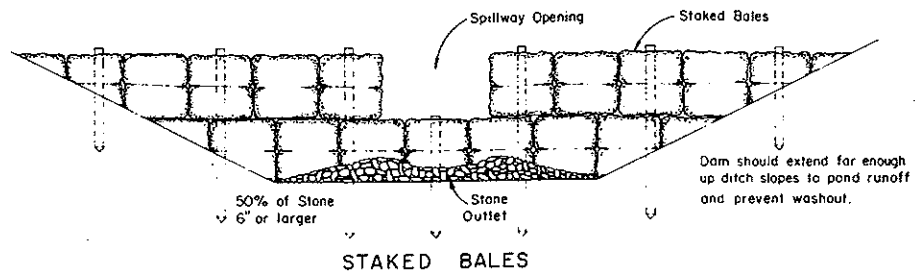
"TYPE A"



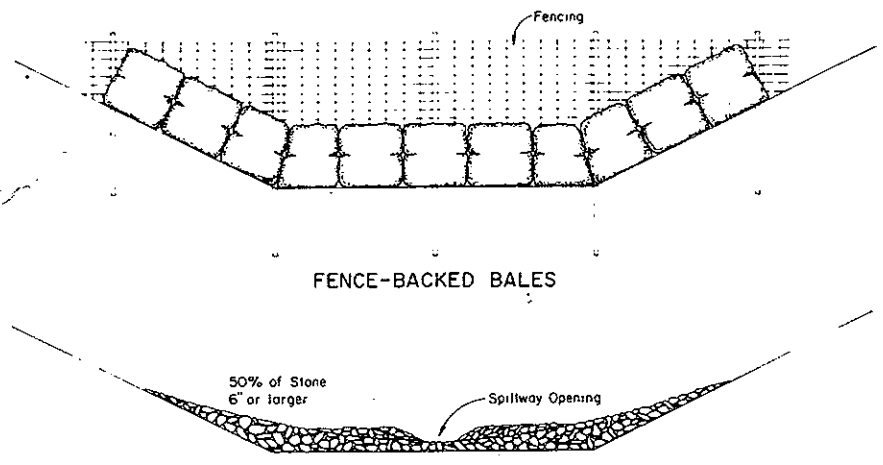
PLAN "TYPE B" BALED HAY OR STRAW EROSION CHECKS



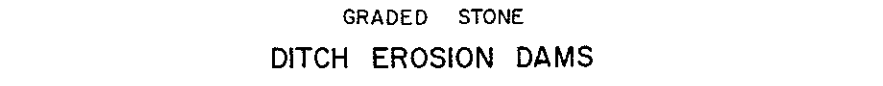
PLAN "TYPE C" BALED HAY OR STRAW EROSION CHECKS



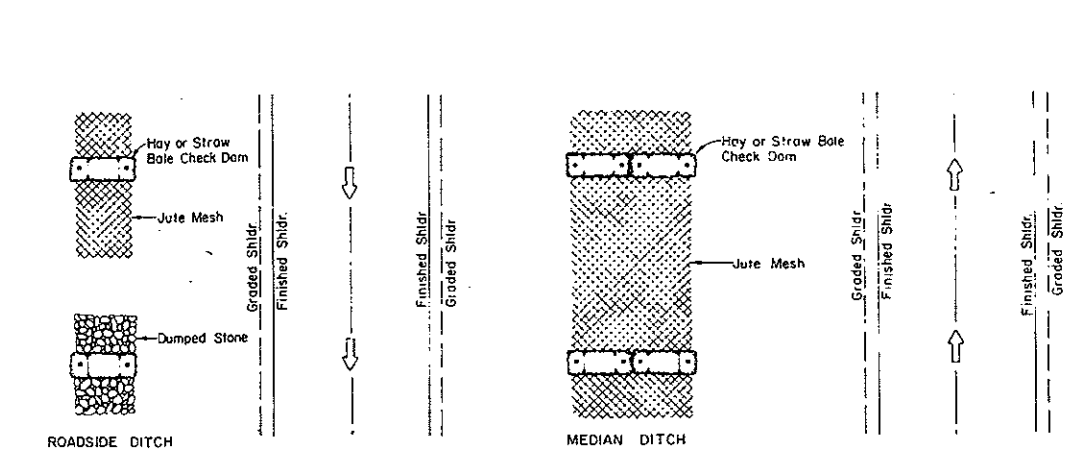
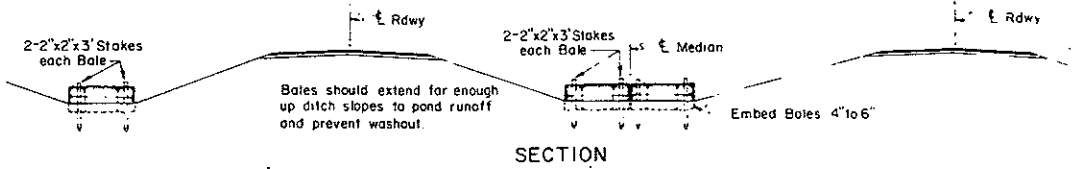
STAKED BALES



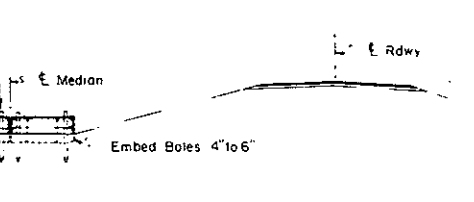
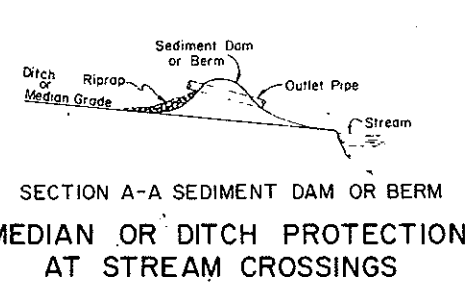
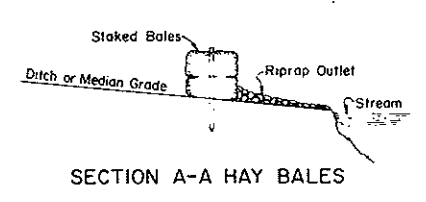
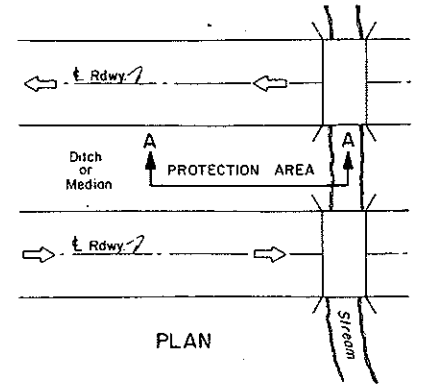
FENCE-BACKED BALES



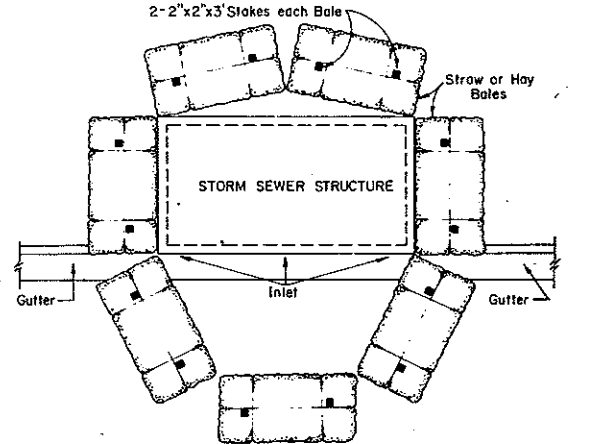
GRADED STONE DITCH EROSION DAMS



STONE, JUTE MESH, OR SOD DITCH & MEDIAN EROSION CONTROL



SMALL SEDIMENT DAM OR BERM



STORM SEWER INLET EROSION & SILTATION BARRIER

NOTES: These Temporary Erosion and Siltation Controls or modifications thereof may be used by the Contractor or directed by the Engineer to prevent erosion or siltation during the construction stage.

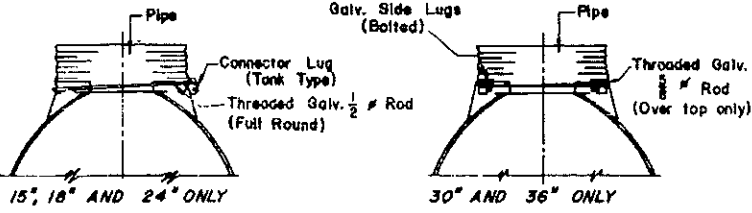
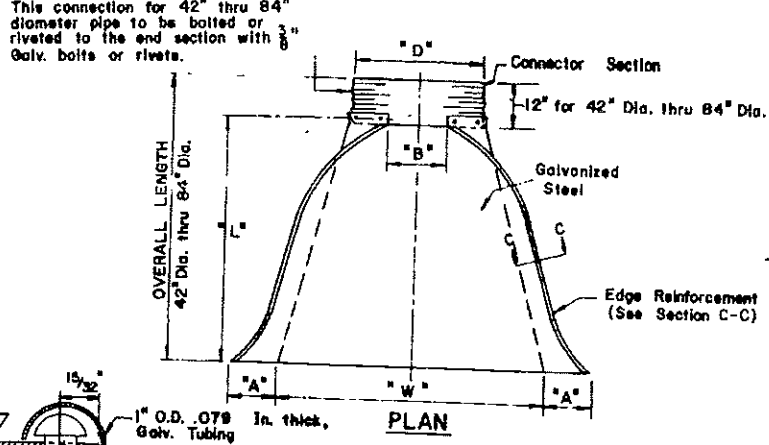
Payment for these items will be incidental unless shown otherwise on the plans.

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
9-4-92	DITCH CHECK	
9-16-92	SEDIMENT CONT. FENCING	
1-31-95	GENERAL REVISIONS	

CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS (ROUND PIPE)

NOTES:
 Pipe and Connecting Bands shall conform to applicable sections of I'DSHD Standard Specifications and to AASHTO M-36.
 Top edge of all End Sections to have tubing reinforcement or rolled tubed reinforcement (See Section A-A). The tubing is to be supplemented with 2"x2"x 1/4" Galv. Angle for 60" thru 72" Dia. and 2 1/2"x 2 1/2"x 1/4" Galv. Angle for 78" and 84" Dia. Angles to be attached by Gal. 3/8" bolts and nuts. Angles are to extend from Pipe to the corner wing band.

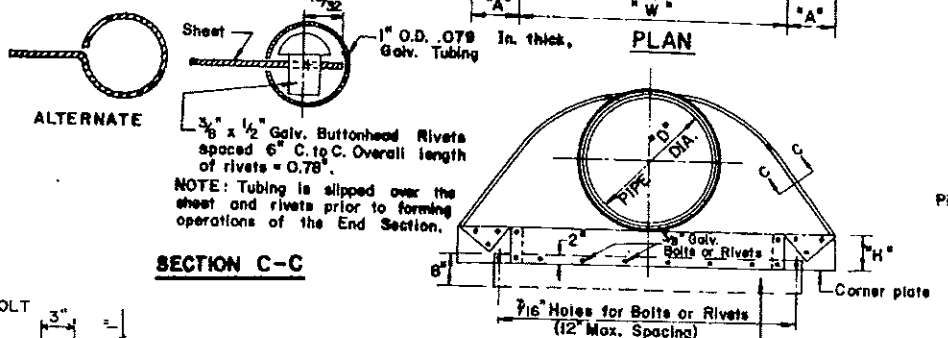
Elongated pipe shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
 Fill Height Tables are based on the following criteria:
 1. Embankment weight = 120 lb/ft³
 2. Max. pipe deflection = 5%
 3. Bedding - Class C
 4. Compaction = 95% Proctor Density
 5. Modulus of passive soil resistance (E') = 1400 psi
 6. H-20 Live Load



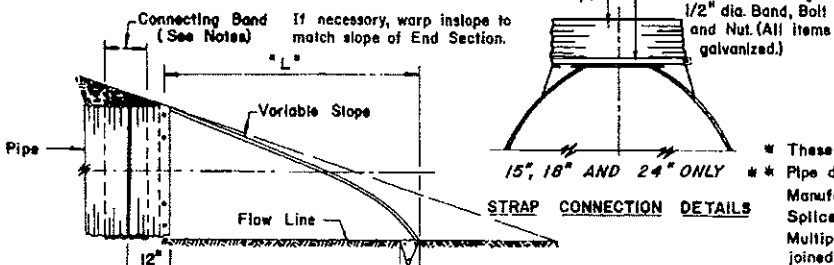
ROD CONNECTION DETAILS

PIPE DIA. (In.)	GALV. THICK.	DIMENSIONS					Approx. Slope Rate	Body Piece
		A	B	H	L	W		
15	.064	7	8	6	26	30	2-1/2:1	1
18	.064	8	10	6	31	36	2-1/2:1	1
24	.064	10	13	6	41	48	2-1/2:1	1
30	.079	12	16	8	51	60	2-1/2:1	1 OR 2
36	.079	14	19	9	60	72	2-1/2:1	2
42	.109	16	22	11	69	84	2-1/2:1	2
48	.109	18	27	12	78	90	2-1/4:1	2
54	.109	18	30	12	84	102	2:1	2
*60	.109	18	33	12	87	114	1-3/4:1	3
*66	.109	18	36	12	87	120	1-1/2:1	3
*72	.109	18	39	12	87	126	1-1/3:1	3
*78	.109	18	42	12	87	132	1-1/4:1	3
*84	.109	18	45	12	87	138	1-1/6:1	3

END SECTIONS



SECTION C-C

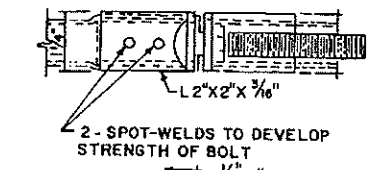


TYPICAL CROSS-SECTION (Showing Connector Section)

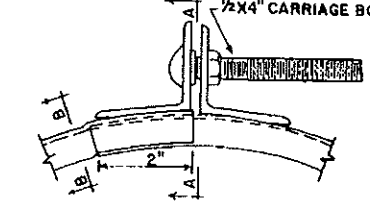
FILL HEIGHT TABLES RIVETED, WELDED OR HELICAL FABRICATION

WATERWAY AREA SQ. FT.	PIPE DIA. (IN.)	MIN. COVER (IN.)	MAX. FILL HEIGHTS OVER TOP OF PIPE					WATERWAY AREA SQ. FT.	PIPE DIA. (IN.)	MIN. COVER (IN.)	MAX. FILL HEIGHTS OVER TOP OF PIPE				
			GALV. METAL THICKNESS (IN.)								GALV. METAL THICKNESS (IN.)				
			.064	.079	.109	.138	.168				.064	.079	.109	.138	.168
7.1	36	12	48	60	78 (88)	89 (106)	101 (118)	1.2	15	12	67	73			
9.6	42	12	41	51	64 (76)	71 (91)	79 (101)	1.8	18	12	56	61			
12.6	48	12	36	45	57 (66)	61 (80)	66 (86)	3.1	24	12	42	46	59		
15.9	54	12	32	40	52 (59)	55 (71)	59 (79)	4.9	30	12	34	36	47		
19.6	60	12	29	36	49 (53)	51 (64)	54 (71)	7.1	36	12	28	30	39	41	
23.8	66	12	26	33	47	49 (58)	51 (64)	9.6	42	12	31	43	46 (67)	48 (70)	50 (73)
28.3	72	12	24	30	44	47 (53)	49 (59)	12.6	48	12	27	37	45 (58)	46 (61)	47 (64)
33.2	78	12	22	28	41	46 (49)	47 (54)	15.9	54	12		33	43 (52)	44 (54)	45 (57)
38.5	84	12	21	26	38	45	46 (51)	19.6	60	12			43 (47)	43 (49)	44 (51)
44.2	90	12	19	24	35	43	45	23.8	66	12			42	43	43 (47)
50.3	96	12	18	22	33	40	44	28.3	72	12				41	43
56.7	102	24	17	21	31	38	42	33.2	78	12					39
63.6	108	24		20	30	35	39	38.5	84	12					35
70.9	114	24		19	28	34	37								
78.5	120	24			27	32	35								

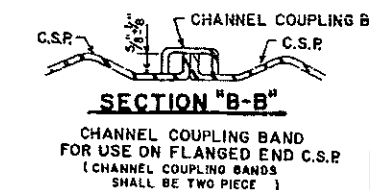
VALUES FOR ELONGATED PIPE ARE SHOWN IN PARENTHESES



ALTERNATE



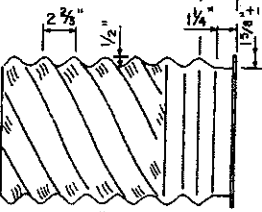
SECTION B-B



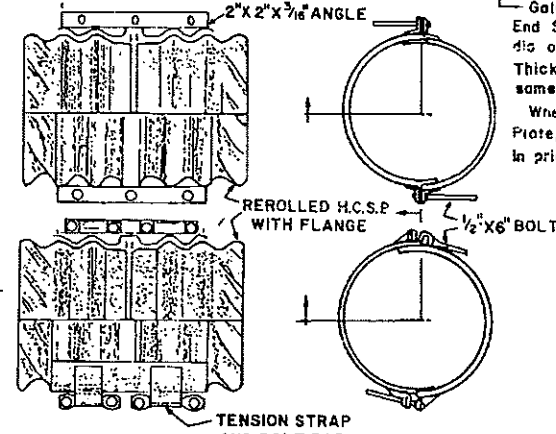
NOMINAL DIMENSIONS

THICKNESS	"A"	FOR USE WITH C.S.P.
0.079"	3/4"	0.09" THICK OR LIGHTER
0.109"	1"	0.138" THICK OR HEAVIER

SECTION A-A



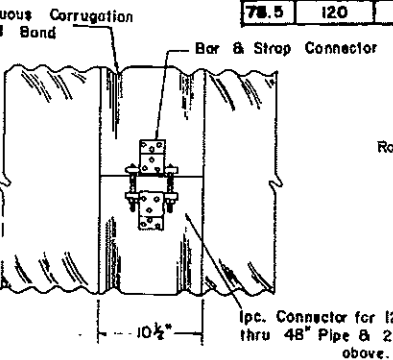
SPIRAL C.S.P.



WING CHANNEL COUPLING BAND

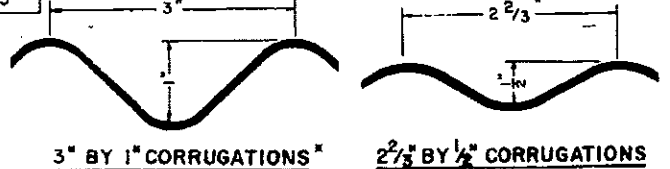
CROSS SECTION OF WING CHANNEL COUPLING BAND

WING CHANNEL COUPLING BAND FOR ANNULAR C.S.P. OR REFORMED H.C.S.P.



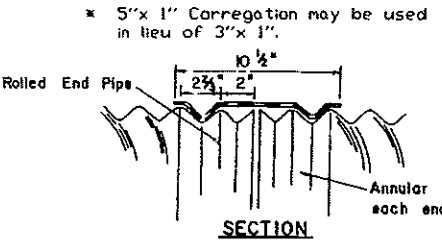
CONNECTING BAND DETAILS FOR HELICAL, WELDED-SEAM CULVERT

CORRUGATED STEEL PIPE FLANGE BAND DETAILS



3" BY 1" CORRUGATIONS

2 1/2" BY 1/2" CORRUGATIONS



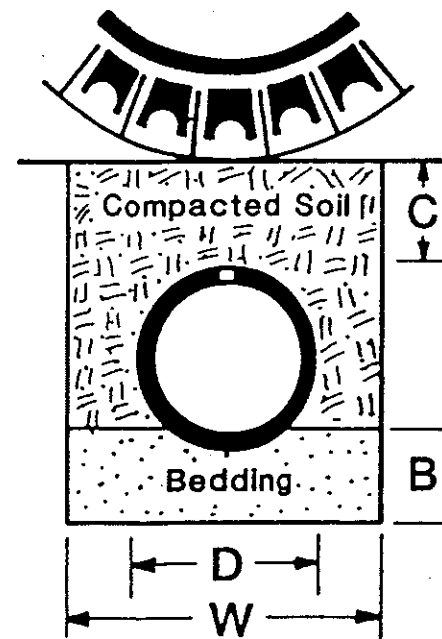
SECTION

10-1-86 REVISIONS	
DATE	CHANGE
4-28-89	TOE PLATE NOTE
12-6-95	CORRUGATIONS

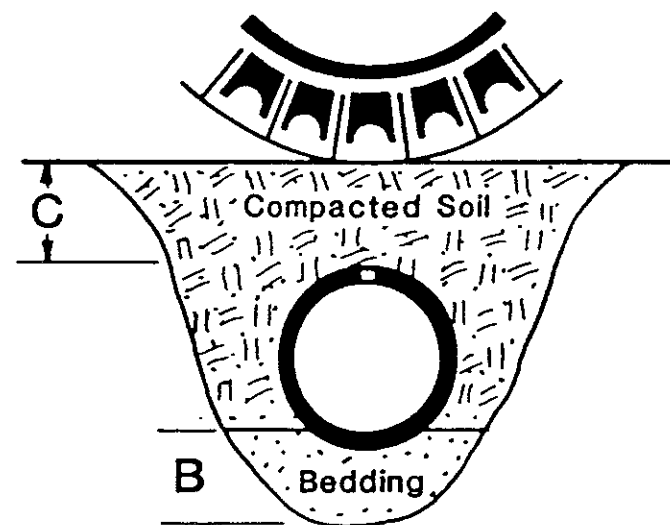
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *David K. O. Lan*
 DESIGN ENGINEER

CORRUGATED POLYETHYLENE PIPE

TRENCH INSTALLATION



OPEN DITCH INSTALLATION



Corrugated Polyethylene Culverts shall conform to AASHTO M-294.

Bedding material shall consist of crushed stone, gravel, sand, or selected sandy soil. The aggregate size shall not exceed 1/6 of the pipe diameter.

After the pipe has been installed on the bedding, backfill shall be placed along each side of the pipe in layers not exceeding six inches. The backfill material shall be well compacted under the haunches, around the sides and above the pipe to the minimum height of cover.

If used in approaches, pipe end sections will be required. These end sections shall conform to Standard Drawing D-714-4 (C.S.E.S.) except that the throat will be modified to accept the corrugation on the Polyethylene Pipe.

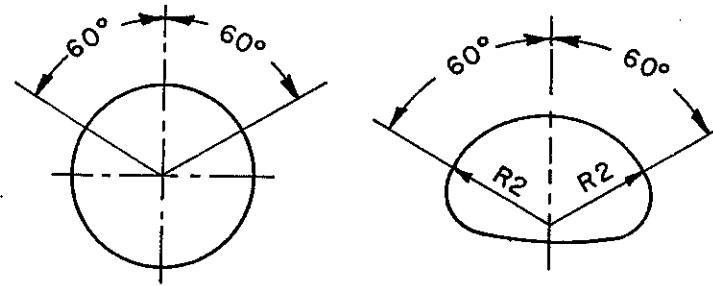
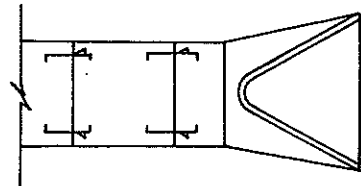
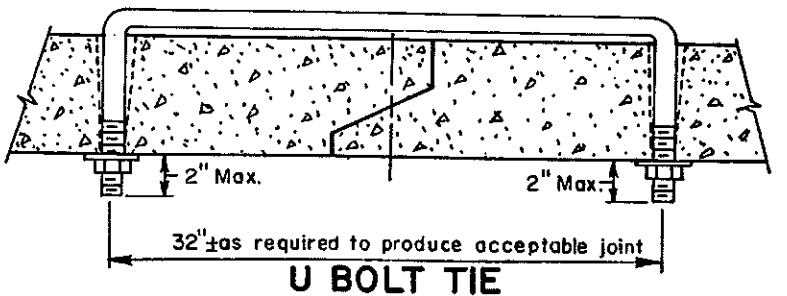
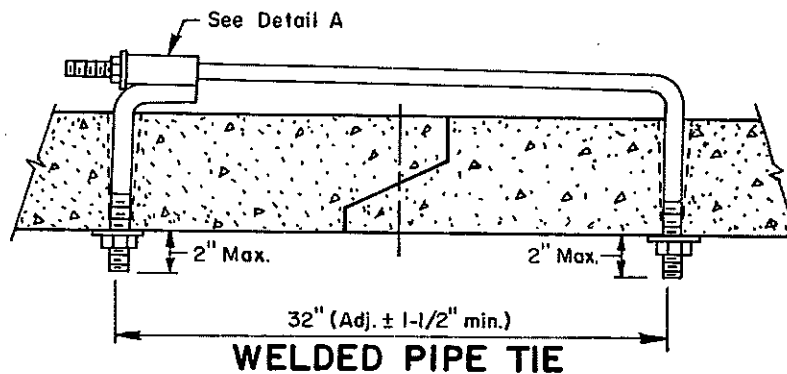
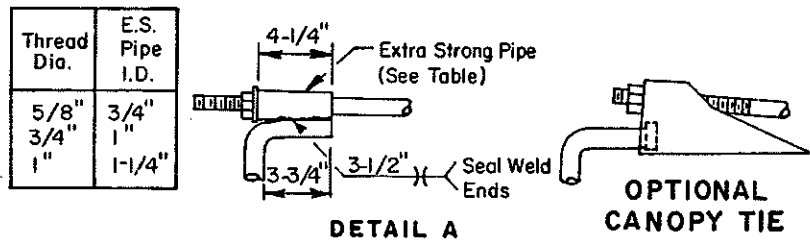
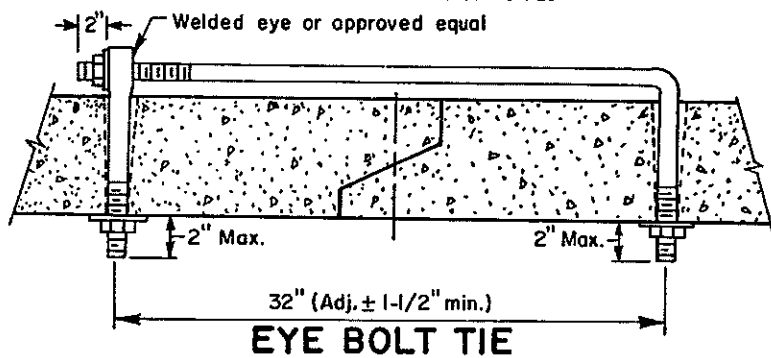
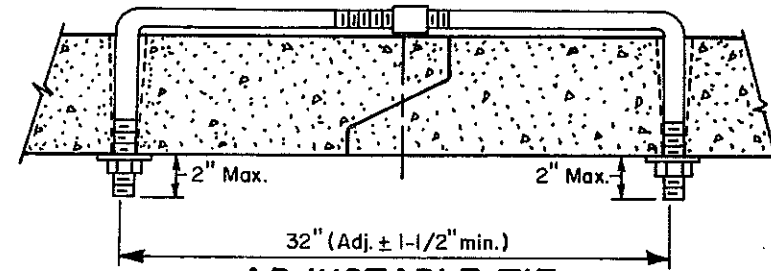
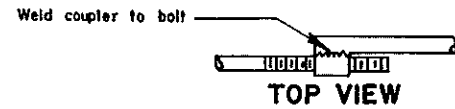
Couplings shall be of the type recommended by the manufacturer. The couplings shall provide a secure joint.

Pipe Diameter (D) inches	Cover (C)		Minimum Bedding Thickness (B) inches	Minimum Trench Width (W) inches
	Minimum inches	Maximum feet		
12	12	58	5	24
15	12	59	5	28
18	12	62	6	36
24	12	61	6	42

8-3-87		NORTH DAKOTA STATE HIGHWAY DEPARTMENT APPROVED: <i>David K. O. [Signature]</i> DESIGN ENGINEER
REVISIONS		
DATE	CHANGE	

CONCRETE PIPE TIES

D714-22



Pipe Size (Inches)	Thread Dia.	Pipe Size (Inches)	Thread Dia.	Pipe Size (Inches)	Thread Dia.
12		30		72	
15		33		78	
18		36		84	
21	5/8"	42	3/4"	90	1"
24	(See Note 2)	48		96	
27		54		102	
		60		108	
		66		120	
				132	

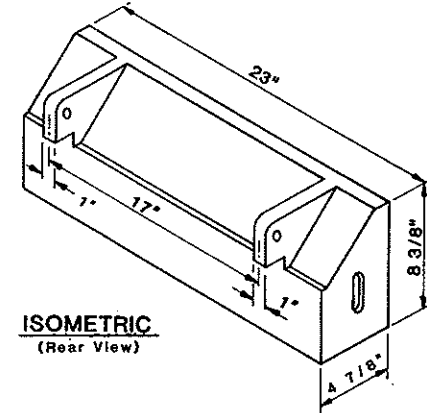
NOTES:

- PIPE SIZE LISTED IS INSIDE DIAMETER OF ROUND PIPE OR EQUIVALENT DIAMETER OF PIPE ARCH.
- NUTS AND WASHERS ARE NOT REQUIRED ON INSIDE OF 21" DIAMETER PIPE OR LESS.
- TIES TO BE USED ONLY TO HOLD PIPE SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.
- TIE BOLTS SHALL BE PAINTED AFTER FABRICATION WITH ONE COAT OF ZINC CHROMATE IRON OXIDE PAINT. THREADED PORTION OF RODS DO NOT HAVE TO BE PAINTED.
- HOLES IN PIPE TO ACCOMMODATE THE TIE BOLTS CAN BE PRECAST OR DRILLED. TAPERED HOLES WILL BE PERMITTED WHEN PRECAST. WHEN EXISTING PIPE ARE EXTENDED OR SALVAGED AND RELAYED, THE CONTRACTOR WILL BE REQUIRED TO DRILL THE NECESSARY HOLES.
- THE CONTRACTOR HAS THE OPTION OF SELECTING THE TYPE OF TIE BOLT TO BE USED. THE TYPE SELECTED SHALL BE APPROVED BY THE ENGINEER.
- THE COST OF PRECASTING OR DRILLING THE REQUIRED HOLES AND FURNISHING AND INSTALLING THE TIE BOLTS SHALL BE INCLUDED IN THE PRICE BID FOR REINFORCED CONCRETE PIPE CULVERTS.
- ALL CONCRETE PIPE JOINTS WILL BE TIED INCLUDING THE END SECTION JOINTS. TIE BOLTS ARE NOT REQUIRED ON STORM SEWER PIPE UNLESS SPECIFICALLY NOTED IN THE PLANS.

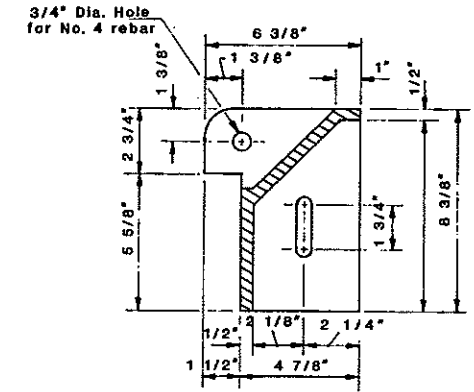
10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	
12-9-94	NOTES	APPROVED: <i>David K. O. Larson</i> DESIGN ENGINEER

INLET - TYPE 1

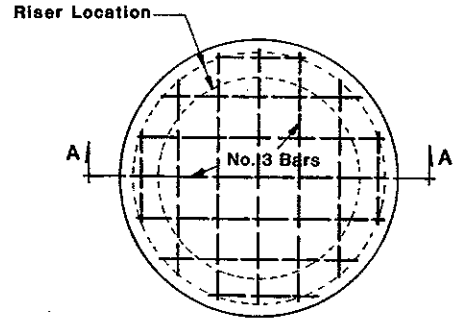
D-722-1



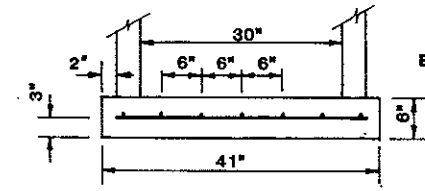
ISOMETRIC
(Rear View)



CURB BOX
Weight - 80 lbs

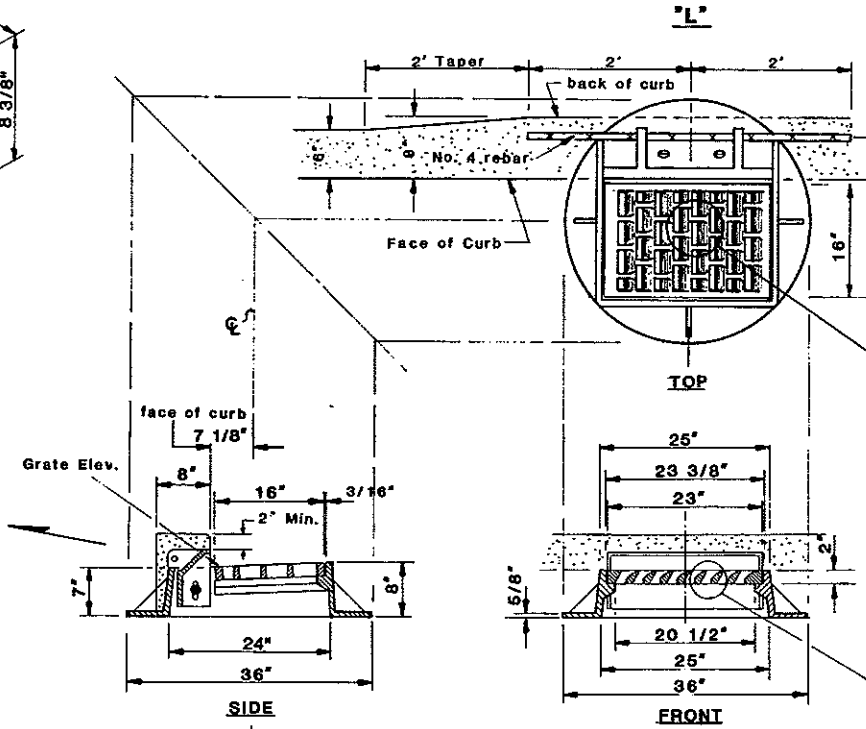


PLAN



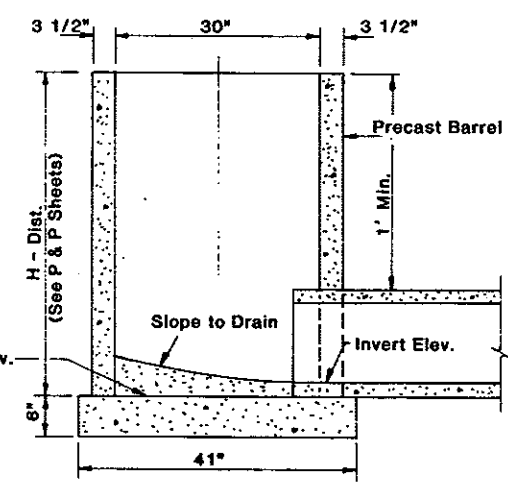
Sect. A - A

RISER DETAILS



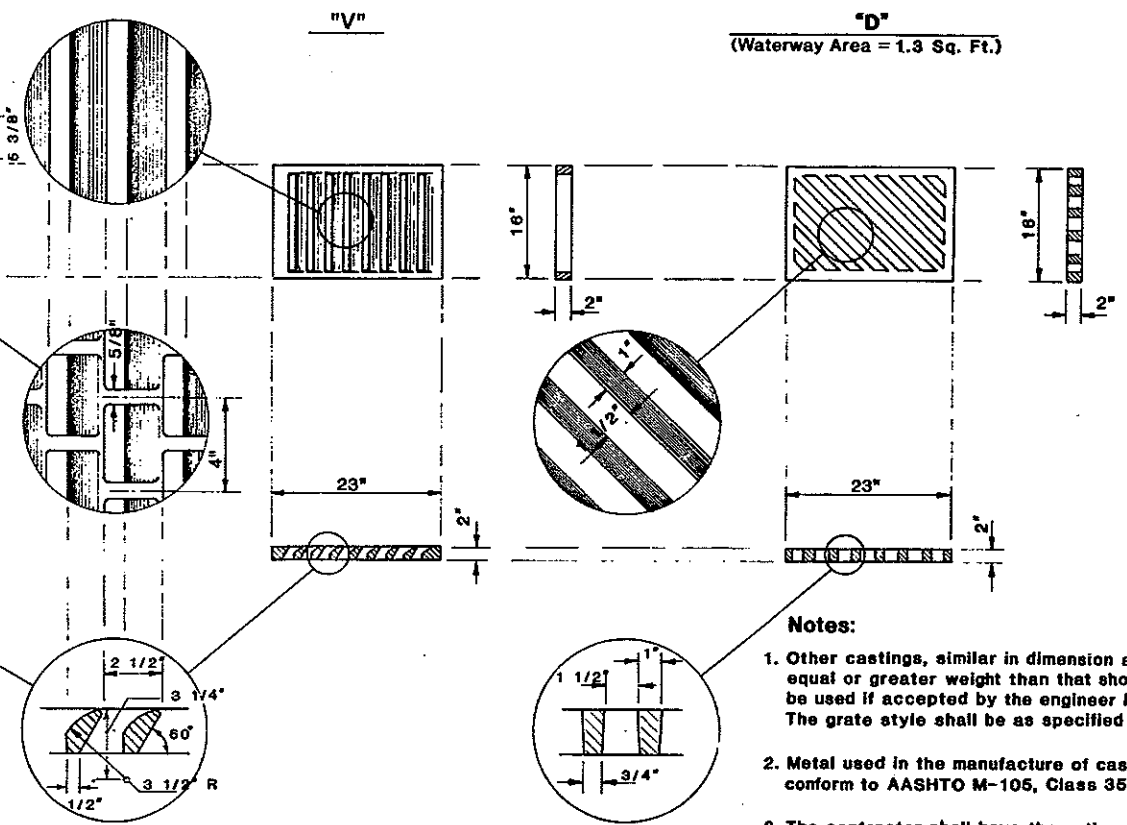
CASTING DETAILS

Weights - Frame - 209 lbs
Grate - 110 lbs



ELEVATION

← GRATE STYLES →



Notes:

1. Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans.
2. Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
3. The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
4. Precast risers shall be constructed in accordance with AASHTO M199.
5. On projects with P.C.C. pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

Pay Item

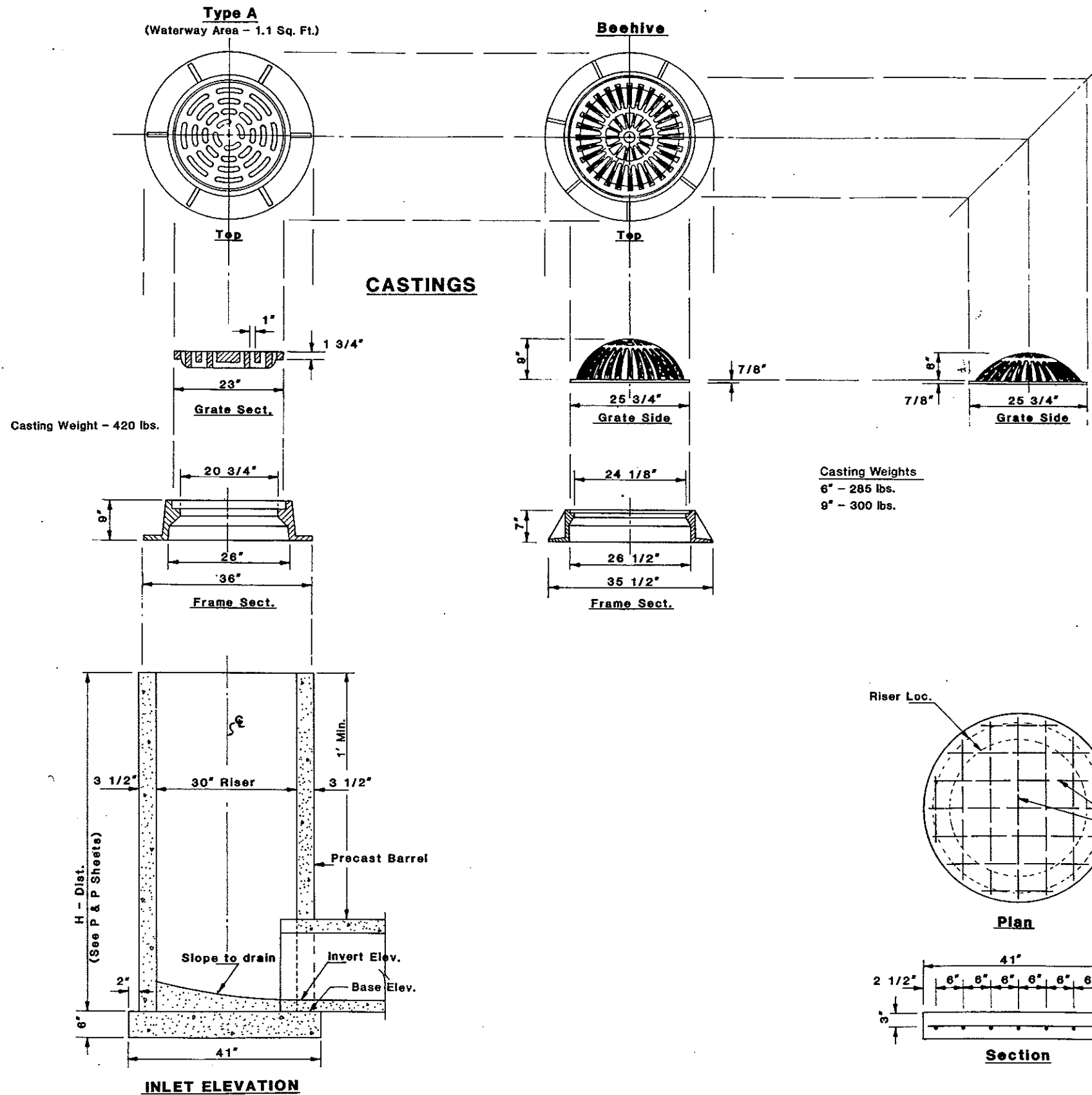
Inlet - Type 1 Ea.

December 1, 1989		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
Revisions		
Date	Change	Approved: <i>David K. Oster</i> Design Engineer
11/90	Note 5 added.	

INLET - CATCH BASIN

FHWA REGION	STATE	FED. AID PROJ. NO.	PROJECT NO.
8	N.D.		

D-722-1A



Notes:

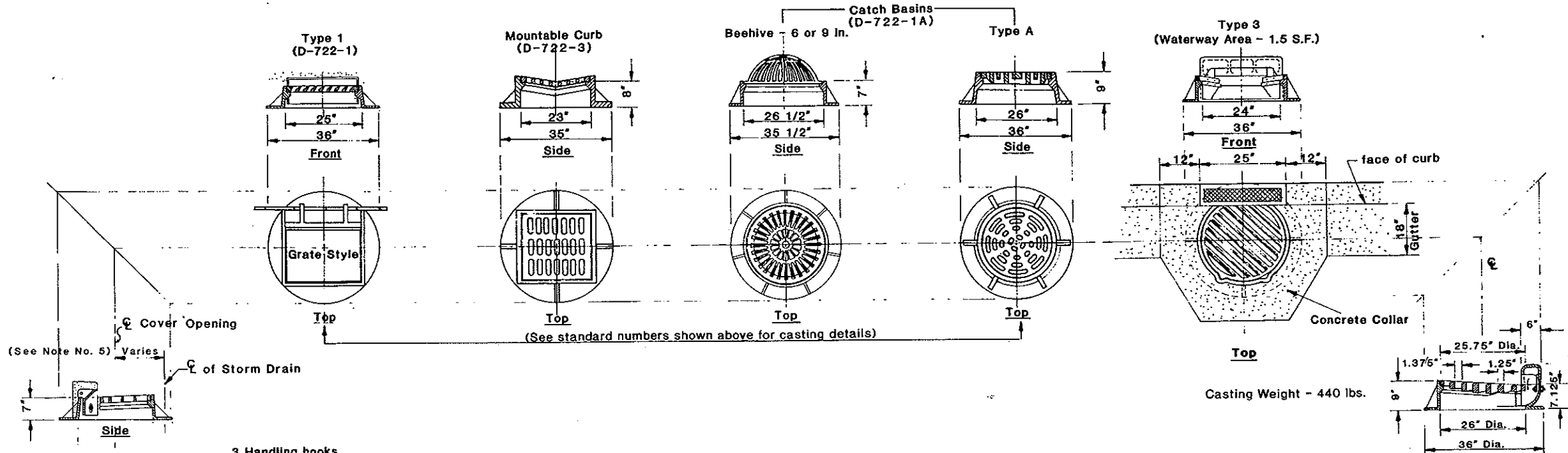
- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans.
- Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B
- The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
- Precast risers shall be constructed in accordance with AASHTO M199.
- On projects with P.C.C. pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

Pay Items

- Inlet - Catch Basin, Type A Ea.
- Inlet - Catch Basin, 6 In. Beehive Ea.
- Inlet - Catch Basin, 9 In. Beehive Ea.

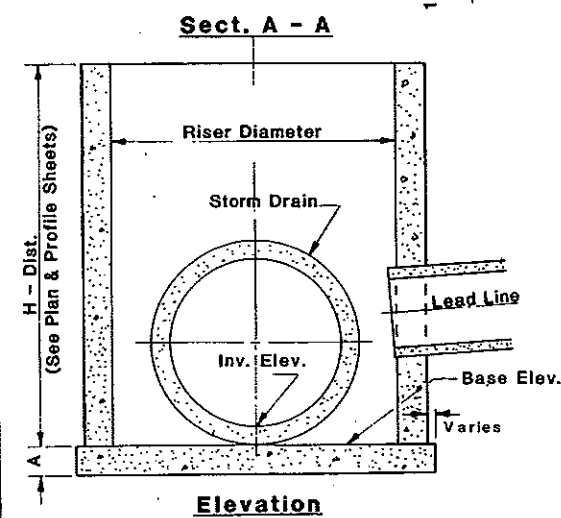
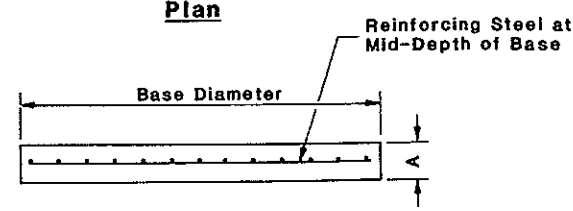
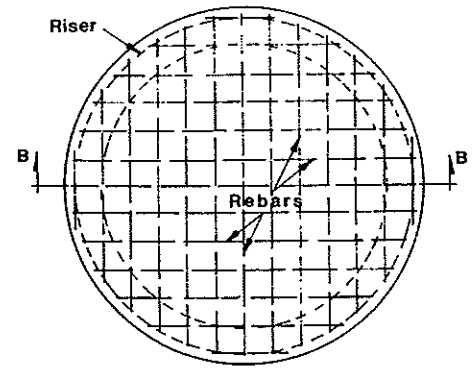
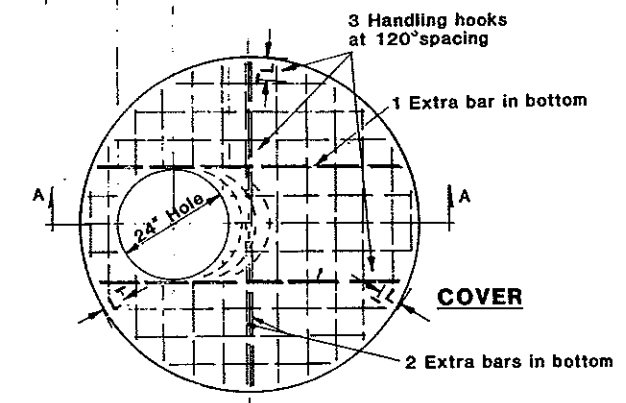
December 1, 1989		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
Revisions		
Date	Change	Approved: <i>David K.O. Lee</i> Design Engineer
11/90	Note 5 added.	

INLET - SPECIAL



- NOTES:**
- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The type of casting and grate style shall be as specified on the plans and included in the price bid for "Inlet - Special (casting type & riser size)".
 - Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
 - The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
 - Precast barrels shall be constructed in accordance with AASHTO M199.
 - The distance between the center of the cover opening and the storm drain shall be noted on the P & P sheets.
 - Ladder rungs shall be provided for riser sections whenever the Type 3 casting is specified. Rungs shall also be required when other castings are used and is noted on the P & P sheets.
 - On projects with P.C.C. pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

Riser Covers							Riser Bases				
Riser Diameter	Cover Diameter	Weight of Section (lbs)	T	K	L	Top Bars	Bottom Bars	Base Diameter	Weight of Section (lbs)	A	Bars
48"	58"	1110	6"	6"	8"	#4 at 6"		66"	1785	6"	#3 at 6"
60"	72"	2470	8"	7"	9"	#3 at 6"	#4 at 6"	78"	3320	8"	#3 at 6"

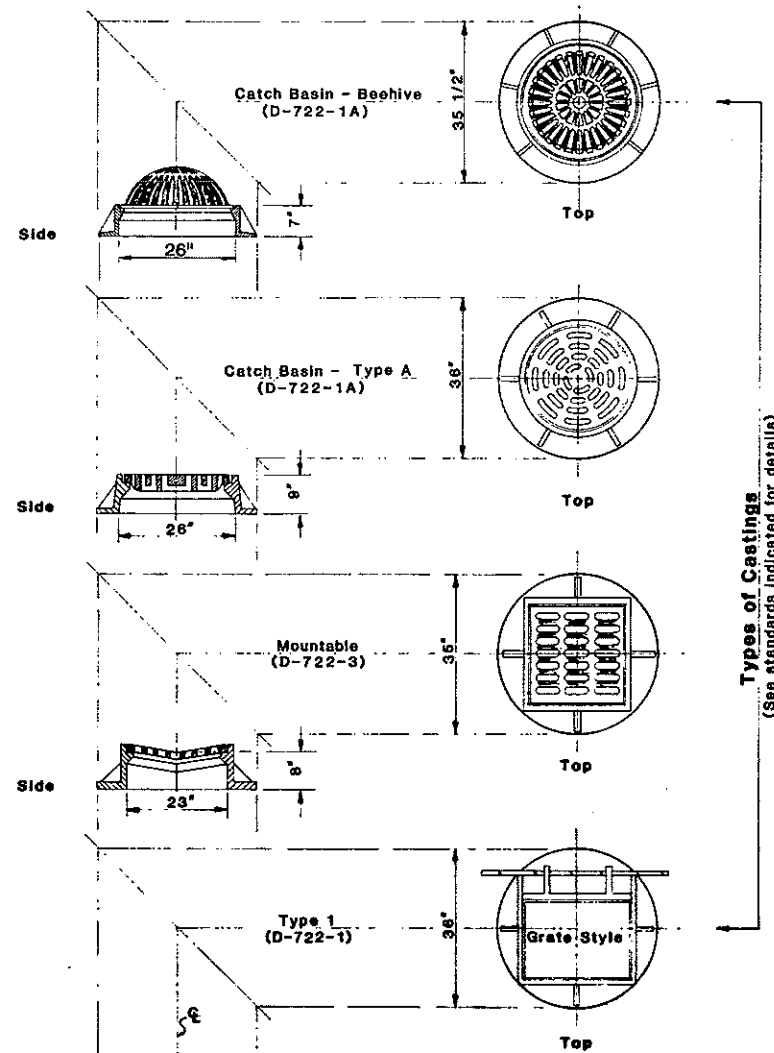


Pay Items

- Inlet - Special, Type 1 - 48 In. Ea.
- Inlet - Special, Mountable, Type A - 48 In. Ea.
- Inlet - Special, Catch Basin, 6 In. Beehive - 48 In. Ea.
- Inlet - Special, Catch Basin, 9 In. Beehive - 48 In. Ea.
- Inlet - Special, Catch Basin, Type A - 48 In. Ea.
- Inlet - Special, Type 3 - 48 In. Ea.
- Inlet - Special, Type 1 - 60 In. Ea.
- Inlet - Special, Mountable, Type A - 60 In. Ea.
- Inlet - Special, Catch Basin, 6 In. Beehive - 60 In. Ea.
- Inlet - Special, Catch Basin, 9 In. Beehive - 60 In. Ea.
- Inlet - Special, Catch Basin, Type A - 60 In. Ea.
- Inlet - Special, Type 3 - 60 In. Ea.

December 1, 1989		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION Approved: <i>David K. Lee</i> Design Engineer
Date	Change	
11/90	Note 7 added.	

INLET - SADDLE BASE



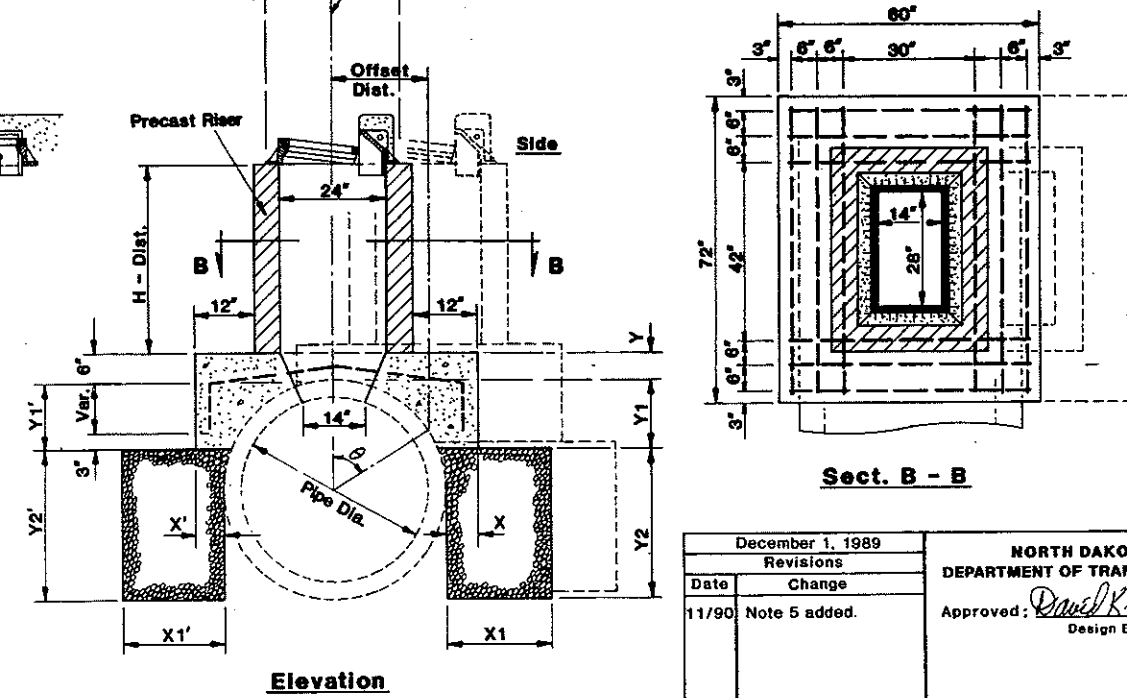
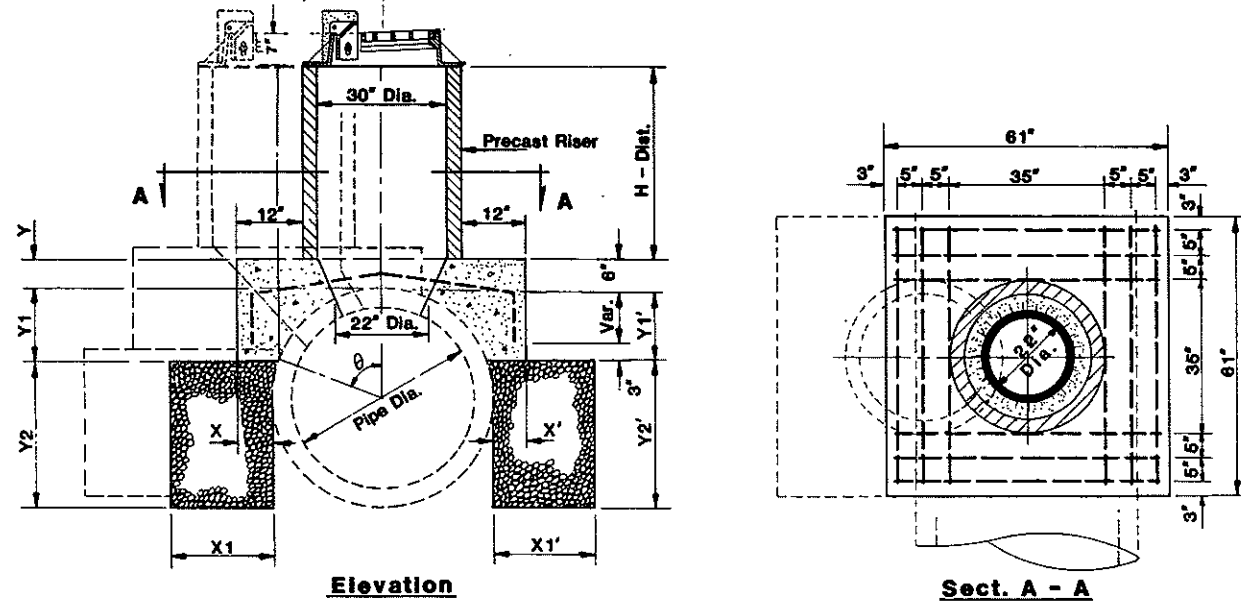
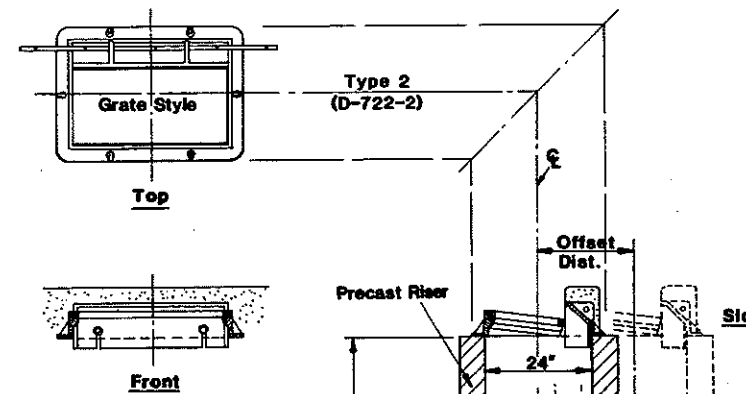
Pipe Dia. (in.)	Offset Angle (Deg.) θ	Offset Dist. (ft.)	Y (ft)	X (ft)	X' (ft)	X1 (ft)	X1' (ft)	Y1 (ft)	Y1' (ft)	Y2 (ft)	Y2' (ft)
42	0	.00	.50	.4	.4	1.7	1.7	1.7	1.7	2.0	2.0
	12.2	.45	.75	.9	—	2.1	—	1.45	1.75	2.0	—
	25.1	.90	.88	1.3	—	2.6	—	1.32	.78	2.0	—
	41.2	1.35	.94	1.8	—	3.0	—	1.33	.37	2.0	—
48	0	.00	.50	.1	.1	1.4	1.4	1.70	1.70	2.0	2.0
	10.7	.45	.71	.6	—	1.8	—	1.49	1.21	2.0	—
	21.9	.90	.82	1.0	—	2.3	—	1.38	.64	2.0	—
	36.8	1.40	.89	1.5	—	2.8	—	1.39	.29	2.0	—
54	0	.00	.50	—	—	—	—	1.77	1.77	—	—
	9.6	.45	.68	.3	—	1.5	—	1.52	.99	2.0	—
	19.4	.90	.78	.7	—	—	—	1.42	.55	2.0	—
	32.4	1.40	.84	1.2	—	2.5	—	1.43	.25	2.0	—
60	0	.00	.5	—	—	—	—	1.41	1.41	—	—
	9.8	.50	.68	—	—	—	—	1.52	.80	—	—
	19.5	1.00	.76	.5	—	1.8	—	1.44	.43	2.0	—
	30.0	1.45	.82	1.0	—	2.2	—	1.47	.21	2.0	—
72	0	.00	.50	—	—	—	—	1.08	1.08	—	—
	8.0	.50	.65	—	—	—	—	1.69	.64	—	—
	16.2	1.00	.72	—	—	—	—	3.04	.35	—	—
	25.6	1.50	.77	.5	—	1.7	—	1.52	.15	2.0	—
84	0	.00	.50	—	—	—	—	.87	.87	—	—
	6.9	.50	.62	—	—	—	—	1.32	.53	—	—
	13.9	1.00	.68	—	—	—	—	1.97	.30	—	—
	21.8	1.50	.73	—	—	—	—	3.15	.13	—	—

Notes:

- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The type of casting and grate style shall be as specified on the plans and included in the price bid for "Inlet - Saddle Base, (casting type)".
- Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
- Precast risers shall be constructed in accordance with AASHTO M199.
- The offset distance shall be noted on the P & P sheets. Interpolate to determine X, Y, X1 ... distances.
- On projects with P.C.C. pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

Pay Items

- Inlet - Saddle Base, Type 1 Ea.
- Inlet - Saddle Base, Type 2 Ea.
- Inlet - Saddle Base, Catch Basin - Type A Ea.
- Inlet - Saddle Base, Catch Basin - 6 In. Beehive Ea.
- Inlet - Saddle Base, Catch Basin - 9 In. Beehive Ea.
- Inlet - Saddle Base, Mountable - Type A Ea.



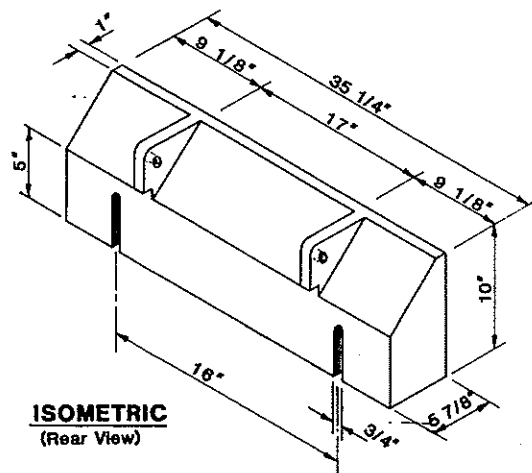
December 1, 1989		<p>NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</p> <p>Approved: <i>Daniel K. O. Lee</i> Design Engineer</p>
Revisions		
Date	Change	
11/90	Note 5 added.	

INLET - TYPE 2

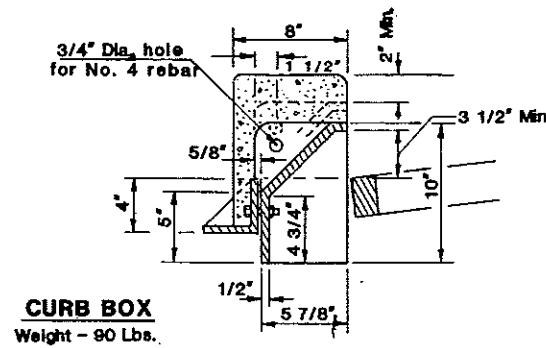
Pay Items

Inlet - Type 1Ea.
 Inlet - Type 2, DoubleEa.

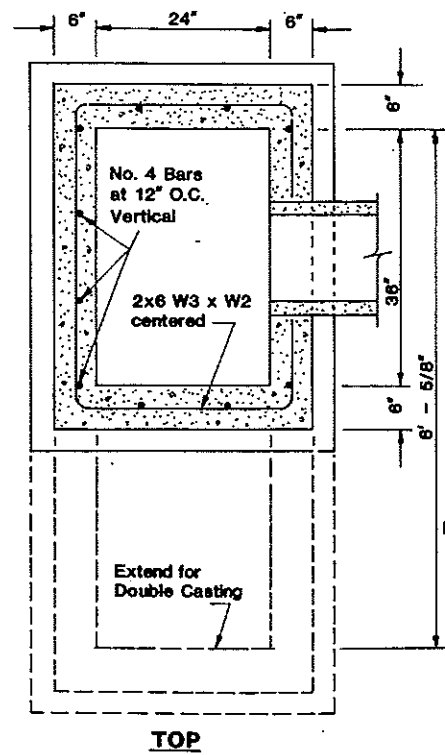
FYWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		D-722-2



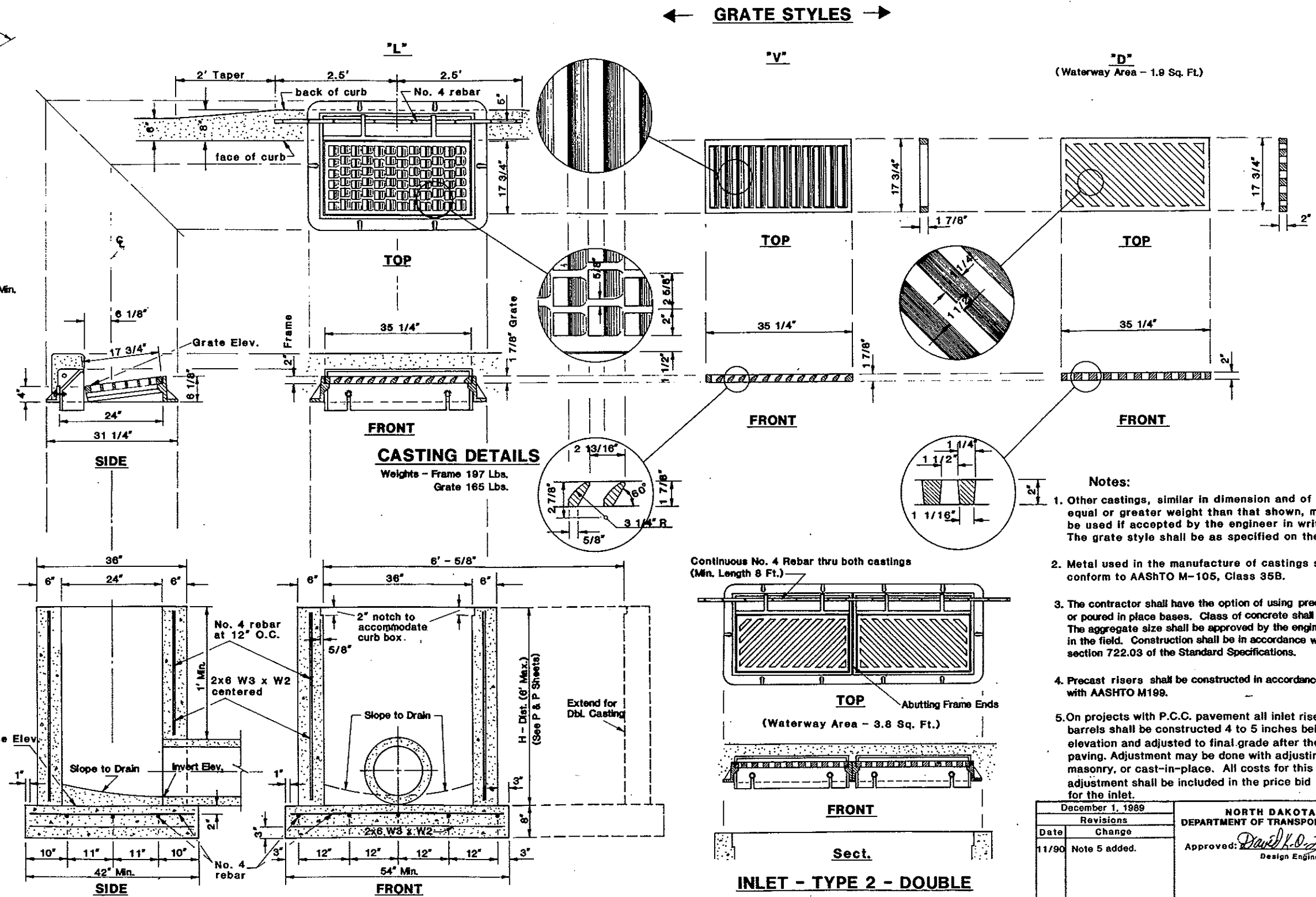
ISOMETRIC
(Rear View)



CURB BOX
Weight - 90 Lbs.

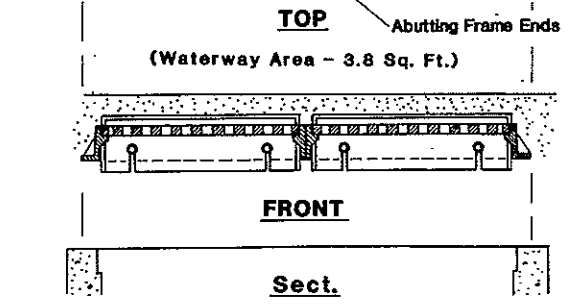
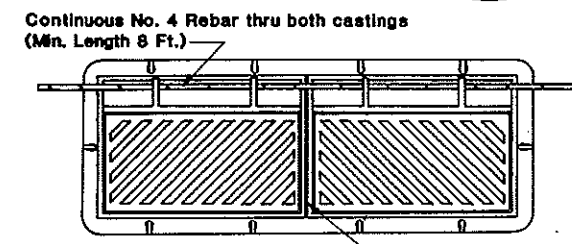


TOP



CASTING DETAILS
Weights - Frame 197 Lbs.
Grate 165 Lbs.

← GRATE STYLES →



INLET - TYPE 2 - DOUBLE

"D"
(Waterway Area - 1.9 Sq. Ft.)

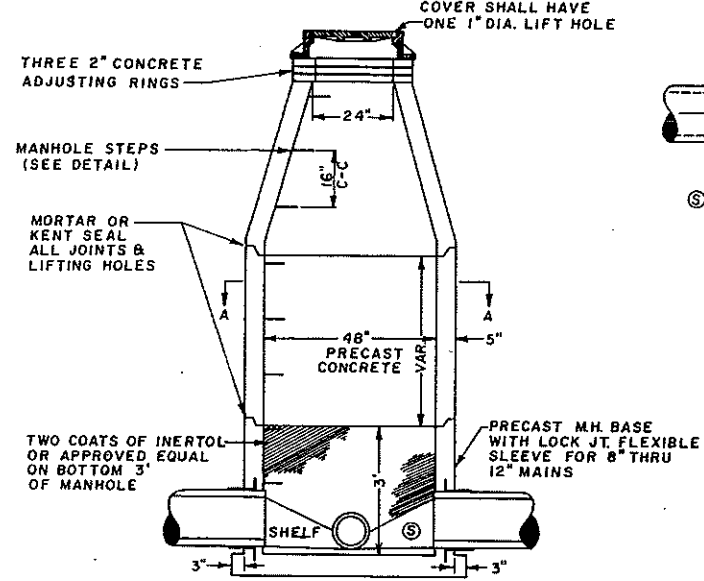
- Notes:**
- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans.
 - Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
 - The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
 - Precast risers shall be constructed in accordance with AASHTO M199.
 - On projects with P.C.C. pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

December 1, 1989	
Date	Change
11/90	Note 5 added.

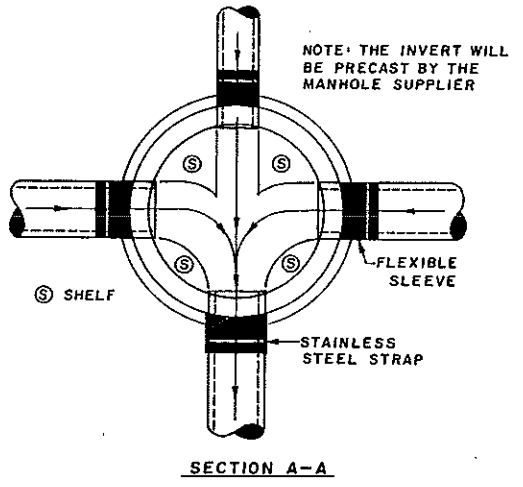
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
Approved: *David H. O. Lee*
Design Engineer

SANITARY MANHOLE

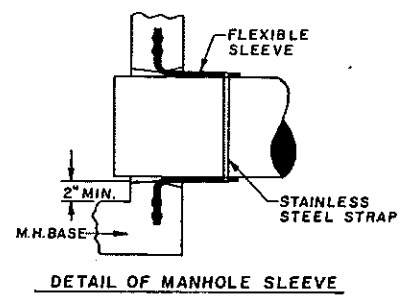
CASTING FRAME & COVER
 NEENAH FOUNDRY CO. R-1726A,
 MUNICIPAL CASTING INC. 304 & 304A
 OR APPROVED EQUAL.



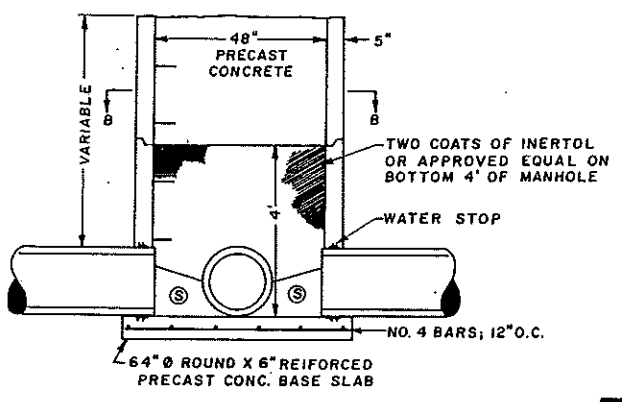
SANITARY MANHOLE FOR 8", 10" & 12" MAINS



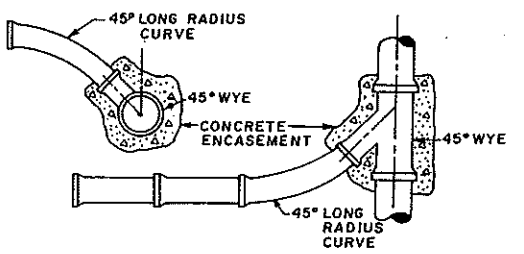
SECTION A-A



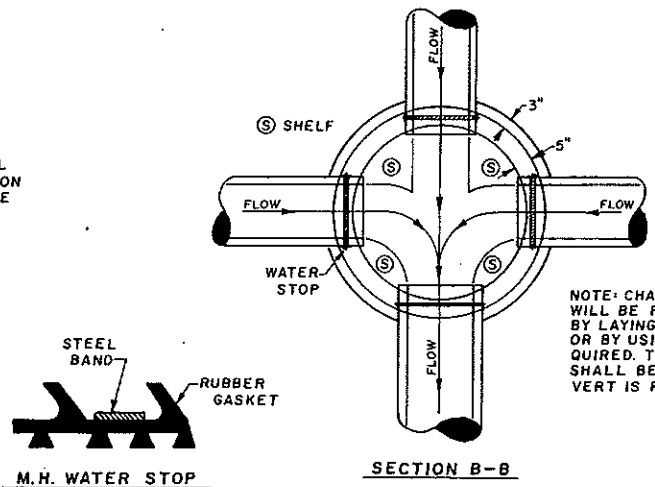
DETAIL OF MANHOLE SLEEVE



SANITARY MANHOLE FOR 15" MAINS & LARGER

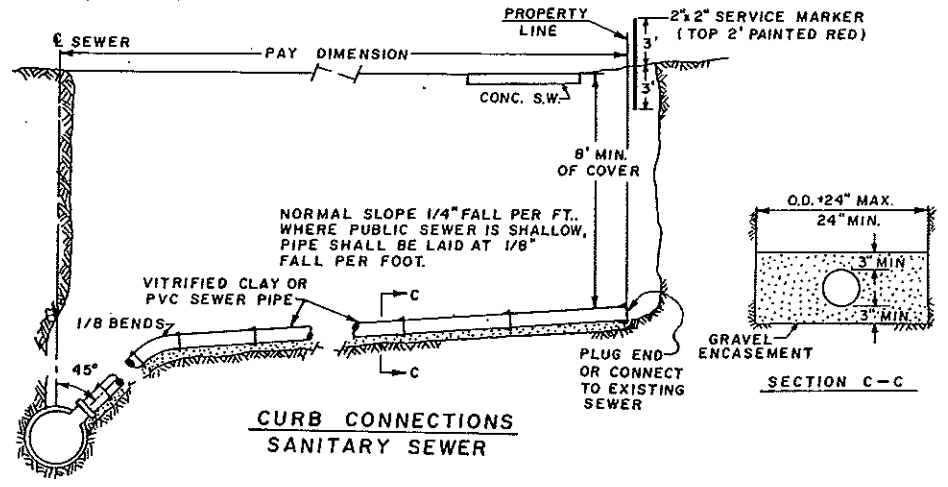


LATERAL CONNECTIONS SANITARY SEWER



SECTION B-B

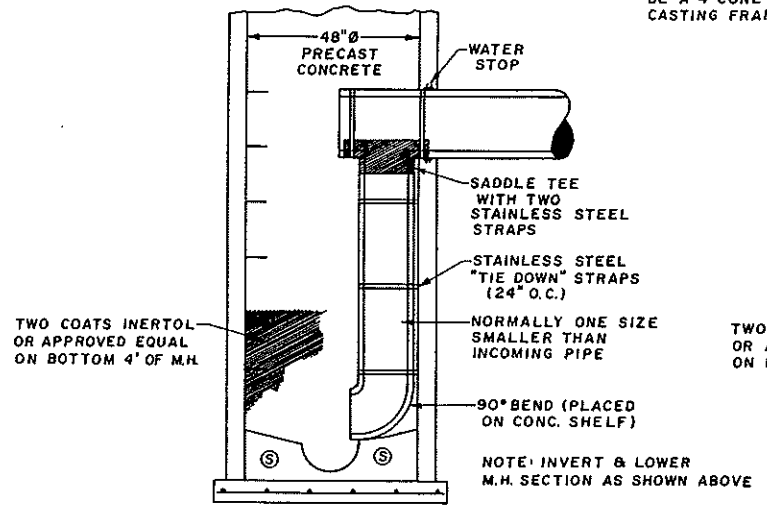
M.H. WATER STOP
 NOTE: APPROVED MANUFACTURERS OF WATER STOP ARE CERTAIN-TEED, FERSCO, & ARMCO.



CURB CONNECTIONS SANITARY SEWER

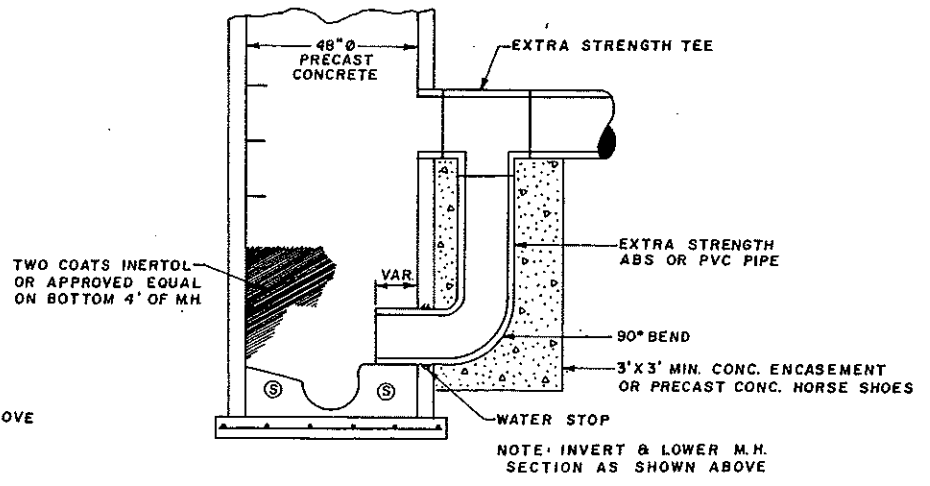
SECTION C-C

NOTE: TOP OF M.H. SHALL BE A 4" CONE WITH STD. CASTING FRAME & COVER



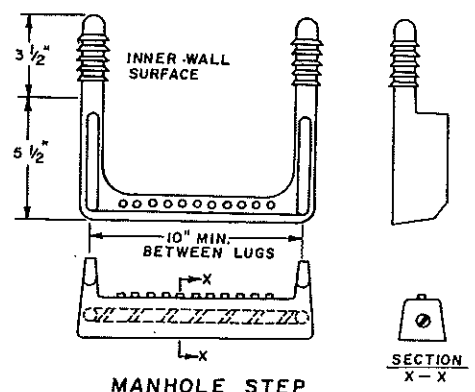
INTERIOR DROP CONNECTION SANITARY MANHOLE

NOTE: THE INTERIOR DROP CONNECTION AS SHOWN, WILL ONLY BE USED WITH THE EXPRESSED CONSENT OF THE ENGINEER.



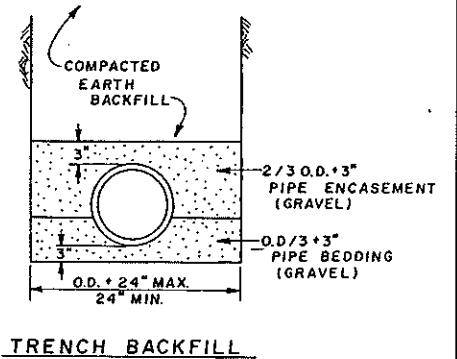
EXTERIOR DROP CONNECTION SANITARY MANHOLE

THE DROP CONNECTION SHALL BE USED FOR A SEWER ENTERING A M.H. AT AN ELEV. 24" OR MORE ABOVE THE MANHOLE INVERT



MANHOLE STEP

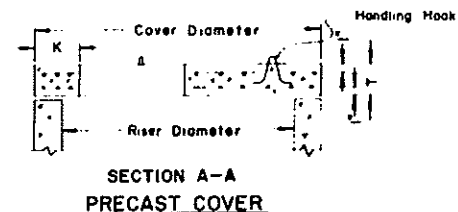
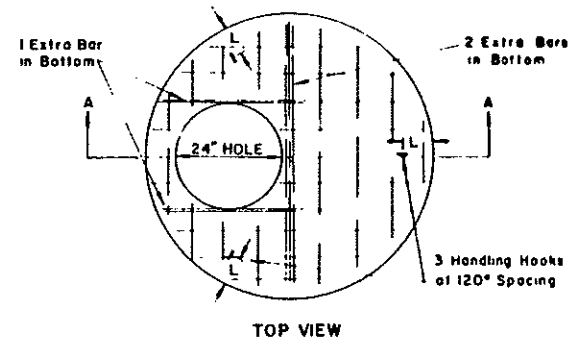
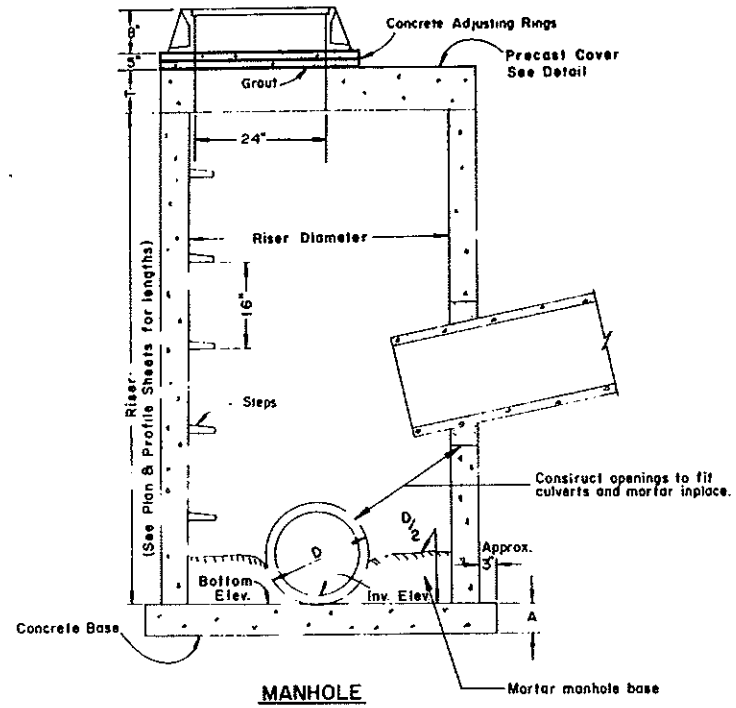
STEP SHALL BE COMPLETELY ENCASED IN A CORROSION RESISTANT RUBBER, WHICH WILL RESIST DETERIORATION FROM HYDROGEN SULPHIDE OR OTHER CHEMICALS AND GASES ENCOUNTERED IN M.H. APPLICATION. ALSO, STEP SHALL HAVE A VERTICAL RESISTANCE OF 400 LBS., & PULLOUT RESISTANCE OF 1000 LBS. SUCH AS: THE WEDGE-LOK STEP BY DELTA PIPE PRODUCTS OR APPROVED EQUAL.



TRENCH BACKFILL

10-1-88		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. [Signature]</i> DESIGN ENGINEER

MANHOLE DETAILS



PRECAST MANHOLE COVERS

PIPE DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM BARS	TOP BARS
42"	51"	800#	6"	6"	7"	#4 AT 6"	
48"	58"	1110#	6"	6"	8"	#4 AT 6"	
54"	65"	1950#	8"	6"	8"	#4 AT 6"	
60"	72"	2470#	8"	7"	9"	#4 AT 6"	#3 AT 6"
66"	79"	3050#	8"	7"	9"	#4 AT 6"	#3 AT 6"
72"	86"	3680#	8"	8"	10"	#4 AT 6"	#3 AT 6"
78"	93"	4360#	8"	8"	10"	#4 AT 4"	#3 AT 4"
84"	100"	5100#	8"	9"	11"	#4 AT 4"	#3 AT 4"
90"	107"	5890#	8"	9"	11"	#4 AT 4"	#3 AT 4"
96"	114"	6730#	8"	9"	11"	#4 AT 4"	#3 AT 4"
102"	121"	7630#	8"	9"	12"	#4 AT 4"	#3 AT 4"
108"	128"	12460#	12"	10"	12"	#4 AT 4"	#3 AT 4"
120"	140"	15500#	12"	11"	13"	#4 AT 4"	#3 AT 4"

Top and Bottom Bars run in both directions

MANHOLE BASES

PIPE DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS
42"	58"	1380#	6"	#3 AT 6"
48"	66"	1785#	6"	#3 AT 6"
54"	72"	2125#	6"	#3 AT 6"
60"	78"	3320#	8"	#3 AT 6"
66"	86"	4030#	8"	#3 AT 6"
72"	92"	4610#	8"	#3 AT 6"
78"	100"	5460#	8"	#3 AT 6"
84"	107"	6230#	8"	#3 AT 6"
90"	114"	7070#	8"	#3 AT 6"
96"	120"	7850#	8"	#3 AT 6"
102"	127"	13200#	12"	#3 AT 6"
108"	132"	14270#	12"	#3 AT 6"
120"	148"	17925#	12"	#3 AT 6"

NOTES: BOTTOMS OF MANHOLES SHALL BE CUT OR PRECAST SQUARE TO FIT THE BASE JOINT BETWEEN BASE AND WALL WITH CEMENT MORTAR. THE CONTRACTOR MAY, IF HE SO DESIRES, CONSTRUCT THE MANHOLES LOWER THAN PLAN GRADE AND BRING THE CASTING TO GRADE USING PRECAST ADJUSTING RINGS IN A MANNER SATISFACTORY TO THE ENGINEER IN THE FIELD.

THE CONTRACTOR SHALL HAVE THE OPTION OF USING PRECAST OR POURED IN PLACE BASES.

PRECAST BASES SHALL BE REINFORCED AS SHOWN IN LISTING FOR EACH SIZE BASE.

THE AGGREGATE SIZE SHALL BE APPROVED BY THE ENGINEER.

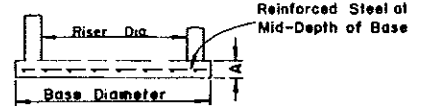
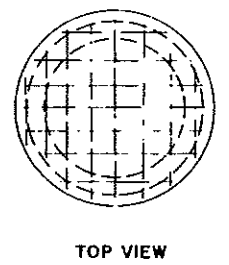
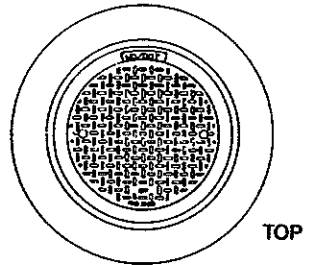
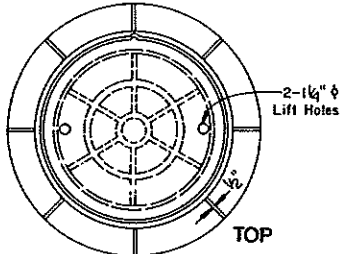
PRECAST BARRELS AND RISERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199.

NOTE: METHOD OF MEASUREMENT FOR MANHOLES SHALL BE AS FOLLOWS: THE CONTRACT UNIT PRICE BID FOR MANHOLES SHALL INCLUDE THE FURNISHING AND INSTALLING THE FOLLOWING:

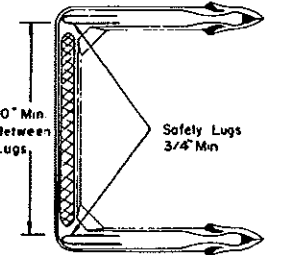
1. CAST IRON RING AND COVER OR BEEHIVE CASTING & COVER
2. PRECAST COVERS
3. CONCRETE BASE
4. CONCRETE ADJUSTING RINGS

THE ITEM "MANHOLE RISER" SHALL INCLUDE THE FURNISHING & INSTALLING OF THE REQUIRED LENGTH OF RISER & CAST STEPS.

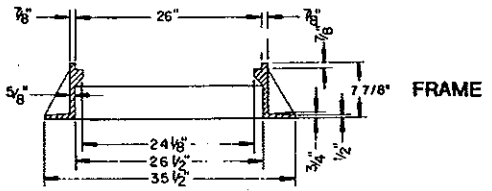
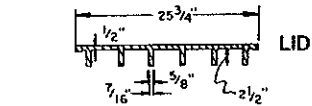
MORTAR TO BE INCLUDED IN THE PRICE BID FOR MANHOLES.



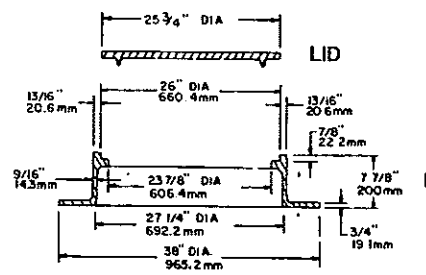
PRECAST MANHOLE BASE



STEP DETAIL

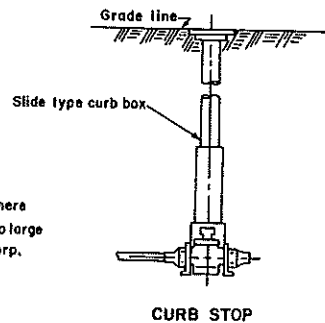


MANHOLE CAST IRON RING & COVER
RIBBED LID - Wt. 201 Lbs.
FRAME - Wt. 251 Lbs.



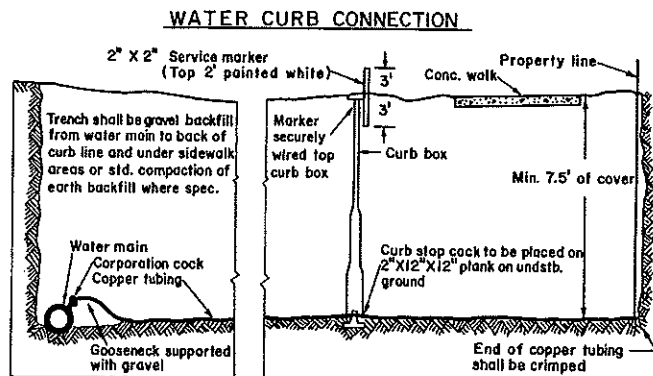
MANHOLE CAST IRON RING & COVER
FLAT LID - Wt. 140 Lbs. (63.5 kg.)
FRAME - Wt. 251 (113.9 kg.)

10-1-88		REVISIONS	NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGE		
8-3-87	NOTE	APPROVED: <i>David K. O. Saar</i> DESIGN ENGINEER	
8-10-80	MANHOLE FRAME & COVER		

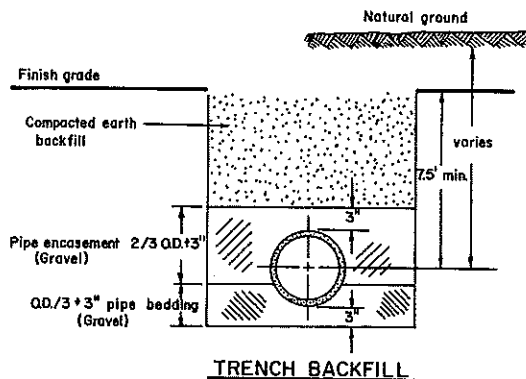


NOTE: Service clamp not required where small size service lines connect to large C.I.P. and three threads of the corp. stop make contact with the wall.

CURB STOP

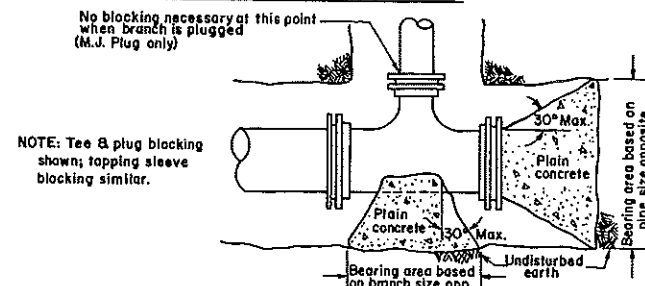


SECTIONAL ELEVATION



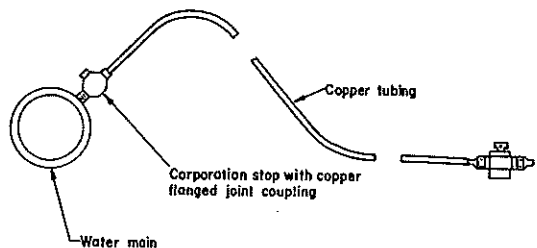
TRENCH BACKFILL

WATERMAIN THRUST BLOCK DETAILS



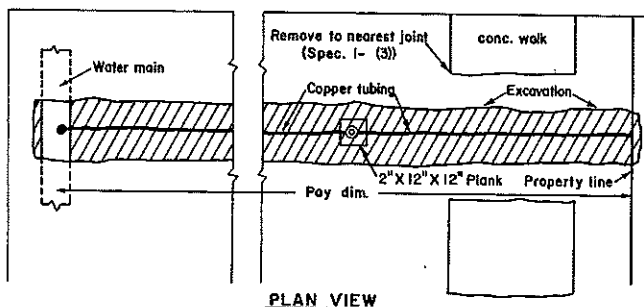
NOTE: Tee & plug blocking shown; tapping sleeve blocking similar.

TEE, PLUG & TAPPING SLEEVE



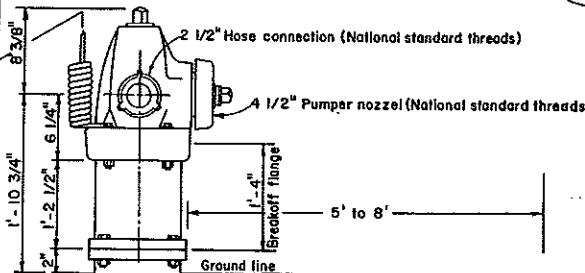
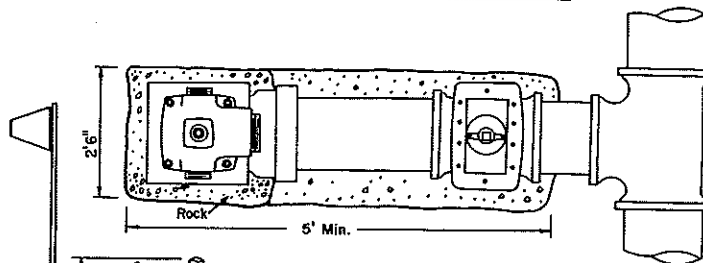
TYPICAL CORPORATION STOP AND CURB STOP

No Scale



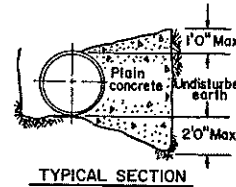
PLAN VIEW

STANDARD FIRE HYDRANT & CONNECTION



NOTES:

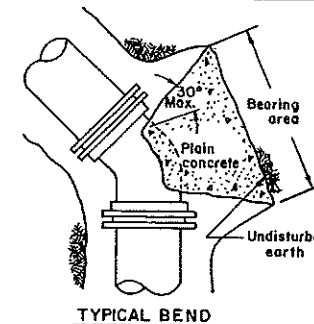
- Operating & Cap nuts: city standards
- Supplier will furnish and install hydrant marker. Cost will be included with the unit bid price for the hydrant. The hydrant marker shall be the Nordic Flexi-Flag as manufactured by Nordic Fiberglass, Inc. or approved equal. marker will be rust resistant.



TYPICAL SECTION

SIZE OF PIPE	90° BEND	45° BEND	22.5° BEND	11.25° BEND	TEES, PLUGS & TAPPING SLEEVE
4"	2' SQ.	2' SQ.	2' SQ.	2' SQ.	2' SQ.
6"	3' SQ.	2' SQ.	2' SQ.	2' SQ.	3' SQ.
8"	5' SQ.	3' SQ.	2' SQ.	2' SQ.	4' SQ.
10"	8' SQ.	4' SQ.	3' SQ.	2' SQ.	6' SQ.
12"	11' SQ.	6' SQ.	3' SQ.	2' SQ.	8' SQ.
15"	20' SQ.	11' SQ.	6' SQ.	4' SQ.	15' SQ.
18"	25' SQ.	14' SQ.	7' SQ.	4' SQ.	18' SQ.

NOTE: Concrete blocking to be poured against undisturbed earth. Keep bells and bolts free of concrete. Concrete in place to be included in price bid for water main.



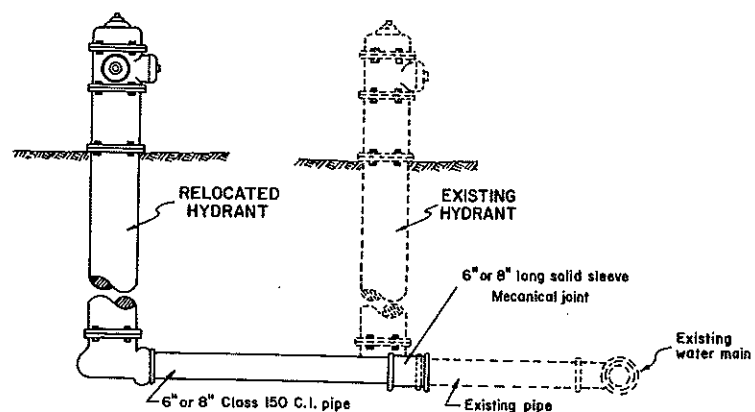
TYPICAL BEND

THRUST BLOCK DETAIL

No Scale

Concrete thrust blocking to be placed as directed.

Hydrant to be set on a precast concrete pad 6" thick by 18" sq. The hydrant shall be surrounded by 1/2 C.Y. course conc. aggr.



LAYOUT FOR RELOCATION OF HYDRANTS

TYPICAL SEQUENCE OF INSTALLATION

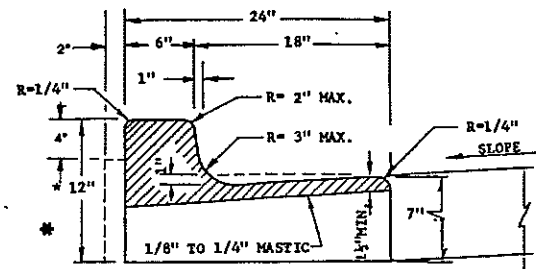
- Remove existing hydrant.
- Install long solid sleeve mech. joint, CI 150 C.I.P.
- Install 6" or 8" CI 150 C.I. Pipe (length as needed).
- Install salvaged hydrant at new location.

All materials necessary for the Relocation of the Hydrant to be included in price bid for "Relocate Hydrant". Existing water main valve to be adjusted as necessary and paid for as "Adjusted Utility Appurtenances."

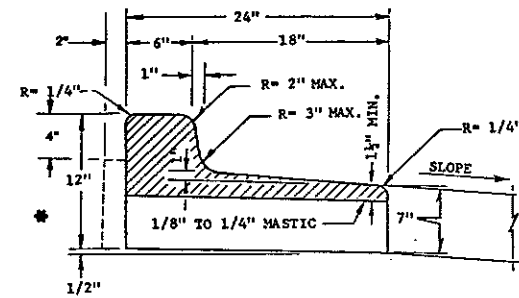
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. O. Lee</i> DESIGN ENGINEER

VALLEY GUTTER AND CURB & GUTTER

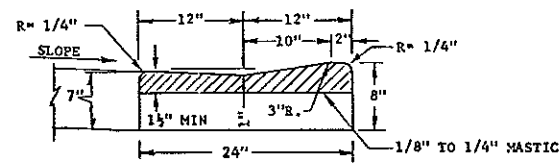
D-748-1



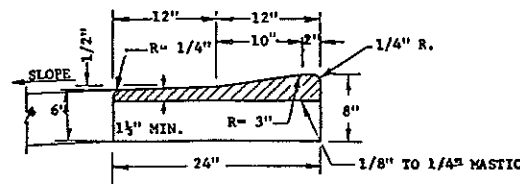
CURB & GUTTER TYPE I (SEC A)
* 16" SEC. B
14" SEC. C



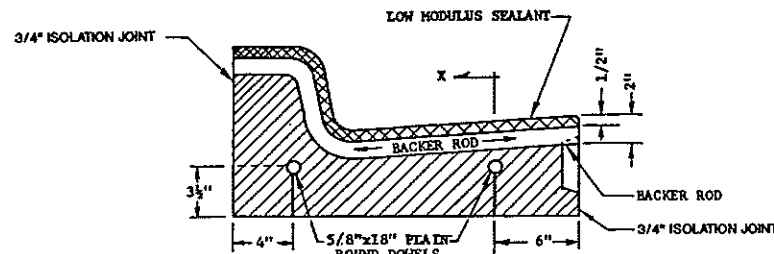
CURB & GUTTER TYPE I (SEC. D)



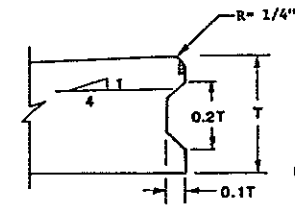
MOUNTABLE CURB & GUTTER TYPE I (SEC. A)



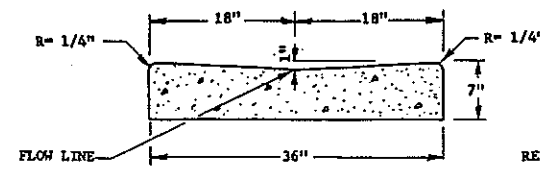
MOUNTABLE CURB & GUTTER TYPE I (SEC. B)



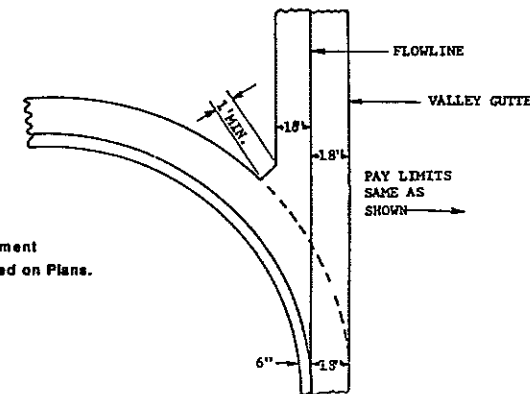
ISOLATION JOINT DETAIL



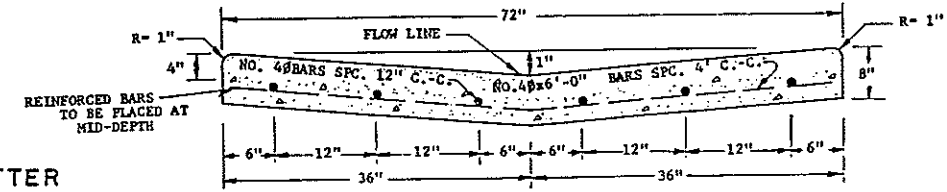
KEYWAY DETAIL FOR CURB & GUTTER
(TO BE USED WITH P.C.C. PAVEMENT AND DRIVES.)



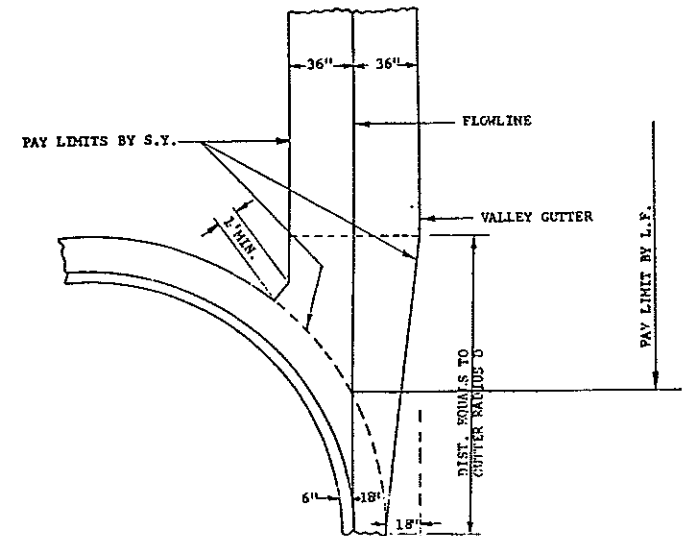
36" CONCRETE VALLEY GUTTER



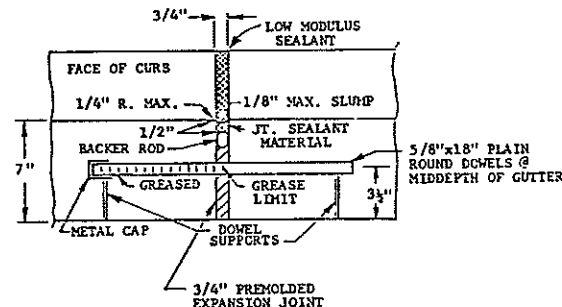
36" CONCRETE VALLEY GUTTER



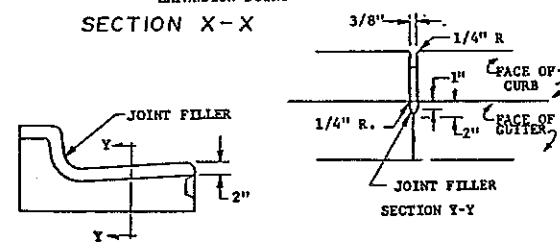
72" CONCRETE VALLEY GUTTER



72" CONCRETE VALLEY GUTTER

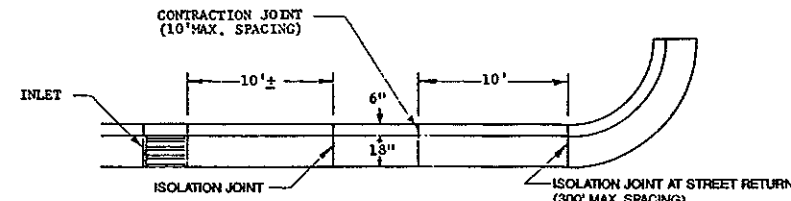


SECTION X-X



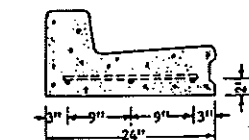
SECTION Y-Y

SCORED CONTRACTION JOINT DETAIL
(10' MAX. SPACING)



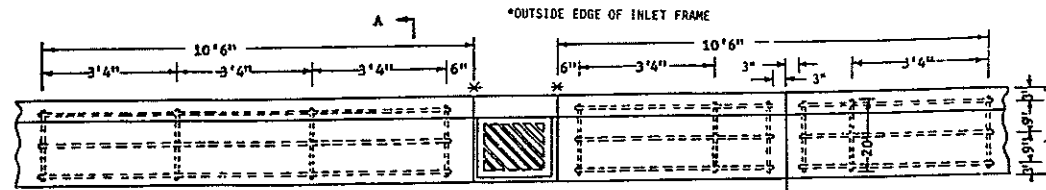
JOINT LOCATION DETAIL

HOT BITUMINOUS PAVEMENT



SECTION A-A

NOTE: ALL BARS SHALL BE #4 DEFORMED REINFORCING BARS. SPLICES WILL NOT BE PERMITTED. REINFORCING BARS AT INLET LOCATIONS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE PRICE BID FOR "CURB AND GUTTER - TYPE I."



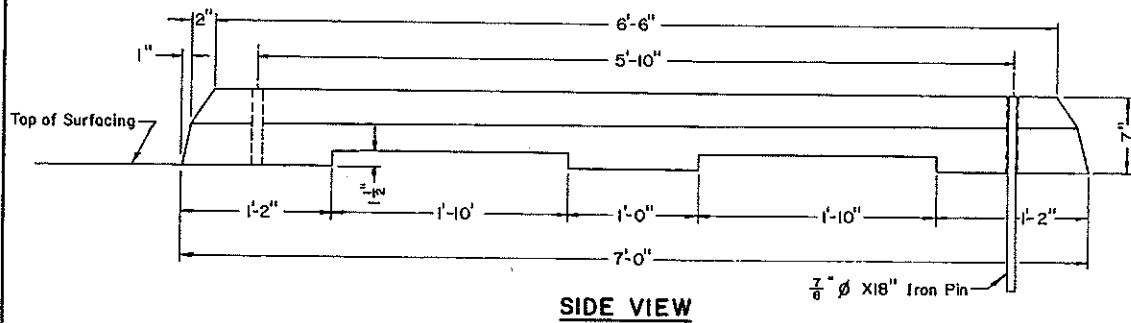
CURB & GUTTER REINFORCING AT INLETS
(This includes Inlets Located on Radi)

- NOTES:
- CURB AND GUTTER TYPE I (SEC. A) TO BE USED UNLESS OTHERWISE SPECIFIED.
 - CONTRACTION JOINTS: USE 1/8" - 1/4" ASPHALTIC MASTIC BOARD EMBEDDED 1 1/2" INTO THE GUTTER AND THROUGH THE CURB, OR SCORE THE CURB AND GUTTER 2" AS SHOWN IN THE DETAIL.
 - ISOLATION JOINTS - ISOLATION JOINT MATERIAL SHALL BE 3/4" PREMOLDED CONFORMING TO SECTION 826.02 B OF THE STANDARD SPECIFICATIONS. THE OPENING FOR THE BACKER ROD AND JOINT SEALANT SHALL BE FORMED BY A PRE-CUT PIECE OF WOOD OR OTHER MATERIAL APPROVED BY THE ENGINEER. DOWEL SUPPORTS ARE NOT REQUIRED ON THE SECOND POUR AT A COLD JOINT. THE METAL CAP AND GREASED DOWEL SHALL BE ON THE SECOND POUR.
 - JOINT SPACING - FOR HOT BITUMINOUS PAVEMENTS THE JOINT SPACING OF THE CURB AND GUTTER SHALL BE AS SHOWN IN THE DETAIL. THE CURB AND GUTTER JOINTS SHALL MATCH THE PAVEMENT JOINT ON PCC PAVEMENTS.
 - JOINT SEALING - ALL CONTRACTION AND ISOLATION JOINTS SHALL BE SEALED AS SHOWN IN THE DETAILS. THE JOINT SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE. THE SEALANT SHALL BE TOoled AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
 - THE COST FOR ALL LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO CONSTRUCT CONTRACTION, & ISOLATION JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR CURB AND GUTTER.

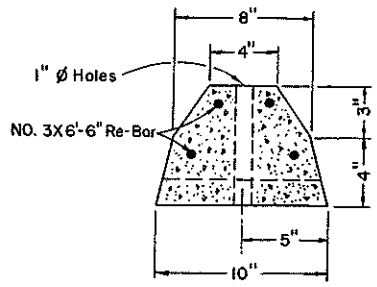
10-1-88 REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION DESIGN ENGINEER
DATE	CHANGE	
10-1-87	NOTE REMOVED	APPROVE <i>David R. Seeger</i>
3/1/88	Keyed Jt. Dimension	
6/19/88	C & G Rehl. at Inlets	
7/5/88	Rein. Radl Inlets	
3-27-82	Add 2" ledge	
11-15-93	ISOLATION JOINT	

D748-3

PRE-CAST CONCRETE CURB SECTIONS



SIDE VIEW



SECTION

NOTES

Pre-Cast Concrete Curb Sections shall be manufactured and installed in accordance with the current specifications for this item.

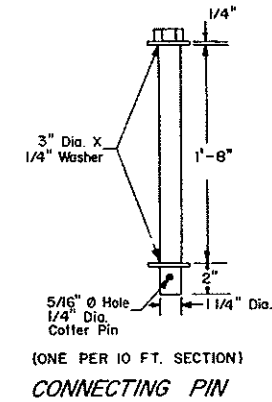
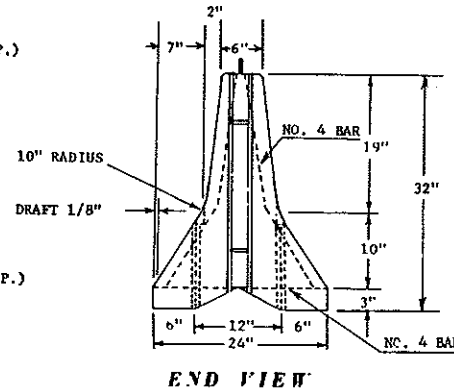
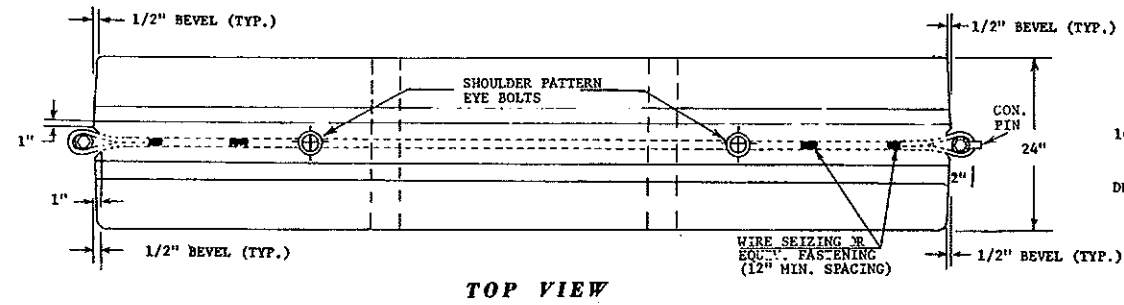
METHOD OF MEASUREMENT & BASIS OF PAYMENT:

Pre-Cast Concrete Curb Sections shall be paid for at the contract unit price per each complete in place, which price shall be payment in full for all materials, labor, tools, equipment and incidentals necessary to install this unit as shown on this Standard Drawing at the locations designated on the plans.

Size 1, 3, 4 or 5 Coarse Aggregate may be used for Concrete.

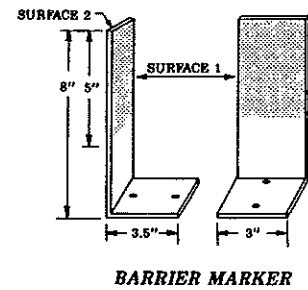
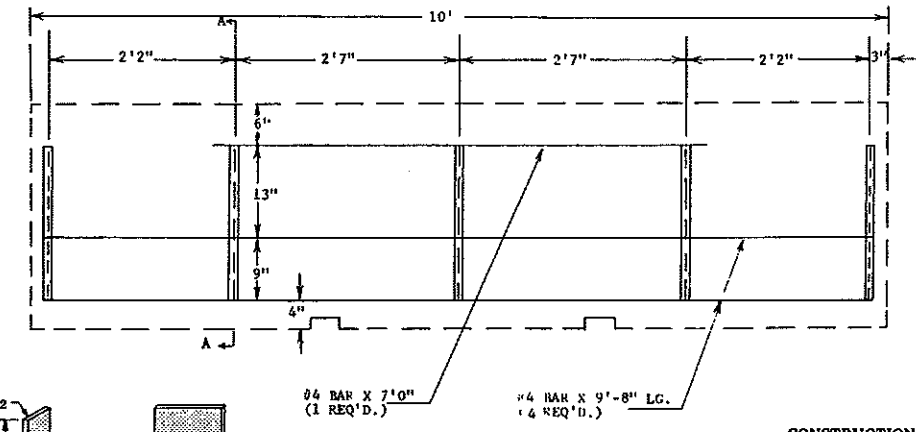
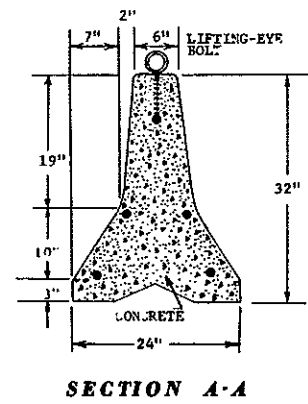
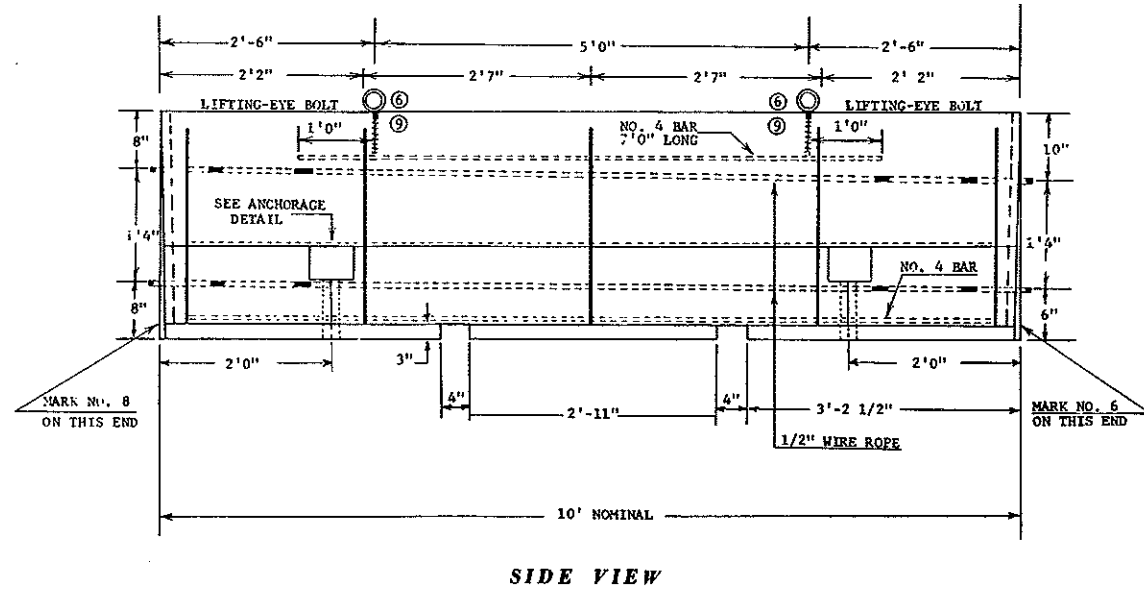
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>Davis K. Olson</i> DESIGN ENGINEER

PORTABLE PRECAST CONCRETE MEDIAN BARRIER (TEMPORARY USEAGE)



NOTES:

1. ALL THE EXPOSED HARDWARE IS TO BE GALVANIZED AS PER ASTM A 153, EXCEPT FOR THE LOOP INSERTS.
2. THE CONCRETE SHALL BE CLASS A OR AE.
3. ALL STEEL SHALL CONFORM TO SECTION 612.
4. APPROXIMATE WEIGHT IS 3850 POUNDS. (10' SECTION) REINFORCEMENT WEIGHT IS 60 POUNDS. (10' SECTION)
5. MARKED ENDS OF THE BARRIER (6 AND 8) ARE FOR FIELD PLACEMENT. MATCH NO. 6 WITH NO. 8.
6. 1" DIAMETER SHOULDER PATTERN EYEBOLT AS PER ASTM A489 OR AN ALTERNATE APPROVED BY THE ENGINEER.
7. LOAD TO THE EYEBOLTS ARE TO BE APPLIED IN THE PLANE OF THE EYE.
8. EYEBOLTS ARE TO BE PROPERLY SEATED.
9. 1" COIL THREADED LOOP INSERT OR AN APPROVED EQUIVALENT. MINIMUM LIFTING STRENGTH IS TO BE 4000 POUNDS SAFE WORKING LOAD.
10. THE WIRE ROPE IS TO CONFORM TO ASTM A 603 CLASS 1.5 OF C COATING OR AN APPROVED EQUIVALENT, ULTIMATE STRENGTH 220,000 PSI, MAXIMUM ELONGATION 4% IN 10" LENGTH.



COLOR OF REFLECTIVE FACES SHALL BE THE SAME AS THE EDGE LINE ALONG BARRIER EDGE. 2 WAY REFLECTIVE ON SURFACE 1 & 2.

PROPERTY	RESULT	ASTM TEST METHOD
Thickness (min)	.000"	
Tensile Strength (min psi) @ yield	5,500	D638
Impact Strength @ -20°F (ft-lbs/in of notch)	3.2	D255 Method A
Impact Strength @ 73°F (ft-lbs/in of notch)	14.0	D255 Method A
Flexural Strength, PSI 1/4" @ 73°F	8,000	D790
Flexural Modulus, PSI 1/4" @ 73°F	300,000	D790
Elongation @ Yield	30%	D638

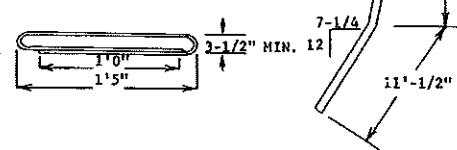
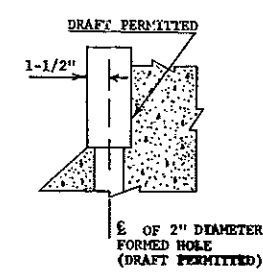
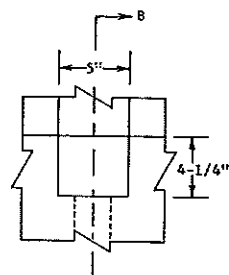
REFLECTIVE TAPE

THE REFLECTOR SHALL BE A RETRO-REFLECTIVE, ACRYLIC MICROPRISM MATERIAL WITH ACRYLIC BACKING, 3" WIDE, PROVIDING THE FOLLOWING MINIMUM OPTICAL PERFORMANCE WITH AN OBSERVATION ANGLE OF 0.1° MEASURED IN CANDLEPOWER:

ENTRANCE ANGLE	SPECIFIC INTENSITY
Yellow -4°	136
White -4°	200

ADHESIVE

THE MARKERS SHALL BE TEMPORARILY MOUNTED TO THE PORTABLE CONCRETE BARRIER WITH FACTORY APPLIED, SOLID BUTYL RUBBER 1/8" THICK, 2" WIDE ON 2 1/4" WIDE RELEASE PAPER ON SURFACE 3.



ANCHORAGE DETAIL

SECTION B-B

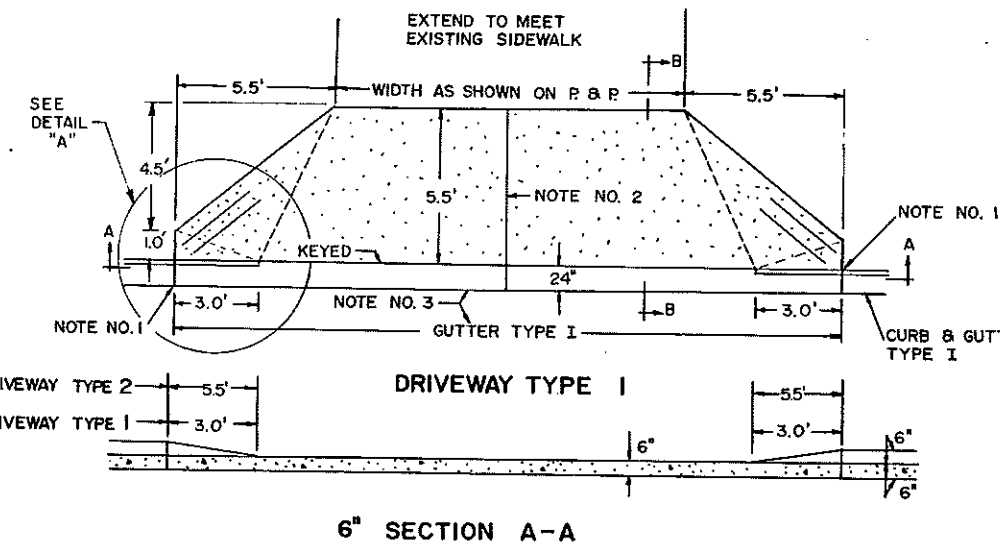
NO. 4 BAR

NO. 4 BAR

10-1-86		REVISIONS	
DATE	CHANGE	DATE	CHANGE
8-1-88	CONNECTING PIN		
4-28-89	CONNECTING PIN NOTE		
12-1-88	REFLECTIVE TAPE & MARKER BODY		
5-1-92	GENERAL REVISIONS		
7-31-92	REFLECTIVE TAPE		
7-3-95	GENERAL REVISIONS		
8-21-95	Remove Delineator Barrel		

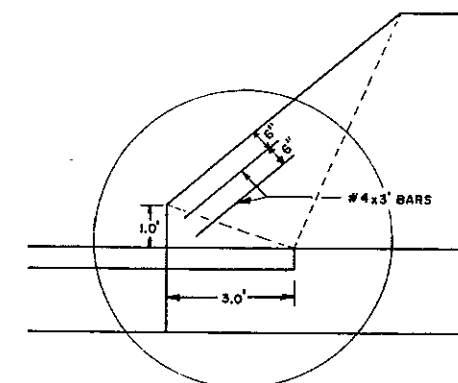
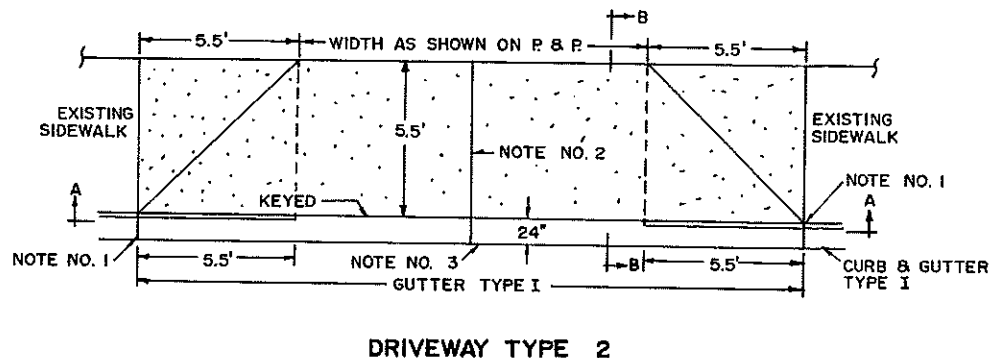
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Spear*
DESIGN ENGINEER

CONCRETE DRIVEWAY (URBAN)

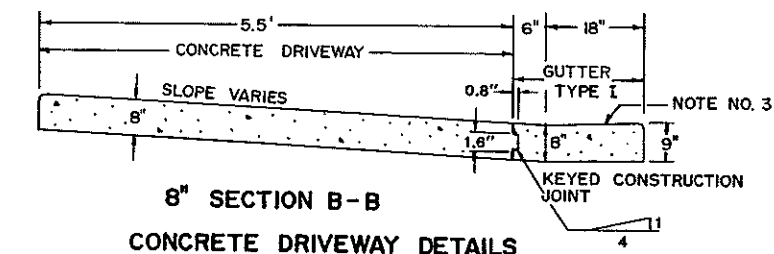
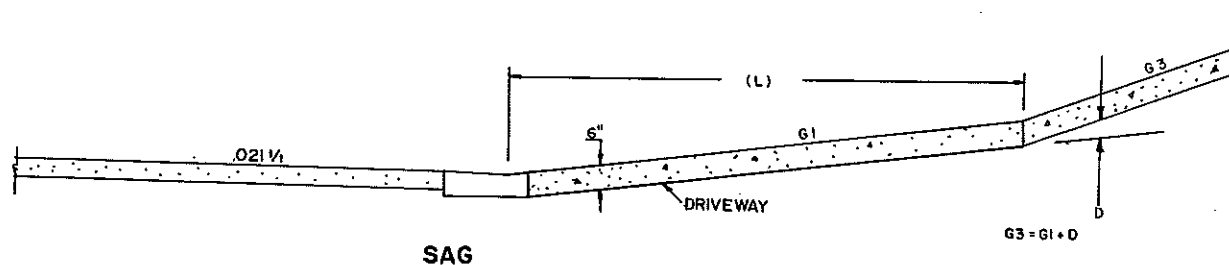
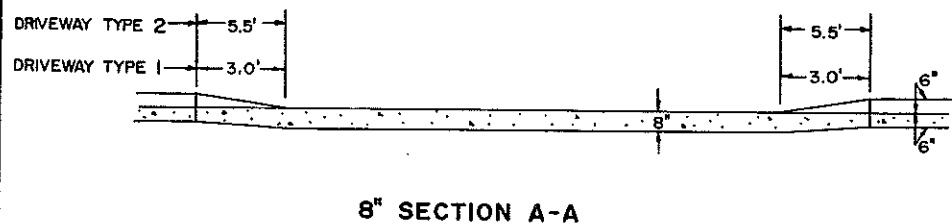
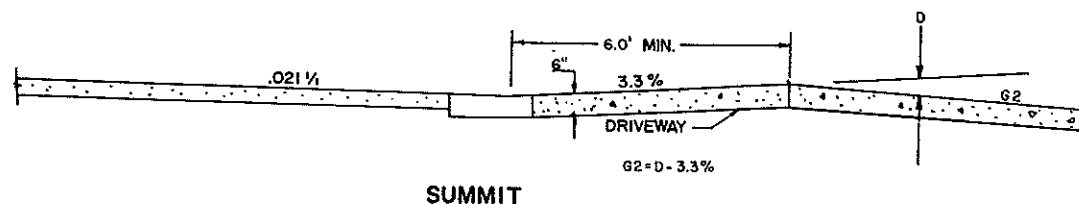
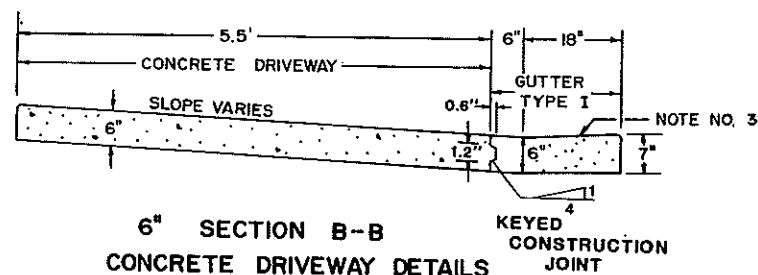


- NOTE NO. 1 ON BITUMINOUS PAVEMENTS PLACE A 3/4" ISOLATION JOINT FULL DEPTH AND THE SAME SHAPE AS THE CURB AND GUTTER. ON PCC PAVEMENTS THE CURB AND GUTTER JOINTS MATCH THOSE OF THE PAVEMENT.
- NOTE NO. 2 JOINT SPACING-THE DRIVEWAY JOINT SPACING SHALL MATCH THE CURB AND GUTTER OR PCC PAVEMENT JOINT SPACING. (SEE STANDARD DRAWING D-748-1) THE JOINT MAY BE A KEYED CONSTRUCTION JOINT, A SAWS, OR A GROOVED JOINT. THE JOINT DEPTH SHALL BE A MINIMUM OF 1/3 THE DEPTH OF THE CONCRETE.
- NOTE NO. 3 GUTTER-TYPE I SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "CURB AND GUTTER-TYPE I."
- NOTE NO. 4 6" DRIVEWAY TO BE USED UNLESS OTHERWISE SPECIFIED.

DRIVEWAY QUANTITIES (S.Y.)		
WIDTH	TYPE 1	TYPE 2
10'	10.1	12.8
12'	11.3	14.1
14'	12.5	15.3
16'	13.8	16.5
18'	15.0	17.7
20'	16.2	18.9
22'	17.4	20.2
24'	18.6	21.4
26'	19.9	22.6
28'	21.1	23.8
30'	22.3	25.1



- NOTE NO. 5 ALL JOINTS SHALL BE SEALED. THE JOINT SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE. THE SEALANT SHALL BE INSTALLED AND TOOLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
- NOTE NO. 6 ALL COSTS FOR LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO CONSTRUCT AND SEAL JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR THE DRIVEWAY.



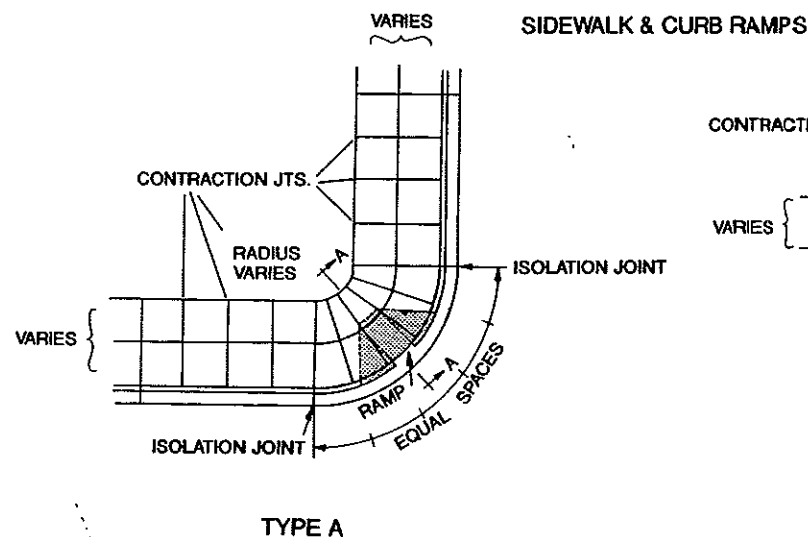
Driveway	Grade G1		Dimension (L) ft.		Grade Changes (D)	
	Desirable	Maximum	Desirable	Minimum	Desirable	Maximum
ADT	5% (1)	12% (2) or Controlled by Vehicle Clearance	12	8	+ 6%	15% or Controlled by Vehicle Clearance
(0-500)	5% (1)	8% (2)	20	20	± 3%	± 6%
(500-1500)	3%	5%	40	40	0%	± 3%
(>1500)	2%	5%	40	40	0%	± 3%

(1) 2% At Sidewalk Locations (2) 6% At Sidewalk Locations

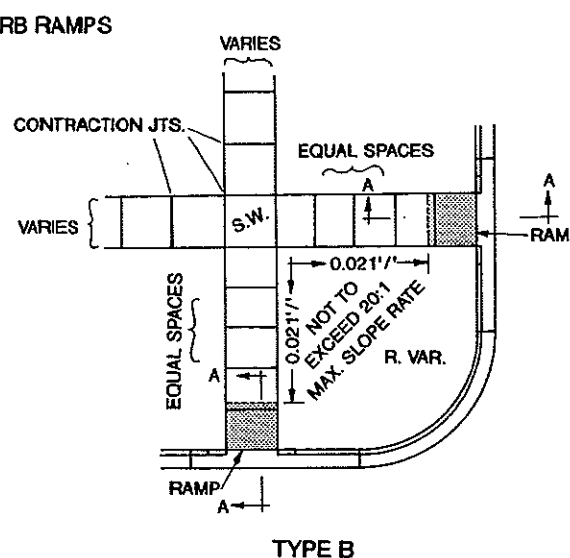
10-1-86 REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGE	
3/1/88	Keyed Jt. Dimension	APPROVED: <i>David K. ...</i> DESIGN ENGINEER
7/1/88	Type I Tapers	
7-1-88	Type I Quantities	
5-1-91	NOTE 2, 5, and 6	
6-8-92	NOTE 1	
9-15-93	NOTE 5	
11-15-93	ISOLATION JOINT	
10-24-94	REV. SUMMIT & SAG	

NOTES

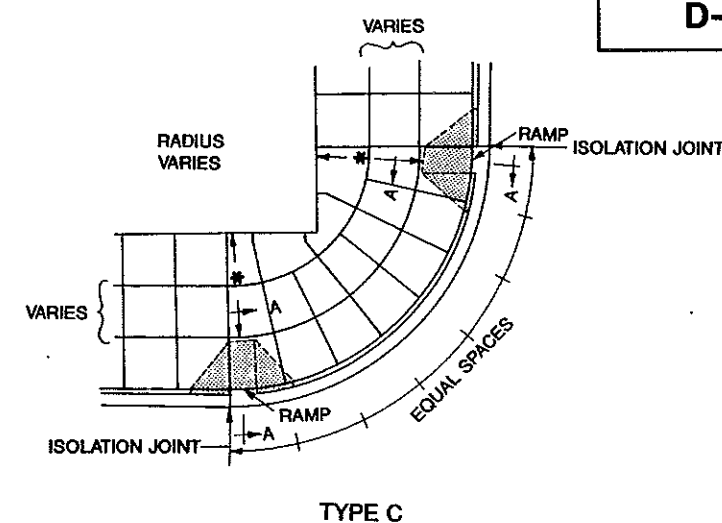
1. THE EXACT LOCATION & TYPE OF RAMP SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD AFTER CONSULTATION WITH THE CITY ENGINEER & CHANGES MADE ACCORDINGLY.
2. THE RAMP SHALL HAVE A SLIP RESISTANT SURFACE
3. METHOD OF PAYMENT: THE CURB RAMP WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE QUANTITIES & PAID FOR AT THE UNIT PRICE FOR CONCRETE SIDEWALK AND CURB & GUTTER.
4. THE COST FOR ALL LABOR, EQUIPMENT, AND MATERIAL (Pre-molded Expansion Material & Hot Bituminous Joint Filler) NECESSARY TO CONSTRUCT CONTRACTION AND ISOLATION JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR SIDEWALK.



TYPE A

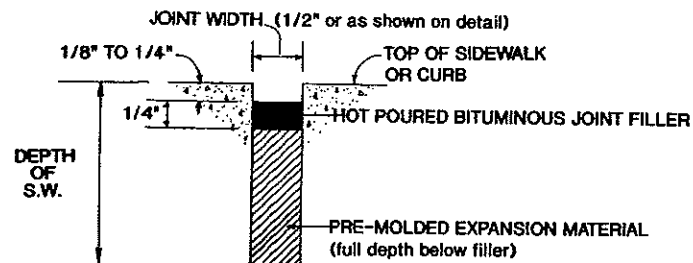


TYPE B

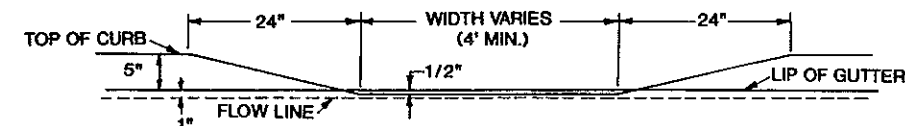


TYPE C

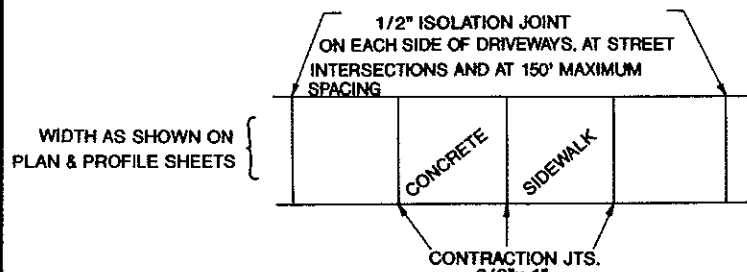
TYPE II CURB AS SHOWN ON THE PLANS OR AT THE DIRECTION OF THE ENGINEER, A CURB SHALL BE CONSTRUCTED WHERE THE EXISTING SIDEWALK, ABUTTING A BUILDING OR ADJACENT PROPERTY, IS TO BE LOWERED. THE CURB WILL BE PAID FOR AT THE UNIT PRICE BID FOR CURB (TYPE-1) PER LINEAL FOOT.



TYPICAL ISOLATION JOINT SEAL (longitudinal and transverse)



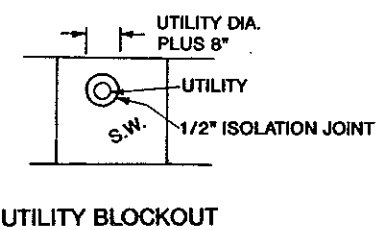
DEPRESSED CURB FOR PEDESTRIAN CROSSING (TYPE B RAMP)



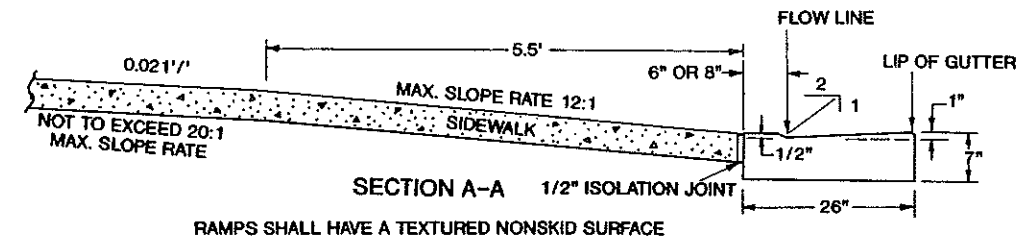
CONCRETE SIDEWALK DETAILS

SIDEWALK WIDTH	AVERAGE CONTRACTION JOINT SPACING
4'-6"	5'
OVER 6'	6'

WHEN THE SIDEWALK IS ADJACENT TO THE CURB & GUTTER THE SIDEWALK JOINTS SPACING SHALL BE VARIED SO THAT THE SIDEWALK JOINTS MATCH UP WITH THE CURB & GUTTER JOINTS

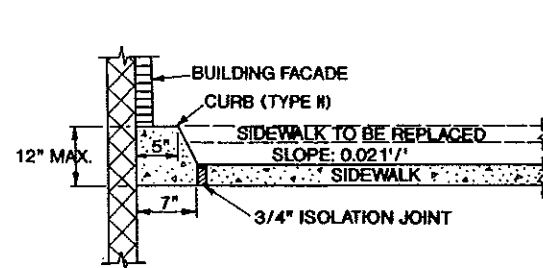


UTILITY BLOCKOUT

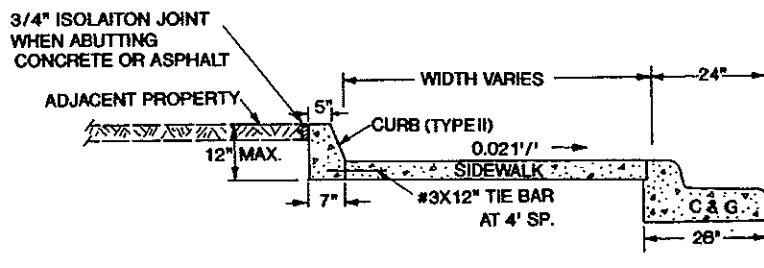


DEPRESSED CURB FOR PEDESTRIAN CROSSING (TYPE A & C RAMP)

* IF LESS THAN 4' USE 12:1 SIDE SLOPE ** SIDE VIEW

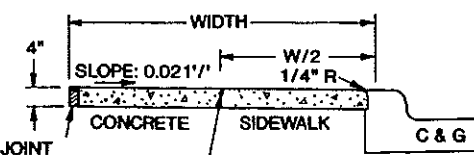


TYPE II CURB DETAIL



CURB DETAIL

3/4" ISOLATION JOINT WHEN ABUTTING EXISTING CONCRETE OR STRUCTURES



3/8"x 1" TO BE USED WHERE SIDEWALK WIDTH IS 7' OR GREATER

3-18-92	
DATE	CHANGE
9-1-92	REMOVE DETECTABLE WARNING
9-23-92	REVISED EXPANSION JOINT
12-9-95	ISOLATION JOINT
2-16-94	GENERAL REVISIONS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED *[Signature]*
 DESIGN ENGINEER

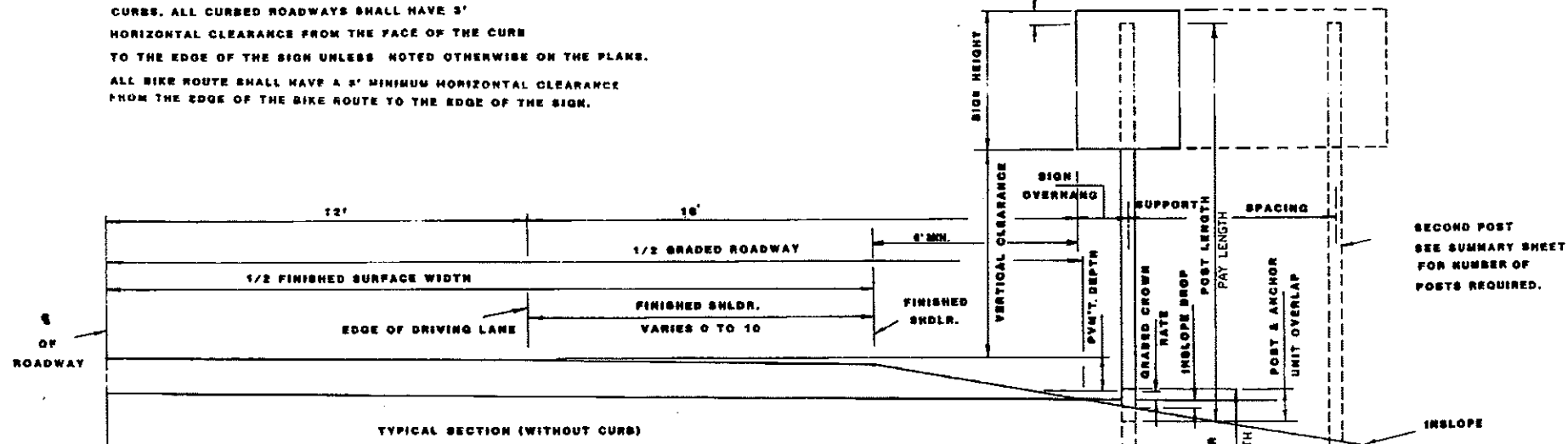
ASSEMBLY DETAILS

MINIMUM HORIZONTAL CLEARANCE

THE 18' CLEARANCE FROM THE EDGE OF THE DRIVING LANE TO THE EDGE OF THE SIGN SHALL BE FOR ALL ROADWAYS WITHOUT CURBS. ALL CURBED ROADWAYS SHALL HAVE 3' HORIZONTAL CLEARANCE FROM THE FACE OF THE CURB TO THE EDGE OF THE SIGN UNLESS NOTED OTHERWISE ON THE PLANS. ALL BIKE ROUTE SHALL HAVE A 3' MINIMUM HORIZONTAL CLEARANCE FROM THE EDGE OF THE BIKE ROUTE TO THE EDGE OF THE SIGN.

MINIMUM VERTICAL CLEARANCE

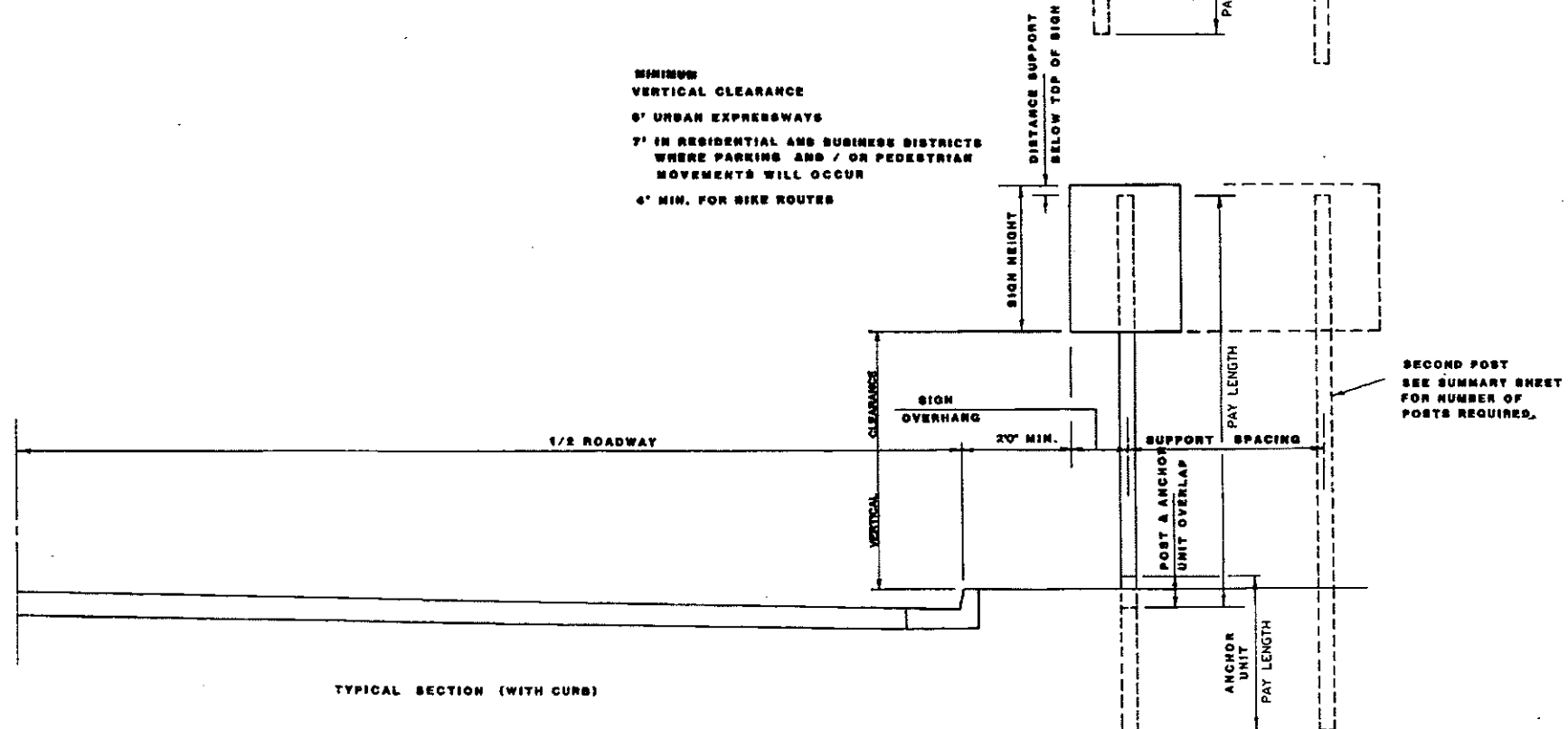
8' RURAL ROADWAYS
6' ON RURAL OR URBAN EXPRESSWAYS
7' ON FREEWAYS



TYPICAL SECTION (WITHOUT CURB)

MINIMUM VERTICAL CLEARANCE

8' URBAN EXPRESSWAYS
7' IN RESIDENTIAL AND BUSINESS DISTRICTS WHERE PARKING AND / OR PEDESTRIAN MOVEMENTS WILL OCCUR
4' MIN. FOR BIKE ROUTES



TYPICAL SECTION (WITH CURB)

NOTE

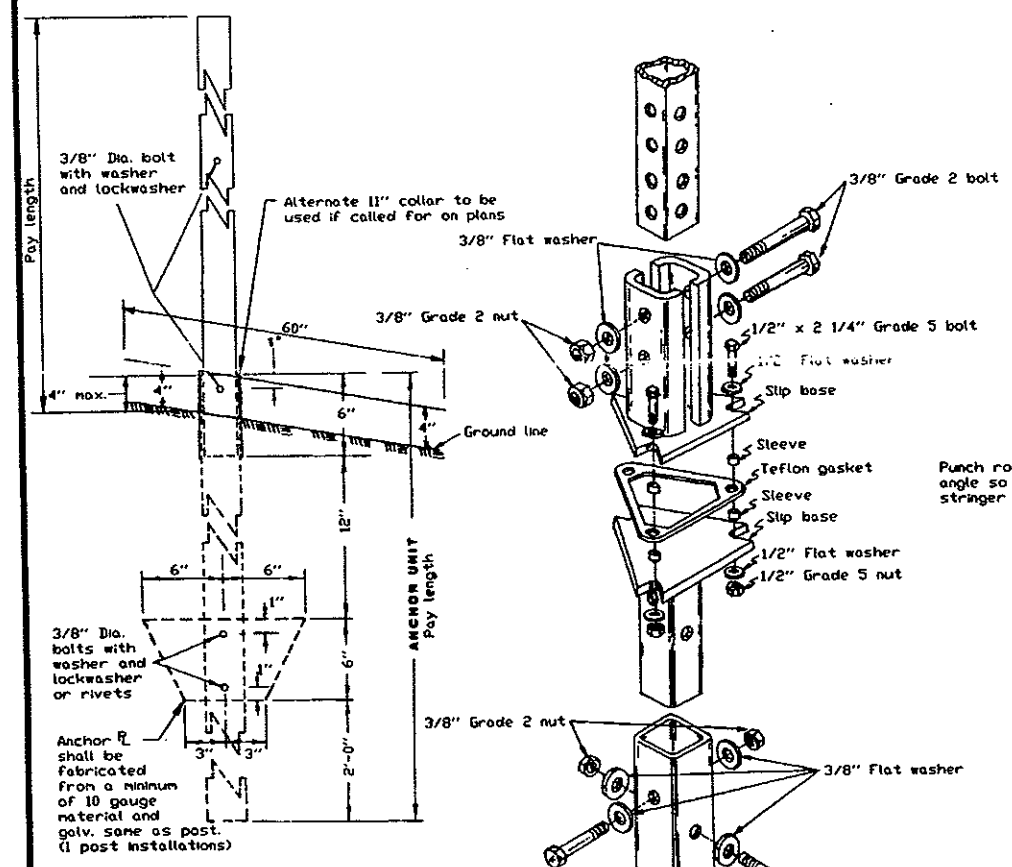
PAVEMENT DEPTH-THE PAVEMENT DEPTH USED TO DEVELOP SUMMARY SHEETS SHOULD BE THE ULTIMATE PAVEMENT DEPTH. SEE PLANS FOR SIGN NUMBERS AND ASSEMBLY NUMBERS. SIGN PUNCHING AND STRINGERS SHALL BE AS SHOWN ON STANDARDS. HORIZONTAL CLEARANCE:

THE POST LENGTHS HAVE BEEN COMPUTED USING A HORIZONTAL CLEARANCE OF 18 FEET BETWEEN THE EDGE OF THE DRIVING LANE AND THE EDGE OF THE SIGN. FOR AN ULTIMATE SHOULDER WIDTH OF 10 FEET, THE DISTRICTS HAVE THE OPTION OF SETTING THE SIGNS OUT TO 18 FEET CLEARANCE. IF THE CLEARANCE IS TO BE INCREASED TO 18 FEET, THE NECESSARY ADJUSTMENT IN SUPPORT LENGTH SHALL BE MADE IN THE FIELD.

10-1-86	
REVISIONS	
DATE	CHANGE
8-1-88	FREEWAYS
9-4-90	MIN. OVERHANG FROM SHOULDER
5-1-92	GENERAL REVISIONS
9-3-92	MIN. CLEARANCE
9-8-95	PAY LENGTH

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *[Signature]*
Design Engineer

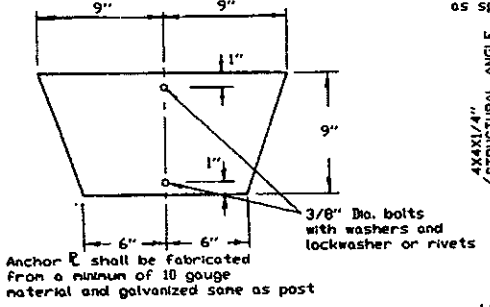
MOUNTING DETAILS PERFORATED TUBE



ANCHOR UNIT AND POST SLEEVE ASSEMBLY

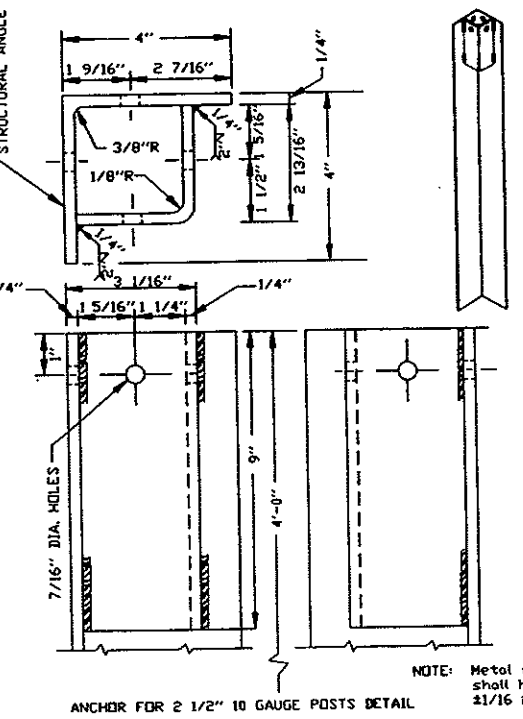
SLIP BASE ASSEMBLY DETAILS

NOTE: Slip base bolts shall be torqued as specified by the manufacturer



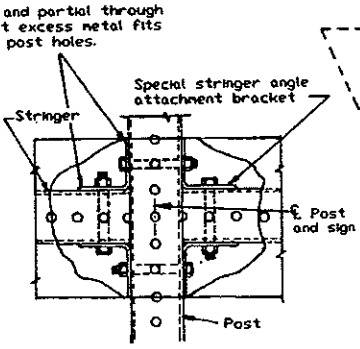
ANCHOR PLATE DETAIL (2 or more post installations)
The 2 3/16 inch size 10 gauge is shown as 2.19 inch size on the plans. The 2 1/2 inch size 10 gauge is shown as 2.51 inch size on the plans.

TELESCOPING PERFORATED TUBES - TYPE I						
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
1 1/2 x 1 1/2	.105	12	1.702	.129	.380	.172
2 x 2	.105	12	2.416	.372	.590	.372
2 1/4 x 2 1/4	.105	12	2.773	.561	.695	.499
2 3/16 x 2 3/16	.135	10	3.432	.605	.841	.590
2 1/2 x 2 1/2	.105	12	3.141	.804	.803	.643
2 1/2 x 2 1/2	.135	10	4.006	.979	1.010	.785
4 x 4	.250	1/4	6.600	3.040	1.940	1.05
SQUARE TELESCOPING STEEL POSTS - TYPE II						
1 3/4 x 1 3/4	.105	12	2.304	.232	.486	.265
2 x 2	.105	12	2.654	.372	.590	.372
2 1/4 x 2 1/4	.105	12	3.004	.564	.697	.501
2 1/2 x 2 1/2	.105	12	3.354	.803	.802	.642



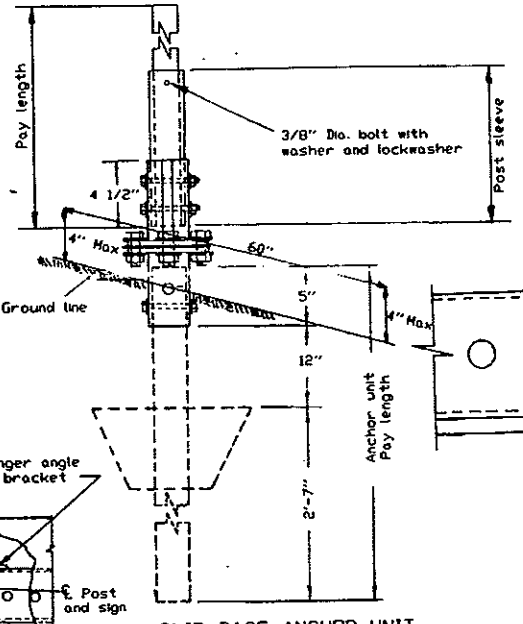
ANCHOR FOR 2 1/2" 10 GAUGE POSTS DETAIL

NOTE: Metal washer and nylon washers used on sign face shall have a minimum outside diameter of 15/16 inch and 10 gauge thickness.



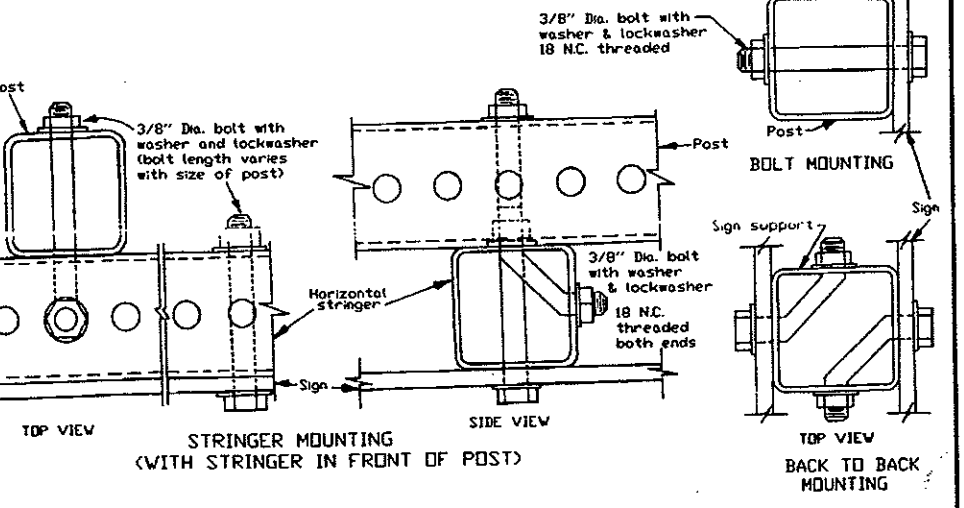
SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY

Punch round and partial through angle so that excess metal fits stringer and post holes.
For single post assemblies having only one stringer or with back to back signs.



STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location, and also back and ahead of post.

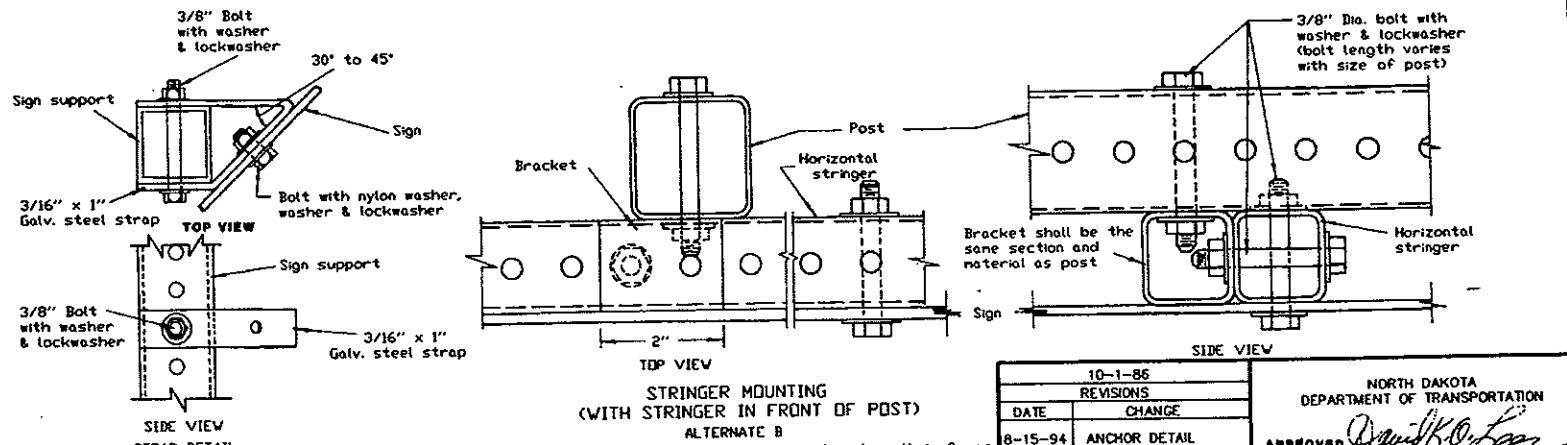


BOLT MOUNTING

BACK TO BACK MOUNTING

NUMBER OF POSTS	TELESCOPING PERFORATED TUBE TYPE I					SQUARE TELESCOPING STEEL POSTS TYPE II						
	POST SIZE	WALL THICKNESS GAUGE	SLEEVE SIZE	ANCHOR SIZE	SLIP BASE	POST SIZE	WALL THICKNESS GAUGE	SLEEVE SIZE	ANCHOR SIZE	SLIP BASE		
1	2	12		2 1/4	12	NO	1 3/4	12		2	12	NO
1	2 1/4	12		2 1/2	12	NO	2	12		2 1/4	12	NO
1	2 3/16	10		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO
1	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO
1	2 1/2	10		A	3/16	YES	2 1/2	12		2 1/2	12	YES
1	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES
1	2 1/2	12	2 1/4	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES
2	2	12		2 1/4	12	NO	2	12		2 1/4	12	NO
2	2 1/4	12		2 1/2	12	NO	2	12		2 1/4	12	NO
2	2 3/16	10		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO
2	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO
2	2 1/2	10		A	3/16	YES	2 1/2	12		2 1/2	12	YES
2	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES
2	2 1/2	12	2 1/4	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES
3 & 4	2 1/2	12		2 1/2	12	YES	2 1/4	12		2 1/4	12	YES
3 & 4	2 1/2	10		A	3/16	YES	2 1/2	12		2 1/2	12	YES
3 & 4	2 1/2	12	2 1/4	2 1/2	12	YES	2 1/4	12	2	2 1/4	12	YES
3 & 4	2 1/4	12	2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES
3 & 4	2 1/2	10	2 3/16	A	3/16	YES	2 1/2	12	2 1/4	2 1/2	12	YES

Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1 3/4" x 3/16" thick, 108 lbs./ft. aluminum alloy or 3.16 lbs./ft. steel.



STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST) ALTERNATE B

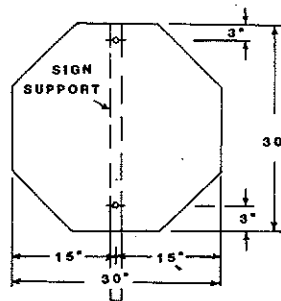
No Parking Signs: All no parking signs that have directional arrows placed on their faces shall be placed at 30 to 45 degree angle with oncoming traffic. No parking signs placed at the above angles may have the support turned at the correct angle unless the no parking sign is placed with another sign that has to be placed at 90 degree angle with oncoming traffic in which case the detailed angle strap should be used to mount the no parking sign. Material used for the attachment straps shall be included in the price bid for flat sheet signs. Flat washers & lockwashers shall be used with all nylon washers.

10-1-86 REVISIONS	
DATE	CHANGE
8-15-94	ANCHOR DETAIL
3-20-95	REV. 4X4 POST
9-8-95	PAY LENGTH

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Olson*
DESIGN ENGINEER

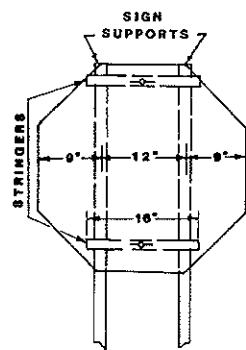
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING, AND GUIDE SIGNS

D-754-26

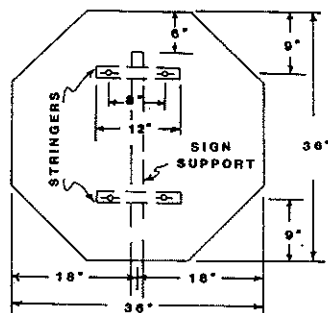


1 POST

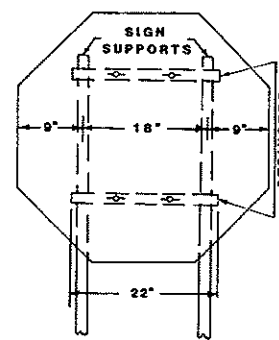
ASSEMBLY NO. 1



2 POSTS

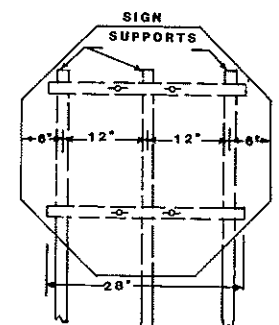


1 POST

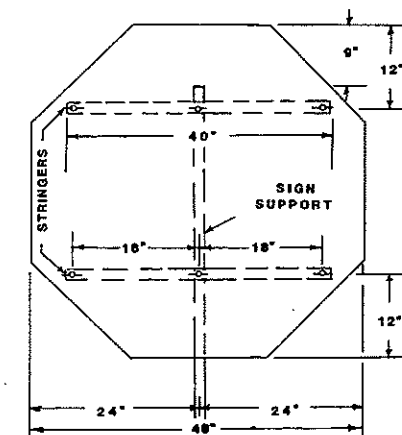


2 POSTS

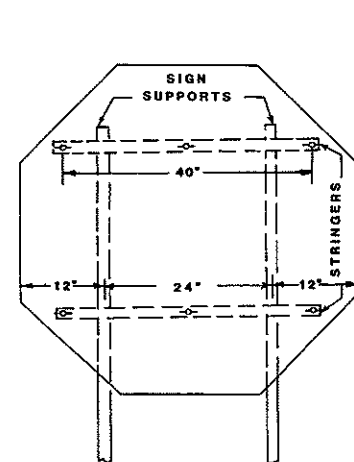
ASSEMBLY NO. 2



3 POSTS

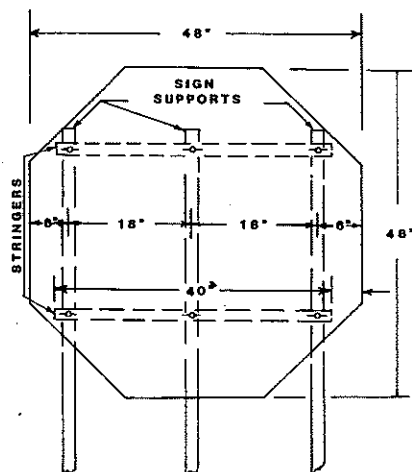


1 POST

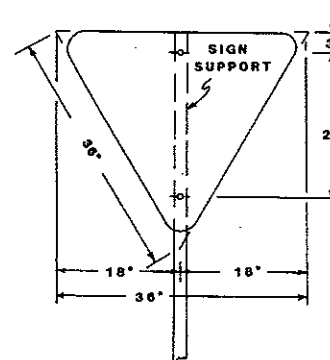


2 POSTS

ASSEMBLY NO. 3

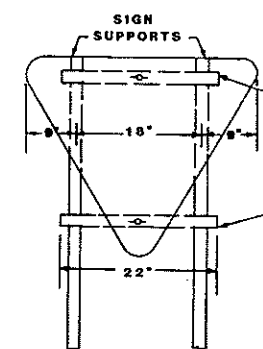


3 POSTS



1 POST

ASSEMBLY NO. 4



2 POSTS

NOTE:

Material:

Signing Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 6062-H38 shall have the following minimum thickness; All signs shall be 0.100 inch.

Stringers:

Flange Channel: All stringers shall be flange channel 1.12# per foot and of the length shown.

Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.

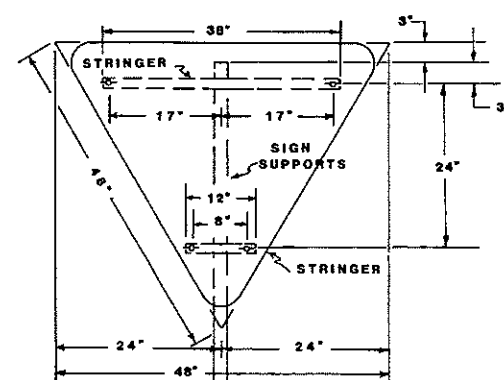
Holes:

Flange Channel: All holes shall be punched round for 3/8" diameter bolts.

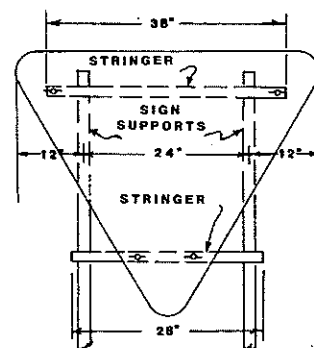
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:

See plans for sign numbers to be used at each location.
See Std. D-754-24 square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

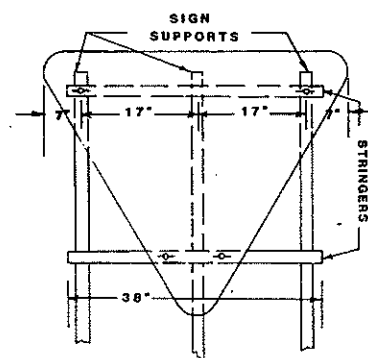


1 POST



2 POSTS

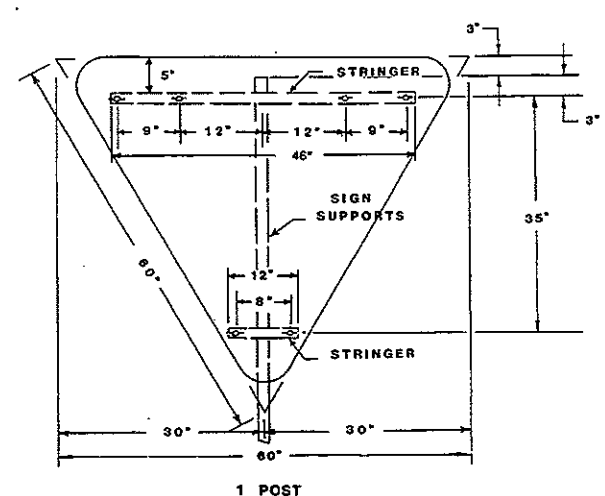
ASSEMBLY NO. 5



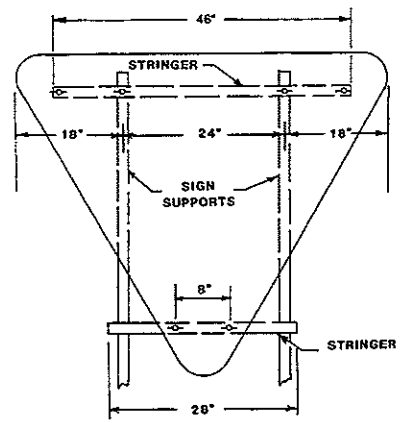
3 POSTS

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. [Signature]</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	

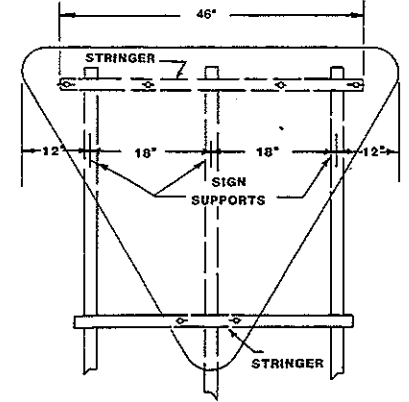
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



1 POST

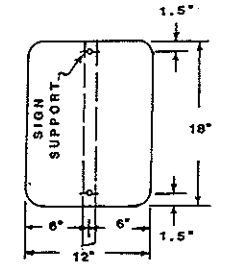


2 POSTS



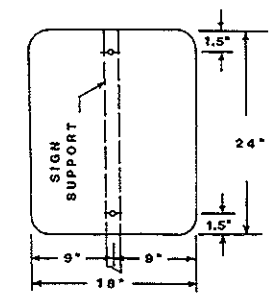
3 POSTS

ASSEMBLY NO. 6



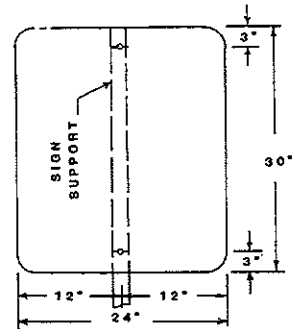
1 POST

ASSEMBLY NO. 7



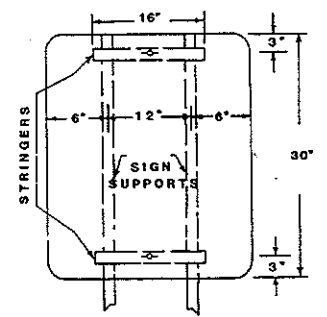
1 POST

ASSEMBLY NO. 8

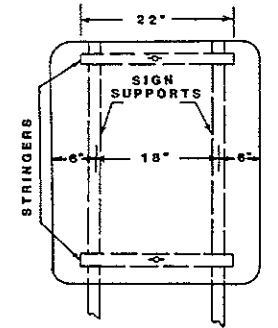


1 POST

ASSEMBLY NO. 9

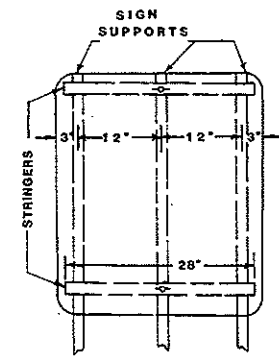


2 POSTS



2 POSTS

ASSEMBLY NO. 10



3 POSTS

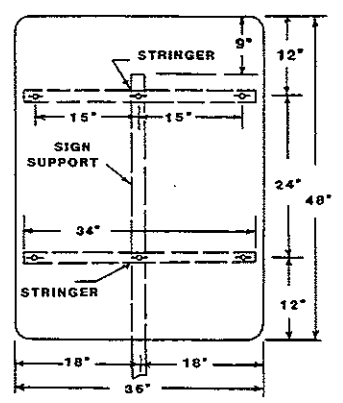
NOTE:
Material:
Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.

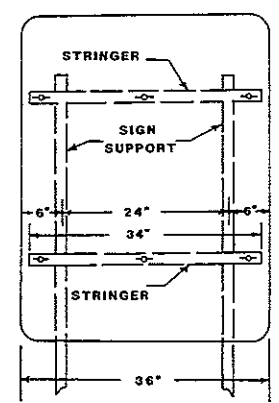
Stringers:
Flange Channel: All stringers shall be flange channel 1.12" per foot and of the length shown.
Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.

Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

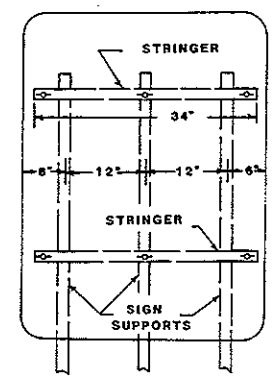
General:
See plans for sign numbers to be used at each location.
See Std. D-754-24 square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.



1 POST



2 POSTS



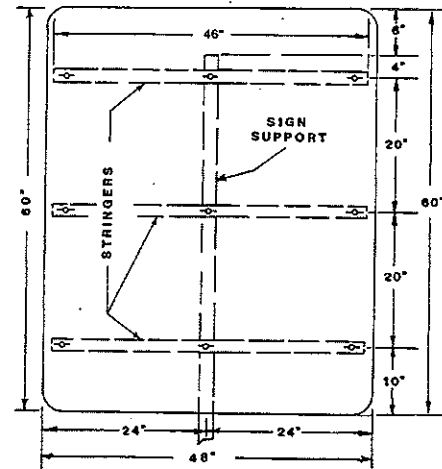
3 POSTS

ASSEMBLY NO. 11

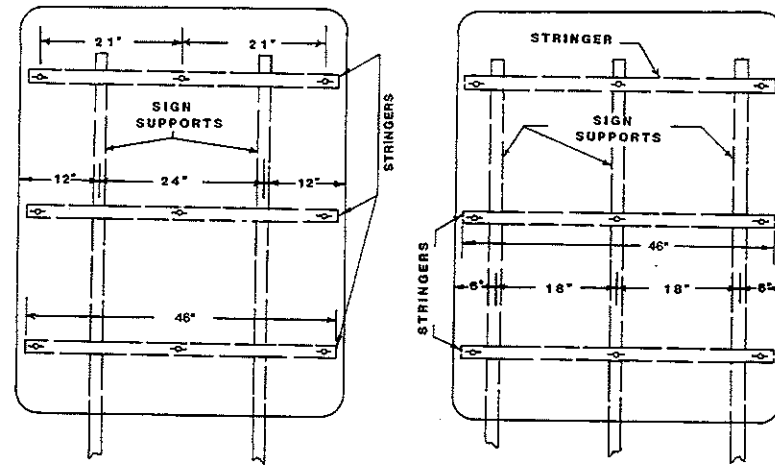
10-1-86 REVISIONS	
DATE	CHANGE
5-1-92	GENERAL REVISIONS
7-14-95	46" Stringer

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K.O. Lear*
DESIGN ENGINEER

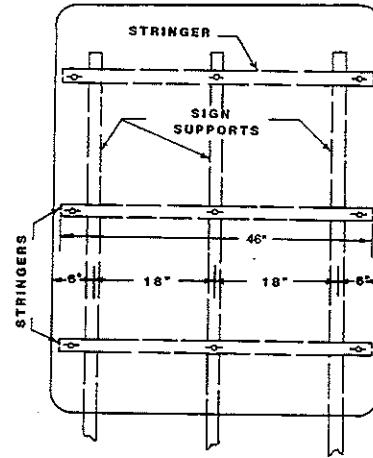
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



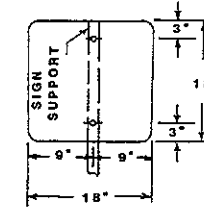
1 POST



2 POSTS



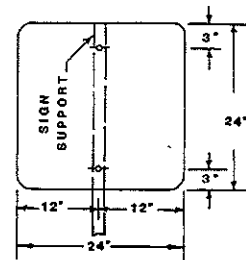
3 POSTS



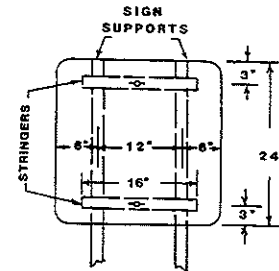
1 POST

ASSEMBLY NO. 13

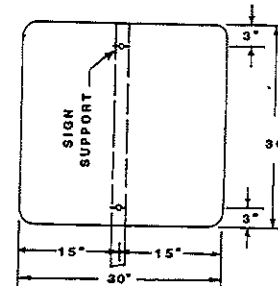
ASSEMBLY NO. 12



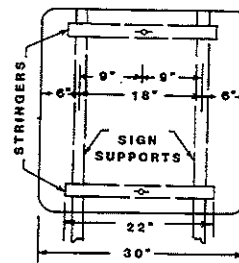
1 POST



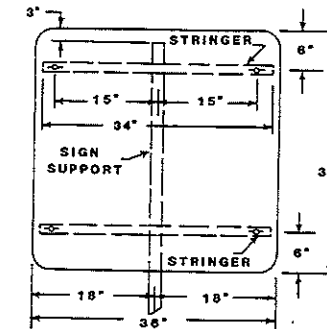
2 POSTS



1 POST



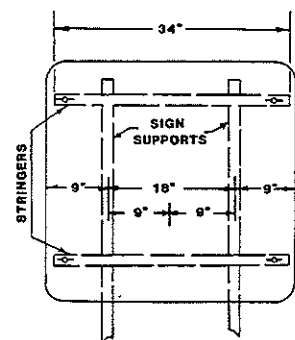
2 POSTS



1 POST

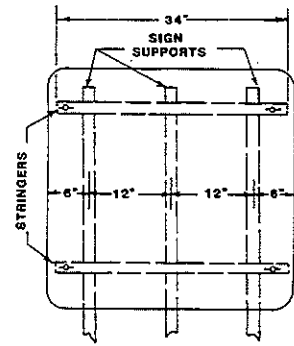
ASSEMBLY NO. 14

ASSEMBLY NO. 15

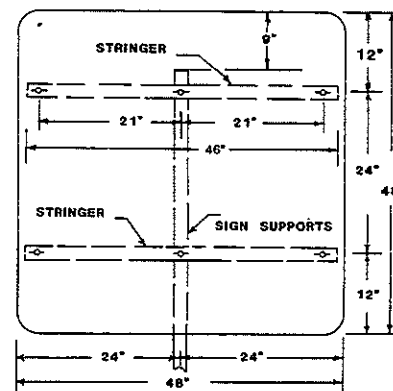


2 POSTS

ASSEMBLY NO. 16

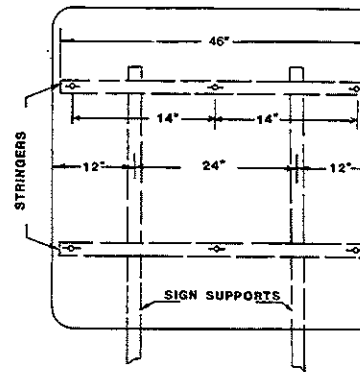


3 POSTS



1 POST

ASSEMBLY NO. 17



2 POSTS

NOTE:

Material

Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall minimum thickness: All signs shall be 0.100 inch.

Stringers:

Flange Channel: All stringers shall be flange channel 1.12# per foot and of the length shown.

Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2"x1 1/2" and of the length shown.

Holes:

Flange Channel: All holes shall be punched round for 3/8" diameter bolts.

Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:

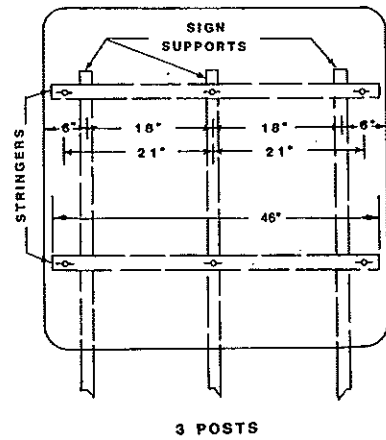
See plans for sign numbers to be used at each location.

See Std. D-754-24 for square tube, perforated mounting details.

See Std. D-754-25 for flange channel mounting details.

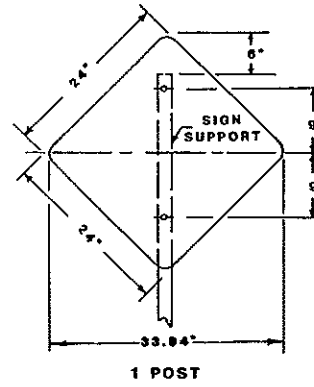
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
5-1-92	CHANGE	APPROVED: <i>David K. Ben</i> DESIGN ENGINEER
7-14-95	GENERAL REVISIONS 46" Stringer	

**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



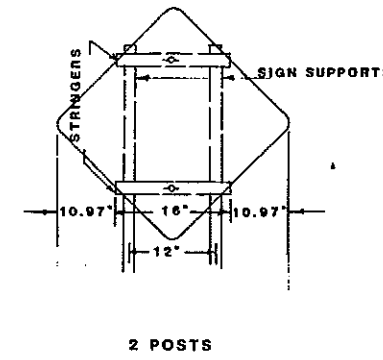
3 POSTS

ASSEMBLY NO. 17

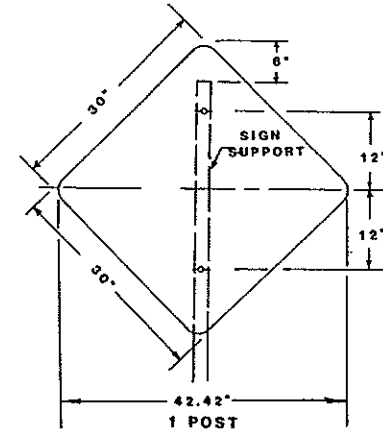


1 POST

ASSEMBLY NO. 18

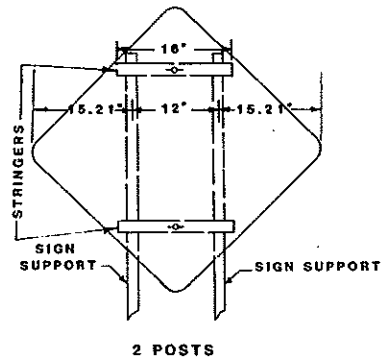


2 POSTS

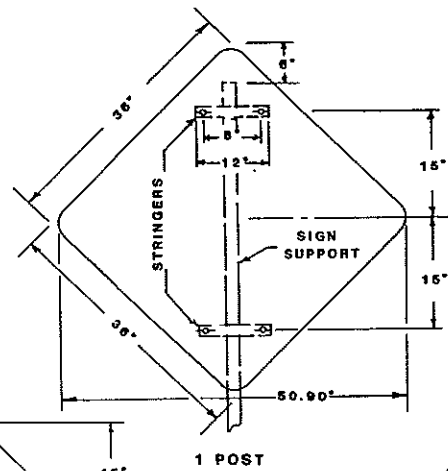


1 POST

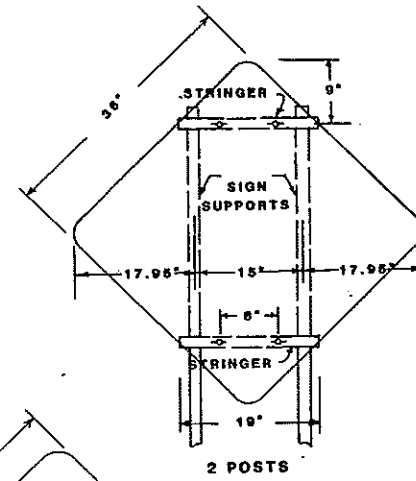
ASSEMBLY NO. 19



2 POSTS

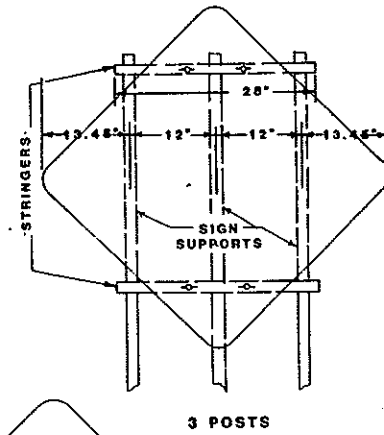


1 POST

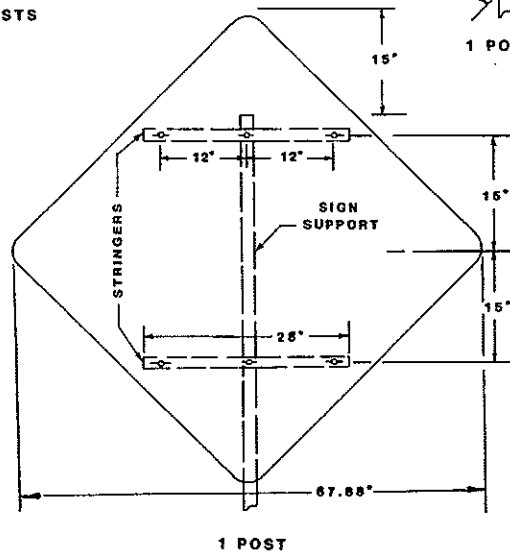


2 POSTS

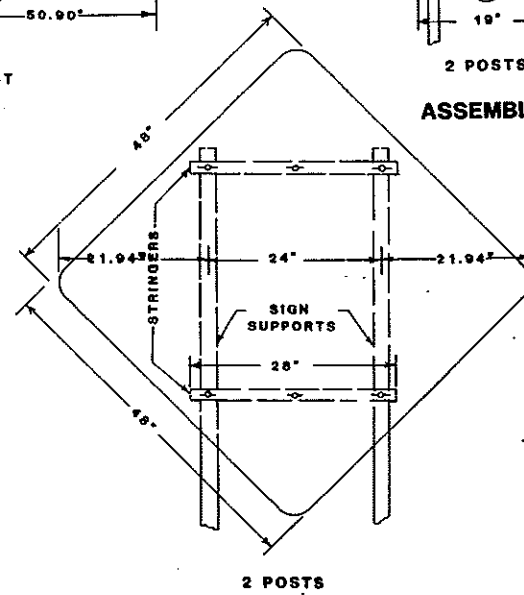
ASSEMBLY NO. 20



3 POSTS

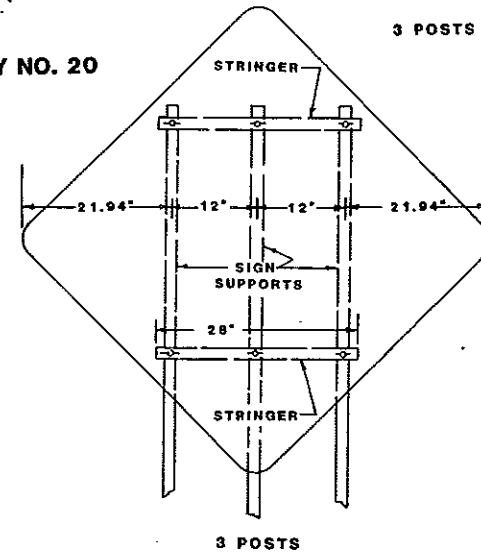


1 POST



2 POSTS

ASSEMBLY NO. 21



3 POSTS

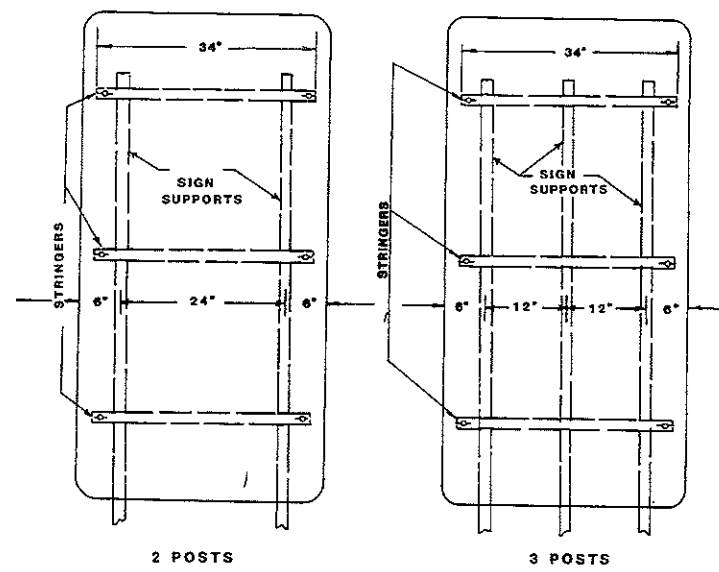
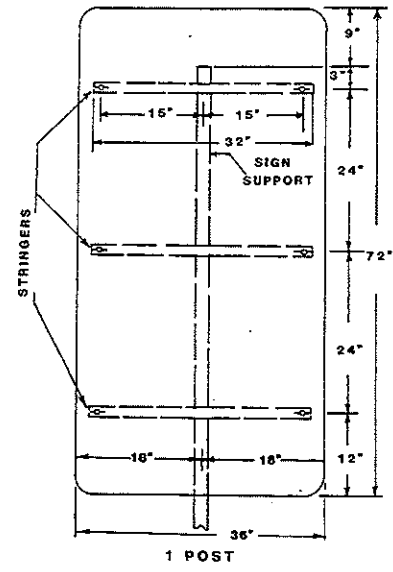
NOTE:

- Material:**
Sign Backing: The signing backing material thickness shall be as follows.
- Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.
- Stringers:**
Flange Channel: All stringers shall be flange channel 1.124 per foot and of the length shown.
Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.
- Note:**
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.
- General:**
See plane for sign numbers to be used at each location.
See Std. D-754-24 for square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

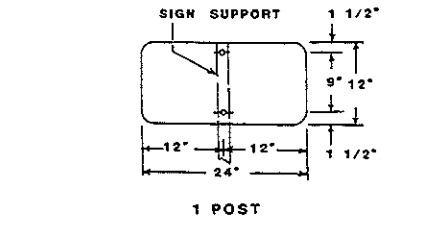
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Brown</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	
7-14-95	4th Stringer	

**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**

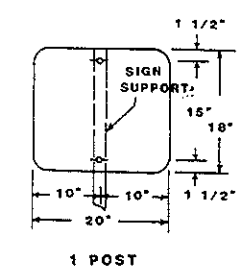
D-754-31



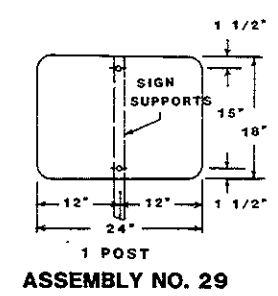
ASSEMBLY NO. 24



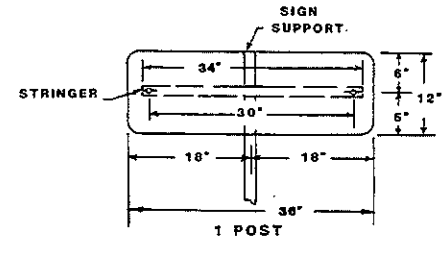
ASSEMBLY NO. 26



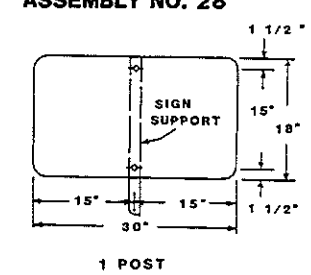
ASSEMBLY NO. 28



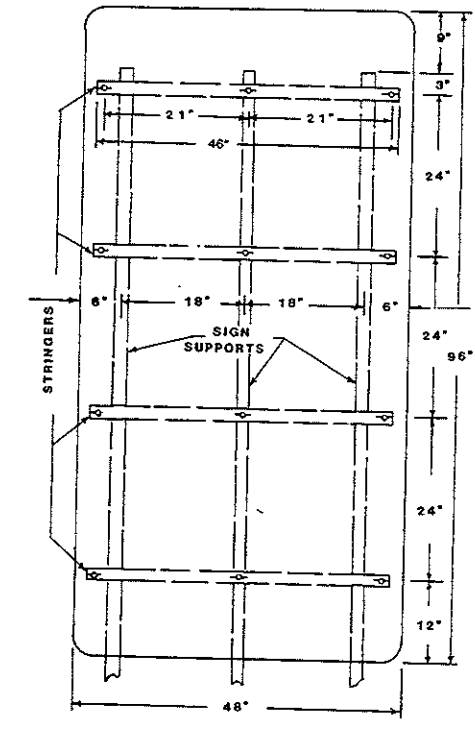
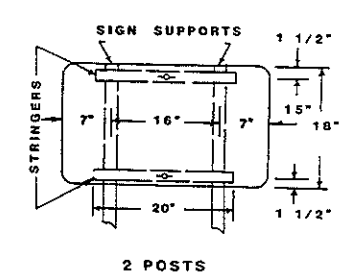
ASSEMBLY NO. 29



ASSEMBLY NO. 27



ASSEMBLY NO. 30



ASSEMBLY NO. 25

NOTE:
Material:
Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.

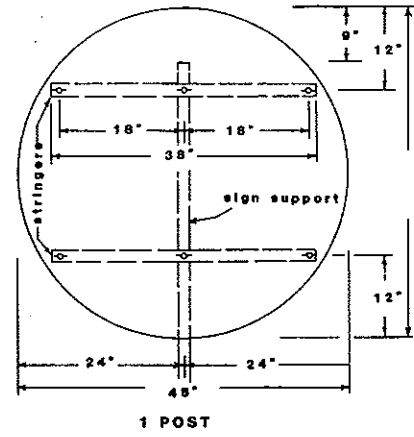
stringers:
Flange Channel: All stringers shall be flange channel 1.12" per foot and of the length shown.
Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" x 1 1/2" and of the length shown.

Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

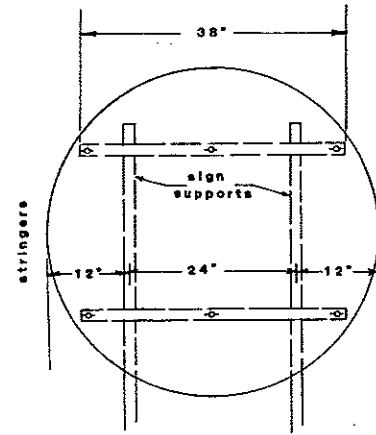
General:
See plans for sign numbers to be used at each location.
See Std. D-754-24 for square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION APPROVED: <i>David K. Olson</i> DESIGN ENGINEER
REVISIONS		
DATE	CHANGE	
5-1-92	GENERAL REVISIONS	
7-14-95	46" Stringer	

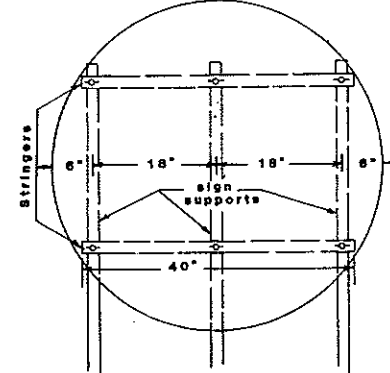
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



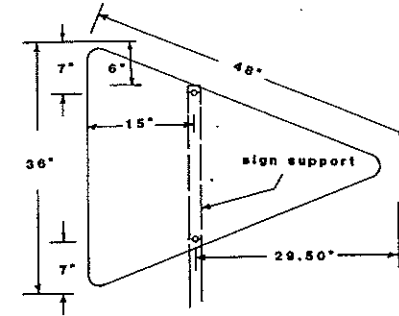
1 POST



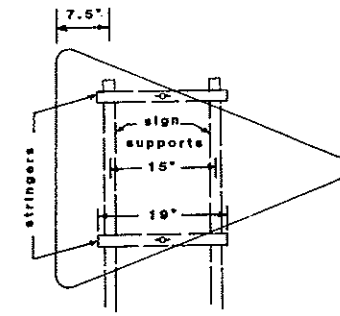
2 POSTS
ASSEMBLY NO. 64



3 POSTS

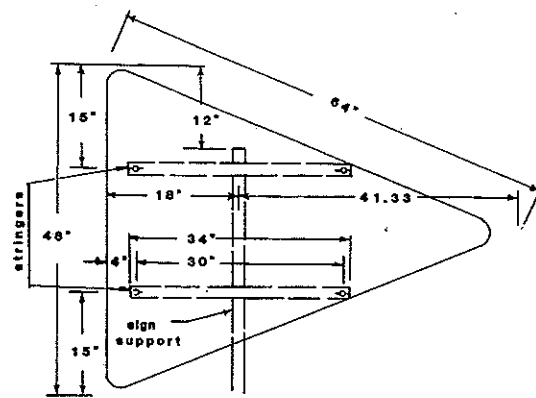


1 POST

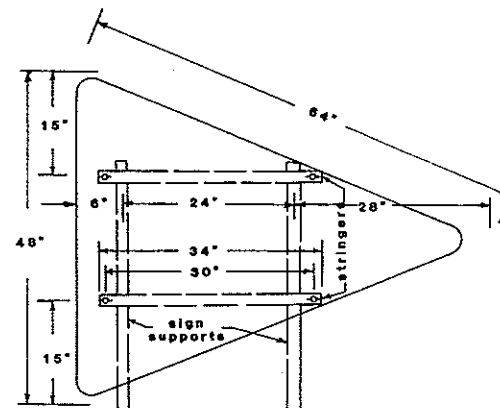


2 POSTS

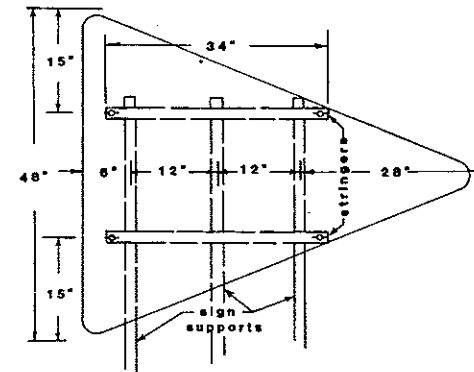
ASSEMBLY NO. 65



1 POST

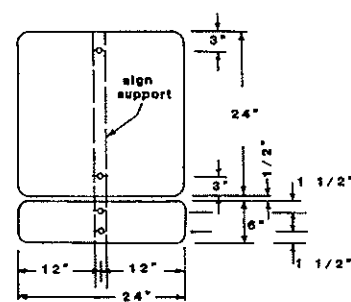


2 POSTS

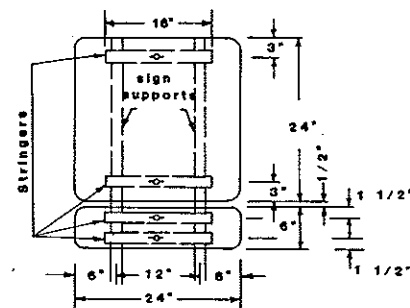


3 POSTS

ASSEMBLY NO. 66



1 POST



2 POSTS

ASSEMBLY NO. 67

NOTE:

Material:
Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.

Stringers:
Flange Channel: All stringers shall be flange channel 1.12+ per foot and of the length shown.
Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2"x1 1/2" and of the length shown.

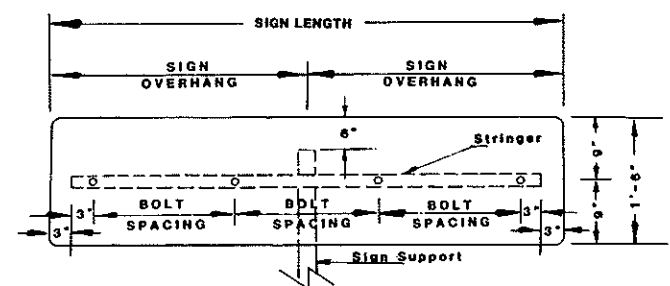
Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:
See plans for sign numbers to be used at each location.
See Std. D-754-24 for square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

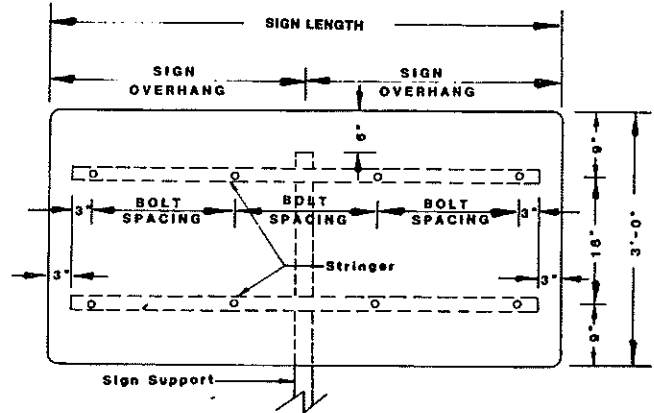
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
5-1-97	GENERAL REVISIONS	

SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

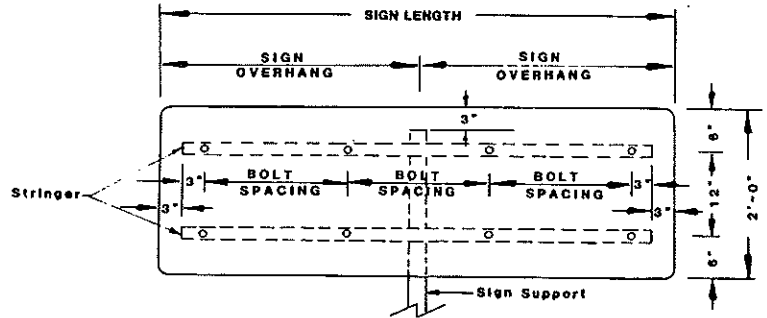
D-754-47



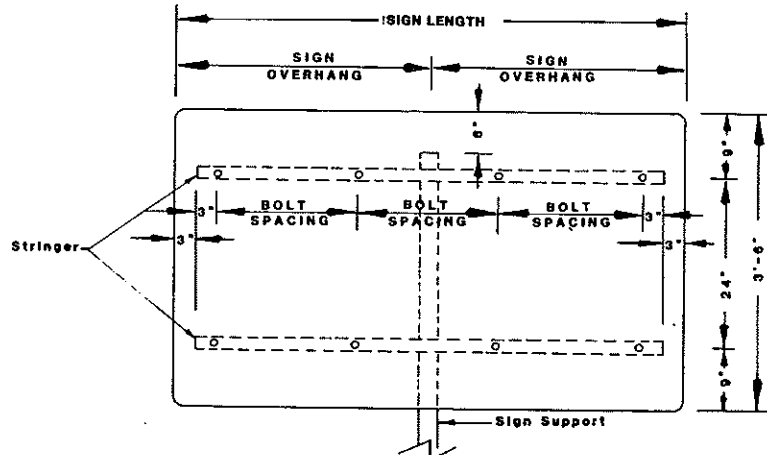
VARIES X 1'-6"



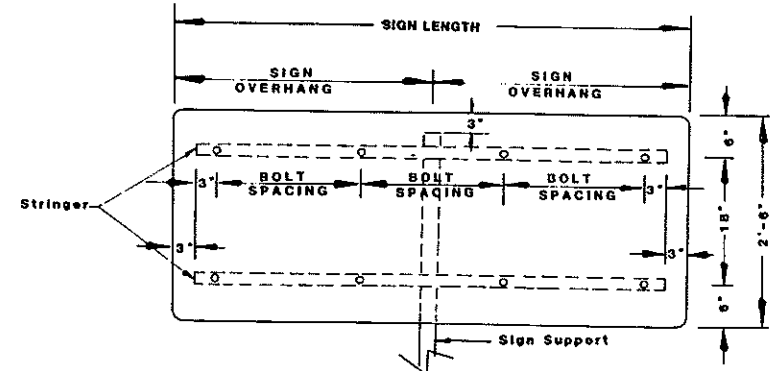
VARIES X 3'-0"



VARIES X 2'-0"



VARIES X 3'-6"



VARIES X 2'-6"

Sign Length	1 POST, 2 POSTS, 3 POSTS, 4 POSTS, & INFORMATION										1 POST Sign Overhang
	1'-6" High	2'-0" High	2'-6" High	3'-0" High	3'-6" High	4'-0" High	4'-6" High	5'-0" High	5'-6" High	Bolt Spacing	
4'-0"	81	107	140	173	206	239	272	305	338	18"	2'-0"
4'-6"	82	108	141	174	207	240	273	306	339	21"	2'-3"
5'-0"	83	109	142	175	208	241	274	307	340	24"	2'-6"
5'-6"	84	110	143	176	209	242	275	308	341	18"	2'-9"
6'-0"	85	111	144	177	210	243	276	309	342	20"	3'-0"
6'-6"	86	112	145	178	211	244	277	310	343	22"	3'-3"
7'-0"	87	113	146	179	212	245	278	311	344	24"	3'-6"
7'-6"	88	114	147	180	213	246	279	312	345	2-20 5/8 2-19"	3'-9"
8'-0"	89	115	148	181	214	247	280	313	346	21"	4'-0"
8'-6"	90	116	149	182	215	248	281	314	347	2-22 5/8 2-23"	4'-3"
9'-0"	91	117	150	183	216	249	282	315	348	24"	4'-6"
9'-6"	92	118	151	184	217	250	283	316	349	4-20 5/8 1-22"	4'-9"
10'-0"	93	119	152	185	218	251	284	317	350	2-21 5/8 1-22"	5'-0"
10'-6"	94	120	153	186	219	252	285	318	351	4-23 5/8 1-22"	5'-3"
11'-0"	95	121	154	187	220	253	286	319	352	24"	5'-6"
11'-6"	96	122	155	188	221	254	287	320	353	21"	5'-9"
12'-0"	97	123	156	189	222	255	288	321	354	22"	6'-0"
12'-6"	98	124	157	190	223	256	289	322	355	23"	
13'-0"	99	125	158	191	224	257	290	323	356	24"	
13'-6"	100	126	159	192	225	258	291	324	357	3-23 5/8 6-21"	
14'-0"	101	127	160	193	226	259	292	325	358	2-23 5/8 6-22"	
14'-6"	102	128	161	194	227	260	293	326	359	6-23 5/8 1-24"	
15'-0"	103	129	162	195	228	261	294	327	360	24"	
15'-6"	104	130	163	196	229	262	295	328	361	6-23 5/8 3-21"	
16'-0"	105	131	164	197	230	263	296	329	362	4-23 5/8 4-23"	
16'-6"	106	132	165	198	231	264	297	330	363	6-23 5/8 3-24"	
17'-0"		133	166	199	232	265	298	331	364	24"	
17'-6"		134	167	200	233	266	299	332	365	22"	
18'-0"		135	168	201	234	267	300	333	366	6-23 5/8 3-23"	
18'-6"		136	169	202	235	268	301	334	367	6-23 5/8 3-24"	
19'-0"		137	170	203	236	269	302	335	368	24"	
19'-6"		138	171	204	237	270	303	336	369	6-23 5/8 3-23"	
20'-0"		139	172	205	238	271	304	337	370	6-23 5/8 2-22"	

NOTE:

Material:
Sign Backing: The sign backing material thickness shall be as follows:

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.

Stringers:
Flange Channel: All stringers shall be flange channel 1.12" per foot and of length shown.
Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1/2" and of the length shown.

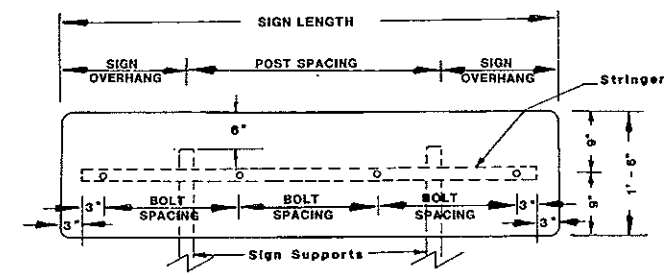
Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:
See plans for sign numbers to be used at each location.
See Std. D-754-24 for square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

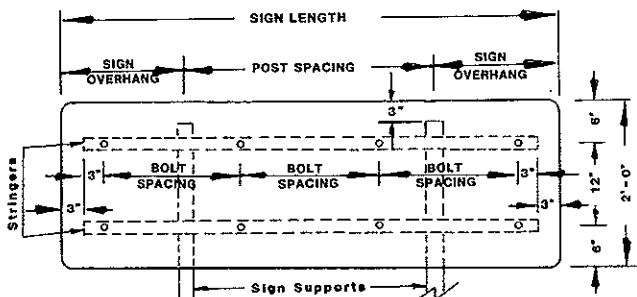
NOTE:
The single stringer and single post sign shall have stringers attached to the post using the special stringer angle shown std. D-754-24 for Perforated Tube post & stringers or using the stringer attachment plate shown on std. D-754-25 for Flange Channel post and stringers.

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
5-1-97 6-3-93	GENERAL REVISIONS BOLT SPACING	

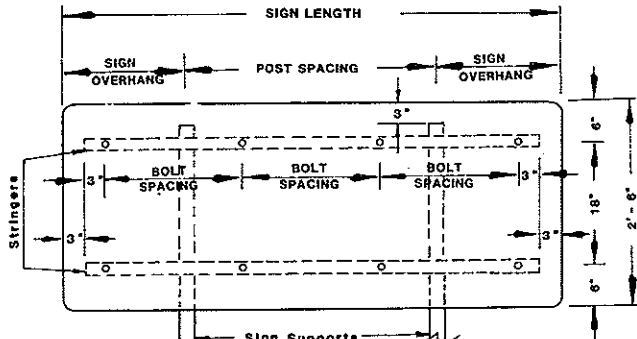
SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS



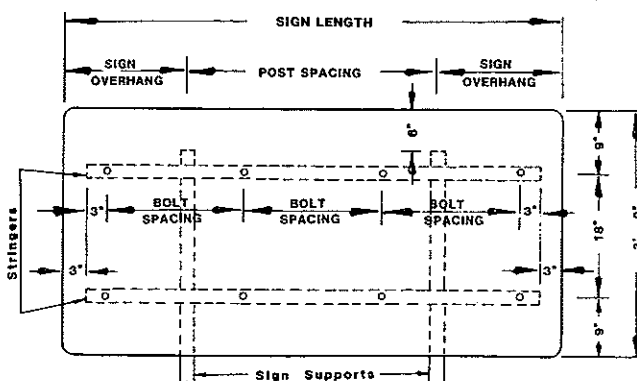
VARIES X 1'-6"



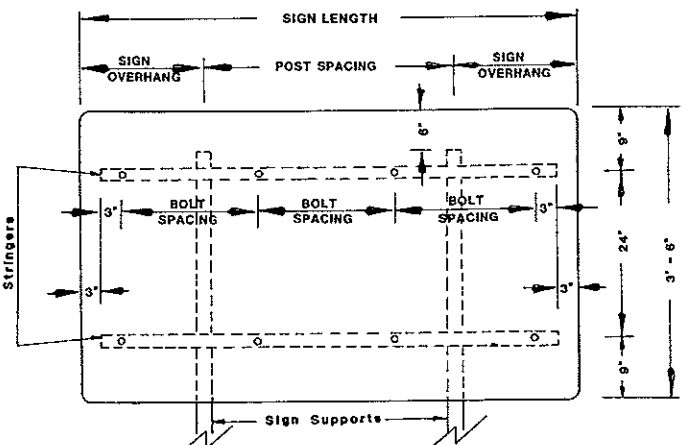
VARIES X 2'-0"



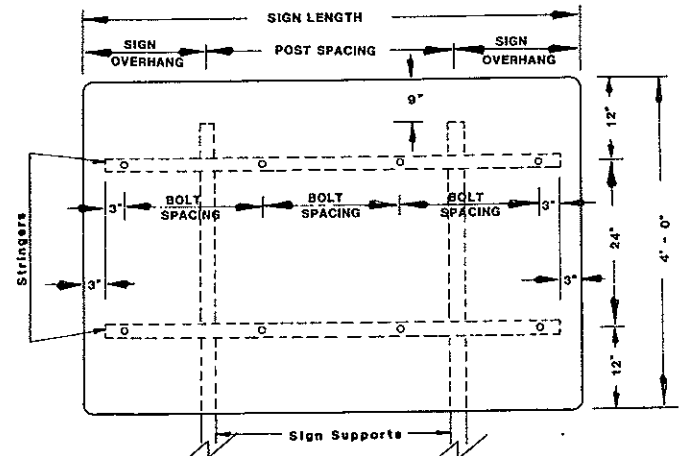
VARIES X 2'-6"



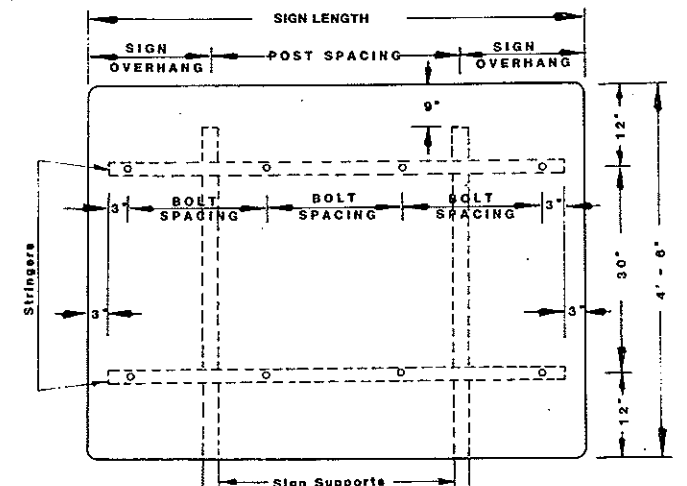
VARIES X 3'-0"



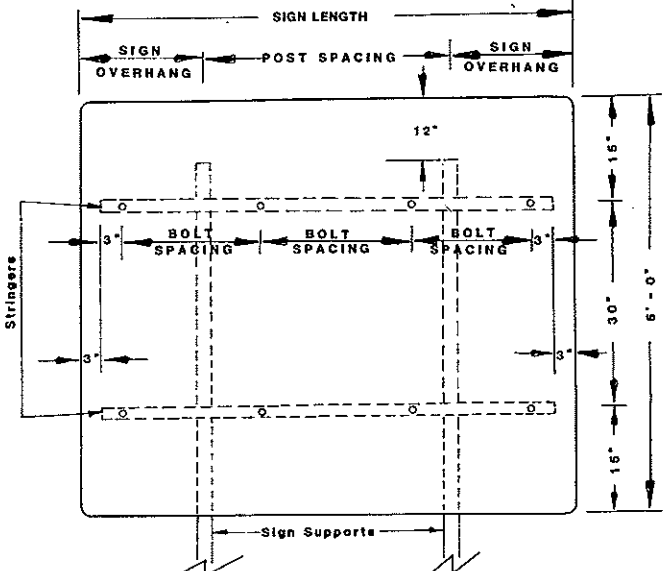
VARIES X 3'-6"



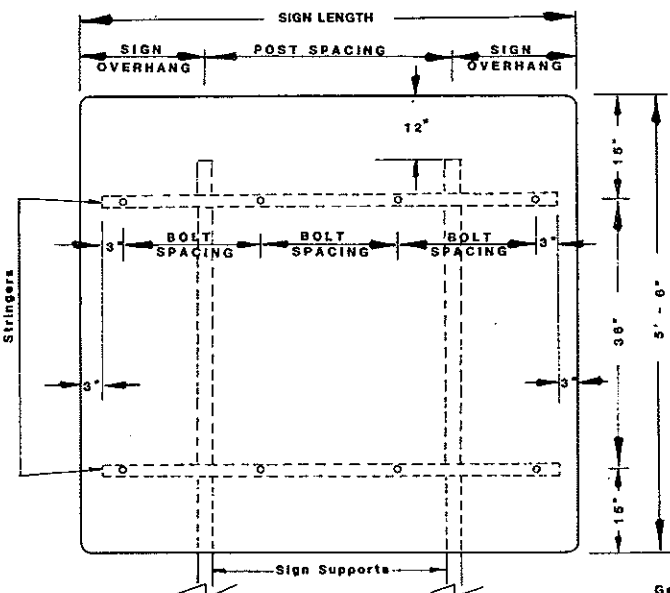
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

* See Standard Number D-754-47 for Assembly Numbers & Bolts spacing.

2 POSTS #		
Sign Length	Sign Overhang	Post Spacing
4'-0"	1'-0"	2'-0"
4'-6"	1'-3"	2'-0"
5'-0"	1'-0"	3'-0"
5'-6"	1'-3"	3'-0"
6'-0"	1'-6"	3'-0"
6'-6"	1'-3"	4'-0"
7'-0"	1'-6"	4'-0"
7'-6"	1'-0"	4'-0"
8'-0"	2'-0"	4'-0"
8'-6"	1'-9"	5'-0"
9'-0"	2'-0"	5'-0"
9'-6"	1'-9"	6'-0"
10'-0"	2'-0"	6'-0"
10'-6"	2'-3"	6'-0"
11'-0"	2'-6"	6'-0"
11'-6"	2'-9"	6'-0"
12'-0"	2'-0"	8'-0"
12'-6"	2'-3"	8'-0"
13'-0"	2'-6"	8'-0"
13'-6"	2'-9"	8'-0"
14'-0"	3'-0"	8'-0"
14'-6"	3'-3"	8'-0"
15'-0"	3'-6"	8'-0"
15'-6"	2'-9"	10'-0"
16'-0"	3'-0"	10'-0"
16'-6"	3'-3"	10'-0"
17'-0"	3'-6"	10'-0"
17'-6"	3'-9"	10'-0"
18'-0"	3'-0"	12'-0"
18'-6"	3'-3"	12'-0"
19'-0"	3'-6"	12'-0"
19'-6"	3'-9"	12'-0"
20'-0"	4'-0"	12'-0"

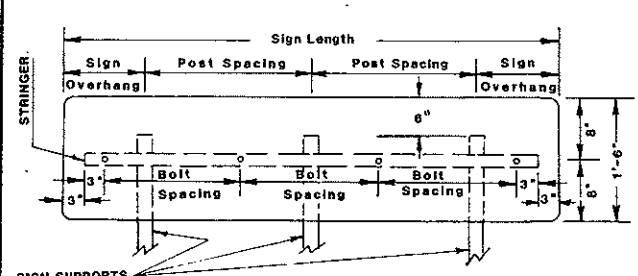
NOTE:
Material:
 Sign Backing: The sign backing material thickness shall be as follows.
 Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.
Stringer:
 Flange Channel: All stringers shall be flange channel 1.12" per foot and of the length shown.
 Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2", and of the length shown.
Holes:
 Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
 Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:
 See plans for sign numbers to be used at each location.
 See Std. D-754-24 for square tube, perforated mounting details.
 See Std. D-754-25 for flange channel mounting details.

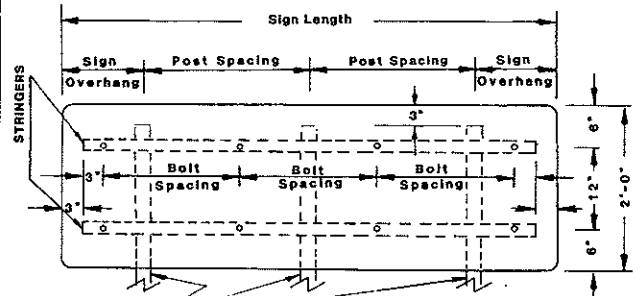
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
1-1-87	GENERAL REVISIONS	APPROVED: <i>David K. Olson</i> DESIGN ENGINEER

SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

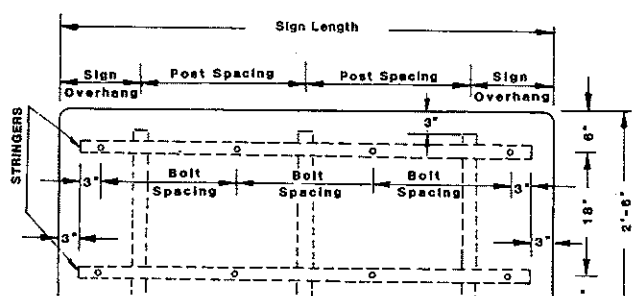
D-754-49



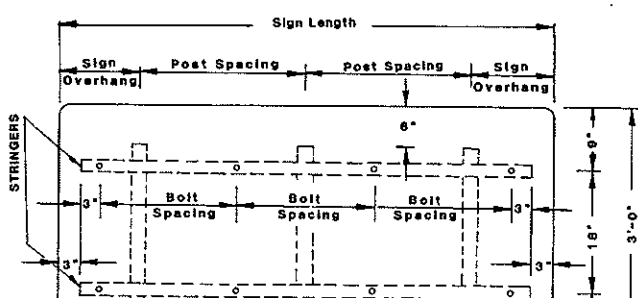
Varies X 1'-6"



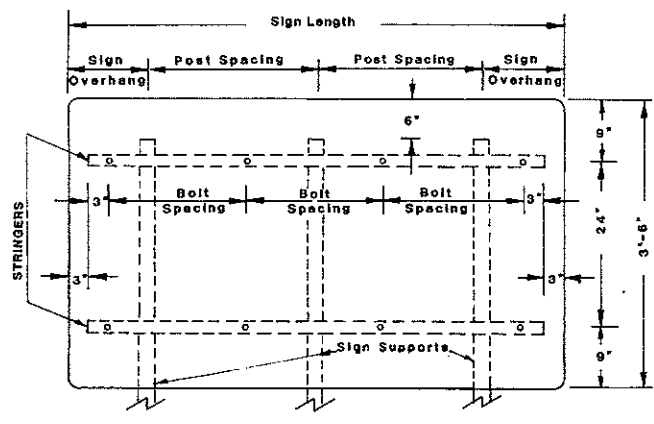
Varies X 2'-0"



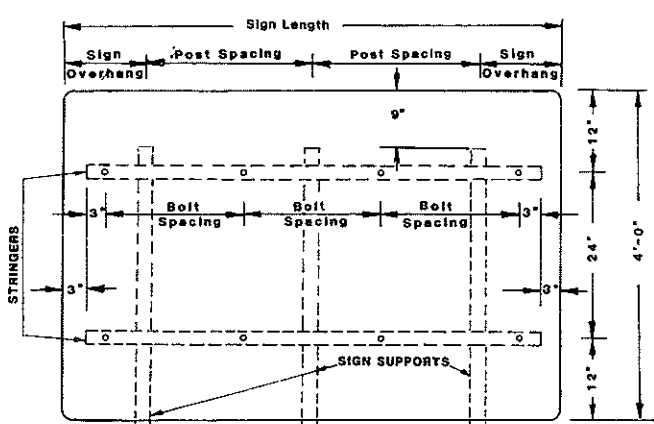
Varies X 2'-6"



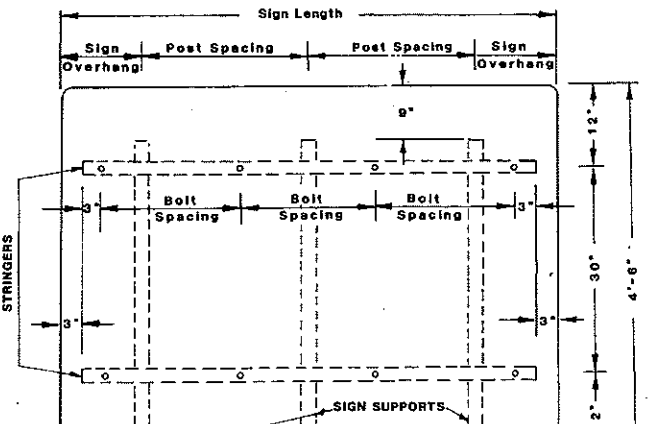
Varies X 3'-0"



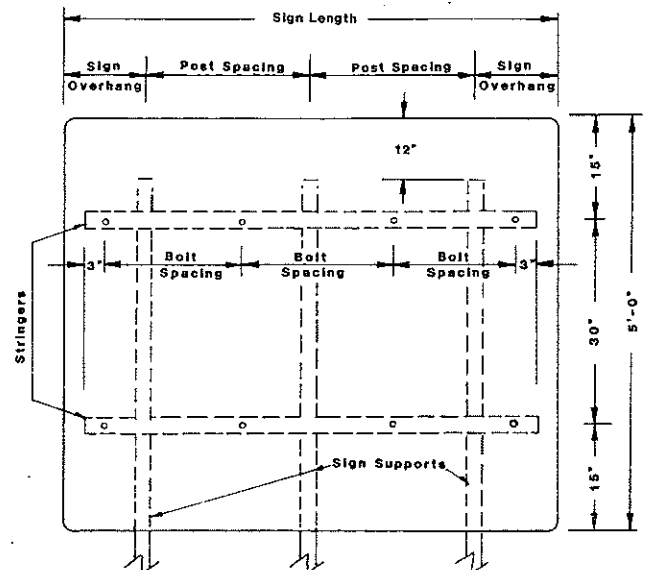
Varies X 3'-6"



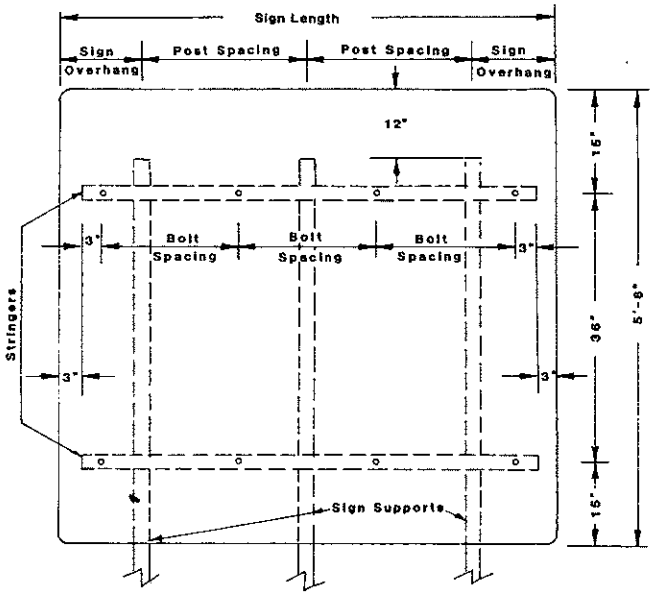
Varies X 4'-0"



Varies X 4'-6"



Varies X 5'-0"



Varies X 5'-6"

# 3 POST		
Sign Length	Sign Overhang	Post Spacing
4'-0"	0'-6"	1'-6"
4'-6"	0'-6"	1'-9"
5'-0"	0'-6"	2'-0"
5'-6"	1'-3"	1'-6"
6'-0"	1'-0"	2'-0"
6'-6"	1'-3"	2'-0"
7'-0"	1'-6"	2'-0"
7'-6"	1'-6"	2'-3"
8'-0"	1'-9"	2'-3"
8'-6"	2'-0"	2'-3"
9'-0"	1'-6"	3'-0"
9'-6"	1'-9"	3'-0"
10'-0"	1'-9"	3'-3"
10'-6"	1'-9"	3'-6"
11'-0"	2'-0"	3'-6"
11'-6"	2'-3"	3'-6"
12'-0"	2'-4"	3'-8"
12'-6"	2'-5"	3'-10"
13'-0"	2'-6"	4'-0"
13'-6"	2'-9"	4'-0"
14'-0"	3'-0"	4'-0"
14'-6"	3'-3"	4'-0"
15'-0"	3'-6"	4'-0"
15'-6"	2'-4"	5'-5"
16'-0"	2'-5"	5'-7"
16'-6"	2'-5"	5'-10"
17'-0"	2'-6"	6'-0"
17'-6"	3'-3"	5'-6"
18'-0"	3'-6"	5'-6"
18'-6"	3'-9"	5'-6"
19'-0"	3'-6"	6'-0"
19'-6"	4'-3"	5'-8"
20'-0"	4'-4"	5'-8"

NOTE:

Material:

Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.

Stringers: Flange Channel: All stringers shall be flange channel 1.12" per foot and of the length shown.

Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.

Hole: Flange Channel: All holes shall be punched round for 3/8" diameter bolts.

Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

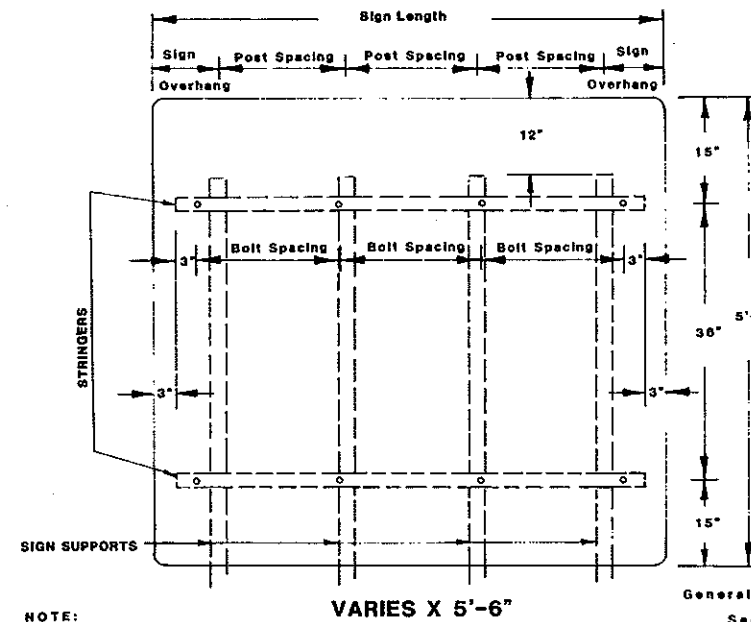
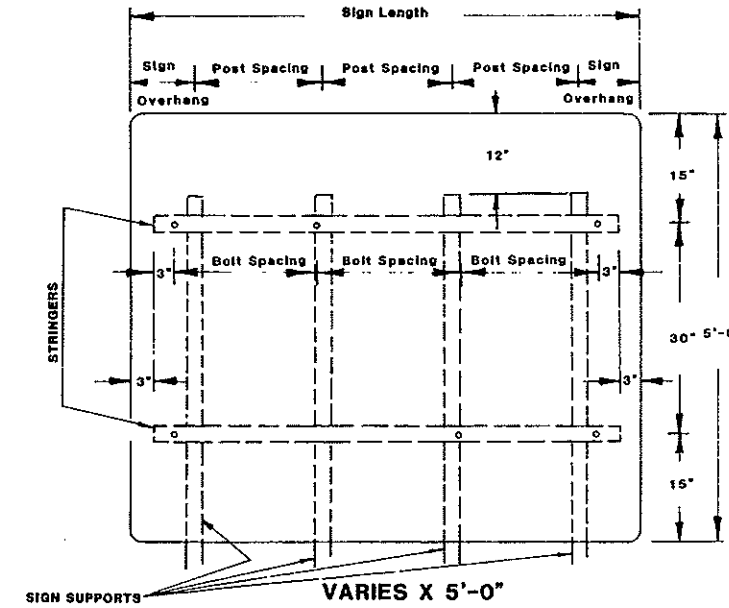
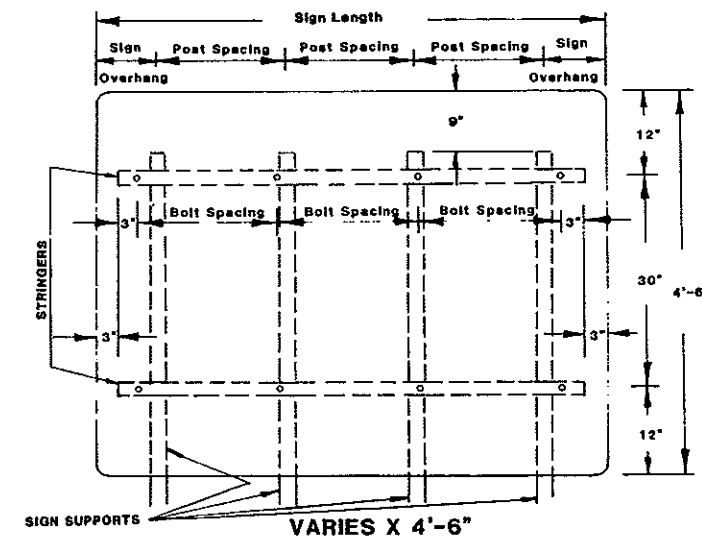
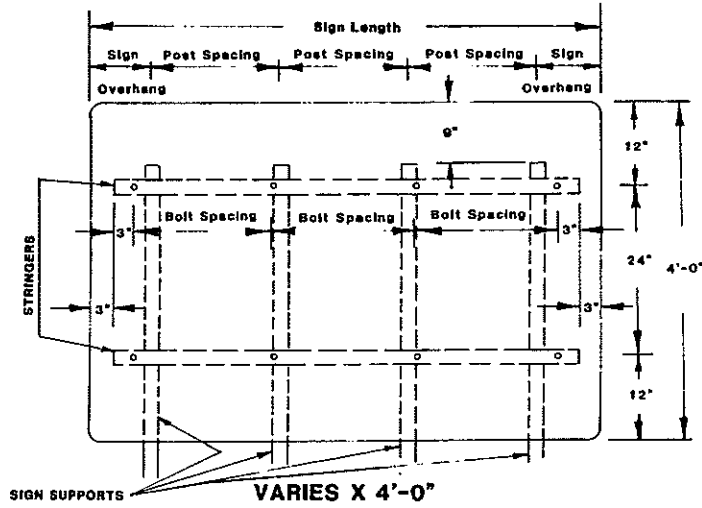
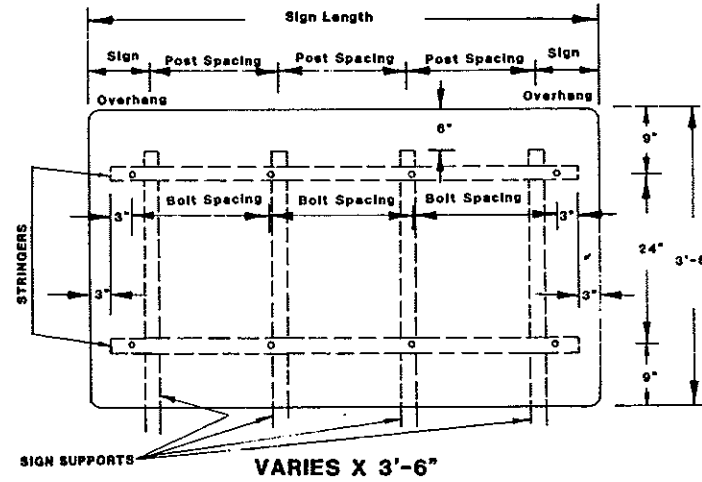
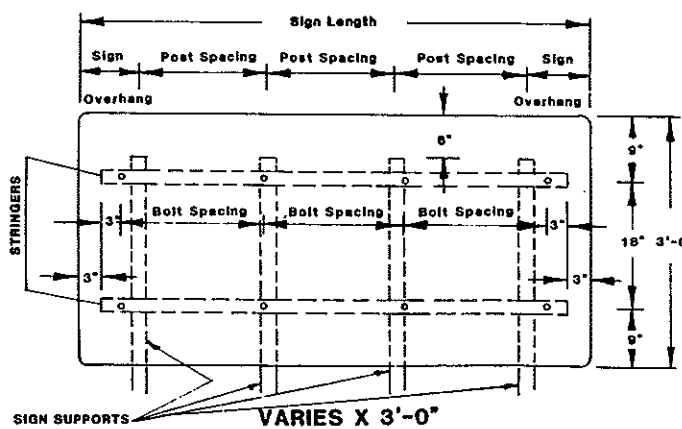
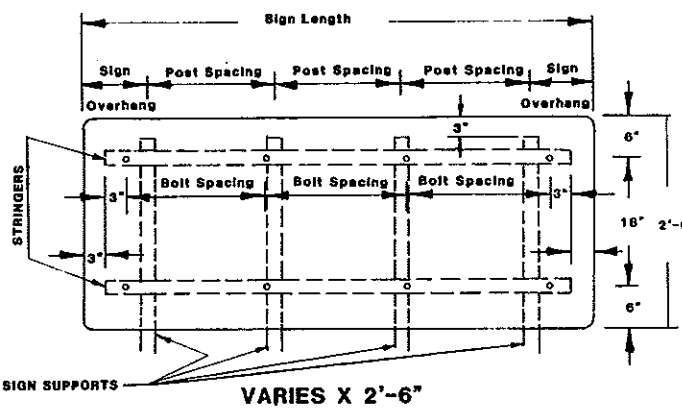
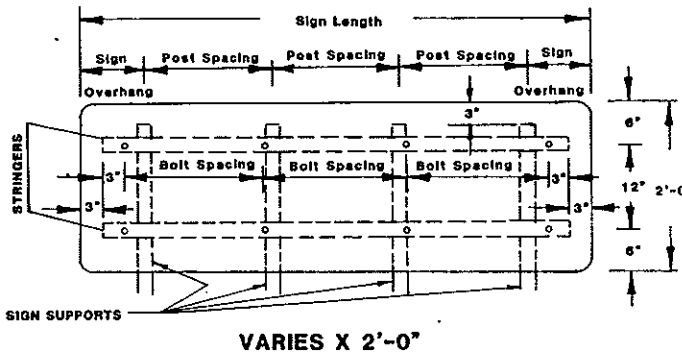
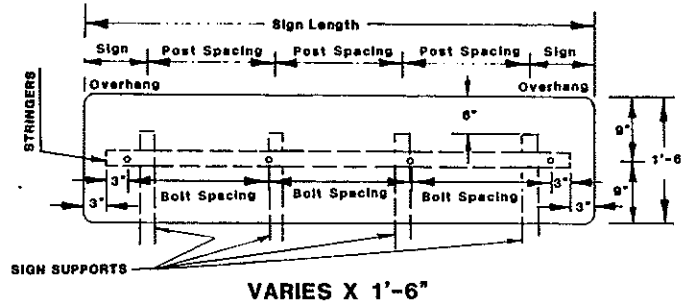
General: See plans for sign numbers to be used at each location. See Std. D-754-24 for square tube, perforated mounting details. See Std. D-754-25 for flange channel mounting details.

* See Standard Number D-754-47 for Assembly Numbers & Bolt spacings.

10-1-86	
REVISIONS	
DATE	CHANGES
5-1-97	GENERAL REVISIONS

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
Approved: *[Signature]*
Design Engineer

SIGN PUNCHING, STRINGERS, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS



4 POST		
Sign Length	sign overhang	Post Spacing
4'-0"		
4'-6"		
5'-0"		
5'-6"		
6'-0"		
6'-6"		
7'-0"		
7'-6"		
8'-0"		
8'-6"	0'-3"	2'-8"
9'-0"	0'-6"	2'-8"
9'-6"	0'-9"	2'-8"
10'-0"	1'-0"	2'-8"
10'-6"	1'-3"	2'-8"
11'-0"	1'-0"	3'-0"
11'-6"	0'-6"	3'-6"
12'-0"	0'-6"	3'-8"
12'-6"	0'-6"	3'-10"
13'-0"	0'-6"	4'-0"
13'-6"	1'-3"	3'-8"
14'-0"	1'-6"	3'-8"
14'-6"	1'-3"	4'-0"
15'-0"	1'-6"	4'-0"
15'-6"	1'-0"	4'-6"
16'-0"	1'-0"	4'-8"
16'-6"	1'-0"	4'-10"
17'-0"	1'-0"	5'-0"
17'-6"	0'-6"	5'-6"
18'-0"	2'-0"	4'-8"
18'-6"	1'-6"	5'-0"
19'-0"	0'-6"	6'-0"
19'-6"	3'-0"	4'-6"
20'-0"	3'-0"	4'-8"

NOTE:
 Material:
 Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H36 shall have the following minimum thickness: All signs shall be 0.100 inch.
 Stringers: Flange Channel: All stringers shall be flange channel 1.12 \pm per foot and of the length shown.
 Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.
 Holes: Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
 Square Tube Perforated: All holes shall be punched round for 3/8" diameter bolts.

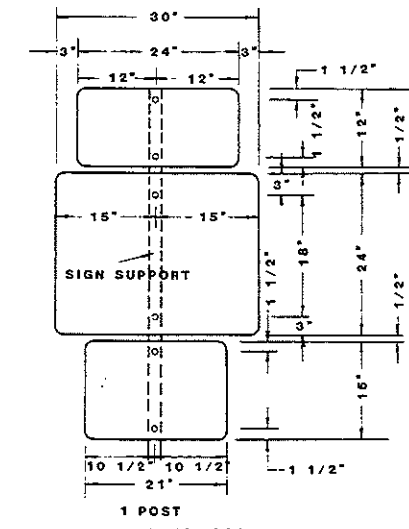
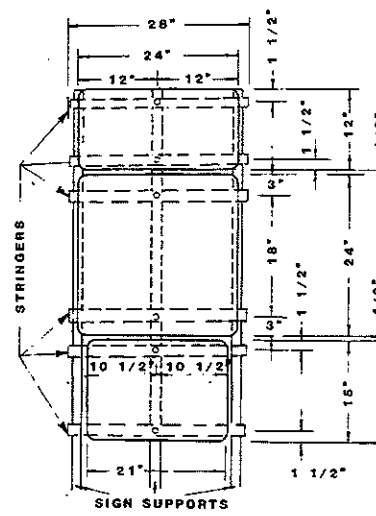
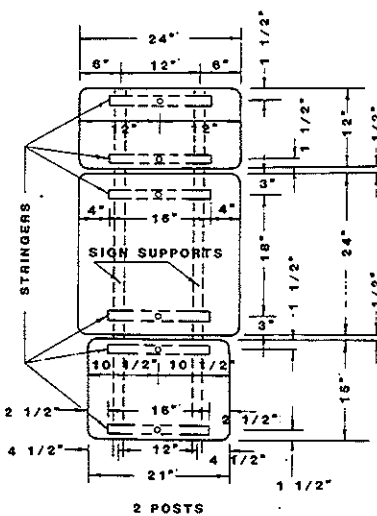
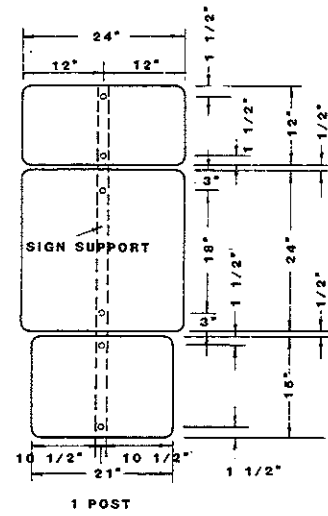
General: See plans for sign numbers to be used at each location.
 See Std. D-754-24 for square tube, perforated mounting details.
 See Std. D-754-25 for flange channel mounting details.

See Standard Number D-754-47 for Assembly Numbers & Bolt Spacings.

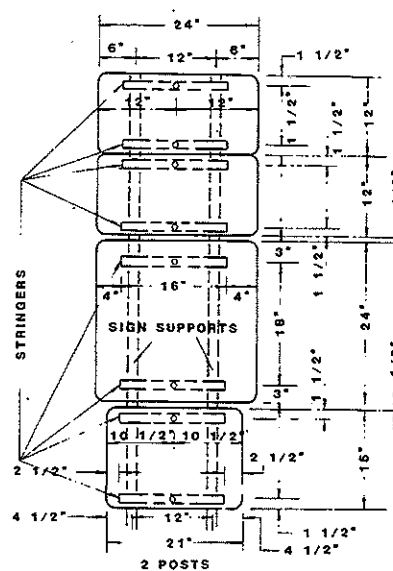
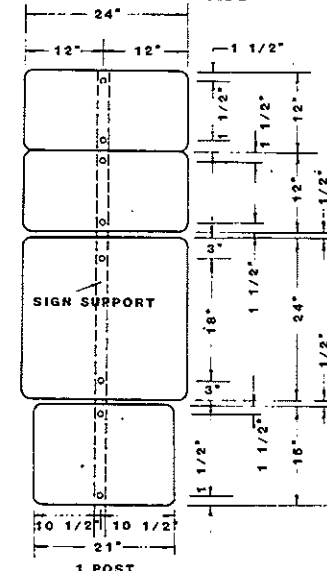
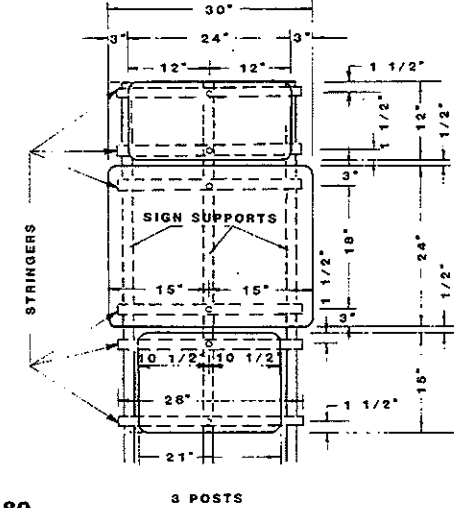
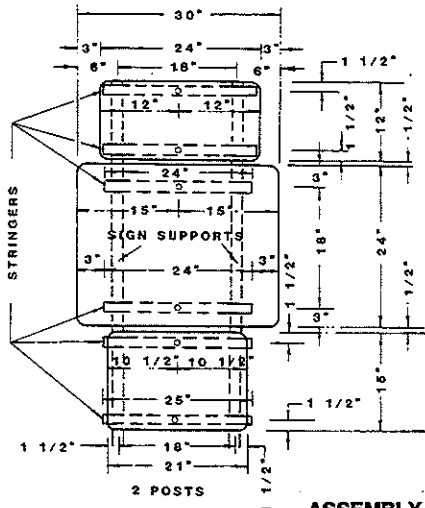
10-1-86		REVISIONS		NORTH DAKOTA	
DATE	CHANGES			DEPARTMENT OF TRANSPORTATION	
5-1-92	GENERAL REVISIONS			APPROVED: <i>David K. Lee</i>	
3-5-93	OVERHANG & SPACING			DESIGN ENGINEER	

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

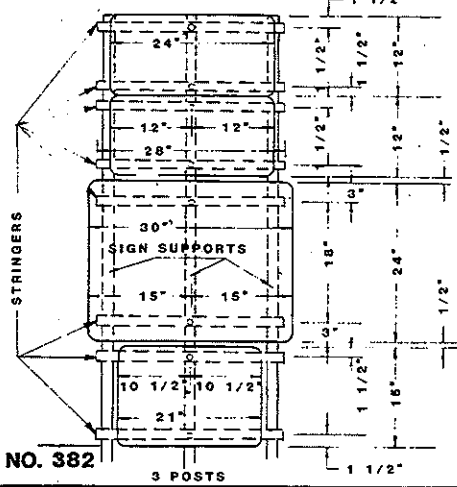
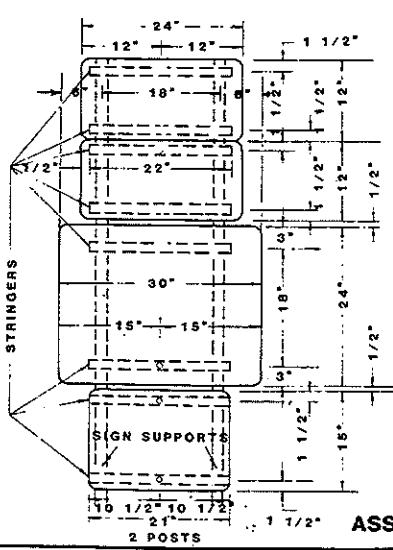
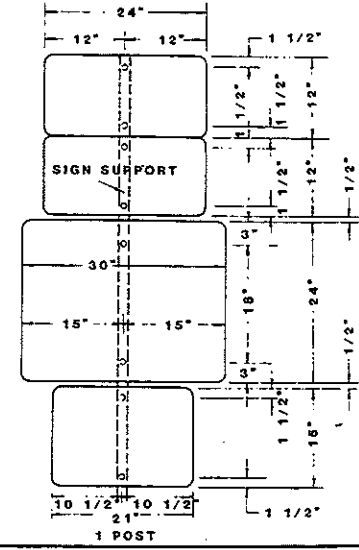
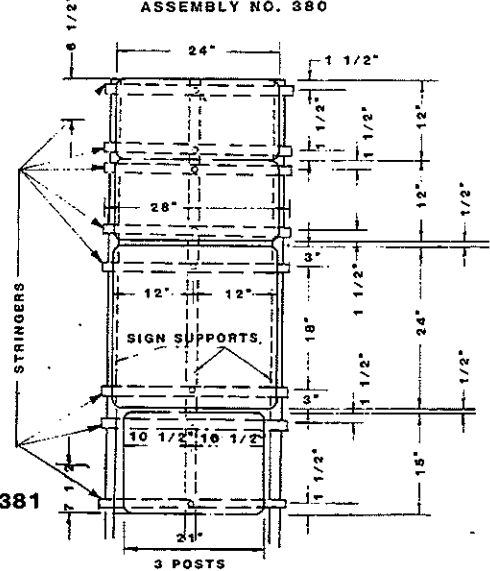
D-754-53



ASSEMBLY NO. 379



ASSEMBLY NO. 381



ASSEMBLY NO. 382

Note:
Material:
Sign Backing: The sign backing material thickness shall be as follows.

Aluminum: Aluminum Alloy 6061-T6 and 5052-H38 shall have the following minimum thickness: All signs shall be 0.100 inch.
Stringers: Flange Channel: All stringers shall be flange channel 1.12" per foot and of the length shown. Square Tube, Perforated: All stringers shall be square tube, perforated 1 1/2" X 1 1/2" and of the length shown.
Holes: Flange Channel: All holes shall be punched round for 3/8" diameter bolts. Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.
General: See plans for sign numbers to be used at each location. See Std. D-754-24 for square tube, perforated mounting details. See Std. D-754-25 for flange channel mounting details.

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
5-1-92	GENERAL REVISIONS	APPROVED: <i>Quail K. O. [Signature]</i> DESIGN ENGINEER
7-16-95	General Revisions	

STREET NAME SIGN ASSEMBLY DETAILS

D 754-76

MAXIMUM SUPPORT LENGTH POSSIBLE - PERFORATED TUBE

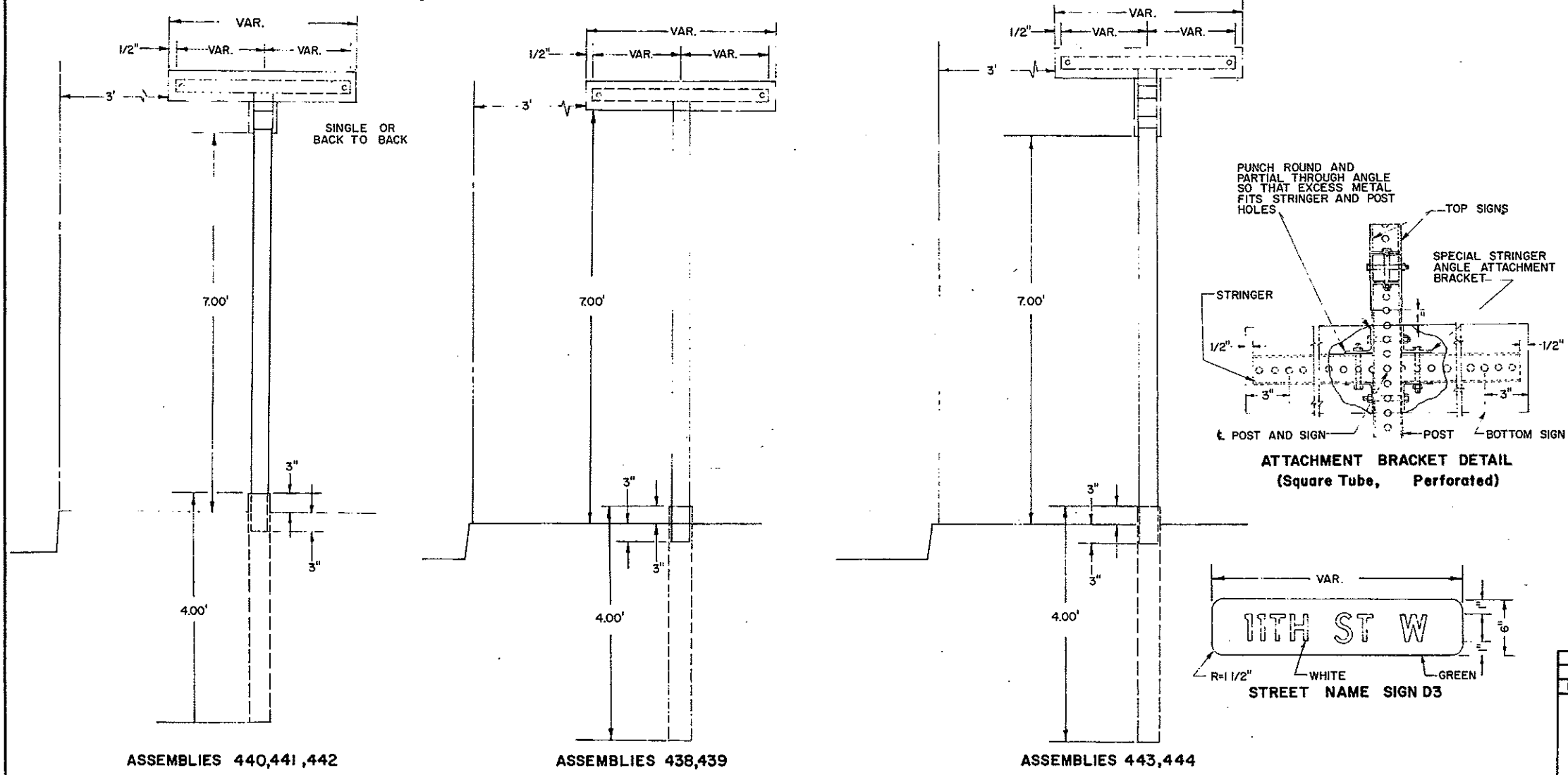
SIGN SIZE	Assemblies 438, 439, 440, 441 and 442						
	2"	2 1/2"	2 3/4"	3"	3 1/2"	4"	4 1/2"
36x6	284	379	-	-	-	-	-
42x6	244	326	-	-	-	-	-
48x6	215	286	337	-	-	-	-
54x6	191	255	300	327	-	-	-
60x6	173	230	271	294	357	-	-
66x6	157	209	246	268	325	-	-
72x6	180	192	226	246	299	332	-
78x6	166	186	209	228	276	306	400
84x6	154	186	195	211	257	285	372
90x6	144	186	186	198	240	260	347
96x6	135	180	186	186	225	250	326

SIGN SIZE	Assemblies 443, 444						
	2"	2 1/2"	2 3/4"	3"	3 1/2"	4"	4 1/2"
36x6	193	206	241	262	315	349	-
42x6	162	195	209	226	272	301	390
48x6	148	194	195	200	240	265	343
54x6	134	174	195	195	215	231	307
60x6	119	155	180	195	195	210	271
66x6	109	147	165	178	195	195	248
72x6	-	131	152	165	195	195	228
78x6	-	122	142	153	183	195	222
84x6	-	114	132	143	171	189	197
90x6	-	107	124	134	161	177	195
96x6	-	-	117	126	151	167	195

MAXIMUM SUPPORT LENGTH POSSIBLE - FLANGE CHANNEL

SIGN SIZE	Assemblies 438, 439, 440, 441 and 442						
	2#	2 1/2#	2 3/4#	3#	3 1/2#	4#	4 1/2#
36x6	256	288	327	-	-	-	-
42x6	218	246	280	319	-	-	-
48x6	190	215	245	277	342	-	-
54x6	184	191	218	248	304	422	-
60x6	184	184	195	222	273	371	-
66x6	171	184	184	202	247	345	-
72x6	155	176	184	184	226	316	-
78x6	141	161	184	184	208	271	400
84x6	128	148	171	184	192	267	372
90x6	117	135	158	181	184	251	347
96x6	106	124	146	168	184	234	326

SIGN SIZE	Assemblies 443, 444						
	2#	2 1/2#	2 3/4#	3#	3 1/2#	4#	4 1/2#
36x6	173	193	193	201	243	343	-
42x6	149	167	179	193	210	288	-
48x6	130	146	166	188	193	253	-
54x6	115	130	148	167	193	225	-
60x6	-	113	129	147	179	199	-
66x6	-	-	107	133	162	193	-
72x6	-	-	106	121	148	193	-
78x6	-	-	-	110	136	189	-
84x6	-	-	-	-	124	175	-
90x6	-	-	-	-	114	163	-
96x6	-	-	-	-	105	151	-



NOTE: The ground mounted street name sign areas have been calculated using a 6"x36" sign panel. The city shall determine the size needed and inform the contractor of the exact length required to accommodate the message in accordance with following legend.

Size and Series: Street name signs 24", 30", or 36" standard length shall be fabricated using the following size and series capital letters:

LENGTH	STREET NAME OR NUMBER
24" Length	4" B,C,D Series
30" Length	4" B,C,D Series
36" Length	4" A,B,C,D Series

To provide maximum legibility, the widest letter shall be used whenever possible for each of the standard lengths specified. A minimum distance of 1/2" shall be allowed between legend and ends of the sign. The actual area shall be paid for at the contract unit price.

Material: Sign Backing: The sign backing material thickness shall be as follows:

Aluminum: Aluminum Alloy 6061-T6 shall have a minimum thickness of 0.080 inch.

Stringers: Perforated Tube: All stringers shall be square tube perforated, the same size as support post. Flange Channel: All stringers shall be flange channel, 1.12# per foot.

Holes: All holes shall be punched round for 3/8" diameter bolts.

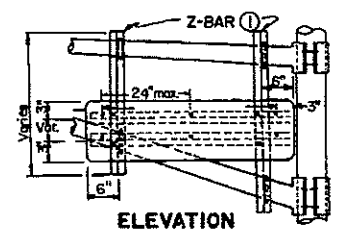
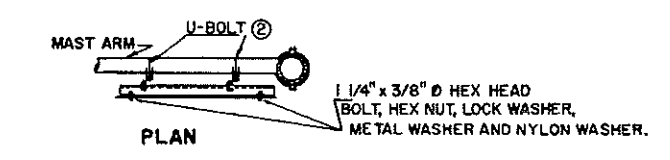
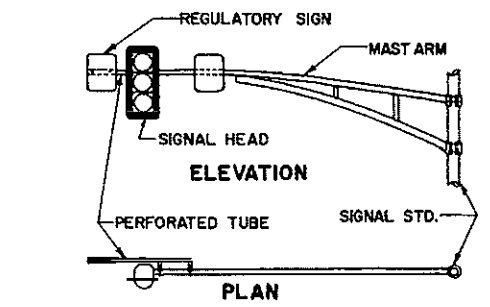
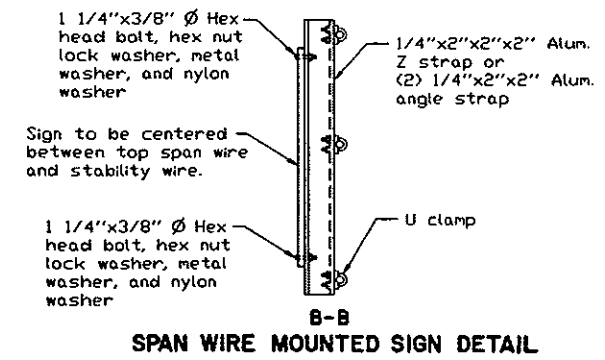
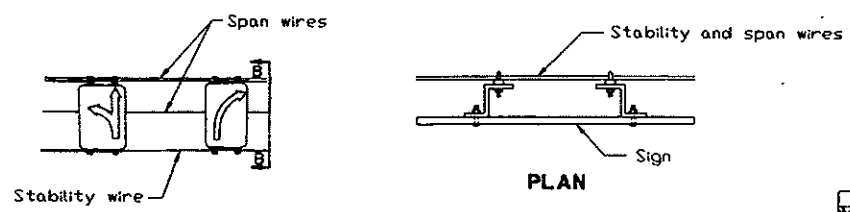
General: See Std. D-754-24 for square tube, perforated mounting details. See Std. D-754-25 for flange channel mounting details.

* 10 gauge material has been used in the manufacturing of these support.

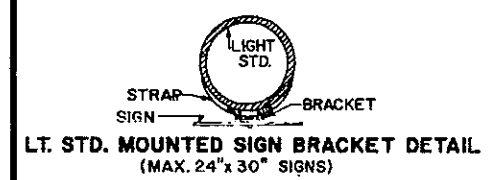
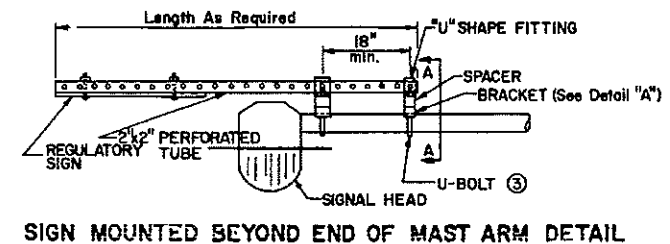
- Assembly: 438 Single sign
 439 Back to Back
 440 Single sign each direction
 441 Single sign one direction back to back other direction
 442 Back to Back both directions
 443 Back to Back single other direction
 Assembly: 444 Back to Back all directions

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
5-1-92	GENERAL REVISIONS	Approved: <i>[Signature]</i> Design Engineer

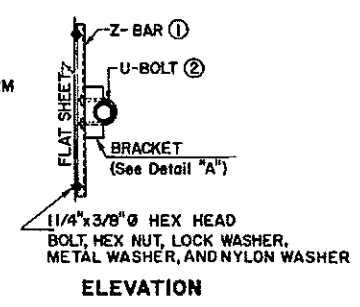
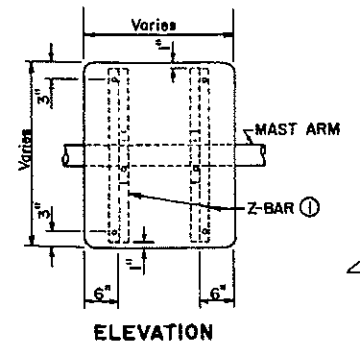
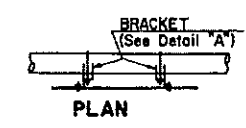
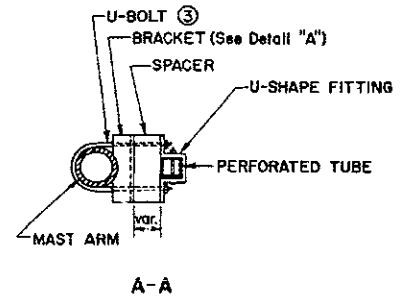
LIGHT STANDARD, SIGNAL STANDARD AND SPAN WIRE MOUNTED SIGN ASSEMBLY DETAIL



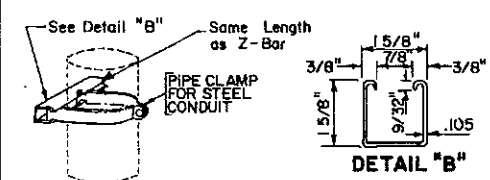
MAST ARM MOUNTED STREET NAME SIGN DETAIL



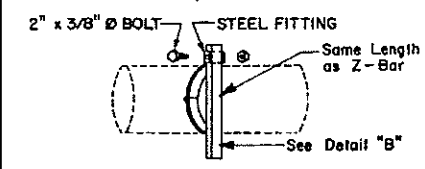
Bracket shall be of galv. steel consisting of strap & sign attachment bracket similar to the one shown in the detail. Cost of the bracket assembly to be included in the price bid for flat sheet signs. Punching shall be as shown on the Standard Drawings. The Engineer in the field shall determine the exact location of the light standard for sign attachment. There shall be a 7" vertical clearance to the bottom of all signs mounted on light standards.



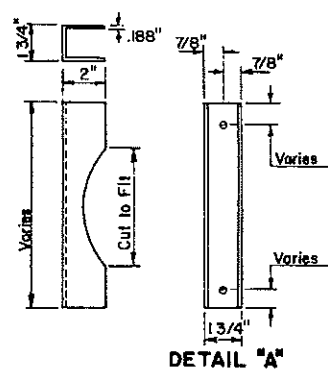
MAST ARM MOUNTED REGULATORY SIGN DETAIL



VERTICAL MOUNTING
Two (2) Clamps Required Per Sign



HORIZONTAL MOUNTING
Two (2) Clamps Required Per Sign
ALTERNATE CLAMP MOUNTING

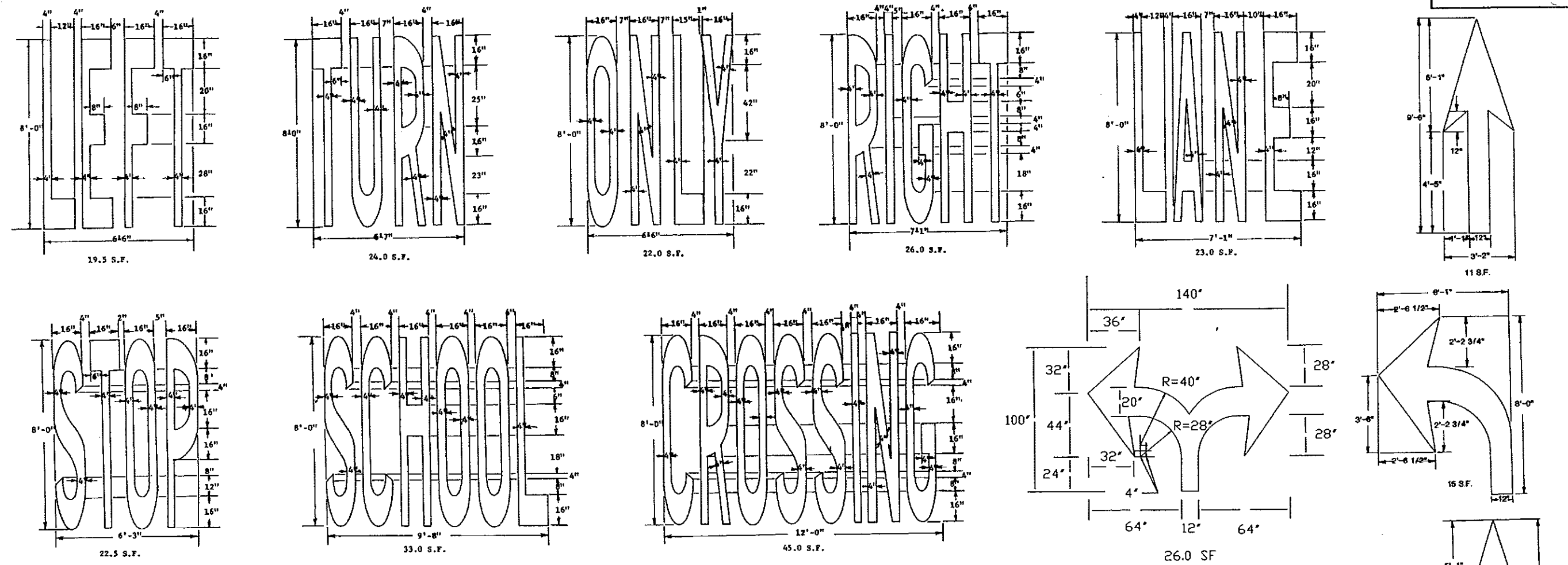


- ① Z-Bar - Use 1 3/4" x 3/16" Thick 108 Lbs./Ft Aluminum Alloy. In lieu of Z-Bar, two angles bolted together may be used or a channel. (1 3/4" x 1 3/4" x 3/16" angles) (1 3/4" x 2" x .188" Channels)
- ② 3/8" U-Bolt, Hex Nut, Lock Washer & Length depends on Dia. of Mast Arm
- ③ 3/8" U-Bolt, Hex Nut, Lock Washer & Length depends on Dia. of Mast Arm. Paint Perforated Tube the same color and specification as Mast Arm.
2" x 2" Maximum support length 99 ft.
2 1/2" x 2 1/4" Maximum support length 12.6 ft.
2 1/2" x 2 1/2" Maximum support length 15.7 ft.

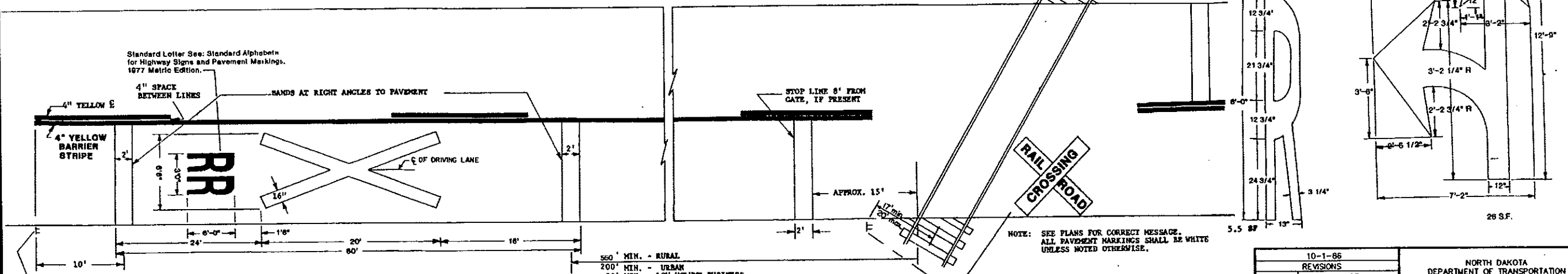
NOTE:
Metal washers and Nylon washers used on sign face shall have a minimum outside dia. of 15/16 inch ± 1/16 inch and 10 gauge thickness.

10-1-86	
REVISIONS	
DATE	CHANGE
5-1-92	GENERAL REVISIONS
11-24-95	SPAN WIRE MOUNTING SIGN DETAIL

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. [Signature]*
DESIGN ENGINEER



PAVEMENT MARKING MESSAGE DETAILS



RR
W10-1-36 SHALL BE PLACED WITHIN 10'± OF LOCATION SHOWN

A THREE LANE ROADWAY SHOULD BE MARKED WITH A CENTERLINE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING. ON MULTI-LANE ROADS, THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL R X R SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.

550' MIN. - RURAL
200' MIN. - URBAN
50' MIN. - LOW VOLUME BUSINESS OR RESIDENTIAL AREAS

RAILROAD CROSS & 2 R'S 65.0 S.F.
3 BANDS 72.0 S.F.

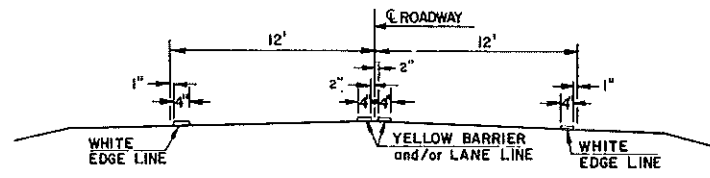
10-1-86	
REVISIONS	
DATE	CHANGE
3-1-89	Arrows
7-2-90	Rail Road X & R
3-2-92	Arrows
7-21-93	RAILROAD R
8-1-94	GENERAL REVISIONS
11-27-95	DUAL ARROWS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Olson*
DESIGN ENGINEER

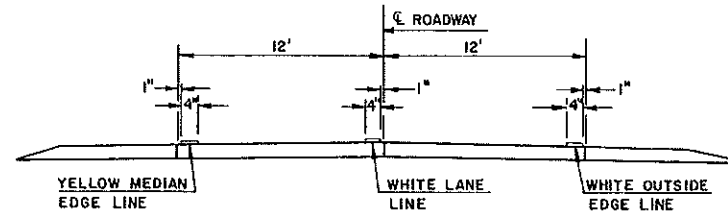
PAVEMENT MARKING

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

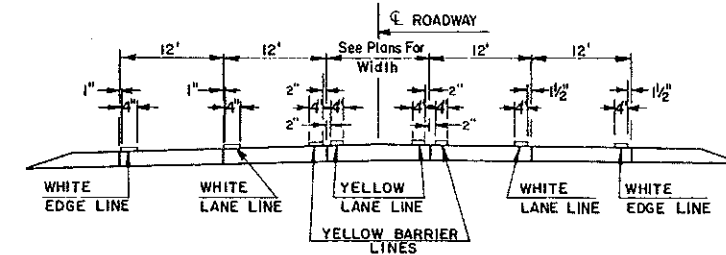
D-762-4



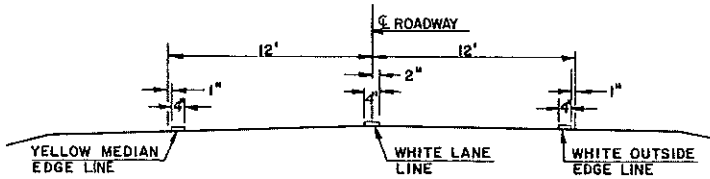
TWO LANE TWO WAY
RURAL ROADWAY



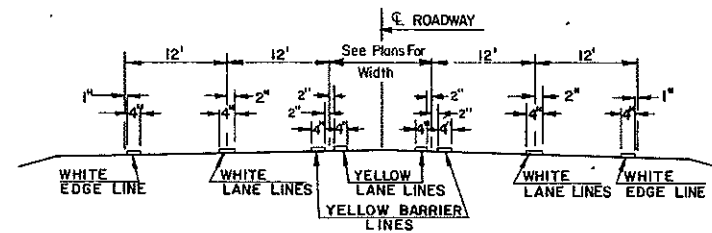
TWO LANE ROADWAY
INTERSTATE HIGHWAY
CONCRETE SECTION



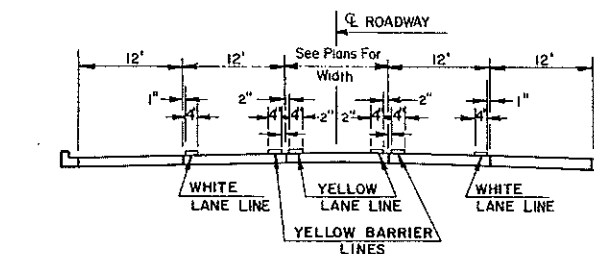
RURAL FIVE LANE ROADWAY
CONCRETE SECTION



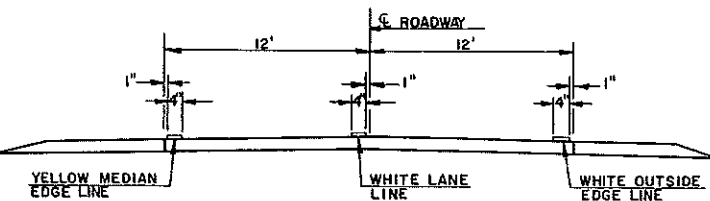
TWO LANE DIVIDED
RURAL ROADWAY
PRIMARY HIGHWAY
ASPHALT SECTION



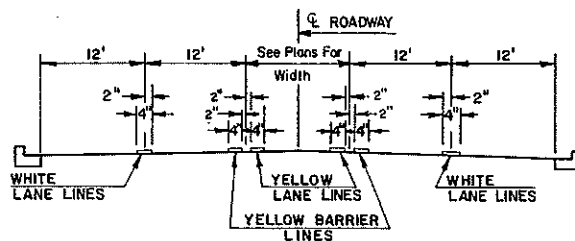
RURAL FIVE LANE ROADWAY
ASPHALT SECTION



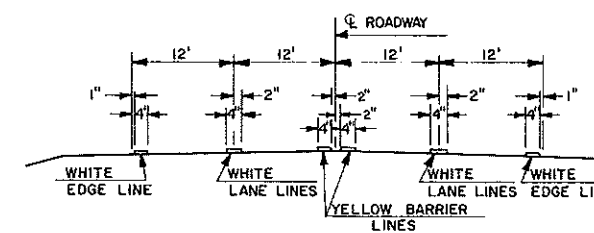
URBAN FIVE LANE SECTION
CONCRETE SECTION



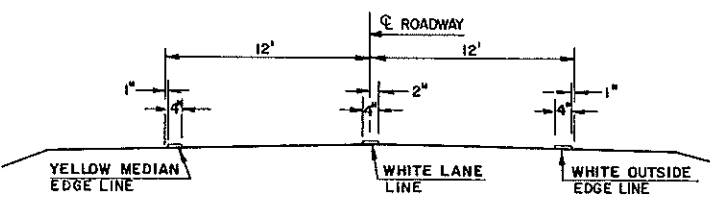
TWO LANE ROADWAY
PRIMARY HIGHWAY
CONCRETE SECTION



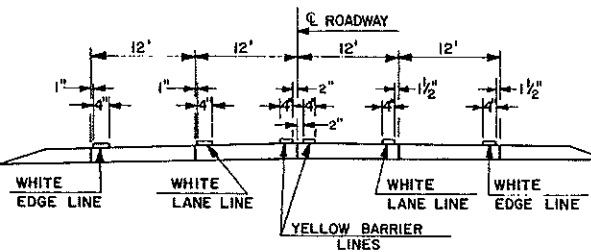
URBAN FIVE LANE SECTION
ASPHALT SECTION



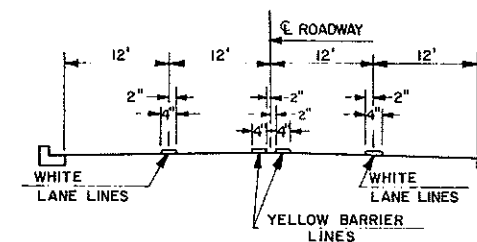
RURAL FOUR LANE ROADWAY
ASPHALT SECTION



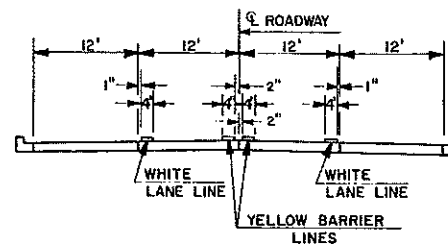
TWO LANE ROADWAY
INTERSTATE HIGHWAY
ASPHALT SECTION



RURAL FOUR LANE ROADWAY
CONCRETE SECTION



URBAN FOUR LANE SECTION
ASPHALT SECTION

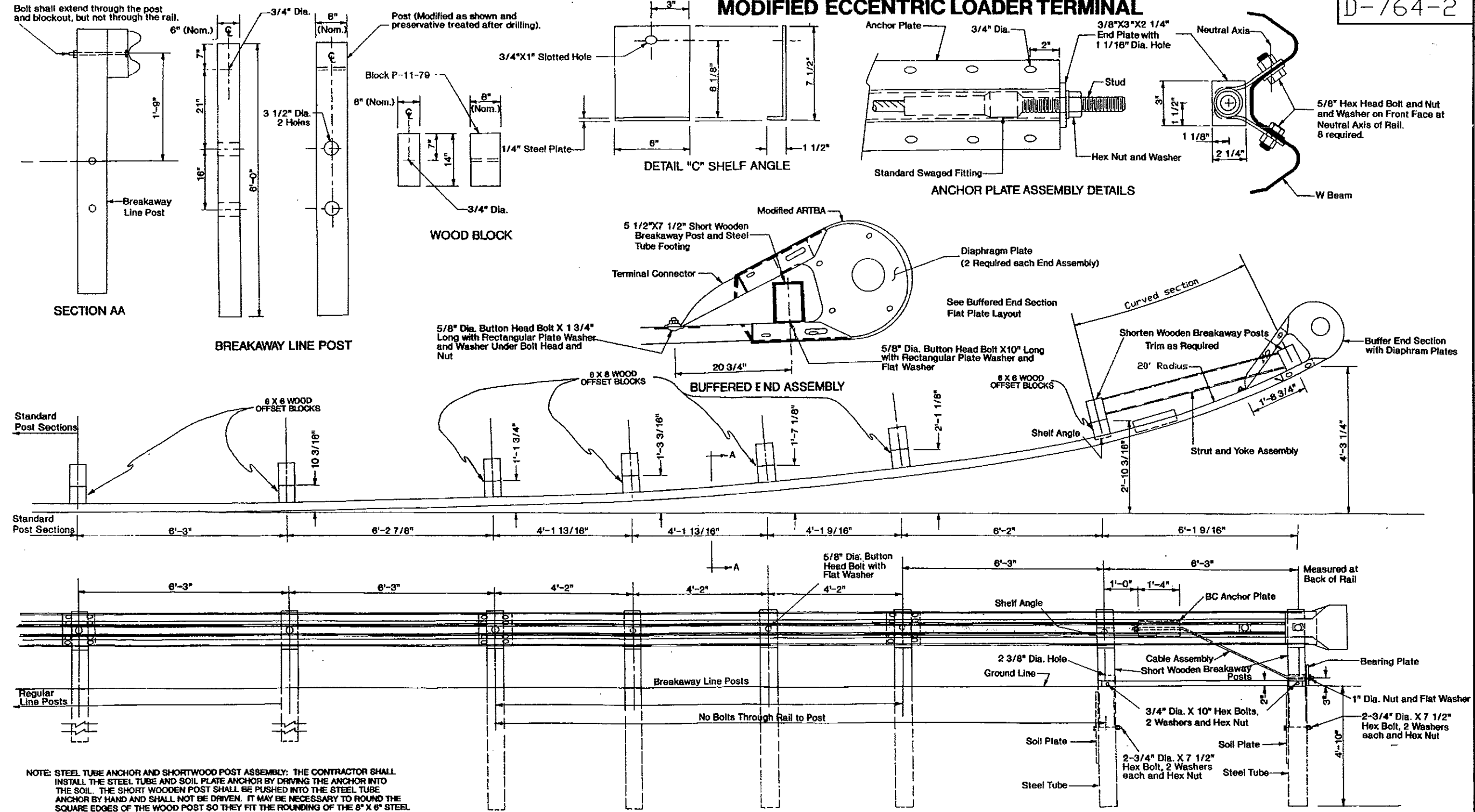


URBAN FOUR LANE SECTION
CONCRETE SECTION

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Olsen</i> DESIGN ENGINEER
3-1-88 9-1-94	Edge Line GEN. REV.	

MODIFIED ECCENTRIC LOADER TERMINAL

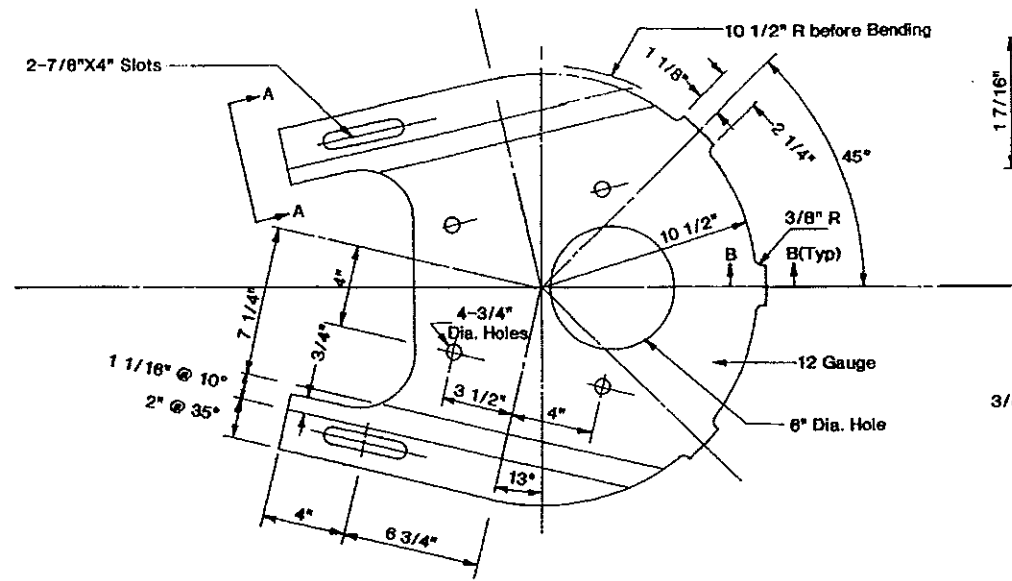
D-764-2



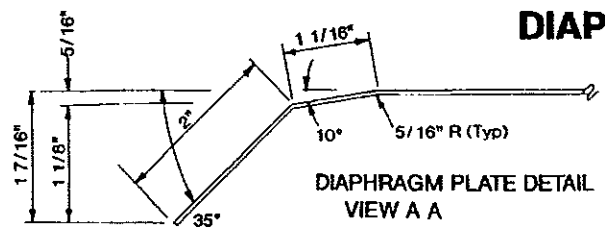
10-1-86		REVISIONS
DATE	CHANGE	
4-26-93	GENERAL REVISIONS	
11-15-93	ADDED NOTE	
9-8-95	REMOVE NOTE	
12-1-95	CURVED SECTION	

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. Olson*
DESIGN ENGINEER

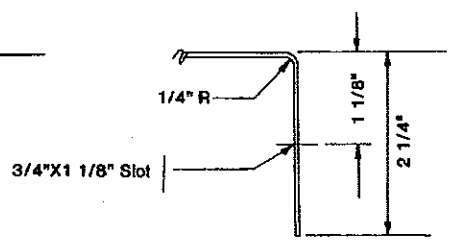
DIAPHRAGM BUFFERED & STRUT AND YOKE DETAILS



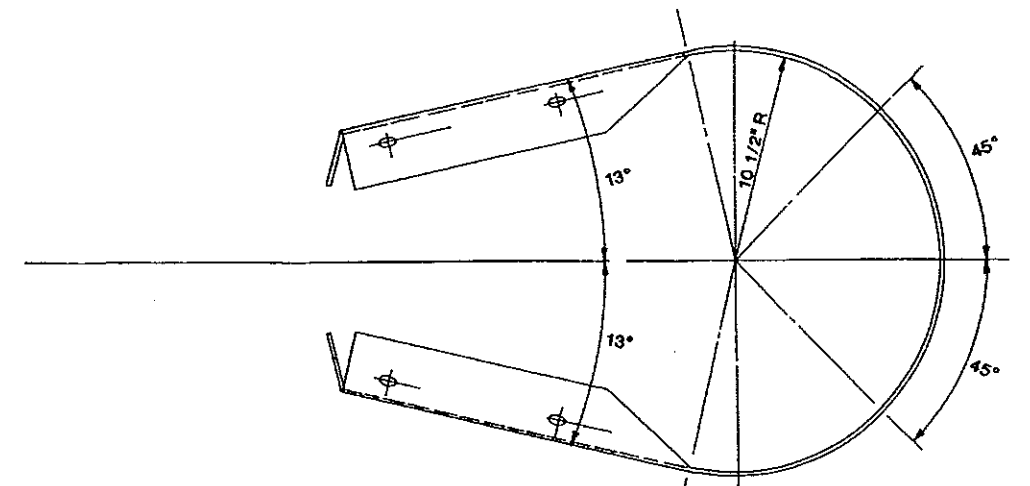
DIAPHRAGM PLATE DETAIL
(2 Required Each Terminal)



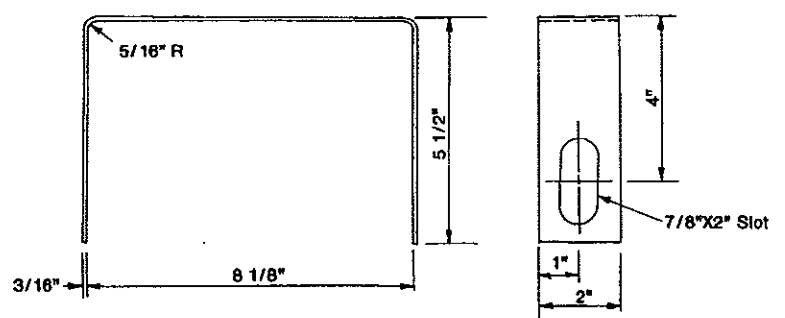
DIAPHRAGM PLATE DETAIL
VIEW A-A



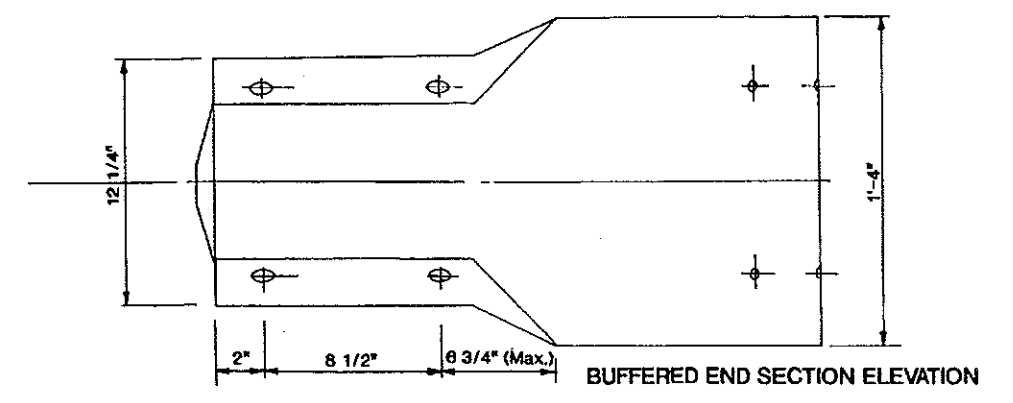
DIAPHRAGM PLATE DETAIL
SECTION B-B



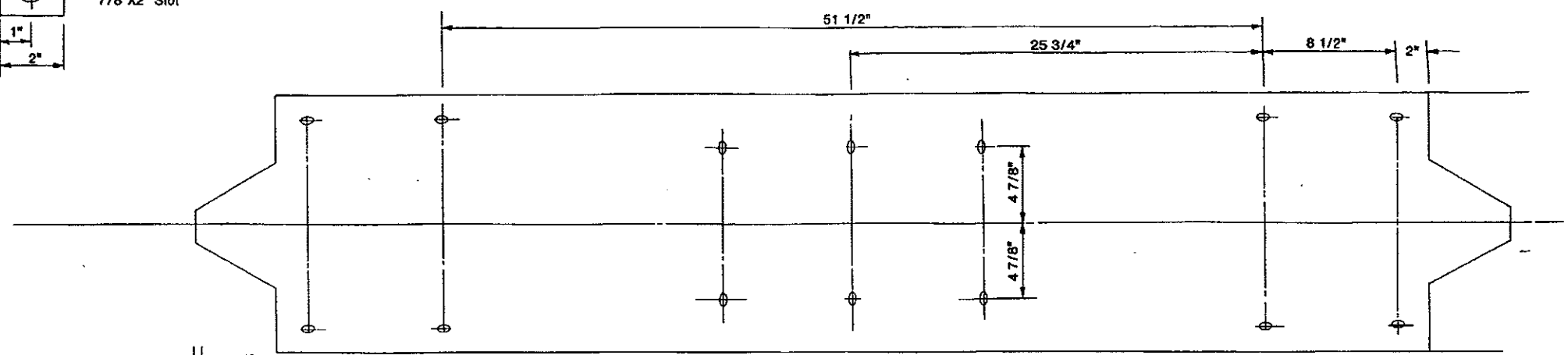
BUFFERED END SECTION PLAN



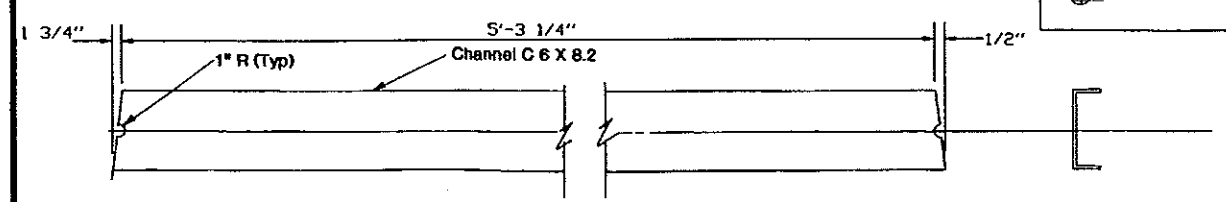
YOKE DETAILS



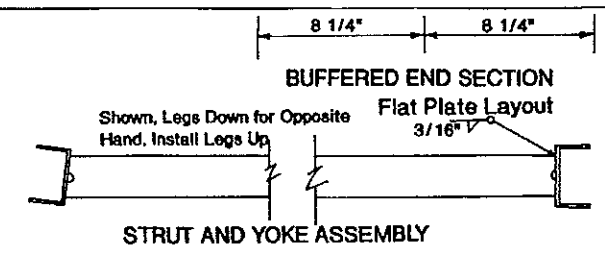
BUFFERED END SECTION ELEVATION



BUFFERED END SECTION
Flat Plate Layout



STRUT DETAILS



STRUT AND YOKE ASSEMBLY

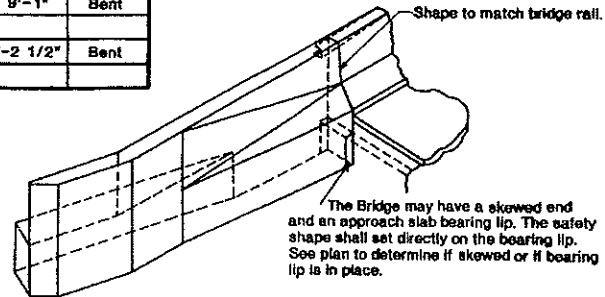
All slots 29/32"X1 1/8"
all bolts 5/8" Button
Head X 1 1/4"

3-2-92	
REVISIONS	
DATE	CHANGE
12-1-95	STRUT DETAILS

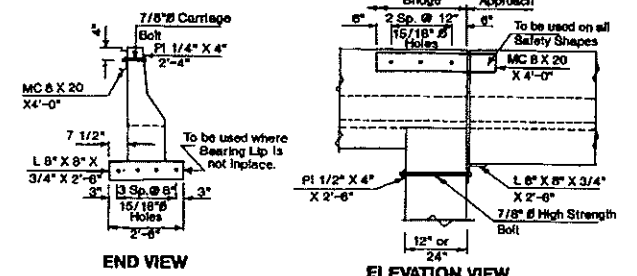
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. Larson*
DESIGN ENGINEER

BAR LIST				
MARK	NUMBER	SIZE	LENGTH	SHAPE
401	8	4	13'-3"	Field Bend
402	4	5	13'-3"	Field Bend
403	2	4	4'-0"	Bent
404	9	4	3'-9"	Bent
405	8	4	3'-10"	Bent
406	9	4	4'-10"	Bent
407	20	4	9'-1"	Bent
408				
409	17	4	4'-2 1/2"	Bent

NOTE: WHEN THE SAFETY SHAPE TRANSITION SECTION IS PRECAST THE JOINT BETWEEN THE BRIDGE RAIL AND THE SAFETY SHAPE SHALL BE SEALED LOW MODULUS SILICONE SEALANT MEETING THE REQUIREMENTS OF SECTION 828.02A4 OR EQUAL. WHEN THE SAFETY SHAPE TRANSITION IS CAST IN PLACE A 1" EXPANSION JOINT FILLER SHALL BE INSTALLED. COST OF SEALANT OR FILLER SHALL BE INCIDENTAL TO "CONCRETE CLASS AE3 FOR SAFETY SHAPE TRANSITION."

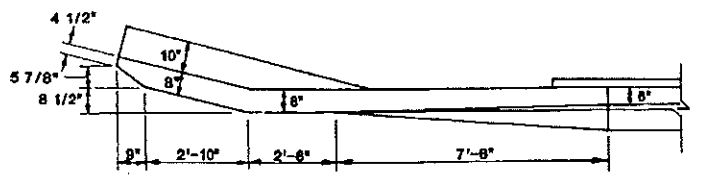


WINGWALL ISOMETRIC

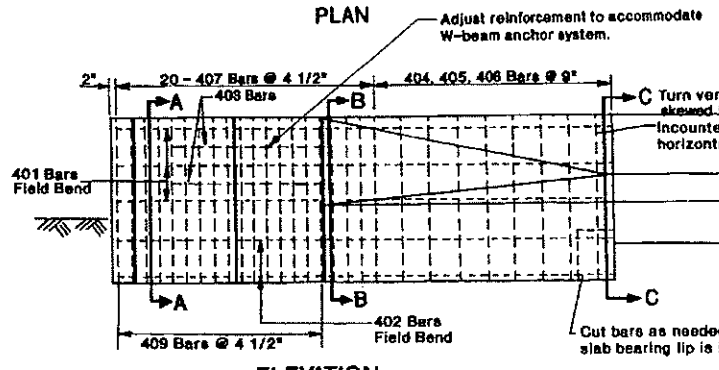


SAFETY SHAPE BEARING AND ALIGNMENT BEAM

W BEAM GUARD RAIL AT BRIDGE END
General Layout & Details
Flared Guard Rail Section



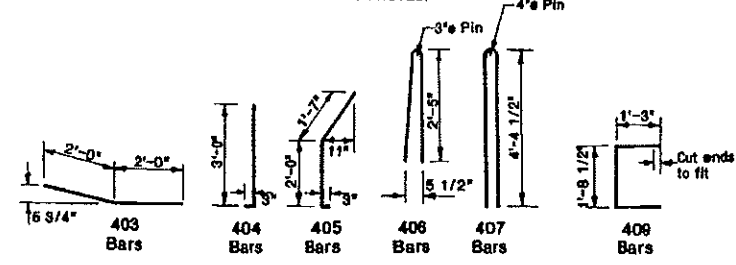
PLAN



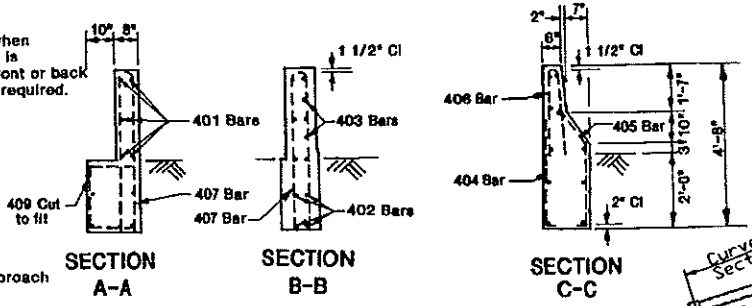
ELEVATION

SAFETY SHAPE TRANSITION
Estimated AE-3 Concrete 56.3 C.F.
Estimated Reinforcing 385.9 Lbs.

NOTE: USE #4 BARS UNLESS OTHERWISE NOTED.



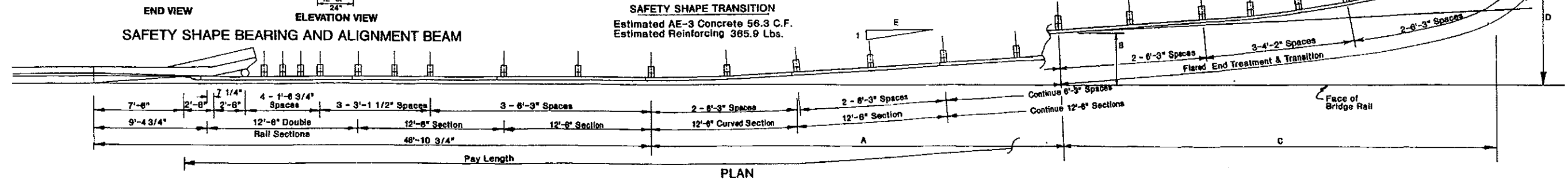
REINFORCING BAR DETAIL



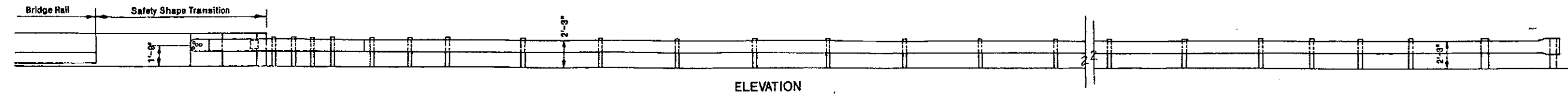
SECTION A-A

SECTION B-B

SECTION C-C



PLAN



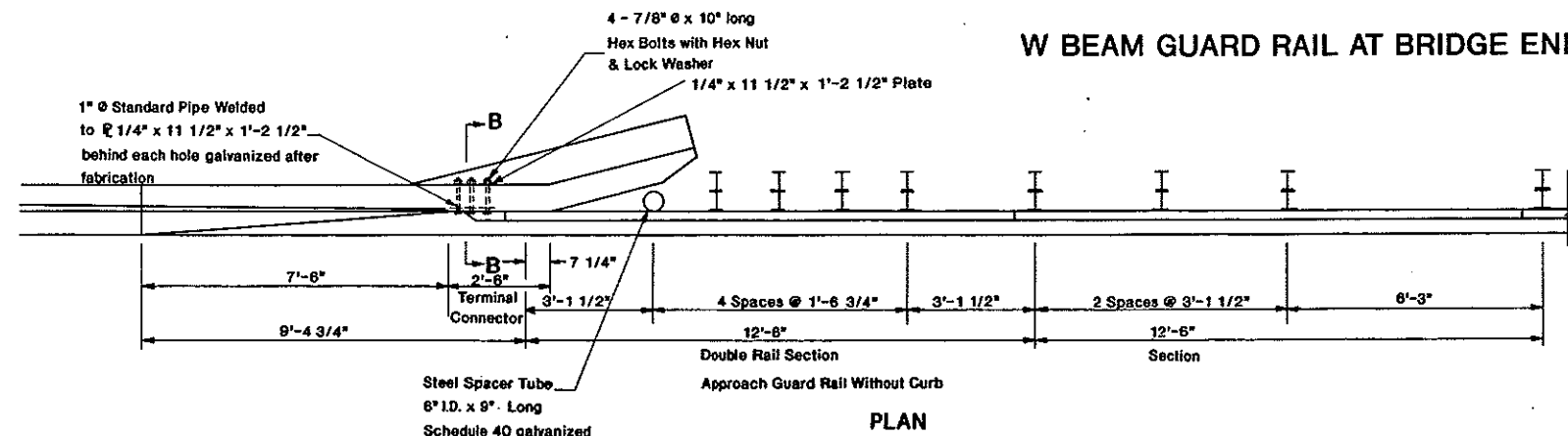
ELEVATION

NOTE: THE SAFETY SHAPE TRANSITION SHALL BE MEASURED BY THE NUMBER. THE COST OF EXCAVATION FORMING, AGGREGATE BASE, SHEET METAL, REINFORCING STEEL, EQUIPMENT AND LABOR SHALL BE INCLUDED IN THE PRICE BID FOR "CONCRETE AE3 FOR SAFETY SHAPE TRANSITION"
THE CONTRACTOR SHALL USE WOOD POSTS FOR THE W-BEAM GUARDRAIL AND FLARED END TREATMENT AND TRANSITION,

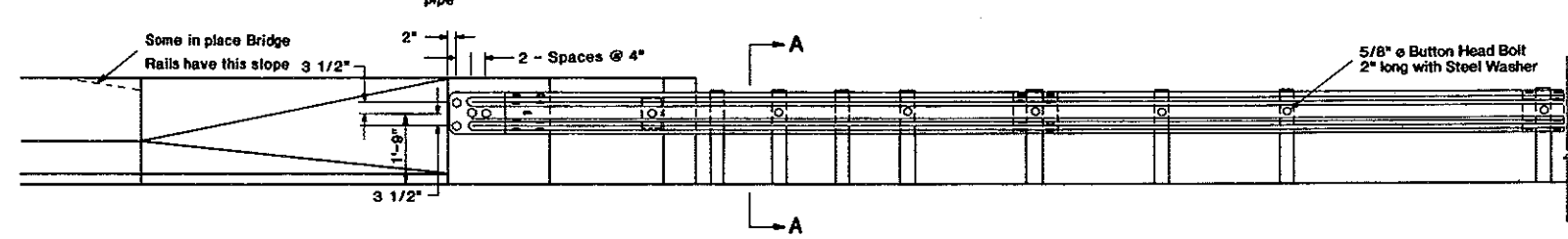
4-28-89 REVISIONS	
DATE	CHANGE
3-21-94	GENERAL REVISIONS
10-10-94	409 BAR LENGTH
12-1-95	CURVED SECTION

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David R. Lee*
DISTRICT ENGINEER

W BEAM GUARD RAIL AT BRIDGE ENDS

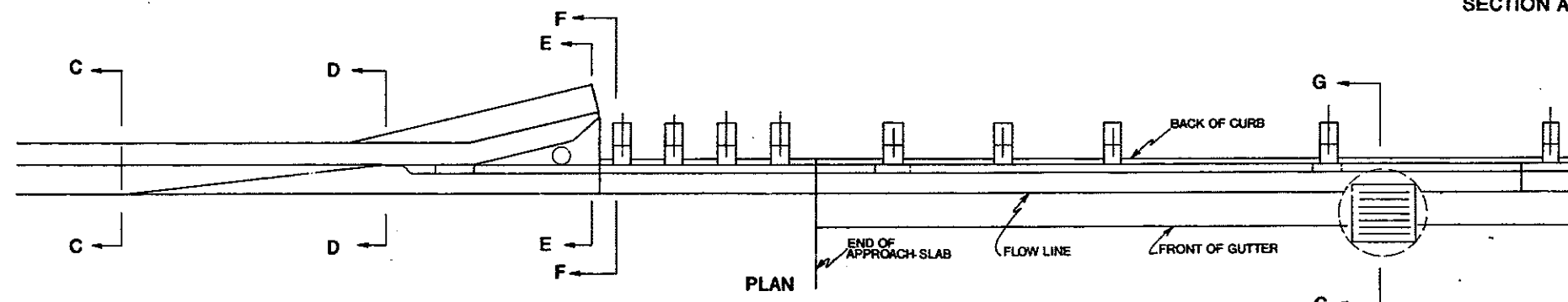


PLAN

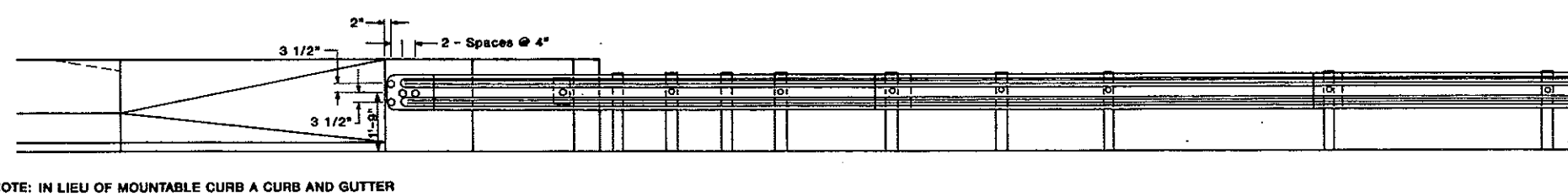


ELEVATION

ATTACHMENT DETAIL WITHOUT APPROACH DROP INLET



PLAN



ELEVATION

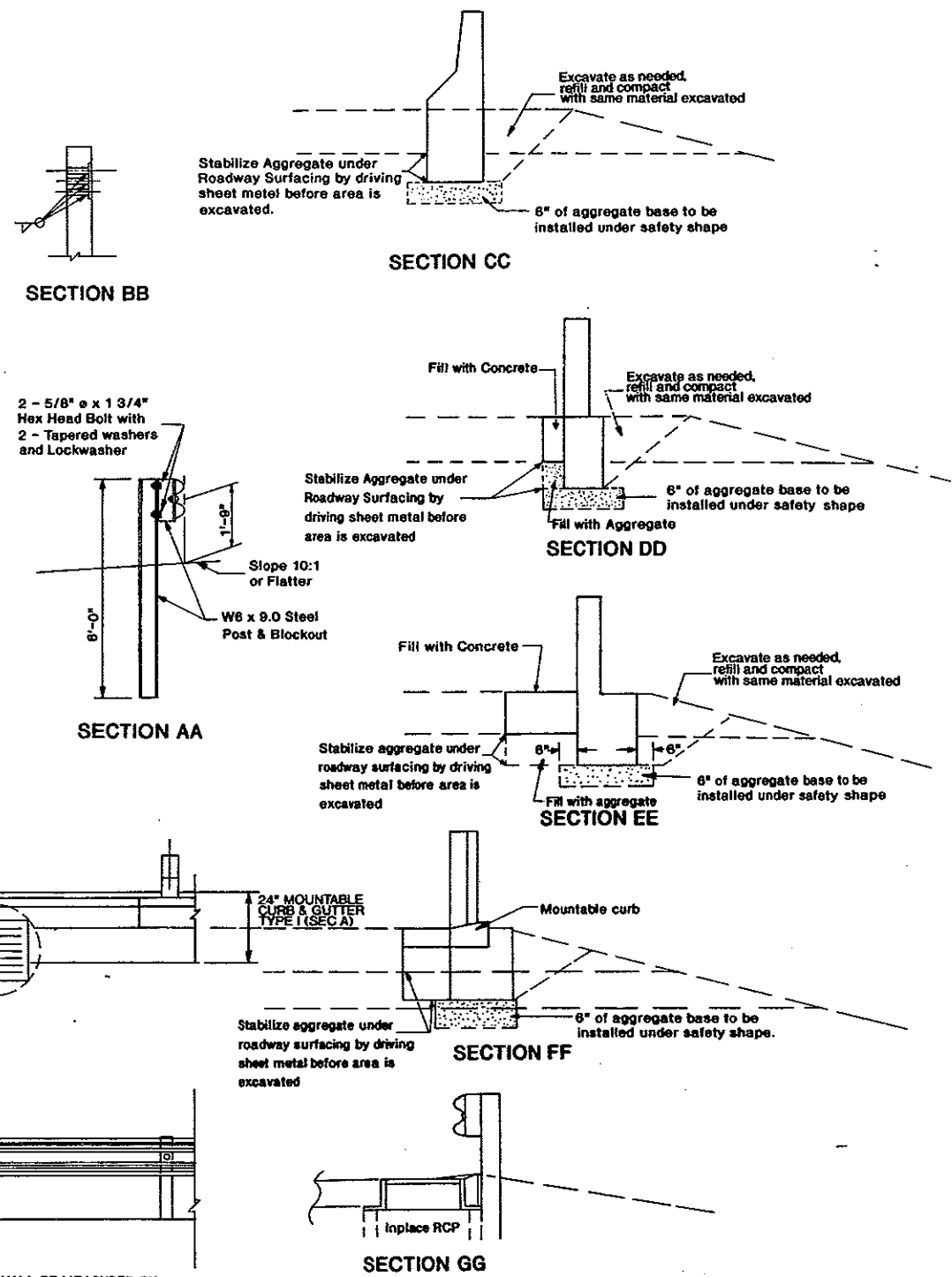
ATTACHMENT DETAIL WITH CURB AND GUTTER MOUNTABLE

NOTE: IN LIEU OF MOUNTABLE CURB A CURB AND GUTTER TYPE 1 (SEC. A.) STANDARD D-748-1 MAY BE USED EXCEPT THE CURB HEIGHT SHALL BE A MAXIMUM OF 3-INCHES ABOVE THE FLOW LINE.

THE SAFETY SHAPE TRANSITION SHALL BE MEASURED BY THE NUMBER. THE COST OF EXCAVATION FORMING, AGGREGATE BASE, SHEET METAL, REINFORCING STEEL, EQUIPMENT AND LABOR SHALL BE INCLUDED IN THE PRICE BID FOR "CONCRETE AES FOR SAFETY SHAPE TRANSITION".

NOTE: THE MOUNTABLE CURB SHALL BE MEASURED BY THE LINEAR FOOT AND SHALL BE PAID FOR AS "MOUNTABLE CURB AND GUTTER TYPE 1" (SEC. A) STANDARD D-748-1

THE CONTRACTOR SHALL USE WOOD POSTS FOR THE W-BEAM GUARDRAIL AND FLARED END TREATMENT AND TRANSITION.



SECTION BB

SECTION CC

SECTION DD

SECTION EE

SECTION AA

SECTION FF

SECTION GG

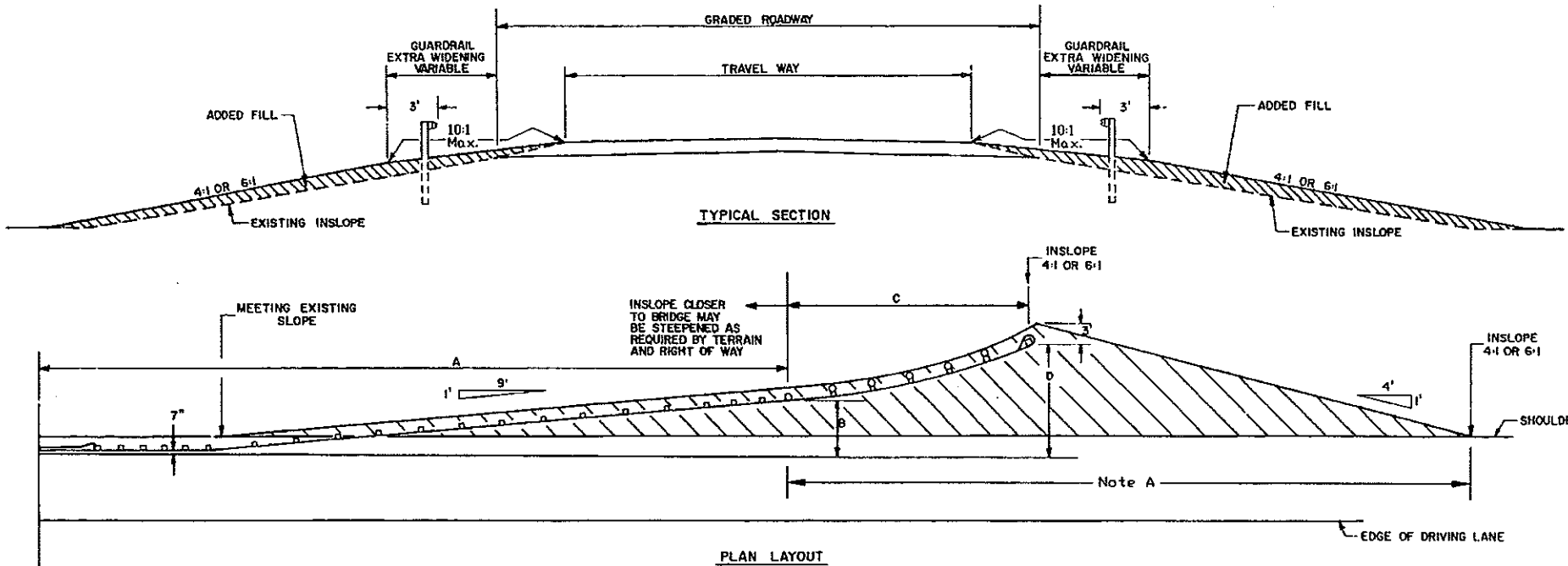
4-28-89	
REVISIONS	
DATE	CHANGE
1-2-90	STANDARD NUMBER
6-1-90	NOTE ADDED
2-26-91	NOTE
3-10-93	GENERAL REVISIONS
6-10-93	GENERAL REVISIONS
10-20-93	NOTE ADDED
03-21-94	GENERAL REVISION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *David K. Olson*
 DESIGN ENGINEER

		W - BEAM DIMENSION TABLE							
		APPROACH SIDE		FLARED END TREATMENT & TRANSITION		OPPOSITE SIDE		FLARED END TREATMENT & TRANSITION	
DESIGN TRAFFIC VOLUME (ADT)	CLEAR ROWY WIDTH OF BRIDGE	STRAIGHT AND FLARED GUARDRAIL		FLARED END TREATMENT & TRANSITION		STRAIGHT AND FLARED GUARDRAIL		FLARED END TREATMENT & TRANSITION	
		A	B	C	D	A	B	C	D
		FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
UNDER 250	44	46.9	0	37.2	4.6	46.9	0	37.2	4.6
	42								
	40								
	38								
	36								
	34								
	32								
	30								
	28	46.9	0	37.2	4.6				
	26	59.4	1.3	36.6	9.4				
24	59.4	1.3	36.6	9.4	46.9	0	37.2	4.6	
800-250	44	46.9	0	37.2	4.6	46.9	0	37.2	4.6
	42								
	40								
	38								
	36								
	34								
	32	46.9	0	37.2	4.6				
	30	59.4	1.3	36.6	9.4				
	28				9.4				
	26	59.4	1.3		9.4				
24	71.8	2.7	36.6	10.7	46.9	0	37.2	4.6	
2000-800	44	46.9	0	37.2	4.6	46.9	0	37.2	4.6
	42								
	40								
	38								
	36								
	34	46.9	0	37.2	4.6				
	32	59.4	1.3	36.6	9.4				
	30	59.4	1.3		9.4				
	28	71.8	2.7		10.7				
	26								
24	71.8	2.7	36.6	10.7	46.9	0	37.2	4.6	
6000-2000	44	46.9	0	37.2	4.58	46.9	0	37.2	4.6
	42								
	40								
	38	46.9	0	37.2	4.58				
	36	59.4	1.3	36.6	9.36				
	34								
	32	59.4	1.3		9.36				
	30	71.8	2.7		10.74				
	28	71.8	2.7		10.74				
	26	84.2	4.0		12.12				
24	84.2	4.0	36.6	12.12	46.9	0	37.2	4.6	
OVER 6000	44	46.9	0	37.2	0	46.9	0	37.2	4.6
	42								
	40	46.9	0	37.2	0				
	38	59.4	1.27	36.6	1.3				
	36	59.4	1.27		1.3				
	34	71.8	2.65		2.7				
	32								
	30	71.8	2.65		2.7				
	28	84.2	4.04		4.0				
	26	84.2	4.04		4.0				
24	96.7	5.42	36.6	5.4	46.9	0	37.2	4.6	

TYPICAL GRADING AT BRIDGE ENDS

WITH
FLARED W-BEAM GUARDRAIL
40 MPH DESIGN SPEED

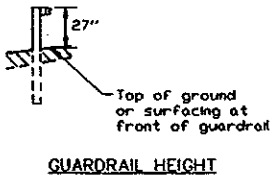


NOTE:
THE DESIGN TRAFFIC VOLUMES (ADT) SHALL BE AS SHOWN ON TITLE SHEET UNDER TRAFFIC FORECAST.

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.

Note A: This area may have to be placed at flatter than 10:1 to get the proper guardrail height.

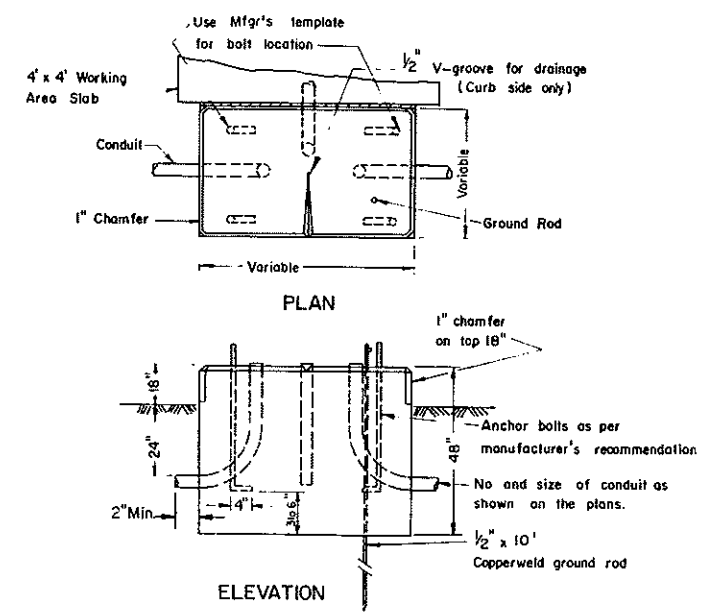


9-4-90	
REVISIONS	
DATE	CHANGE
7-9-91	SLOPE 1'-9"
6-1-92	TITLE
6-30-95	NOTE A
9-7-95	REVISE GUARDRAIL SLOPE
12-8-95	GUARDRAIL HEIGHT

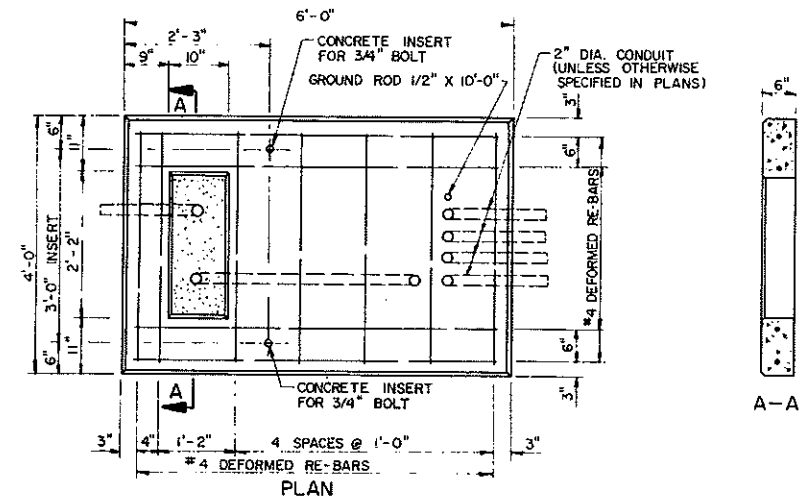
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *Dan K. Olson*
DESIGN ENGINEER

CONCRETE FOUNDATIONS (TRAFFIC SIGNALS & HIGHWAY LIGHTING)

LIGHT & SIGNAL STANDARD FOUNDATION SELECTION TABLE				
Description	Reinforcing Bars Required	Footing Depth "D" 24" Diameter	Reinforcing Bars Required	Footing Depth "D" 36" Diameter
Light Standard				
30'-35' Mounting Height	8-#5	6'	8-#4	5'
36'-44' Mounting Height	8-#5	6'	8-#4	5'
45'-50' Mounting Height	8-#5	8'	8-#4	7'
Combination 30' Mounting Height				
0-25' Signal Mast Arm	8-#6	10'	8-#5	8'
26'-44' Signal Mast Arm	8-#6	10'	8-#5	8'
45'-50' Signal Mast Arm	8-#8	11'	8-#7	9'
Combination 40' Mounting Height				
0-25' Signal Mast Arm	8-#6	10'	8-#5	8'
26'-44' Signal Mast Arm	8-#7	11'	8-#6	9'
45'-50' Signal Mast Arm	8-#8	12'	8-#7	10'
Combination 50' Mounting Height				
0-25' Signal Mast Arm	8-#6	10'	8-#5	9'
26'-44' Signal Mast Arm	8-#8	12'	8-#7	10'
45'-50' Signal Mast Arm	8-#8	13'	8-#7	11'
Type IV Signal Standard	8-#7	10'	8-#6	9'
Type I, II, III, V, VI, & VII Signal Std	4-#5	4'	4-#5	3'



CONTROLLER CABINET FOUNDATION PAD MOUNT
The Controller Cabinet Foundation shall be bid as Concrete Foundations-Traffic Signals.



TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT
The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundations-Feed Point Pad-Type A.

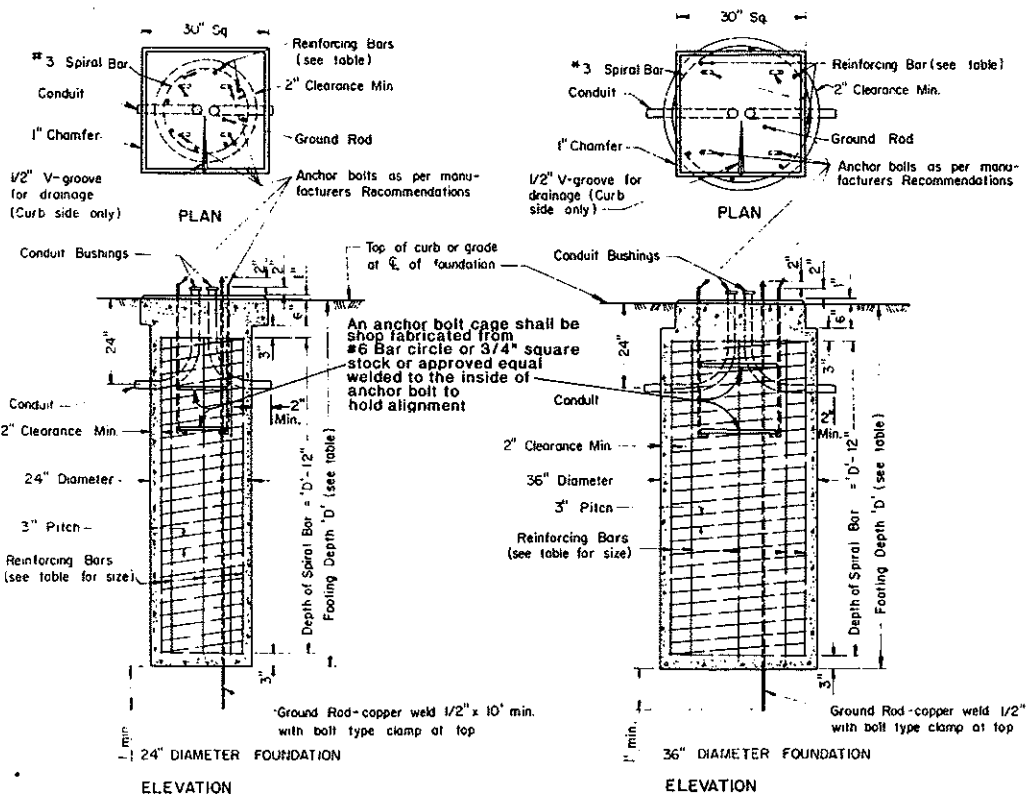
NOTES:

Light & Signal Standard Foundations:
See plans for conduit size, number of bends and correct positioning for each foundation.
When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown.
See plans for correct location of foundations. The grade and exact location shall be established by the Engineer in the field.

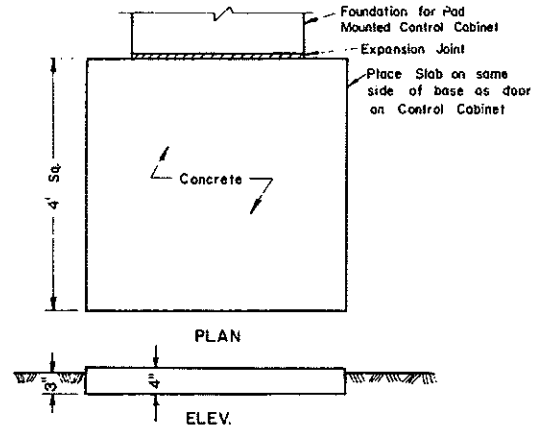
Maximum anchor bolt circle for the 24" foundation shall not exceed 18". Maximum anchor bolt circle for the 36" foundation shall not exceed 30".
Pad Mounted Signal Control Cabinet Foundation:
See plans for the number of 90° bends per foundation and correct positioning.
Foundation for Pad Mounted Signal Control Cabinets shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The Contractor shall insure a watertight seal between the control cabinet and the foundation by caulking, except for V groove.

Working Area Slab:
The materials and preparation of this slab shall be as approved by the Engineer in the field.

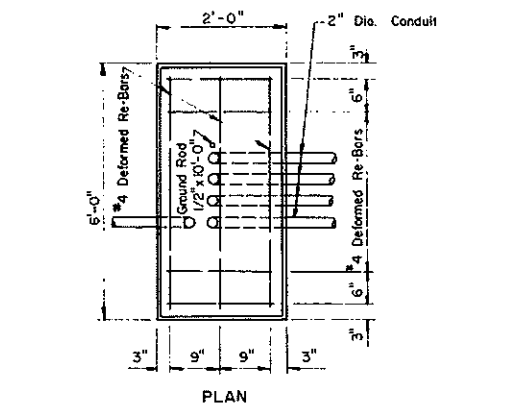
Transformer & Feed Point Cabinet Foundation Pad Mounted:
Foundation shall have a wood float finish.
All conduits shown shall be installed. Conduit that is not used at this time shall be plugged.
Feed Point Cabinet Foundation Pad Mounted:
Foundation shall have wood float finish.
All conduits shown shall be installed. Conduit that is not used at this time shall be plugged.



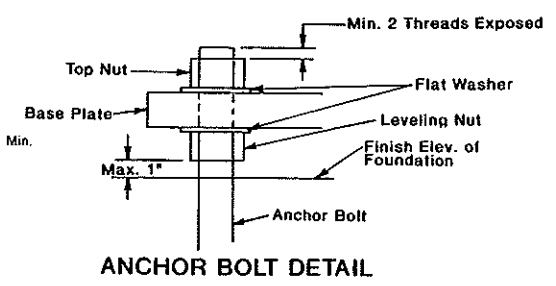
LIGHT & SIGNAL STANDARD FOUNDATION



WORKING AREA SLAB
The Working Area Slab shall be installed where shown on the plans, and shall not be bid separately but shall be included in the price bid for Concrete Foundations-Traffic Signals.



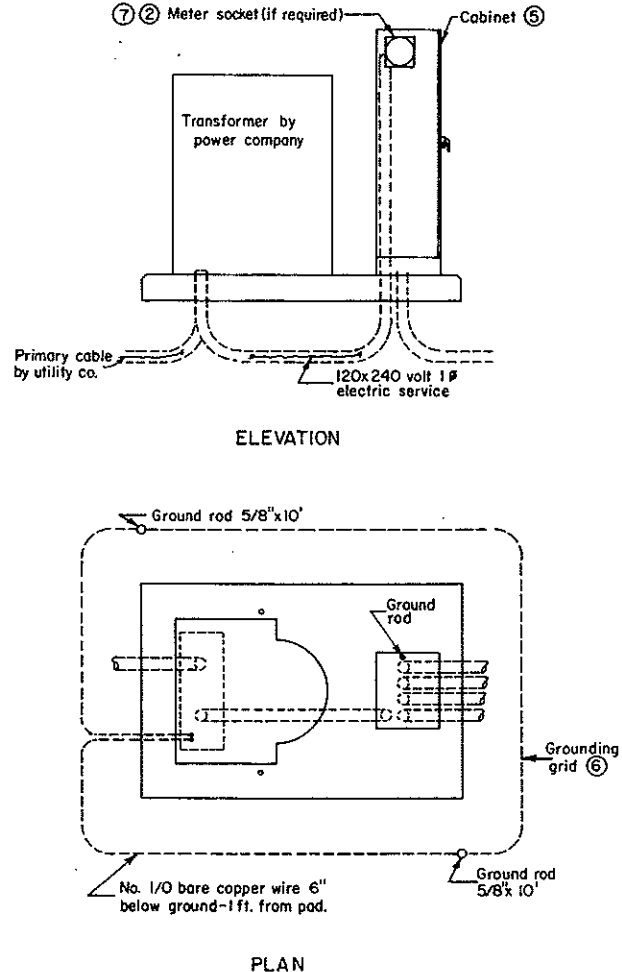
FEED POINT CABINET FOUNDATION PAD MOUNT
The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundations-Feed Point Pad-Type B.



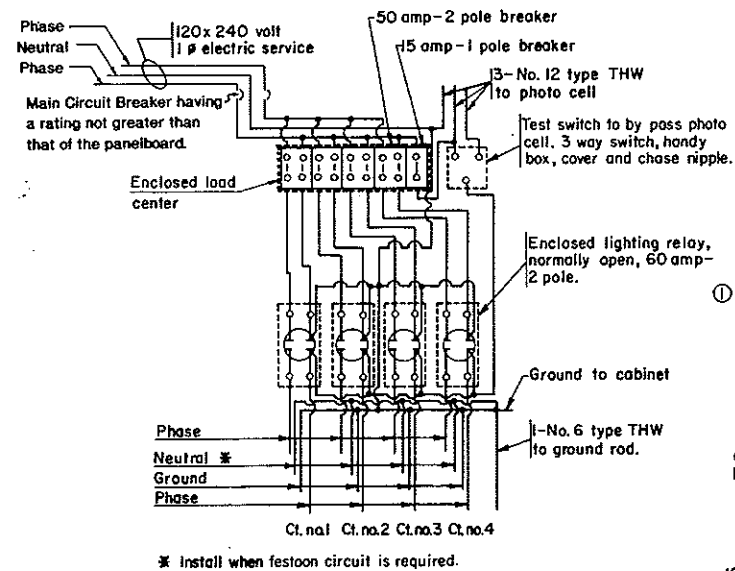
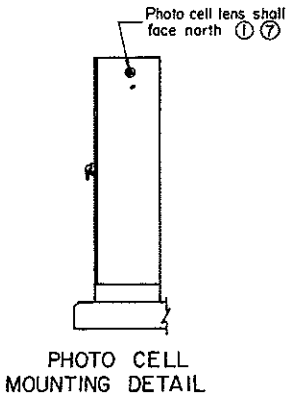
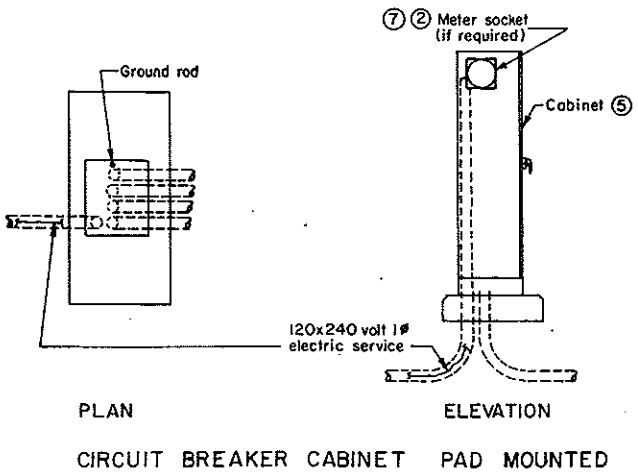
10-1-86 REVISIONS	
DATE	CHANGES
5-5-92	1. Std. Mounting Ht.
6-16-94	Anchor Bolts & Leveling Nuts
10-10-94	Slab Revision
8-14-95	Footnote (1) Revision

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *[Signature]*
DESIGN ENGINEER

FEED POINTS (ROADWAY LIGHTING)



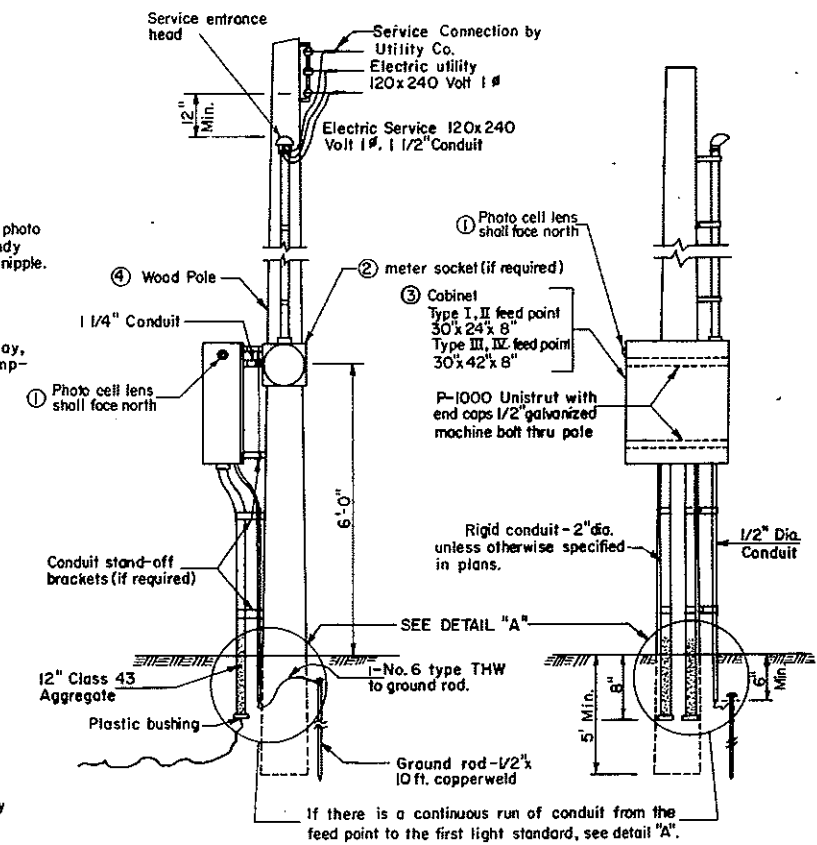
TRANSFORMER AND CIRCUIT BREAKER CABINET PAD MOUNTED



FEED POINT TYPE IV

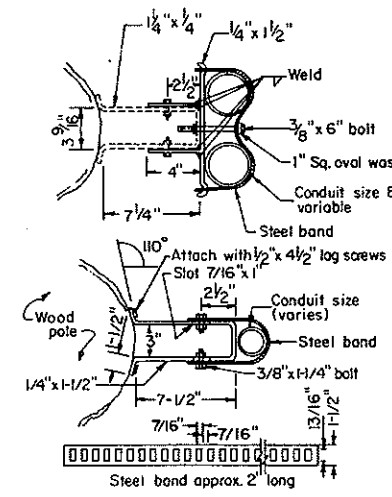
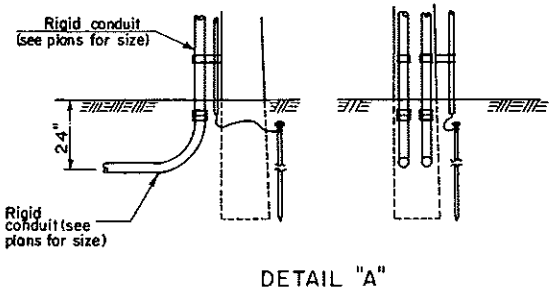
* Install when festoon circuit is required.

Type I feed point is similar to type IV except only one electrical circuit, one 50 amp-2 pole breaker and one lighting relay, normally open, shall be installed. Type II feed point is similar to type IV except only two electrical circuits, two 50 amp-2 pole breaker and two lighting relays, normally open, shall be installed. Type III feed point is similar to type IV except only three electrical circuits, three 50 amp-2 pole breakers and three lighting relays, normally open, shall be installed.



POLE MOUNTED

- NOTES:**
- PHOTO CELL:** The Electrical Contractor shall furnish and install the photoelectric cell.
 - METER SOCKET:** The contractor shall install the meter socket and trim if meter is required by local utility company. Meter to be furnished and installed by utility company.
 - CABINET:** Cabinet shall be N.E.M.A. 12 rating with lock drip shield and 1/2" plywood backing, stainless steel hardware. Paint plywood with 2 coats of oil base gray. Cabinet shall be shop coated with one coat of primer & have two coats of exterior gray enamel.
 - WOOD POLE:** Minimum 20ft. Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
 - CABINET:** Cabinet shall be 56" high x 26" wide x 14" deep. Minimum 12 ga. steel with provisions for padlock. Cabinet shall be weatherproof. Cabinet shall have one shop coat of primer and two field coats of exterior dark green enamel.
 - GROUNDING GRID:** The grounding grid shall have a ground resistance not to exceed 25 ohms. This shall be obtained by one or more 5/8"x10" copperweld ground rods in parallel or series at two corners. Minimum distance between ground unit assemblies shall be 6'-0".
 - METER LOCATION:** The Meter (if required) shall not be mounted on the same side of the cabinet as the photo-cell is mounted.

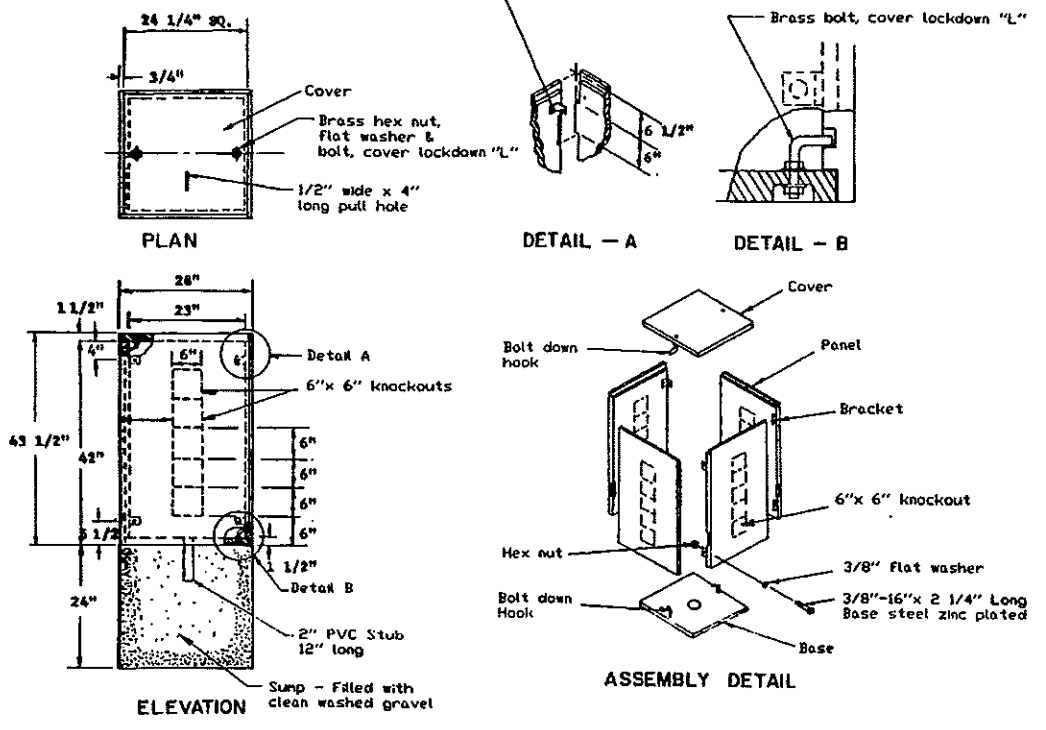


CONDUIT STANDOFF BRACKET

The conduit standoff brackets may be omitted if not required by the local utility company.

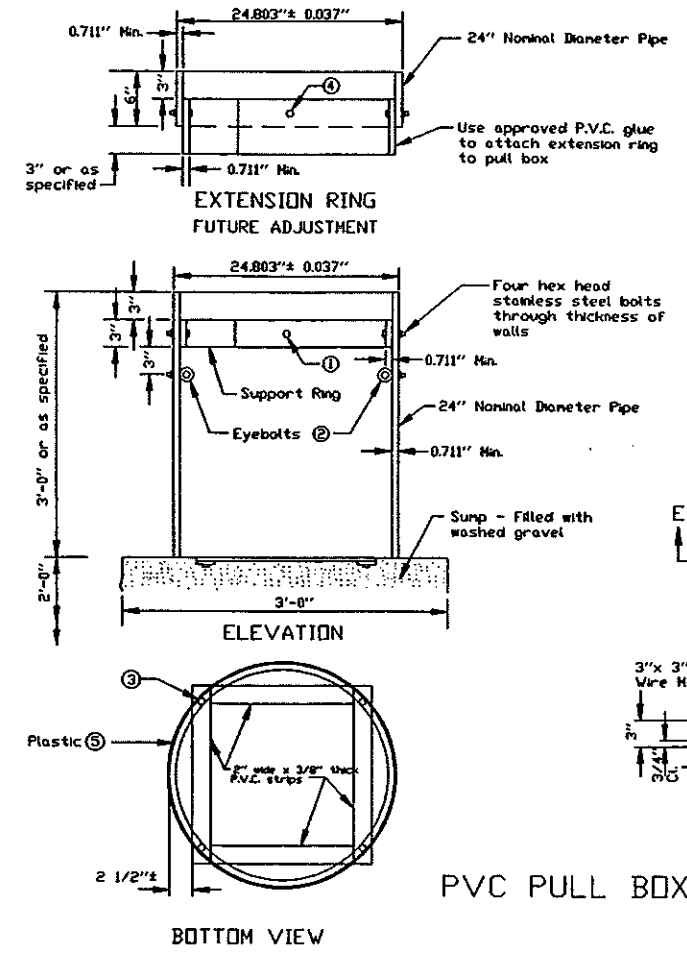
10-1-86 REVISIONS		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	CHANGES	
1-28-91	Cabinet Note	APPROVED: <i>David K.O. Zear</i> DESIGN ENGINEER
3-20-91	Conduit	
9-1-92	Feed Point	

NOTE: Fiberglass pull box is composed of fiberglass skins and reinforced mortar structural elements in combination with polyurethane foam cells.



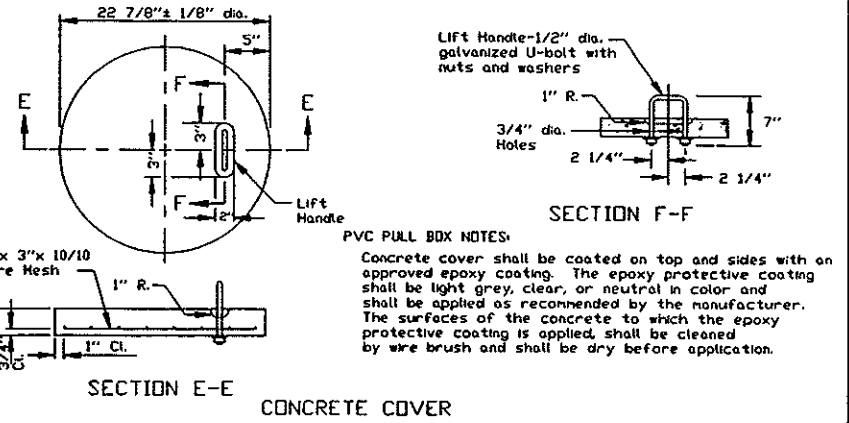
FIBERGLASS PULL BOX

PULL BOX DETAILS

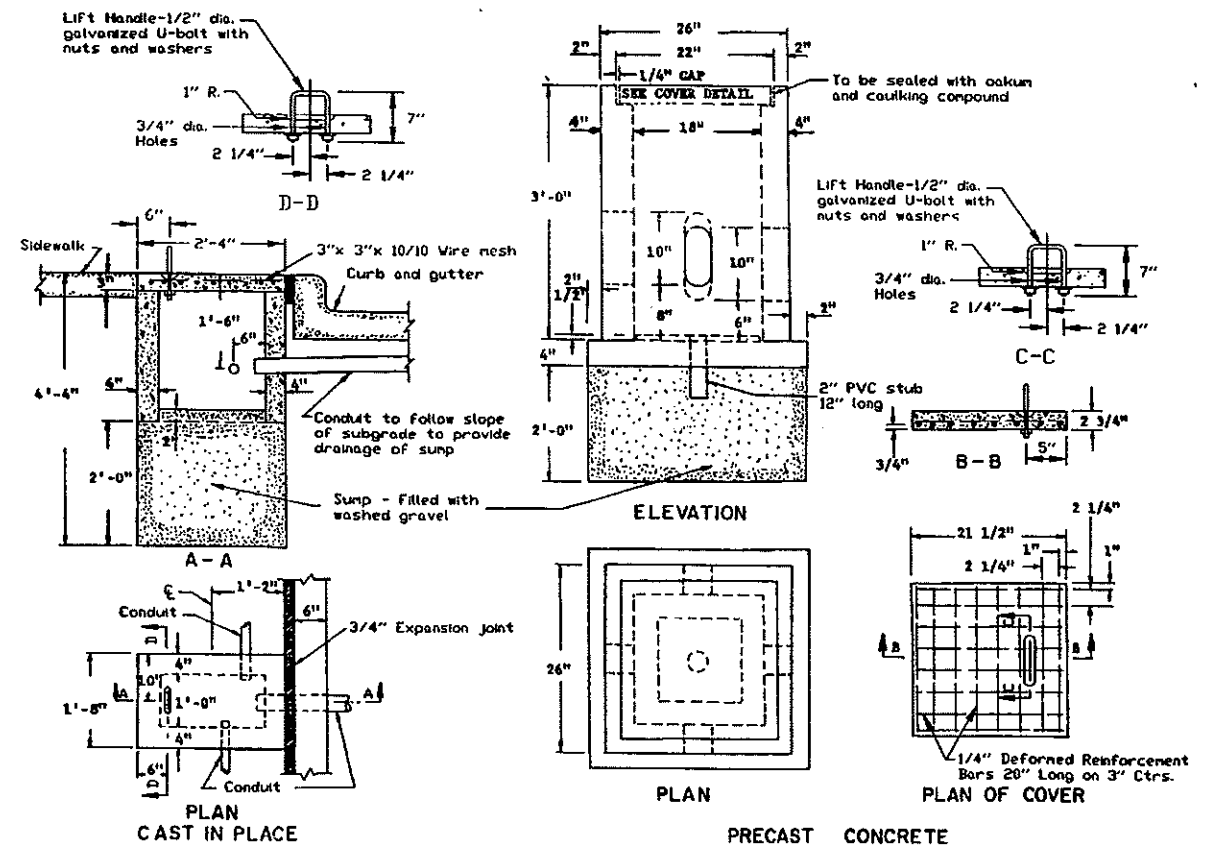


PVC PULL BOX

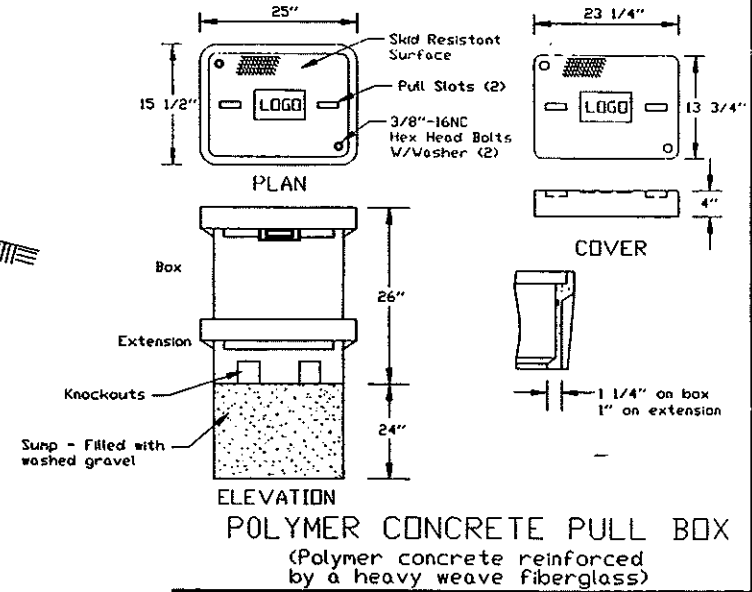
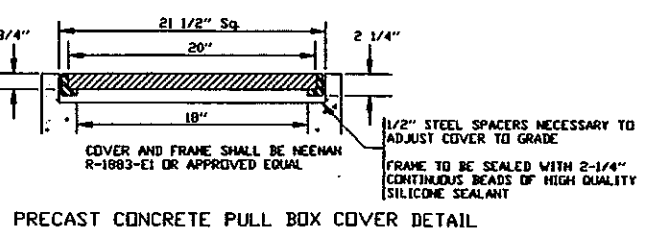
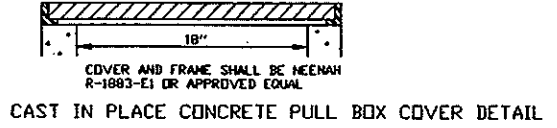
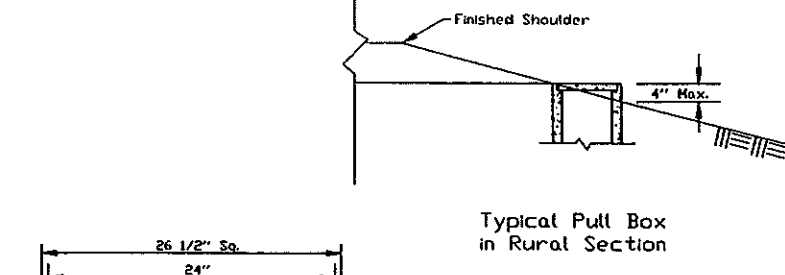
- PVC PULL BOX NOTES:
- ① Attach split 24" nominal diameter P.V.C. cover support ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90° apart.
 - ② Two Type 2 Shoulder Eyebolts, 3/8" dia. x 1 1/4" shank length, with hex nuts 180° apart (for lifting pull box and supporting electric cable).
 - ③ Four 1/4"x 1 1/4" long galvanized lag screws. Screw assembly together.
 - ④ Attach split 24" nominal diameter P.V.C. cover support extension ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90° apart.
 - ⑤ Bolt assembly together.
 - ⑥ Conduit holes located in barrel section shall be sized no more than 1" larger than size of conduit being used.
 - ⑦ After pull box & conduit installation all inside walls & cover shall be made water tight to the satisfaction of the Engineer.
 - ⑧ P.V.C. pipe to meet requirements of ASTM F679I-1 or equal.
 - ⑨ Hex head bolts and nuts shall be austenitic stainless steel. Other fasteners to be galvanized as per AASHTO M-232.



CONCRETE COVER

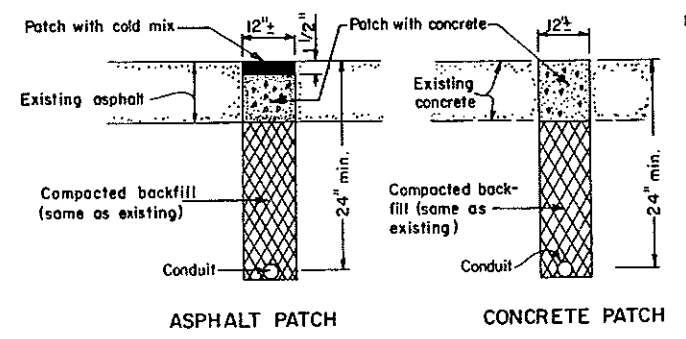


CONCRETE PULL BOX



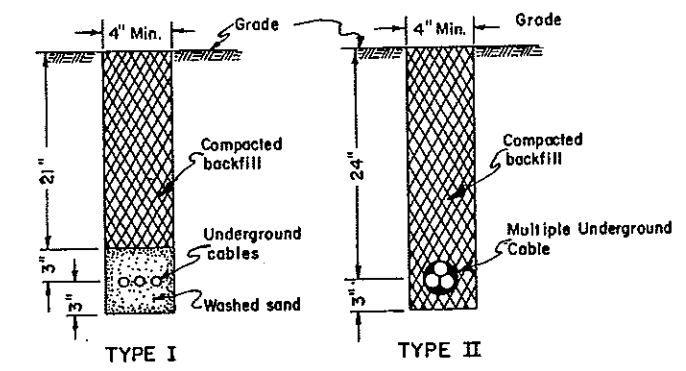
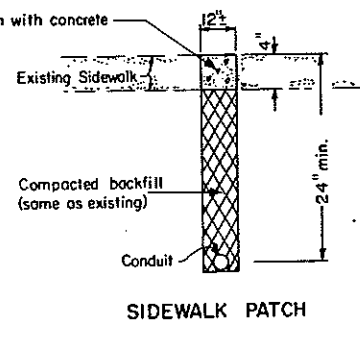
10-1-88		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
4-26-94	Add NEENAH Cover	APPROVED: <i>David K. O. Loren</i> DESIGN ENGINEER
10-11-94	Lift Handle & Polymer Concrete Pull Box	
3-20-95	Add PVC Pull Box	

LIGHTING & SIGNAL DETAILS



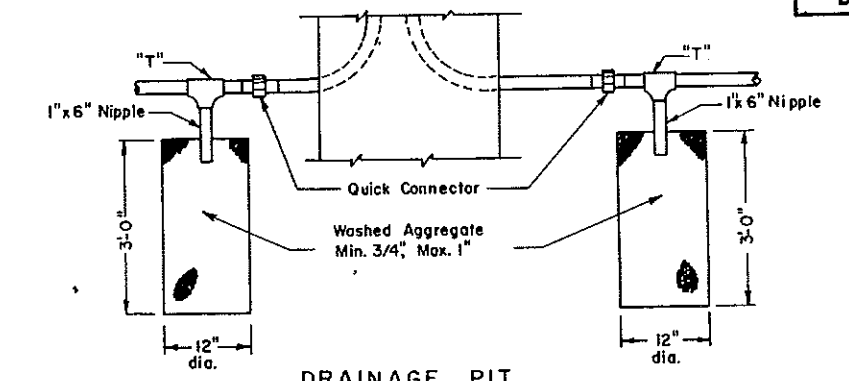
SURFACE PATCH DETAILS

NOTE:
PATCHES: All trenches shall be saw-cut. The replacement concrete shall be P.C.C. pavement and the coarse aggregate gradation, maximum size and method of curing shall be as approved by the Engineer. The cost shall be included in the price bid for Conduit.
 Immediately prior to pouring replacement concrete, all surfaces shall be painted with an approved epoxy compound.



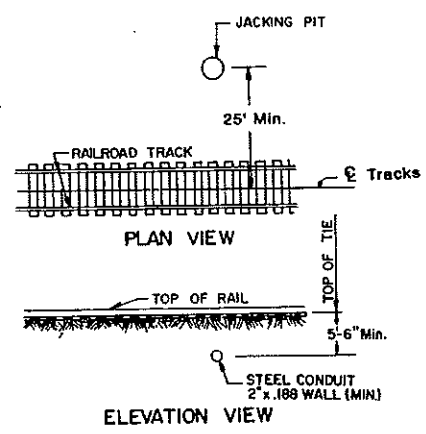
CABLE TRENCH

The entire area which is disturbed by the trenching shall be sodded, or as directed by the Engineer. The cost shall be included in the price bid for "Cable Trench".

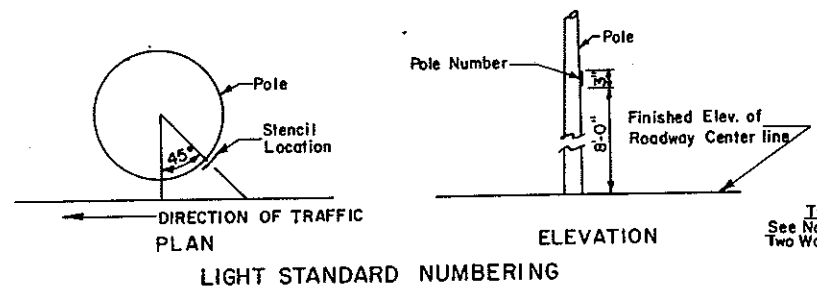


DRAINAGE PIT

Drainage pits shall be installed in both ends of the conduit runs. Except where conduit slopes enough for drainage to one end. (To be used for Traffic Signal Conduit Runs Only)

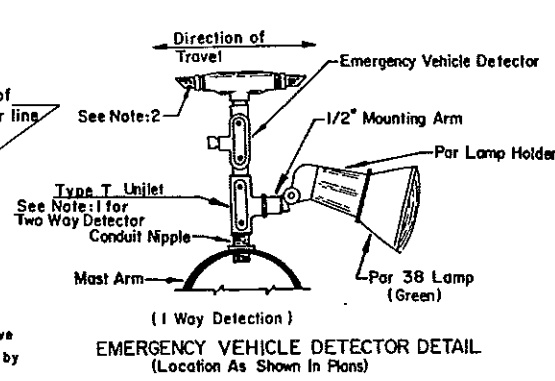


RAILROAD TRACK CONDUIT PLACEMENT



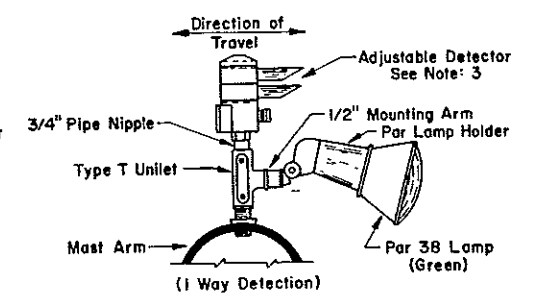
LIGHT STANDARD NUMBERING

NOTE:
POLE NUMBERING: The contractor shall stencil on each light standard the pole number in black paint on the roadway side of the pole, or adhesive coated plastic such as *Scotch-coil*, Manufactured by 3M as approved by the Engineer. See layout sheets for pole numbers.



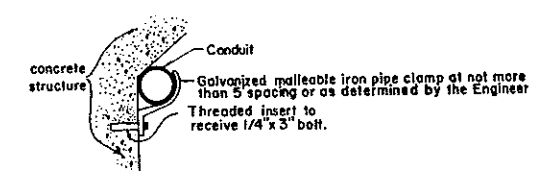
EMERGENCY VEHICLE DETECTOR DETAIL (Location As Shown In Plans)

- Notes:**
- Two-way Detector shall have Type X Unilet with two Par lamp holders and lamps (one in each direction).
 - One-Way Detector shall have the unused end plugged with metal pipe plug.

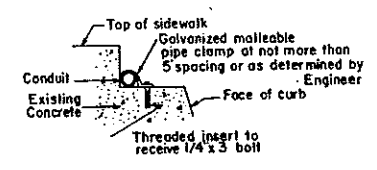


ALTERNATE EMERGENCY VEHICLE DETECTOR DETAIL (Adjustable) (Location As Shown In Plans)

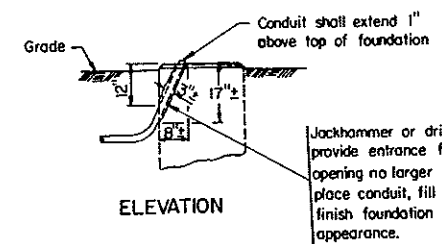
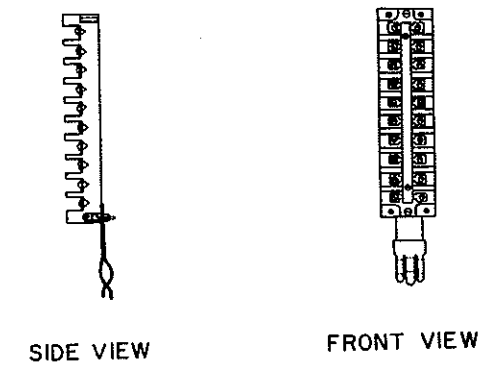
- Notes:**
- Two-way Detector shall have the detector lens rotated to face the direction of travel, and shall have Type X Unilet with two Par lamp holders and lamps (one in each direction).



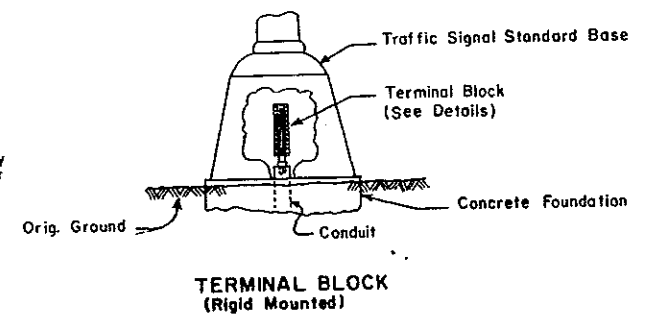
BRIDGE MOUNTED CONDUIT HANGER



CURB MOUNTED CONDUIT



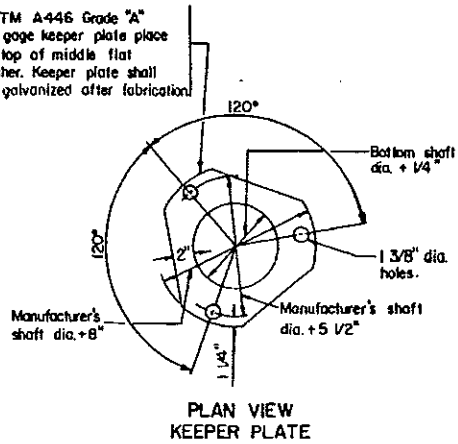
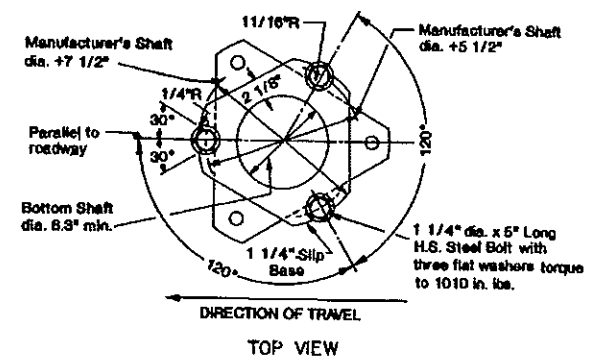
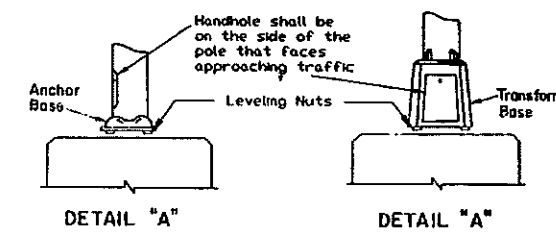
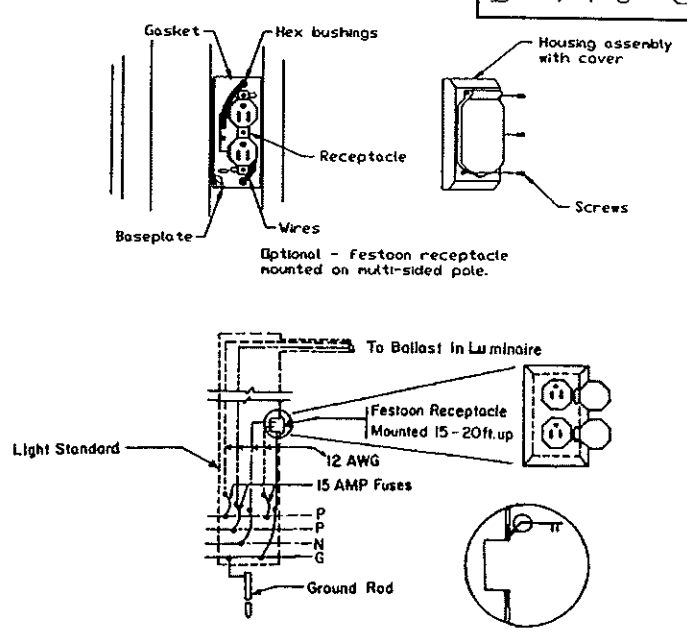
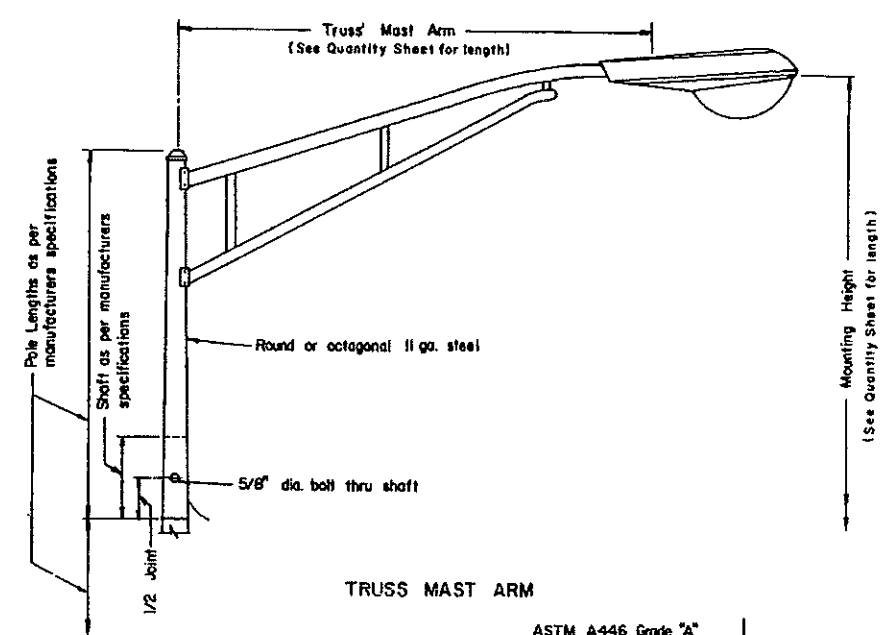
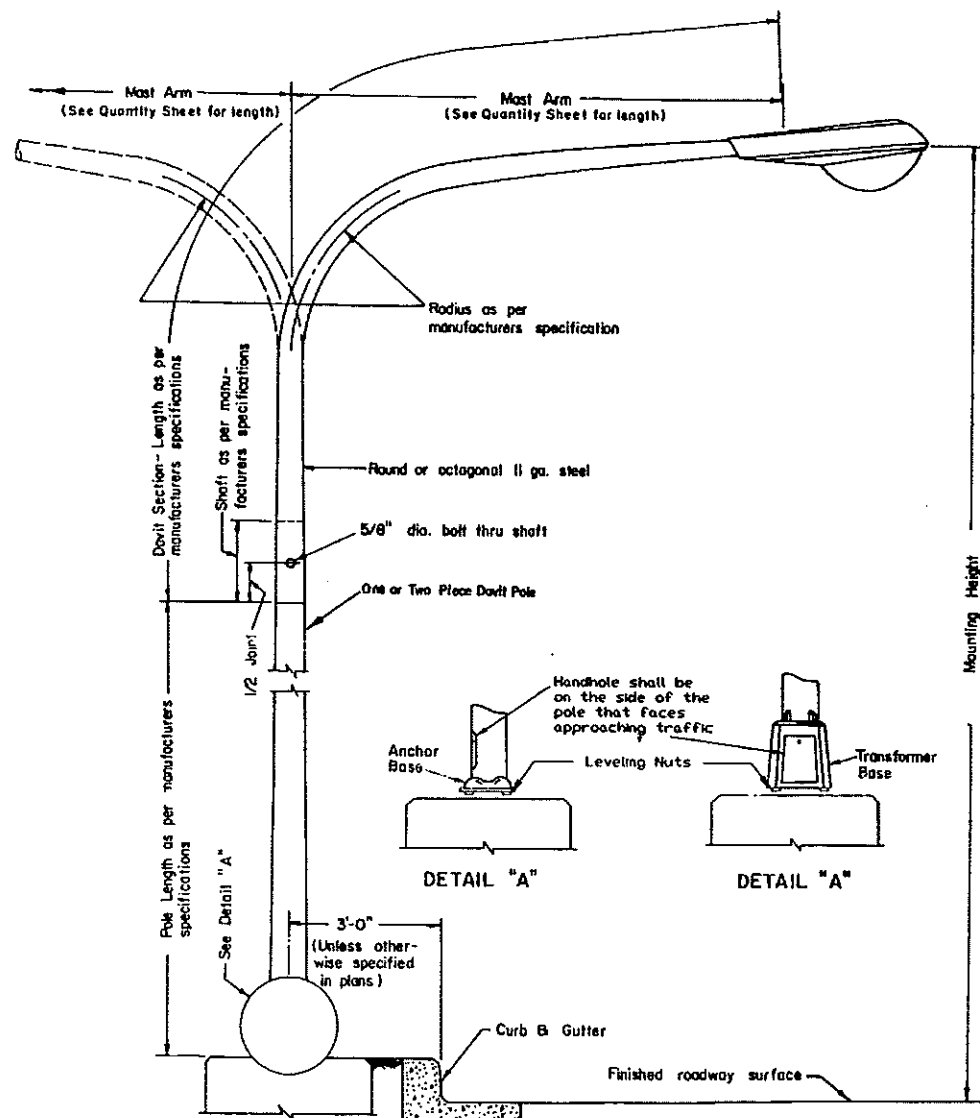
REVISE CONCRETE FOUNDATION



TERMINAL BLOCK (Rigid Mounted)

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGES	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
11-7-90	Track Clearance	

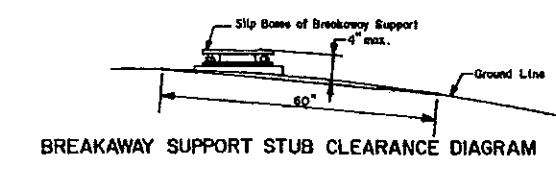
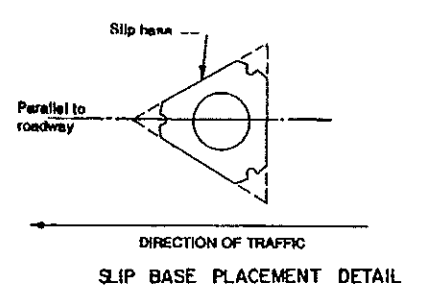
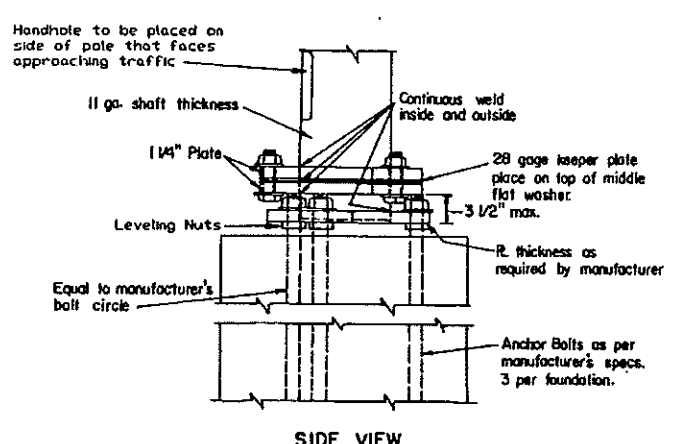
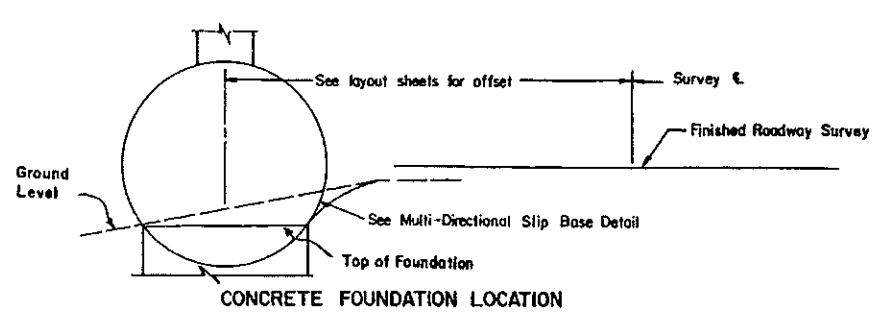
LIGHT STANDARD DETAILS



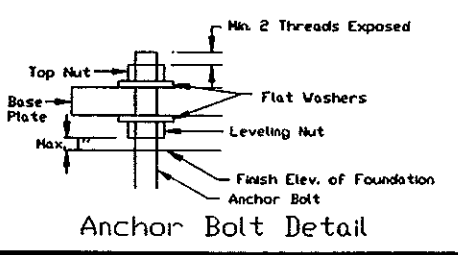
RECEPTACLE MOUNTING DETAIL
 Receptacle shall be mounted on the side of the pole that faces the street side.
 (Festoon Receptacle shall be installed only when specified in the plans.)

NOTES:
 STEEL STANDARDS: Marred or Scratch areas shall be touched up after erection.

Mast Arm: See Quantity Sheet for length.
 LUMINAIRE: Shall be internal ballast - constant wattage 120 x 240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, operating voltage.
 FUSING: Fusing in base, see specifications.
 SLIP BASE BOLT TORQUE PROCEDURE:
 1. Tighten all bolts the maximum possible with 12\"/>



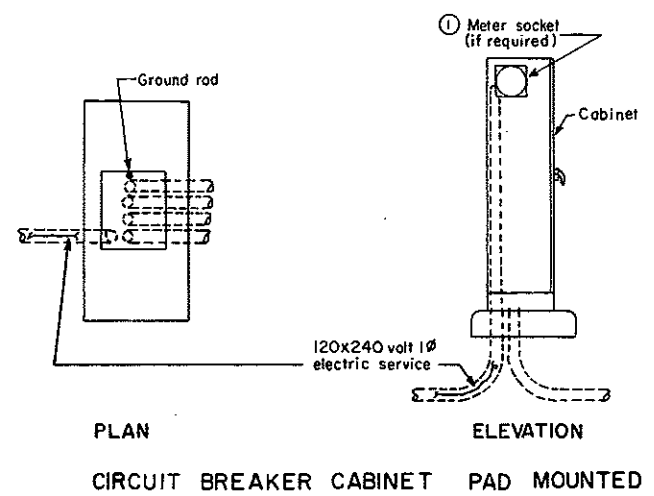
STEEL BASE DETAIL
 MULTI-DIRECTIONAL SLIP BASE



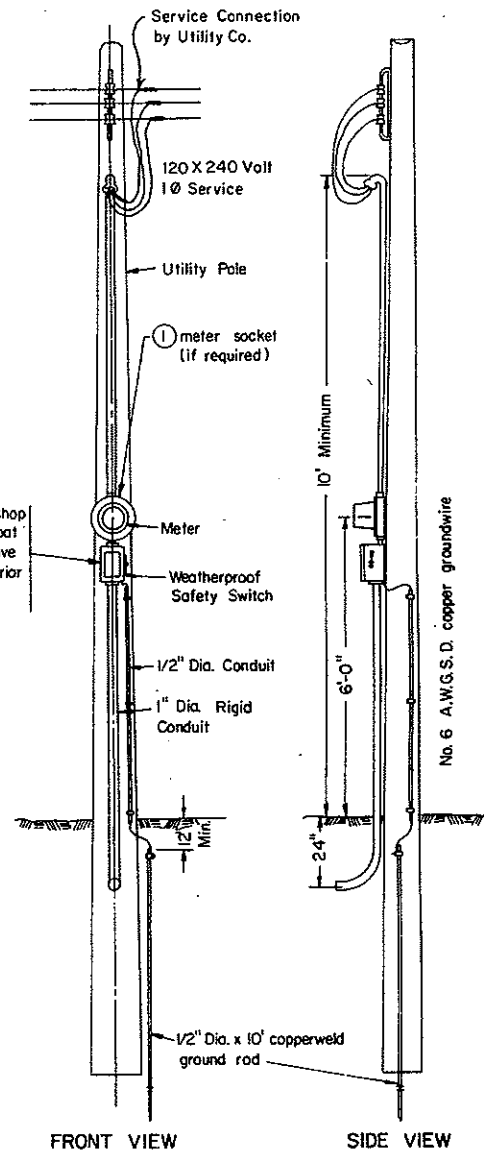
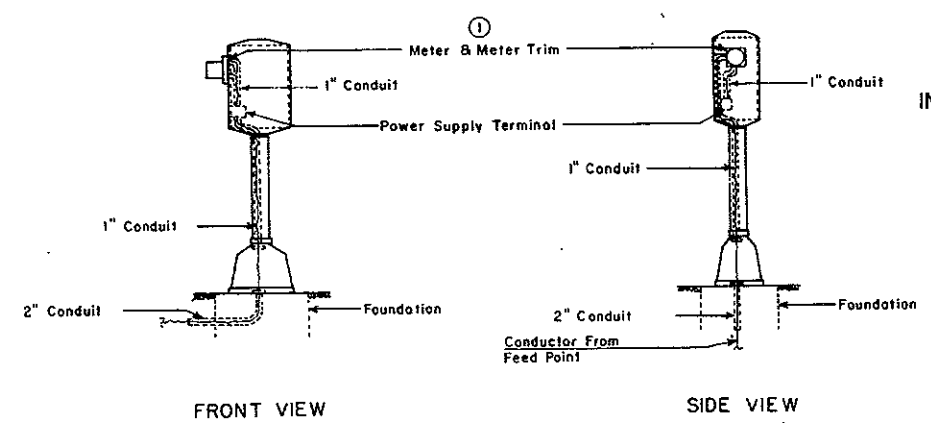
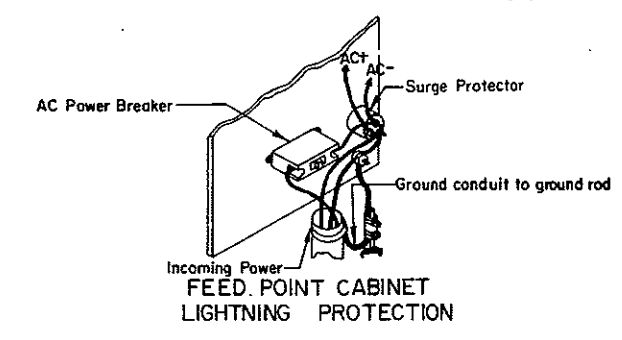
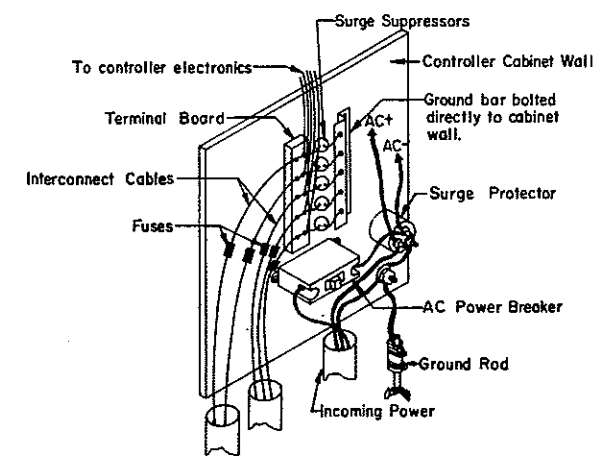
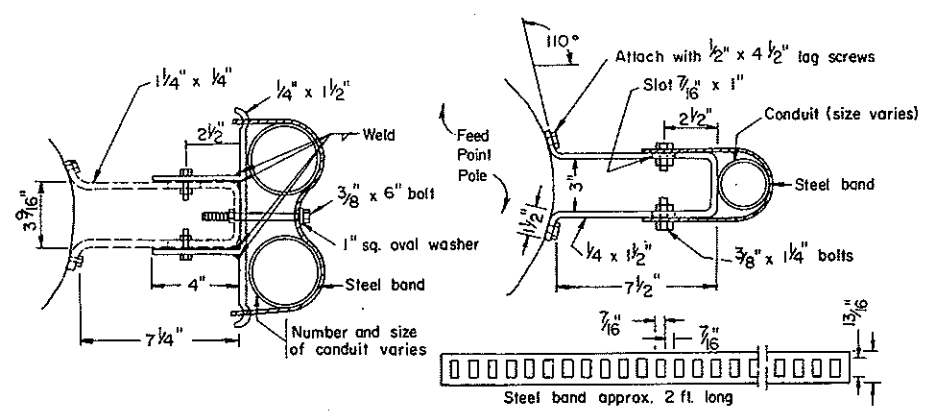
10-1-86 REVISIONS	
DATE	CHANGE
6-1-89	Breakaway Support
6-19-91	Breakaway Base
10-5-93	General Revisions
6-16-94	Leveling Nuts
11-07-94	Handhole Location
7-17-95	Festoon Mounting Detail

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
 APPROVED: *David K. Lane*
 DESIGN ENGINEER

FEED POINT - TRAFFIC SIGNALS



Cabinet shall be 56" high x 26" wide x 14" deep. Minimum 12 ga. steel with provisions for padlock. Cabinet shall be weatherproof. Cabinet shall have one shop coat of primer and two field coats of exterior dark green enamel.



Cabinet shall be shop coated with one coat of primer and have two coats of exterior gray enamel.

① METER SOCKET: The contractor shall install the meter socket and trim if meter is required by local utility company. Meter to be furnished and installed by utility company.

NOTE: Traffic signal controller shall be operated on 120 volts.

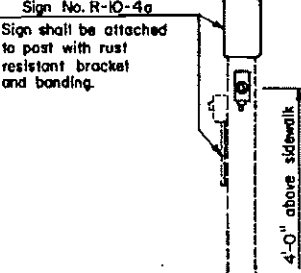
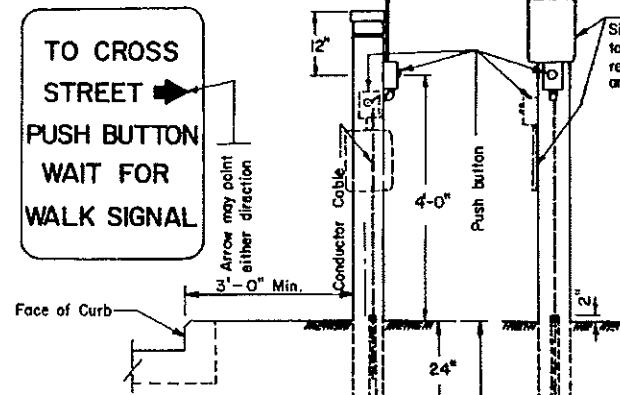
10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGES	APPROVED <i>David R. Lee</i> DESIGN ENGINEER
1-28-91	Cabinet Note	

TRAFFIC SIGNAL STANDARDS

D-772-2

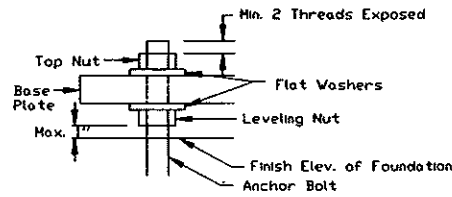
SIGN NO. R-10-4a
(ODBI Aluminum)
See Standard Sign Layout Booklet
for dimensions and legend series.

The positioning of sign & pushbutton & direction of arrow shall clearly indicate which crosswalk is actuated by the push button.



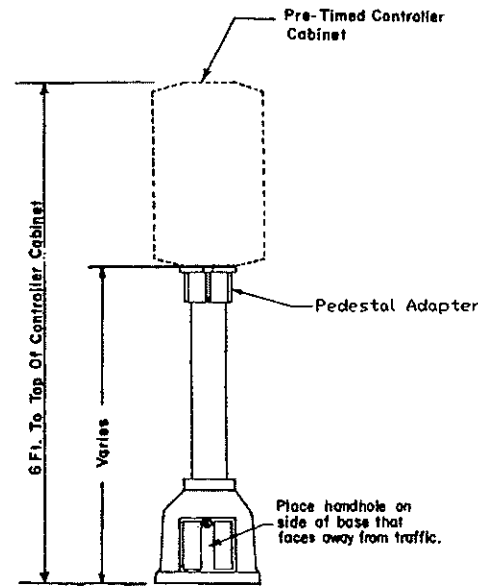
SIGNAL STANDARD MOUNTED PUSH BUTTON DETECTOR

PEDESTRIAN PUSH BUTTON POST DETAILS

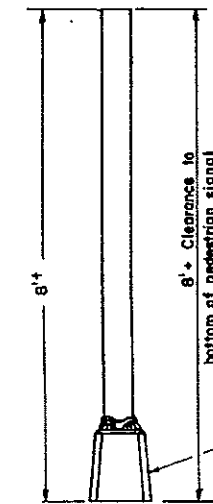


Anchor Bolt Detail

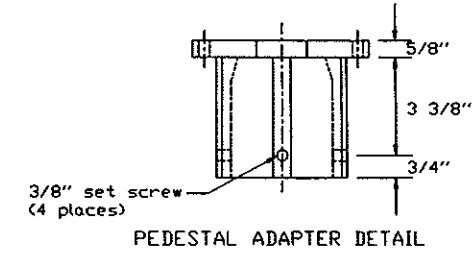
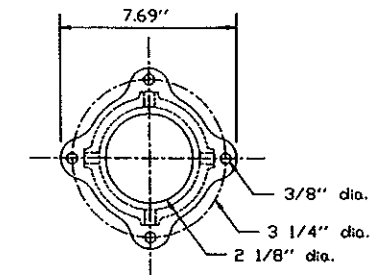
2" standard pipe to be dug or driven
Slot post approx. 18" to facilitate the placement of the post over the conduit



TYPE I

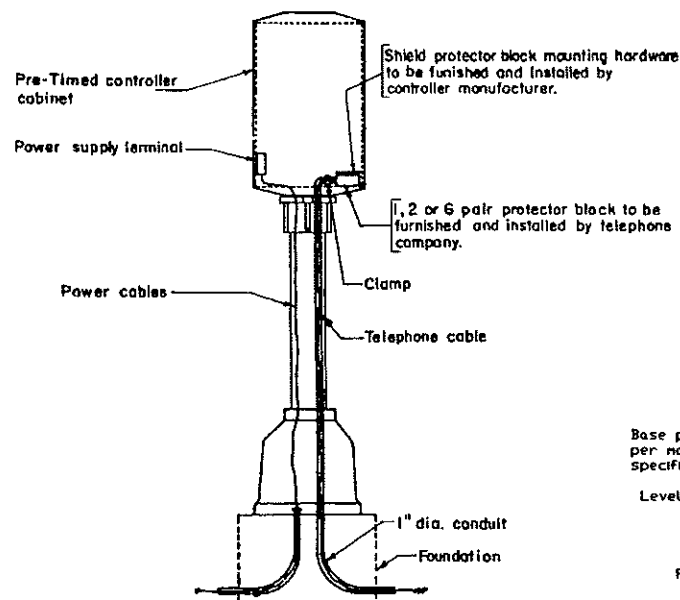


TYPE II

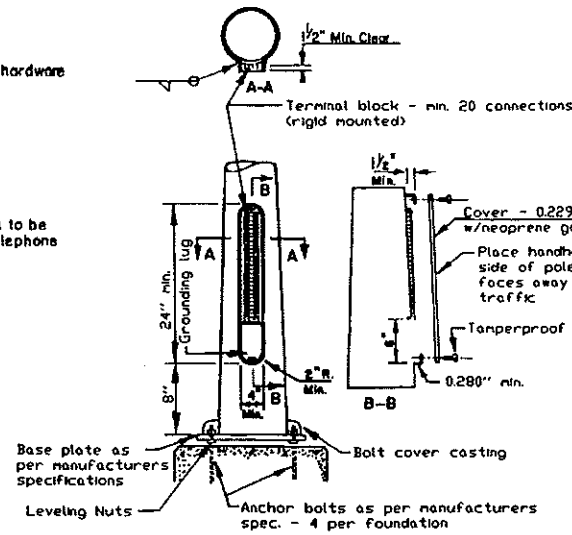


PEDESTAL ADAPTER DETAIL

Place handhole on side of base that faces away from traffic.

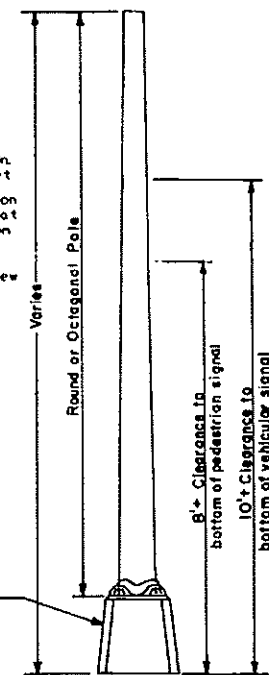


TELEPHONE INTERCONNECT SCHEMATICS DETAIL
(Control circuits not shown)

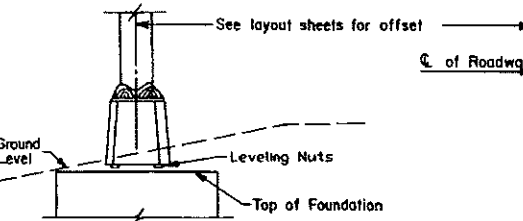
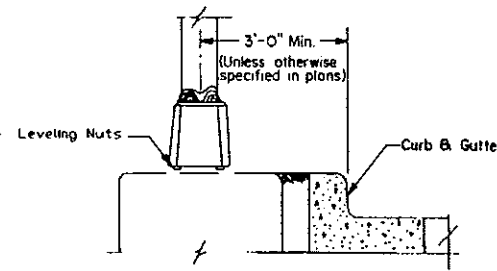


ALTERNATE SIGNAL STANDARD BASE
For Use Only With Type V, VI, & VII Signal Standards

Place Handhole on side of base that faces away from traffic.



TYPE V, VI, VII



SIGNAL STANDARD MIN. CLEARANCE DETAIL

NOTES:
Signal Heads: See traffic signal layout for correct mounting position, number, size, and arrangement of lenses.

Steel Standards: The C of the signal standard shall be a minimum of 3 feet from the face of the curb unless shown otherwise on the layout sheets.

Paint: See note sheet for required color of paint.

Transformer Base: In lieu of the transformer base the contractor may use the alternate signal standard base.

10-1-86	
REVISIONS	
DATE	CHANGE
12-1-88	Min. Clearance
6-16-94	Leveling Nuts
8-29-95	Delete Type III
11-27-95	Pedestal Adapter

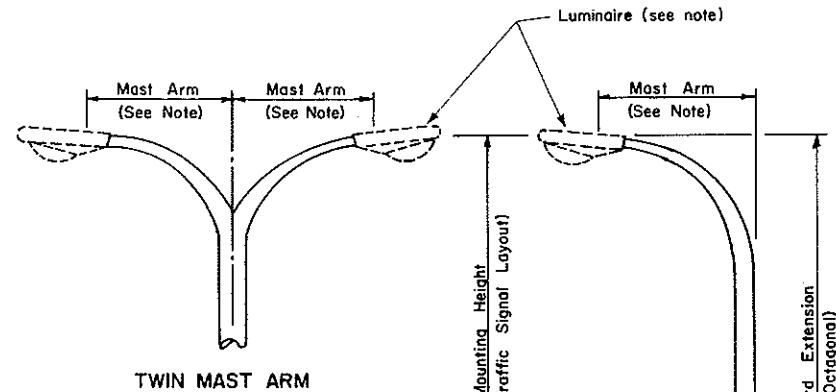
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

APPROVED *David K. Lee*
DESIGN ENGINEER

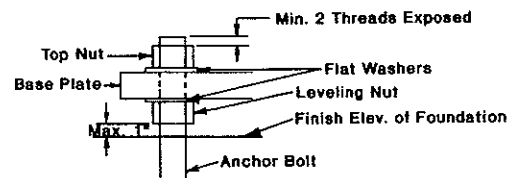
TRAFFIC SIGNAL STANDARDS (Mast Arm Type)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.		

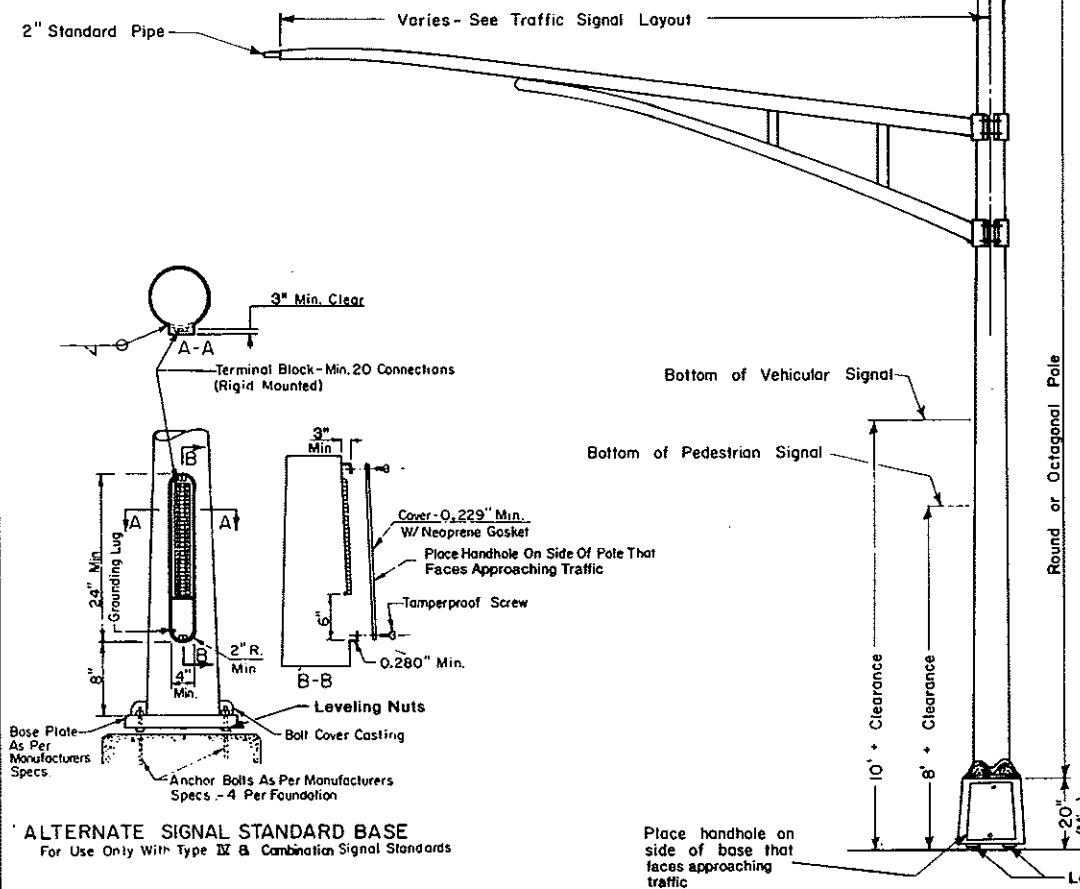
D-772-3



TWIN MAST ARM

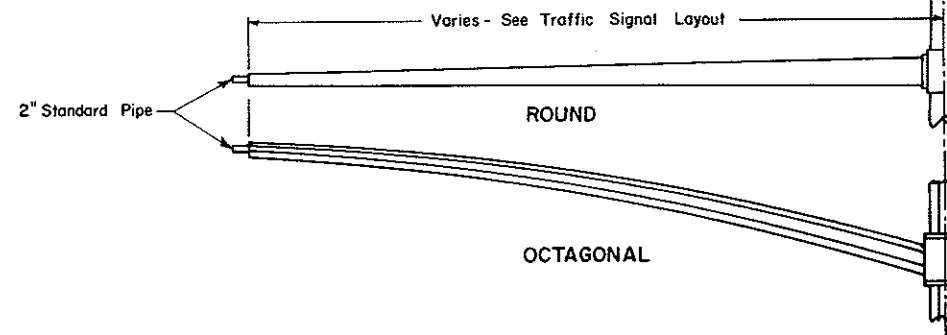


ANCHOR BOLT DETAIL

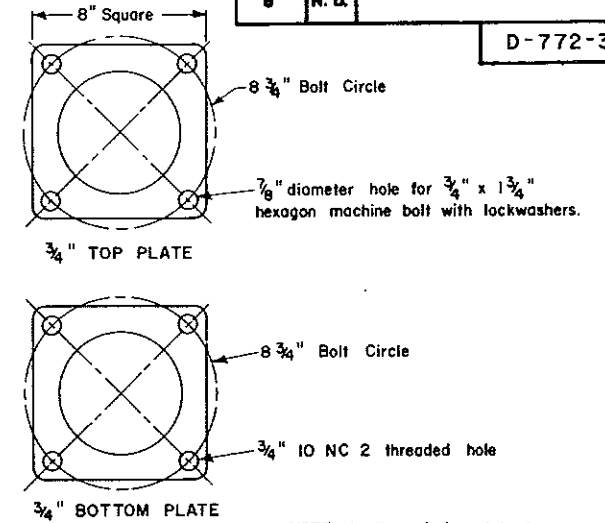


COMBINATION SIGNAL AND LIGHT STANDARD

ALTERNATE SIGNAL STANDARD BASE
For Use Only With Type IV B Combination Signal Standards



MONOTUBE TYPE MAST ARMS



DETAIL "A"

NOTE: In lieu of the plate type connection a telescoping clamp type extension may be used.

NOTES: COMBINATION SIGNAL AND LIGHT STANDARD:

Signal Standard Type	Luminaire Mounting Height	Install Light Standard Extension and Luminaire	Luminaire Mast Arm
A	30 ft.	Yes	Single
B	30 ft.	*	Single
C	40 ft.	Yes	Single
D	40 ft.	*	Single
E	30 ft.	Yes	Twin
F	30 ft.	*	Twin
G	40 ft.	Yes	Twin
H	40 ft.	*	Twin
I	50 ft.	Yes	Single
J	50 ft.	Yes	Twin

* The Light Standard Extension for these signal standards shall be installed at a later date under a separate contract.

LIGHT STANDARD EXTENSION:

The Mast Arm shall be 6 ft., unless otherwise noted on the plans. The Light Standard Extension shall be galvanized. Galvanizing shall be in accordance with ASTM A 123.

LUMINAIRE:

Luminaires shall be internal ballast - constant wattage 120 x 240 voltage. See layout sheets for type of luminaire, wattage and I.E.S. distribution. See note sheet for operating voltage.

SIGNAL HEAD:

See Traffic Signal Layout for correct mounting position, number, size and arrangement of lenses. Clearance from the center of the roadway to the bottom of mast arm mounted signal heads shall be 16 ft. minimum and 19 ft. maximum.

STEEL STANDARD:

The center of the signal standard shall be a minimum of 3 ft. from the face of the curb unless shown otherwise on the layout sheets.

PAINT:

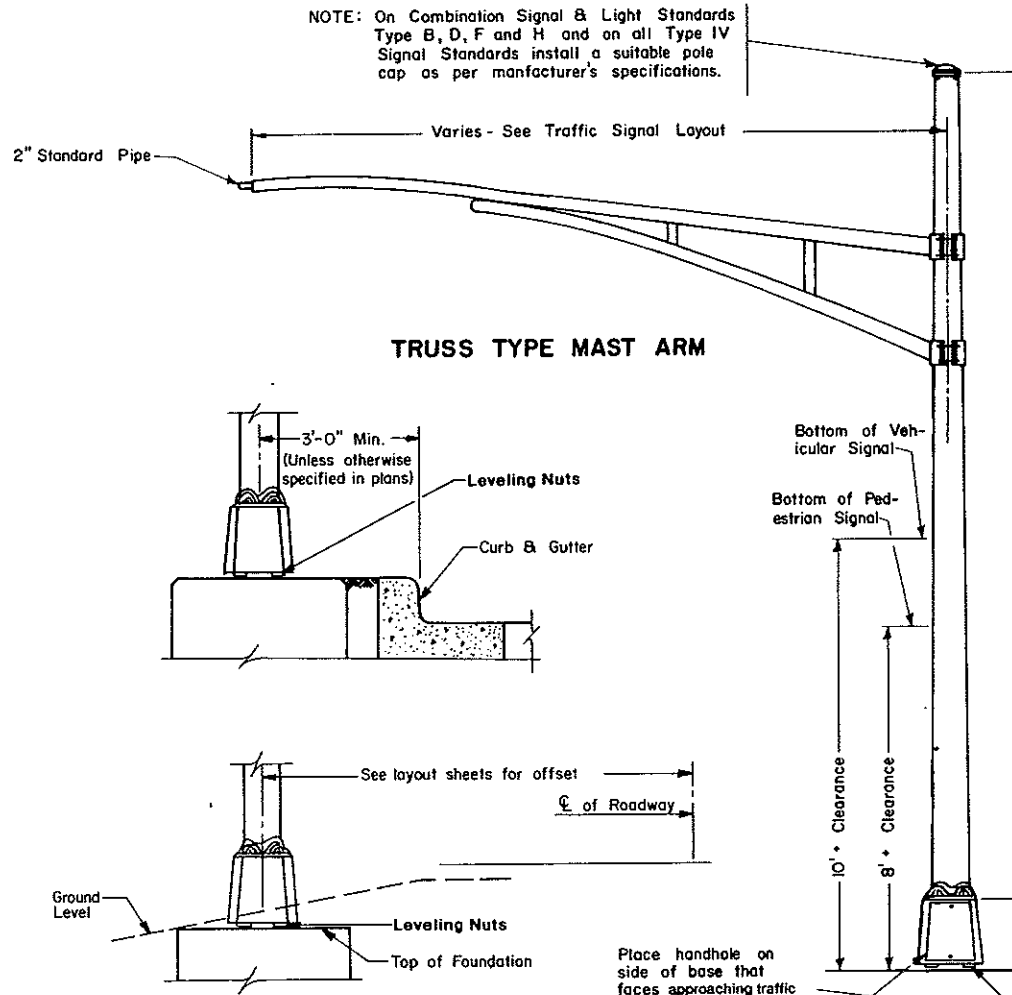
See note sheet for required color of paint.

OCTAGONAL POLES:

Shall have a means that will not allow the mast arm to be rotated by wind forces other than friction. This means shall be so fabricated so that the mast arm is rotatable. This feature shall be approved by the Engineer.

TRANSFORMER BASE:

In lieu of the transformer base the contractor may use the alternate signal standard base.



TRUSS TYPE MAST ARM

SIGNAL STANDARD MIN. CLEARANCE DETAIL

TYPE IV SIGNAL STANDARD

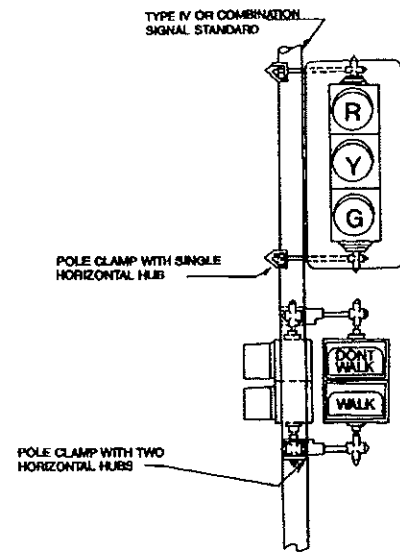
10-1-86 REVISIONS	
DATE	CHANGES
12-1-88	Min. Clearance
1-21-94	Add 50 ft.
8-19-94	Leveling Nuts
10-12-94	Handhole Location

NORTH DAKOTA STATE HIGHWAY DEPARTMENT
APPROVED: *David K.D. [Signature]*
DESIGN ENGINEER

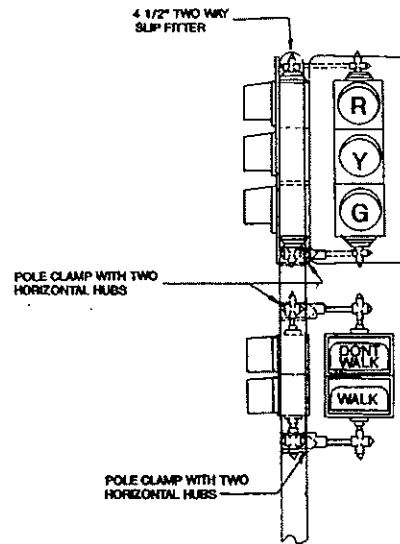
TRAFFIC SIGNAL HEAD MOUNTING



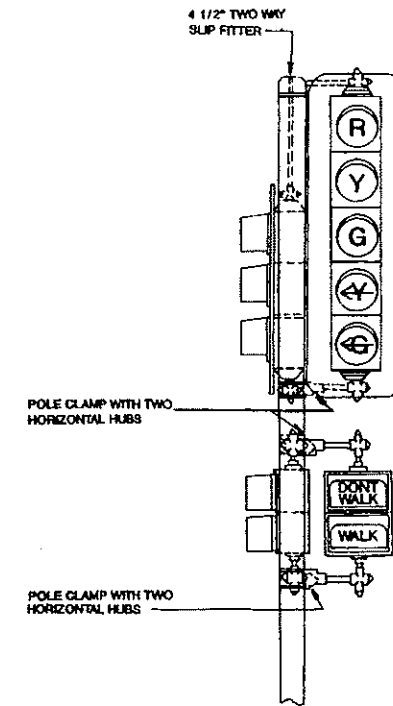
TYPE II
PEDESTAL MOUNTED
PEDESTRIAN



TYPE IV
POST MOUNTED - VEHICULAR
POST MOUNTED - PEDESTRIAN



TYPE V
POST MOUNTED - VEHICULAR
POST MOUNTED - PEDESTRIAN



TYPE VI
POST MOUNTED - VEHICULAR
POST MOUNTED - PEDESTRIAN

NOTES:

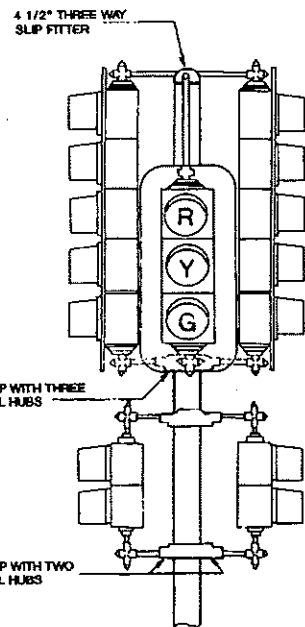
CLEARANCE: CLEARANCE FROM THE GROUND LINE OR SIDE-WALK TO THE BOTTOM OF POST OR PEDESTAL MOUNTED VEHICULAR SIGNAL HEADS SHALL BE 10 FT. MINIMUM. FROM PEDESTRIAN SIGNAL HEADS SHALL BE 8 FT. MINIMUM.

SIGNAL HEADS: SEE TRAFFIC SIGNAL LAYOUT FOR CORRECT MOUNTING POSITION, NUMBERS, SIZE AND ARRANGEMENT OF LENSES.

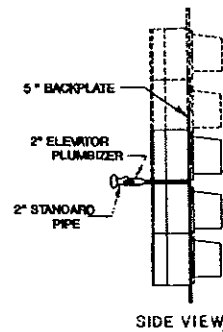
POLE CLAMPS: A POLE PLATE WITH SUITABLE BANDING MATERIAL AS APPROVED BY THE ENGINEER IN THE FIELD MAY BE SUBSTITUTED FOR THE POLE CLAMPS. WHERE TRAFFIC SIGNAL HEADS AND PEDESTRIAN SIGNAL HEADS ARE MOUNTED ONE ABOVE THE OTHER, ONE POLE CLAMP ASSEMBLY MAY BE USED.

PAINT: SIGNAL HOUSING SHALL BE PAINTED YELLOW. BACK PLATES SHALL BE PAINTED DULL BLACK. POLE CLAMPS AND SIGNAL HEAD MOUNTING HARDWARE SHALL BE PAINTED THE SAME COLOR AS THE SIGNAL STANDARD SHAFT.

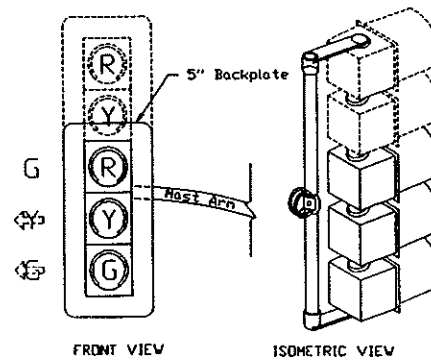
MOUNTING DETAILS: ALL SIGNAL HEADS SHOWN ARE VIEWED FROM DIRECTION OF TRAVEL.



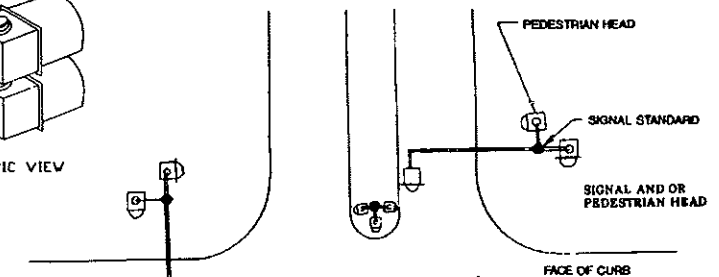
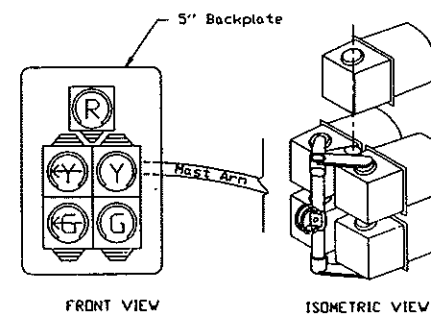
TYPE VII
POST MOUNTED - VEHICULAR
POST MOUNTED - PEDESTRIAN



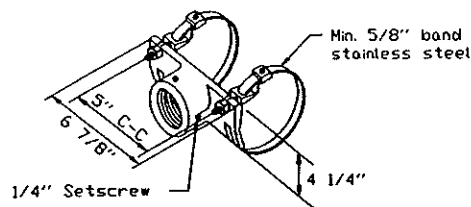
MID-SPAN MOUNTED
MAST ARM RIGID MOUNTED SIGNAL HEADS



END MOUNTED
MAST ARM RIGID MOUNTED SIGNAL HEADS



PLAN LAYOUT
(TYPICAL)
HEADS SHALL NOT PROTRUDE
OVER THE FACE OF THE CURB.



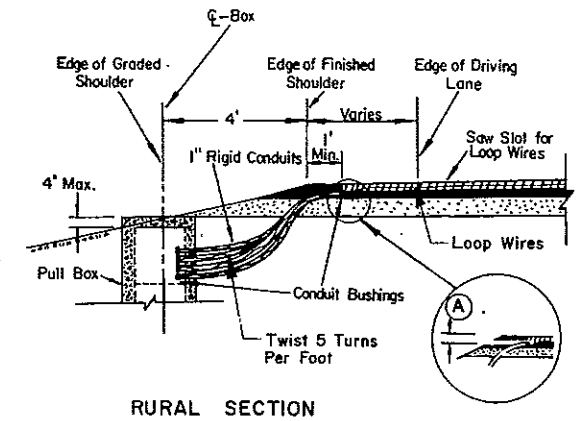
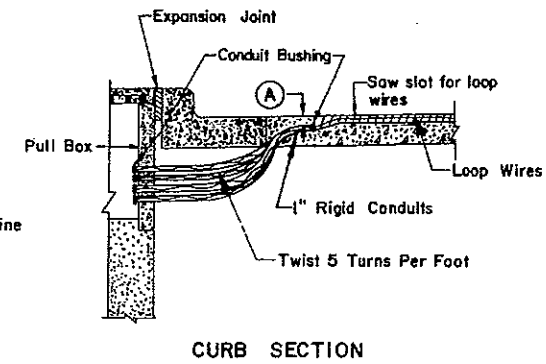
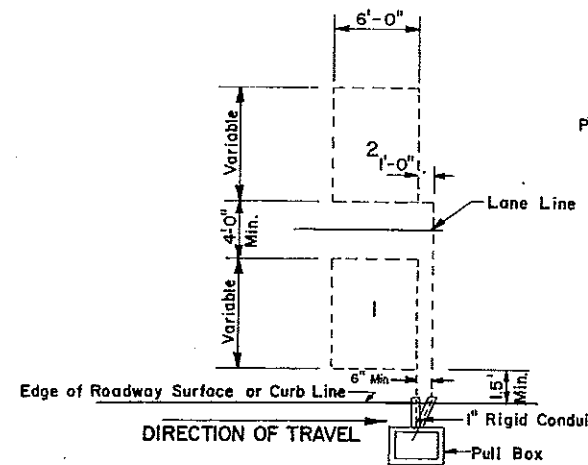
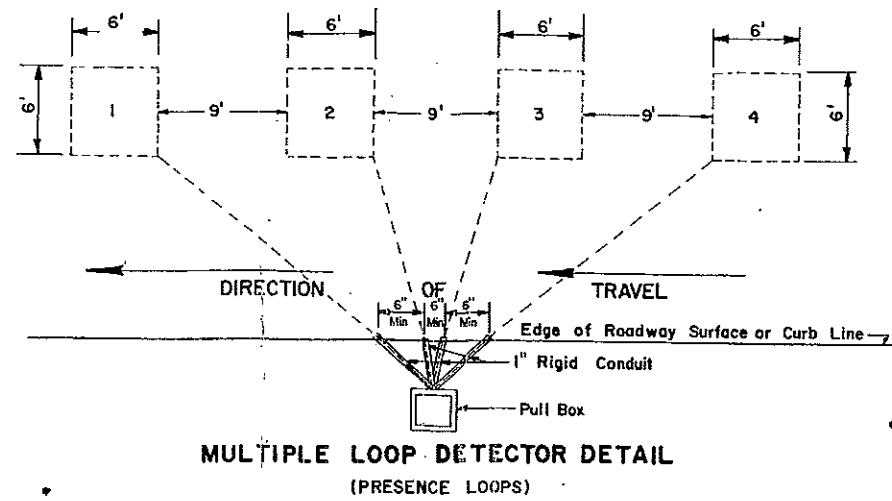
MAST ARM
SIGNAL HEAD BRACKET

10-1-86	
REVISIONS	
DATE	CHANGE
5-23-94	Type II
10-19-94	Rev. Visors & Add 5-Section Head
8-1-95	5 Section Head End mounted Detail
8-29-95	Delete Type II
11-29-95	Mast Arm Mounting Bracket

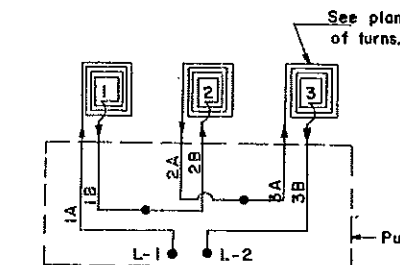
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David H. Lee*
DESIGN ENGINEER

LOOP DETECTORS DETAILS

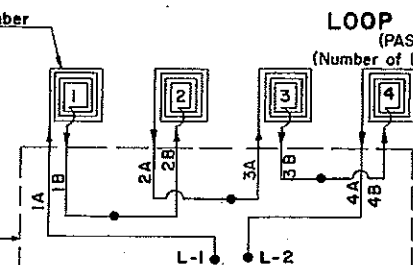
(A) 1" Concrete Surfacing Min.
2" Asphalt Surfacing Min.



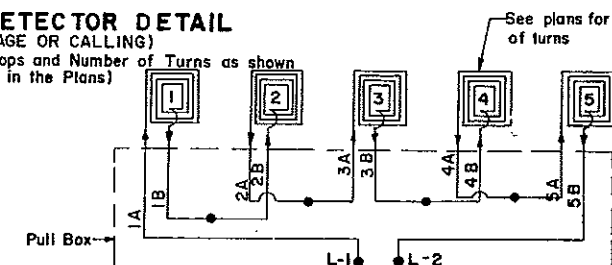
SAW SLOT TO PULL BOX DETAILS



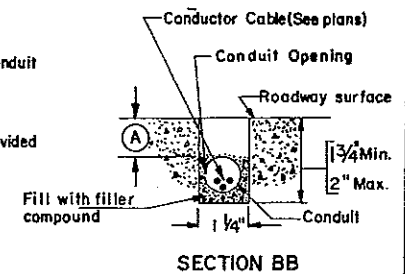
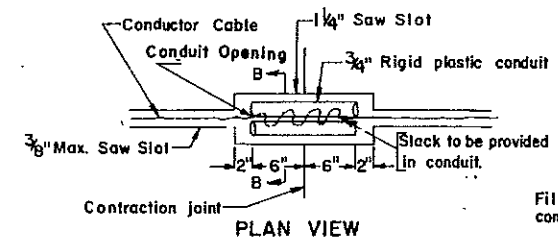
All conductors shall be labeled in the pull box as shown: (IA, IB, 2A, etc.)
The loop connections shall be spliced in the pull box: IA to L-1, IB to 2B, 2A to 3A, and 3B to L-2



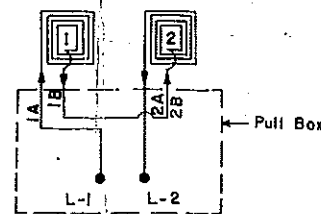
All conductors shall be labeled in the pull box as shown: (IA, IB, 2A, etc.)
The loop connections shall be spliced in the pull box: IA to L-1, IB to 2B, 2A to 3A, 3B to 4B, 4A to 5A, and 5B to L-2



All conductors shall be labeled in the pull box as shown: (IA, IB, 2A, etc.)
The loop connections shall be spliced in the pull box: IA to L-1, IB to 2B, 2A to 3A, 3B to 4B, 4A to 5A, and 5B to L-2



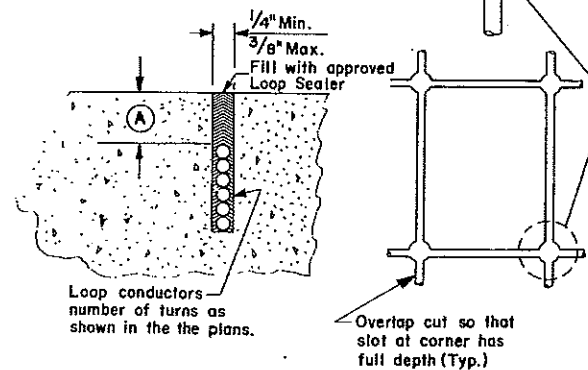
CONTRACTION JOINT DETAIL (This detail shall also be used whenever a crack in the roadway is encountered.)



All conductors shall be labeled in the pull box as shown: (IA, IB, 2A, etc.)
The loop connections shall be spliced in the pull box: IA to L-1, IB to 2B, and 2A to L-2.

NOTES:

- Each loop shall be saw cut in the roadway.
- The number of turns, size of loop and size of conductor shall be as shown on the plans. The first loop dimension figure is the length in the direction of travel and the second dimension is the width across the traffic lane.
- The lead routing shall be in separate slots to conduit leading to pull box to minimize interaction.



SAW SLOT DETAILS

Drill detector loop corners 2" deep then saw pavement slots to form loops. Dimensions and location shall be as shown in plans.

10-1-86 REVISIONS	
DATE	CHANGES
8-3-87	NOTE
11-20-88	RIGID CONDUIT AT CURB SPACING
12-8-88	MULTIPLE LOOP CONNECTION
8-3-91	SAW SLOT
10-12-94	Delete Loop Lead-in Lightning Prot

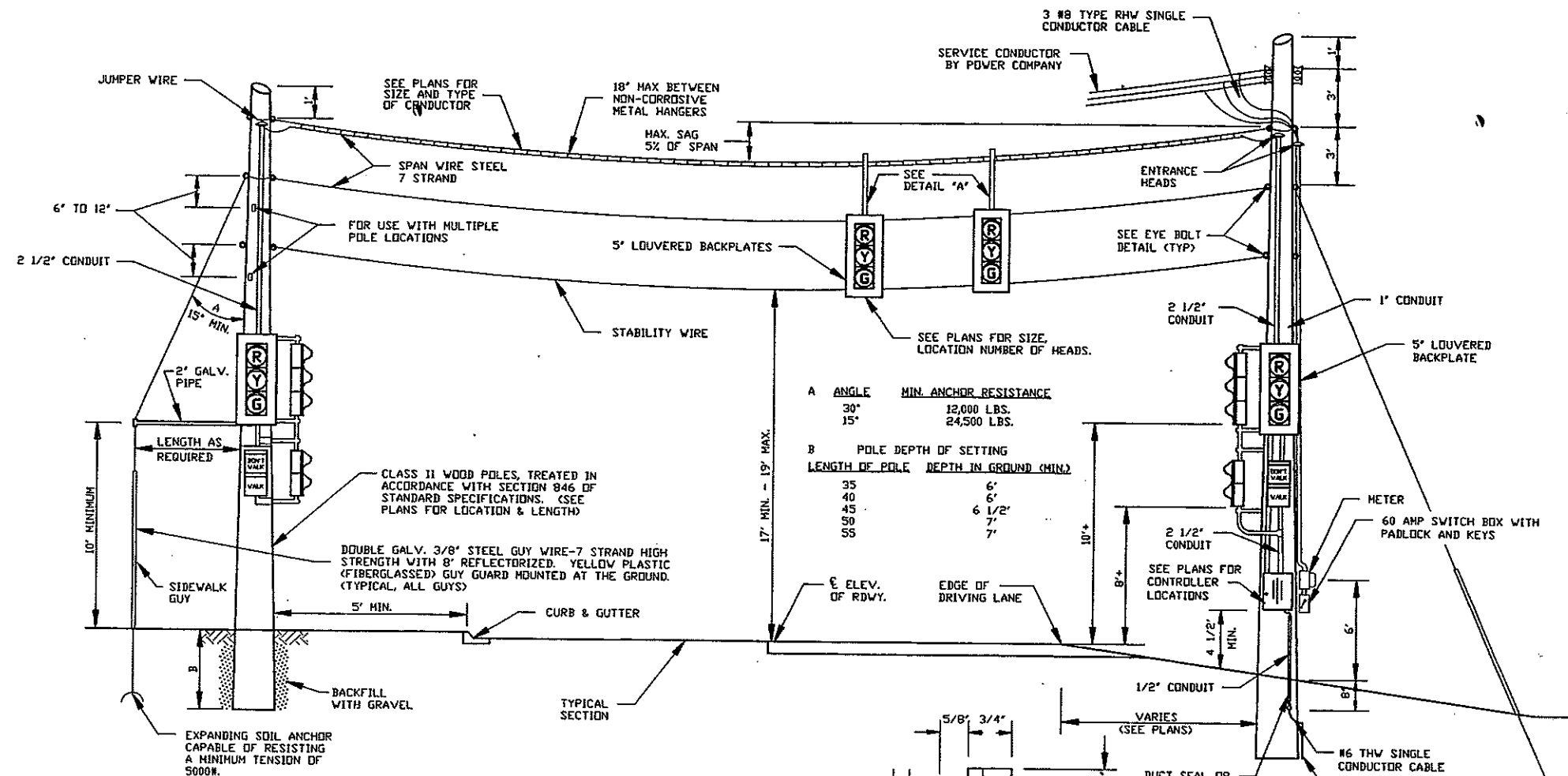
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. O. Lee*
DESIGN ENGINEER

INTERIM TRAFFIC SIGNALS

D-772-6

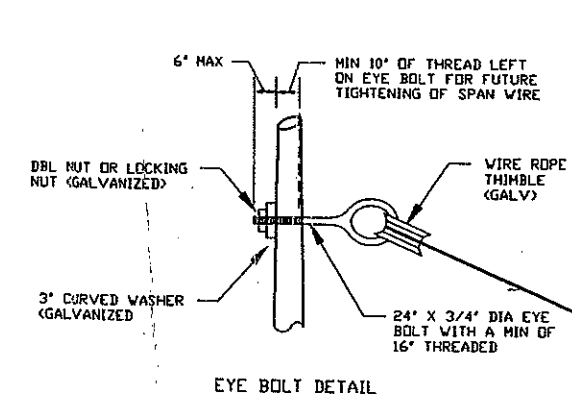
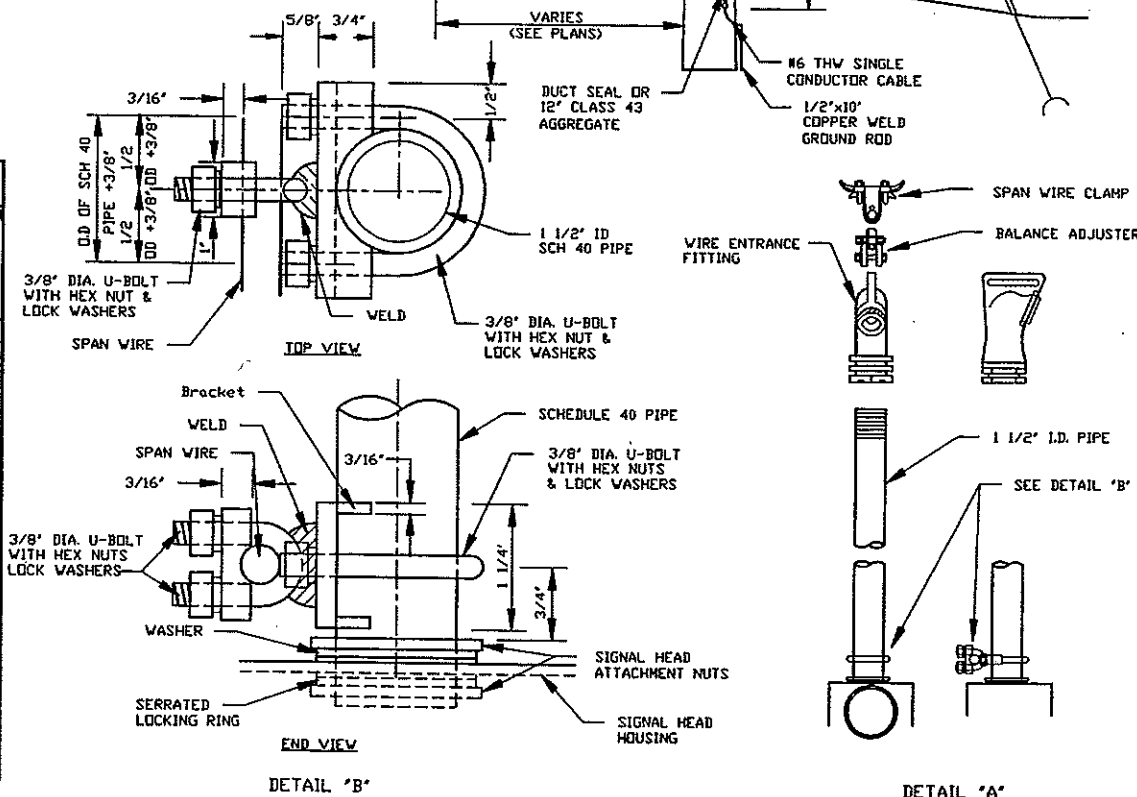
MATERIALS:

1. THE INTERIM TRAFFIC SIGNAL SHALL MEET THE REQUIREMENTS AS STATED IN THE N.D. STANDARD SPECIFICATION SECTION 772 AND 896.
2. IF A GUY WIRE ANGLE OF LESS THAN 45 IS USED, THE CAPABILITY OF THE EXPANDING SOIL ANCHOR TO RESIST TENSION ON SITE MUST BE INCREASED.
3. THE CONTRACTOR SHALL MAINTAIN THE REQUIRED 17 TO 19 FT. SIGNAL HEIGHT OVER THE ROADWAY FOR A MINIMUM PERIOD OF 90 CALENDAR DAYS AFTER INSTALLATION, UNLESS WRITTEN PERMISSION IS GRANTED BY THE ENGINEER TO WAIVE THE 90 DAY REQUIREMENT. THE COST OF MAINTAINING THE SIGNAL HEAD ELEVATION SHALL NOT BE BID SEPARATELY BUT SHALL BE INCLUDED IN THE PRICE BID FOR INTERIM SIGNALS.
4. TRAFFIC SIGNAL/CONTROLLER SHALL BE OPERATED ON 120 VOLTS.
5. ALL SPAN WIRE & STABILITY WIRE SHALL HAVE THIMBLE TYPE CONNECTIONS.



A	ANGLE	MIN. ANCHOR RESISTANCE
30°		12,000 LBS.
15°		24,500 LBS.

B	POLE DEPTH OF SETTING	LENGTH OF POLE	DEPTH IN GROUND (MIN.)
35		6'	6'
40		6'	6'
45		6 1/2'	7'
50		7'	7'
55		7'	7'



OVERHEAD INTERIM TRAFFIC SIGNAL SPAN LENGTHS																
MAXIMUM SPAN LENGTH	ONE TRAFFIC SIGNAL HEAD				TWO TRAFFIC SIGNAL HEAD				THREE TRAFFIC SIGNAL HEAD				FOUR TRAFFIC SIGNAL HEAD			
	HIGH STRENGTH STEEL				HIGH STRENGTH STEEL				HIGH STRENGTH STEEL				HIGH STRENGTH STEEL			
	133	163	199	225	71	98	153	199	48	67	113	163	36	51	86	129
	EXTRA HIGH STRENGTH STEEL				EXTRA HIGH STRENGTH STEEL				EXTRA HIGH STRENGTH STEEL				EXTRA HIGH STRENGTH STEEL			
	189	215	254	277	101	132	192	234	68	95	157	218	51	72	123	181

7-28-93		REVISIONS	
DATE	REVISIONS	DATE	CHANGE
7-9-94	EYE BOLT DETAIL SPAN LENGTHS		

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION

 APPROVED DESIGN ENGINEER