

East Main Street Reconstruction
Project #96-2

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	
WRAP		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
All	Alternate	Off Loc	Office Location
Approx	Approximate or Approximately	O to O	Out to Out
Appr	Approach	P B 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 Pcm'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	Chdch Basin	P P	Power Pole
C B G	Curb and Gutter	P R C	Point of Reverse Curvature
Ch Bk	Channel Block	PreF	Pre-formed
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	R C E 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 Pcm't	Continuously Reinforced Concrete Pavement	Rd	Road
Contn	Contraction	Rdbd	Roadbed
Crn	Crown	Rdwy	Roadway
CRS	Cationic Rapid Setting	Ref	Reflectorized
Cse	Course	R R	Railroad
C S	Curve to Spiral	Ri	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
Esm't	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
Hel	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
JI	Joint	Trans	Transverse or Transition
L	Length of Curve	Trtd	Treated
Lc	Length of Spiral	Tr	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
Matt	Material	Wrg	Wearing
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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*See Note 100/014.

LIST OF STANDARD DRAWINGS

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STANDARD
NO.

D-550-2 Longitudinal Joint Detail

D-550-3 Transverse Contraction Joint Detail

D-550-5 Transverse Construction Joint

D-704-1 Attenuation Device

D-704-8, 9, 10, 11, 12 Construction Sign Details

D-704-13 Barricade Details

D-704-14 Construction Sign and Barricade Assembly Details

D-706-1 Type C field Lab

D-708-2 Temporary Erosion and Siltation Controls

D-714-1 Reinforced Concrete Pipe Culverts and End Sections

D-714-2 Reinforced Concrete Pipe Arch Culverts and End Sections

D-722-1 Inlet - Type 1

D-722-2 Inlet - Type 2

D-722-3A Inlet Slotted Drain

D-722-5 Manhole Details

D-748-1 Curb & Gutter

D-750-1 Driveway (Urban)

D-750-2 Sidewalk

D-754-23 Assembly Details

D-754-24 Mounting Details Perforated Tube

D-754-26 Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs

D-754-27 Sign Punching, Stringer, and Support Location Details for Regulatory, Warnings, and Guide Signs

D-754-29 Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs

STANDARD
NO.

D-754-32 Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs

D-754-41 Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs

D-754-47 Sign Punching, Stringer, and Support Location Details for Variable Length Signs

D-754-48 Sign Punching, Stringer, and Support Location Details for Variable Length Signs

D-754-49 Sign Punching, Stringer, and Support Location Details for Variable Length Signs

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 Assembly Detail

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D-764-2 Modified Eccentric Loader Terminal

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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 Need Tables)

D-770-1 Concrete Foundations (Traffic Signals and Highway Lighting)

D-770-2 Feed Point (Roadway Lighting)

D-770-3 Pull Box Details

D-770-4 Lighting and Signal Details

D-770-5 Light Standard Details

D-772-1 Feed Points - Traffic Signals

D-772-2 Traffic Signal Standards

D-772-3 Traffic Signal Standards (Mast Arm Type)

D-772-4 Traffic Signal Head Mounting

D-772-5 Loop Detector Details

D-772-6 Interim Traffic Signals

Note: Standard Drawings are included in the back of the plans.

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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 shall be responsible for sending a knowledgeable representative to conduct a weekly Reporting/Planning meeting. It shall be the contractor's responsibility to prepare minutes for each meeting and to make the appropriate distribution of the minutes.
2. The contractor shall 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 shall 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 PUBLIC RELATIONS COORDINATOR: The contractor shall provide a public
P01 relations and information coordinator. The coordinator shall not be the project superintendent or construction foreman. The coordinator shall 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 shall 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 shall have sufficient knowledge and authority to resolve property owner and business concerns regarding scheduling, maintaining access, and construction operations.

The P.R. coordinator will notify Mandan Supply a minimum of ten days prior to beginning construction on Mandan Supply's property.

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

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100 SEQUENCE OF CONSTRUCTION: The traffic control has been set up to
P02 construct the project in the following manner:

1. Two-way traffic shall be maintained on one-half of the roadway. Parking shall be prohibited as required during all phases of construction.
2. The westbound lanes shall be constructed first.
3. No construction shall be conducted July 2 through July 5, and all hazards shall be removed from the construction area.

The contractor will be responsible for providing access to all residential dwellings and businesses adjacent to this project. The method used to maintain access shall be left to the contractor to work out with the property owners. Final details on location of access points and construction procedures shall be worked out with the engineer in the field prior to the start of the project.

This sequence has been set up as a basis for scheduling and signing, and may be revised by the contractor, with approval of the engineer. Any revised plan by the contractor shall be submitted to the engineer a minimum of four (4) weeks prior to beginning construction.

100 DETOURS: The contractor shall maintain the streets used as detours
P03 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. Route markers shall remain the property of the state.

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

105 COORDINATION OF WORK: Main Street, from the Heart River Bridge to
P01 Fifth Avenue Northeast, will be reconstructed during the 1996 season, Project No. NHU-STNU-1-094(035)915.

It shall be the contractor's responsibility to coordinate activities, schedule, and traffic-control delineation with the above stated project

105 PAVEMENT SWEEPING: The contractor shall sweep new pavements before
P02 opening to traffic and for final acceptance. For this sweeping, the contractor shall furnish and utilize a vacuum type or pickup sweeper to control dust. All costs connected with this work shall be included in the price bid of other items. If dust, dirt or any other roadway debris from construction operations becomes a hazard to traffic or a nuisance to the public, a vacuum or pickup sweeper shall be made available. Cost shall be incidental to other bid items.

105 PAVEMENT PROTECTION: The contractor shall protect the existing
P03 pavement outside of construction limits during the course of construction. Surface repair which is required because of the contractor's operations shall be repaired by the contractor at the contractor's expense. The contractor shall be responsible for all normal maintenance of existing pavement for maintaining traffic.

107 RAILROAD CROSSING: This project crosses under the Burlington Northern
100 Railroad at station 194+75± and 163+00 Rt.

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

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

200 COMPACTION AND DENSITY CONTROL: Compaction and density controls
360 shall be in accordance with Section 203.02 G of the Standard Specifications T-180.

202 CONCRETE REMOVAL: Removal of concrete, up to six-inches thick,
P01 shall be paid for as "Removal of Concrete." Any concrete greater than 6" to be paid for as "Removal of Concrete Pavement."

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, weighing, and stockpiling salvaged bituminous materials.

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202 SALVAGED SURFACING: The PCC pavement, concrete driveways,
P03 sidewalks, and curb and gutter shall be salvaged from the existing
roadway to be utilized in the permeable stabilized base and the dense
graded base.

The bituminous surface salvaged from the existing roadway is to be
utilized in the dense graded base.

202 Removal of inlets and manholes shall consist of removing the
P04 casting, rings, barrel, and base. Remove existing pipe connecting
those structures. Existing pipe 4' below the new dirt grade may remain
in place and be plugged or capped. Backfill to grade with suitable
material. The 6" perforated pipe and 8" perforated pipe shall remain
in place and functional from Sta 191+00 to 198+50. All perforated pipe
required for connections, labor, equipment, materials, and disposal of
items involved shall be included in the price bid for "Removal of
Inlets" or "Removal of Manholes."

The inlet grates are to be delivered to the city shop. The contractor
shall contact the city engineer's office at 701-667-3225 prior to
delivery.

202 PORTABLE CURBS: At various locations, portable curbs exist to define
P05 parking where sidewalk abuts parking lot. These curbs may be moved to
the outside edge of the construction easement during construction and
replaced after. Payment shall be included in price bid for other items.

202 Removal of the 3' curb and gutter located on the raised island
P06 of Memorial Highway and on the raised island separating the north
roadway from the south roadway shall be paid for as "Removal of Curb
and Gutter."

203 EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL: If contaminated
P01 material is encountered, the contractor shall notify the City Engineer,
Tom Little (701-667-3225); and Gary Berreth (701-328-5227); 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.
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.

Disposal at the city land fill will be allowed. Soil cannot be in a
liquid state. The contractor shall contact the city engineer's office
at 701-667-3225 prior to any disposal on city site. Potential disposal
sites are available from the Department of Insurance, Bob Olson
(701-328-3246).

203 SUBGRADE: The subgrade shall meet Std. Spec. 203.02 C. If, in the
P02 opinion of the field engineer, soft spots are encountered, reinforcing
fabric Type R1 may be used in lieu of scarifying with approval of the
engineer. Scarifying limits to extend one foot behind the curb and
gutter.

203 Delete the first and last paragraphs of Section 203.03 J. Plan
P03 quantity shall be paid.

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.

302 DENSE GRADED BASE COURSE: Salvaged bituminous material and salvaged
P01 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, blend, place, and
compact the salvaged bituminous/concrete material shall be included in
the price bid for "Salvaged Base Course," Ton. Material shall be
blended prior to placement on roadway.

302 Twelve inches of dense graded base shall be installed below the
P02 10" PCC pavement at radius connection of all side streets.

304 STABILIZED DRAINABLE BASE: The contractor shall use Portland cement
P01 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. After processing the
existing PCC concrete for the stabilized drainable base, the remains
shall be used in the dense graded base.

304 DRAINABLE BASE: The contractor may substitute unstabilized base at
P02 leave-out locations if approved by the engineer. The unstabilized base
shall be placed just prior to paving. No traffic shall be allowed on
it, except that which is required for installation and paving.

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408 HOT BITUMINOUS PAVEMENT: The hot bituminous pavement shall be
100 compacted in accordance with Section 408.04I.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 Hot bituminous shall be laid in approximately equal lifts not to
P01 exceed 3 inches.

550 CONCRETE PROTECTION: Adjacent P.C.C. Pavement shall be protected
130 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 P.C.C. Pavement slab shall not be used as a table for stockpiling, mixing, or drying of any material.

550 PAVEMENT REINFORCING OVER PIPE CROSSING: The PCC pavement over storm
P01 drain pipe crossings shall be reinforced with No. 4 reinforcing bar. The cost of the reinforcing steel shall be included in the price bid for "10 Inch Non-Reinforced Concrete Pavement, Class AE." (See detail.)

550 CONTRACTION JOINT SILICONE SEAL: Transverse joints that encompass a
P02 significant dogleg may be sealed with silicone.

560 REMOVAL OF CONCRETE PAVEMENT: All concrete pavement indicated for
P01 removal that is broken in place shall be 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.

602 JERSEY BARRIER FORMED OR SLIPFORMED: This item consists of
P01 constructing base slabs and Jersey barriers adjacent to the piers, abutments and wing walls of the Burlington Northern Railroad separation, which includes furnishing and installing reinforcing steel, Class AE-3 concrete, mastic and joint sealant.

The voids behind the Jersey barrier and between the median pier columns and between the south abutments behind the Jersey barrier shall be filled with Class 5 aggregate and capped with 4-inch thick concrete slabs, as detailed in the plans. An additional 18 cubic yards has been included in the quantity for the item "Aggregate Base Course Class 5" to provide for filling these voids.

The concrete, mastic and joint sealant required for the 4-inch thick cap slabs shall not be paid for separately but shall be included in the price bid for the item "Jersey Barrier Formed or Slipformed."

602/P01 (Cont)

The item "Jersey Barrier Formed or Slipformed" shall be measured by the linear foot of Jersey barrier wall installed.

The quantity 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.

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 knowledgeable with the contents and intentions contained within the MUTCD and the NDDOT Specifications.
 - c. Have previous experience working with maintenance and protection of traffic.
 - d. Be competent to supervise personnel in traffic maintenance operations.
 - e. Be present on the project on a daily basis unless released by the engineer.
2. Duties:
 - a. To provide traffic control as required by the plans, Standard Specifications, Special Provisions, or MUTCD or as directed by the engineer.
 - 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 TRAFFIC CONTROL DEVICES LIST: The quantity listing for the traffic
P01 control construction area has sufficient quantities for traffic control at all sites. The contractor will be paid for only the signs and devices installed, and accepted by the engineer, even though he will move these from one completed site to the next.

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704 P02 TRAFFIC CONTROL: The south side of Main Street at the Memorial Highway intersection may be closed for 15 consecutive working days during construction of this area and Third Street used as a detour. The intersection of Main Street and Memorial Highway shall be open to the traveling public July 2 through July 4.

708 P01 TOPSOIL FOR SEEDING: Upon completion of the grading operation, topsoil shall be spread evenly over the areas to be seeded or sodded, where there is a shortage of existing topsoil. A minimum of 4 inches shall be used for seeding and 3 inches used for sodding 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.

708 P02 TEMPORARY EROSION CONTROL: The following temporary erosion control has been provided for placement prior to disturbing the topsoil. (To be used in conjunction with Section 110 of the Standard Specifications.) See Mandan Avenue Plan and Profile Sheet and Std. D708-2.

714 P02 ADJUST WATER AND SEWER LINES: The exact depth of the existing 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."

714 P04 DRAINAGE: If the existing drainage facilities become inoperable before the new drainage system is functioning, the contractor shall provide sufficient temporary pumping and drainage facilities to keep the roadway drained to the satisfaction of the engineer. Not a pay item, cost to be incidental to the price bid for other items.

714 P01 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 design yields approximately one cubic yard of flowable mortar.

MIX DESIGN

Fine Aggr	2600 lbs
Water	70 gals
Flyash	300 lbs
Cement	100 lbs

714/P01 (Cont)
Measurement and Payment: Controlled density backfill will not be measured separately but shall be included in the price bid for storm drain items.

714 P02 UNDERDRAINS: All edgedrain pipe not terminating in a headwall, manhole, or 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." The edgedrain shall extend around the side street radii into inlets.

722 P01 DRAINAGE STRUCTURES: All inlets on this project have a minimum 4 foot riser. The bottom of the inlet shall be filled with concrete up to the elevation that will accommodate the lowest lead line elevation. All costs to accomplish this work will be paid for at the unit price bid for this item.

724 P01 STORM DRAINS: At several locations, the new line is to be installed into an existing trunk line or drainage structure. The cost for attaching at these locations shall be included in the price bid for drainage items.

724 P02 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."

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

748 P02 CURB ENDS: On street returns and other locations where the new 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 P01 CURB AND GUTTER TYPE I: Curb and gutter sections at the Burlington Northern Railroad separation vary in width and height as shown in the plans. The various curb and gutter sections shall be paid for as "Curb and Gutter Type I."

750 P01 DRIVEWAYS: Driveways shall be subcut approximately twelve inches deep and backfilled with Class 5 Aggregate Base or Dense Graded Base.

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754 050 SIGN SUPPORTS: The sign support "Steel Galvanized Posts - Square 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.

754 P01 SIGN LOCATION: In the area where 40 feet of right of way is available, the signs shall have the far edge of the sign placed on the right of way line when not placed on light standards, except where permanent easement exist.

754 P02 The businesses along this project that have a metal pipe set into 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.

762 025 PREFORMED PATTERNED PAVEMENT MARKING - LINES AND MESSAGE (GROOVED): 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 P01 PAVEMENT MARKING: The following pavement marking--painted lines have 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	8,155 LF
Pavement Marking Painted 6 Inch Lines	1,177 LF
Pavement Marking Painted 8 Inch Lines	2,227 LF
Pavement Marking Painted 24 Inch Lines	554 LF
Pavement Marking Painted Message	557 SF

764 P01 CRASH CUSHION/ATTENUATING TERMINAL: The barrier-end protection shall be the crash cushion/attenuating terminal system as manufactured by Syro Steel Company or approved equal. The contractor shall furnish shop drawings for approval of the end treatment. Shop drawings shall be submitted and shall include manufacturer's specification and erection requirements.

Erection shall begin at the end (area requiring protection) progressing to the nose piece. All bolts and nuts shall be placed and properly tightened in accordance with the manufacturer's specifications.

The item "Crash Cushion/Attenuation Terminal" shall be measured by the number installed. The payment shall be full compensation for all labor, equipment, and material necessary to complete the work.

770 001 OVERHEAD LINES CLEARANCE: Minimum horizontal and vertical 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

770 027 BREAKAWAY LIGHT STANDARD: The breakaway light standards shall be 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.

770 645 MULTIPLE UNDERGROUND CABLE: The plans call for using Multiple 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.

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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 RELOCATE LIGHT STANDARD: New internal wiring and fuse connector
900 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.

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

770 LIGHT STANDARDS: The light standards shall be of the davit type
P01 and designed for 6' mast arms 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 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 arm, luminaire, 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.

The mast arm 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 four 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.

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.

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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."

772 008 EXISTING PLANS: As-built plans of existing traffic signal system (Project No. SHE-1-094(018)916) 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.

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.

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

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.

772 349 CONTROLLER MONITORING UNIT AND/OR COMMUNICATION MODULE: The volume density 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.

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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 volume density controller. The contractor shall be responsible for the telephone service until final acceptance of the traffic signal system.

772 PAINT: The traffic signal system components shall be painted in 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 PULL BOX: The pull box shall be constructed of polymer concrete.

772 INTERCHANGEABLE: All new controllers shall be compatible with the existing controllers at Twin City Drive and Mandan Avenue. Controllers provided shall be compatible with the software being provided and installed in the city engineer's office under project number NHU-1-094(035)915.

772 SYSTEM MASTER CONTROLLER: The system master controller shall be a 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 REMOVAL OF TRAFFIC SIGNAL SYSTEM: Mast arm and signal standards that 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 interim traffic signals at 3rd Street and 1806 shall remain in place.

772 COMMUNICATIONS MODULE: The pre-timed controller shall be provided with a communication module which provides a full duplex data link with a central monitor. The communication module shall be IBM PC compatible.

772 INTERIM TRAFFIC SIGNALS: The item "Interim Traffic Signals" shall 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.

The contractor shall remove the interim traffic signal system when the permanent signals are in operation except for the 1806 and 3rd Street signals which shall remain in place. 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 preform this work.

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772 EMERGENCY VEHICLE PRE-EMPTION UNIT: The contractor shall drill and
P09 thread a hole in the mast arm or light standard for the installation of
the conduit nipple as shown on Standard D-770-4, and touch up the mast
arm or light standard using matching colored paint.

The contractor shall be responsible for any damage to the signal
standard mast arm or light standard and any wiring during the
installation of the detector. Any damage done shall be repaired or
replaced at the contractor's expense.

When a pre-emption call is received from the detector located at
Station 10+51-43' Lt a timer shall be activated and the call held in
the phase selector. Trial runs with the emergency vehicles are
required to clear the North Bound vehicles through the Main Street
Intersection.

The contractor shall inform the Fire Chief when the equipment is
installed and ready for the time setting. 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.

This shall not be bid separately, but shall be included in the price
bid for "Emergency Vehicle Pre-Emption Unit."

920 PUMP HOUSE: This item includes modification of the existing pump
P01 house and manhole as shown on the plans. This includes necessary riser
sections with new covers installed to the elevations shown. If other
items such as additional grouting are required to upgrade the facility,
they too shall be included in this pay item.

BASIS OF ESTIMATE (SURFACING)

Description	Unit
Water for Compaction:	
20 GAL/TON of Cl. 5 Aggregate	M GAL
40 GAL/TON of Dense Graded Base	M GAL
Aggregate Base Course - Cl. 5 @ 1.5 TON/CY +25%	TON
Permeable Stabilized Base @ 1.75 TON/CY	TON
Dense Graded Base @ .5 TON/CY +25%	TON
Hot Bit. Pvmt. Cl. 27 & 29 @ 2 TON/CY	TON
120-150 Asphalt Cement for Hot Bit. Pvmt. @ 5.7% of Hot Bit. Pvmt.	TON
Emul. Asph. for Tack Coat @ 0.05 GAL/SY (SS-1H or CSS-1H)	GAL
MC-70 or 250 Liquid Asph. for Prime @ 0.20 GAL/SY Dense Grd. Base	GAL
MC-70 or 250 Liquid Asph. for Prime @ 0.35 GAL/SY	GAL
Remove and Salvage Bituminous Surface 2.0 TON/CY	TON

BASIS OF ESTIMATE (GRADING)

WATER: 10 GAL/CY of estimated embankment quantities. Additional water has been included in the quantities and shall be used as a dust palliative as directed by the engineer.

Geotextile Fabric Type R1: 1,000 SY has been provided. See Note 203/P02.

SODDING

SOD: 1,200 SY has been provided and shall be used as directed by engineer and slopes steeper than 4:1 or as shown on plans.

TRAFFIC CONTROL

125 flex. delineators have been provided to be placed at 25' intervals between traffic lanes.

FLAGGING: 2,000 hours have been provided.

TRAFFIC CONTROL (CONT)

50 additional traffic cones have been provided.

2500 LF of safety fence has been provided.

BASIS OF ESTIMATE (DENSE GRADED BASE)

Ninety percent of the salvaged bituminous quantity has been used in the volume for the dense graded base. Eighty-five percent of the salvaged quantities of PCC pavement, concrete sidewalk, driveways, and curb and gutter has been used in the volume for permeable stabilized base and dense graded base. The actual percent will be determined in the field. The quantity of Class 5 aggregate base will be adjusted accordingly.

BASIS OF ESTIMATE H.E.S PAVEMENT

10% of total quantity has been provided and shall be used at the intersection of Mandan Avenue and Main Street and as directed by engineer.

BASIS OF ESTIMATE (EROSION CONTROL)

300 LF has been provided and shall be used as shown on plans. See Std. 708-2 or as directed by engineer.

DIMENSIONS USED FOR SALVAGE ROADWAY

Removal of concrete sidewalk based on 4-inch thick slab.
Removal of curb and gutter based on 1.25 square foot cross-section.
Removal of bituminous surfaced parking lot, based on 3-inch depth.
Removal of concrete driveway based on 6-inch thick slab.

CORED SIDE STREETS

LOCATION	ASPHALT
Twin City Drive	5.0"
Mandan Ave	3.75"
13th Ave NE	5.0"
11th Ave NE	3.0"
12th Ave NE	4.25"
10th Ave NE	3.0"
9th Ave NE	4.0"
8th Ave NE	5.5"

SPECIAL PROVISIONS

SP-184(92)	Partnering
SP-183(92)	Critical Path Method Schedule
SP-175(92)	Pumping Equipment
SP-185(92)	Landscaping Enhancement Project
SP-188(92)	Contract Time for Completion

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103	0100	Contract Bond	L SUM	0.9		0.1	1
107	0100	Railway Protection Insurance	L Sum	1			1
201	0357	Removal of Trees - 4-in.	EA	3			3
202	0112	Removal of Concrete	SY	2,672		8	2,680
202	0114	Removal of Concrete, Pavement	SY			808	808
202	0119	Saw Concrete	LF	1,035			1,035
202	0121	Remove & Salvage Bituminous Surface	TON	2,154		129	2,283
202	0130	Removal of Curb and Gutter	LF	10,371		13	10,384
202	0153	Saw Bituminous Surface	LF	2,910		33	2,943
202	0210	Removal of Manholes	EA	2			2
202	0230	Removal of Inlets	EA	6			6
203	0101	Common Excavation - Type A	CY	22,717			22,717
203	0109	Topsoil	CY	883			883
216	0100	Water	M GAL	958		42	1,000
302	0100	Salvaged Base Course	TON	7,492		370	7,862
302	0120	Aggregate Base Course Cl. 5	TON	9,875		452	10,327
304	1000	Permeable Stabilized Base Course	SY	31,975			31,975
401	0100	MC 70 or 250 Liquid Asphalt	GAL	7,064		345	7,409
401	0152	SS-1H or CCS-1h Emulsified Asphalt	GAL	84		43	127
408	0175	Hot Bituminous Pavement - Cl. 27	TON	1,226			1,226
408	0185	Hot Bituminous Pavement - Cl. 29	TON	666		260	926
408	0320	120-150 Asphalt Cement	TON	108		15	123
550	0112	8-In. Non-reinf. Conc. Pvmt Cl. AE	SY	131			131
550	0118	10-In. Non-reinforced Conc. Pvmt. Cl. AE	SY	28,816			28,816
550	0178	10-In Non-reinf. Conc. Pvmt. Cl AE (HES)	SY	3,202			3,202
550	0424	Dowel Bars	EA	196			196

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550	0710	10-In Concrete Pavement Repair	SY			808	808
550	0809	Perf. Elastomeric Compr. Jt. Seal 9/16 In.	LF	18,334			18,334
550	0958	Longitudinal Joint Silicone Seal	LF	4,764			4,764
550	0959	Contraction Joint Silicone Seal	LF	2,047			2,047
560	1590	Removal of Concrete Pavement	SY	29,548			29,548
602	1200	Jersey Barrier Formed on Slip Formed	LF	327			327
702	0100	Mobilization	L SUM	0.9		0.1	1
704	0100	Flagging	HR	2,000			2,000
704	0104	Obliteration of Pavement Marking	SF	2,000			2,000
704	1000	Traffic Control Signs	UNIT	3,675			3,675
704	1051	Type II Barricade	EA	87			87
704	1052	Type III Barricade	EA	138			138
704	1060	Delineator Drums	EA	300			300
704	1067	Tubular Markers	EA	50			50
704	1072	Flexible Delineators	EA	125			125
704	1081	Vertical Panels (Back to Back)	EA	24			24
704	1087	Sequencing Arrow Panel - Type C	EA	1			1
706	0300	Field Laboratory - Type C	EA	1			1
708	1310	Erosion Checks	LF	300			300
708	2240	Seeding, Type B Cl. II	ACRE	2			2
708	3020	Topsoil for Seeding	CY	150			150
708	4000	Sod	SY	1,200			1,200
709	0701	Geotextile Fabric Type R1	SY	1,000			1,000
714	0115	Pipe Conc Reinf 12" Cl. III Storm Drain	LF	12			12
714	0210	Pipe Conc. Reinf. 15" Cl. III Storm Drain	LF	372			372

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	17

SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
714	0315	Pipe Conc. Reinf. 18" Cl. III Storm Drain	LF	592			592
714	0405	Pipe Conc. Reinf. 21" Cl. III Storm Drain	LF	316			316
714	0620	Pipe Conc. Reinf. 24" Cl. III Storm Drain	LF	180		196	376
714	2220	Pipe Conc. Reinf. Arch 29 In x 18 In Cl 4	LF	42		42	84
714	7030	Pipe, PVC 12 In	LF	100			100
714	3150	Headwall, Precast Concrete 4-In.	EA	2			2
714	9695	Edge Drain Permeable Base	LF	9,354			9,354
722	0100	Manhole 48-In.	EA	2			2
722	0110	Manhole 60-In.	EA	2			2
722	1100	Manhole Riser 48-In.	LF	14			14
722	1110	Manhole Riser 60-In.	LF	14			14
722	2500	Manhole Special	EA	1			1
722	3500	Inlet - Type 1	EA	2			2
722	3510	Inlet - Type 2	EA	20			20
722	3520	Inlet - Type 2, Double	EA	10		2	12
722	3920	Inlet - Slotted Drain 18 In.	EA	40			40
722	3930	Inlet - Slotted Drain 21-In.	LF	142			142
722	6160	Adjust Inlet	EA	2			2
722	6200	Adjust Manhole	EA	18		2	20
722	6695	Air Relief Valve & Manhole	EA			1	1
724	0210	Fittings, Ductile Iron	LBS			5,650	5,650
724	0300	Gate Valve & Box, 6 Inch	EA			10	10
724	0310	Gate Valve & Box, 8 Inch	EA			9	9
724	0320	Gate Valve & Box, 12 Inch	EA			11	11
724	0400	Hydrant, Install 6 Inch	EA			7	7
724	0426	Hydrant Extension	LF			10	10

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	18

SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
724	0430	Remove Hydrant	EA			6	6
724	0605	Water Service Pipe, 1½ Inch Copper	LF			419	419
724	0607	Water Service Pipe, 2 Inch Copper	LF			23	23
724	0810	Watermain, 6 Inch PVC	LF			481	481
724	0830	Watermain, 8 Inch PVC	LF			334	334
724	0850	Watermain, 12 Inch PVC	LF			2,599	2,599
724	0852	Watermain, 16 Inch PVC	LF			176	176
724	0907	Curb Stop & Box, 1½ Inch	EA			20	20
724	0910	Curb Stop & Box, 2 Inch	EA			2	2
724	0958	Water Service Connection, 1½ Inch	EA			20	20
724	0960	Water Service Connection, 2 Inch	EA			2	2
724	6013	Abandon Existing Valve Box	EA			16	16
744	0100	Polystyrene Insulation	BD FT			256	256
748	0140	Curb & Gutter - Type 1	LF	10,096		337	10,433
748	0500	Curb, Header - Type 1	LF	100			100
750	0100	Sidewalk, Conc.	SY	3,495		110	3,605
750	0200	Conc. Median Paving	SY	106			106
750	1010	Driveway, Conc. High Early Strength	SY	850		25	875
752	0910	Safety Fence	LF	2,500			2,500
752	0922	Fence, Remove & Reset	LF	230			230
754	0116	Flat Sheet for Signs - Type 2 Reflective Sheeting	SF	820			820
754	0117	Flat Sheet for Signs - Type 3A Reflective Sheeting	SF	43			43
754	0206	Steel Galv Posts Telescoping Perforated Tube	LF	641			641
762	0103	Pavement Marking - Painted Message	SF	557			557
762	0122	Preformed Patterned Pvmt Mk Message-Grooved	SF	557			557
762	0200	Raised Pavement Markers	EA	596			596

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	19

SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
762	0420	Short Term 4" Line Type R	LF	6,701			6701
762	0430	Short Term 4" Line Type NR	LF	8,902			8,902
762	1104	Pvmt. Mkg. Painted 4 In. Line	LF	8,155			8,155
762	1106	Pvmt. Mkg. Painted 6 In. Line	LF	1,177			1,177
762	1108	Pvmt. Mkg. Painted 8 In. Line	LF	2,227			2,227
762	1124	Pvmt. Mkg. Painted 24 In. Line	LF	554			554
762	1140	Pvmt. Mkg. Painted Curb Top & Face	LF	494			494
762	1305	Preformed Patterned Pvmt Mk 4 In. Line (Grooved)	LF	8,155			8,155
762	1307	Preformed Patterned Pvmt Mk 6 In Line (Grooved)	LF	1,177			1,177
762	1309	Preformed Patterned Pvmt Mk 8 In Line (Grooved)	LF	2,227			2,227
762	1325	Preformed Patterned Pvmt Mk 24 In Line (Grooved)	LF	554			554
764	0131	W-Beam Guardrail	LF	79			79
764	0139	W-Beam Guardrail - Flared End Treatment and Transition	EA	2			2
764	1001	Concrete Cl. AE-3 Safety Shape Transition	EA	2			2
764	9005	Crash/Cushion Attenuating Terminal	EA	2			2
770	0020	Concrete Foundation - Highway Lighting	EA	34			34
770	0060	Concrete Foundation - Feed Point - Type B	EA	1			1
770	0220	Cable Trench - Type II	LF	2,729			2,729
770	0330	2 In. Diameter Rigid Conduit	LF	5,092			5,092
770	0445	Multiple Underground Cable 3, No. 6 Style USE	LF	3,837			3,837
770	0503	Underground Conductor No. 2 - Type RHW	LF	3,146		1,573	4,719
770	0504	Underground Conductor No. 4 - Type RHW	LF	5,418		2,709	8,127
770	0505	Underground Conductor No. 6 - Type RHW	LF	1,214			1,214
770	0506	Underground Conductor No. 8 - Type RHW	LF	456			456

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	20

SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
770	0605	Underground Conductor No. 6 - Type THW	LF	4,889			4,889
770	0730	Feed Point - Type I - Pad Mounted	EA	1			1
770	1076	Light Standard 6 Ft. M.A. - 40 Ft. Mt. Ht.	EA	4			4
770	1376	Light Standard 6 Ft. M.A. - 40 Ft. Mt. Ht. Festoon	EA	16			16
770	1676	Light Standard 6 Ft. M.A. - 40 Ft. Mt. Ht. Breakaway	EA	11			11
770	4115	H.P. Sodium Vapor Luminaire - 100 Watt	EA	15			15
770	4120	H.P. Sodium Vapor Luminaire - 150 Watt	EA	4			4
770	4130	H.P. Sodium Vapor Luminaire - 200 Watt	EA	18			18
770	4140	H.P. Sodium Vapor Luminaire - 250 Watt	EA	2			2
770	4501	Temporary Lighting System	EA	1			1
770	4540	Relocate Light Standard	EA	3			3
770	4542	Relocate Luminaire	EA	2			2
770	4560	Remove Light Standard	EA	41			41
770	4570	Remove Street Light Luminaire	EA	2			2
772	0020	Concrete Foundation - Traffic Signals	EA	10			10
772	0055	Concrete Foundation - Feed Point - Type B	EA	2			2
772	0100	Pull Box	EA	16			16
772	0200	1 In. Diameter Rigid Conduit	LF	464			464
772	0240	2 In. Diameter Rigid Conduit	LF	5,406			5,406
772	0260	2.5 In. Diameter Rigid Conduit	LF	101			101
772	0270	3 In. Diameter Rigid Conduit	LF	237			237
772	0300	Underground Conductor No. 6 - Type RHW	LF	116			116
772	0301	Underground Conductor No. 8 - Type RHW	LF	288			288
772	0310	Underground Conductor No. 6 - Type THW	LF	58			58

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	21

SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
772	0330	Loop Lead-in Conductor	LF	3,694			3,694
772	0350	Preformed Loop Detector	EA	26			26
772	0400	No. 12 AWG 2 Conductor Cable	LF	957			957
772	0401	No. 12 AWG 3 Conductor Cable	LF	48			48
772	0403	No. 12 AWG 5 Conductor Cable	LF	900			900
772	0410	No. 12 AWG 12 Conductor Cable	LF	1,340			1,340
772	0450	Interconnect Cable	LF	3,824			3,824
772	0551	Feed Point - Combo. Lighting and Signal Pad Mount	EA	2			2
772	0842	Combo 14 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	0952	Combo 25 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	0962	Combo 26 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	1032	Combo 33 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	1102	Combo 40 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	1162	Combo 46 Ft. M.A. Signal and Light Standard - Type C	EA	2			2
772	1172	Combo 47 Ft. M.A. Signal and Light Standard - Type C	EA	1			1
772	1810	1-Way 3 Sec Head W/12 In. Lenses - Post Mounted	EA	8			8
772	1812	1-Way 3 Sec. Head W/12 In. Lenses - Mast Arm Mounted	EA	13			13
772	1832	1-Way 5 Sec. Head W/12 In. Lenses - Mast Arm Mounted	EA	2			2
772	2000	1-Way, 2 Sec. Hd. Pedestrian Signal - Post Mounted	EA	4			4
772	2505	Volume Density Controller W/Ped. Timing	EA	1			1
772	2544	Volume Density System Controller	EA	1			1
772	2610	Emergency Vehicle Pre-emption Unit	EA	3			3
772	2800	Interim Traffic Signal	EA	4			4
772	2940	Revise Concrete Foundation	EA	1			1
772	3000	Relocate Controller	EA	2			2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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SUMMARY OF QUANTITIES

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>NHU-1-094(039)916</u>	<u>STNU-1-094(039)916</u>	<u>CITY FUNDS ONLY</u>	<u>TOTAL</u>
772	3002	Relocate Controller Cabinet	EA	2			2
772	3125	Remove Traffic Signal System	EA	2			2
920	0100	Pumping Equipment	L SUM	1			1
920	0200	Pump House	L SUM	1			1
950	0100	Trainee	HR	2,000			2,000
970	0025	Landscape Enhancement Project	L SUM		1		1
990	0100	Critical Path Method Schedule	L SUM	1			1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	23

SUMMARY OF EARTHWORK - ROADWAY SURFACE BREAKDOWN

LOCATION	EXCAVATION CY	SURFACE REMOVAL CY	TOPSOIL STRIPPING CY	COMMON EXCAVATION CY	EMBANKMENT CY	EXCESS EXCAVATION CY
167+20 to 189+00 Survey	12,210	5210.5	78.1	6921.4	74	6847.4
189+00 to 205+00 N. Rdwy	5,837	1807.8	40.7	3988.5	249	3739.5
189+00 to 204+00 to S. Rdwy	5,475	1606.0	36.1	3832.9	42	3790.9
8th Ave. NE	292	54.3	0	237.7	3	234.7
9th Ave. NE	259	37.2	0	221.8		221.8
10th Ave. NE	296	42.4	0	253.6	0	253.6
11th Ave. NE	309	28.0	3.0	278.0	3	275.0
12th Ave. NE	277	40.0	0	237.0	0	237.0
13th Ave. NE	190	35.1	0	154.9	0	154.9
Mandan Ave.	1,041	126.2	0	914.8	191	723.8

NOTE: Excavation - (Minus) Surface Removal - (Minus) Topsoil = Common Excavation

East Median X-Over

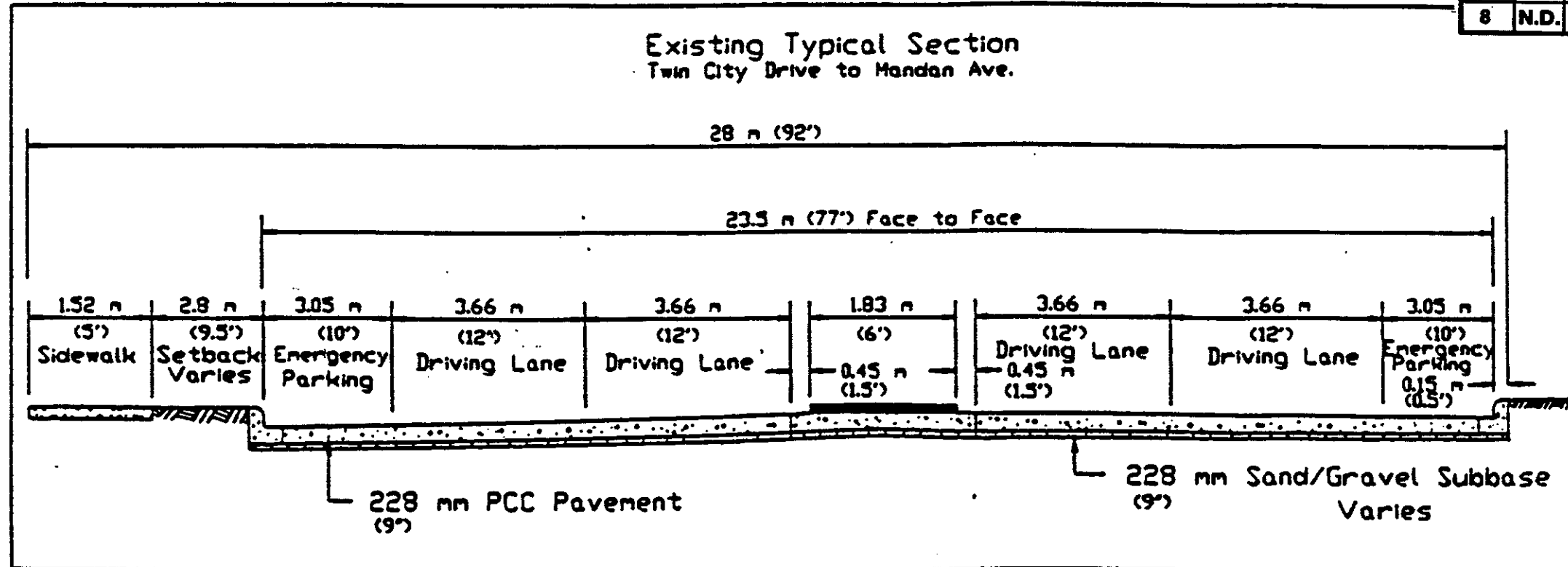
Phase 1			534		3338	
Phase 2			191		2338	1000
						2338 CY Phase 2 Removal

NOTE: 3338 CY Required to Construct

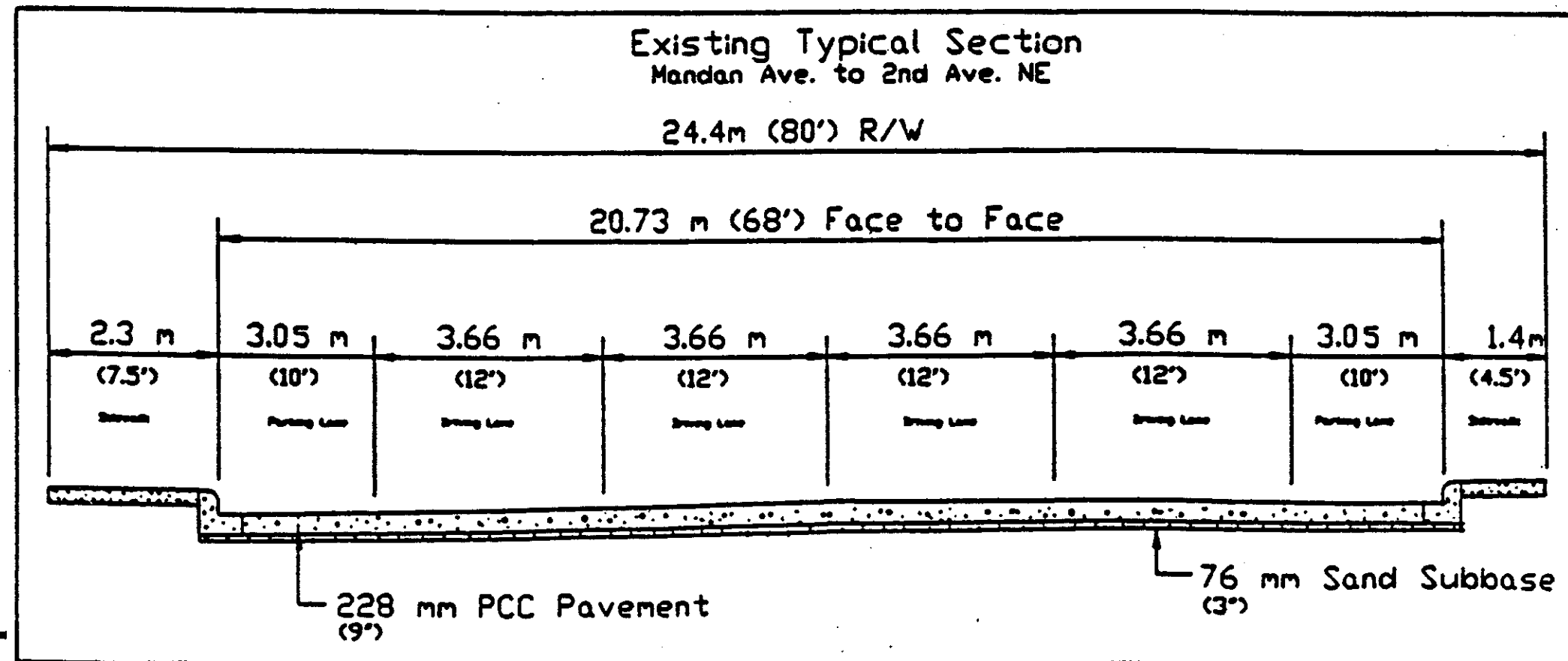
Phase 1 may be obtained from I-94 R/W and replaced after Phase 2.

Twin city Drive to Mandan Avenue

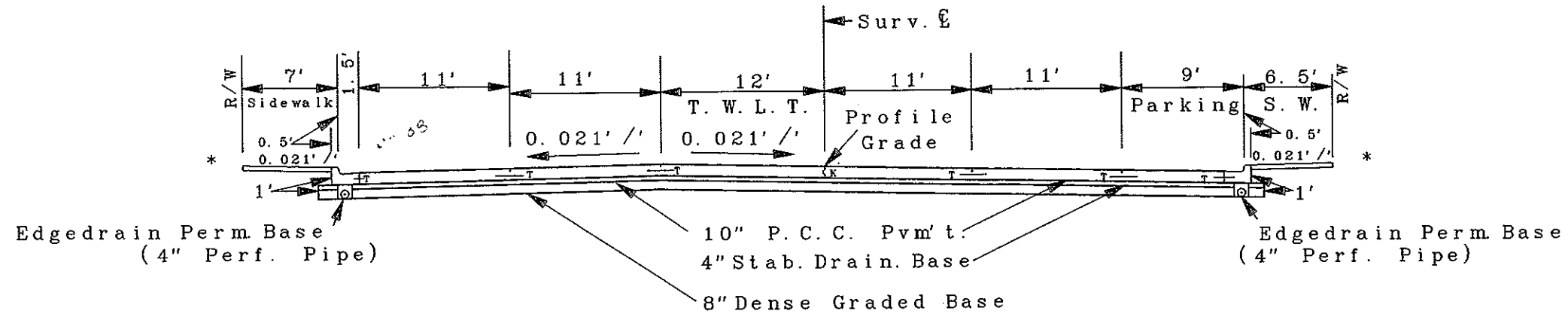
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	24



Mandan Avenue to 2nd Avenue NE



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	25



Typical Section 171+44 to 173+00

Note: See Pvm't. Edge Drain & Inlet Connection Detail for Edge-Drain Perm Base.

T : Tied Joint (See Std. D-550-2 for Size & Spacing)
 K : Keyed Joint Silicone Seal

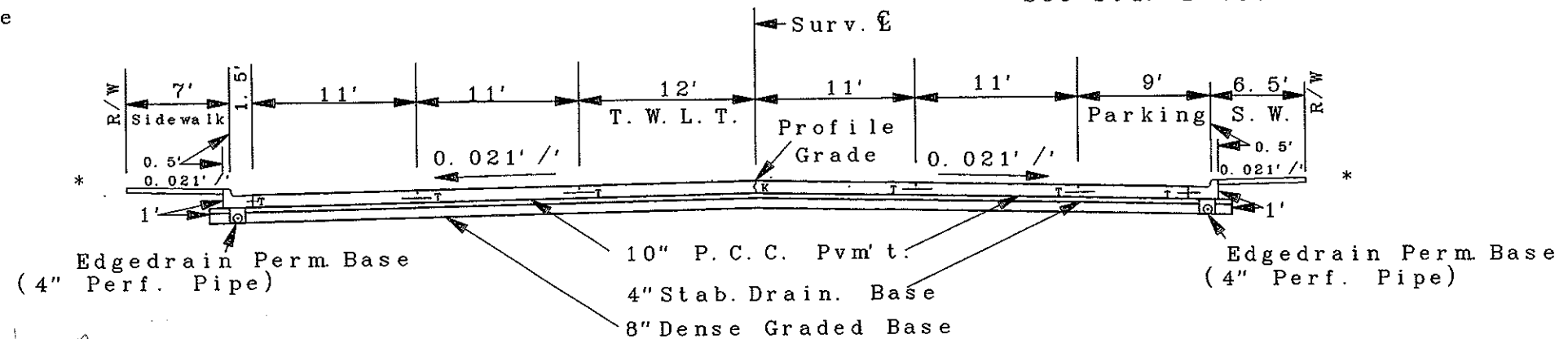
Curb & Gutter Type 1 used on this Typical See Std. D-748-1
 Curb & Gutter shall extend down to the top of the Stab. Drainable Base.

Note: Rdwy. Width Varies From 167+20 to 169+00.

Note : Warp X-Slope of T. W. L. T. Lane from 170+44 to 171+44 and from 173+00 to 174+00

*Slope To Match Saw Cut Location Shown on P & P Sheets.

Note : X-Slope of Sidewalk May Vary to Match Existing Terrain (5% Max.). Slope Sidewalk Away From Roadway Sta. 169+00 Rt. to 171+40 Rt. (0.021' /'). Install Header Curb 169+75 to 170+75 Rt. See Std. D-750-2

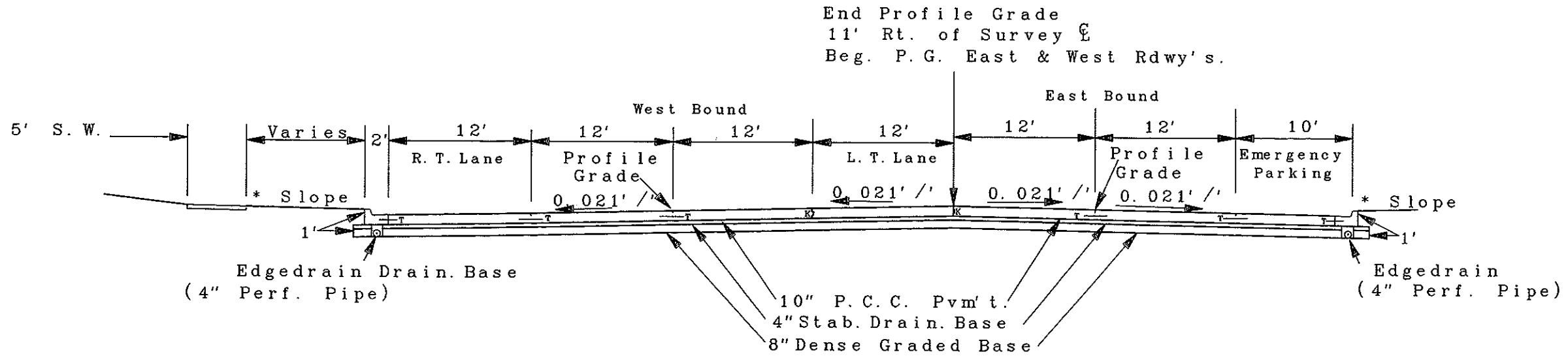


Typical Section 169+00 to 170+44
 Typical Section 174+00 to 183+00

↑ This one only 169+00 - 169+32

TYPICAL SECTIONS		
STA. 169+00 to 183+00 East Main Street		
Scale: 1" = 10'	FILE: Mdn1.GRF	Plot Factor: 1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	26



Typical Section 189+00

T : Tied Joint (See Std. D-550-2 for Size & Spacing)

K : Keyed Joint Silicone Seal

Curb & Gutter Type 1 used on this Typical See Std. D-748-1

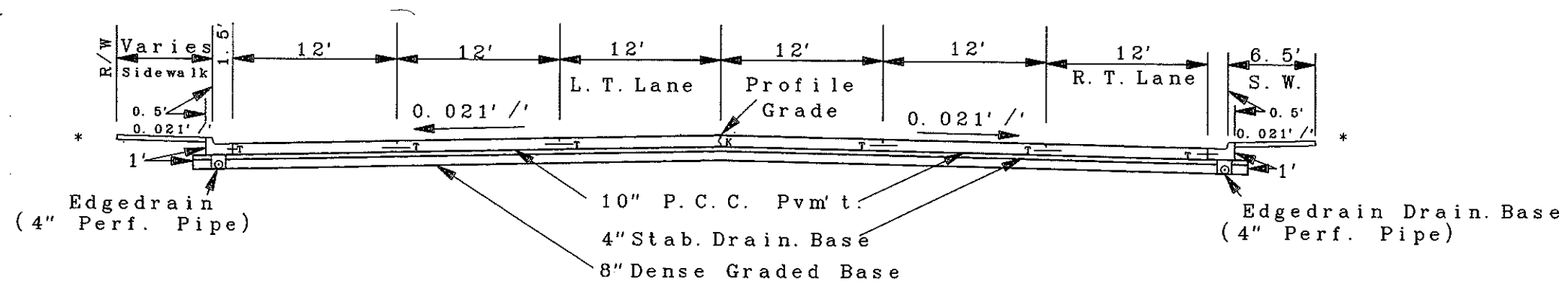
Curb & Gutter shall Extend down to the Top of the Stab. Drain. Base.

Note: See Pvm't. Edge-Drain & Inlet Connection Detail for Edgedrain Drainable Base

* Slope to Fit Existing Terrain or Saw Cut Location Shown On P & P Sheets.

Note : Lane Taper/Profile Grd. From Surv. \bar{C} @ 183+00 to 11' Rt. @ 188+00.

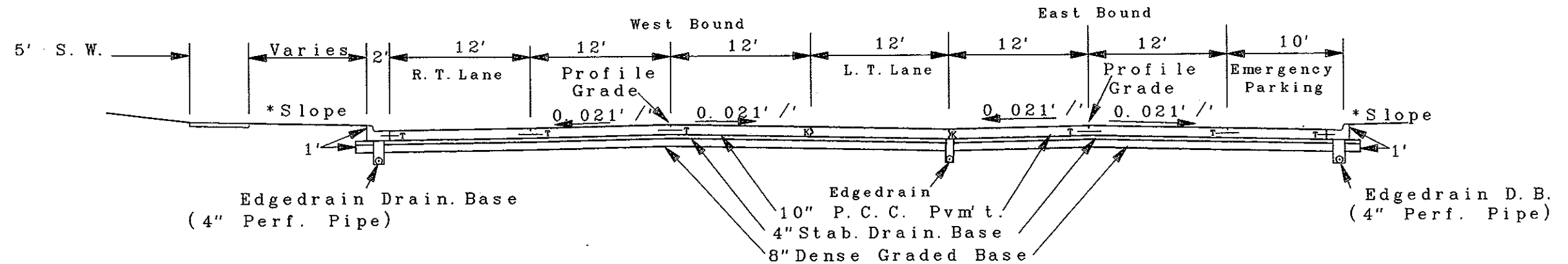
Note : Dr. Lane Transition From 11' @ 183+00 to 12' @ 184+00.



Typical Section 184+00 to 187+00+/-

TYPICAL SECTIONS		
STA. 184+00 to 189+00		
East Main Street		
Scale: 1" = 10'	FILE: Mdn2.GRF	Plot Factor: 1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	27



Typical Section 191+00 to 192+24

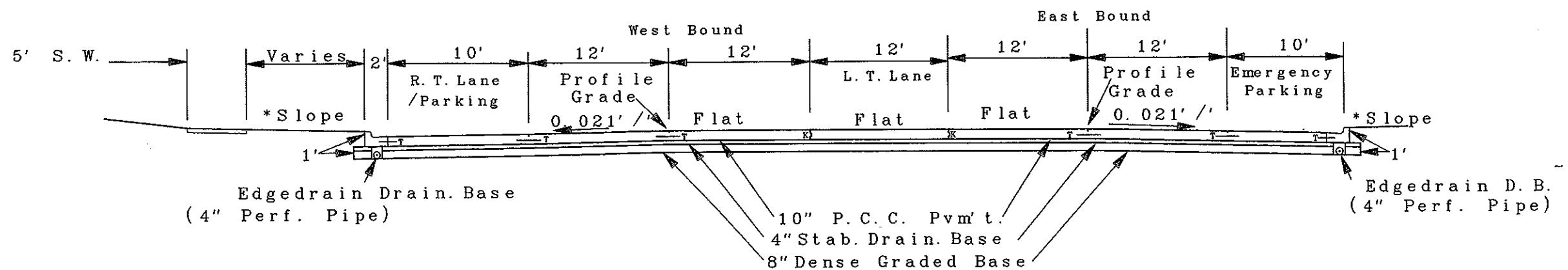
T : Tied Joint (See Std. D-550-2 for Size & Spacing)
 K : Keyed Joint Silicone Seal

Curb & Gutter Type 1 used on this Typical See Std. D-748-1
 Curb & Gutter shall Extend down to the Top of the Stab. Drainable Base.

Note: Edgedrains Shall Be Installed 1' Below The Bottom Of The Dense Grd. Base Sta. 191+00 to 198+50. Simple 2 : 1 Slope Shall Attain This Depth.

Note: See Pvm't. Edge-Drain & Inlet Connection Detail for Edgedrain Drainable Base

*Note : Slope to Fit Existing Terrain, See X-Section & Tie Slopes.



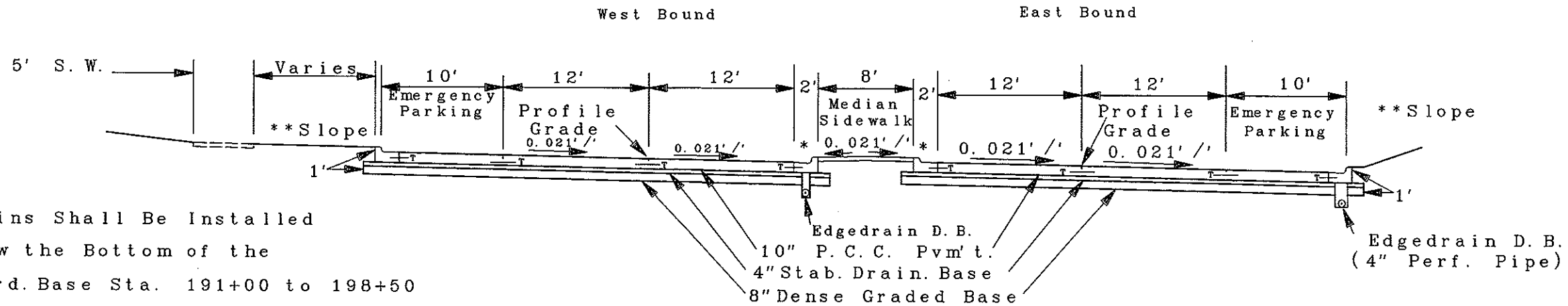
Typical Section 190+00

TYPICAL SECTIONS		
STA. 190+00 to 192+24		
East Main Street - I 94		
Scale: 1" = 10'	FILE: Mdn3.GRF	Plot Factor: 1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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Note : Edge Drains Are Not Required on High Side of Super-Elev. Curve.

Note : Reverse X-Slope of North Lanes of the East & West Bound Rdwy's.



Edgedrains Shall Be Installed 1' Below the Bottom of the Dense Grd. Base Sta. 191+00 to 198+50

Typical Section 197+81.08 Ahd.

* See Conc. Barrier Detail

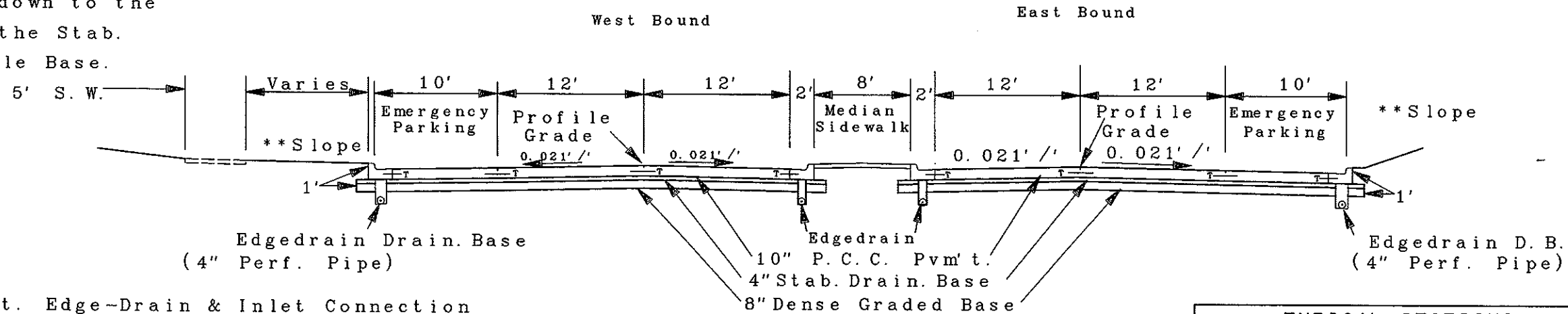
Note : Beg. Raised Median 192+24. Median Width Varies from 192+24 to 194+08.3 & from 197+81.08 Ahead. Median Width is 0.0 @ 199+80.2

T : Tied Joint (See Std. D-550-2 for Size & Spacing)
K : Keyed Joint Silicone Seal

Curb & Gutter Type 1 used on this Typical See Std. D-748-1

**Note : Slope to Fit Existing Terrain, See X-Sections & Tie Slopes.

Curb & Gutter Shall Extend down to the Top of the Stab. Drainable Base.

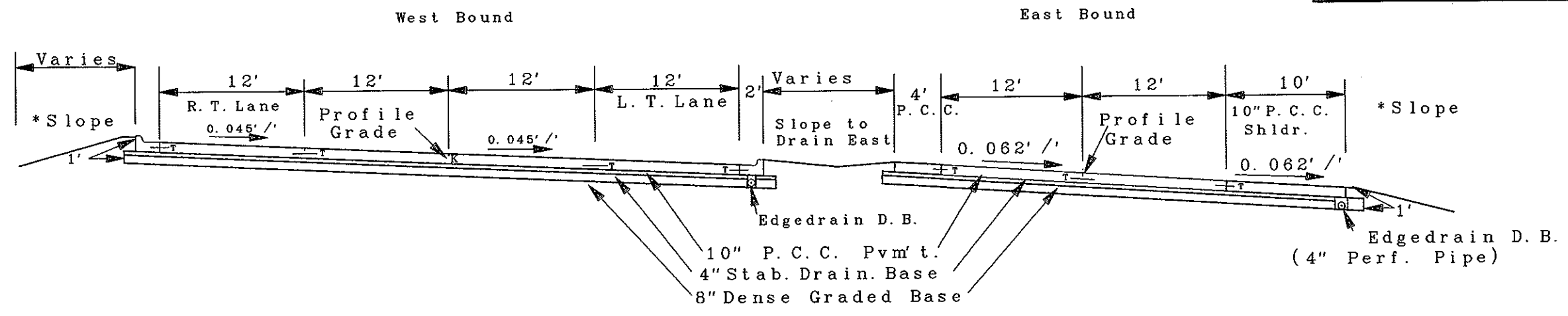


See Pvm't. Edge-Drain & Inlet Connection Detail for Edgedrain Drainable Base.

Typical Section 194+08.32 to 195+81.08

TYPICAL SECTIONS		
STA. 192+24 to 201+00 +/-		
East Main Street - I 94		
Scale: 1" = 10'	FILE: Mdn4.GRF	Plot Factor: 1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	29



Typical Section 203+42.9 to 204+00

T : Tied Joint (See Std. D-550-2 for Size & Spacing)
 K : Keyed Joint Silicone Seal

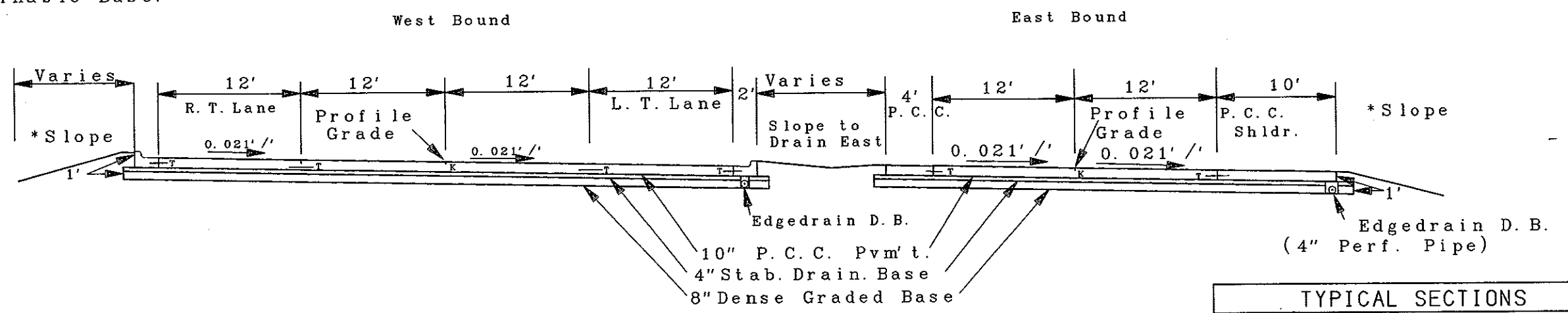
Curb & Gutter Type 1 used on this Typical See Std. D-748-1

Curb & Gutter shall Extend down to the Top of the Stabilized Drainable Base.

*Note : 6:1 Slope or Fit Existing Terrain, See X-Sections & Tie Slopes.

See Pvm't. Edge Drain Detail I-94 &/or Inlet Connection Detail

Note : Transition X-Slope from 0.021'/' @ 202+42.9 to 0.045'/' @ 203+42.9 No. Rdwy. Transition X-Slope from 0.021'/' @ 202+42.9 to 0.062'/' @ 203+42.9 So. Rdwy.



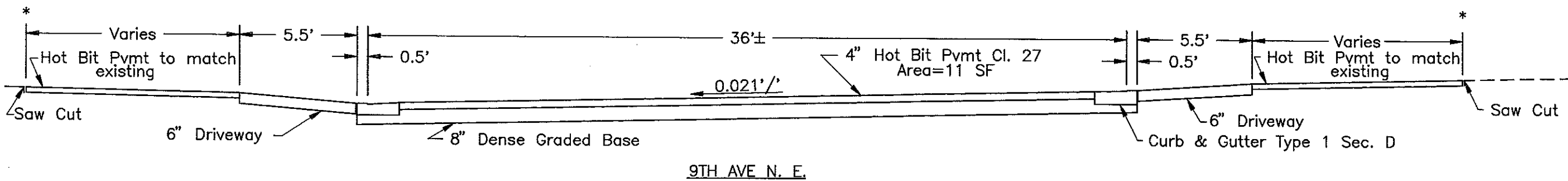
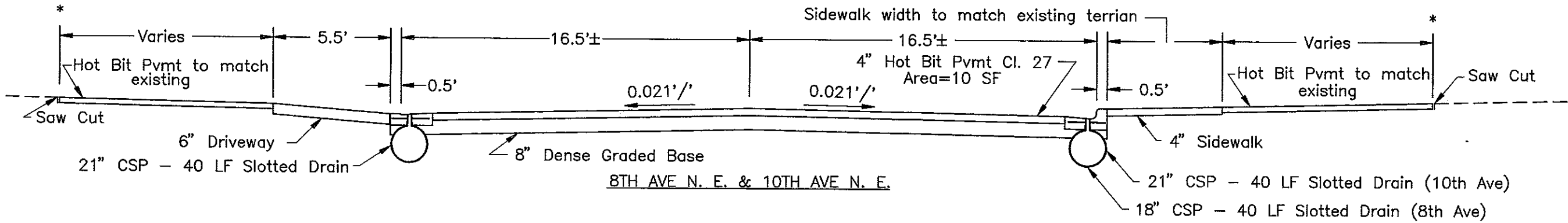
Typical Section 202+42.9

TYPICAL SECTIONS		
STA. 202+42.9 to 204+17.9		
East Main Street - I 94		
Scale: 1" = 10'	FILE: Mdn5.GRF	Plot Factor: 1

PROJ. P1

TYPICAL SURFACING SECTIONS

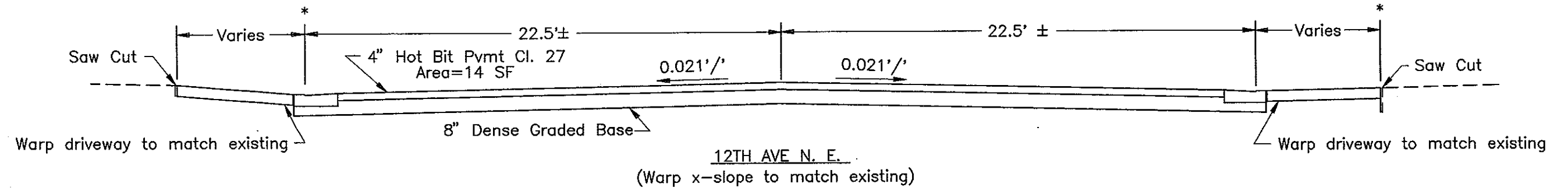
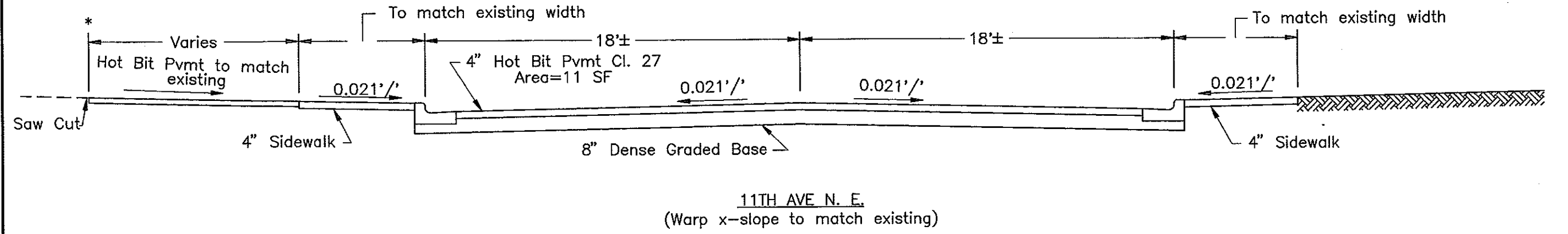
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094(039)916	30



*See Plan & Profile sheets for Saw Cut locations

TYPICAL SURFACING SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094(039)916	31

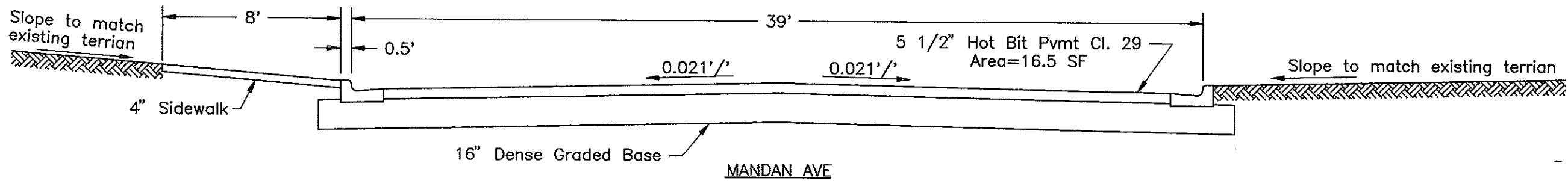
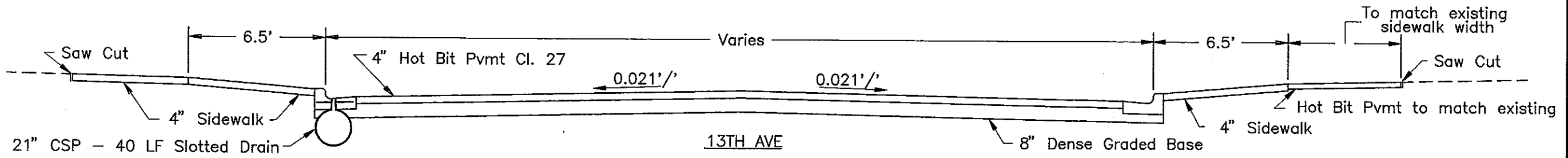


*See Plan & Profile Sheets for Saw Cut Locations

PROTO_P1

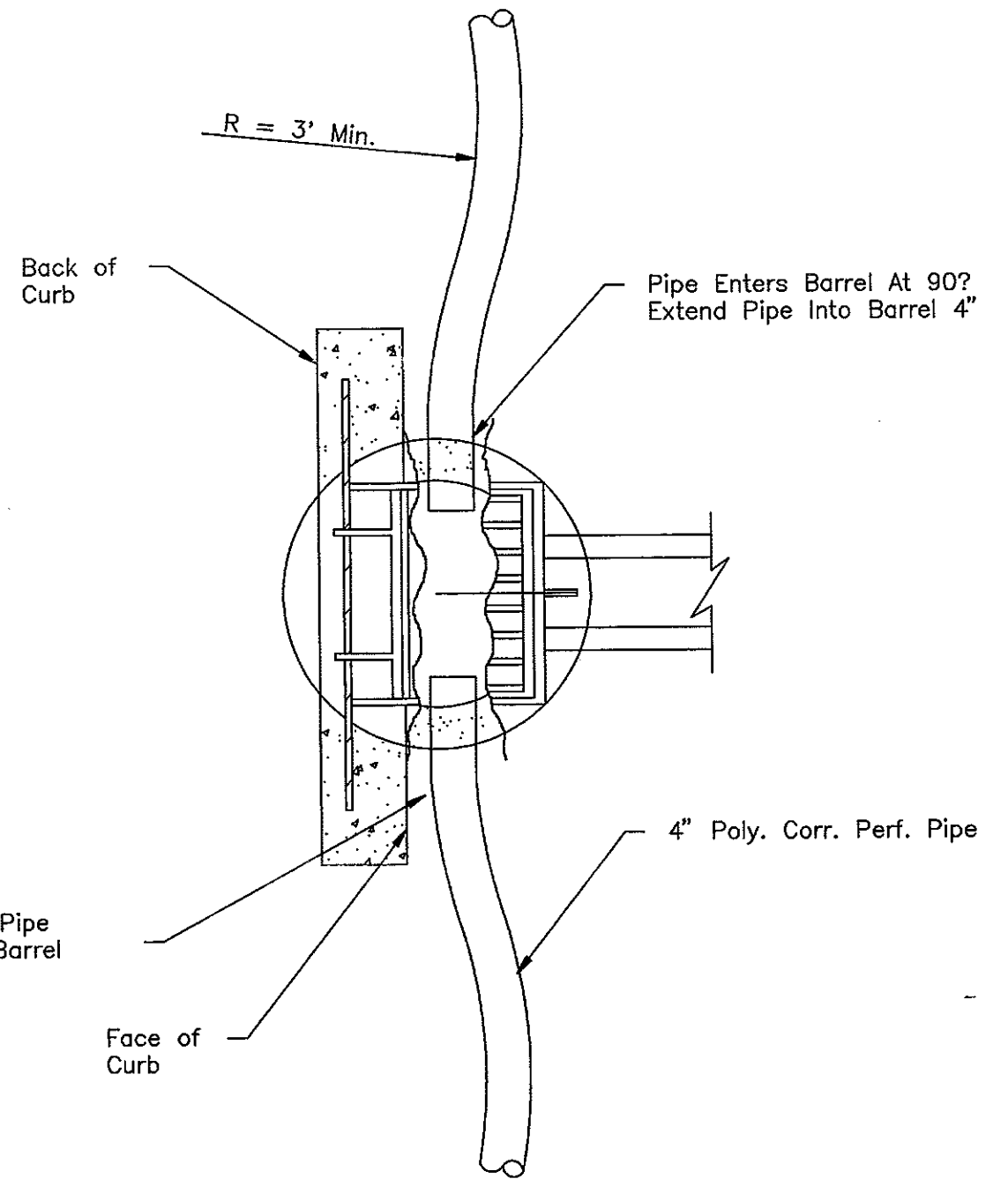
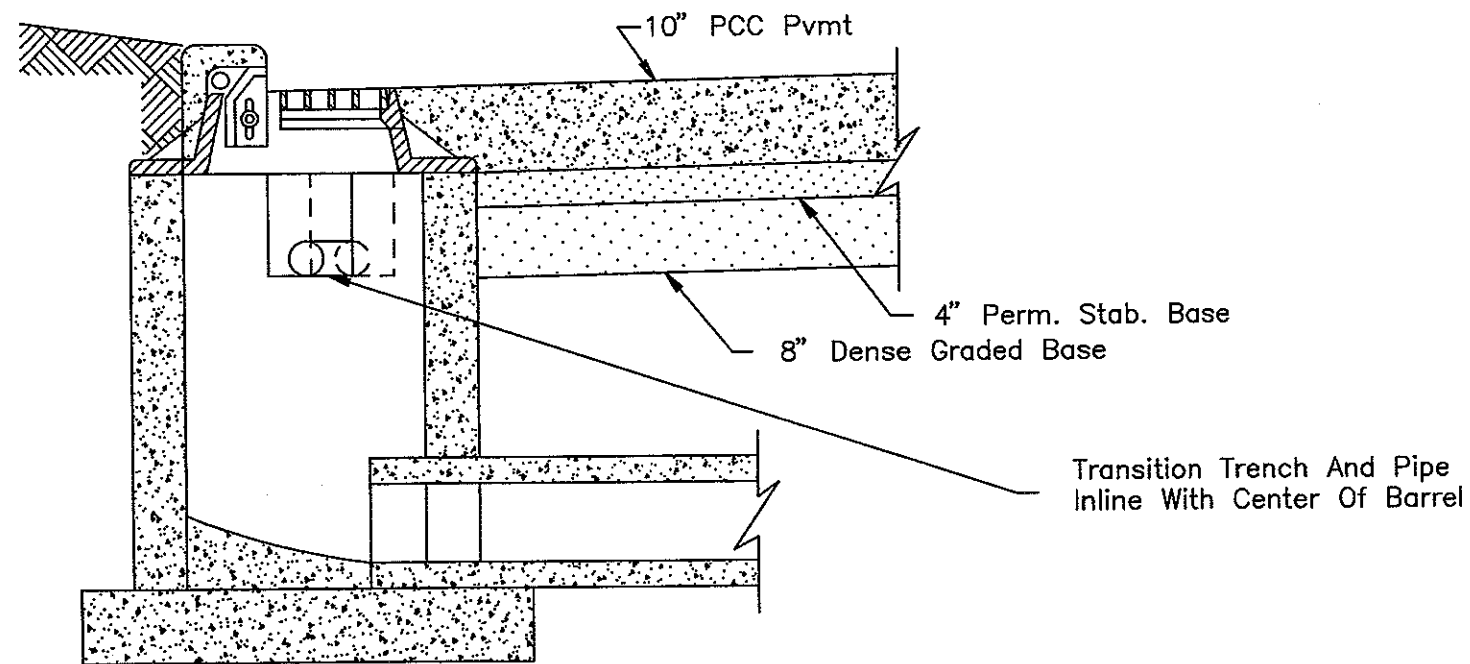
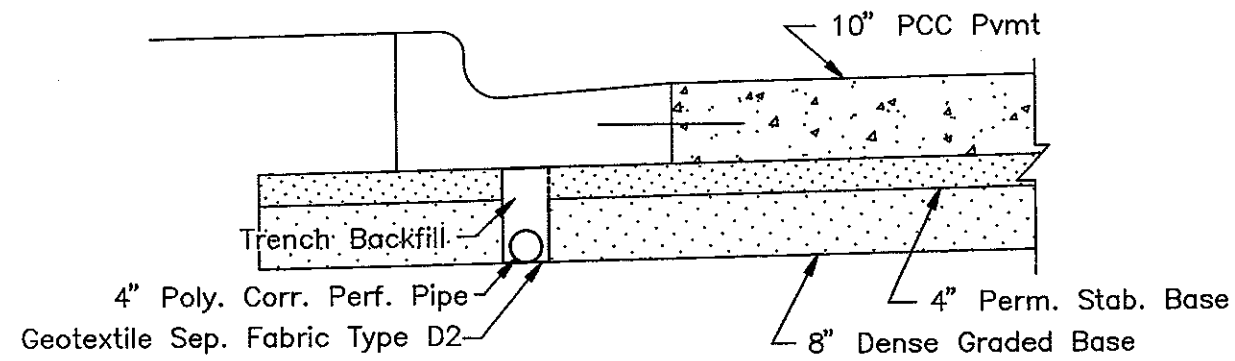
TYPICAL SURFACING SECTIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094(039)916	32



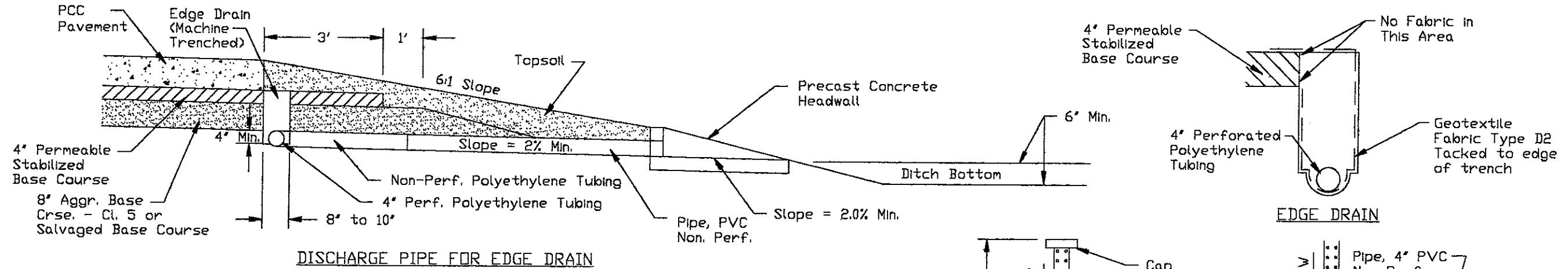
PAVEMENT EDGE DRAIN & INLET CONNECTION DETAIL

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	33

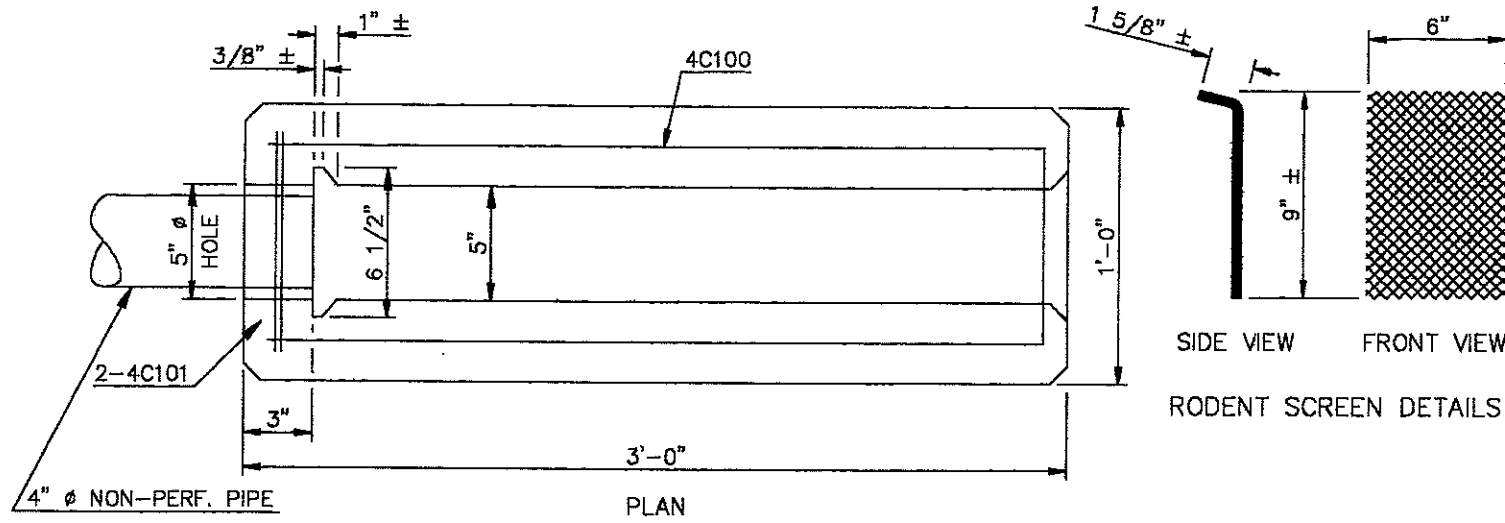


PAVEMENT EDGE DRAIN DETAIL
I-94 Main-Line Roadway

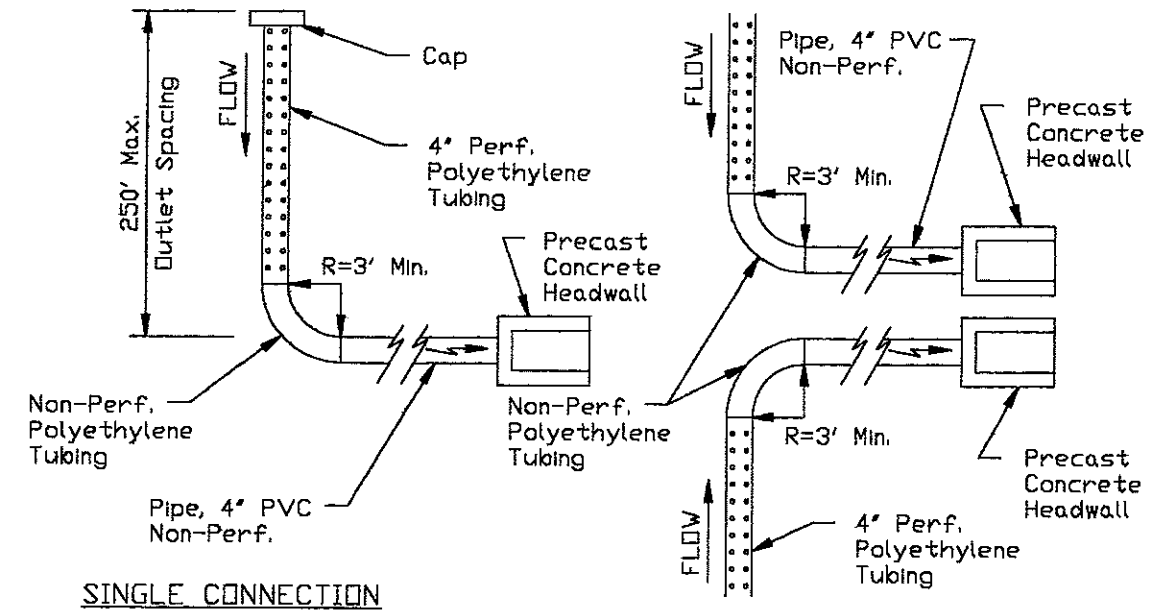
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	34



DISCHARGE PIPE FOR EDGE DRAIN

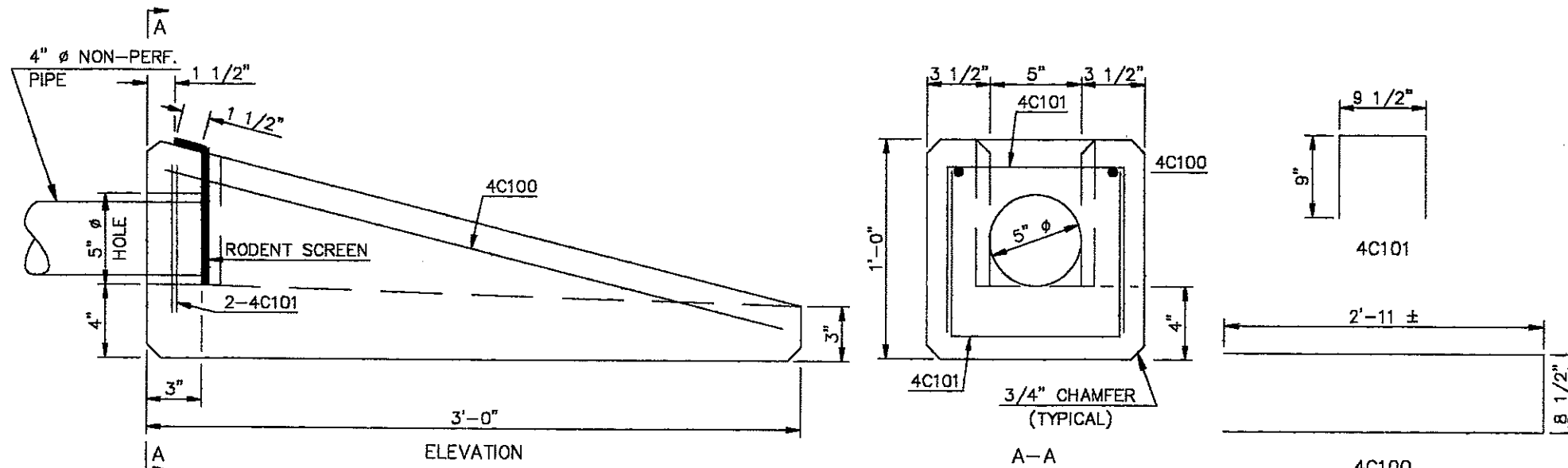


RODENT SCREEN DETAILS

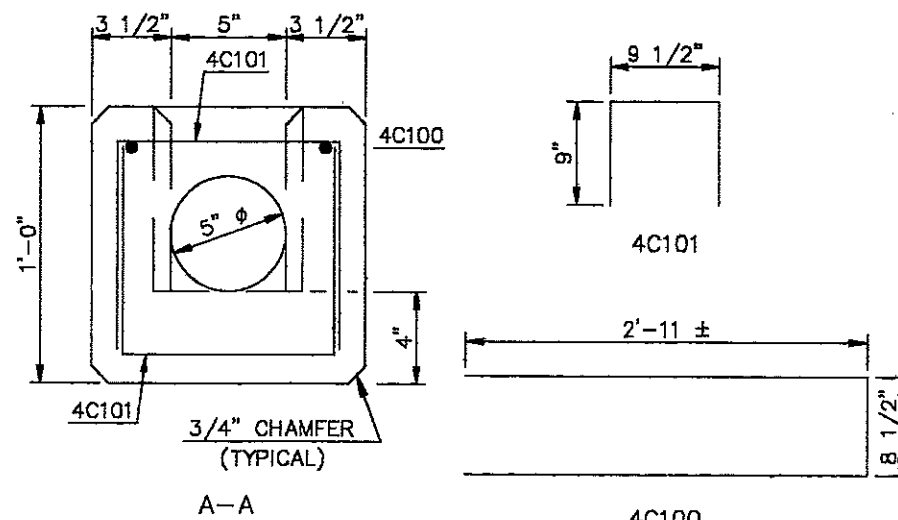


SINGLE CONNECTION

CONNECTION AT SAG (low point)



PRECAST CONCRETE HEADWALL DETAILS



BENT BAR DETAILS

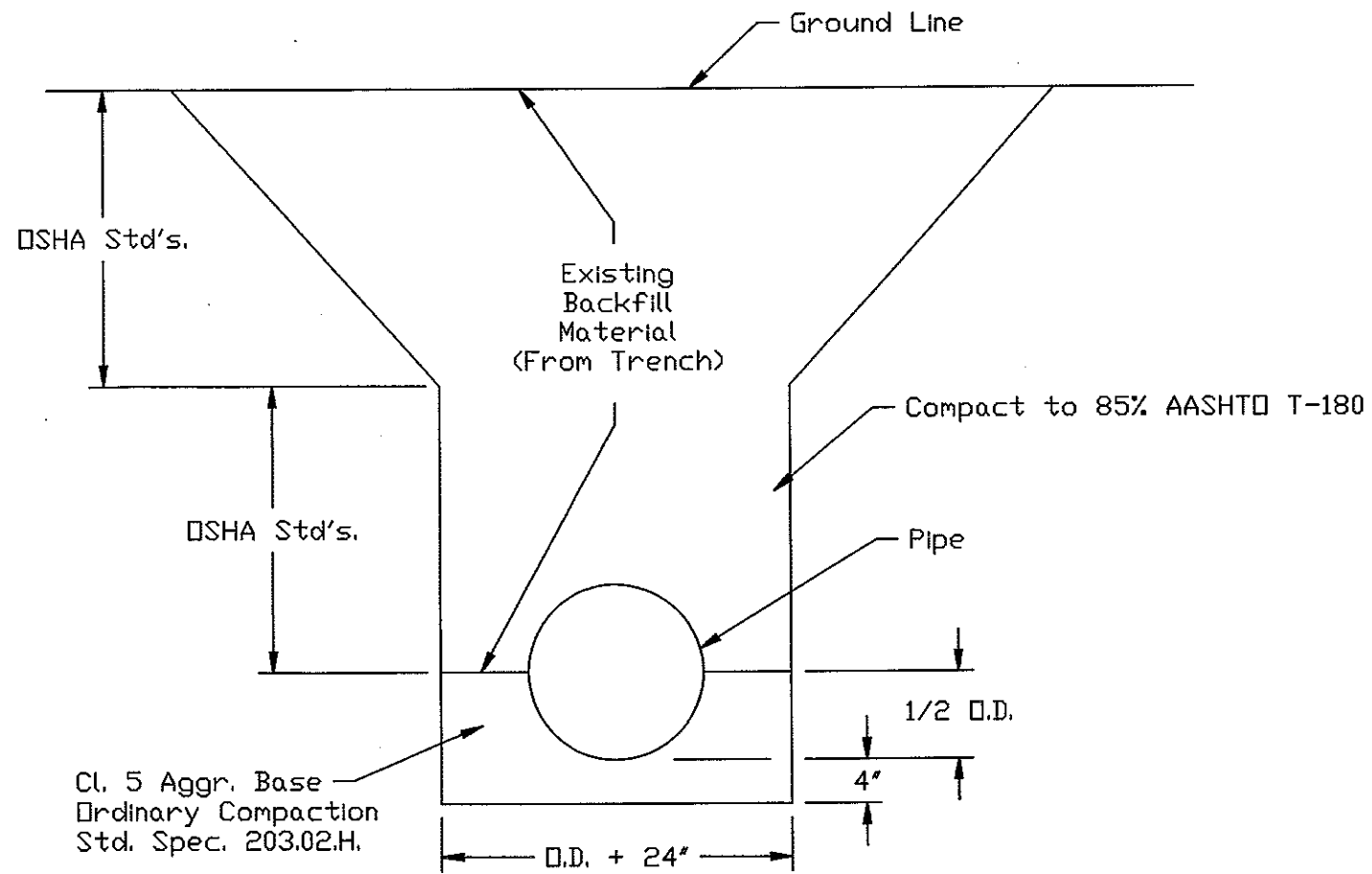
NOTE:

THE DIMENSIONS FOR THE RODENT SCREEN ARE APPROXIMATE TO ALLOW FOR BENDING AND A SNUG FIT INTO THE SLOT IN THE HEADWALL.

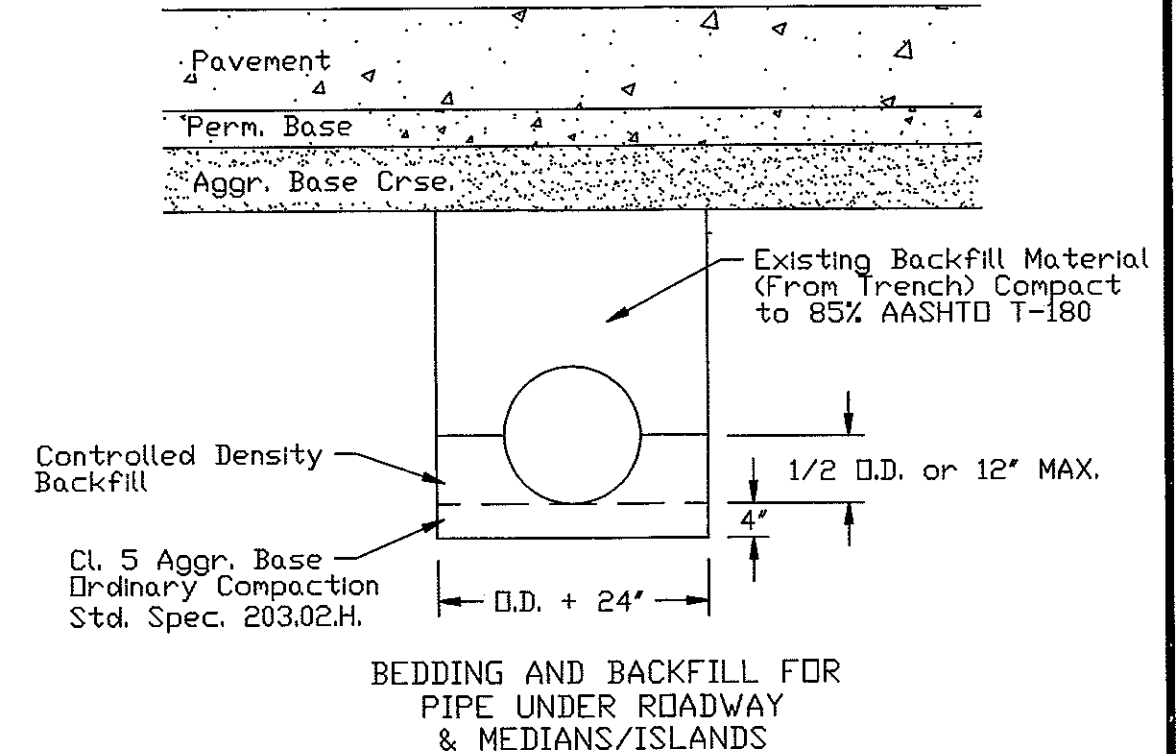
THE RODENT SCREEN SHALL BE FABRICATED FROM FLATTENED, EXPANDED METAL WITH SCREEN OPENINGS OF APPROXIMATELY 0.25 SQUARE INCHES. THE SCREEN SHALL BE 16 GA. METAL AND BE HOT DIP GALVANIZED AFTER FABRICATION.

PIPE BACKFILL DETAIL STORMDRAIN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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BEDDING AND BACKFILL FOR
PIPE NOT UNDER ROADWAY



BEDDING AND BACKFILL FOR
PIPE UNDER ROADWAY
& MEDIANS/ISLANDS

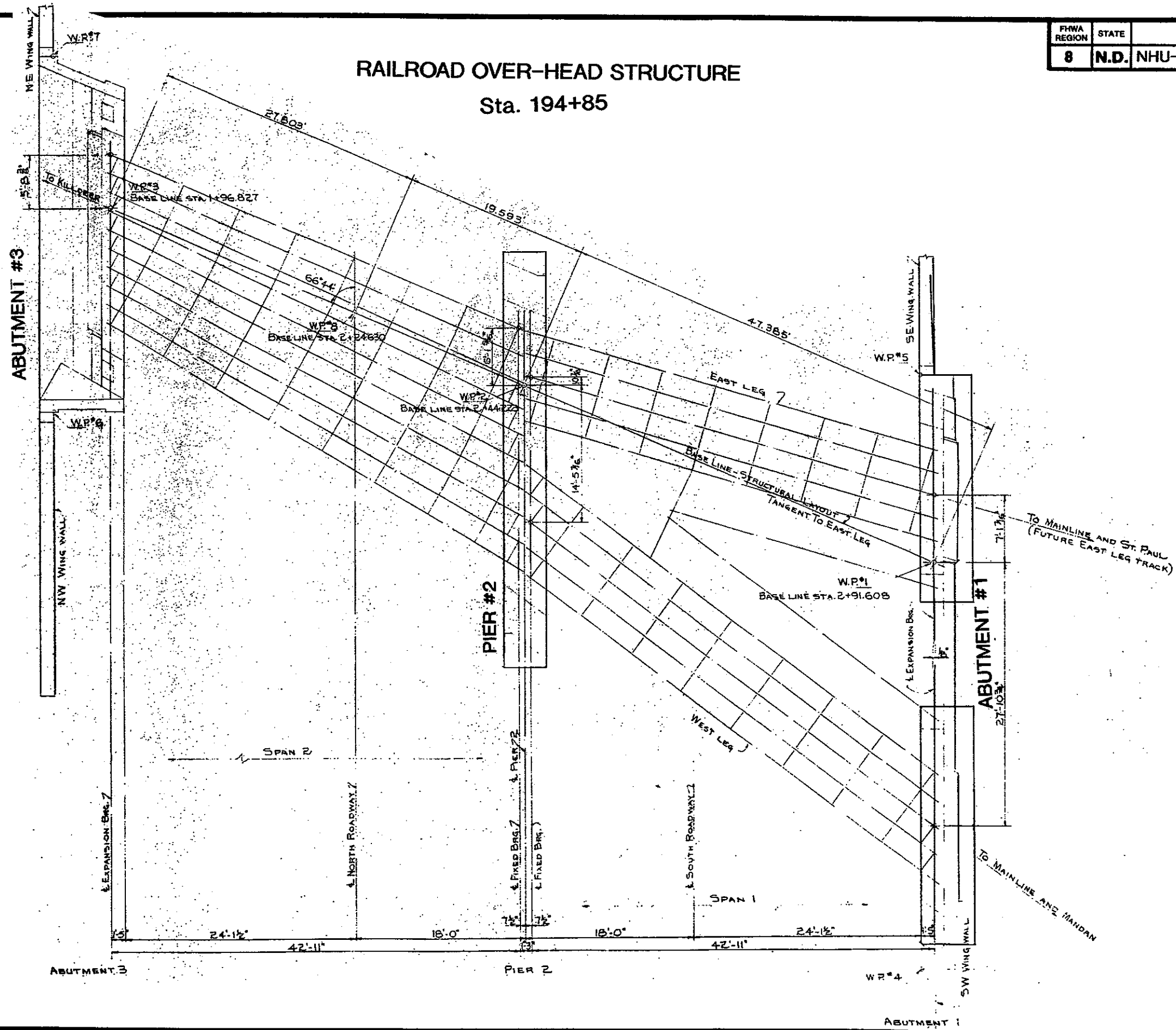
NOTES:

- ① The cost for all backfill materials shall be included in the price bid for the pipe.
- ② See Plan Note 714-P01 "CONTROL DENSITY BACKFILL"

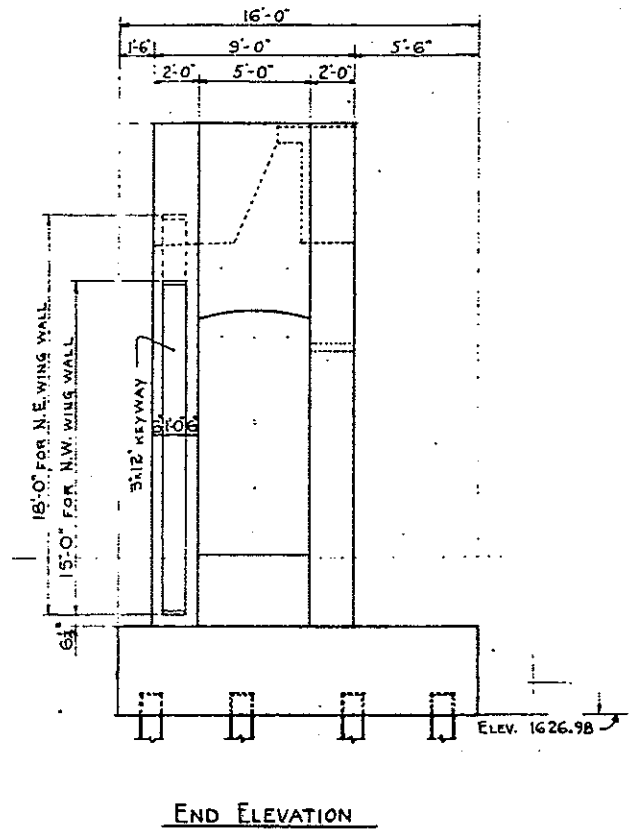
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	36

RAILROAD OVER-HEAD STRUCTURE

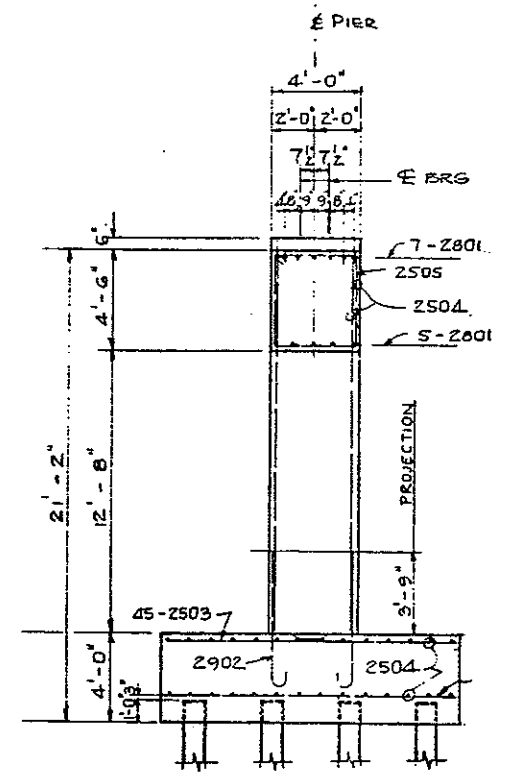
Sta. 194+85



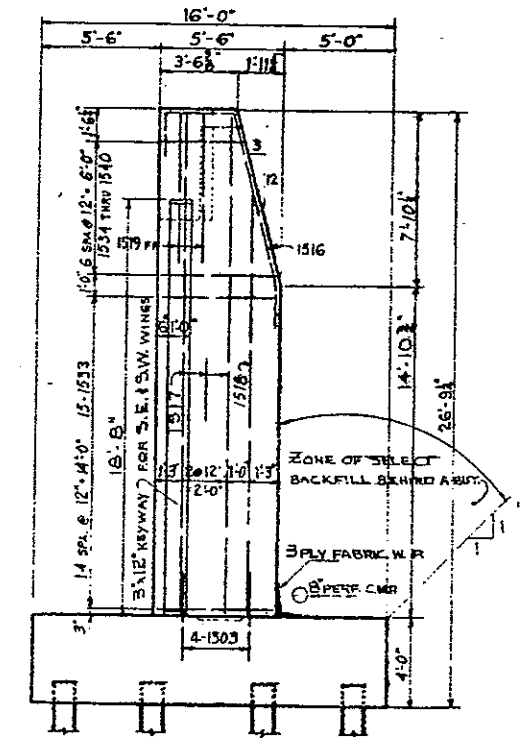
RAILROAD OVER-HEAD STRUCTURE Sta. 194+85



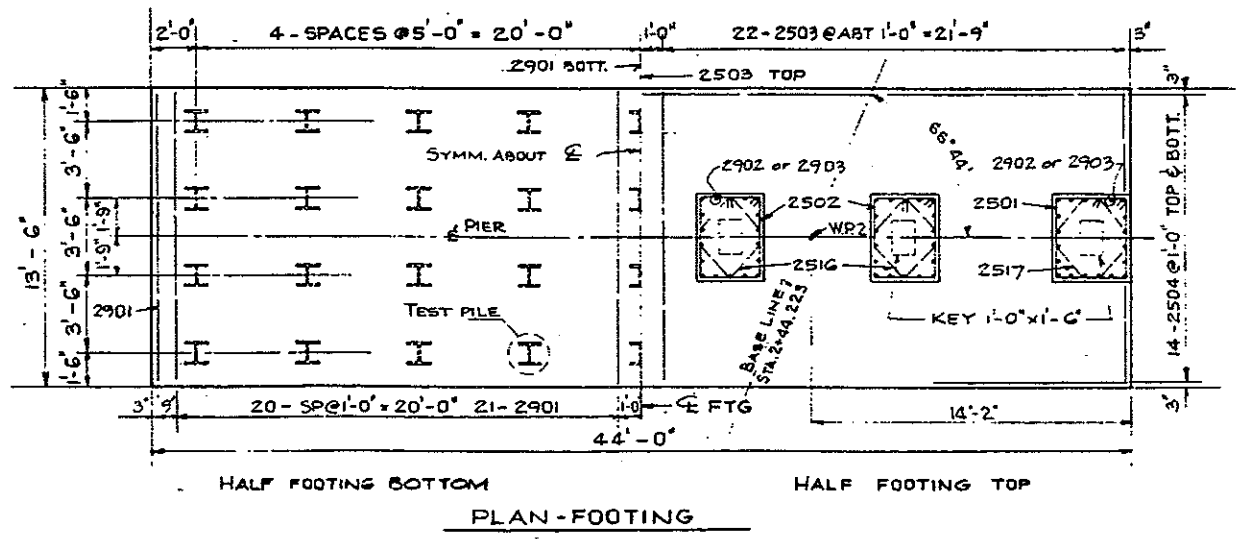
END ELEVATION
ABUTMENT #3



PIER #2



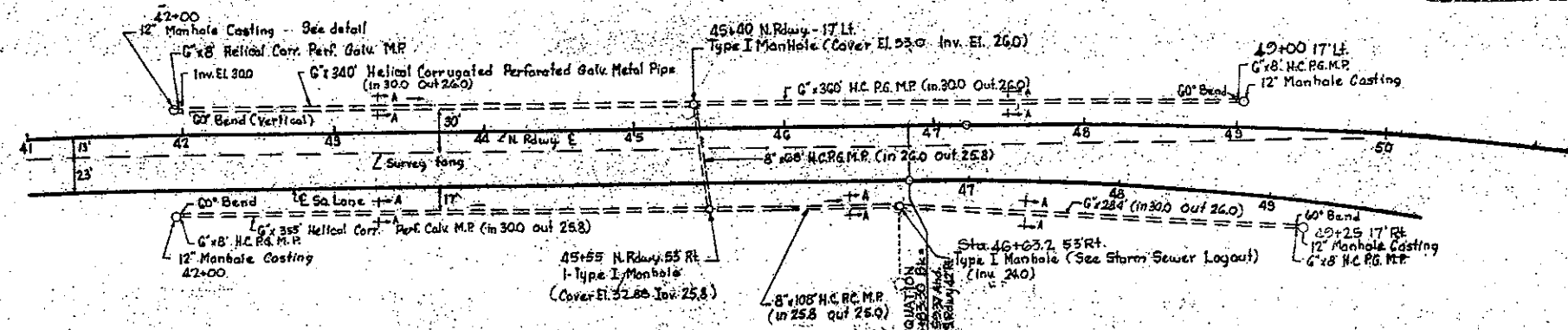
END ELEVATION
ABUTMENT #1



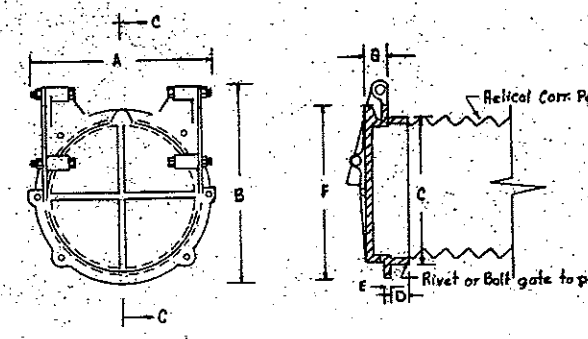
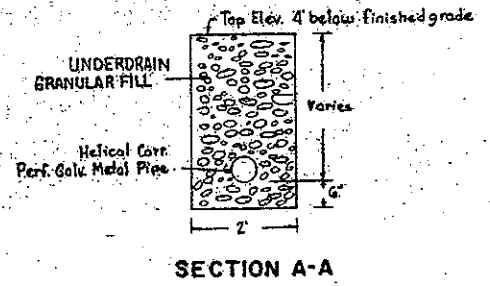
PLAN-FOOTING

FWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	38

UNDERDRAINS
LAYOUT & DETAILS



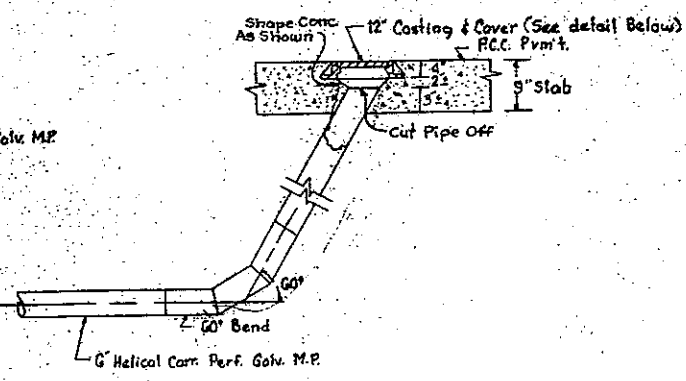
LAYOUT OF UNDERDRAIN SYSTEM
PROJECT UG-100 (7)



FRONT VIEW

GATE ALL DIMENSIONS IN INCHES

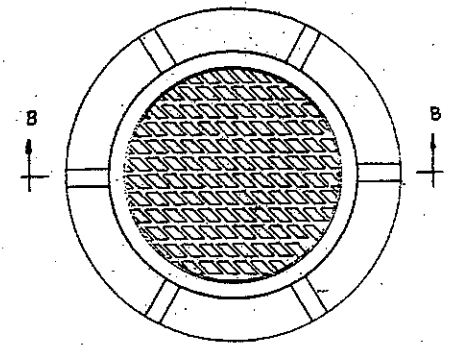
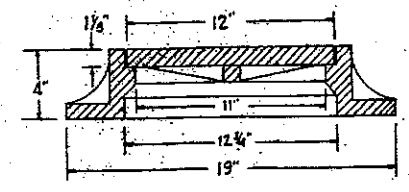
SIZE	A	B	C	D	E	F	G
6\"/>							



~~DETAIL OF FLAP GATE
(Flap gates to be installed on ends of perforated pipes in Manhole of Sta. 46+05.2 (Off. Loc.) 53' Rt.~~

~~NOTES~~

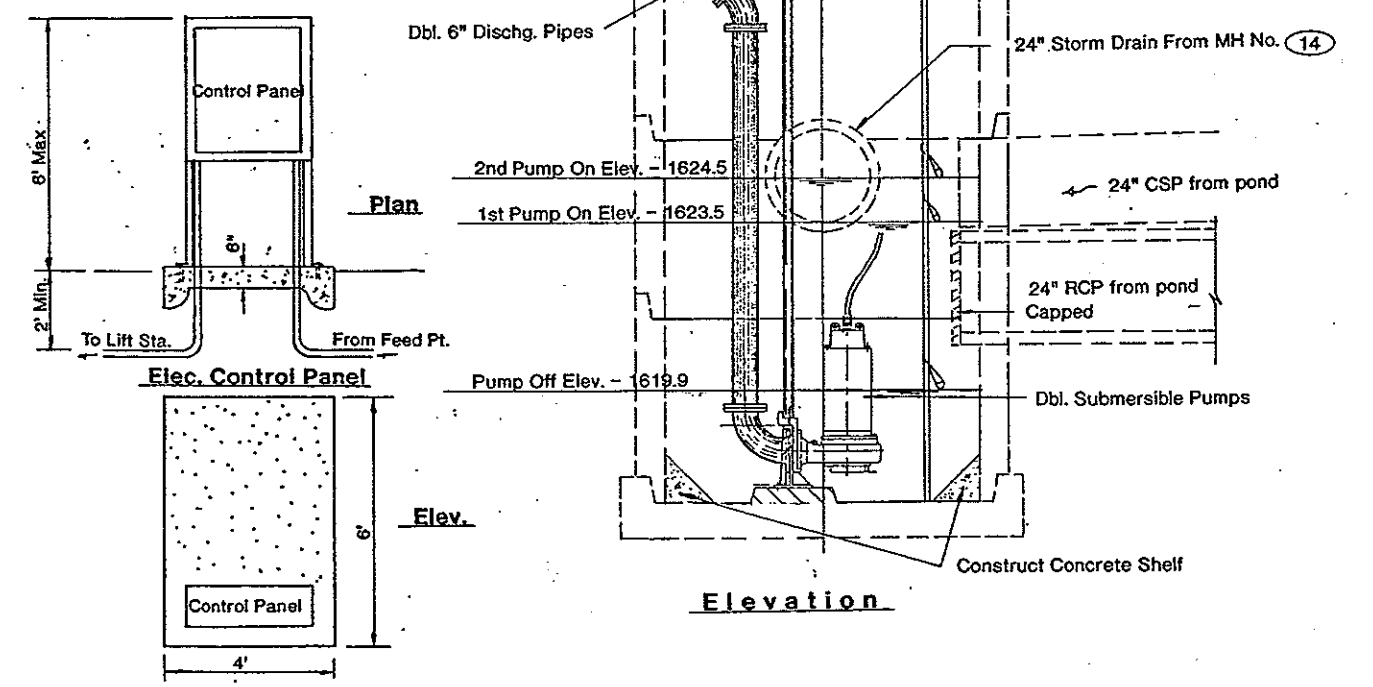
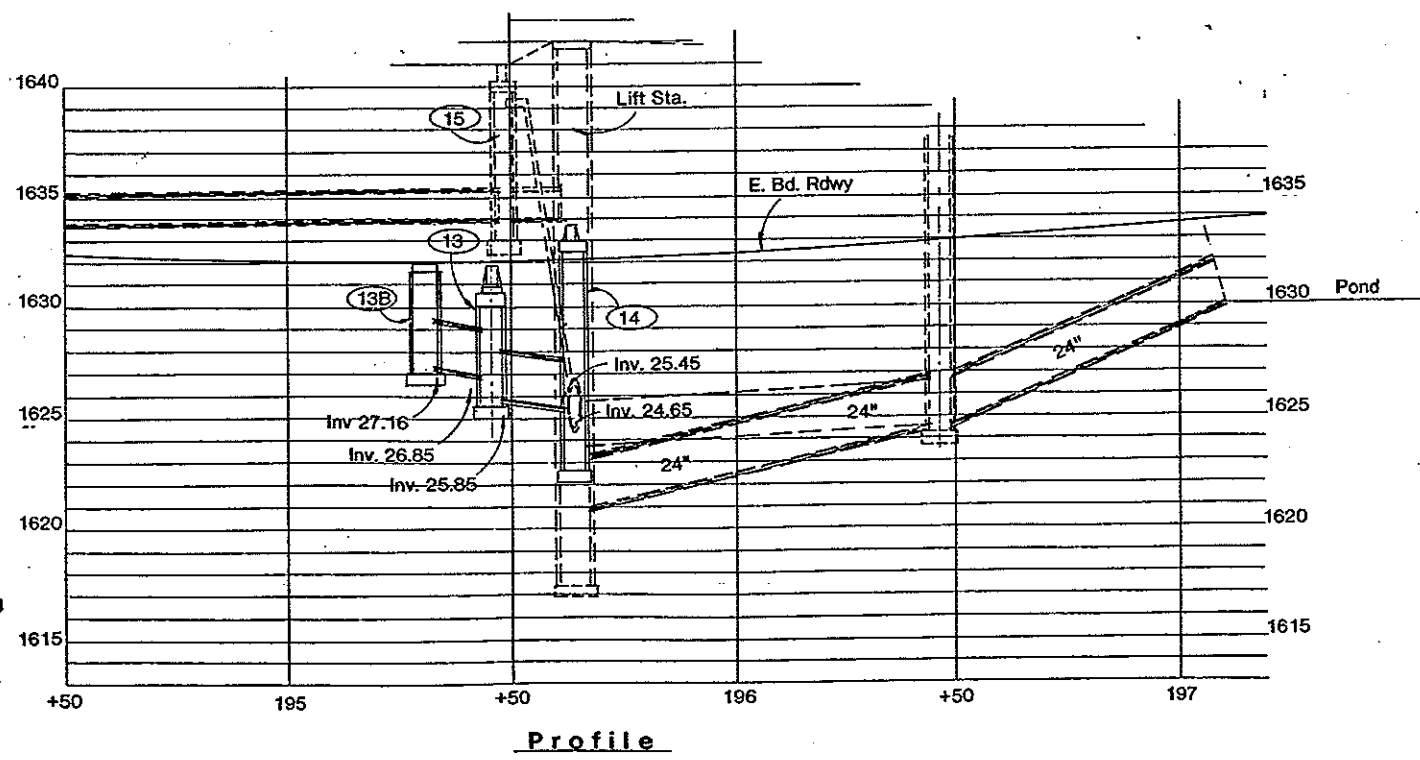
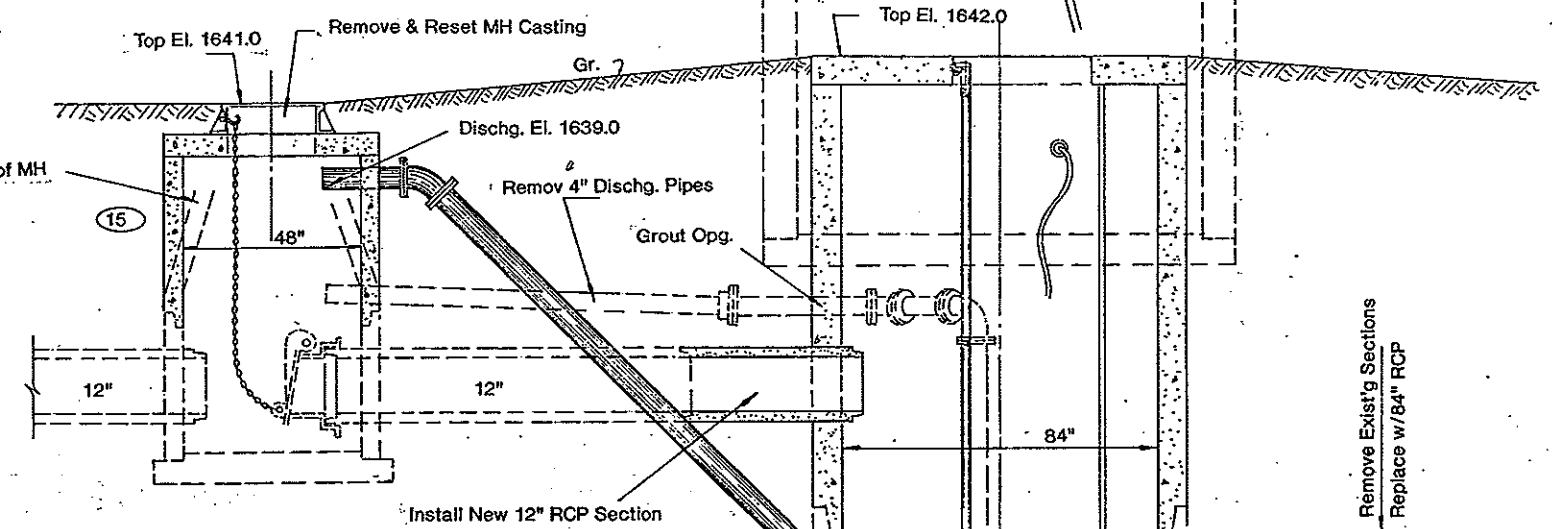
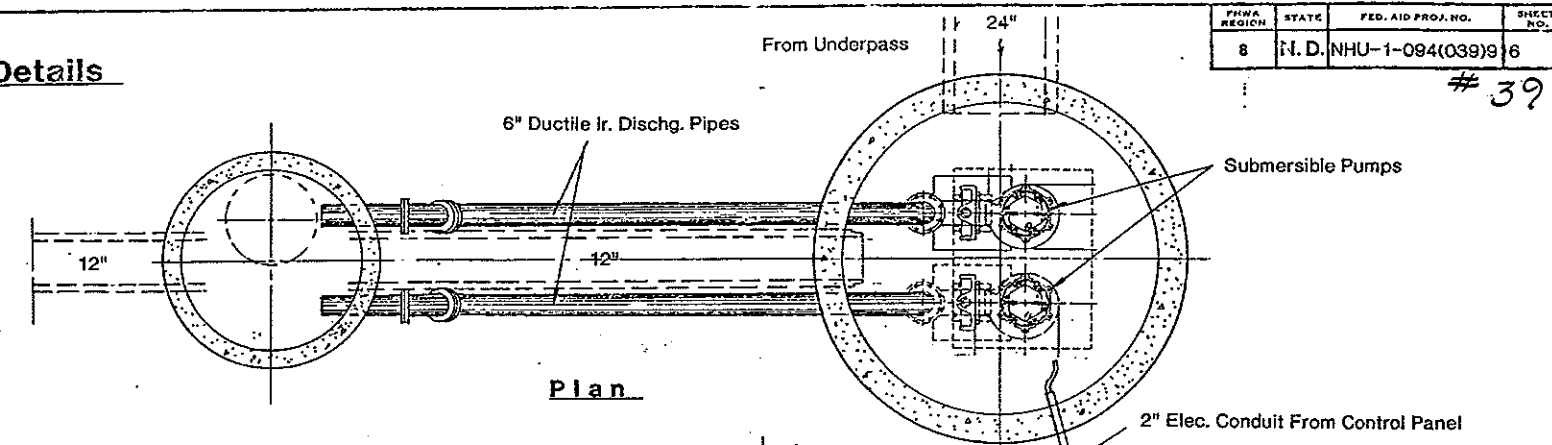
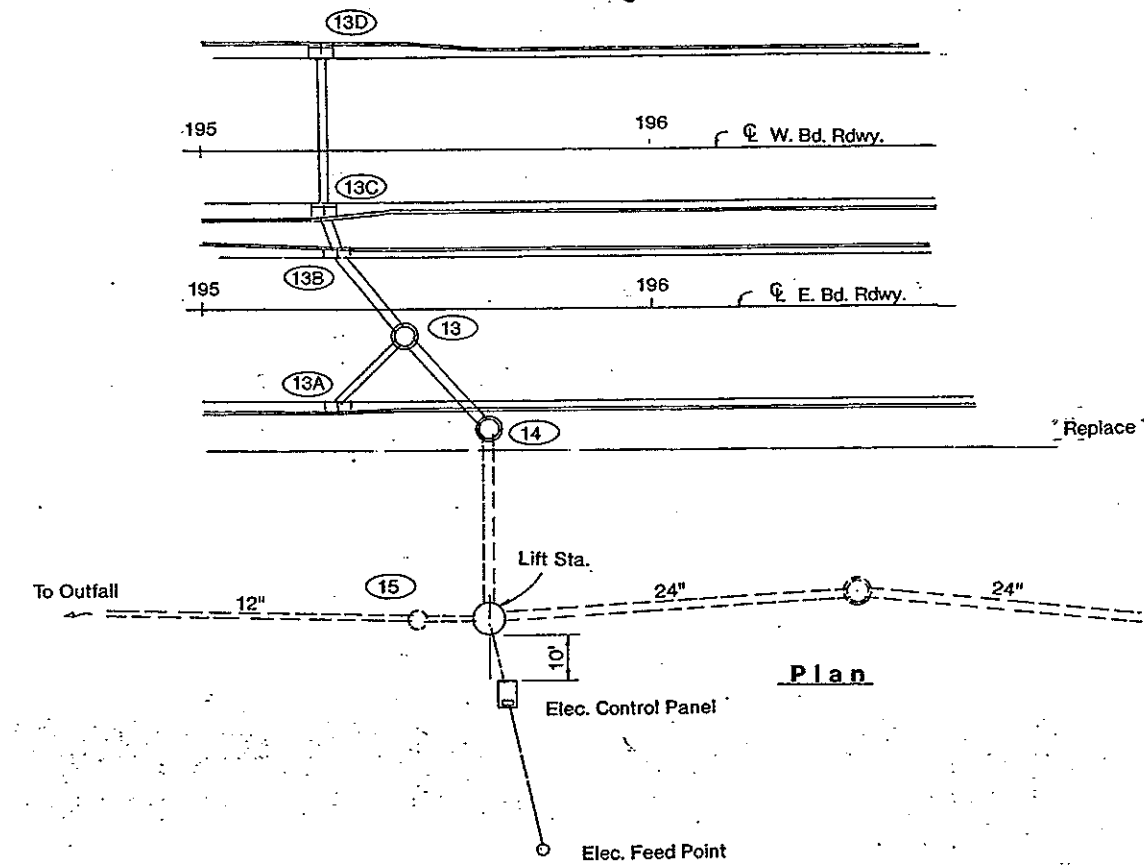
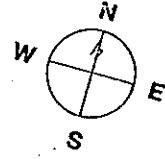
~~Cost of installation of Flap Gates, 12\"/>~~



DETAIL OF 12\"/>

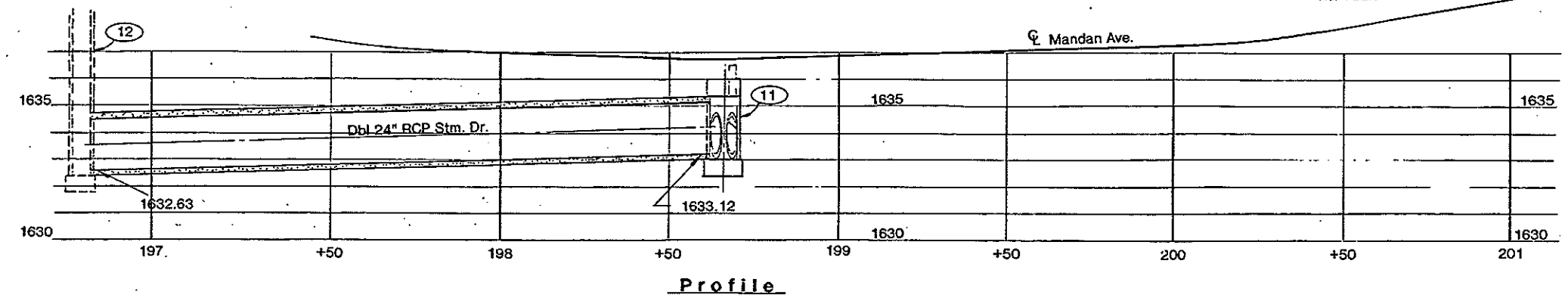
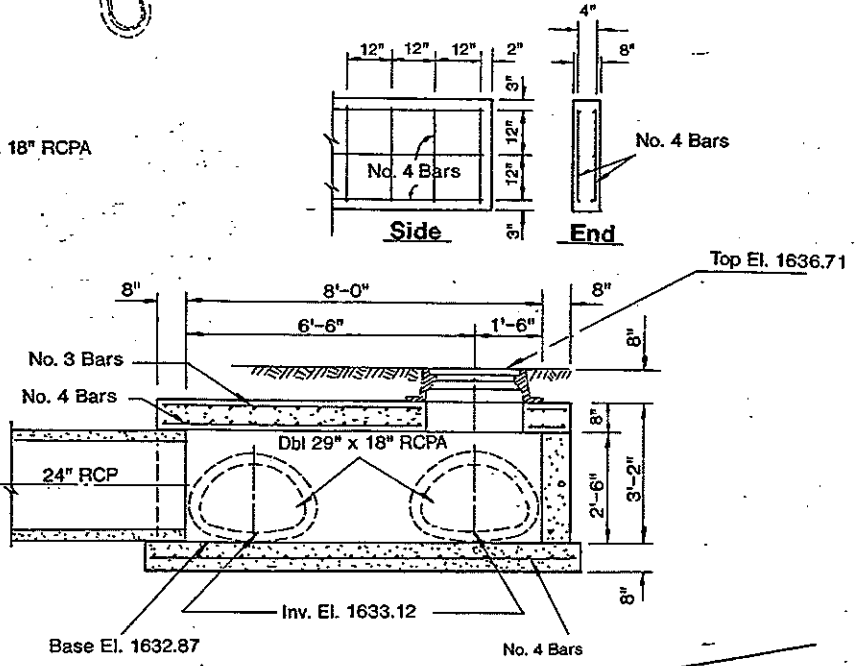
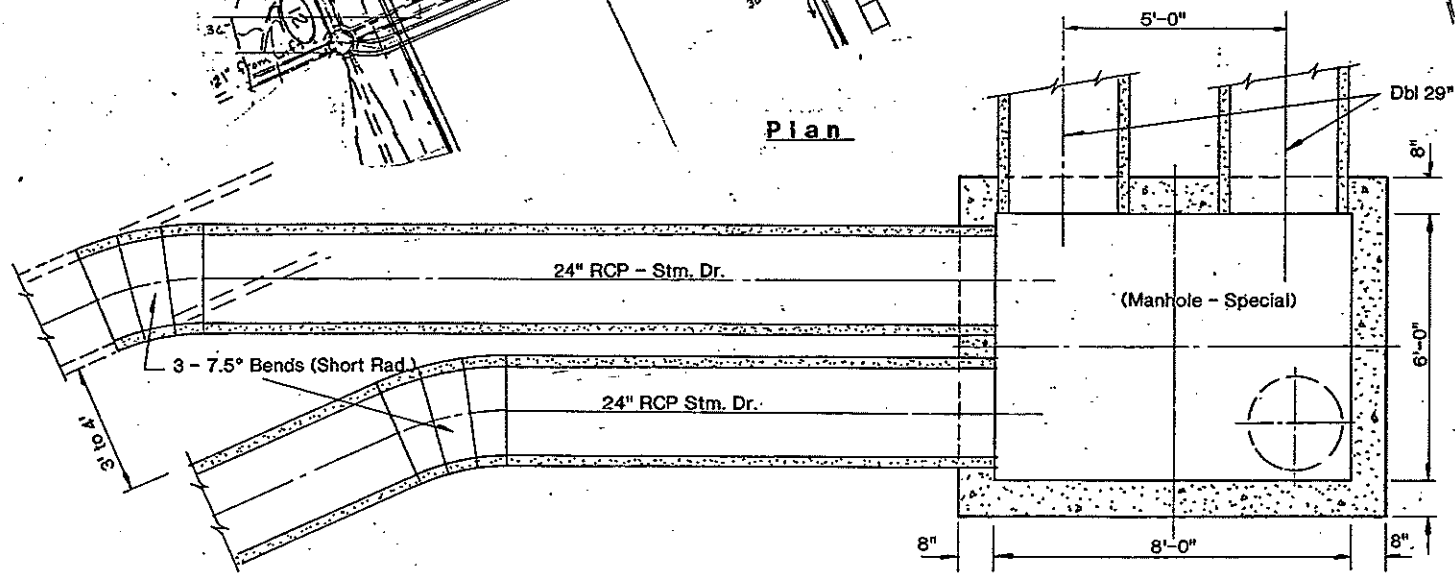
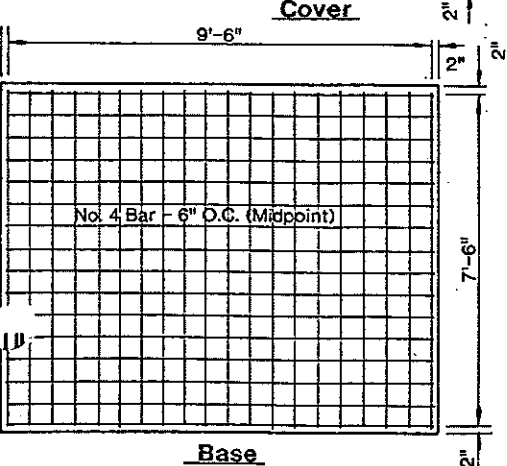
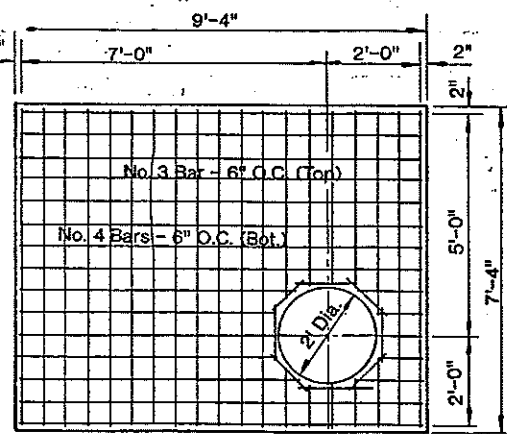
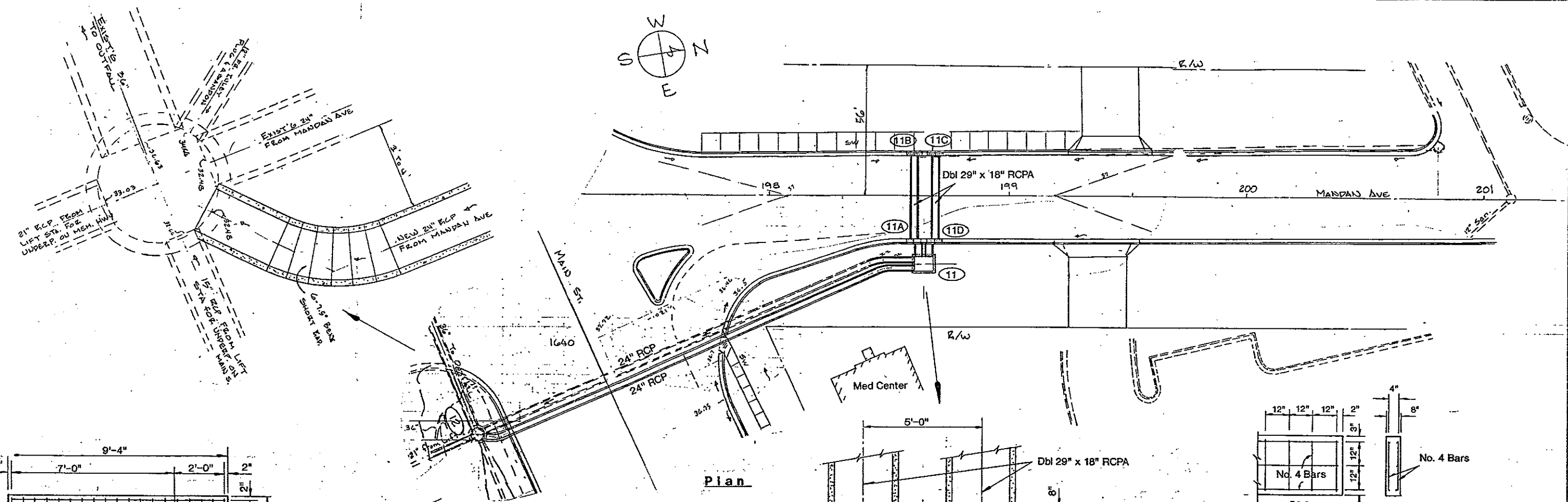
Existing UnderDrain System.
See Note 202 / P04

Lift Station Details



Drainage Details - Mandan Ave.

PHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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Inlet & Manhole Location List

Inlet No. 1A
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 167+54.5 - 37' LT
 Grate Elev. . . . 1642.33
 Base Elev. . . . 1637.97
 Invert Elev. . . . 1638.20
 'H' Dist. . . . 4.03 FT

Inlet No. 1B
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 167+64.9 - 55.9' LT
 Grate Elev. . . . 1641.71
 Base Elev. . . . 1637.38
 Invert Elev. . . . 1638.50
 'H' Dist. . . . 4.00 FT

MH No. . . . 2 - 60 In.
 Sta. . . . 168+04 - 24.77' LT
 Top Elev. . . . 1642.61
 Base Elev. . . . 1631.67
 Invert Elev. . . . 1632.00
 Riser 9.18 Ft
 □-----
 18 In. RCP NE 1637.98
 18 In. RCP N 1637.30
 36 In. RCP NW 1632.10
 36 In. RCP SE 1632.00

Inlet No. 2A
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 168+12.1 - 37.6' LT
 Grate Elev. . . . 1642.20
 Base Elev. . . . 1637.87
 Invert Elev. . . . 1638.08
 'H' Dist. . . . 4.00 FT

Inlet No. 2B
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 168+00 - 55.8' LT
 Grate Elev. . . . 1641.71
 Base Elev. . . . 1637.38
 Invert Elev. . . . 1637.59
 'H' Dist. . . . 4.00 FT

Inlet No. 3A
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 167+82.6 - 33.3' RT
 Grate Elev. . . . 1642.31
 Base Elev. . . . 1638.13
 Invert Elev. . . . 1638.32
 'H' Dist. . . . 4.00 FT

MH No. . . . 4 - 48 In.
 Sta. . . . 171+37.71 - 5.3' RT
 Top Elev. . . . 1647.20
 Base Elev. . . . 1641.25
 Invert Elev. . . . 1641.46
 Riser 4.36 Ft
 □-----
 15 In. RCP N 1641.65
 18 In. RCP W 1641.46

Inlet No. 4A
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 171+37.71 - 42.69' LT
 Grate Elev. . . . 1646.64
 Base Elev. . . . 1642.22
 Invert Elev. . . . 1642.41
 'H' Dist. . . . 4.09 FT

MH No. . . . 5 - 60 In. (Existing)
 Sta. . . . 168+16.6 - 5.5' Rt.
 Top Elev. . . . 1643.07
 Base Elev. . . . 1631.37
 Invert Elev. . . . 1631.70
 Riser 9.94 Ft
 □-----
 18 In. RCP E 1637.51
 36 In. RCP NW 1631.70
 36 In. RCP SE 1631.70

MH No. . . . 6 - 84 In. (Existing)
 Sta. . . . 176+16.7 - 26.2' Rt.
 Top Elev. . . . 1645.38
 Base Elev. . . . 1629.69
 Invert Elev. . . . 1630.19
 Riser 13.93 Ft
 □-----
 15 In. RCP W 1640.68
 21 In. RCP NW 1639.38
 21 In. RCP NW 1637.97
 54 In. RCP E 1630.20
 60 In. RCP SW 1630.19

Inlet No. 6A
 Type. Inlet - Type 1
 Grate Style. . . . V
 Sta. 175+50 - 29.5' RT
 Grate Elev. . . . 1645.72
 Base Elev. . . . 1641.13
 Invert Elev. . . . 1641.32
 'H' Dist. . . . 4.00 FT

Inlet No. 6B
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 175+16.8 - 39' LT
 Grate Elev. . . . 1643.67
 Base Elev. . . . 1639.34
 Invert Elev. . . . 1639.57
 'H' Dist. . . . 4.00 FT

Inlet No. 6C
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 175+25 - 53.93' LT
 Grate Elev. . . . 1644.99
 Base Elev. . . . 1639.59
 Invert Elev. . . . 1639.82
 'H' Dist. . . . 5.07 FT

Inlet No. 6D
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 175+80.55 - 35' LT
 Grate Elev. . . . 1645.29
 Base Elev. . . . 1639.65
 Invert Elev. . . . 1639.88
 'H' Dist. . . . 4.60 FT

Inlet No. 6E
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 175+61.2 - 48.8' LT
 Grate Elev. . . . 1645.08
 Base Elev. . . . 1639.95
 Invert Elev. . . . 1640.18
 'H' Dist. . . . 4.70 FT

Inlet No. 7A
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 179+16 - 30.5' RT
 Grate Elev. . . . 1643.20
 Base Elev. . . . 1638.87
 Invert Elev. . . . 1639.06
 'H' Dist. . . . 4.00 FT

Inlet No. 7B
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 178+92.5 - 36.7' LT
 Grate Elev. . . . 1643.20
 Base Elev. . . . 1637.94
 Invert Elev. . . . 1638.13
 'H' Dist. . . . 4.93 FT

Inlet No. 7C
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 179+04.9 - 53.6' LT
 Grate Elev. . . . 1642.57
 Base Elev. . . . 1638.24
 Invert Elev. . . . 1638.43
 'H' Dist. . . . 4.00 FT

MH No. . . . 7 - 72 In. (Existing)
 Sta. . . . 179+23.2 - 26.8' Rt.
 Top Elev. . . . 1643.42
 Base Elev. . . . 1630.54
 Invert Elev. . . . 1631.00
 Riser 11.12 Ft
 □-----
 15 In. RCP NW 1637.63
 15 In. RCP NE 1636.61
 48 In. RCP E 1631.01
 54 In. RCP W 1631.00

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Inlet & Manhole Location List

Inlet No. 7D
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 179+51.5 - 37.2'LT
 Grate Elev. . . . 1642.89
 Base Elev. . . . 1637.22
 Invert Elev. . . 1637.41
 'H' Dist. . . . 5.34 FT

Inlet No. 8C
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 182+80.3 - 51.5'LT
 Grate Elev. . . . 1640.30
 Base Elev. . . . 1635.97
 Invert Elev. . . 1636.18
 'H' Dist. . . . 4.00 FT

Inlet No. 9B
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 187+05 - 50'LT
 Grate Elev. . . . 1638.05
 Base Elev. . . . 1633.43
 Invert Elev. . . 1633.64
 'H' Dist. . . . 4.29 FT

Inlet No. 11A
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 198+62 - 19' RT
 Grate Elev. . . . 1636.16
 Base Elev. . . . 1631.83
 Invert Elev. . . 1633.12
 'H' Dist. . . . 4.00 FT

MH No. . . 8 - 72 In. (Existing)
 Sta. . . 183+43.4 - 30.9' Rt.
 Top Elev. . . 1640.59
 Base Elev. . . 1631.28
 Invert Elev. . 1631.70
 Riser 7.55 Ft
 □-----
 15 In. RCP S 1636.11
 24 In. RCP N 1634.50
 42 In. RCP E 1631.71
 48 In. RCP W 1631.70

Inlet No. 7E
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 179+40.3 - 53.6'LT
 Grate Elev. . . . 1642.56
 Base Elev. . . . 1637.51
 Invert Elev. . . 1637.71
 'H' Dist. . . . 4.00 FT

Inlet No. 8D
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 182+68 - 36.6'LT
 Grate Elev. . . . 1641.00
 Base Elev. . . . 1636.19
 Invert Elev. . . 1636.38
 'H' Dist. . . . 4.48 FT

Inlet No. 9C
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 186+60 - 51'LT
 Grate Elev. . . . 1638.24
 Base Elev. . . . 1633.75
 Invert Elev. . . 1633.96
 'H' Dist. . . . 4.16 FT

Inlet No. 11B
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 198+62 - 19' LT
 Grate Elev. . . . 1636.16
 Base Elev. . . . 1631.83
 Invert Elev. . . 1633.22
 'H' Dist. . . . 4.00 FT

MH No. . . 9 - 72 In. (Existing)
 Sta. . . 183+03.5 - 49.6' Rt.
 Top Elev. . . 1638.70
 Base Elev. . . 1630.70
 Invert Elev. . 1630.91
 Riser 6.24 Ft
 □-----
 12 In. RCP NE 1633.67
 18 In. RCP N 1632.64
 36 In. RCP E 1632.39
 42 In. RCP W 1632.38

Inlet No. 8A
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 183+41.7 - 36'LT
 Grate Elev. . . . 1640.32
 Base Elev. . . . 1635.43
 Invert Elev. . . 1635.68
 'H' Dist. . . . 4.56 FT

Inlet No. 8E
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 183+43.6 - 34'RT
 Grate Elev. . . . 1640.35
 Base Elev. . . . 1636.02
 Invert Elev. . . 1636.21
 'H' Dist. . . . 4.00 FT

Inlet No. 9D
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 186+46 - 32.5'LT
 Grate Elev. . . . 1638.40
 Base Elev. . . . 1634.07
 Invert Elev. . . 1634.26
 'H' Dist. . . . 4.00 FT

Inlet No. 11C
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 198+70 - 19' LT
 Grate Elev. . . . 1636.16
 Base Elev. . . . 1632.97
 Invert Elev. . . 1633.22
 'H' Dist. . . . 4.00 FT

Inlet No. 8B
 Type. Inlet - Type 2
 Grate Style. . . . V
 Sta. 183+24 - 54.5'LT
 Grate Elev. . . . 1640.37
 Base Elev. . . . 1635.67
 Invert Elev. . . 1635.88
 'H' Dist. . . . 4.37 FT

Inlet No. 9A
 Type. Inlet - Type 2
 Grate Style. . . . D
 Sta. 187+13 - 46.7' Rt.
 Grate Elev. . . . 1638.03
 Base Elev. . . . 1633.70
 Invert Elev. . . 1633.87
 'H' Dist. . . . 4.00 FT

Inlet No. 10A
 Type. Inlet - Type 1
 Grate Style. . . . V
 Sta. 187+97.95 - 37.9' RT
 Grate Elev. . . . 1637.99
 Base Elev. . . . 1633.40
 Invert Elev. . . 1633.59
 'H' Dist. . . . 4.00 FT

Inlet No. 11D
 Type. Inlet - Type 2 - Dbl.
 Grate Style. . . . DR/DL
 Sta. 198+70 - 19' RT
 Grate Elev. . . . 1636.16
 Base Elev. . . . 1632.87
 Invert Elev. . . 1633.12
 'H' Dist. . . . 4.00 FT

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Inlet & Manhole Location List

MH No. . . . 13 - 60 In.
Sta. . . . 195+45 - 6' RT
Top Elev. . . . 1631.98
Base Elev. . . . 1625.60
Invert Elev. . . . 1625.85
Riser 4.63 Ft

- 24 In. RCP SE 1625.85
24 In. RCP NW 1625.85
18 In. RCP SW 1625.85

Inlet No. 13A
Type. Inlet - Type 2 - Dbl.
Grate Style. . . . DR/DL
Sta. 195+30 - 22.25' RT
Grate Elev. . . . 1631.49
Base Elev. . . . 1627.16
Invert Elev. . . . 1627.37
'H' Dist. . . . 4.00 FT

Inlet No. 13B
Type. Inlet - Type 2 - Dbl.
Grate Style. . . . DR/DL
Sta. 195+30 - 13' LT
Grate Elev. . . . 1631.67
Base Elev. . . . 1626.91
Invert Elev. . . . 1627.16
'H' Dist. . . . 4.43 FT

Inlet No. 13C
Type. Inlet - Type 2 - Dbl.
Grate Style. . . . DR/DL
Sta. 195+27 - 14.2' RT
Grate Elev. . . . 1631.72
Base Elev. . . . 1627.01
Invert Elev. . . . 1627.26
'H' Dist. . . . 4.37 FT

Inlet No. 13D
Type. Inlet - Type 2 - Dbl.
Grate Style. . . . DR/DL
Sta. 195+27 - 22.25' LT
Grate Elev. . . . 1631.54
Base Elev. . . . 1627.21
Invert Elev. . . . 1627.46
'H' Dist. . . . 4.00 FT

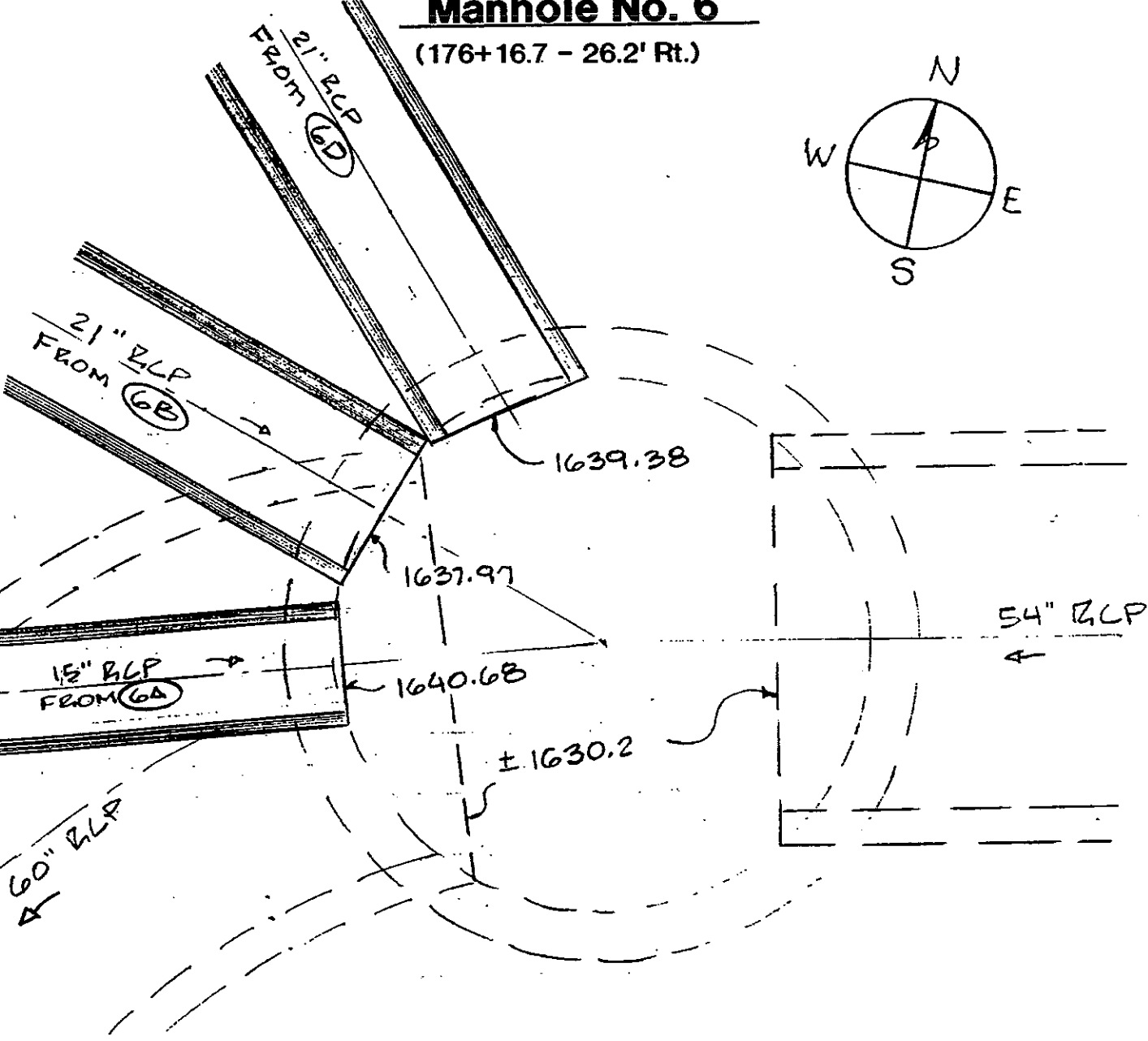
MH No. . . . 14 - 48 In.
Sta. . . . 195+64 - 27.5' RT. (S. Rdwy.)
Top Elev. . . . 1633.90
Base Elev. . . . 1622.40
Invert Elev. . . . 1624.65
Riser 9.91 Ft
□-----
24 In. RCP NW 1625.45
24 In. RCP S 1624.65

Manhole Layouts

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	I-1-094(039)916	44

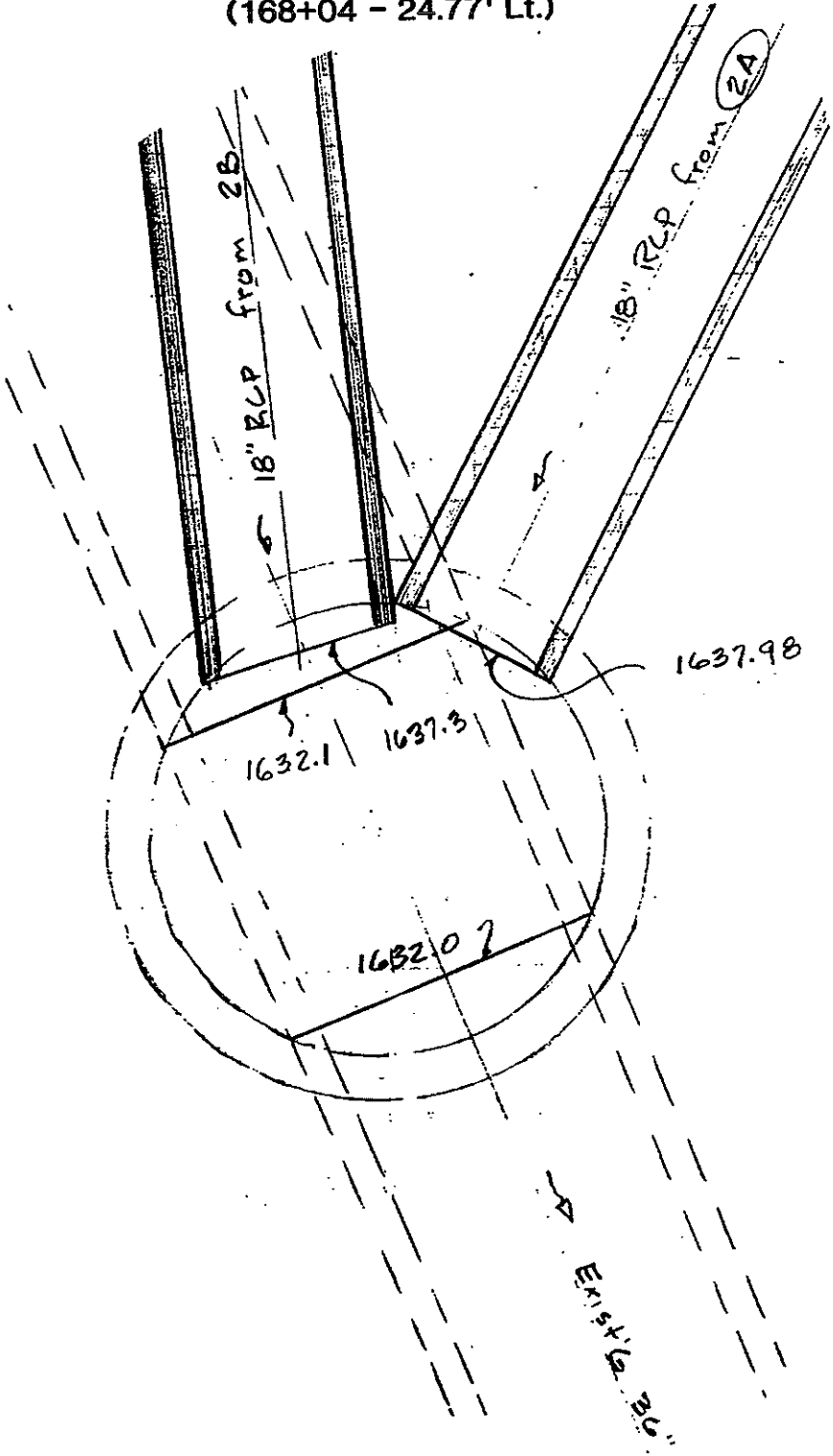
Manhole No. 6

(176+16.7 - 26.2' Rt.)



Manhole No. 2

(168+04 - 24.77' Lt.)



CONTAMINATED SOIL MAP

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	45

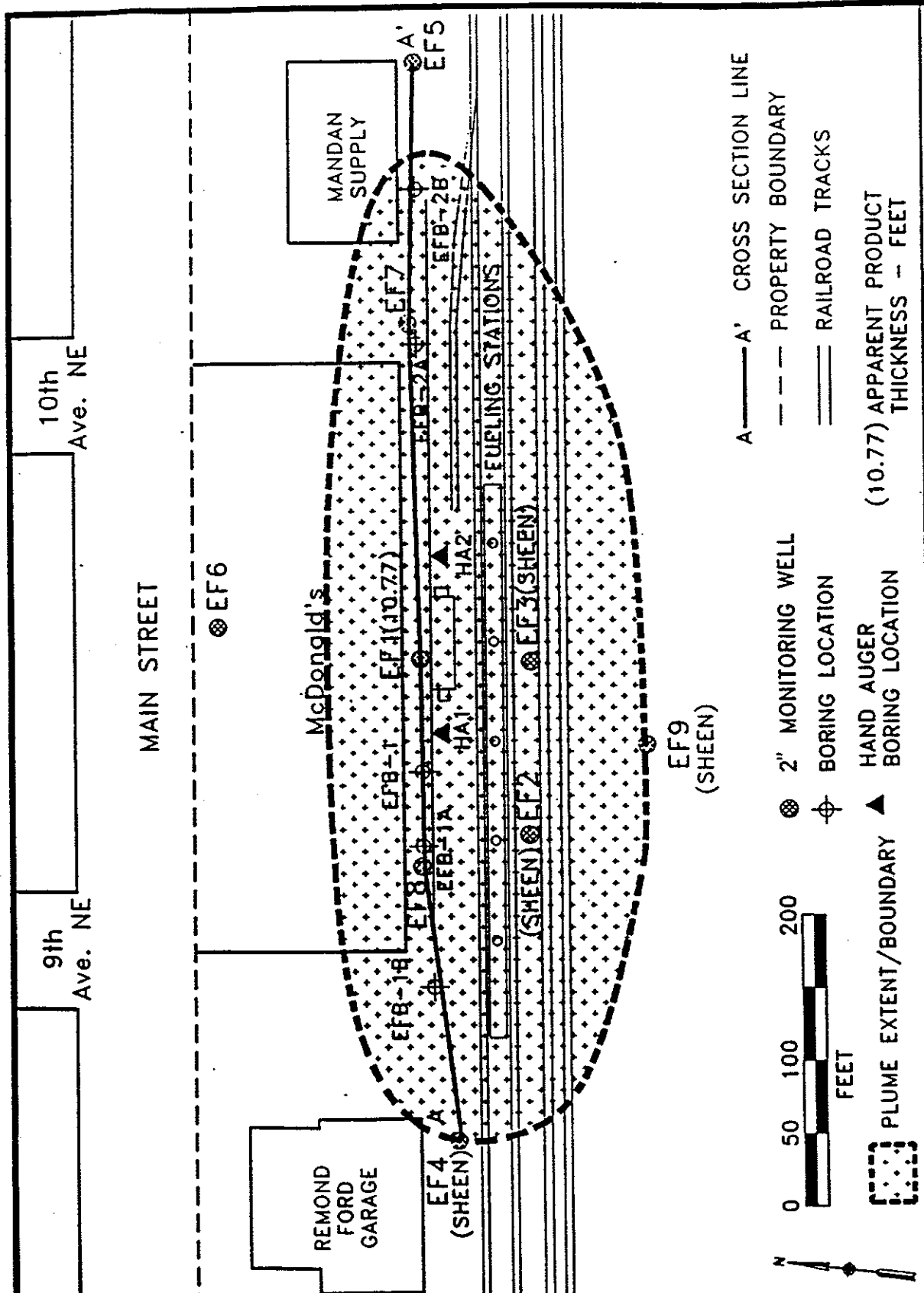


Figure 3-1. East Fueling Area Product Occurrence Map, December, 1991

228129-2

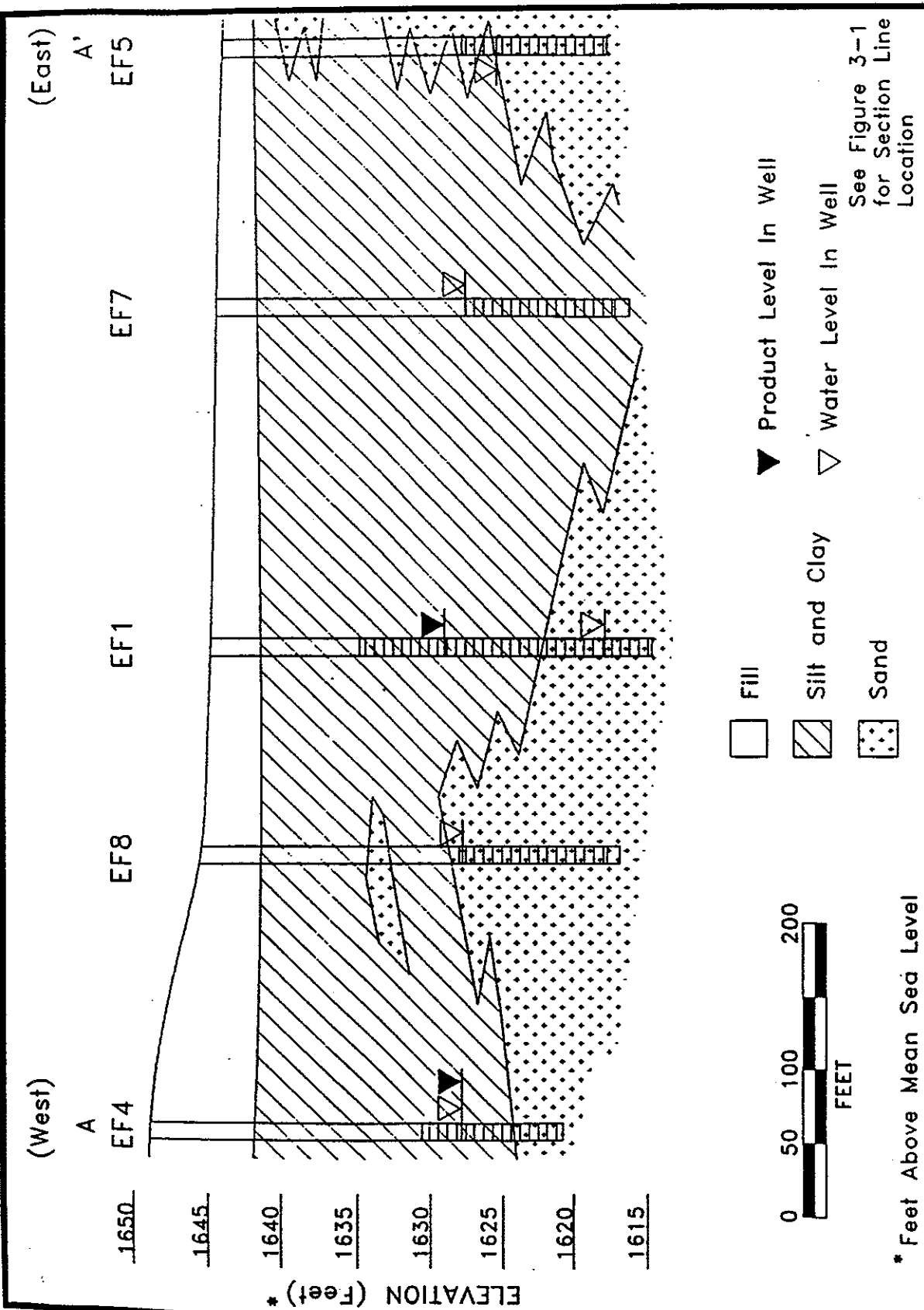


Figure 3-2. East Fueling Area Cross Section, A - A'

228129-7

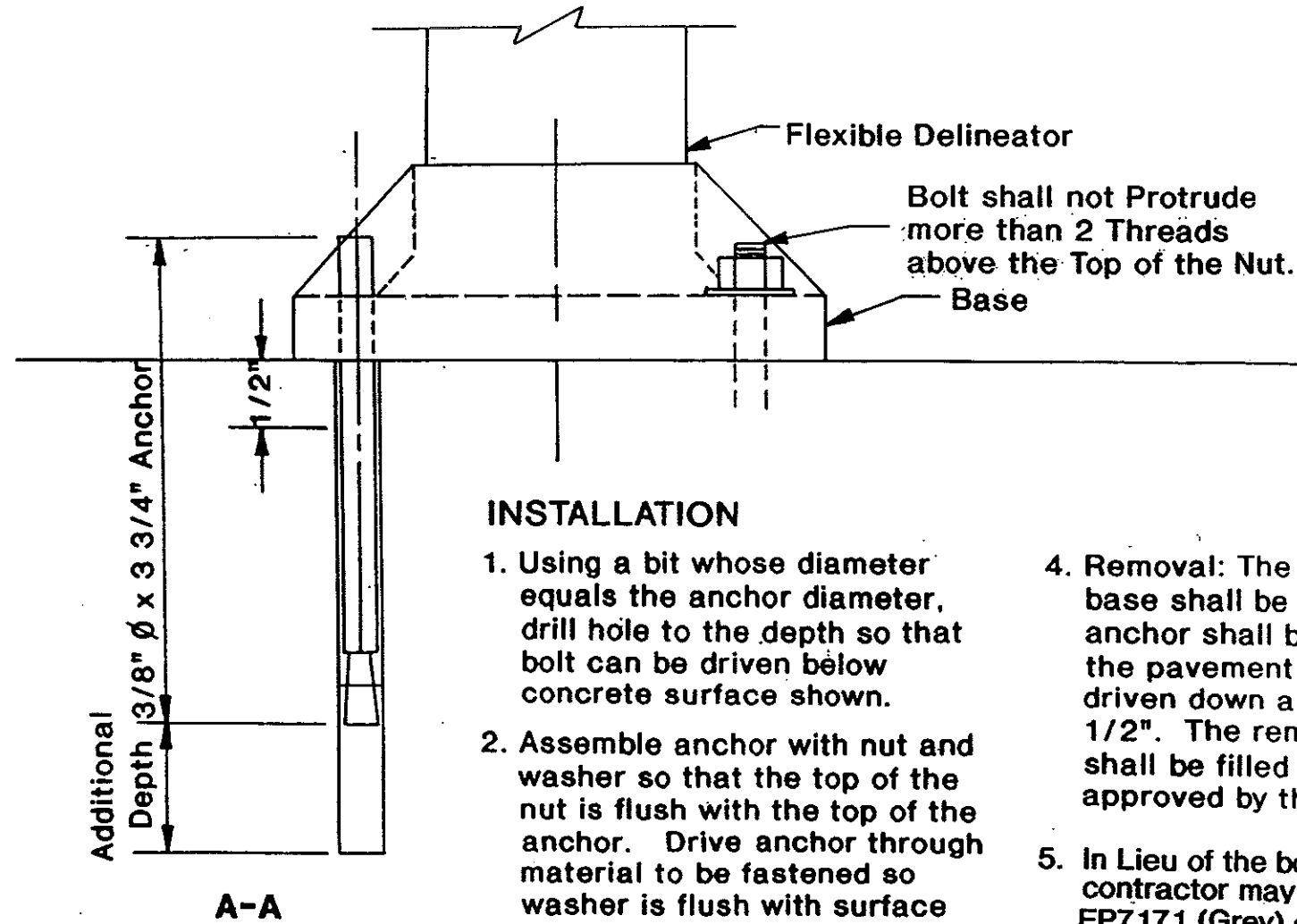
* Feet Above Mean Sea Level

See Figure 3-1 for Section Line Location

FLEXIBLE DELINEATOR DETAIL

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	46

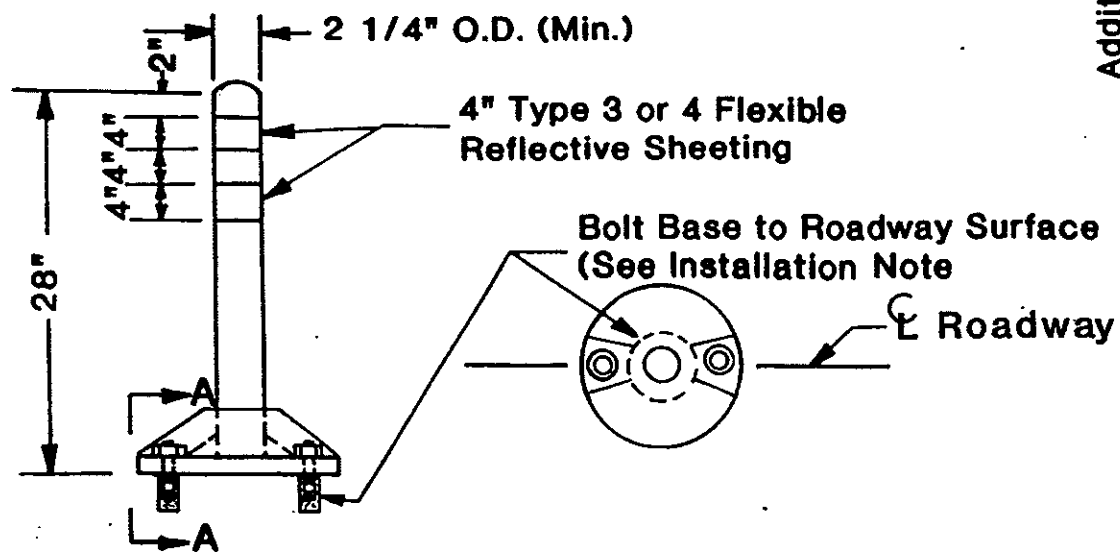
Note : The Contractor Shall Not Be Allowed To Bolt Flex. Delineator's Into New P.C.C. Pavement.



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 EP7171 (Grey) or equal.

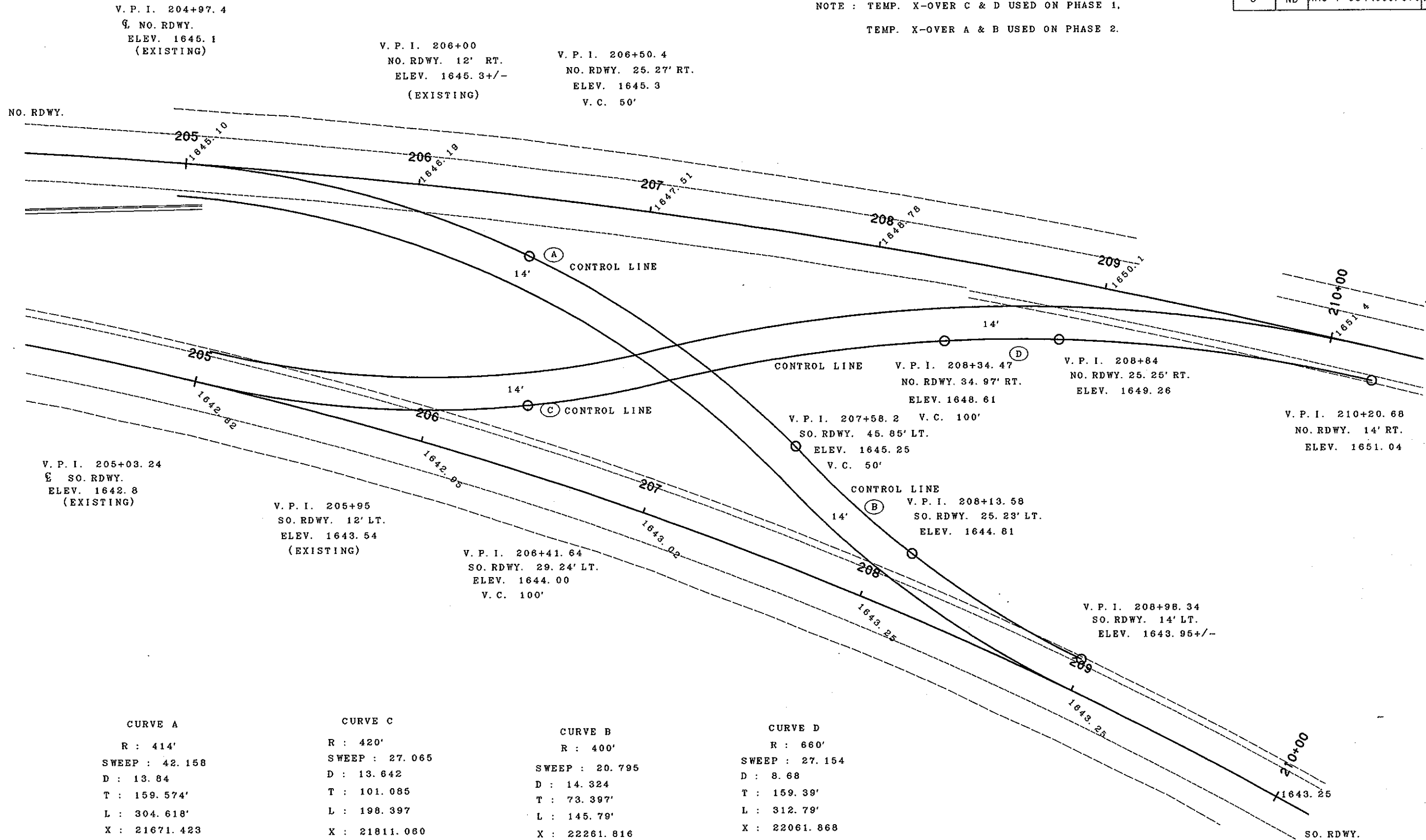
The anchor shall be galvanized steel.



FLEXIBLE DELINEATOR DETAILS

FLEXIBLE DELINEATOR DETAIL

NOTE : TEMP. X-OVER C & D USED ON PHASE 1,
TEMP. X-OVER A & B USED ON PHASE 2.



V. P. I. 204+97.4
Q. NO. RDWY.
ELEV. 1645.1
(EXISTING)

V. P. I. 206+00
NO. RDWY. 12' RT.
ELEV. 1645.3+/-
(EXISTING)

V. P. I. 206+50.4
NO. RDWY. 25.27' RT.
ELEV. 1645.3
V. C. 50'

V. P. I. 205+03.24
E SO. RDWY.
ELEV. 1642.8
(EXISTING)

V. P. I. 205+95
SO. RDWY. 12' LT.
ELEV. 1643.54
(EXISTING)

V. P. I. 206+41.64
SO. RDWY. 29.24' LT.
ELEV. 1644.00
V. C. 100'

V. P. I. 207+58.2 V. C. 100'
SO. RDWY. 45.85' LT.
ELEV. 1645.25
V. C. 50'

V. P. I. 208+34.47
NO. RDWY. 34.97' RT.
ELEV. 1648.81

V. P. I. 208+13.58
SO. RDWY. 25.23' LT.
ELEV. 1644.81

V. P. I. 208+84
NO. RDWY. 25.25' RT.
ELEV. 1649.26

V. P. I. 208+98.34
SO. RDWY. 14' LT.
ELEV. 1643.95+/-

V. P. I. 210+20.68
NO. RDWY. 14' RT.
ELEV. 1651.04

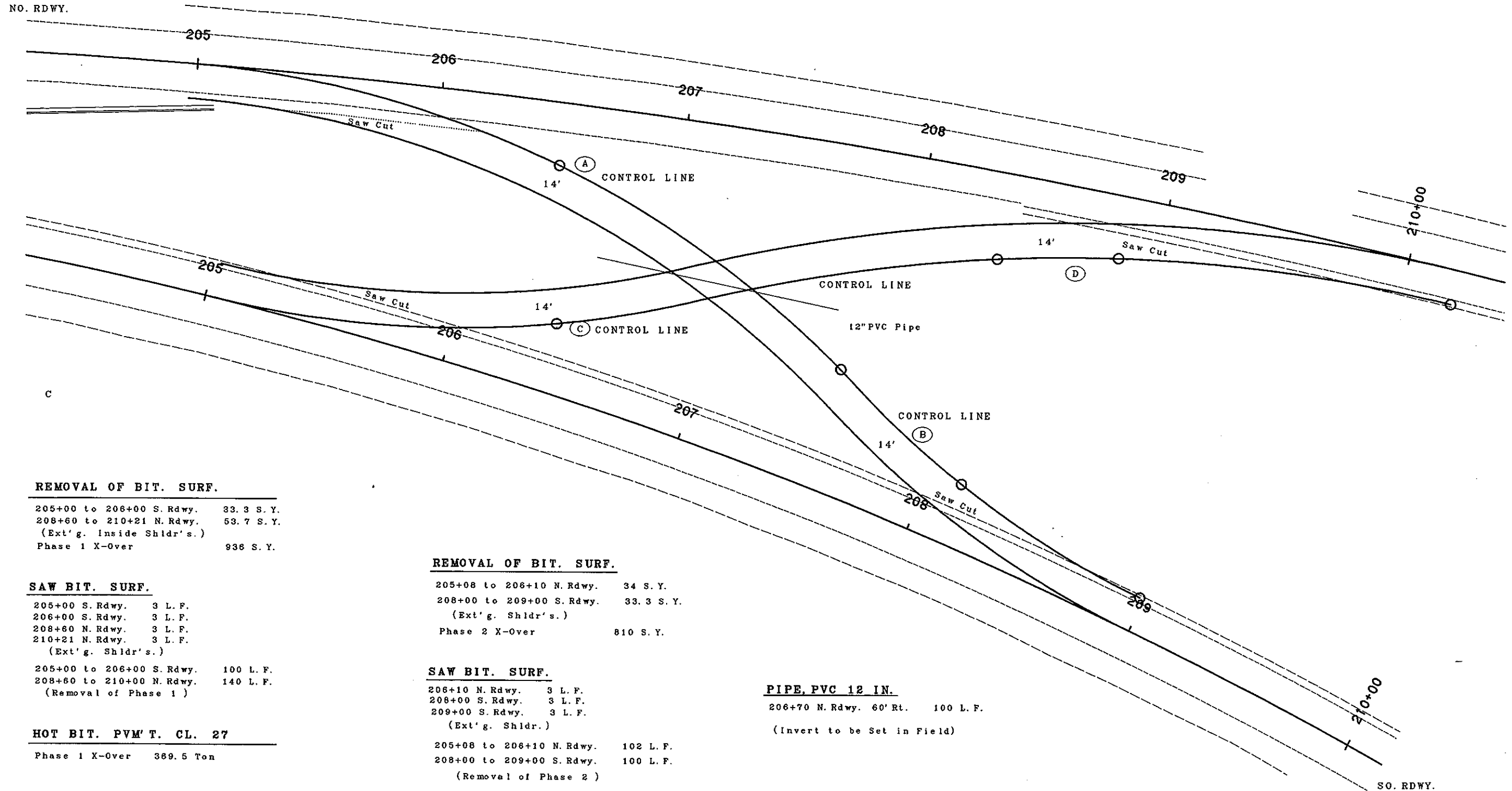
CURVE A
R : 414'
SWEEP : 42.158
D : 13.84
T : 159.574'
L : 304.618'
X : 21671.423
Y : 12455.449
204+97.40 NO. RDWY.
(414' RT.)

CURVE C
R : 420'
SWEEP : 27.065
D : 13.642
T : 101.085
L : 198.397
X : 21811.060
Y : 13182.391
205+03.24 SO. RDWY.
(420' LT.)

CURVE B
R : 400'
SWEEP : 20.795
D : 14.324
T : 73.397'
L : 145.79'
X : 22261.816
Y : 13015.884
208+98.34 SO. RDWY.
(414' LT.)

CURVE D
R : 660'
SWEEP : 27.154
D : 8.68
T : 159.39'
L : 312.79'
X : 22061.868
Y : 12131.917
210+20.68 NO. RDWY.
(674' RT.)

NOTE : TEMP. X-OVER C & D USED ON PHASE 1,
TEMP. X-OVER A & B USED ON PHASE 2.



REMOVAL OF BIT. SURF.

205+00 to 206+00 S. Rdwy.	33.3 S. Y.
208+60 to 210+21 N. Rdwy. (Ext'g. Inside Shldr's.)	53.7 S. Y.
Phase 1 X-Over	936 S. Y.

SAW BIT. SURF.

205+00 S. Rdwy.	3 L. F.
206+00 S. Rdwy.	3 L. F.
208+60 N. Rdwy.	3 L. F.
210+21 N. Rdwy. (Ext'g. Shldr's.)	3 L. F.

205+00 to 206+00 S. Rdwy.	100 L. F.
208+60 to 210+00 N. Rdwy. (Removal of Phase 1)	140 L. F.

HOT BIT. PVM' T. CL. 27

Phase 1 X-Over	389.5 Ton
----------------	-----------

REMOVAL OF BIT. SURF.

205+08 to 206+10 N. Rdwy.	34 S. Y.
208+00 to 209+00 S. Rdwy. (Ext'g. Shldr's.)	33.3 S. Y.
Phase 2 X-Over	810 S. Y.

SAW BIT. SURF.

206+10 N. Rdwy.	3 L. F.
208+00 S. Rdwy.	3 L. F.
209+00 S. Rdwy. (Ext'g. Shldr.)	3 L. F.

205+08 to 206+10 N. Rdwy.	102 L. F.
208+00 to 209+00 S. Rdwy. (Removal of Phase 2)	100 L. F.

HOT BIT. PVM' T. CL. 27

Phase 2 X-Over	317 Ton
----------------	---------

PIPE, PVC 12 IN.

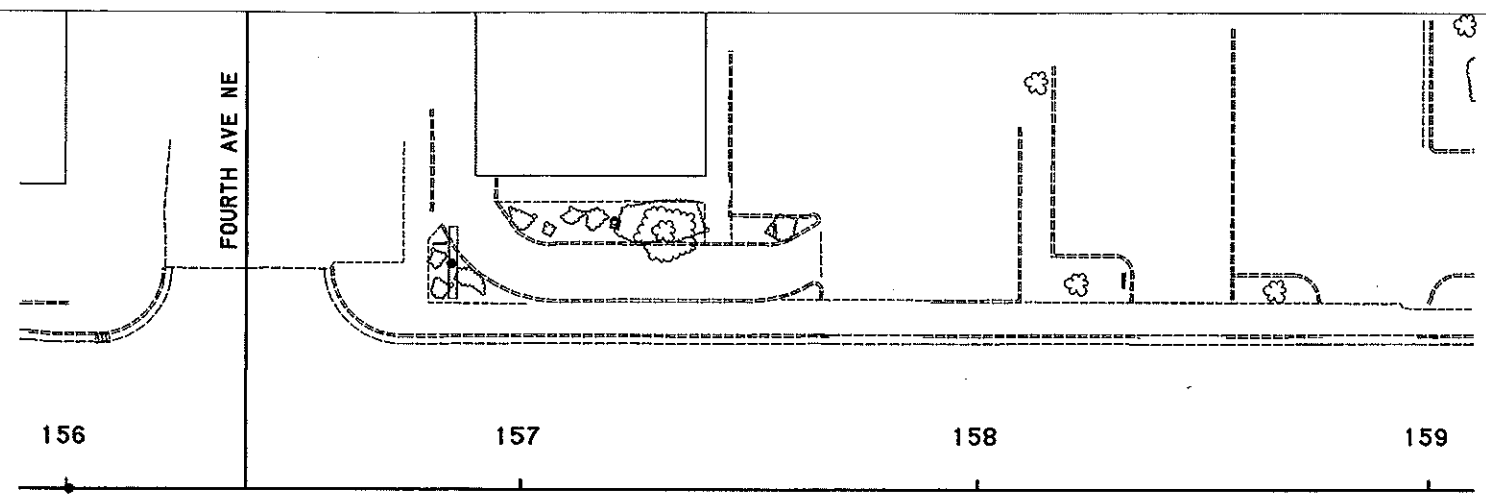
206+70 N. Rdwy. 60' Rt.	100 L. F.
(Invert to be Set in Field)	





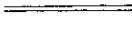
MANDAN-EAST MEDIAN X-OVER
ESTAMATE OF QUANTITIES

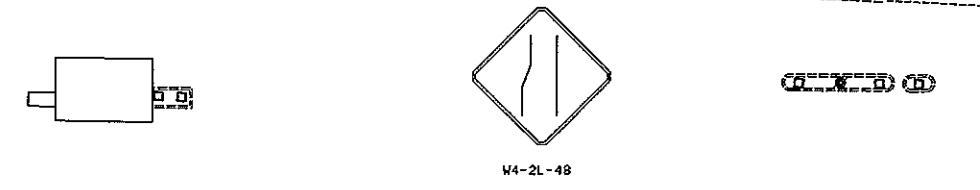
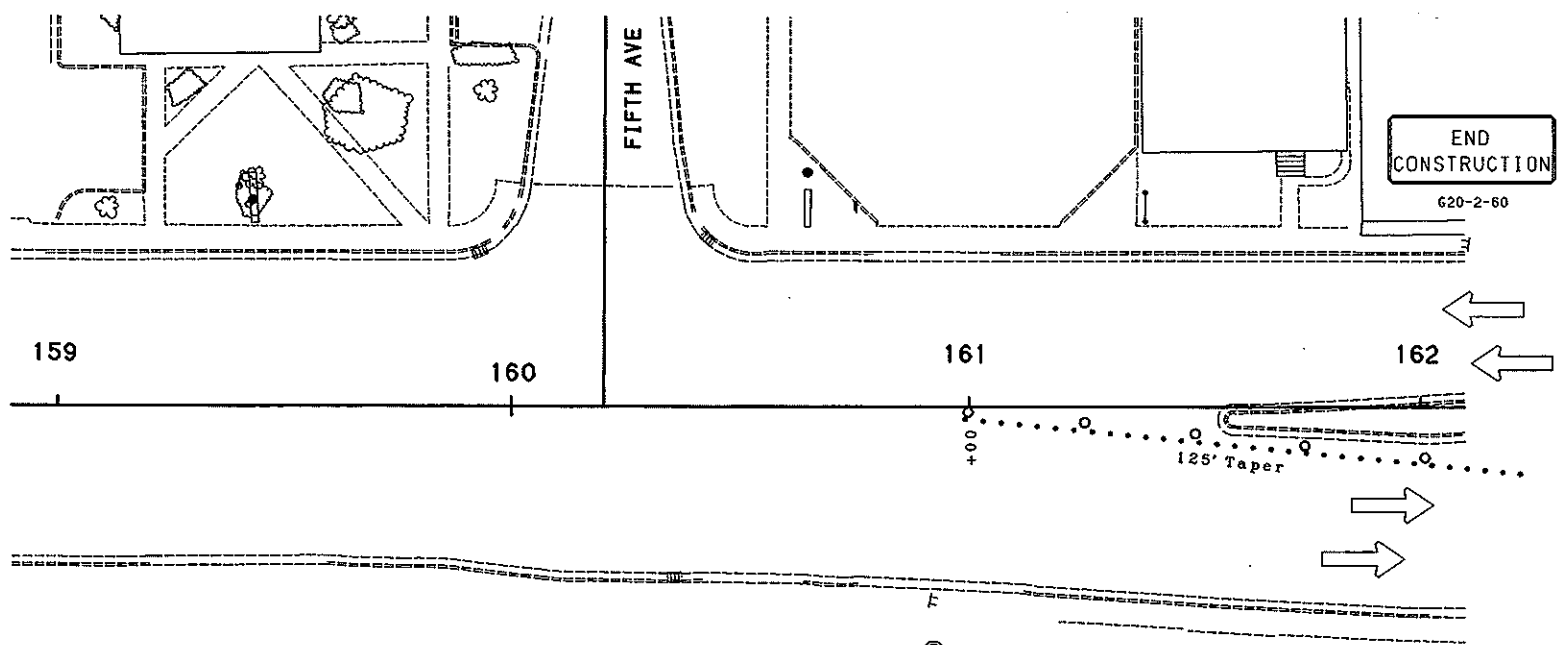
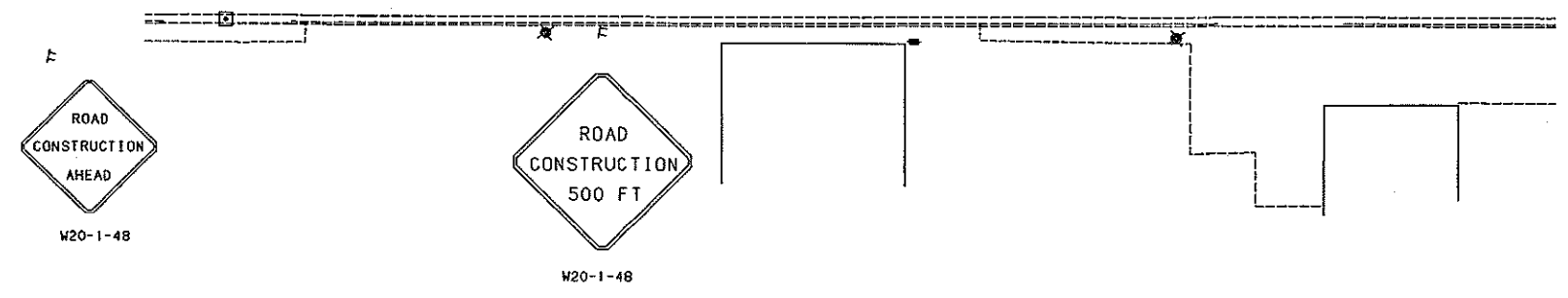
FILE: MEDQUAN-D.GRF	0 20 40 60 SCALE IN FEET
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FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	50

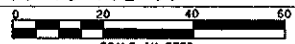
Note : See Notes 100/P02 & 105/P01.
See All Notes With 704 Spec. #.



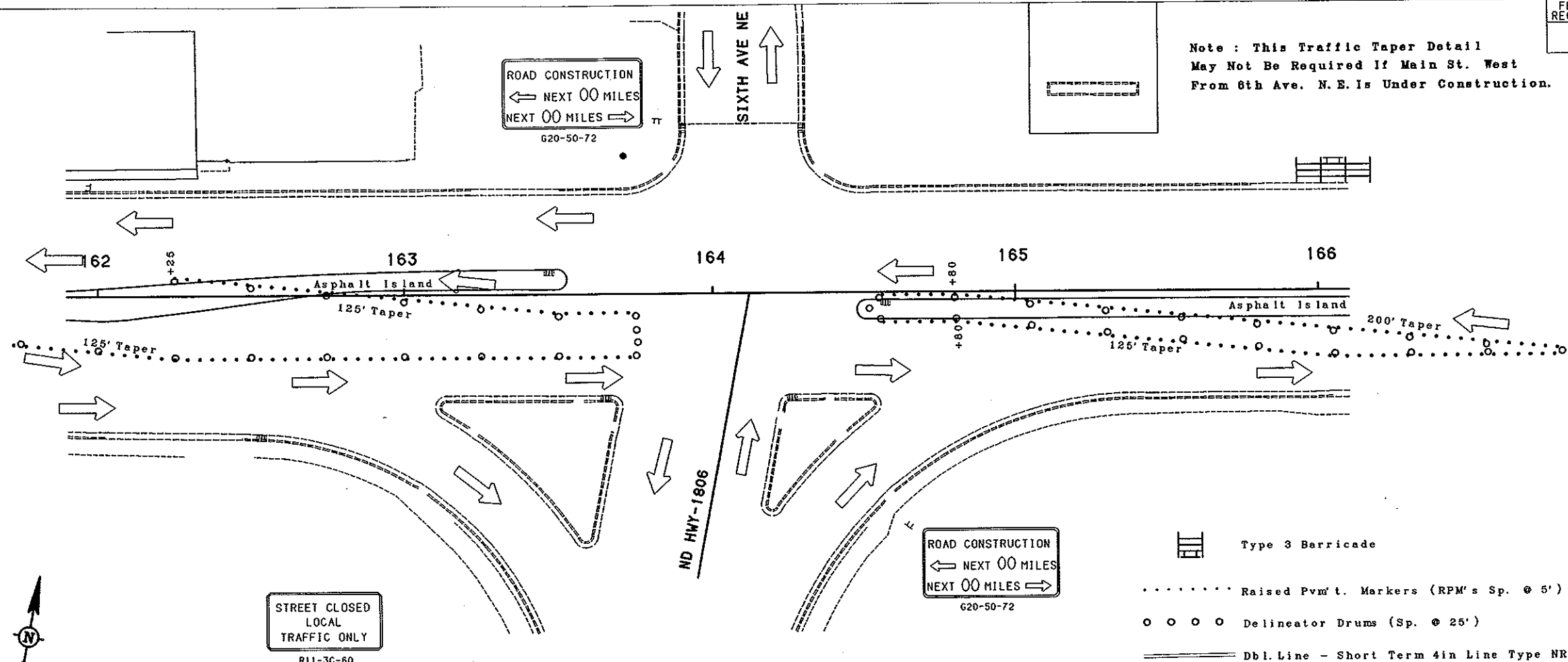
-  Sign Symbol
-  Type 3 Barricade
-  Raised Pvm't. Markers (RPM's Sp. @ 5')
-  Delineator Drums (Sp. @ 25')
-  Double - Short Term 4in Line Type R



**Work Zone Traffic Control
Phase - 1**

MANDAN-EAST MAIN STREET STA. 156+00 TO 162+00	
FILE: IWZTC.GRF Plot Factor = 0.5	SCALE IN FEET 

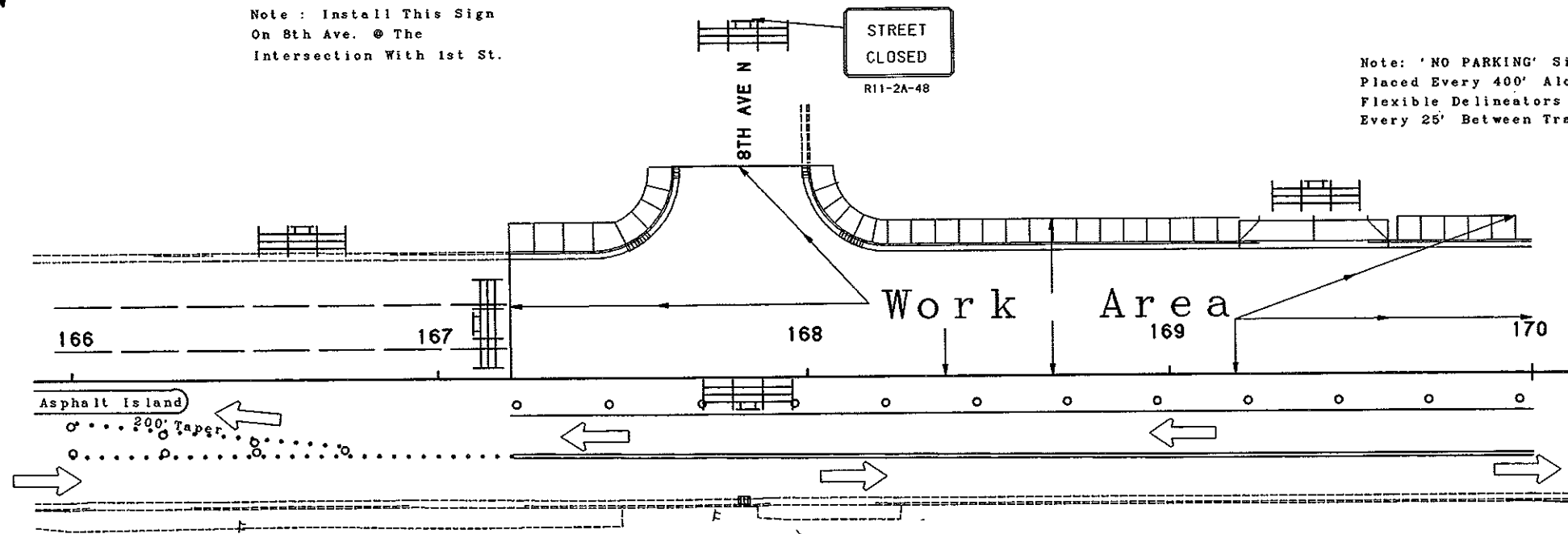
Note: This Traffic Taper Detail May Not Be Required If Main St. West From 8th Ave. N.E. Is Under Construction.



Note: Install This Sign On 8th Ave. @ The Intersection With 1st St.

- Type 3 Barricade
- Raised Pav't. Markers (RPM's Sp. @ 5')
- Delineator Drums (Sp. @ 25')
- Dbl. Line - Short Term 4in Line Type NR

Note: 'NO PARKING' Signs To Be Placed Every 400' Along Construction Zone. Flexible Delineators To Be Placed Every 25' Between Traffic Lanes.



Note: Maintain Traffic On The South 24' Of Existing Roadway. (2-12' Driving Lanes)

Work Zone Traffic Control Phase - 1

MANDAN-EAST MAIN STREET STA. 162+00 TO 170+00	
FILE: 2WZTC.GRF	
Plot Factor: 0.5	SCALE IN FEET




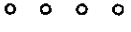

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	52

STREET CLOSED LOCAL TRAFFIC ONLY
R11-3C-60

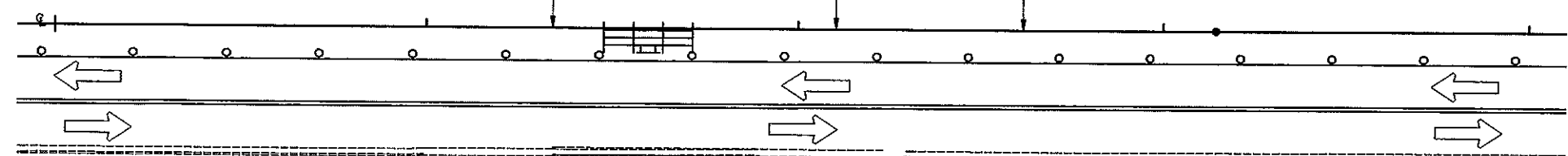
Note: Install On 9th Ave. @ Intersection With 1st Street.

STREET CLOSED
R11-2A-48



-  Sign Symbol
-  Type 3 Barricade
-  Raised Pvm't. Markers (RPM's Sp. @ 5')
-  Delineator Drums (Sp. @ 25')
-  Double - Short Term 4in Line Type NR

170 171 **Work Area** 172 173 174

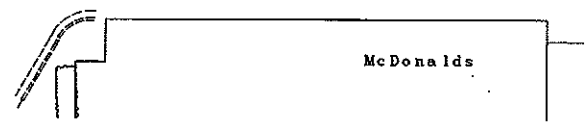


B. P. Ford

NO PARKING
R8-3 (24x30)

STREET CLOSED LOCAL TRAFFIC ONLY
R11-3C-60

Note: Install On 10th Ave. @ Intersection With 1st Street.



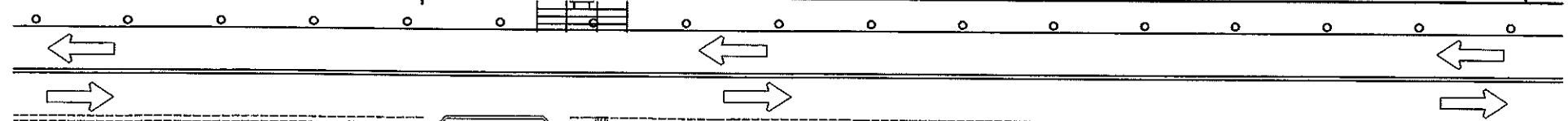
Heart & Lung Clinic

STREET CLOSED
R11-2A-48

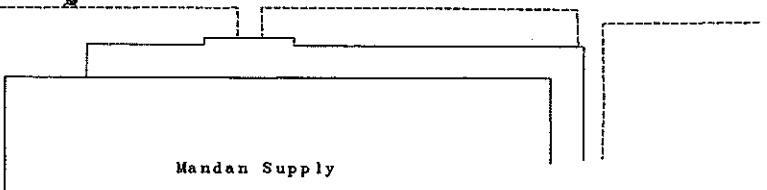
TENTH AVE NE



174 175 **Work Area** 176 177 178



NO PARKING
R8-3 (24x30)



Note: Maintain Traffic On the South 24' Of Existing Roadway. (2-12' Driving Lanes)

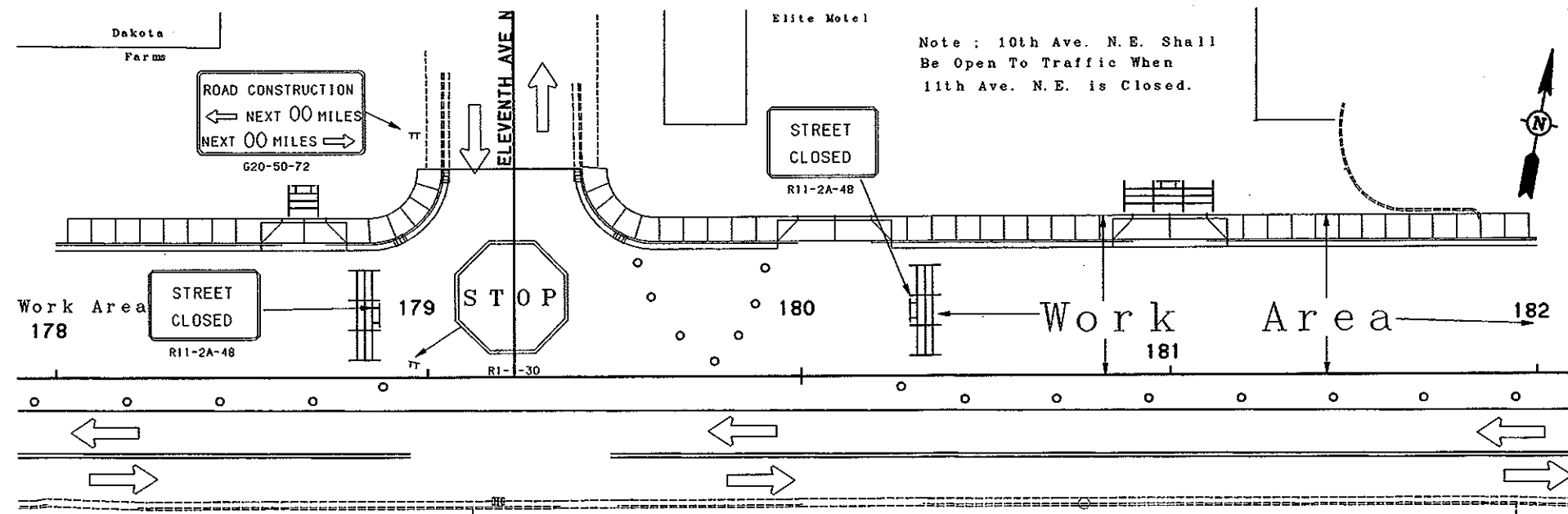
Work Zone Traffic Control Phase - 1

MANDAN-EAST MAIN STREET
STA. 170+00 TO 178+00

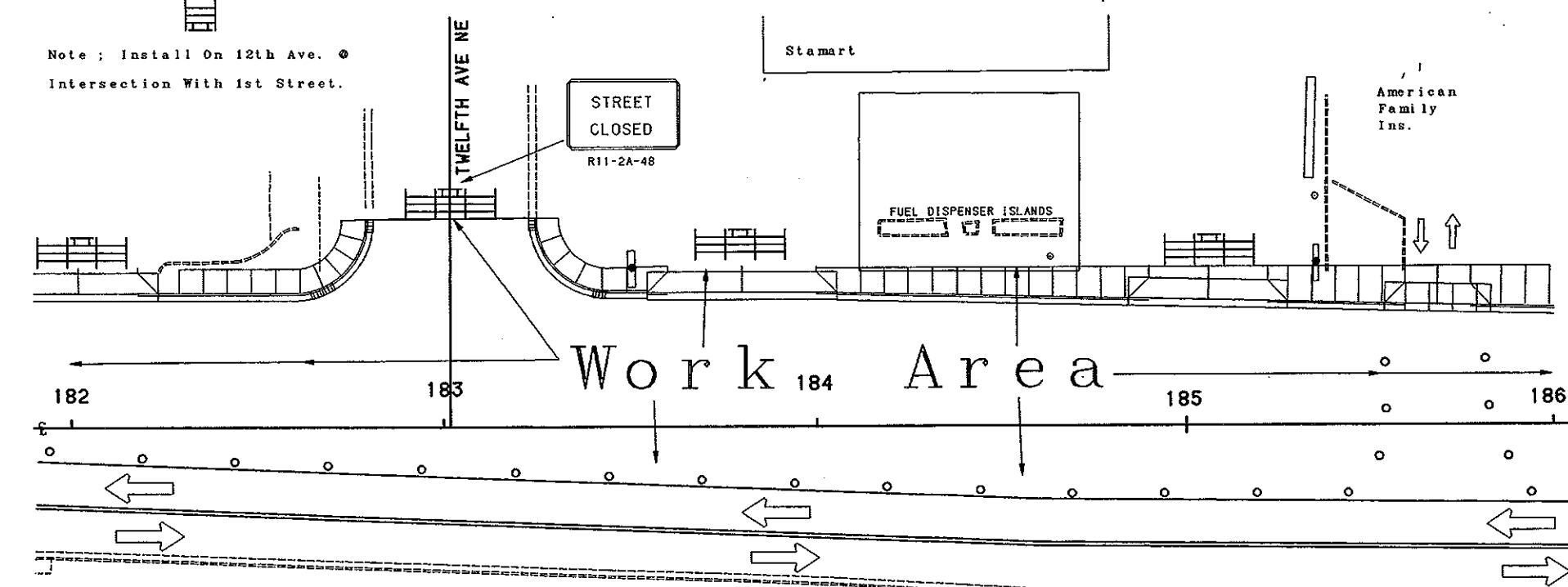
FILE: 3WZTC.GRF Plot Factor: 0.5

SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	53



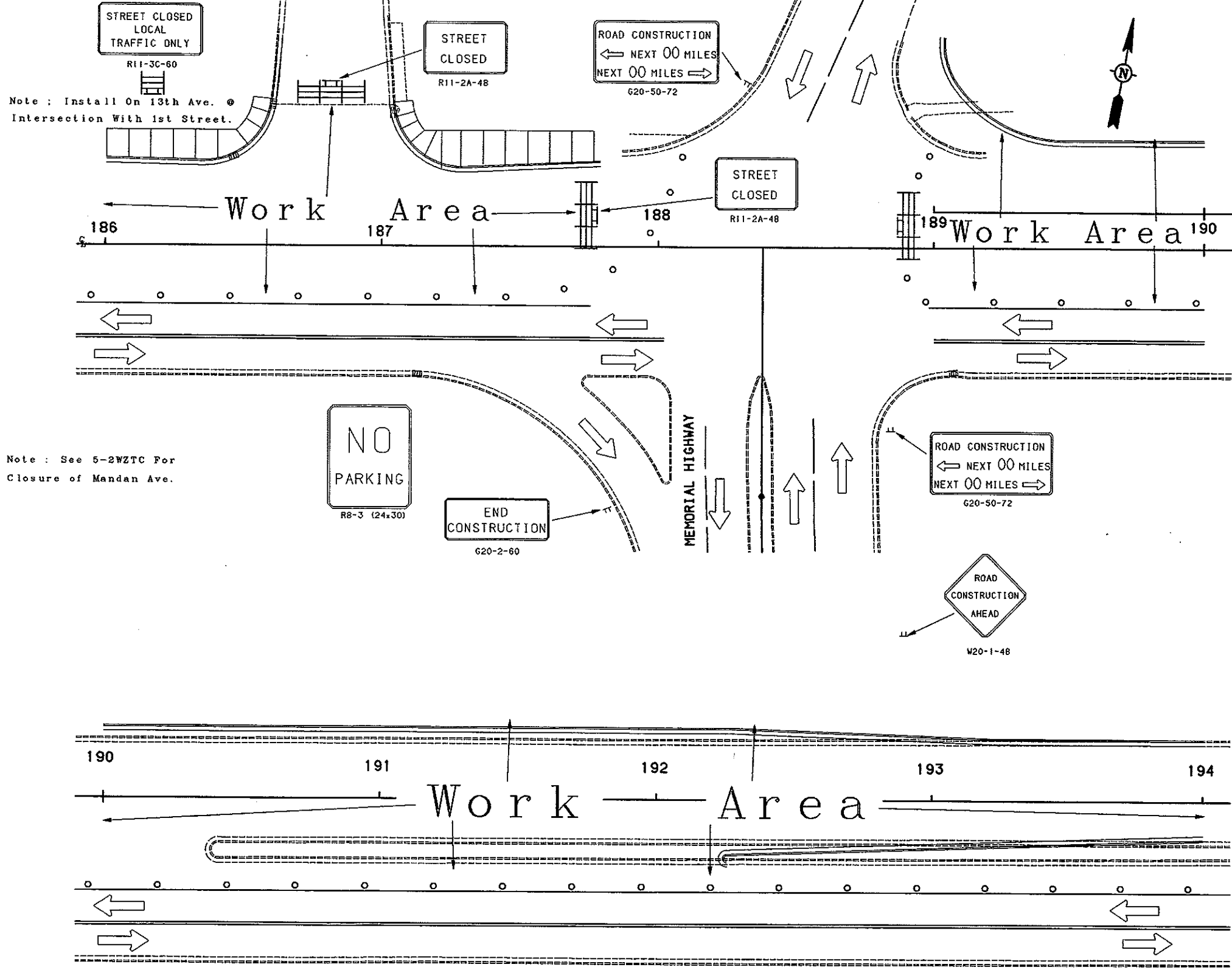
- Sign Symbol
- ▤ Type 3 Barricade
- Raised Pvm't. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ==== Double - Short Term 4in Line Type NR



Work Zone Traffic Control
Phase - 1

MANDAN-EAST MAIN STREET STA. 178+00 TO 186+00	
FILE: 4WZTC.GRF Plot Factor: 0.5	<p>SCALE IN FEET</p>

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	54



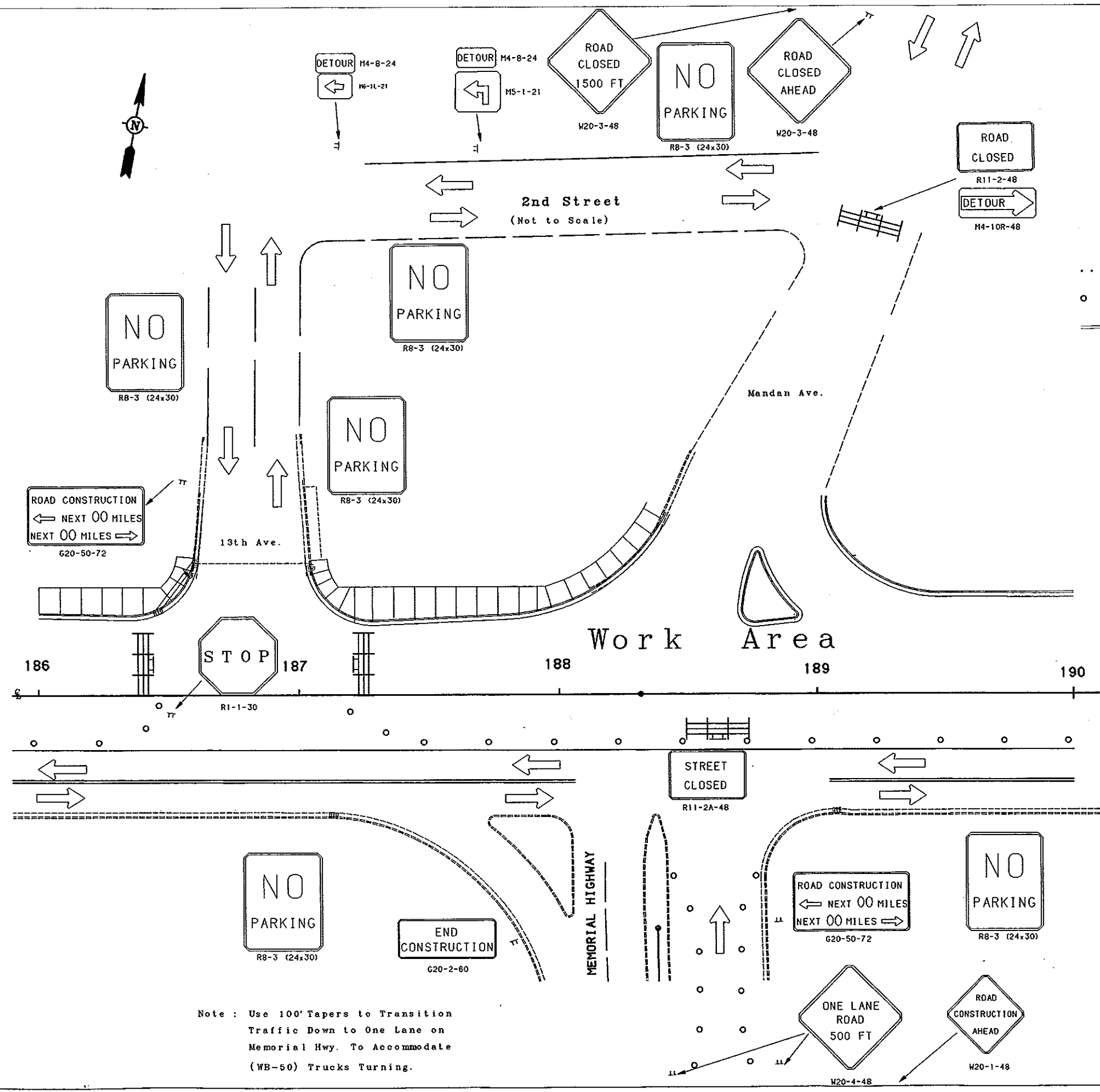
Note: Install On 13th Ave. @ Intersection With 1st Street.

Note: See 5-2WZTC For Closure of Mandan Ave.

- Sign Symbol
- ▤ Type 3 Barricade
- Raised Pvm't. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ==== Double - Short Term 4in Line Type R

Work Zone Traffic Control
Phase - 1

MANDAN-EAST MAIN STREET STA. 186+00 TO 194+00	
FILE: 5WZTC.GRF Plot Factor: 0.5	SCALE IN FEET 0 20 40 60



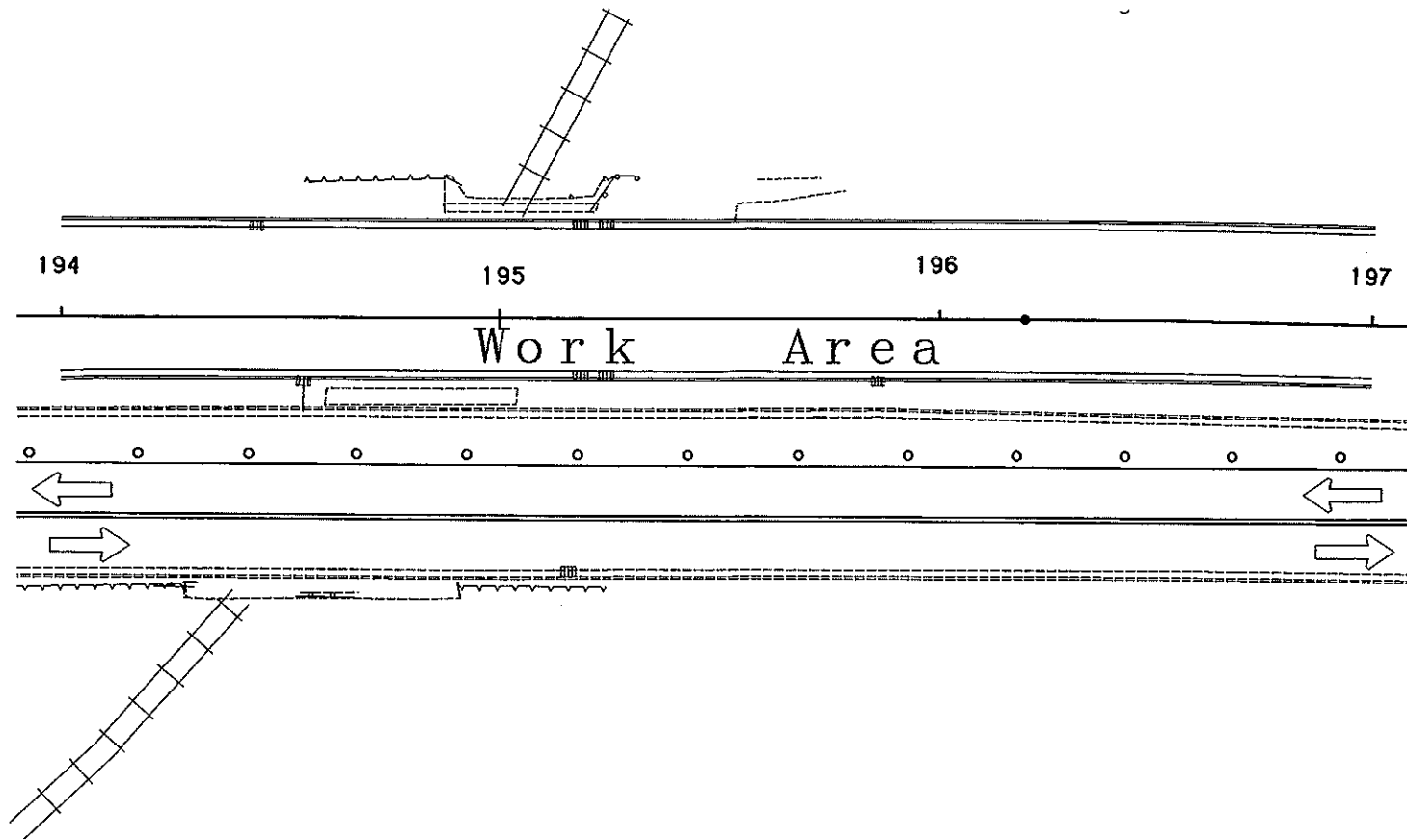
- Sign Symbol
- ▬ Type 3 Barricade
- Raised Pavmt. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ▬▬▬ Double - Short Term 4in Line Type R

Note: Use 100' Tapers to Transition Traffic Down to One Lane on Memorial Hwy. To Accommodate (WB-50) Trucks Turning.

Work Zone Traffic Control
Phase - 1

MANDAN-EAST MAIN STREET STA. 186+00 TO 190+00	
FILE# 5-2WZTC.GRF	SCALE IN FEET
Plot Factor: 0.5	0 20 40 60

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	56



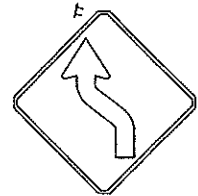
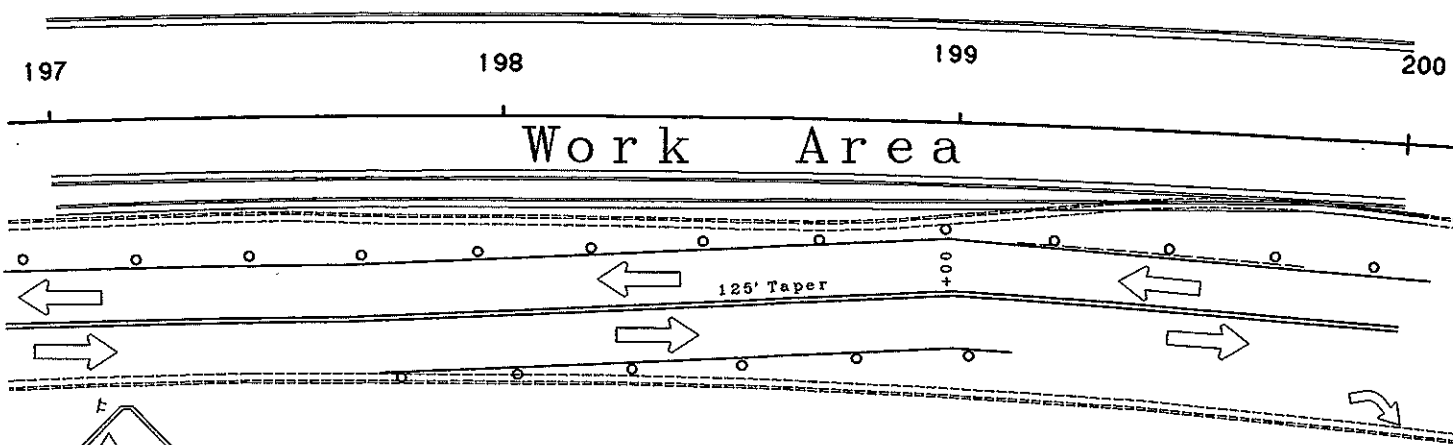
⊞ Sign Symbol

⊞ Type 3 Barricade

..... Raised Pav't. Markers (RPM's Sp. @ 5')

○ ○ ○ ○ Delineator Drums (Sp. @ 25')

==== Double - Short Term 4in Line Type R



W1-4L-48

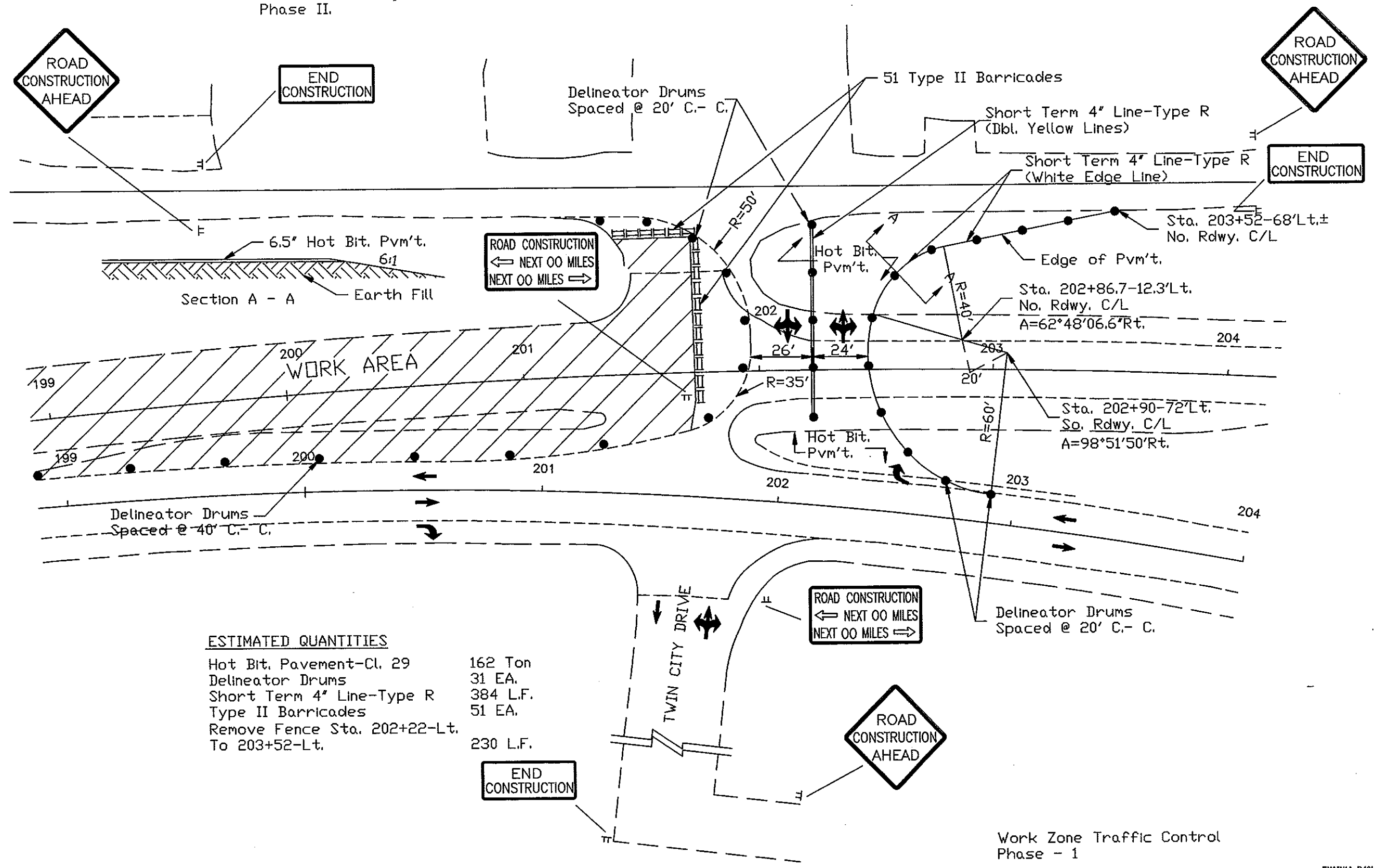
Work Zone Traffic Control

Phase - 1

MANDAN-EAST MAIN STREET STA. 194+00 TO 200+00	
FILE: 6WZTC.GRF	0 20 40 60 SCALE IN FEET
Plot Factor : 0.5	

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	57

NOTE: The Curb & Gutter from 200+60 N.Rdwy. to 202+60 N.Rdwy. shall be installed after Phase II.



ESTIMATED QUANTITIES

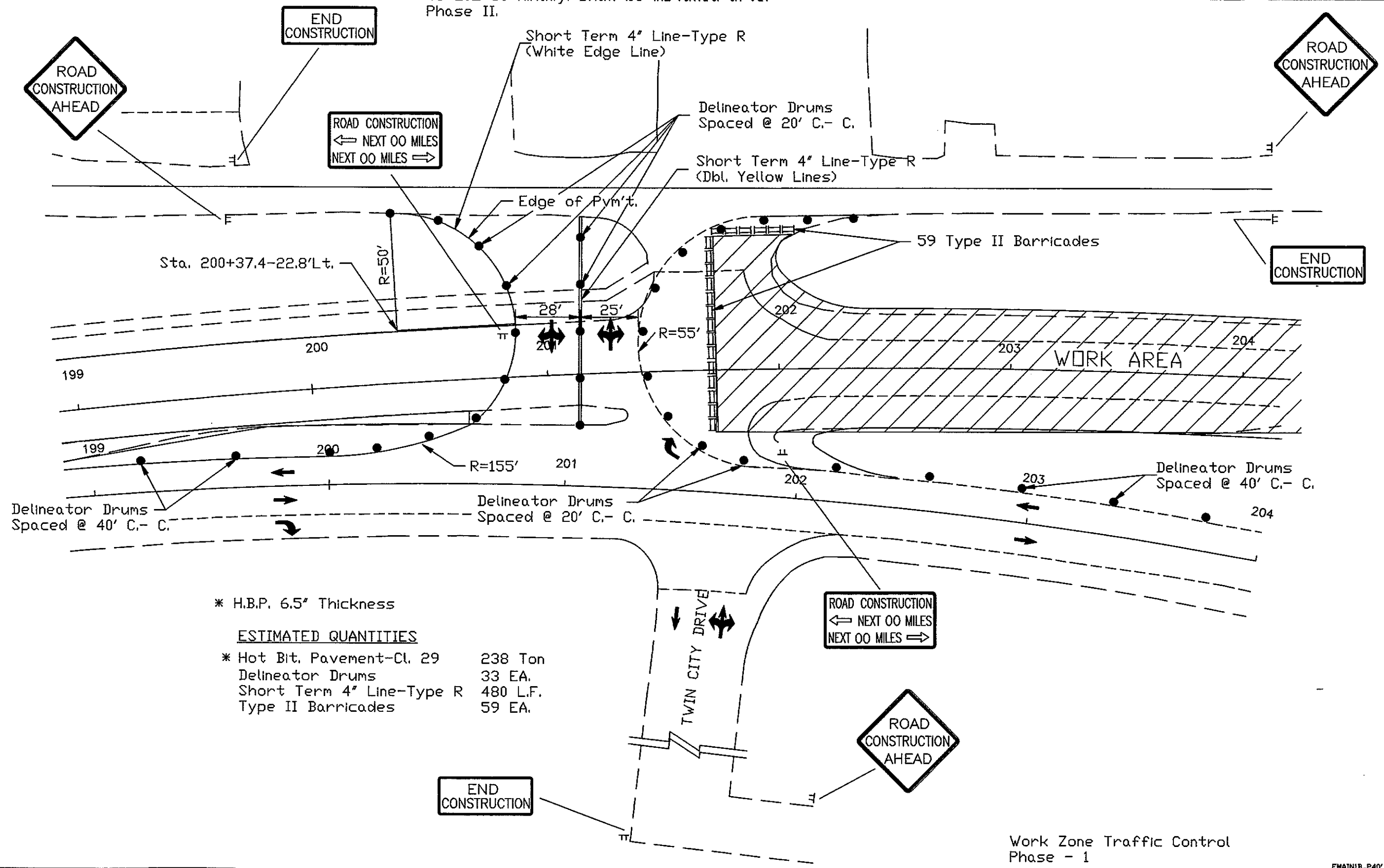
Hot Bit. Pavement-Cl. 29	162 Ton
Delineator Drums	31 EA.
Short Term 4" Line-Type R	384 L.F.
Type II Barricades	51 EA.
Remove Fence Sta. 202+22-Lt. To 203+52-Lt.	230 L.F.

END CONSTRUCTION

Work Zone Traffic Control Phase - 1


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	58

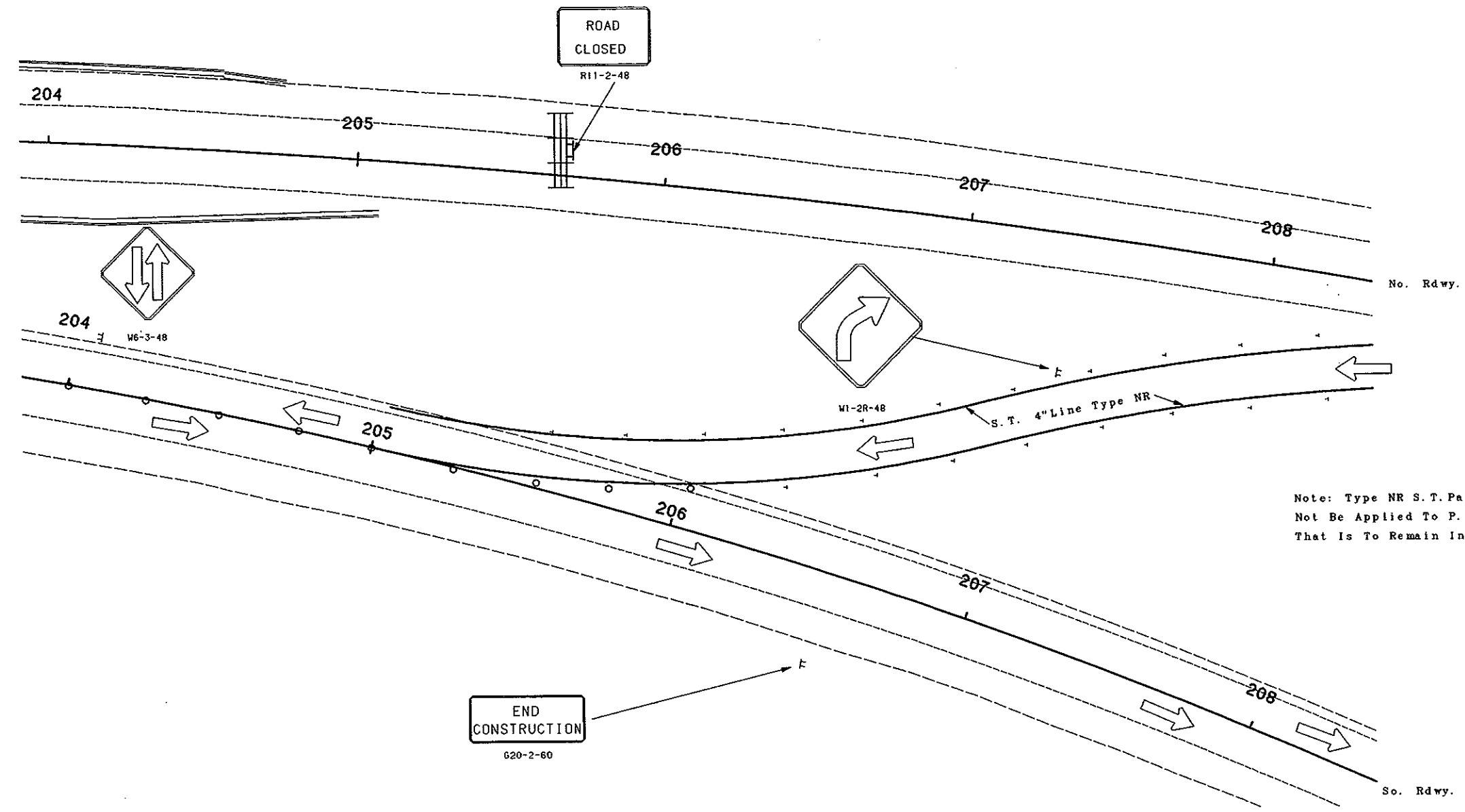
NOTE: The Curb & Gutter from 200+60 N.Rdwy. to 202+60 N.Rdwy. shall be installed after Phase II.



- * H.B.P. 6.5" Thickness
- ESTIMATED QUANTITIES**
- * Hot Bit. Pavement-CI. 29 238 Ton
- Delineator Drums 33 EA.
- Short Term 4" Line-Type R 480 L.F.
- Type II Barricades 59 EA.

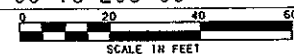
Work Zone Traffic Control Phase - 1

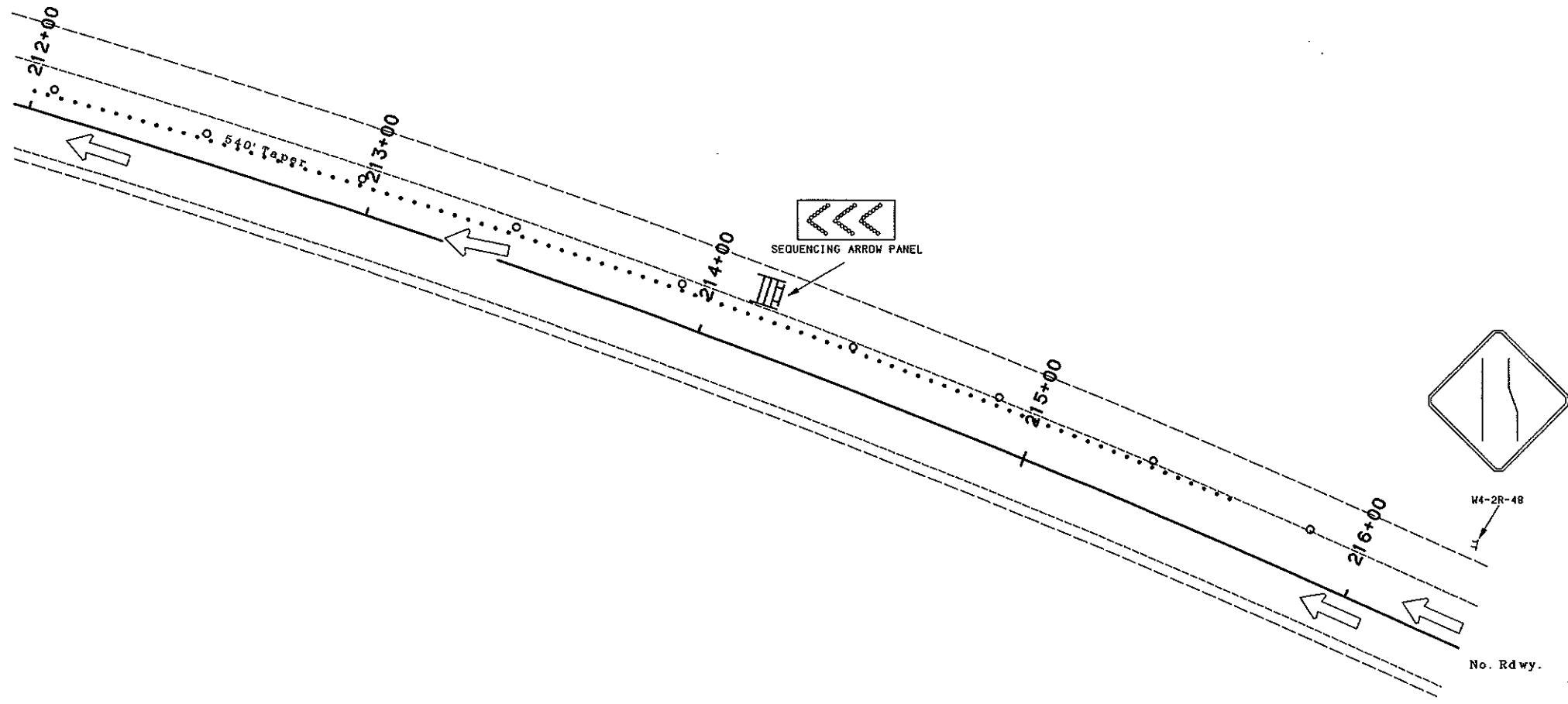
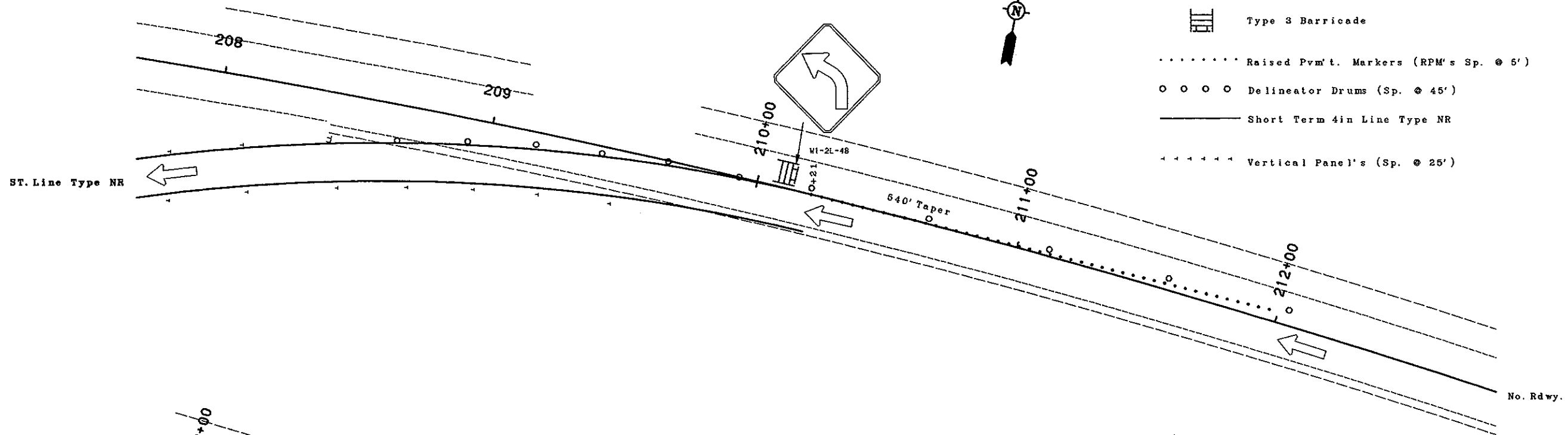
- ⊣ Sign Symbol
-  Type 3 Barricade
- Raised Pvm't. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- Short Term 4in Line Type NR
- + + + + + Vertical Panel's (Sp. @ 25')



Note: Type NR S.T. Paint Shall Not Be Applied To P.C.C. Pvm't. That Is To Remain Inplace.

Work Zone Traffic Control
Phase - 1

MANDAN-EAST MAIN STREET STA. 204+00 TO 208+00	
FILE: 8WZTC.GRF	SCALE IN FEET 

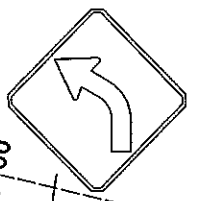
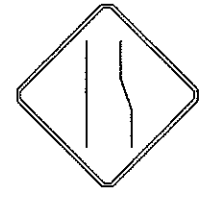


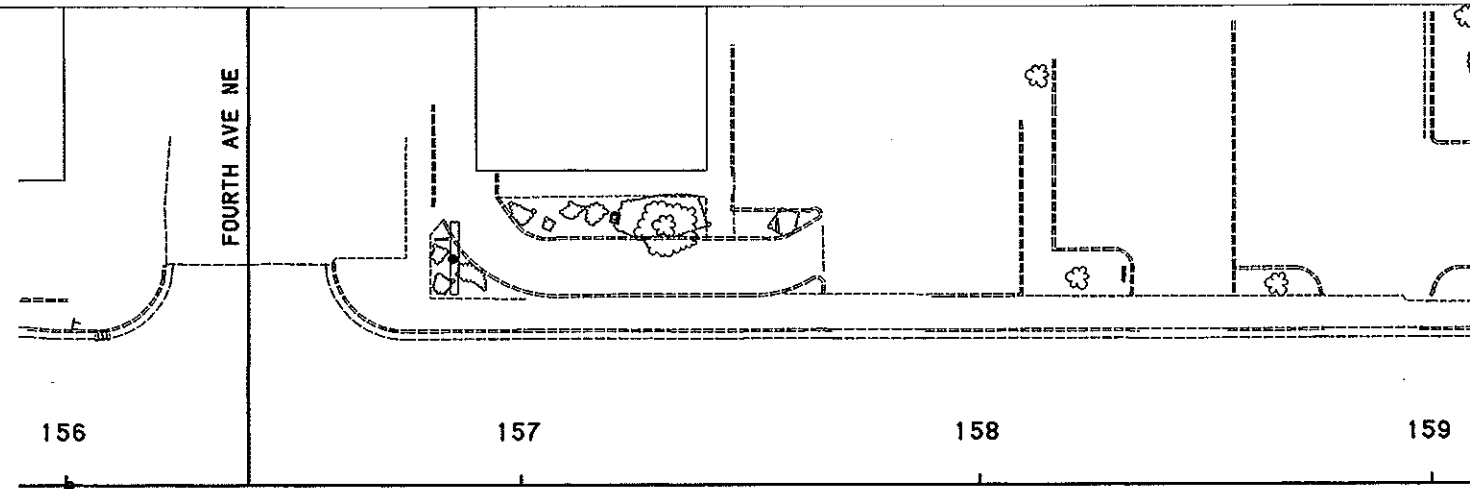
WORK ZONE TRAFFIC CONTROL
PHASE 1

MANDAN-EAST MAIN STREET
 STA. 208+00 TO 212+00

FILE: SHZTC.GRF

SCALE IN FEET





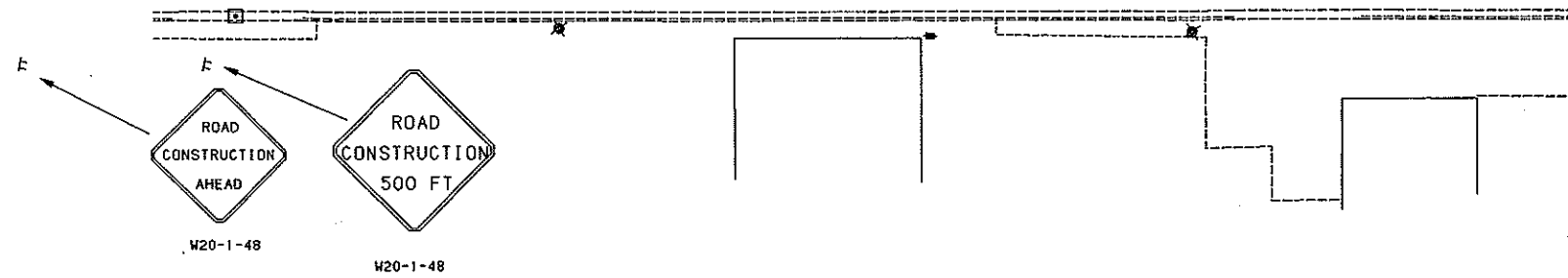
⊥ Sign Symbol

▬ Type 3 Barricade

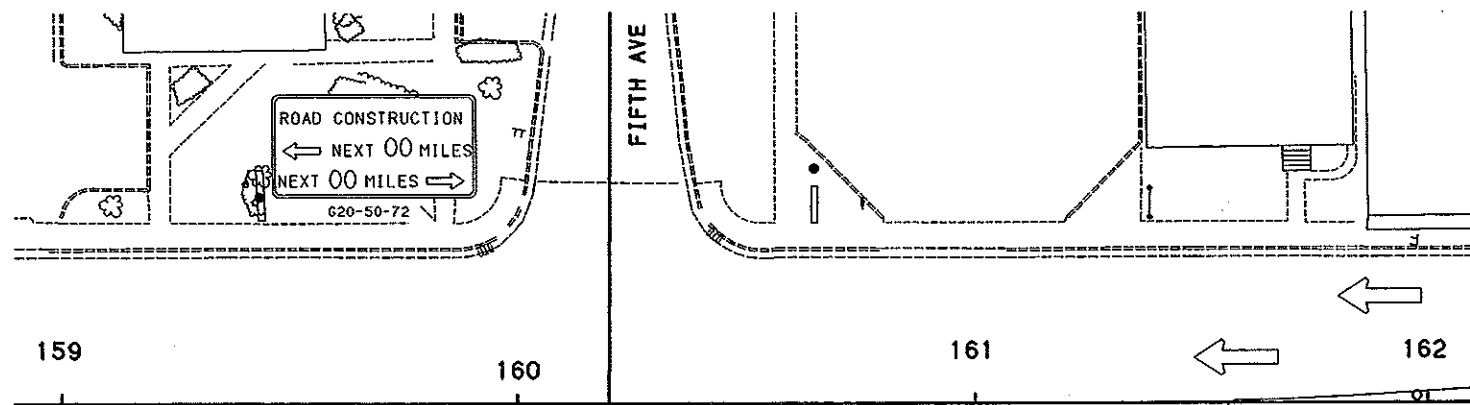
..... Raised Pav't. Markers (RPM's Sp. @ 5')

○ ○ ○ ○ Delineator Drums (Sp. @ 25')

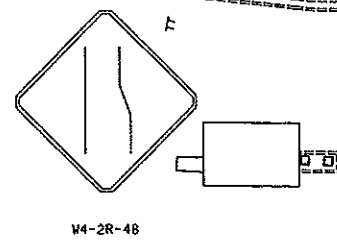
==== Double - Short Term 4in Line Type R



Note : See Notes 100/P02 & 105/P01.
See All Notes With 704 Spec. #'s.








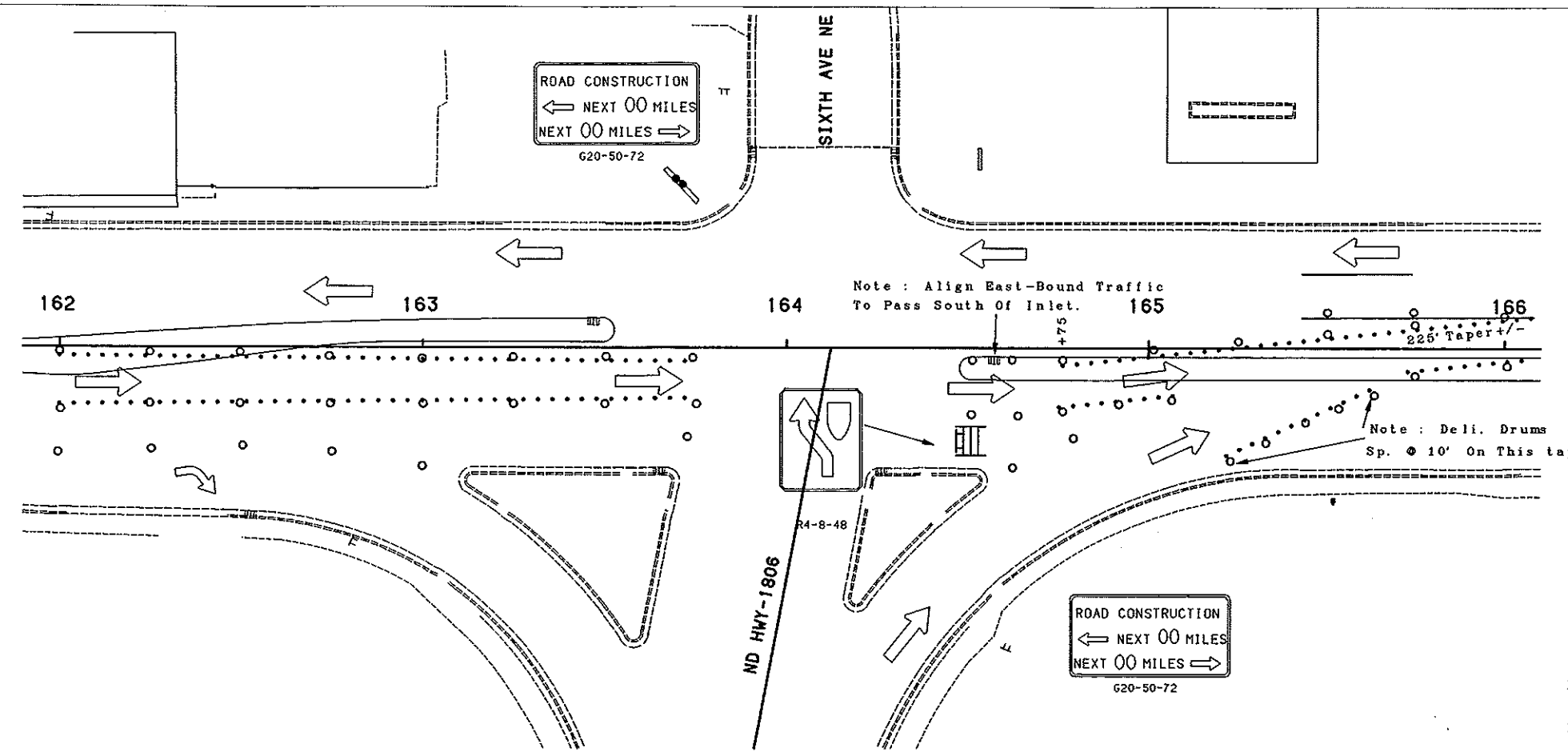
Note : This Traffic Taper Detail
May Not Be Required If Main St. West
From 6th Ave. N.E. Is Under Construction.



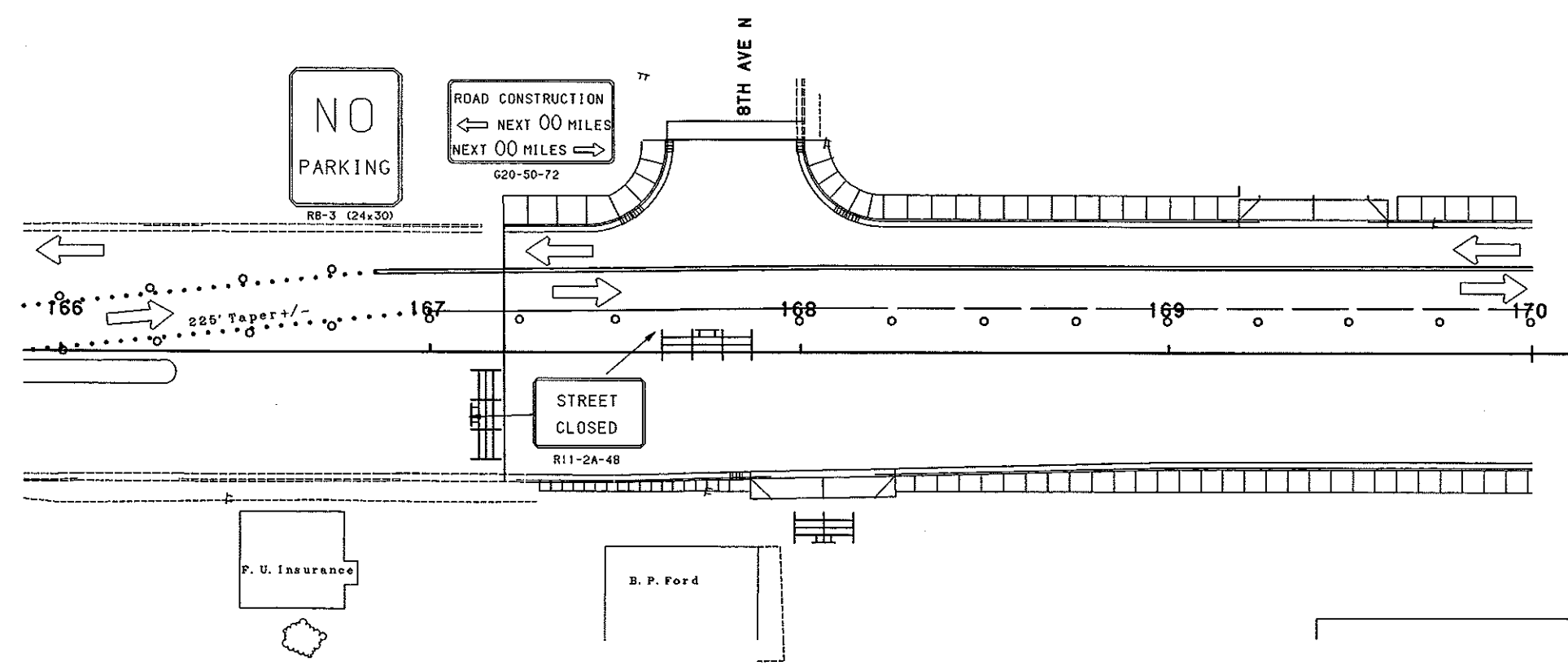
Work Zone Traffic Control
Phase - 2

MANDAN-EAST MAIN STREET STA. 156+00 TO 162+00	
FILE: WZTC1.GRF Plot Factor : 0.5	SCALE, IN FEET 0 20 40 60

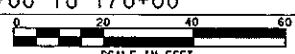
-  Sign Symbol
-  Type 3 Barricade
-  Raised Pvm't. Markers (RPM's Sp. @ 5')
-  Delineator Drums (Sp. @ 25')
-  Double - Short Term 4in Line Type R

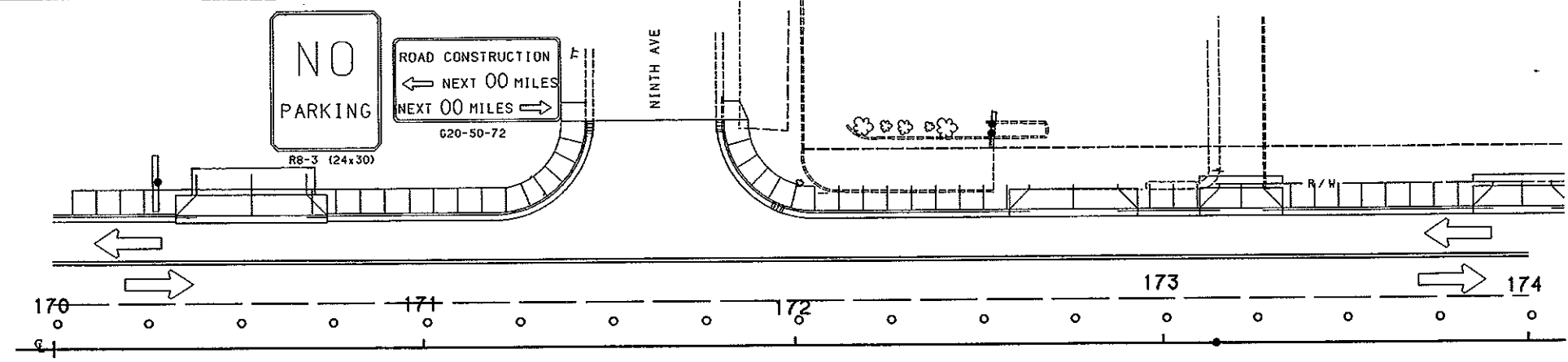


Note: 'NO PARKING' Sign Shall Be Placed Every 400' Along Construction Zone.

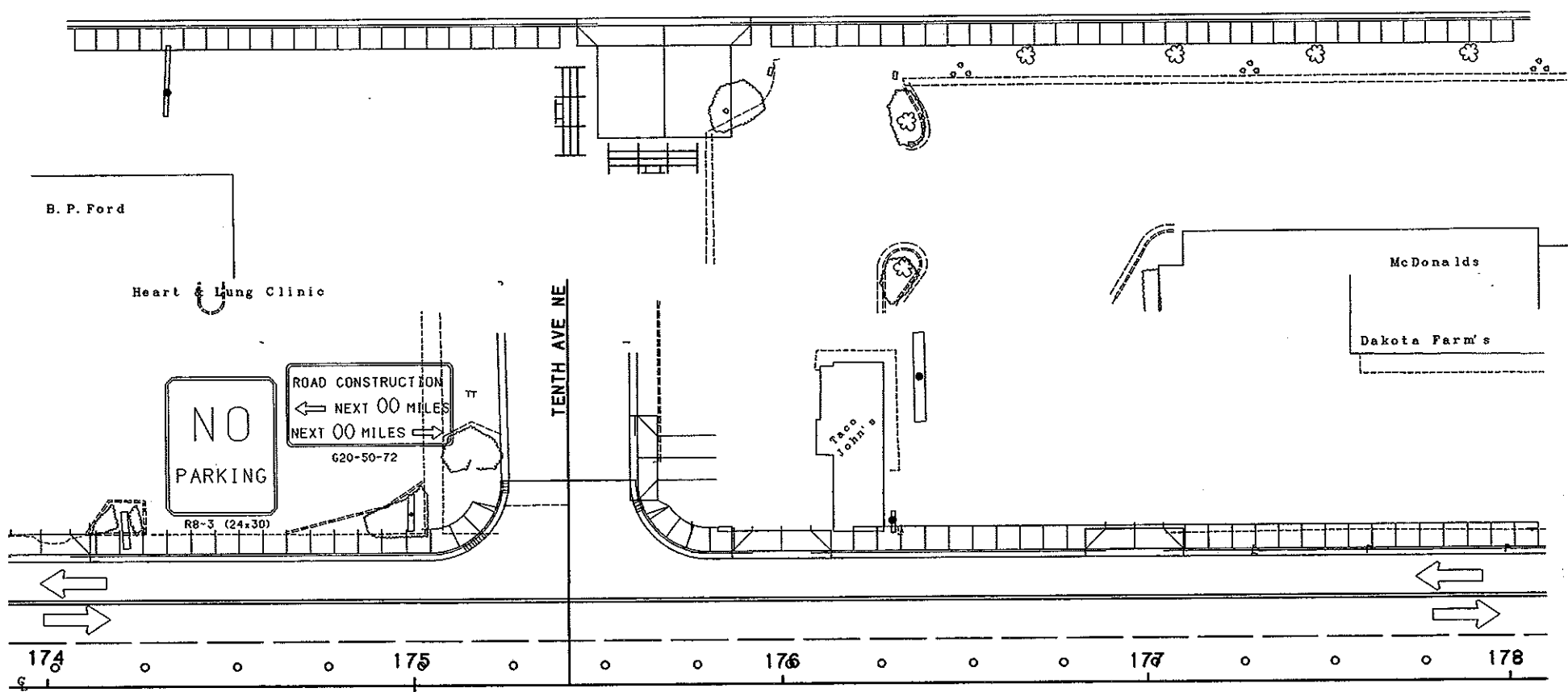


Work Zone Traffic Control
Phase - 2

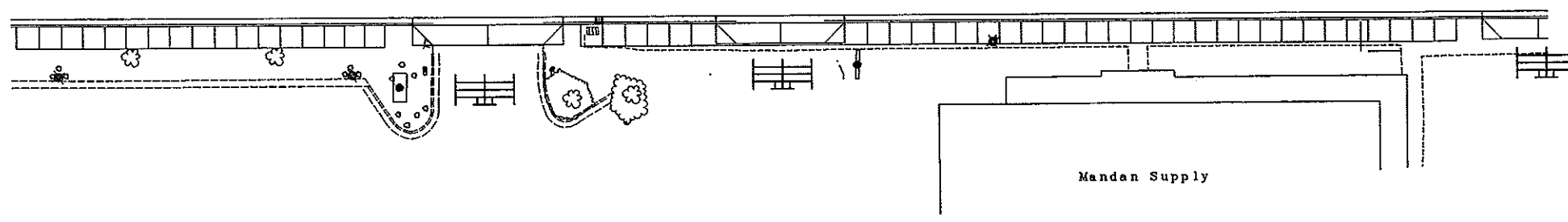
MANDAN-EAST MAIN STREET STA. 162+00 TO 170+00	
FILE: WZTC2.GRF Plot Factor = 0.5	 SCALE IN FEET



Work Area



Work Area

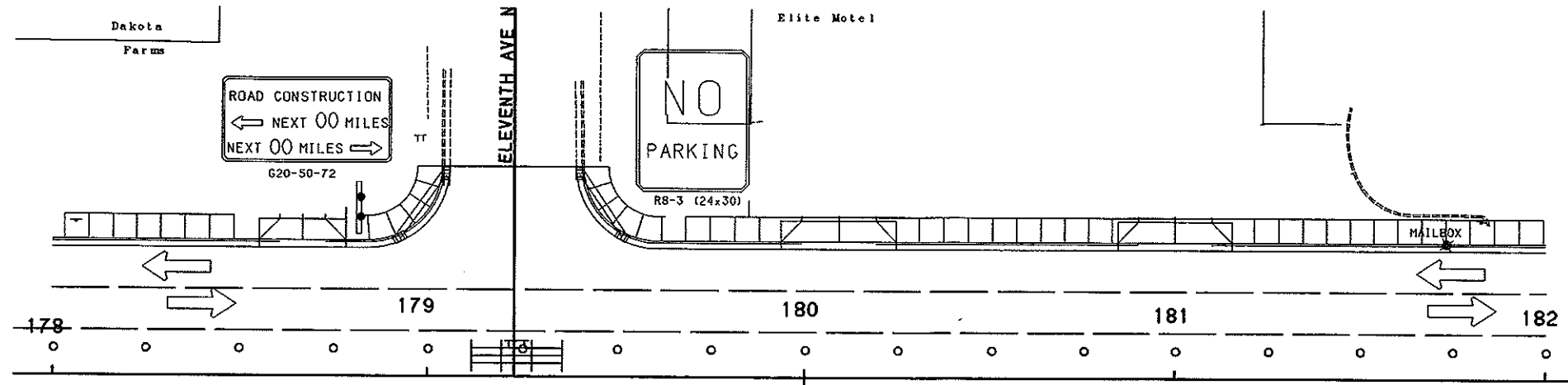


- Sign Symbol
- Type 3 Barricade
- Raised Pav't. Markers (RPM's Sp. @ 5')
- Delineator Drums (Sp. @ 25')
- Double - Short Term 4in Line Type R

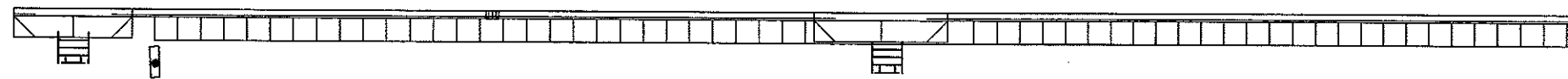
Work Zone Traffic Control
Phase - 2

MANDAN-EAST MAIN STREET STA. 170+00 TO 178+00	
FILE: WZTC3.GRF Plot Factor: 0.5	 SCALE IN FEET

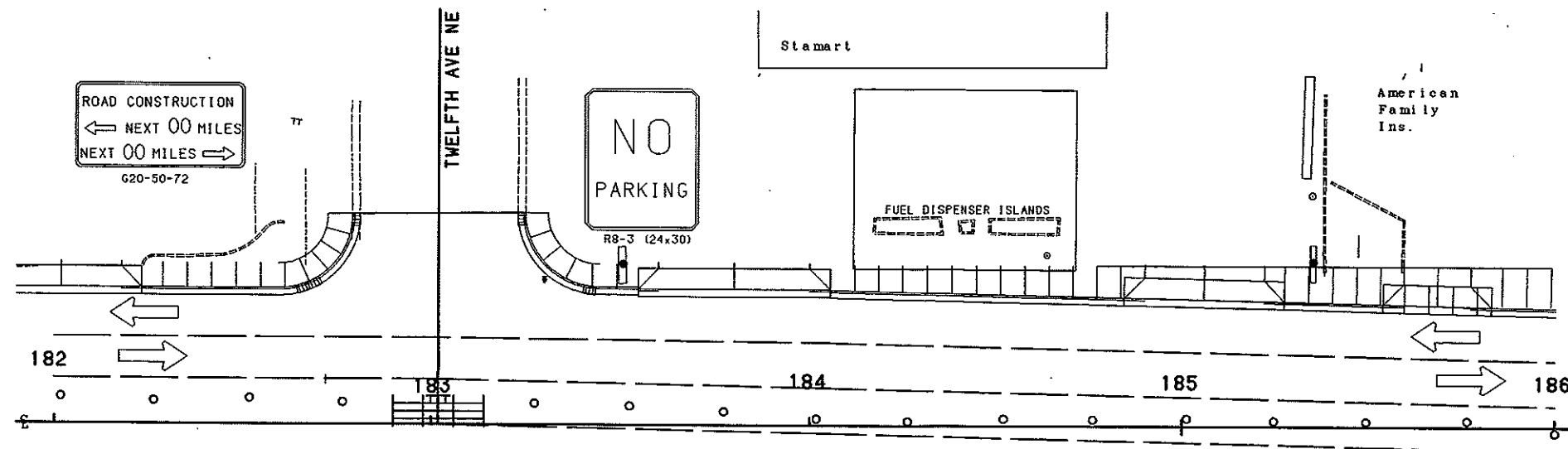
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	64



Work Area



- ⊣ Sign Symbol
- ▤ Type 3 Barricade
- Raised Pvm't. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ==== Double - Short Term 4in Line Type R



Work Area

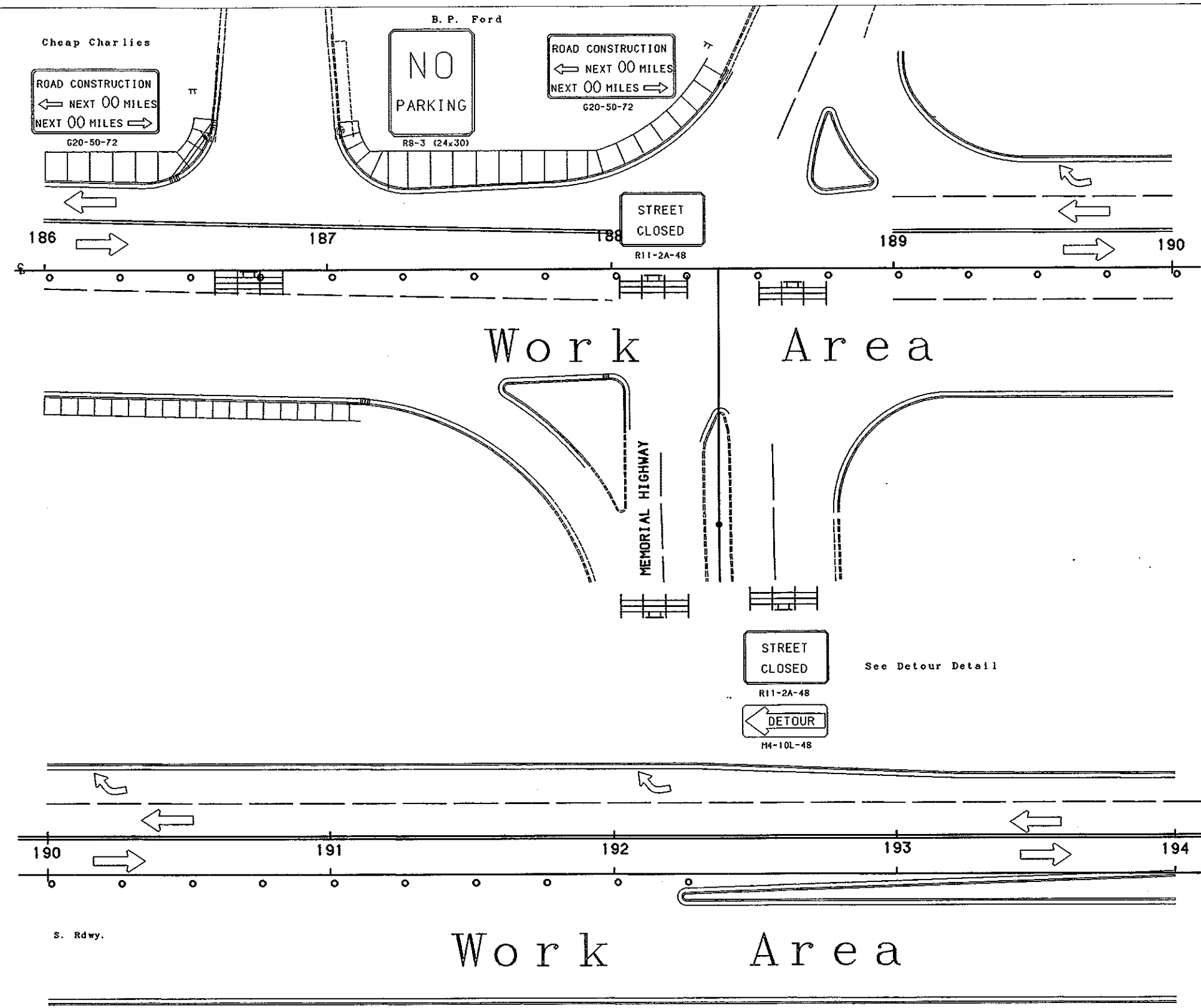


Work Zone Traffic Control

Phase - 2

MANDAN-EAST MAIN STREET STA. 178+00 TO 186+00	
FILE: WZTC4.GRF Plot Factor: 1.05	<p>SCALE IN FEET</p>

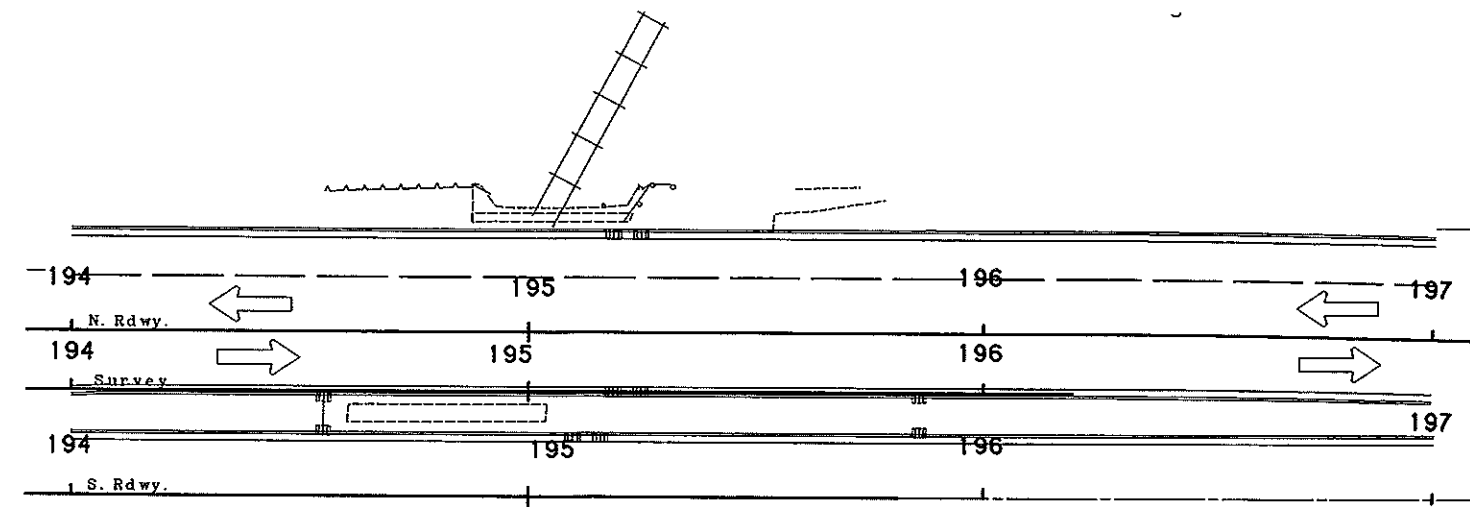
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	65



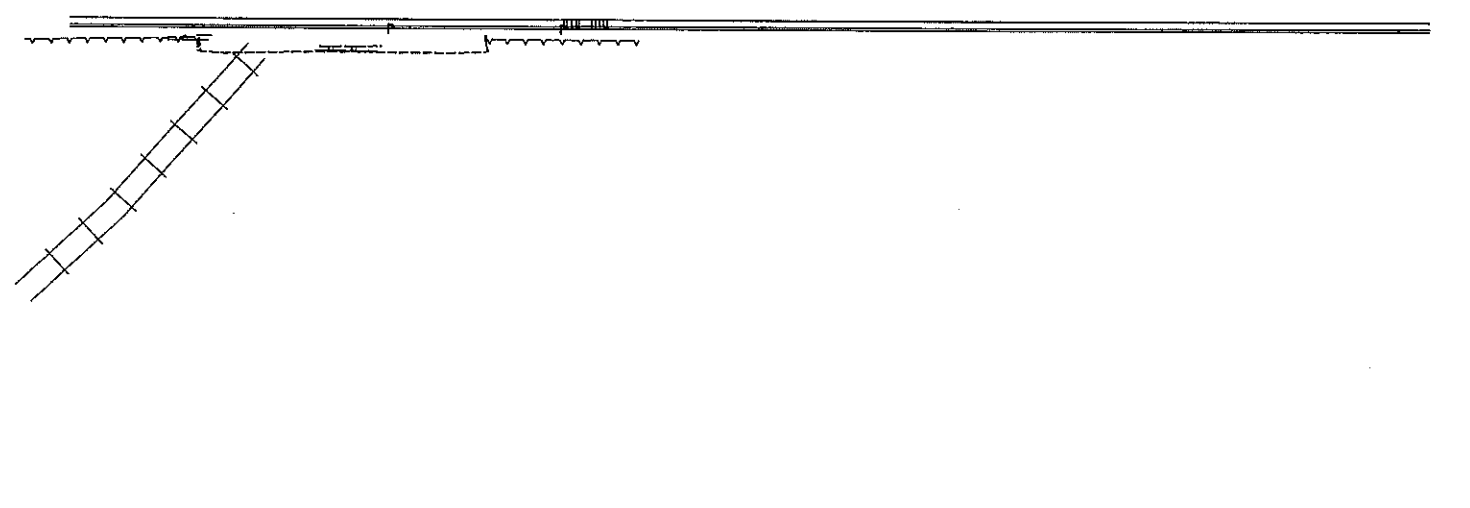
- ⊞ Sign Symbol
- ▤ Type 3 Barricade
- Raised Pav't. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ==== Double - Short Term 4in Line Type R

Work Zone Traffic Control
Phase - 2

MANDAN-EAST MAIN STREET STA. 186+00 TO 194+00	
FILE: WZTC5.GRF Plot Factor: 1:0.5	<p>SCALE IN FEET</p>



Work Area



Work Area

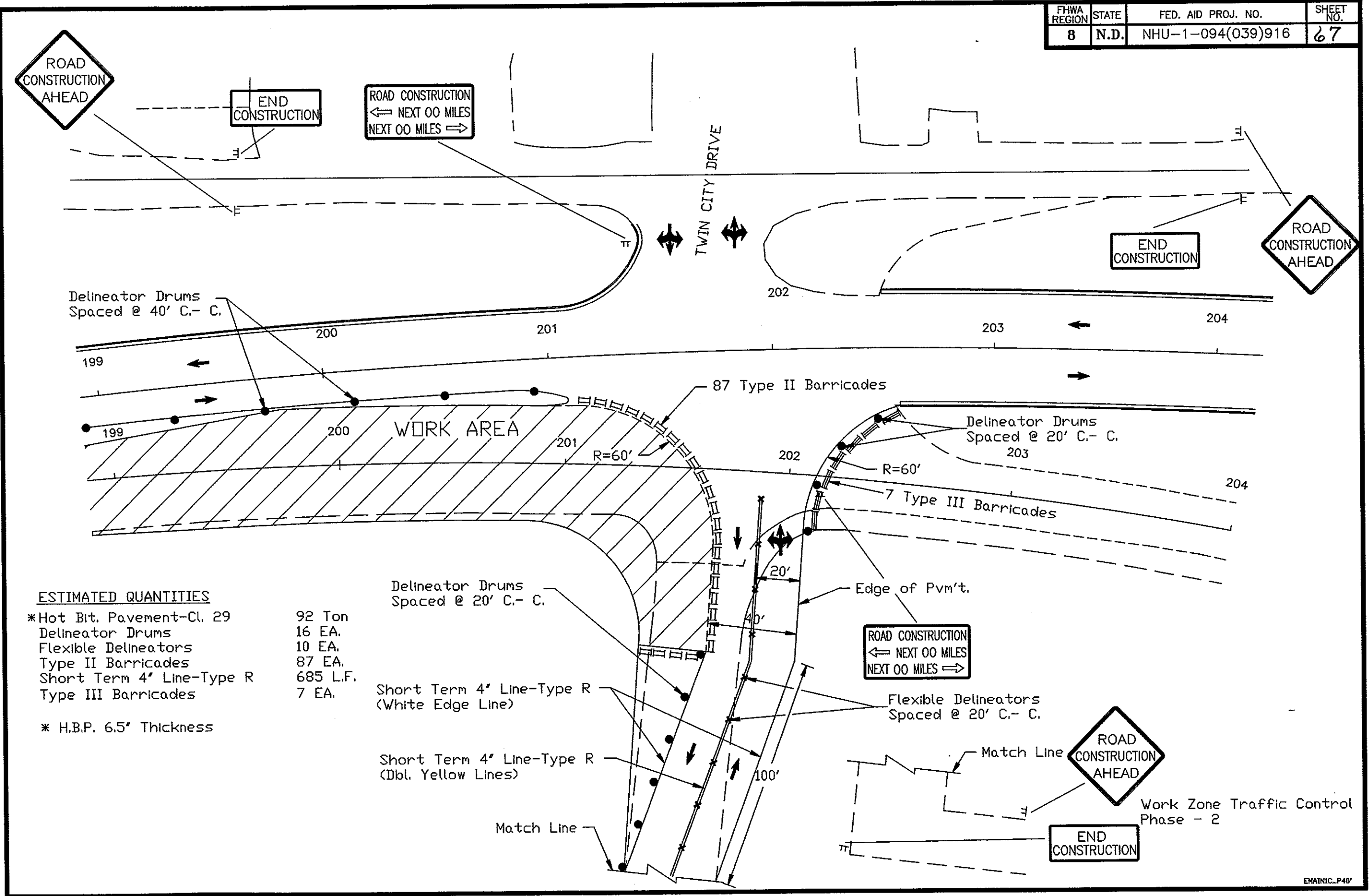
- ⊢ Sign Symbol
- ▤ Type 3 Barricade
- Raised Pvm'l. Markers (RPM's Sp. @ 5')
- ○ ○ ○ Delineator Drums (Sp. @ 25')
- ==== Double - Short Term 4in Line Type R

Work Zone Traffic Control

Phase - 2

MANDAN-EAST MAIN STREET STA. 194+00 TO 200+00	
FILE: WZTC6.GRF	
Plot Factor = 0.5	SCALE IN FEET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
B	N.D.	NHU-1-094(039)916	67



ESTIMATED QUANTITIES

- * Hot Bit. Pavement-Cl. 29 92 Ton
- Delineator Drums 16 EA.
- Flexible Delineators 10 EA.
- Type II Barricades 87 EA.
- Short Term 4" Line-Type R 685 L.F.
- Type III Barricades 7 EA.
- * H.B.P. 6.5" Thickness

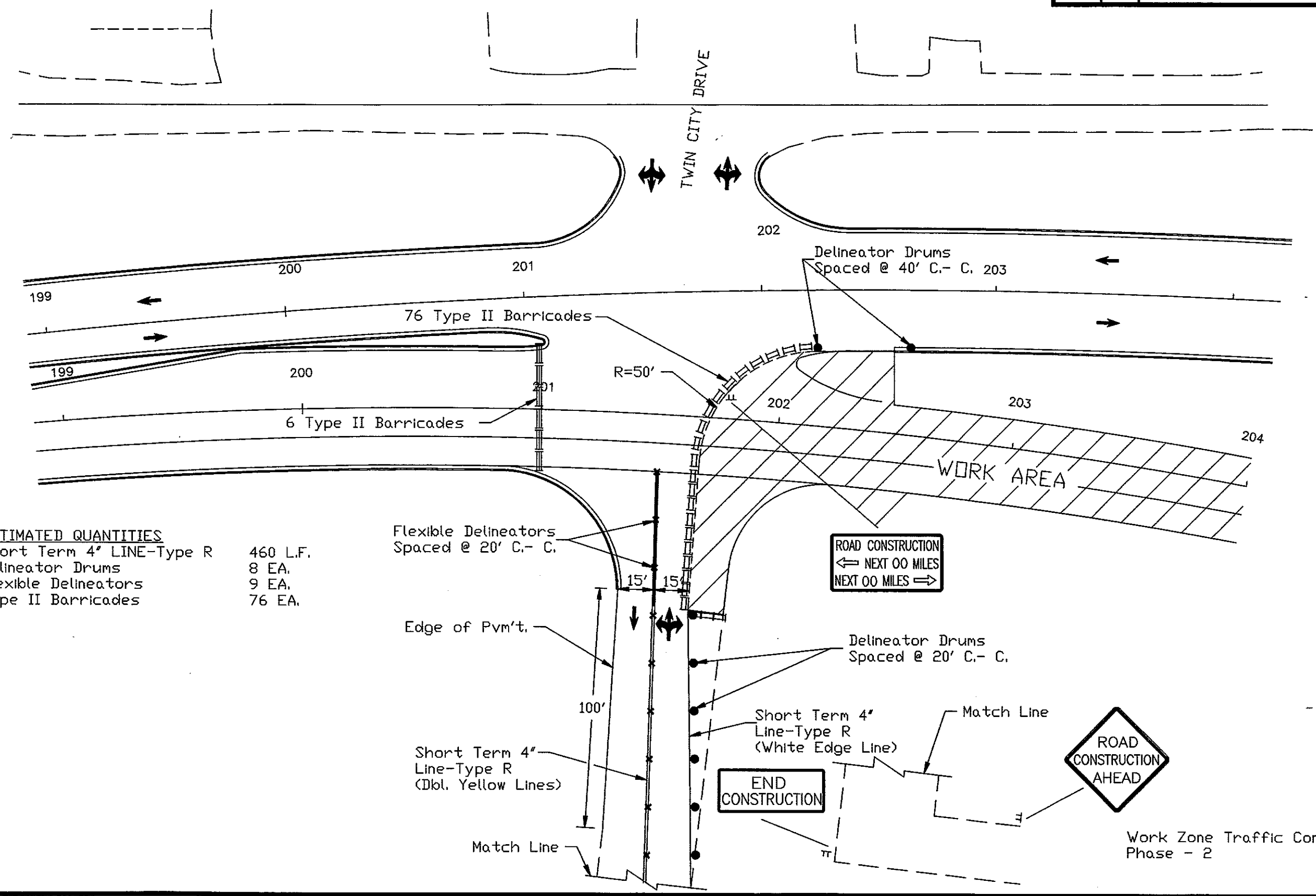
- Delineator Drums Spaced @ 20' C.- C.
- Short Term 4" Line-Type R (White Edge Line)
- Short Term 4" Line-Type R (Dbl. Yellow Lines)

ROAD CONSTRUCTION
 ← NEXT 00 MILES
 NEXT 00 MILES →

ROAD CONSTRUCTION AHEAD

END CONSTRUCTION

Work Zone Traffic Control Phase - 2



ESTIMATED QUANTITIES
 Short Term 4" LINE-Type R 460 L.F.
 Delineator Drums 8 EA.
 Flexible Delineators 9 EA.
 Type II Barricades 76 EA.

Flexible Delineators Spaced @ 20' C.- C.

Edge of Pvm't.

Short Term 4" Line-Type R (Dbl. Yellow Lines)

Match Line

15'

15'

100'

Match Line

R=50'

ROAD CONSTRUCTION
 ← NEXT 00 MILES
 NEXT 00 MILES →

Delineator Drums Spaced @ 20' C.- C.

Short Term 4" Line-Type R (White Edge Line)






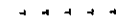
END CONSTRUCTION

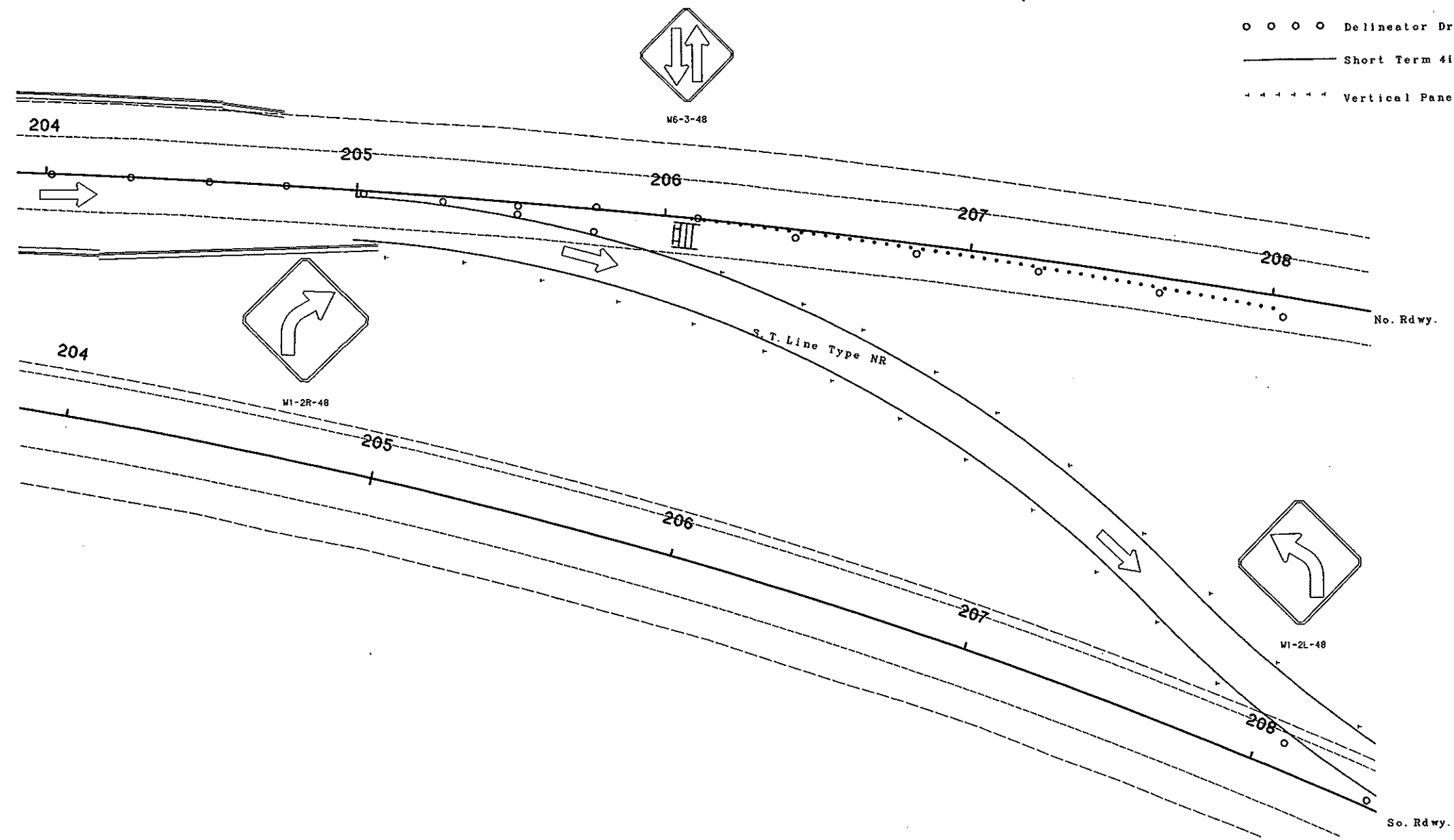
Match Line

ROAD CONSTRUCTION AHEAD

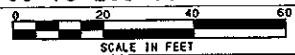
Work Zone Traffic Control Phase - 2



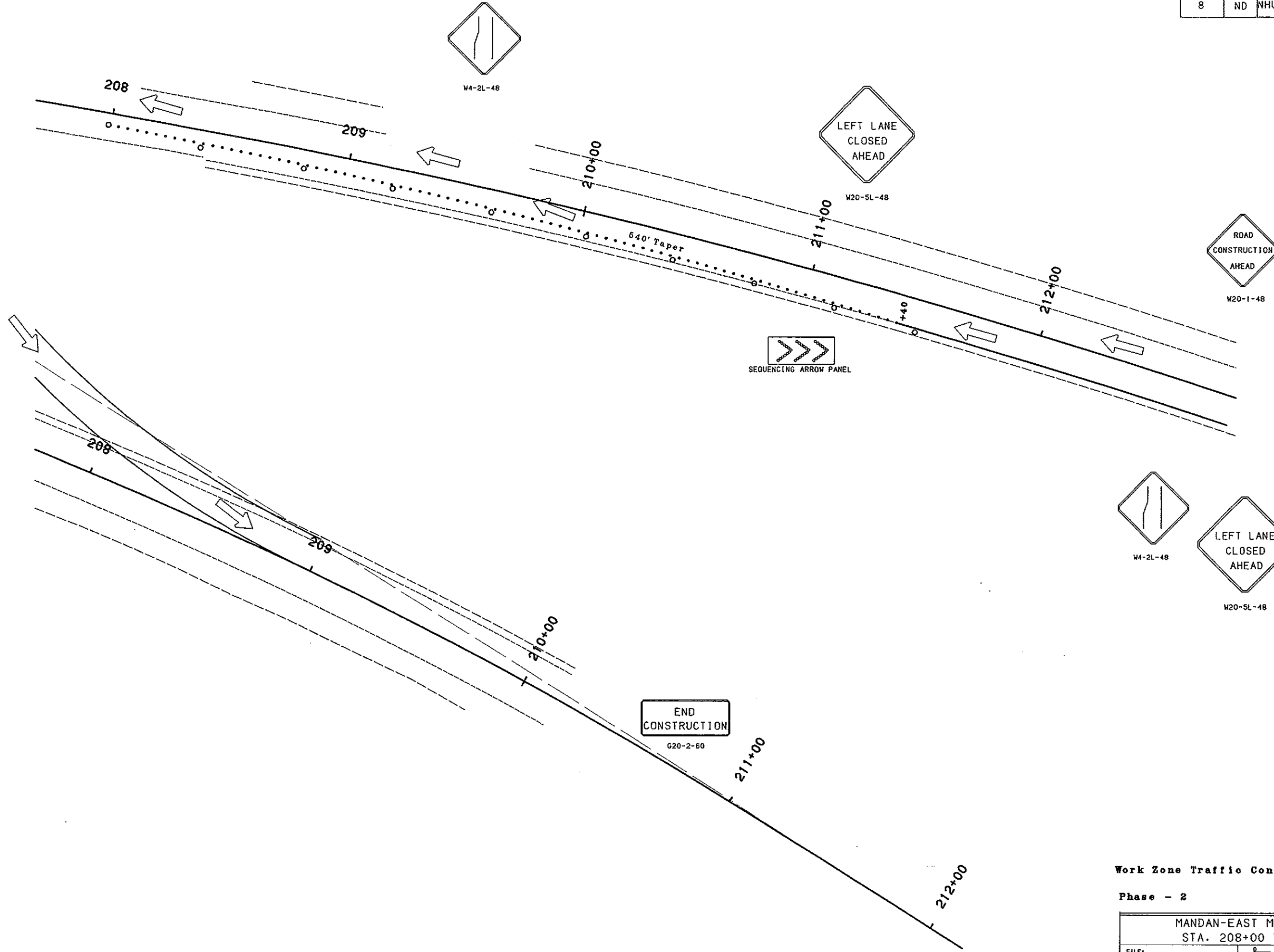
-  Sign Symbol
-  Type 3 Barricade
-  Raised Pavm't. Markers (RPM's Sp. @ 5')
-  Delineator Drums (Sp. @ 25')
-  Short Term 4in Line Type NR
-  Vertical Panel's (Sp. @ 25')



Work Zone Traffic Control
Phase - 2

MANDAN-EAST MAIN STREET STA. 204+00 TO 208+00	
FILE: WZTC8.GRF	 <p>SCALE IN FEET</p>

410



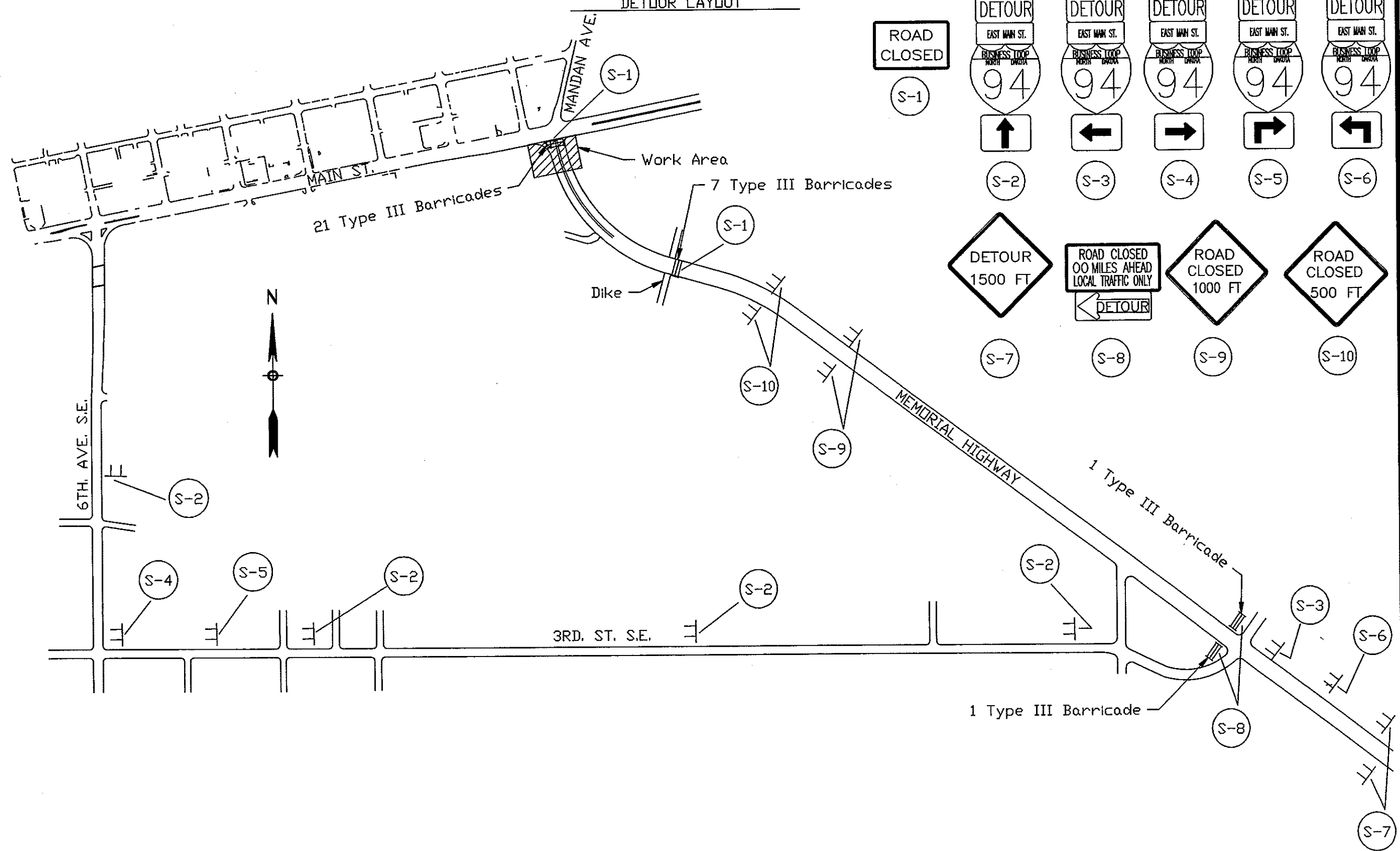
Work Zone Traffic Control

Phase - 2

MANDAN-EAST MAIN STREET STA. 208+00 TO 212+00	
FILE: WZTC9.GRF	SCALE IN FEET 0 20 40 60

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	71

MANDAN AVENUE
INTERSECTION CONSTRUCTION
DETOUR LAYOUT



COORDINATE AND CURVE DATA (PRELIMINARY SURVEY)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	72

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	
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	
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	
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	
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	
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	
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	
POT	105+10.36	11125.398	11883.043						TP18	11261.983	13123.406	
PC	109+16.88	11144.915	12289.094	CURVE #2								
PI#2	110+00.29	11148.920	12372.411	ARC DEFINITION								
PT	110+83.41	11164.948	12454.269	I = 8° 19' 35" LT								
POT	131+92.35	11570.190	14523.908	D = 5° 00'								
POT	156+00.56	12032.937	16887.240	R = 1145.92'								
POT	173+14.55	12362.286	18569.285	T = 83.41'								
PI	188+31.73	12653.819	20058.192	L = 166.53'								
END	196+19.60	12804.495	20831.520									
N. ROADWAY ALIGNMENT				CURVE #1 (RECORD)								
NORTH ROADWAY ALIGNMENT				CHORD DEFINITION								
BEG	188+31.73	12666.579	20055.706	I = 38° 17' 00" RT								
PC	196+19.58	12817.252	20829.017	D = 1° 45'								
PI#1	207+56.03	13034.591	21944.487	R = 3274.17'								
PT	218+07.28	12514.105	22954.737	T = 1136.43'								
				L = 2187.62'								
SOUTH ROADWAY ALIGNMENT				S. ROADWAY ALIGNMENT								
BEG	188+31.73	12631.243	20062.590	CURVE #1 (RECORD)								
TS	195+81.08	12774.553	20798.106	CHORD DEFINITION								
SC	197+81.08	12809.366	20995.028	I = 43° 02' 20" RT								
PI#1	204+34.55	12937.777	21635.836	D = 3° 00' 2-200' SP								
CS	210+15.87	12588.366	22188.137	R = 1910.08'								
ST	212+15.87	12485.331	22359.525	SC = 3° 00'								
				Yc = 199.95'								
				Xc = 3.49'								
				TS = 853.47'								
				L = 1234.77'								

NOTES:

- | | | |
|---|--|--|
| <input type="checkbox"/> METRIC UNITS | INITIALIZING BENCH MARK
Z 15 ELEV 1654.288 | <input checked="" type="checkbox"/> ASSUMED COORDINATES |
| <input checked="" type="checkbox"/> ENGLISH UNITS | <input checked="" type="checkbox"/> NGVD-29 <input type="checkbox"/> NAVD-88 | <input type="checkbox"/> ND COORD SYSTEM OF '83 ----- ZONE |

REMOVAL OF CURB & GUTTER

164+49 to 166+30 382 L.F.
(Median)

REMOVAL OF CONCRETE

164+49 to 166+30 49.3 S.Y.
(Median)

ADJUST INLET

164+56 Rt. 1 Ea.
164+56 Lt. 1 Ea.

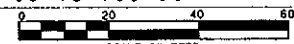
8 IN. NON-REINF. CONC. PVM'T. CL. A. E.

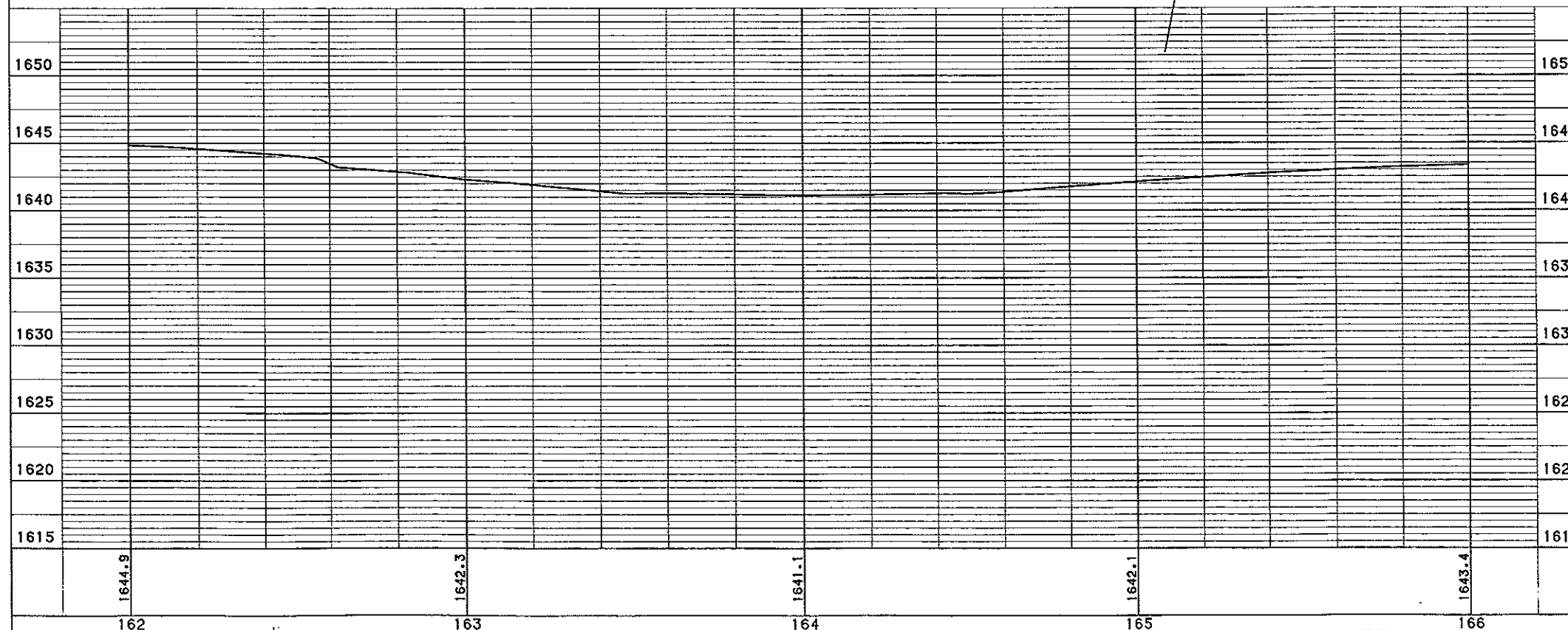
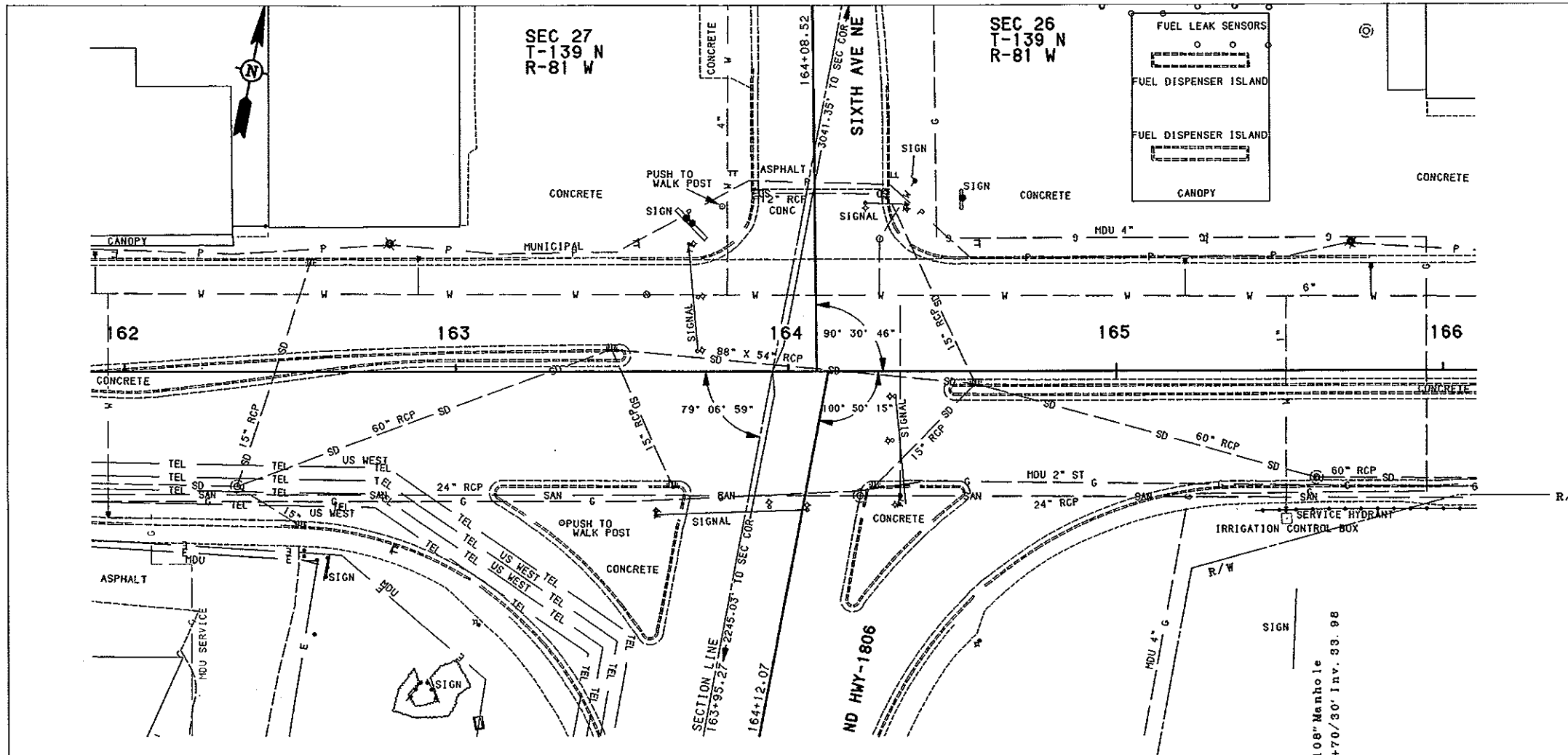
164+49 to 166+30 Median 130.72 S.Y.

CONCRETE MEDIAN PAVING

164+49 TO 166+30 Median 49.3 S.Y.

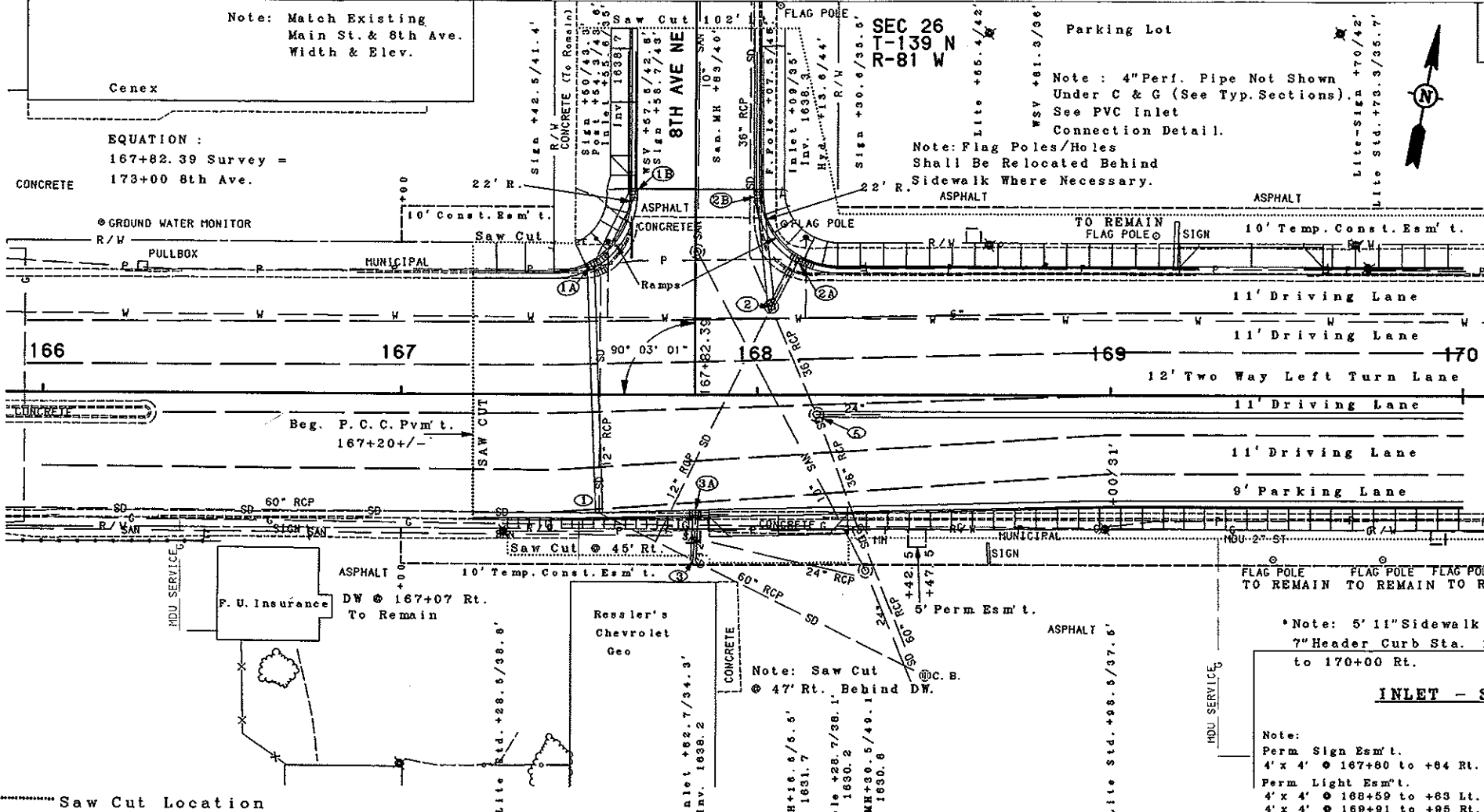
Note : The Void After Removing The Raised Median Island Shall Be Paved Flush With The Existing Pavement Prior to Phase 1. After Completion of Phase 2 The 6" Pvm't. Shall Be Installed To Form The Raised Median Island As Previously Existed. (See Concrete Median Paving Detail).

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
10	TOP OF FH	164+38 - 56' LT	1646.77
-	-	-	-
MANDAN-EAST MAIN STREET STA. 162+00 TO 166+00			
FILE:	PP162-166.GRF	 SCALE IN FEET	



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Note: Match Existing Main St. & 8th Ave. Width & Elev.



ADJUST MANHOLE
 167+83 LT. 1 EA.
 168+17 RT. 1 EA.
 168+29 RT. 1 EA.

MANHOLE - 60 IN.
 #2 1 EA.

MH RISER - 60 IN.
 #2 9.19 L.F.

INLET - SLOTTED DRAIN 18 IN.
 2B 40 L.F.

REMOVAL OF CONCRETE
 167+20 to 170+00 (D.W.) 49.7 S.Y.
 167+20 to 170+00 (S.W.) 212.9 S.Y.

REMOVAL OF CONCRETE PAVEMENT
 167+20 TO 170+00 2125.66 S.Y

REMOVAL OF BIT. SURF.
 166+00 TO 170+00 152.5 Ton

SAW CONCRETE
 167+20 TO 170+00 LT. 118 L.F

REMOVAL OF CURB & GUTTER
 167+20 TO 170+00, LT 321 L.F
 167+20 TO 170+00, RT 280 L.F

SAW BIT. SURF.
 167+20 TO 170+00 571.2 L.F

PIPE, CONC. REINF. 15 IN. CL. 3 STORM DRAIN
 3 TO 3A 12 L.F.

PIPE, CONC. REINF. 18 IN. CL. 3 STORM DRAIN
 2 TO 2A 14 L.F.
 2 TO 2 B 28 L.F.
 4 TO 5 320 L.F.

PIPE, CONC. REINF. 21 IN. CL. 3 STORM DRAIN
 1 TO 1A 68 L.F.
 1A TO 1B 20 L.F.

EDGEDRAIN PERMEABLE BASE
 167+20 to 170+00 L&R 548.9 L.F.

INLET - TYPE 2
 1B 1 Ea.
 2B 1 Ea.
 3A 1 Ea.

INLET - TYPE 2, DOUBLE
 1A 1 Ea.
 2A 1 Ea.

INLET - SLOTTED DRAIN 21 IN.
 1B 40 L.F.

CURB & GUTTER TYPE 1
 167+20 TO 170+00, LT 377 L.F
 167+20 TO 170+00, RT 280 L.F

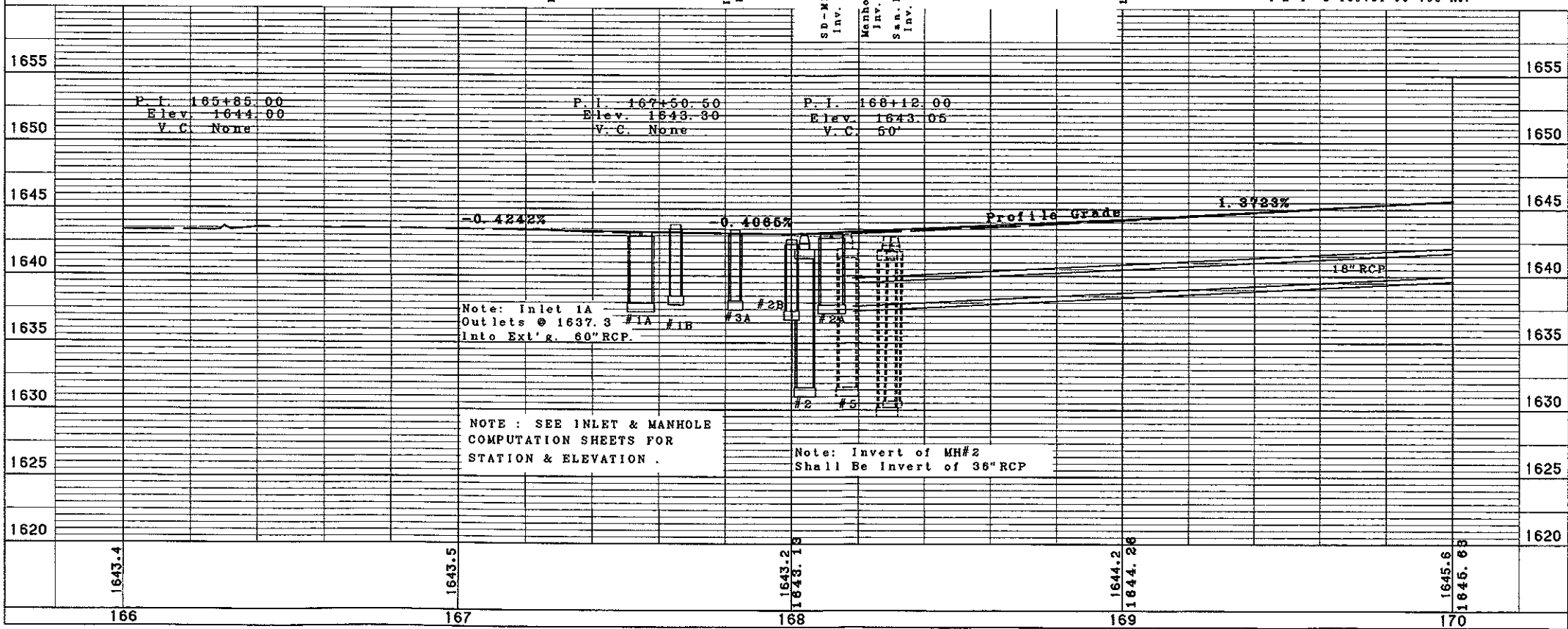
***CURB HEADER TYPE 1**
 169+75 to 170+00 Rt. 25 L.F.
 (See Std. D-750-2 Type 2 Curb Detail. Sloped Face Away From Sidewalk).

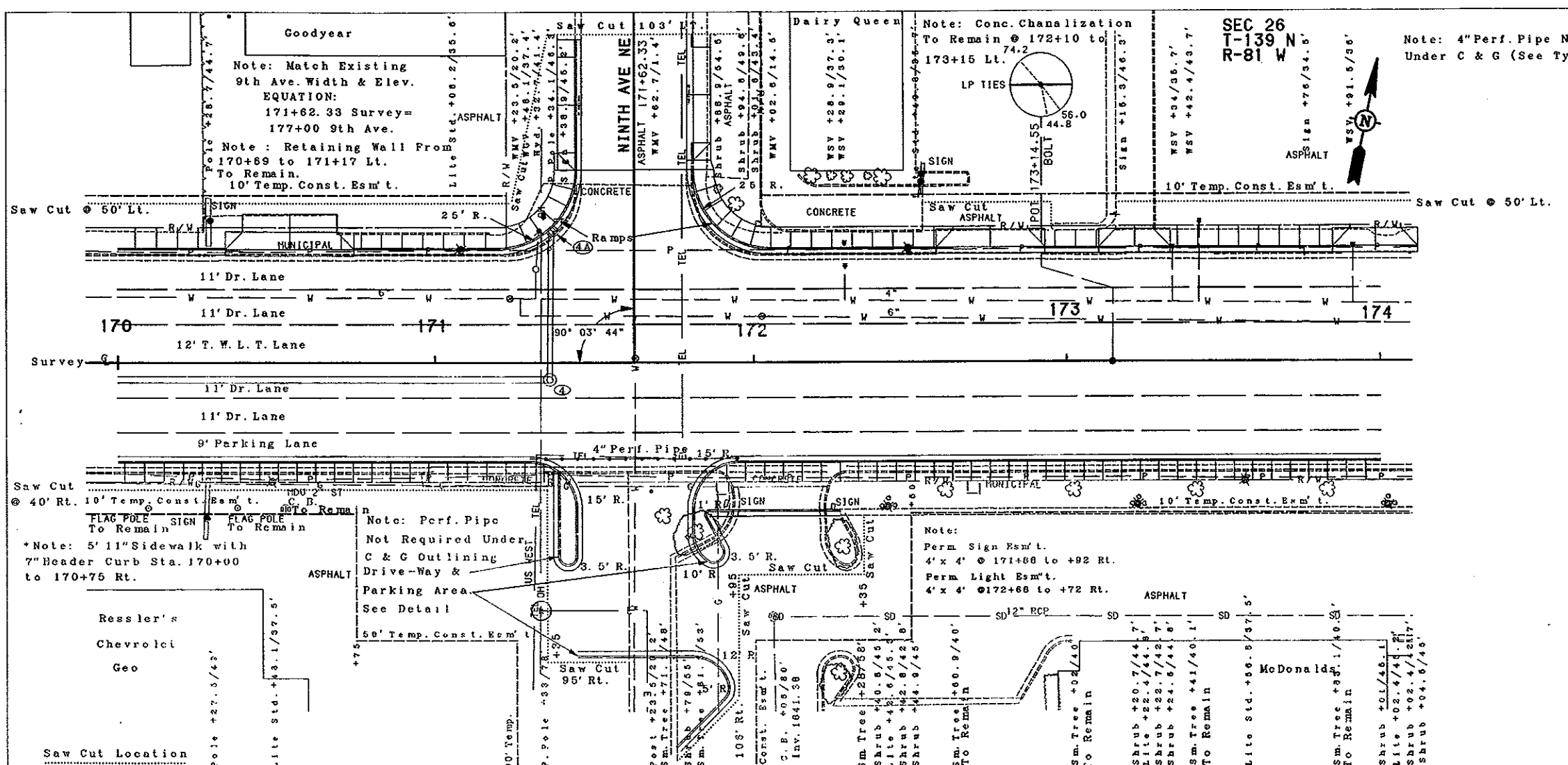
***SIDEWALK CONC.**
 167+20 TO 170+00, LT 213.17 S.Y
 167+20 TO 170+00, RT 145.0 S.Y

DRIVEWAY, CONC. TYPE 2
 168+06 RT. (28') 28.17 S.Y
 169+40 LT. (30') 29.61 S.Y
 167+64 LT. (30') 25.10 S.Y

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
10A	TOP OF FH	168+13 - 43' LT	1647.10
-	-	-	-

MANDAN-EAST MAIN STREET STA. 166+00 TO 170+00			
FILE:	PP166-170.GRF		





REMOVAL OF TREES 4 IN.
 171+71 Rt. 1 Ea.
 171+81 Rt. 1 Ea.
 172+28 Rt. 1 Ea.

REMOVAL OF CONCRETE
 170+00 to 174+00 (D.W.) 181.8 S.Y.
 170+00 to 174+00 (S.W.) 214.6 S.Y.

REMOVAL OF CONCRETE PAVEMENT
 170+00 TO 174+00 3039.56 S.Y.

REMOVAL OF BIT. SURF.
 170+00 TO 174+00 176.44 Ton

SAW CONCRETE
 170+00 TO 174+00 LT. 12.5 L.F.

REMOVAL OF CURB & GUTTER
 170+00 TO 174+00, LT 487 L.F.
 170+00 TO 174+00, RT 497 L.F.

SAW BIT. SURF.
 170+00 TO 174+00 706.2 L.F.

SODDING
 171+80 to 174+00 Rt. 220 S.Y.

PIPE, CONC. REINF. 15 IN. CL. 3 STORM DRAIN
 4 TO 4A 46 L.F.

EDGEDRAIN PERMEABLE BASE
 170+00 to 174+00 L&R 792.5 L.P.

MANHOLE - 48 IN
 4 1 EA

MANHOLE RISER - 48 IN
 4 4.36 L.F.

INLET - TYPE 2
 4A 1 Ea.

CURB & GUTTER TYPE 1
 170+00 TO 174+00, LT 494 L.F.
 170+00 TO 174+00, RT 669.1 L.F.

***CURB HEADER TYPE 1**
 170+00 to 170+75 Rt. 75 L.F.
 (See Std. D-750-2 Type 2 Curb Detail, Sloped Face Away From Sidewalk).

***SIDEWALK CONC.**
 170+00 TO 174+00, LT 206.64-S.Y.
 170+00 TO 174+00, RT 235.33 S.Y.

DRIVEWAY CONC. TYPE 2

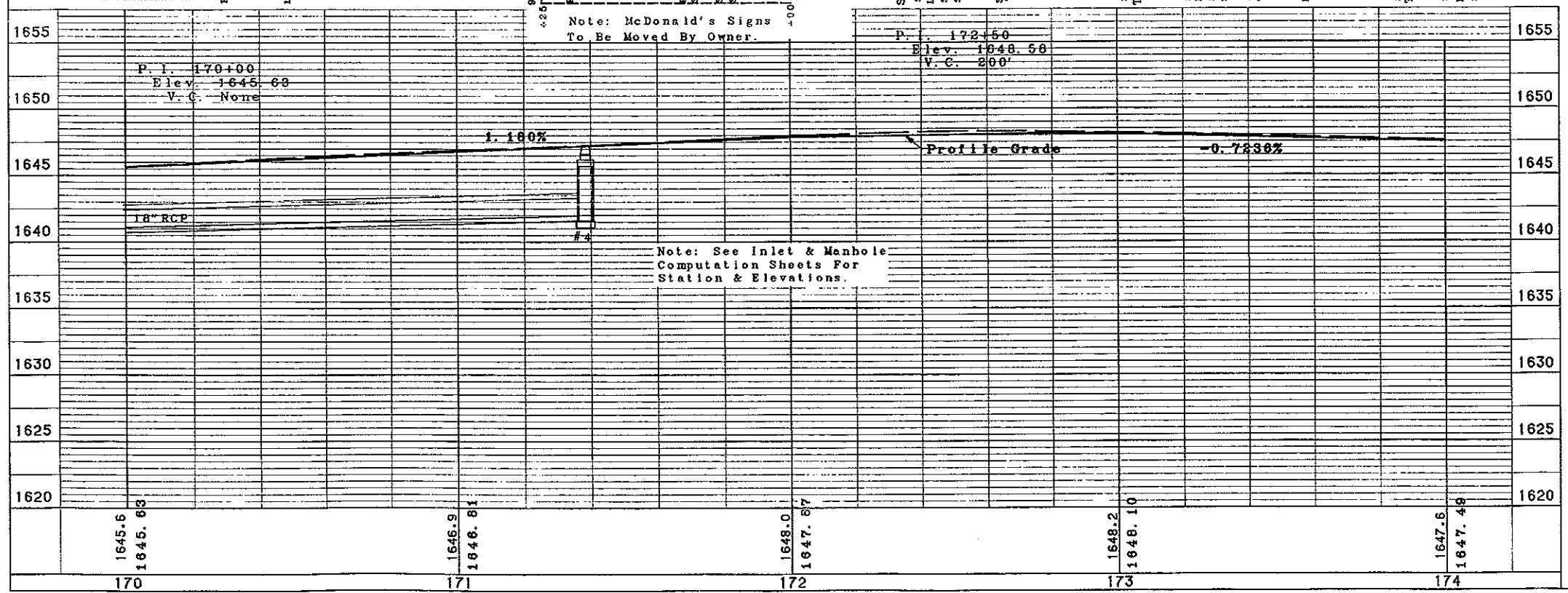
170+48 LT. (30')	25.1 S.Y.
171+62.33 RT. (38')	28.7 S.Y.
172+75.60 LT. (24')	21.4 S.Y.
173+21.70 LT. (12')	14.1 S.Y.
173+98.60 LT. (16')	16.5 S.Y.
171+42 LT. (42')	26.3 S.Y.
171+79 LT. (40')	24.1 S.Y.

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
11	TOP OF FH	171+32 - 41' LT	1651.06
-	-	-	-

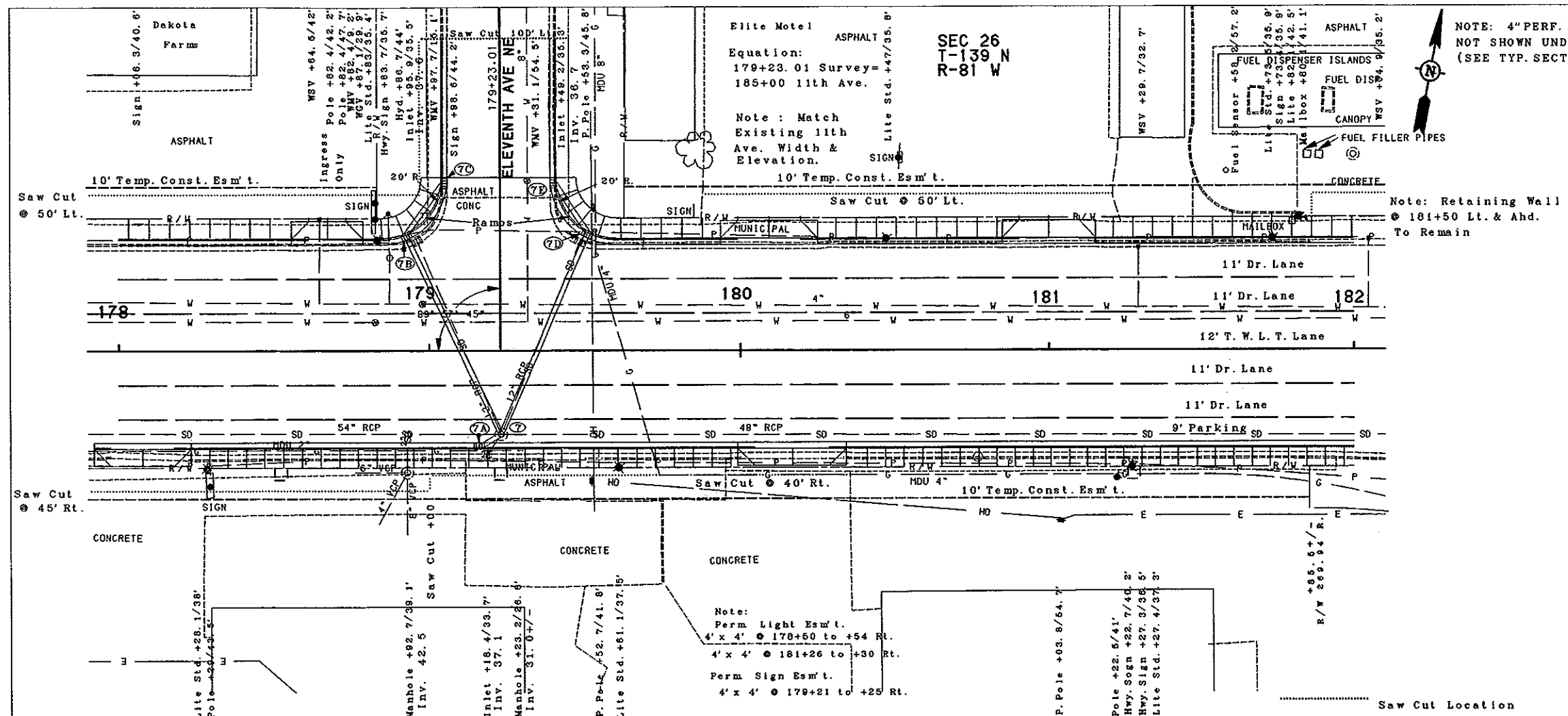
MANDAN-EAST MAIN STREET
 STA. 170+00 TO 174+00

FILE: PP170-174.GRF

SCALE IN FEET



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	77



NOTE: 4" PERF. PIPE NOT SHOWN UNDER C & G (SEE TYP. SECTIONS).

REMOVAL OF CONCRETE

178+00 TO 182+00 (D.W.)	110.8 S.Y.
178+00 TO 182+00 (P.L.)	55.1 S.Y.
178+00 TO 182+00 (S.W.)	344.1 S.Y.

REMOVAL OF CONCRETE PAVEMENT

178+00 TO 182+00	2984.28 S.Y.
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REMOVAL OF BIT. SURFACING

178+00 TO 182+00	78.04 TON
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SAW CONCRETE

178+00 TO 182+00	198.0 L.F.
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REMOVAL OF CURB & GUTTER

178+00 TO 182+00, LT	492 L.F.
178+00 TO 182+00, RT	400 L.F.

SAW BIT. SURF.

178+00 TO 182+00	397.0 L.F.
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SODDING

179+75 Lt.	89.5 S.Y.
181+35 Lt.	20.2 S.Y.

PIPE, CONC. REINF. 15 IN. CL. 3 STORM DRAIN

7 TO 7A	6 L.F.
7 TO 7B	70 L.F.
7B TO 7C	22 L.F.
7 TO 7D	68 L.F.
7D TO 7E	20 L.F.

EDGEDRAIN PERMEABLE BASE

178+00 to 182+00 L&R	786.4 L.F.
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INLET - TYPE 2

7A	1 Ea.
7B	1 Ea.
7C	1 Ea.
7D	1 Ea.
7E	1 Ea.

ADJUST MANHOLE

#7	1 Ea.
178+93 Rt.	1 Ea.

CURB & GUTTER TYPE 1

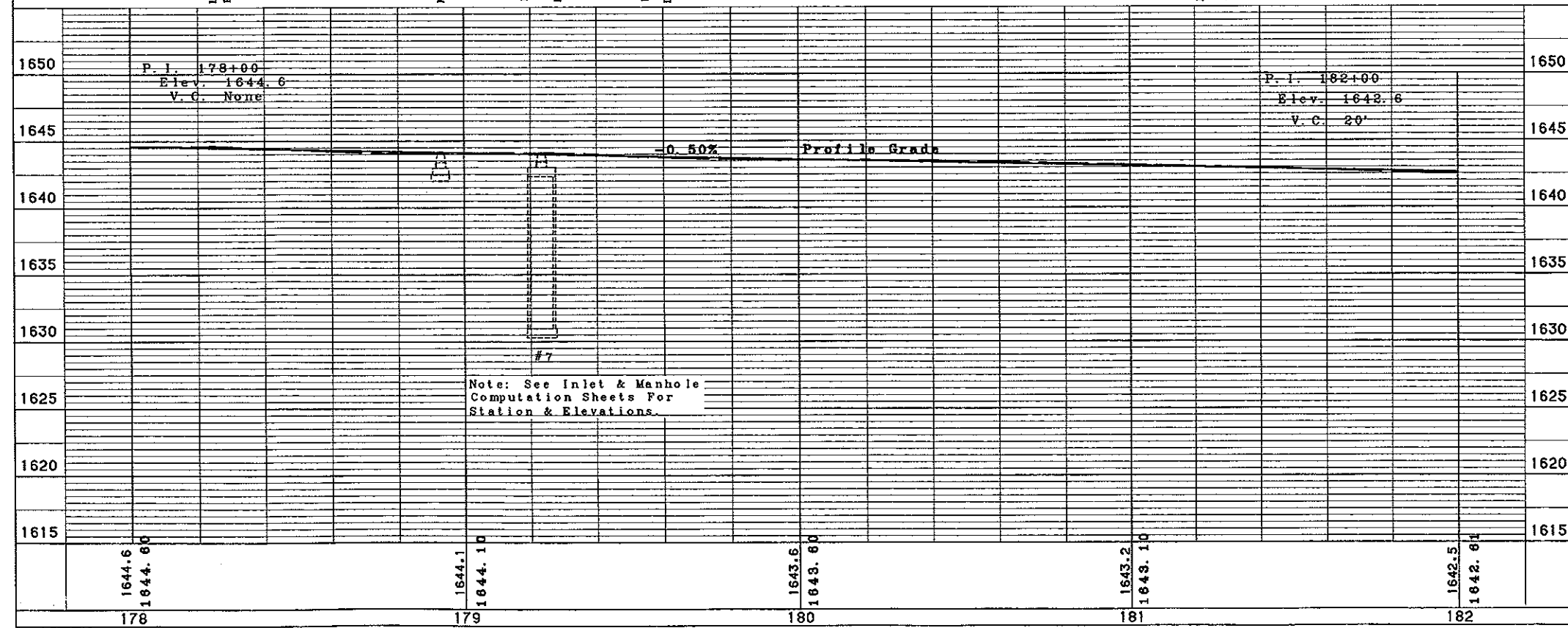
178+00 TO 182+00 LT.	485 L.F.
178+00 TO 182+00, RT	400 L.F.

SIDEWALK CONC.

178+00 TO 182+00 LT	246.39 S.Y.
178+00 TO 182+00 RT	325.10 S.Y.

DRIVEWAY, CONC. TYPE 2

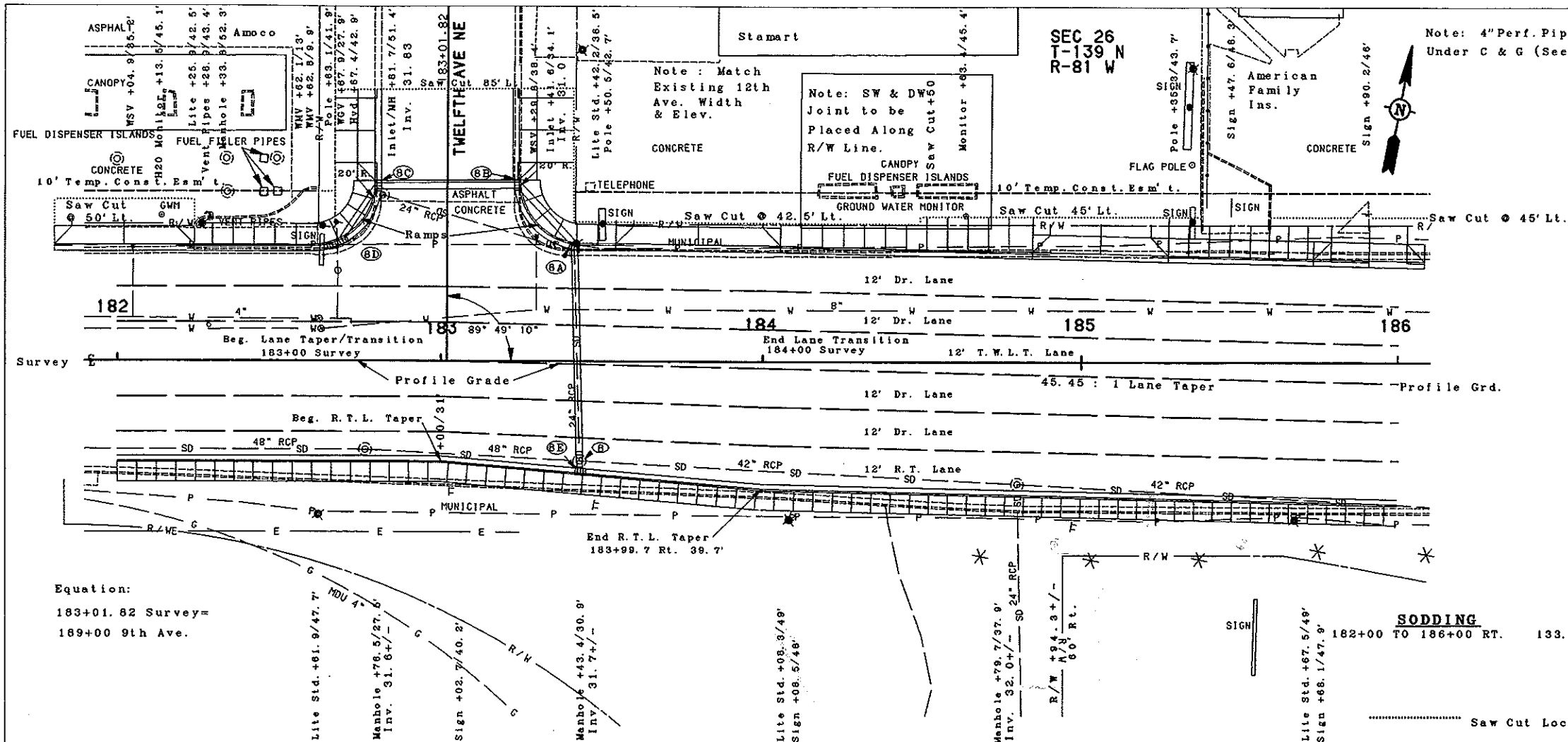
178+07.4 RT. (20')	36.7 S.Y.
178+67 LT. (12')	14.1 S.Y.
180+09.2 LT. (20')	18.9 S.Y.
180+16.5 RT. (24')	29.4 S.Y.
181+00 LT. (20')	18.9 S.Y.



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

MANDAN-EAST MAIN STREET
STA. 178+00 TO 182+00

FILE: PP178-182.GRF	0 20 40 60
SCALE IN FEET	



Note: 4\"/>

- REMOVAL OF CONCRETE**
182+00 TO 186+00 (D. W.) 275.5 S. Y.
182+00 TO 186+00 (S. W.) 242.9 S. Y.
- REMOVAL OF CONCRETE PAVEMENT**
182+00 TO 186+00 3275.50 S. Y.
- REMOVAL OF BIT. SURF.**
182+00 TO 186+00 38.72 TONS
- SAW CONCRETE**
182+00 TO 186+00 377.0 L. F.

- REMOVAL OF CURB & GUTTER**
182+00 TO 186+00, LT 452 L. F.
182+00 TO 186+00, RT 400 L. F.

- SAW BIT. SURF.**
182+00 TO 186+00 LT. 41.0 L. F.

- PIPE, CONC. REINF. 15 IN. CL. 3 STORM DRAIN**
8C TO 8D 20 L. F.
8 TO 8E 2 L. F.

- PIPE, CONC. REINF. 18 IN. CL. 3 STORM DRAIN**
8A TO 8B 26 L. F.
8B TO 8C 44 L. F.

- PIPE, CONC. REINF. 24 IN. CL. 3 STORM DRAIN**
8 TO 8A 66 L. F.

- EDGEDRAIN PERMEABLE BASE**
182+00 TO 186+00 L&R 778.3 L. F.

- INLET - TYPE 2**
8A 1 Ea.
8B 1 Ea.
8C 1 Ea.
8E 1 Ea.

- INLET - TYPE 2, DOUBLE**
8D 1 Ea.

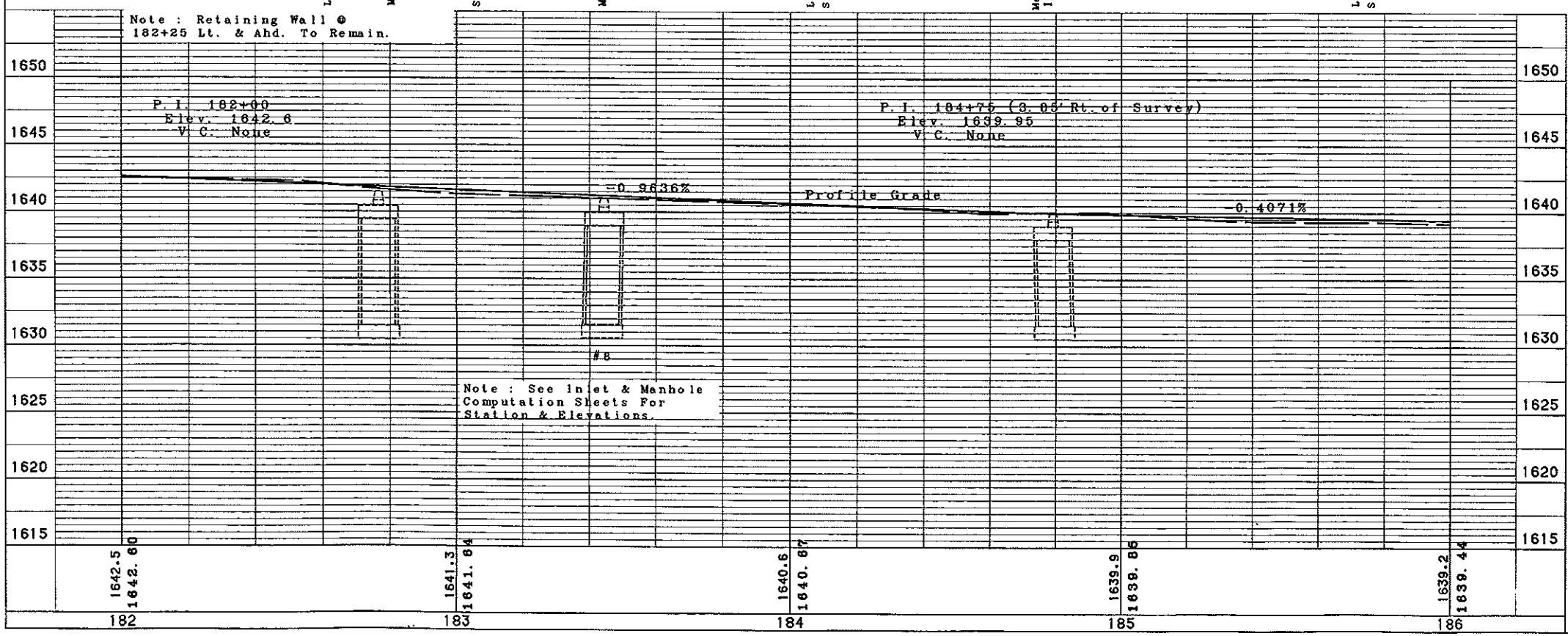
- ADJUST MANHOLE**
182+76 Rt. 1 Ea.
183+43 Rt. 1 Ea.
184+80 Rt. 1 Ea.
182+82 Lt. 1 Ea.

- CURB & GUTTER TYPE 1**
182+00 TO 186+00 LT 452 L. F.
182+00 TO 186+00, RT 396 L. F.

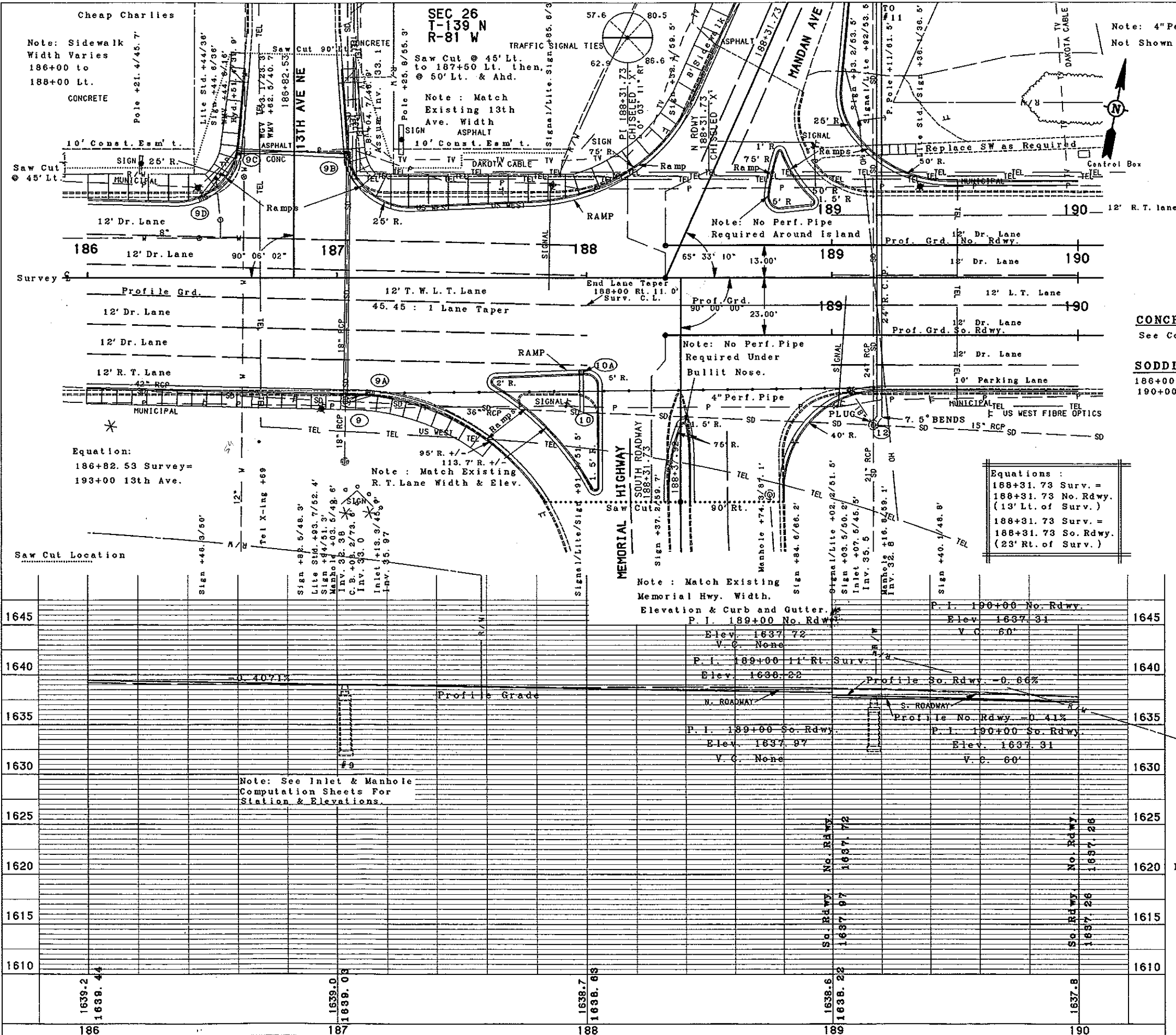
- SIDEWALK CONC.**
182+00 TO 186+00 LT 246.56 S. Y.
182+00 TO 186+00 RT 264.0 S. Y.

- DRIVEWAY, CONC. TYPE 2**
182+02 LT. (32') 66.9 S. Y.
183+80 LT. (40') 39.7 S. Y.
185+06 LT. (32') 53.9 S. Y.
182+79.4 LT. (20') 34.7 S. Y.
183+24 LT. (20') 47.8 S. Y.
*185+91 LT. (24') 32.5 S. Y.
*Center DW on Property Line

Equation:
183+01.82 Survey =
189+00 9th Ave.



BENCH MARKS			
NO.	DESCRIPTION	LOCATION	NGVD-29 ELEV.
13	TOP OF FH	182+68 - 42' LT	1644.35
MANDAN-EAST MAIN STREET STA. 182+00 TO 186+00			
FILE:	PP182-186.GRF		
SCALE IN FEET			



Note: 4" Perf. Pipe Under C & G Not Shown (See Typ. Sections)

REMOVAL OF CONCRETE
 186+00 to 190+00 (D.W.) 17.5 S.Y.
 186+00 to 190+00 (S.W.) 300.6 S.Y.

REMOVAL OF CONCRETE PAVEMENT
 186+00 TO 190+00 4706.60 S.Y.

REMOVAL OF BIT. SURF.
 186+00 TO 190+00 61.82 TON

SAW CONCRETE
 186+00 TO 190+00 LT. 204.8 L.F.

REMOVAL OF CURB & GUTTER
 186+00 TO 190+00 LT 483 L.F.
 186+00 TO 190+00 RT 540 L.F.

SAW BIT. SURF.
 186+00 TO 190+00 155.6 L.F.

CONCRETE MEDIAN PAVING
 See Conc. Med. Detail 40 S.Y.

REMOVE INLET
 189+07 Rt. 1 Ea.

SODDING
 186+00 TO 190+00 55 S.Y.

PIPE, CONC. REINF. 12 IN. CL. 3 STORM DRAIN
 9 TO 9A 8 L.F.

PIPE, CONC. REINF. 15 IN. CL. 3 STORM DRAIN
 9C TO 9D 24 L.F.
 10 TO 10A 16 L.F.

PIPE, CONC. REINF. 18 IN. CL. 3 STORM DRAIN
 9 TO 9B 96 L.F.
 9B TO 9C 44 L.F.

EDGEDRAIN PERMEABLE BASE
 186+00 to 190+00 L&R 956 L.F.

INLET - TYPE 1
 10A 1 Ea.

INLET - TYPE 2
 9A 1 Ea.
 9B 1 Ea.
 9C 1 Ea.
 9D 1 Ea.

INLET - SLOTTED DRAIN 21 IN.
 9C 22 L.F.

ADJUST MANHOLE
 187+03 Rt. 1 Ea.
 188+74 Rt. 1 Ea.

CURB & GUTTER TYPE 1
 186+00 TO 190+00 LT 565 L.F.
 186+00 TO 190+00 RT 455 L.F.

SIDEWALK CONC.
 186+00 TO 190+00 LT 295.58 S.Y.
 186+00 TO 190+00 RT 108.87 S.Y.

DRIVEWAY CONC. TYPE 2
 186+63 LT. (6' So. Half) 7 S.Y.
 187+02 LT. (6' So. Half) 8.3 S.Y.

Note: End Control Line 189+00 Survey (11' Rt.).
 Begin Control Line 189+00 No. Rdwy.
 Begin Control Line 189+00 So. Rdwy.

BENCH MARKS			
			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
14	TOP OF FH	186+52 - 40' LT	1640.76
-	-	-	-

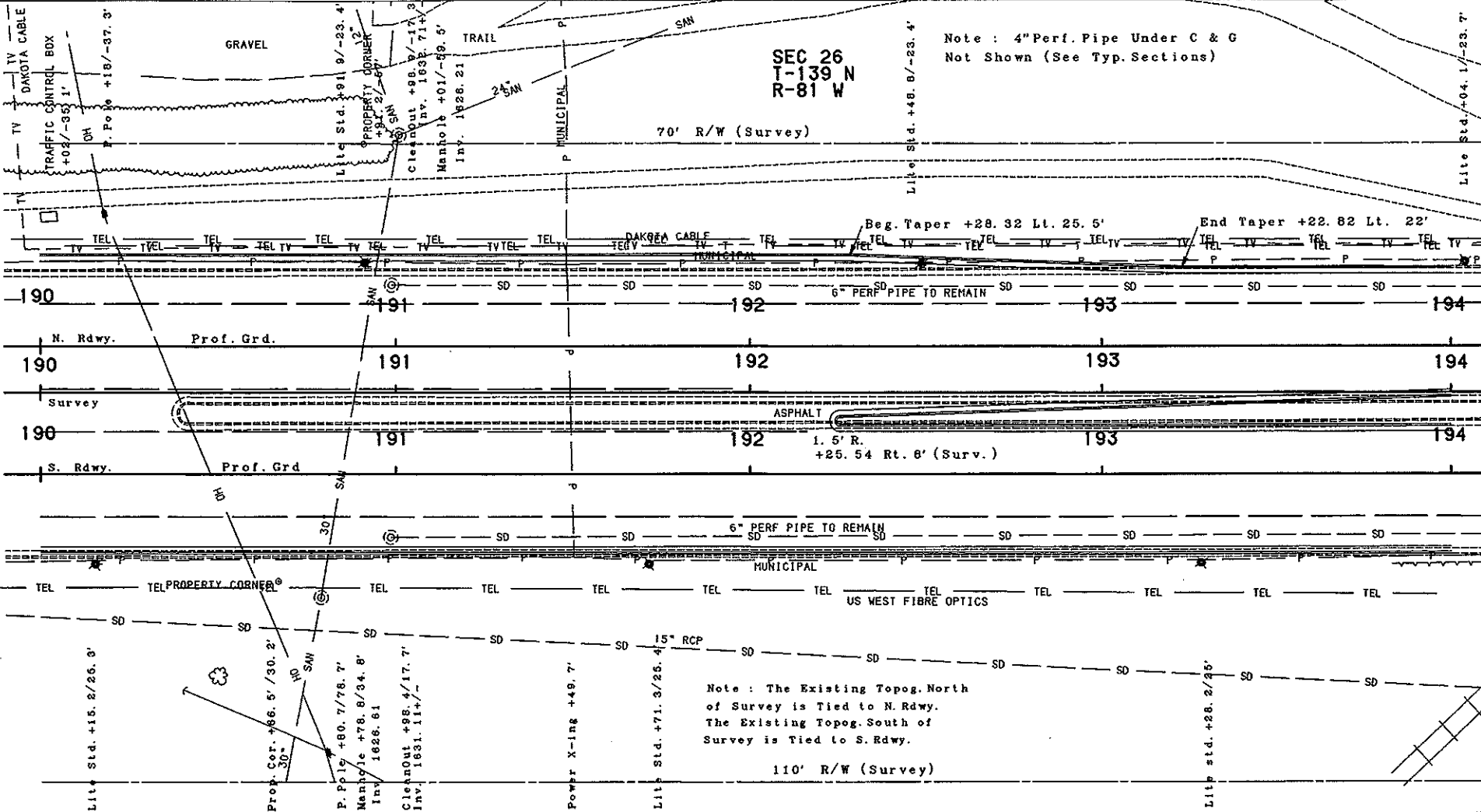
MANDAN-EAST MAIN STREET STA. 186+00 TO 190+00			
FILE:	PP186-190.GRF	SCALE IN FEET	

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	80

SEC 26
T-139 N
R-81 W

Note: 4" Perf. Pipe Under C & G
Not Shown (See Typ. Sections)

70' R/W (Survey)



Note: The Existing Topog. North
of Survey is Tied to N. Rdwy.
The Existing Topog. South of
Survey is Tied to S. Rdwy.

110' R/W (Survey)

REMOVAL OF CONCRETE PAVEMENT
190+00 TO 194+00 2936.89 S. Y

REMOVAL OF BIT. SURF.
190+00 TO 194+00 (MEDIAN) 16.9 Ton

REMOVAL OF CURB & GUTTER
190+00 TO 194+00, LT 400 L. F
190+00 TO 194+00, RT 400 L. F
190+00 TO 194+00, (MEDIAN) 728 L. F

EDGEDRAIN PERMEABLE BASE
190+00 TO 194+00 LT. & RT. 1154 L. F.

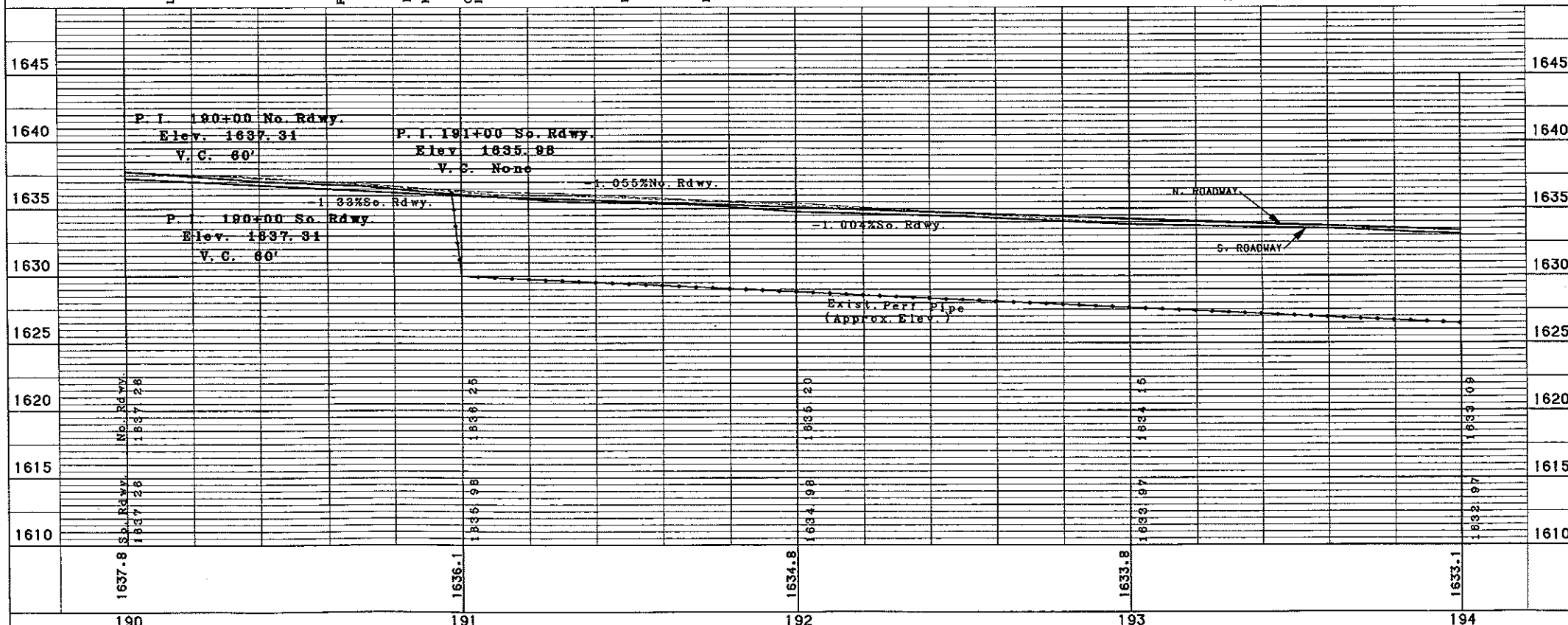
ADJUST MANHOLE (CLEAN-OUT)
190+98 Rt. 1 Ea.
190+99 Lt. 1 Ea.

CURB & GUTTER TYPE 1
190+00 TO 194+00, LT 400 L. F
190+00 TO 194+00, RT 400 L. F
192+24 TO 194+00, (MED) 344 L. F

SIDEWALK, CONCRETE
192+26 TO 194+00 (MED.) 92 S. Y.

CONCRETE MEDIAN PAVING
See Conc. Med. Paving Detail 5 S. Y.

Note: See Jersey Barrier Crash Cushion
& W-Beam Guardrail Layout.

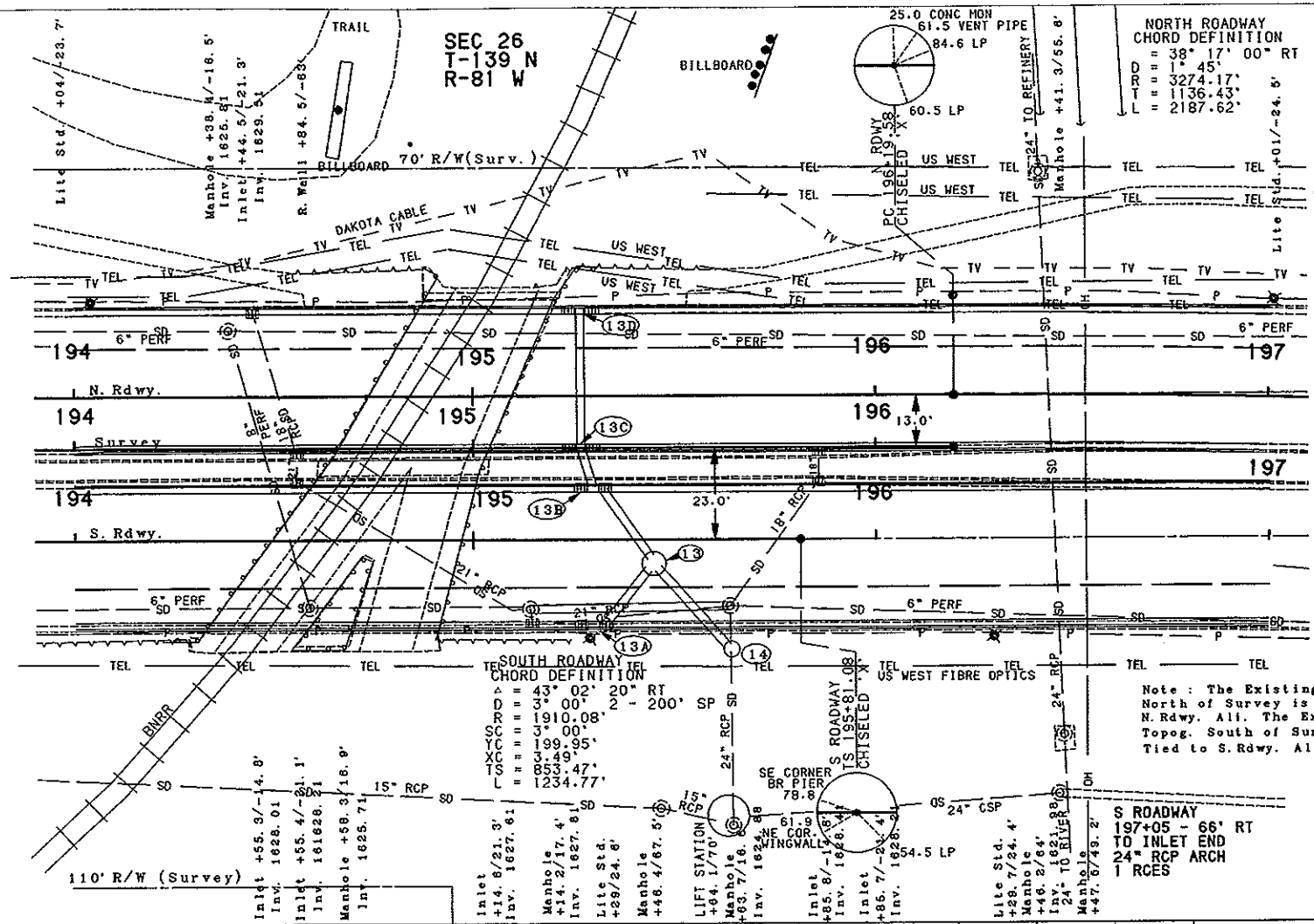


BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-

MANDAN-EAST MAIN STREET
STA. 190+00 TO 194+00

FILE: PP190-194.GRF

SCALE IN FEET



NOTE: 4" PERF. PIPE UNDER C & G NOT SHOWN (SEE TYP. SECTIONS).
 Note: Place EdgeDrains Along Side Abuttment & Pier Footings @ Railroad Structure Sta. 194+85.
 (See Detail)

Req. 3" Curb Height
 194+87.2 N. Side N. Rdwy.

6" PERF. PIPE TO REMAIN IN PLACE. SEE UNDERDRAIN LAYOUT & DETAIL. SEE NOTE 202 / P.04.

Note: See Jersey Barrier Crash Cushion & W-Beam Guardrail Layout for Curb Height to Barrier Transitions.

Note: The Existing Topog. North of Survey is Tied to N. Rdwy. All. The Existing Topog. South of Survey is Tied to S. Rdwy. All.

REMOVAL OF CONCRETE PAVEMENT
 194+00 TO 197+00 2166.67 S. Y

REMOVAL OF BIT. SURF.
 194+00 TO 197+00 (MED) 13.9 Ton

REMOVAL OF CURB & GUTTER
 194+00 TO 197+00, LT 300 L. F
 194+00 TO 197+00, RT 300 L. F
 194+00 TO 197+00, (MED) 600 L. F

REMOVE INLET
 194+45 Lt. 1 Ea.
 194+55 Med. 2 Ea.
 195+86 Med. 2 Ea.

REMOVAL OF MANHOLE
 195+14 Rt. 1 Ea.
 195+64 Rt. 1 Ea.

PIPE, CONC. REINF. 18 IN. CL. 3 STORM DRAIN
 #13 to #13A 20 L. F.

PIPE, CONC. REINF. 24 IN. CL. 3 STORM DRAIN
 #13 to #13B 22 L. F.
 #13B to #13C 10 L. F.
 #13C to #13D 36 L. F.
 #13 to #14 26 L. F.

EDGEDRAIN PERMEABLE BASE
 170+00 to 174+00 L&R 1200 L. F.

INLET - TYPE 2, DOUBLE
 #13A 1 Ea.
 #13B 1 Ea.
 #13C 1 Ea.
 #13D 1 Ea.

ADJUST MANHOLE
 194+38 Lt. 1 Ea.
 194+58 Rt. 1 Ea.

MANHOLE 48 IN
 #14 1 Ea.

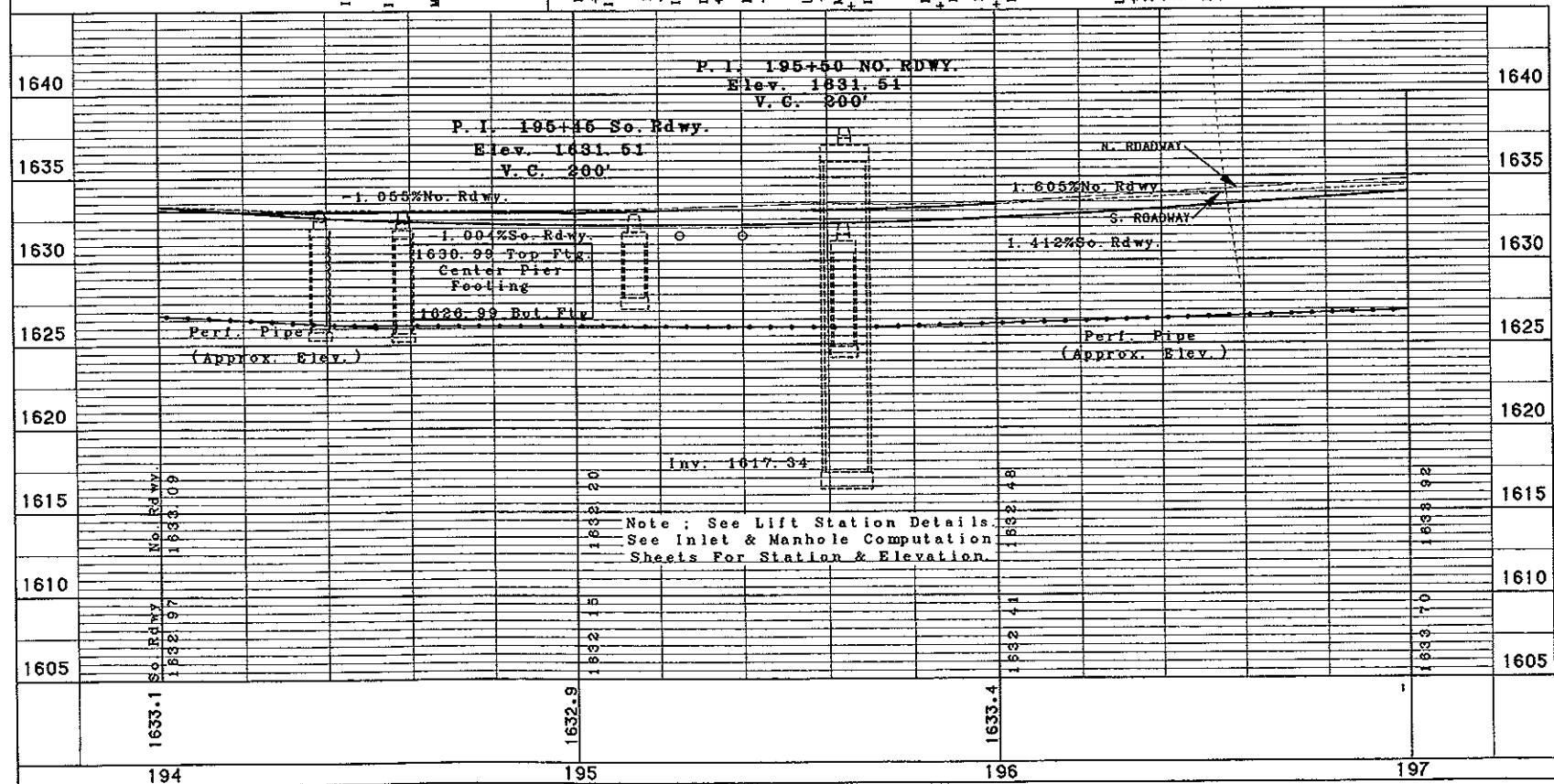
MANHOLE RISER 48 IN.
 #14 9.67 L. F.

MANHOLE 60 IN.
 #13 1 Ea.

MANHOLE RISER 60 IN.
 #13 4.63 L. F.

CURB & GUTTER TYPE 1
 194+00 TO 197+00, LT 255.5 L. F
 194+00 TO 197+00, (MED) 488 L. F
 194+00 TO 197+00, RT 150 L. F

SIDEWALK, CONC.
 194+00 TO 197+00 (MEDIAN) 200 S. Y.



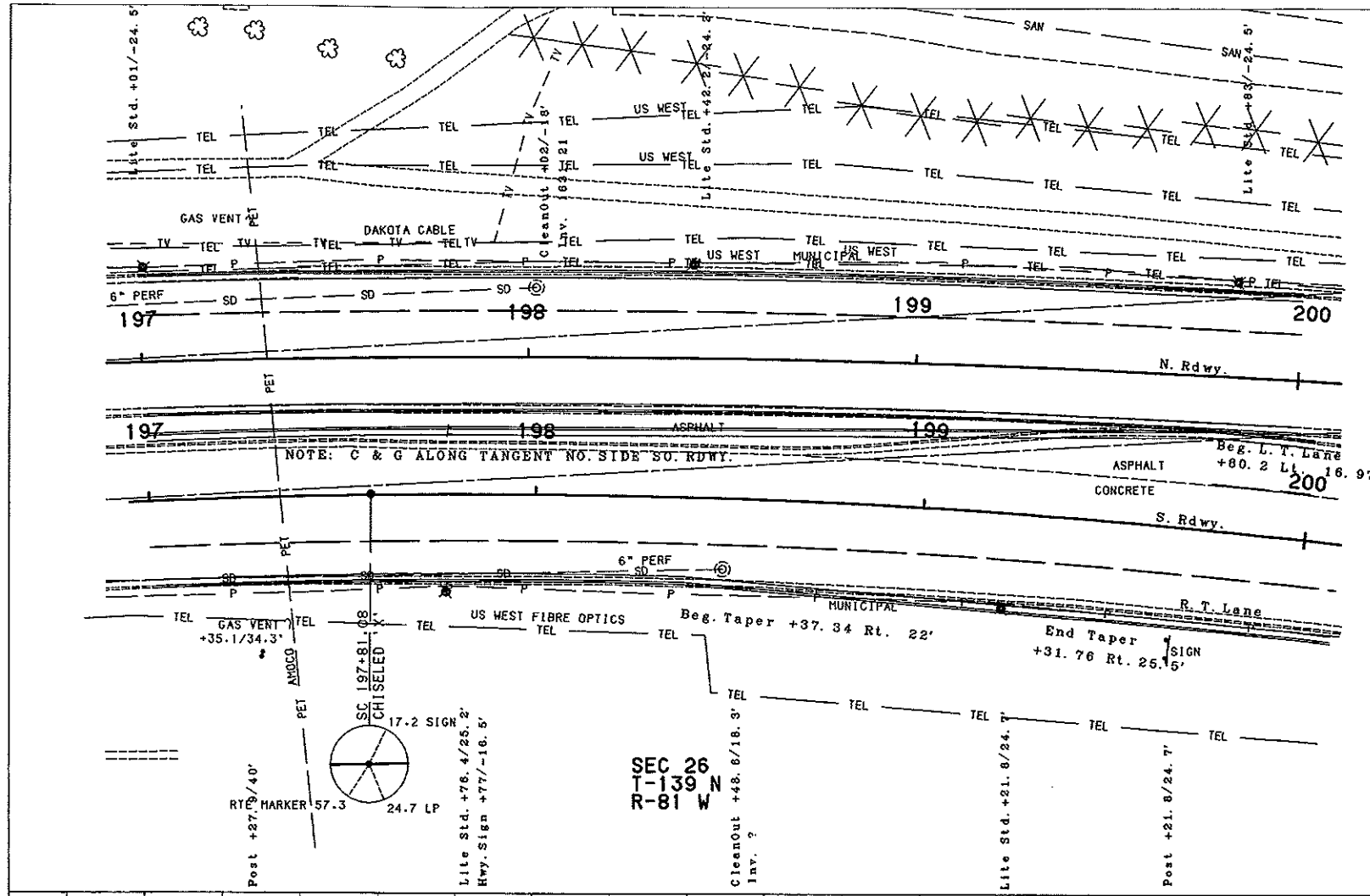
BENCH MARKS			
NO.	DESCRIPTION	LOCATION	NGVD-29 ELEV.
-	-	-	-
-	-	-	-

MANDAN-EAST MAIN STREET
 STA. 194+00 TO 197+00

FILE: PP194-197.grf

SCALE IN FEET

Note : 4" Perf. Pipe Under C & G
Not Shown (See Typ. Sections).



Note: 6" Perf. Pipe To Remain

REMOVAL OF CONCRETE PAVEMENT
197+00 TO 200+00 2166.66 S. Y

REMOVAL OF BIT. SURF.
197+00 TO 200+00 84.4 Ton

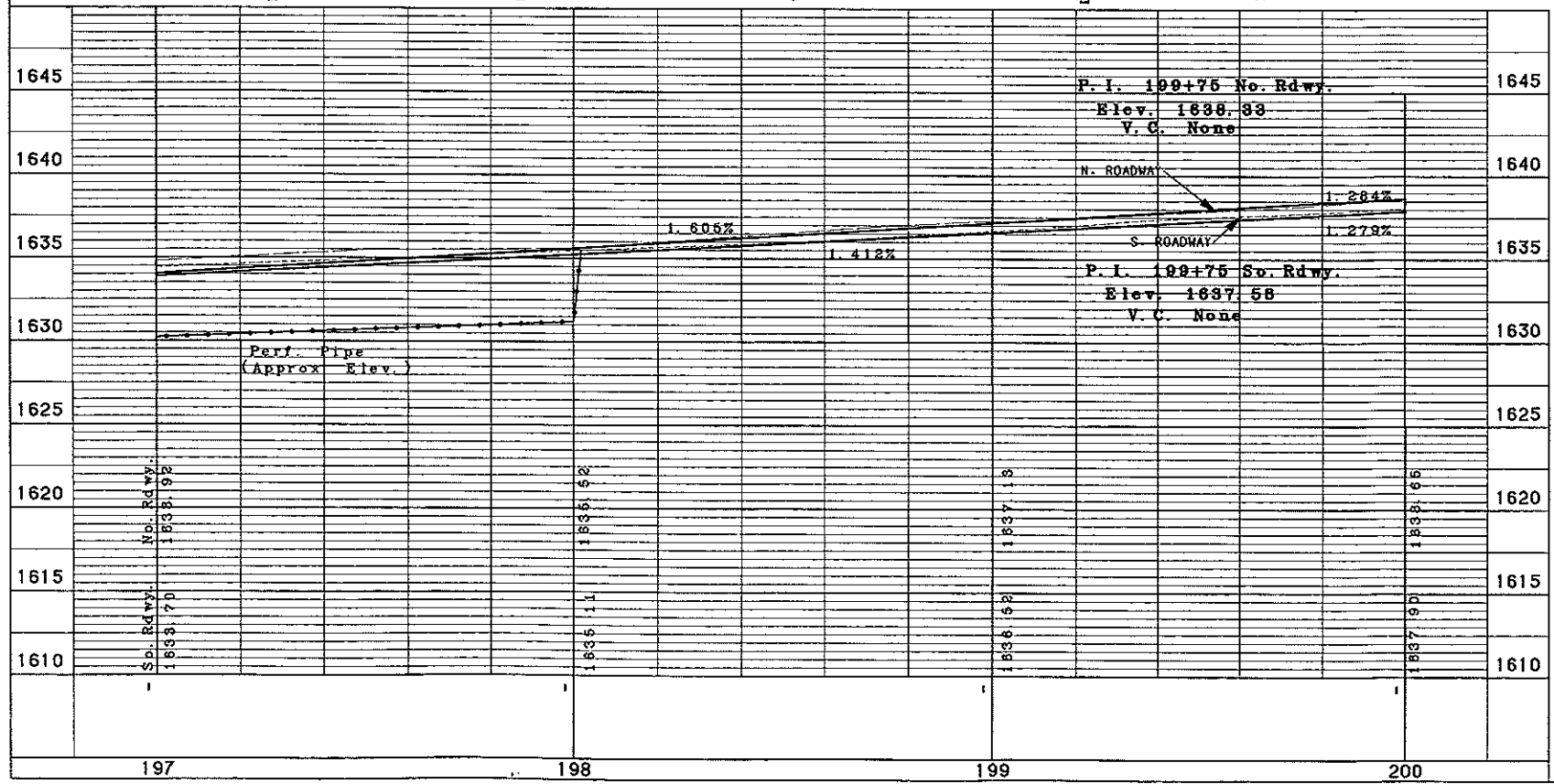
REMOVAL OF CURB & GUTTER
197+00 TO 200+00, LT 300 L. F
197+00 TO 200+00, RT 296 L. F
197+00 TO 200+00, (MED) 597 L. F

EDGEDRAIN PERMEABLE BASE
197+00 to 200+00 L&R 1200 L. F.

ADJUST MANHOLE (CLEANOUT)
198+02 Lt. 1 Ea.
198+48 Rt. 1 Ea.

CURB & GUTTER TYPE 1
197+00 TO 200+00, LT 300 L. F
197+00 TO 200+00, RT 295 L. F
197+00 TO 200+00, (MED) 592 L. F

SIDEWALK, CONCRETE
197+00 to 200+00 (Med.) 139.4 S. Y.

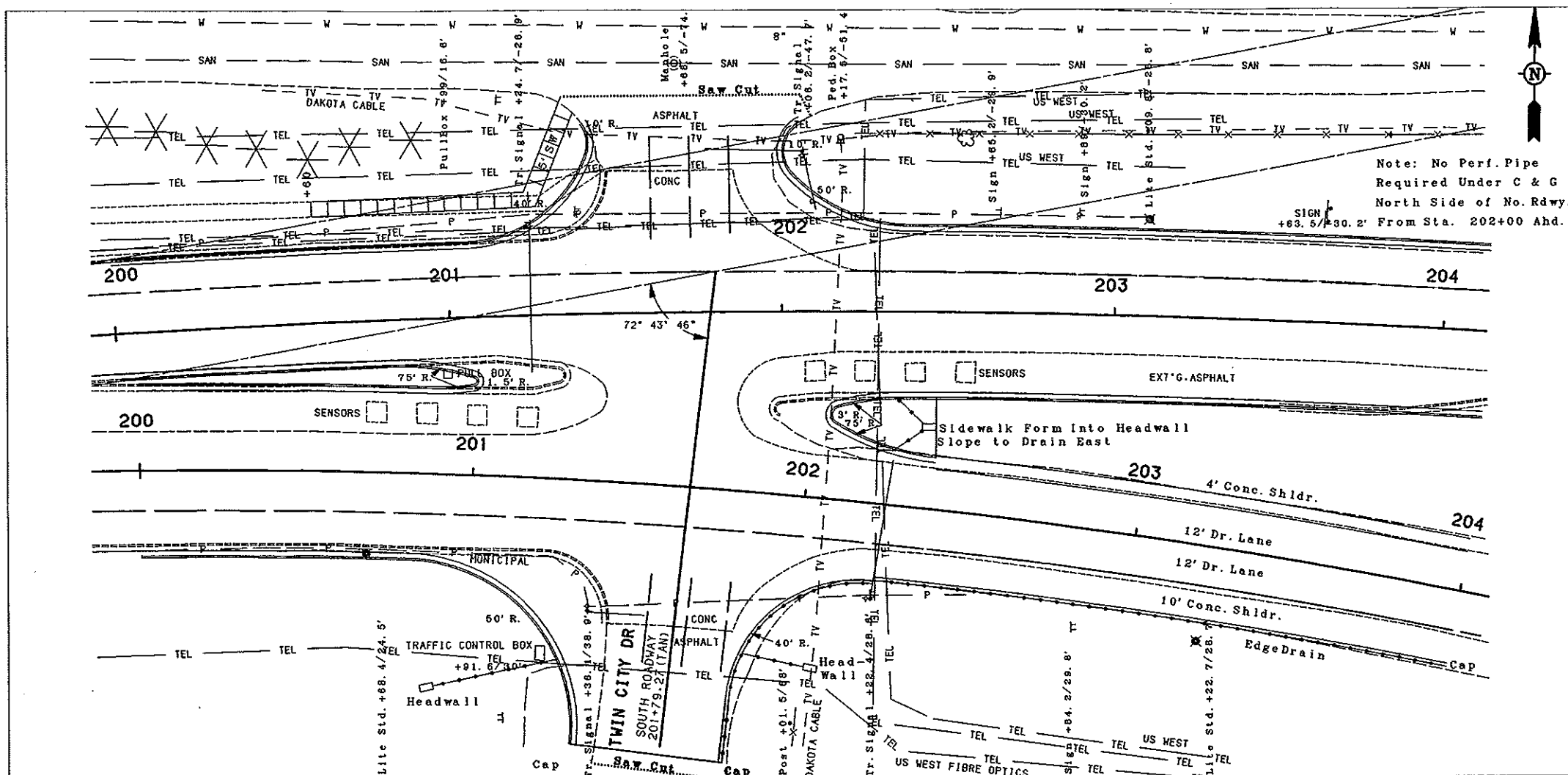


BENCH MARKS				NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.	
14A	SW BOLT ON LP BASE	N. ROADWAY ALIGN 198+42 - 24' LT	1637.75	
-	-	-	-	

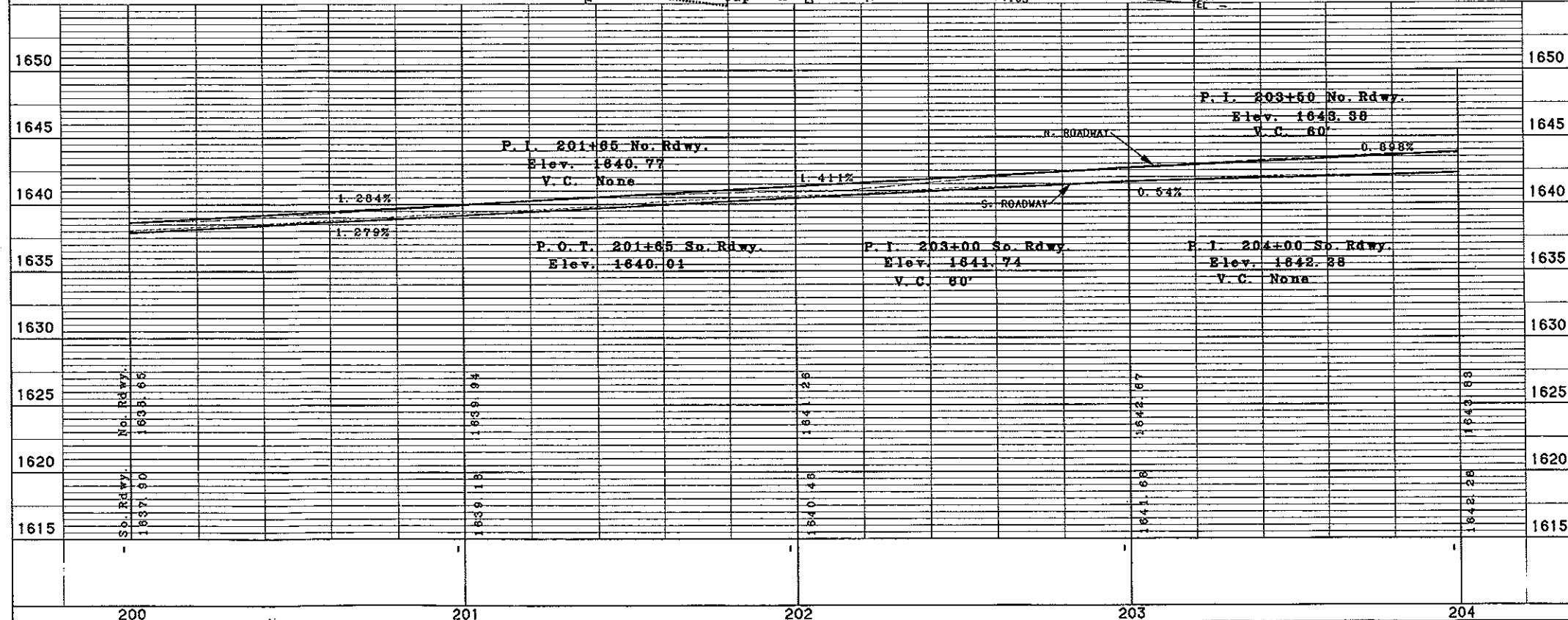
MANDAN-EAST MAIN STREET
STA. 197+00 TO 200+00

FILE:	PP197-200.grf
-------	---------------

SCALE IN FEET



- REMOVAL OF CONCRETE**
200+60 TO 201+40 LT. 30 S. Y.
- REMOVAL OF CONCRETE PAVEMENT**
200+00 TO 204+00 3074.36 S. Y.
- REMOVAL OF BIT. SURF.**
200+00 TO 204+00 575.6 Ton
- SAW CONCRETE**
200+60 LT. (SW) 5 L. F.
- REMOVAL OF CURB & GUTTER**
200+00 TO 204+00, LT 159 L. F
200+00 TO 204+00, RT 150 L. F
200+00 TO 204+00, (MED) 476 L. F
- SAW BIT. SURF.**
T. C. DRIVE LT. 83 L. F
T. C. DRIVE RT. 40 L. F
(To Be Determined By Field Engineer)
- EDGEDRAIN PERMEABLE BASE**
200+00 To 204+00 L&R 1021.5 L. F.
- HEADWALL, PRECAST CONC. 4 IN.**
201+00 Rt. 1 Ea.
202+00 Rt. 1 Ea.
(Exact Location To Be Established In The Field)
- CURB & GUTTER TYPE 1**
200+00 TO 204+00, LT 390 L. F
200+00 TO 204+00, RT 166 L. F
200+00 TO 204+00, (MED) 409 L. F
- SIDEWALK, CONCRETE**
200+ 00 to 202+36 103 S. Y.
- CONCRETE MEDIAN PAVING**
See Conc. Med. Paving Detail 12 S. Y.



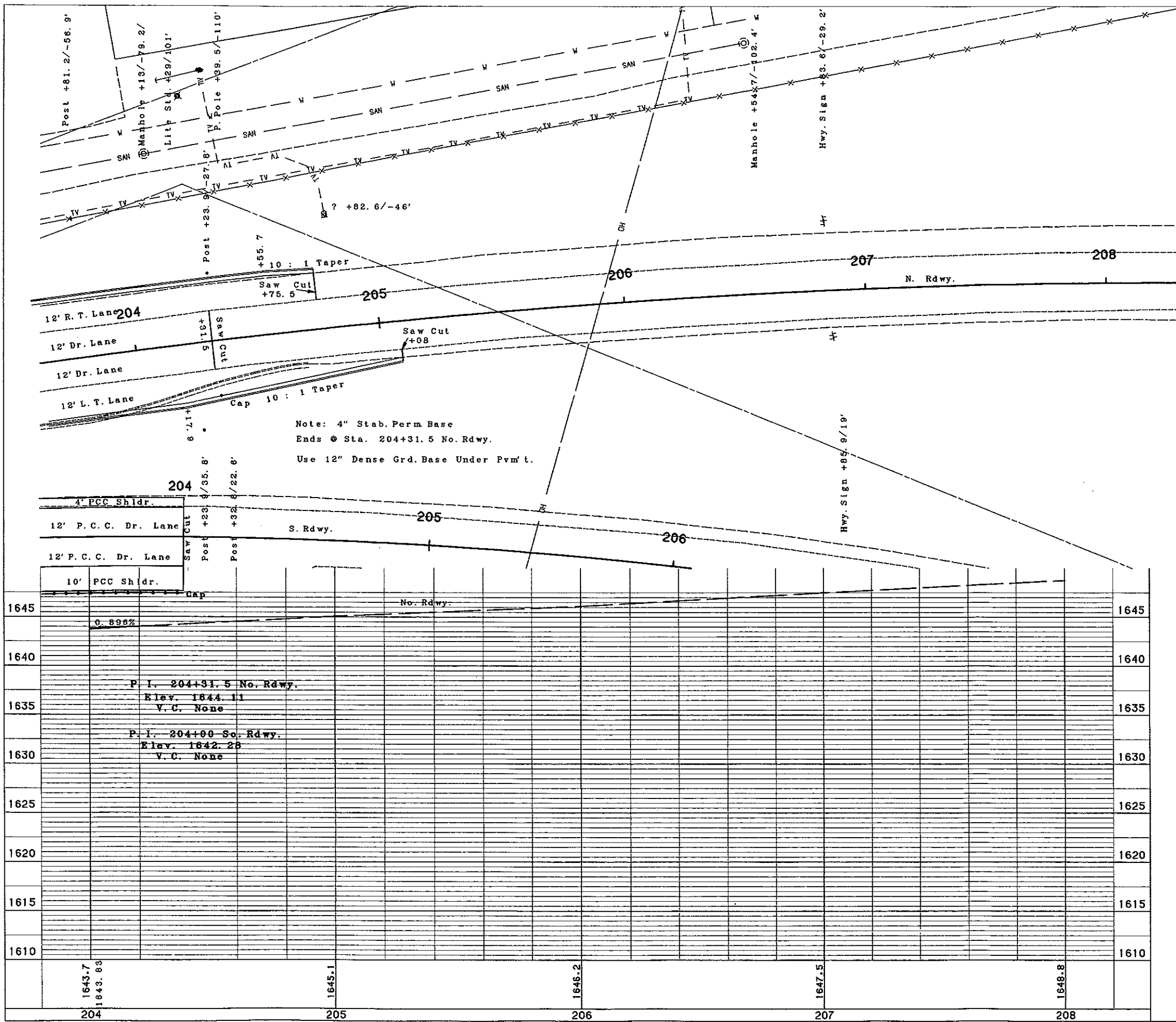
Note: The Curb & Gutter From 200+60 to 202+60 N. Rdwy. & Median Shall Be Installed After Phase 2. See Work Zone Traffic Control Detail Sheets.

BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
148	NW BOLT SIGNAL BASE	S. ROADWAY ALIGN 201+21 - 50' RT	1640.72
-	-	-	-

MANDAN-EAST MAIN STREET
STA. 200+00 TO 204+00

FILE: PP200-204.gcf

SCALE IN FEET



Note: 4" Stab. Perm Base
Ends @ Sta. 204+31.5 No. Rdwy.
Use 12" Dense Grd. Base Under Pvm't.

- REMOVAL OF CONCRETE PAVEMENT**
204+00 TO 204+31.5 84.0 S.Y.
- REMOVAL OF BIT. SURF.**
204+00 TO 205+08 72.9 Ton
- SAW CONCRETE**
204+31.5 N. RDWY. 24 L.F.
204+00 S. RDWY. 24 L.F.
- REMOVAL OF CURB & GUTTER**
204+00 TO 204+70, RT 70 L.F.
- SAW BIT. SURF.**
204+75.7 N. RDWY. 10 L.F. L.F.
205+08 N. RDWY. 4 L.F.
204+00 S. RDWY. 14 L.F.
- EDGEDRAIN PERMEABLE BASE**
204+00 TO 204+31 31 L.F.
- CURB & GUTTER TYPE 1**
204+00 TO 204+75.5, LT 75.5 L.F.
204+00 TO 205+08, RT 108 L.F.

1645	0.896%										1645
1640											1640
1635	P.I. 204+31.5 No. Rdwy. Elev. 1644.11 V.C. None										1635
1630	P.I. 204+00 So. Rdwy. Elev. 1642.28 V.C. None										1630
1625											1625
1620											1620
1615											1615
1610											1610
	1643.7 1643.83	1645.1	1646.2	1647.5	1648.8						
	204	205	206	207	208						

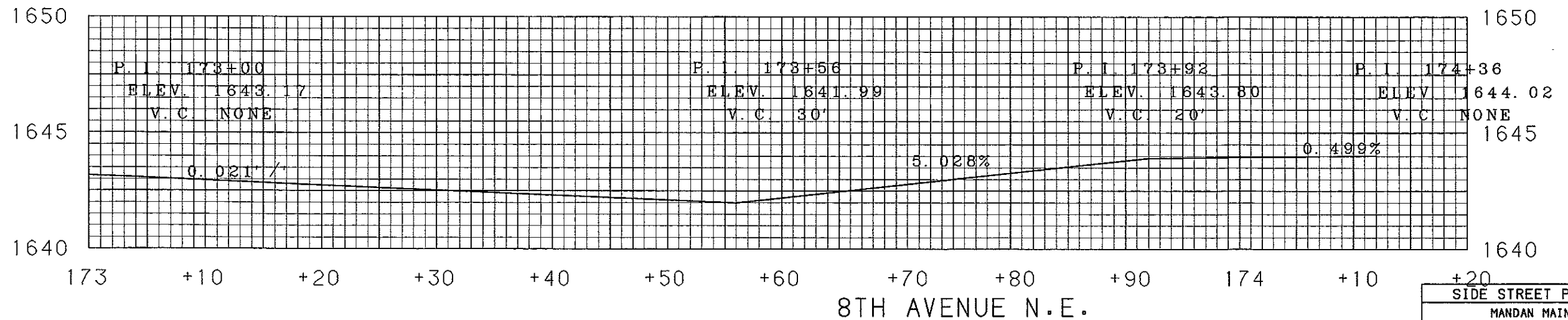
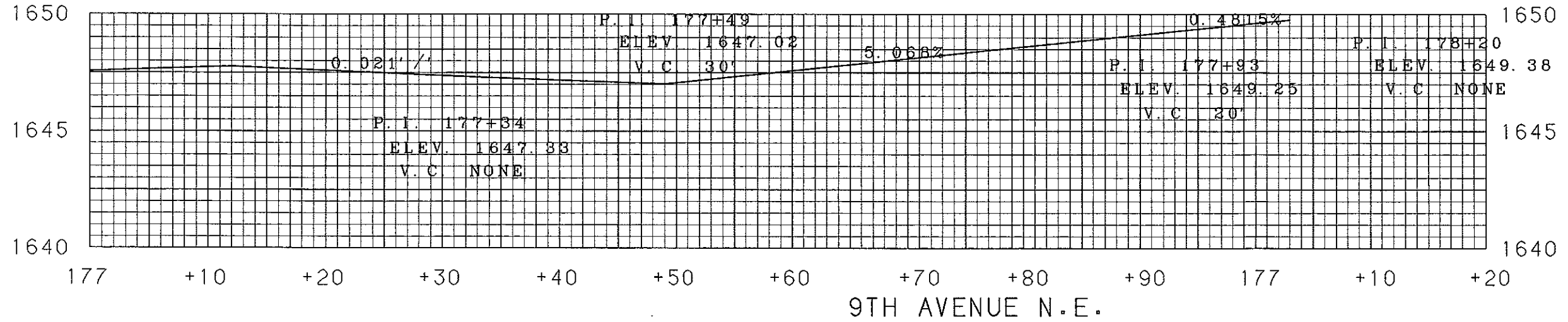
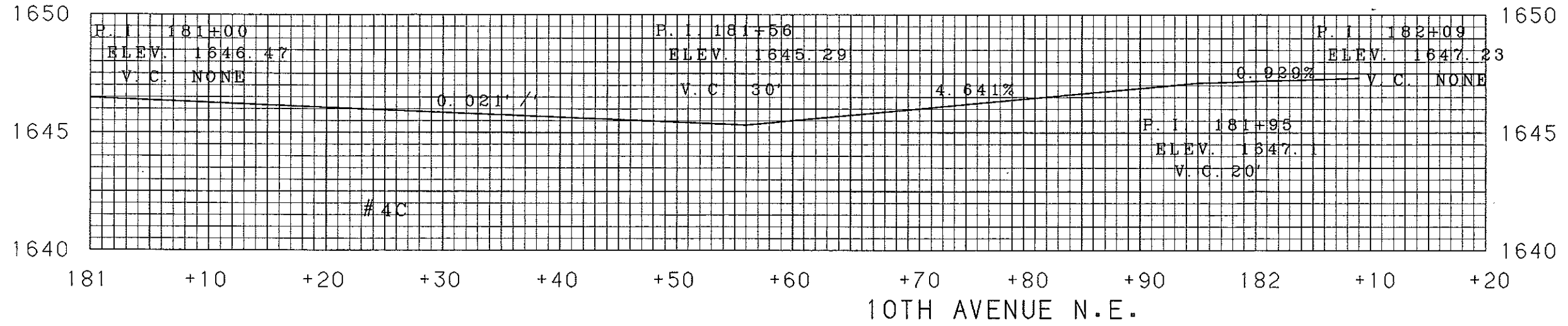
BENCH MARKS			NGVD-29
NO.	DESCRIPTION	LOCATION	ELEV.
-	-	-	-
-	-	-	-

MANDAN-EAST MAIN STREET & I - 94
STA. 204+00 TO 208+00 No. Rdwy.

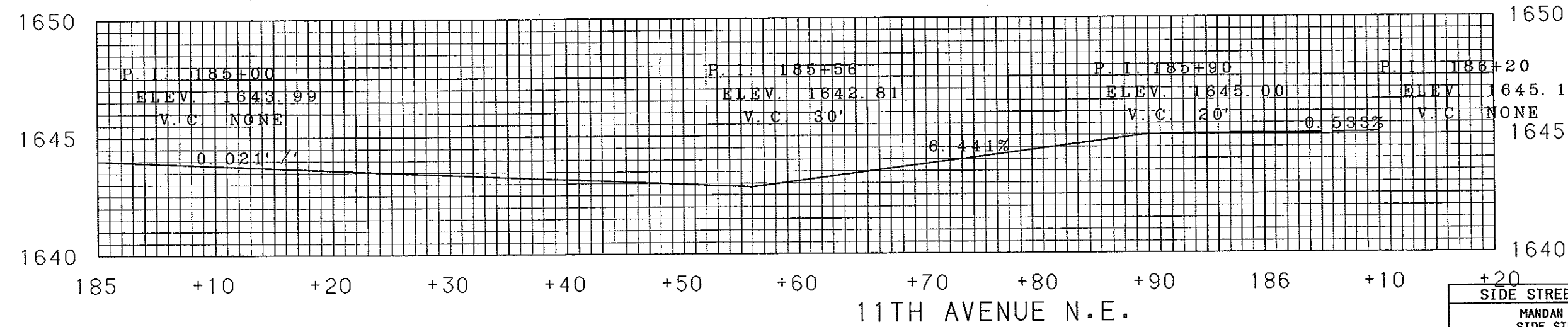
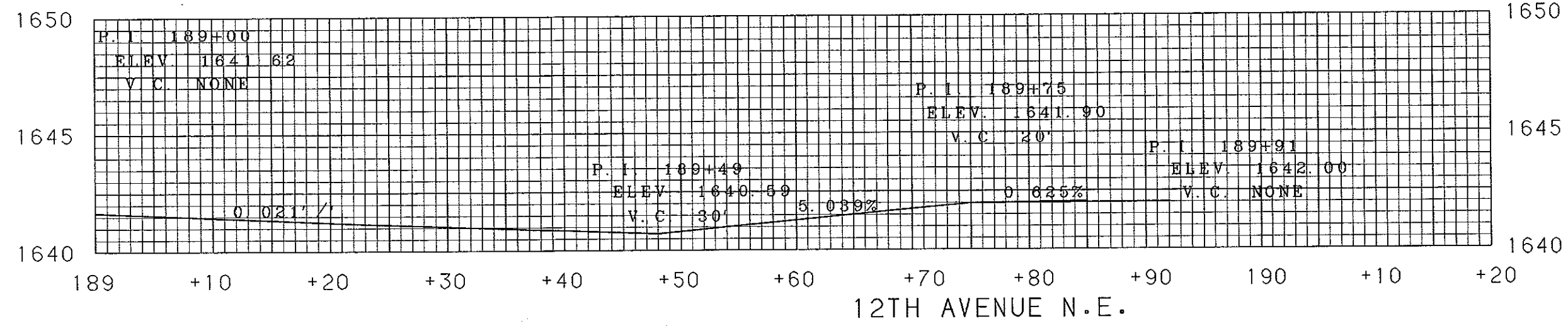
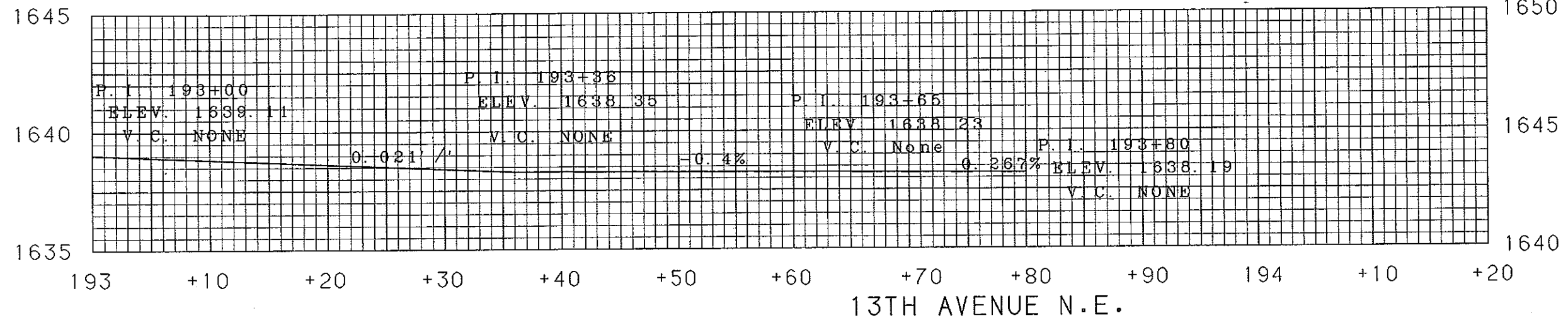
FILE: PPN204-208-GRF

SCALE IN FEET

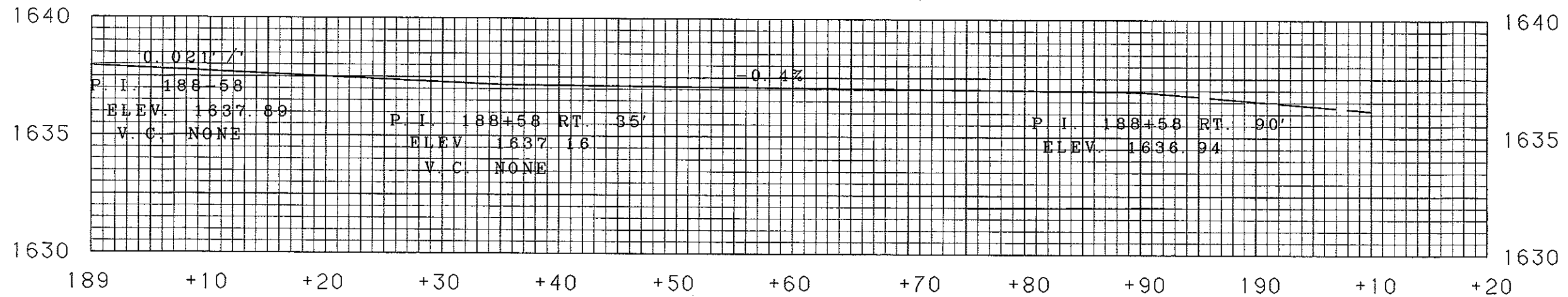
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	86



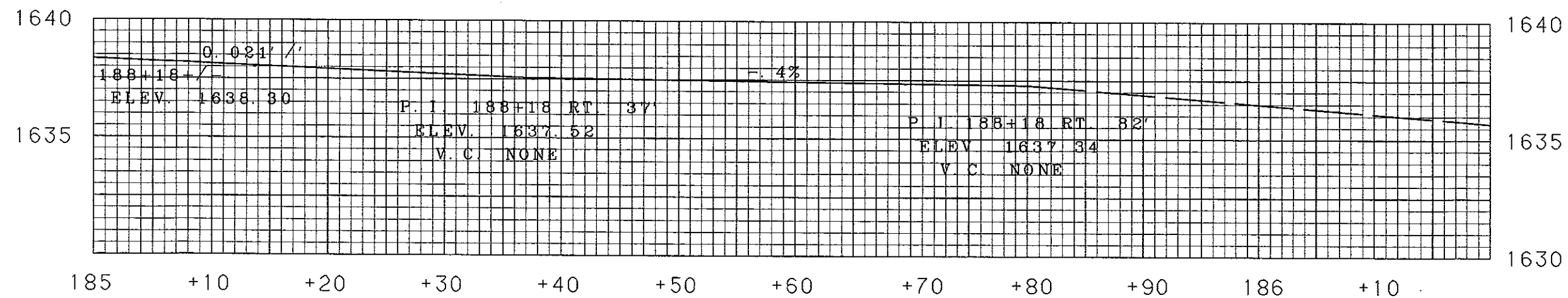
SIDE STREET PROFILE SHEETS			
MANDAN MAIN STREET			
SIDE STREET PROFILE			
FILE:	SCALE:	DRAWING NO.:	
1-(11x17)	EARTHDIRT.DAT	SPLIT SIDE-ST.GRF	



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	88



188+58+/- SURVEY = MEMORIAL HWY. N. BOUND



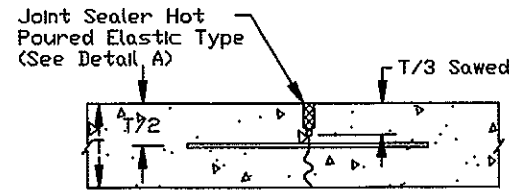
188+18+/- SURVEY = MEMORIAL HWY. SO. BOUND

+20			
SIDE STREET PROFILE SHEETS			
MANDAN MAIN STREET			
SIDE STREET PROFILE			
PLOT FACTOR:	FILE:	SCALE:	DRAWING NO.:
1" (11x17)	EARTHDIRT.DAT	SPLIT	STRIP-GRF

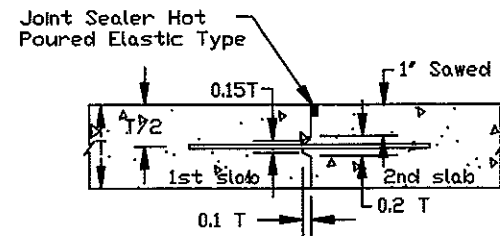
JOINT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	89

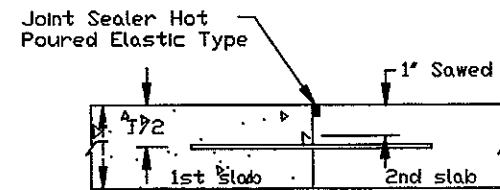
TIED JOINTS
(With Hot Poured Elastic Seal)



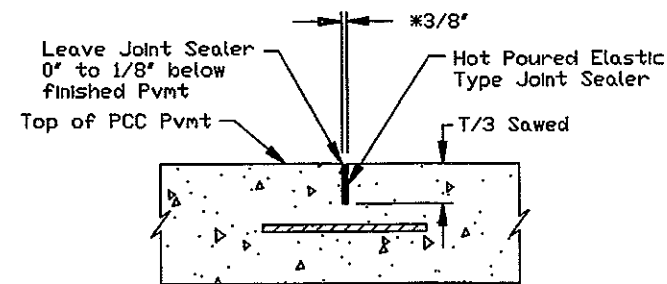
SAWED LONGITUDINAL JOINT
(Tied)



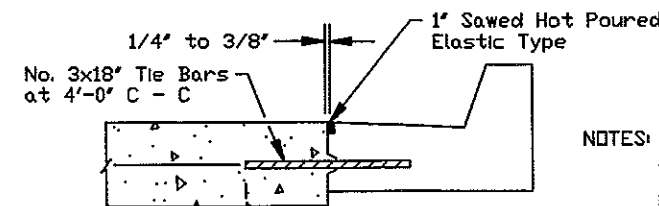
LONGITUDINAL CONSTRUCTION JOINT
(Keyed Tied Joint)



LONGITUDINAL CONSTRUCTION JOINT
(Tied Butt Joint)



HOT POUR ELASTIC SEAL
DETAIL A

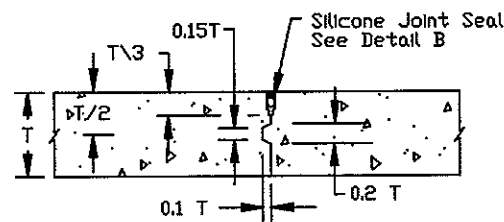


CURB & GUTTER JOINT INSTALLATION

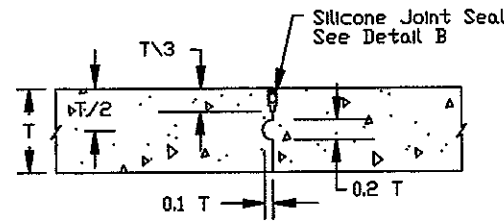
NOTES:

- T = Thickness of PCC Pvmt
- *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 826.02A.2.

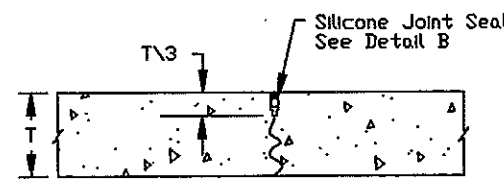
UNTIED JOINTS
(With Silicone Seal)



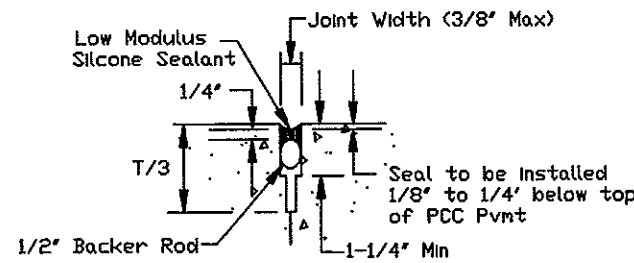
KEYED LONGITUDINAL JOINT
(Trapezoidal)



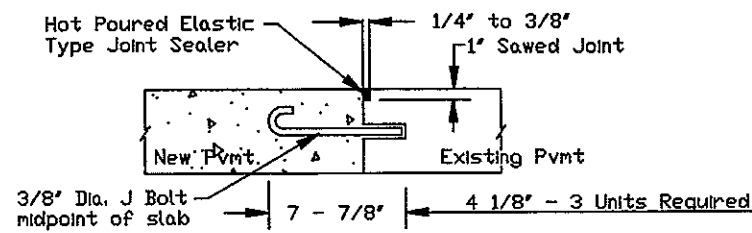
KEYED LONGITUDINAL JOINT
(Half-Round)



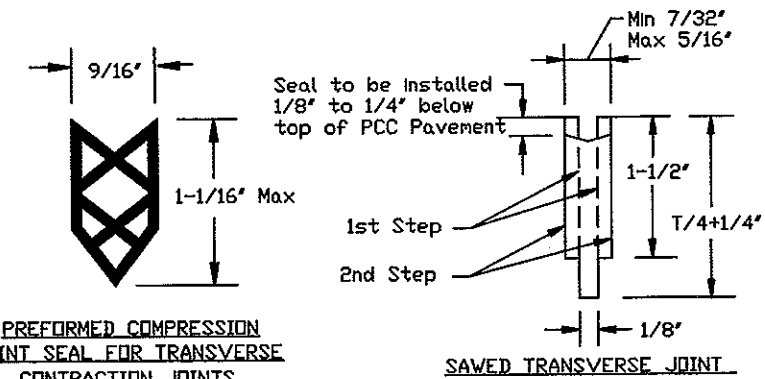
SAWED LONGITUDINAL JOINT



SILICONE JOINT SEAL
DETAIL B



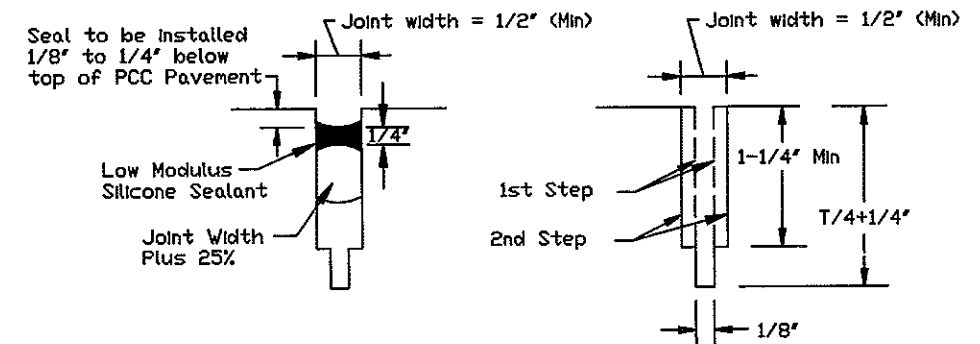
J BOLT INSTALLATION
(See Std. Drawing B-550-1)



PREFORMED COMPRESSION JOINT SEAL FOR TRANSVERSE CONTRACTION JOINTS

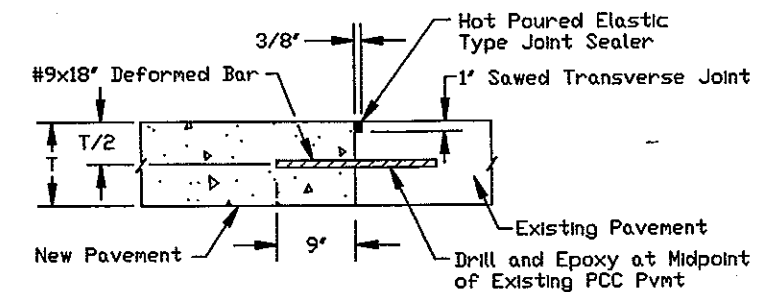
PREFORMED COMPRESSION SEAL

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

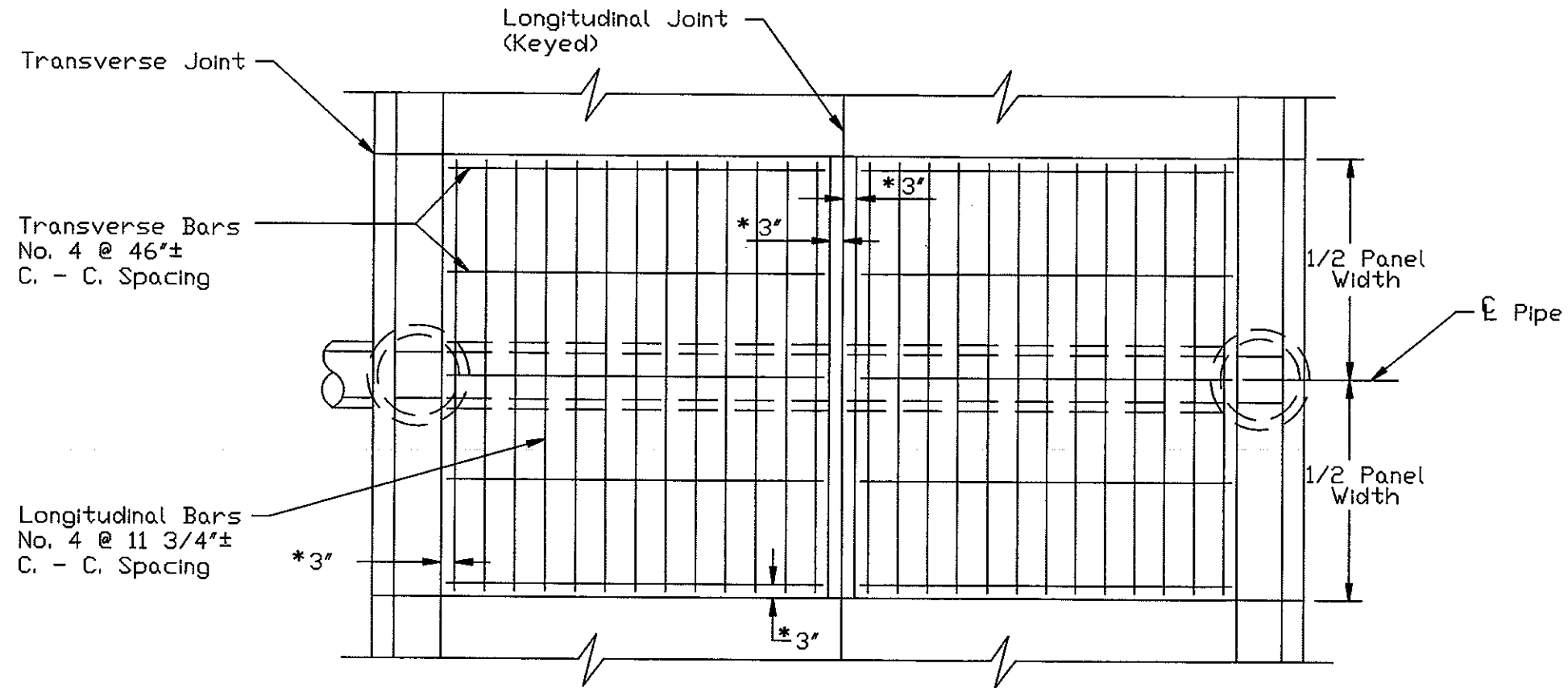
SILICONE SEAL



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(039)916	90

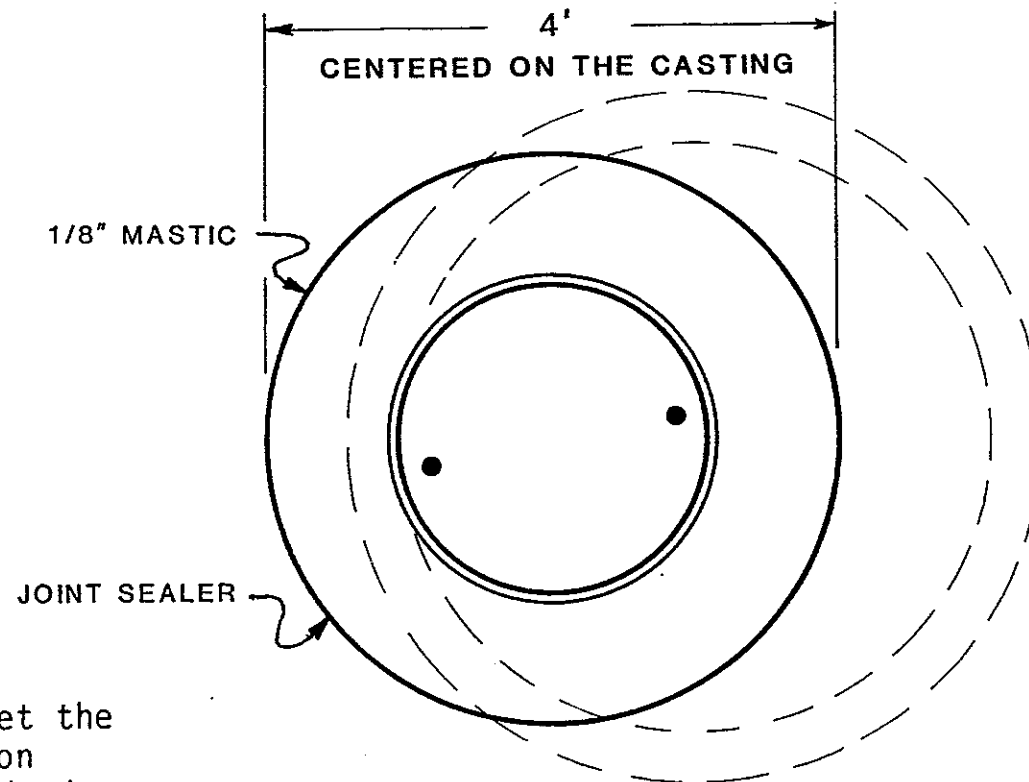
PAVEMENT REINFORCING DETAIL



TYPICAL REINF. CONC. ROADWAY PANEL WITH REINF. STEEL

- NOTES:
1. Place reinforcing bars at mid depth of pavement
 2. A 10' 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.

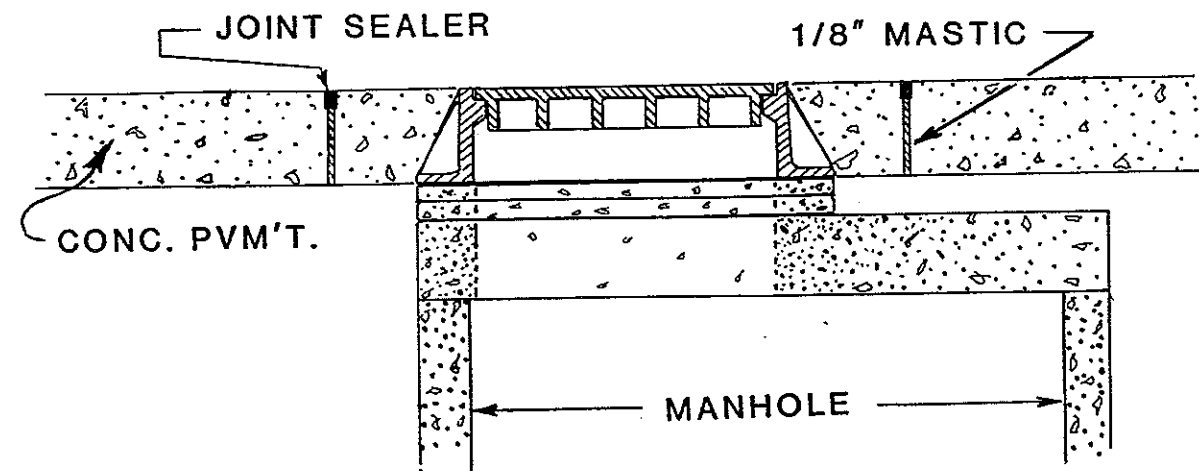
*6"Max.



(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.

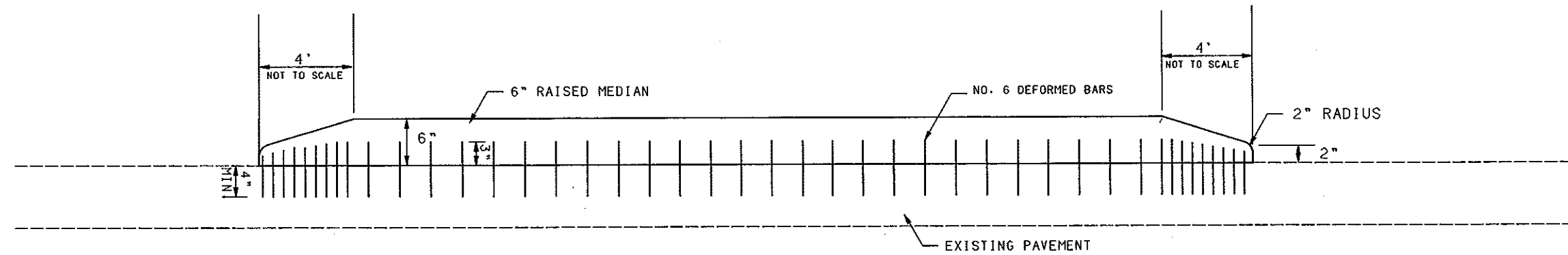


**MANHOLE BLOCKOUT
DETAILS
(ROUND)**

MEDIAN PAVING DETAIL

@ 164+49 to 166+30 (See P & P Sheets)

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	93



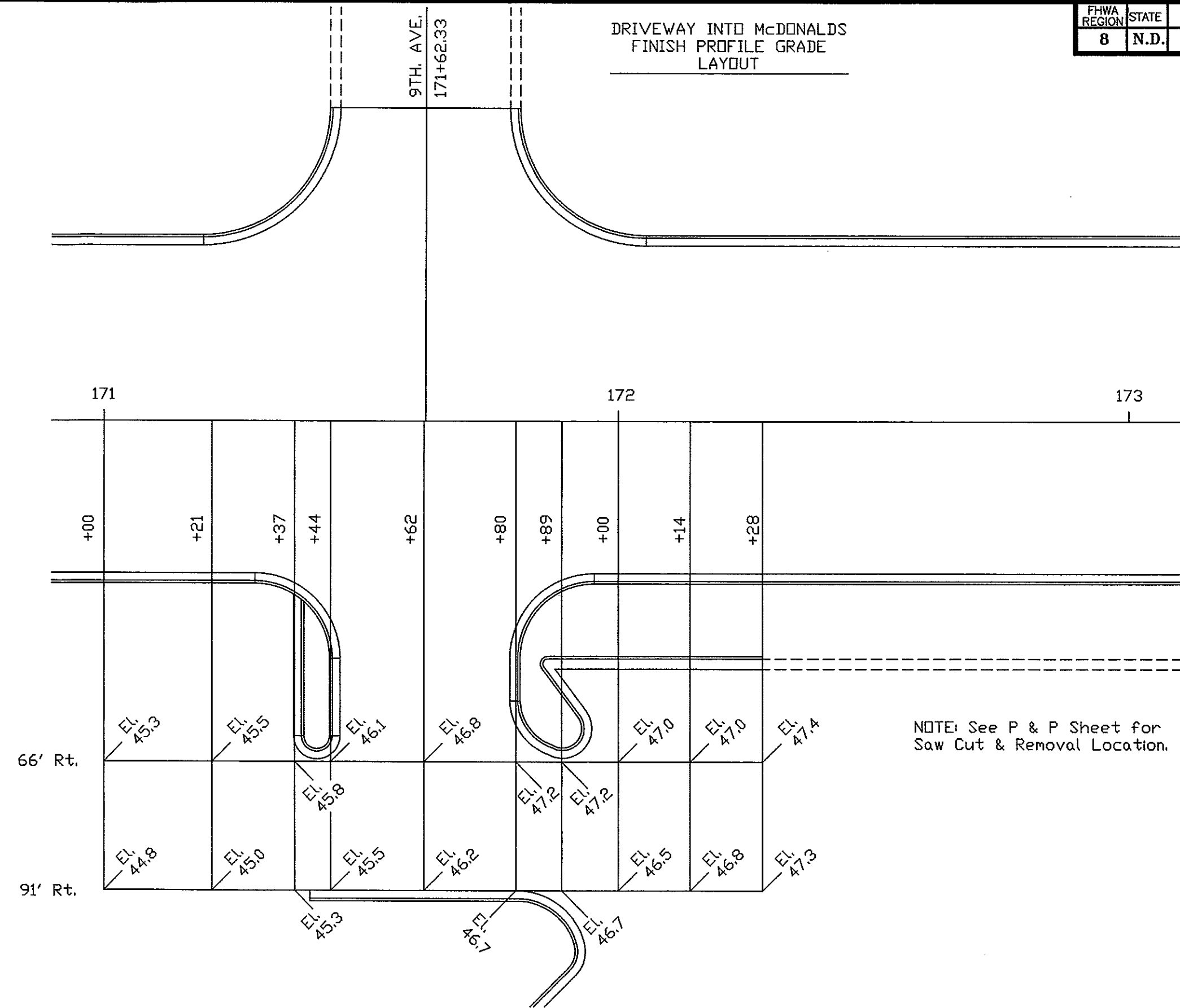
NOTES: RAISED MEDIAN TO BE PINNED IN PLACE WITH NO. 6 DEFORMED TIE BARS. BARS TO BE DRILLED AND GROUTED INTO EXISTING PAVEMENT AT A DEPTH OF NOT LESS THAN 4" DEEP. BARS TO STICK UP INTO RAISED PORTION OF MEDIAN A MINIMUM OF 1/2 THE MEDIAN HIGHT. THE EXACT NUMBER AND LOCATION OF BARS SHALL BE AS DESIGNATED 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:
MEDPAV.GRF

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	24

DRIVEWAY INTO McDONALDS
FINISH PROFILE GRADE
LAYOUT



NOTE: See P & P Sheet for
Saw Cut & Removal Location.

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
6TH	164+08.52	17680.141	12188.189
HWY 1806	164+12.07	17683.625	12188.871
8TH	167+82.39	18047.048	12260.031

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
8TH AVE. NE				
ALI. SURVEY				
22'	167+42.28	56' LT	17996.921	12307.272
22'	168+22.52	57.5' LT	18075.380	12324.170
END TAPER	169+00	31' RT	18168.356	12252.194

HOT BIT. PVMT CL-27
 8th Ave. N. E. 43.4 Ton
 Parking Lot 69.0 Ton

10IN NON-REINF. CONC. PVMT CL-AE
 167+20 TO 170+00 2147.49 S. Y

LONGITUDINAL JOINT SILICONE SEAL
 167+20 TO 170+00 390 L. F

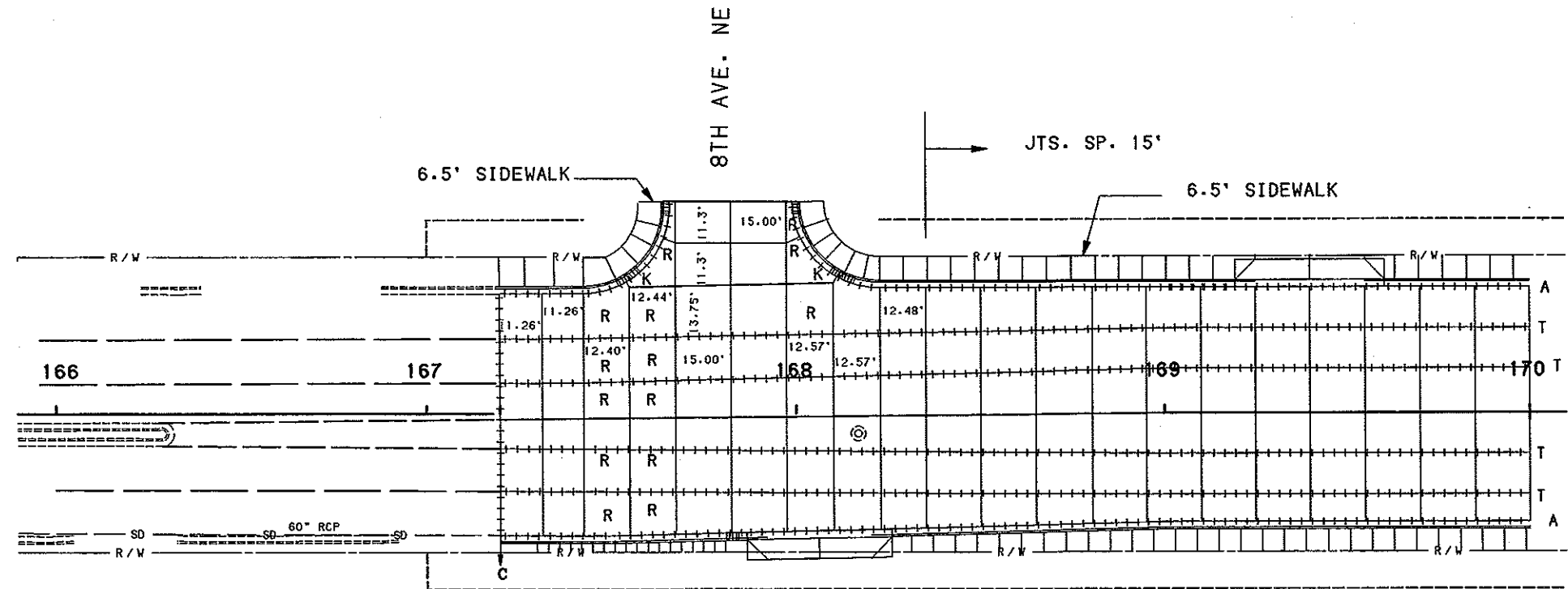
PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
 167+20 TO 170+00 1205 L. F

PERMEABLE STABILIZED BASE
 167+20 TO 170+00 2177.2 S. Y.

DENSE GRADED BASE
 167+20 TO 170+00 1111.7 TON

CONTRACTION JT. SILICONE SEAL
 Dogleg Jts. 140 L. F.
 Jt. C 68 L. F.

Dowel Bars
 Jt. C 68 Ea.



NOTE : SEE MANHOLE BLOCKOUT DETAIL.

NOTE : SEE P & P SHEETS FOR
 SAW CUT REMOVAL LOCATIONS.

- R : REINFORCED PAVEMENT (SEE DETAIL)
 - K : KEYED JOINT SILICONE SEAL (UNTIED)
 - T : TIED JOINT SAWED
 - C : DOWELED CONTRACTION JOINT - SILICONE SEAL
 - A : NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- NOTE : DOWEL BARS FOR JT. C SHALL BE 1'-1/2" X 18" PLAIN ROUND,
 DRILLED & GROUTED. (Spaced 12" C-C.)

P.C.C. PAVEMENT LAYOUT STA. 166+00 TO 170+00	
FILE: 166-170JTS.GRF	 SCALE IN FEET

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
9TH	171+62.33	18419.901	12333.036

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
9TH AVE. NE				
ALI. SURVEY				
25'	171+19.46	60.5' LT	18366.207	12384.171
25'	172+05.45	60.5' LT	18450.598	12400.695
15'	171+29.46	46' RT	18396.485	12281.578
3.5'	171+41.46	61' RT	18411.144	12269.163
15'	171+95.46	46' RT	18461.255	12294.260
10'	171+90.46	54.15' RT	18457.915	12285.298
3.5'	171+87.09	59.71' RT	18455.676	12279.194
1'	171+85.74	47.86' RT	18452.073	12290.568
12'	171+80.39	104.39' RT	18457.685	12234.066
5'	171+87.15	102.56' RT	18463.968	12237.158
END C&G	171+44.46	92.386' RT	18420.119	12238.938
END C&G	171+75.39	121.39' RT	18456.046	12216.418

HOT BIT. PVMT CL-27
 9th Ave. N.E. 38.3 Ton
 Parking Lot Area 126.1 Ton

10 IN NON-REINF. CONC. PVMT CL-AE
 170+00 TO 174+00 2999.89 S. Y

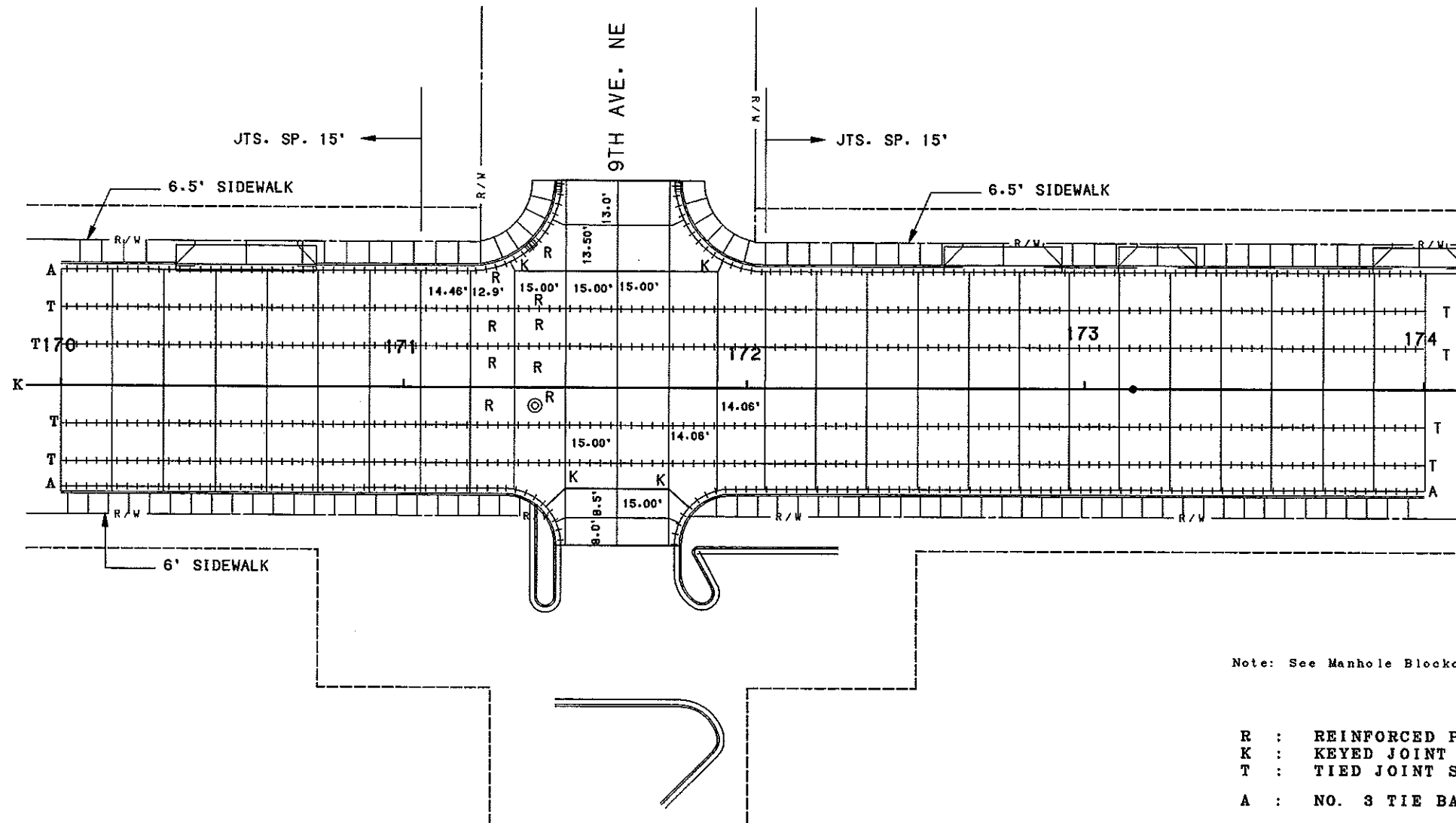
LONGITUDINAL JOINT SILICONE SEAL
 170+00 TO 174+00 505 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
 170+00 TO 174+00 1803 L. F

PERMEABLE STABILIZED BASE
 170+00 TO 174+00 3088.9 S. Y.

DENSE GRADED BASE
 170+00 TO 174+00 1493.8 Ton TON

CONTRACTION JT. SILICONE SEAL
 Dogleg Jts. 135 L. F.



Note: See Manhole Blockout Detail

- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED
- A : NO. 3 TIE BARS, 1' - 6" @ 4' C TO C (CONTINUOUS)

NOTE : SEE P & P SHEETS FOR
 SAW CUT REMOVAL LOCATIONS.

P.C.C. PAVEMENT LAYOUT	
STA. 170+00 TO 174+00	
FILE:	JTS1.GRF

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
10TH	175+42.25	18792.742	12406.040

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
10TH AVE. NE				
ALI. SURVEY				
20'	175+04.53	55.5' LT	18745.065	12453.257
20'	175+80.53	55.5' LT	18819.641	12467.859

HOT BIT. PVMT CL-27
 10TH AVE. N. E. 48.4 Ton
 PARKING LOT AREA 50.8 Ton

10IN NON-REINF. CONC. PVMT CL-AE
 174+00 TO 178+00 2945.89 S. Y

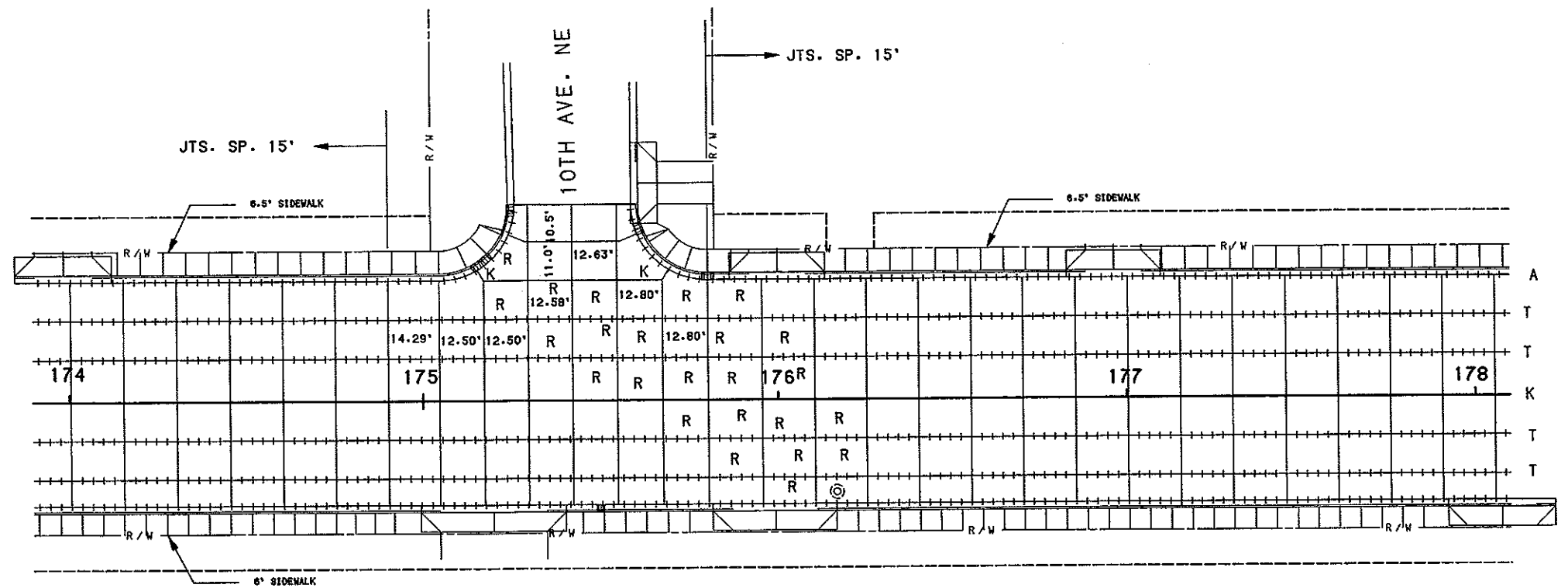
LONGITUDINAL JOINT SILICONE SEAL
 174+00 TO 178+00 451 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
 174+00 TO 178+00 1753 L. F

PERMEABLE STABILIZED BASE
 174+00 TO 178+00 3088.9 S. Y.

DENSE GRADED BASE
 174+00 TO 178+00 1479.4 TON

CONTRACTION JT. SILICONE SEAL
 Dogleg Jts. 134 L. F.



NOTE : SEE MANHOLE BLOCKOUT DETAIL.

R : REINFORCED PAVEMENT (SEE DETAIL)
 K : KEYED JOINT SILICONE SEAL (UNTIED)
 T : TIED JOINT SAWED
 A : NO. 3 TIE BARS, 1' - 6" Ø 4' C TO C (CONTINUOUS)

NOTE : SEE P & P SHEETS FOR SAW CUT REMOVAL LOCATIONS.

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
11TH	179+23.01	19166.406	12479.204

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
11TH AVE. NE				
ALI. SURVEY				
20'	178+84.38	55.5' LT	19117.832	12526.246
20'	179+60.83	55.5' LT	19192.857	12540.936

HOT BIT. PVMT CL-27
 11th Ave. N. E. 41.6 Ton
 Parking Lot Area 37.3 Ton

10IN NON-REINF. CONC. PVMT CL-AE
 178+00 TO 182+00 2960.33 S. Y

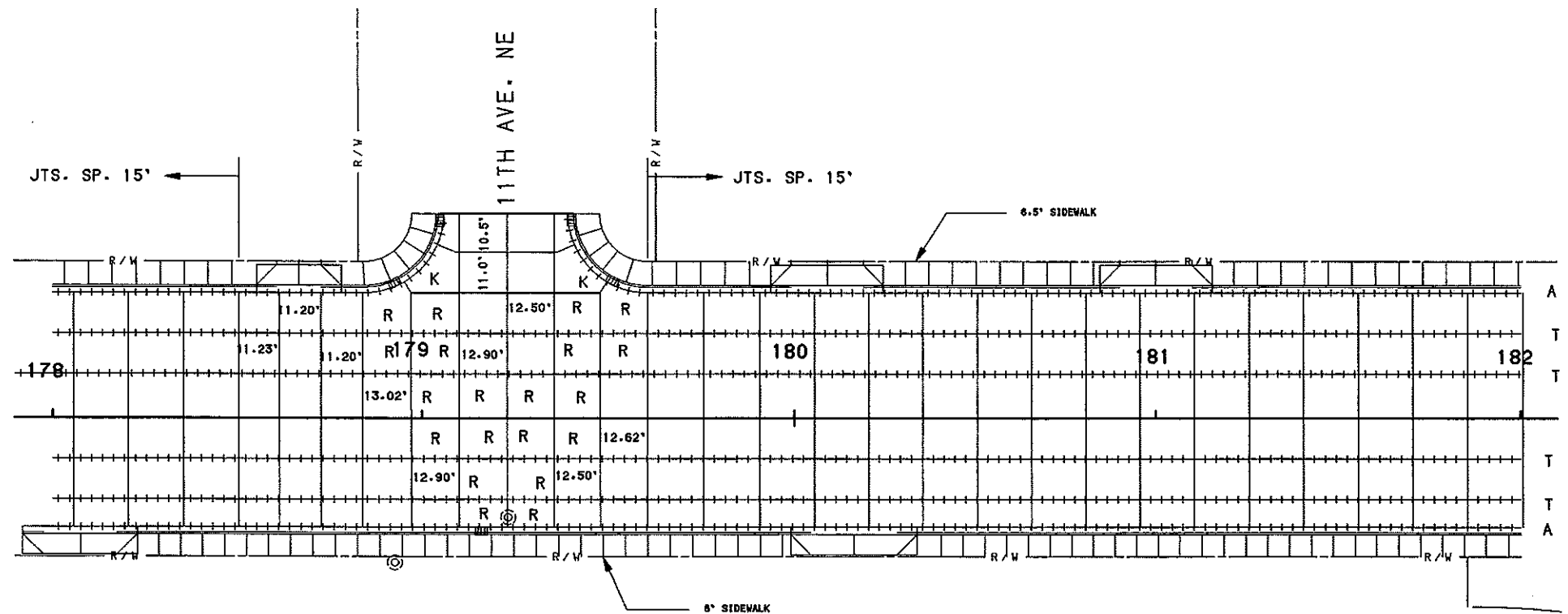
LONGITUDINAL JOINT SILICONE SEAL
 178+00 TO 182+00 451 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
 178+00 TO 182+00 1754 L. F

PERMEABLE STABILIZED BASE
 178+00 TO 182+00 3088.9 S. Y.

DENSE GRADED BASE
 178+00 TO 182+00 1474.6 TON

CONTRACTION JT. SILICONE SEAL
 Dogleg Jts. 134 L. F.



NOTE : SEE MANHOLE BLOCKOUT DETAIL.

- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED
- A : NO. 3 TIE BARS, 1' - 6" @ 4' C TO C (CONTINUOUS)

NOTE : SEE P & P SHEETS FOR SAW CUT REMOVAL LOCATIONS.

P.C.C. PAVEMENT LAYOUT	
STA. 178+00 TO 182+00	
FILE: 178-182JTS.GRF	SCALE IN FEET

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
12TH	183+01.82	19538.157	12551.994

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
12TH AVE. NE			ALI. SURVEY	
20'	182+59.77	55.5' LT	19486.230	12598.380
20'	183+44.35	55.5' LT	19569.229	12614.631
BEG. TAPER	183+00	31.0' RT	19542.340	12521.225
END TAPER	183+99.44	39.7' RT	19641.584	12531.796

HOT BIT. PVMT CL-27
12th Ave. N.E. 36.4 Ton

10IN NON-REINF. CONC. PVMT CL-AE
182+00 TO 186+00 3208.67 S.Y

LONGITUDINAL JOINT SILICONE SEAL
182+00 TO 186+00 456 L.F

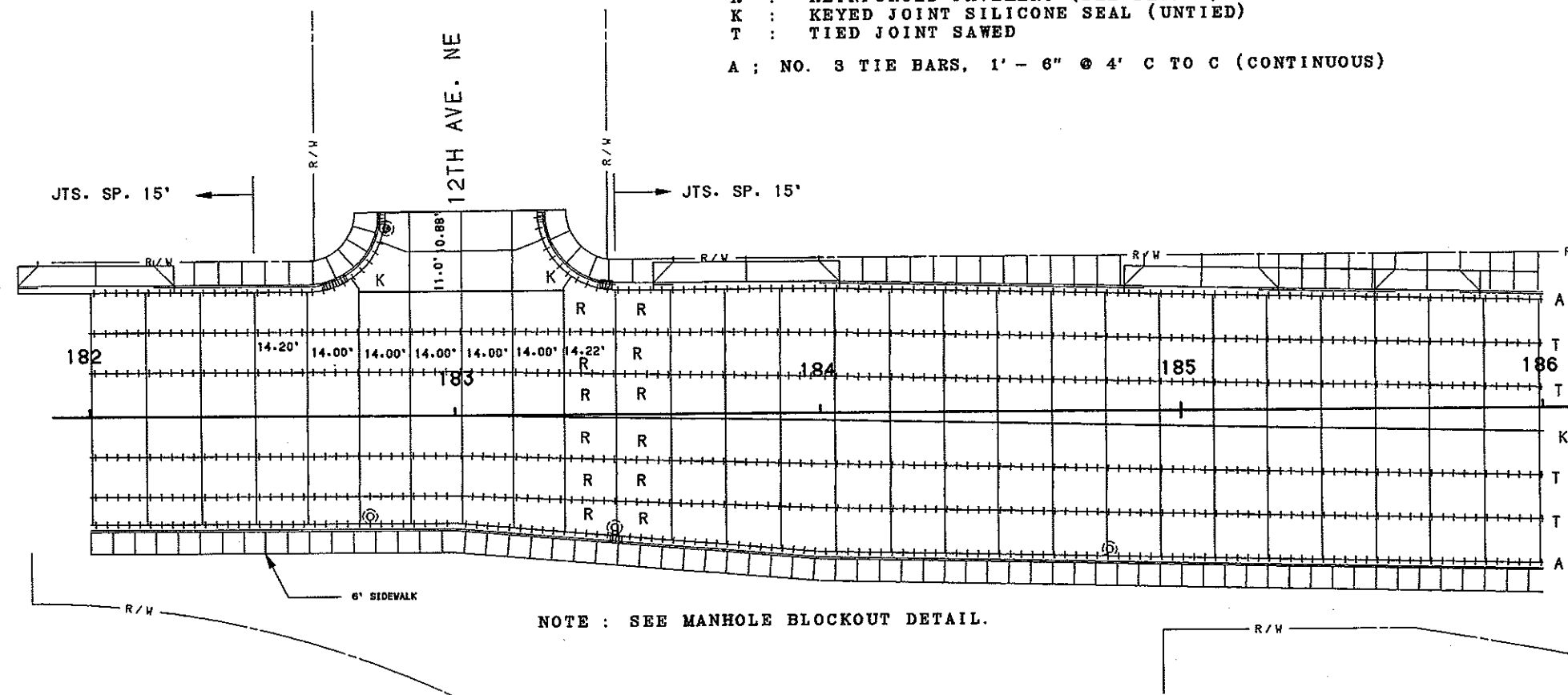
PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
182+00 TO 186+00 1842 L.F

PERMEABLE STABILIZED BASE
182+00 TO 186+00 3325 S.Y.

DENSE GRADED BASE
182+00 TO 186+00 1566.9 TON

CONTRACTION JT. SILICONE SEAL
Dogleg Jts. 138 L.F.

R : REINFORCED PAVEMENT (SEE DETAIL)
K : KEYED JOINT SILICONE SEAL (UNTIED)
T : TIED JOINT SAWED
A : NO. 3 TIE BARS, 1' - 6" @ 4' C TO C (CONTINUOUS)



NOTE : SEE P & P SHEETS FOR SAW CUT REMOVAL LOCATIONS.

P.C.C. PAVEMENT LAYOUT	
STA. 182+00 TO 186+00	
FILE:	JTS2.GRF
SCALE IN FEET	

SIDE STREETS			
AVE.	STA.	EASTING	NORTHING
MAIN STREET ALIGNMENT			
13TH MANDAN AVE MEMORIAL	186+82.53 188+31.73 188+37.92	19911.771 20058.192 20064.265	12625.149 12653.819 12655.002

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
13TH AVE. NE ALI. SURVEY				
25'	186+35.39	55.2' LT	19854.898	12670.283
25'	187+29.09	53.1' LT	19947.263	12686.219
MANDAN AVE. ALI. SURVEY				
75'	187+75.84	105.2' LT	19983.127	12746.360
50'	189+48.32	88.5' LT	20155.704	12762.985
25'	189+28.32	73.5' LT	20138.949	12744.432
MANDAN AVE. ISLAND ALI. SURVEY				
75'	189+48.16	25.48' LT	20167.605	12701.098
5'	188+78.52	32.5' LT	20097.900	12694.672
1.5'	188+91.41	30.3' LT	20110.976	12694.972
50'	189+26.01	68.44' LT	20137.648	12739.028
1'	188+78.4	50.16' LT	20094.409	12711.982

DOWEL BARS
JT. C 80 EA.

HOT BIT. PVMT CL-27
13th Ave. N.E. 36.8 Ton
Parking Lot Areas 11.9 Ton

HOT BIT. PVMT CL-29
Mandan Ave. 116.1 Ton
*Mandan Ave. 260.1 Ton

10 IN NON-REINF. CONC. PVMT CL-AE
186+00 TO 190+00 4953.8 S.Y

LONGITUDINAL JOINT SILICONE SEAL
186+00 TO 190+00 936 L.F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
186+00 TO 190+00 2675 L.F

PERMEABLE STABILIZED BASE
186+00 TO 190+00 3489.8 S.Y. S.Y.

DENSE GRADED BASE
186+00 to 190+00 3102 Ton
*Mandan Ave 821.7 Ton
CONTRACTION JT. SILICONE SEAL
Dogleg Jts. 663 L.F.
Jt. C 60 L.F.

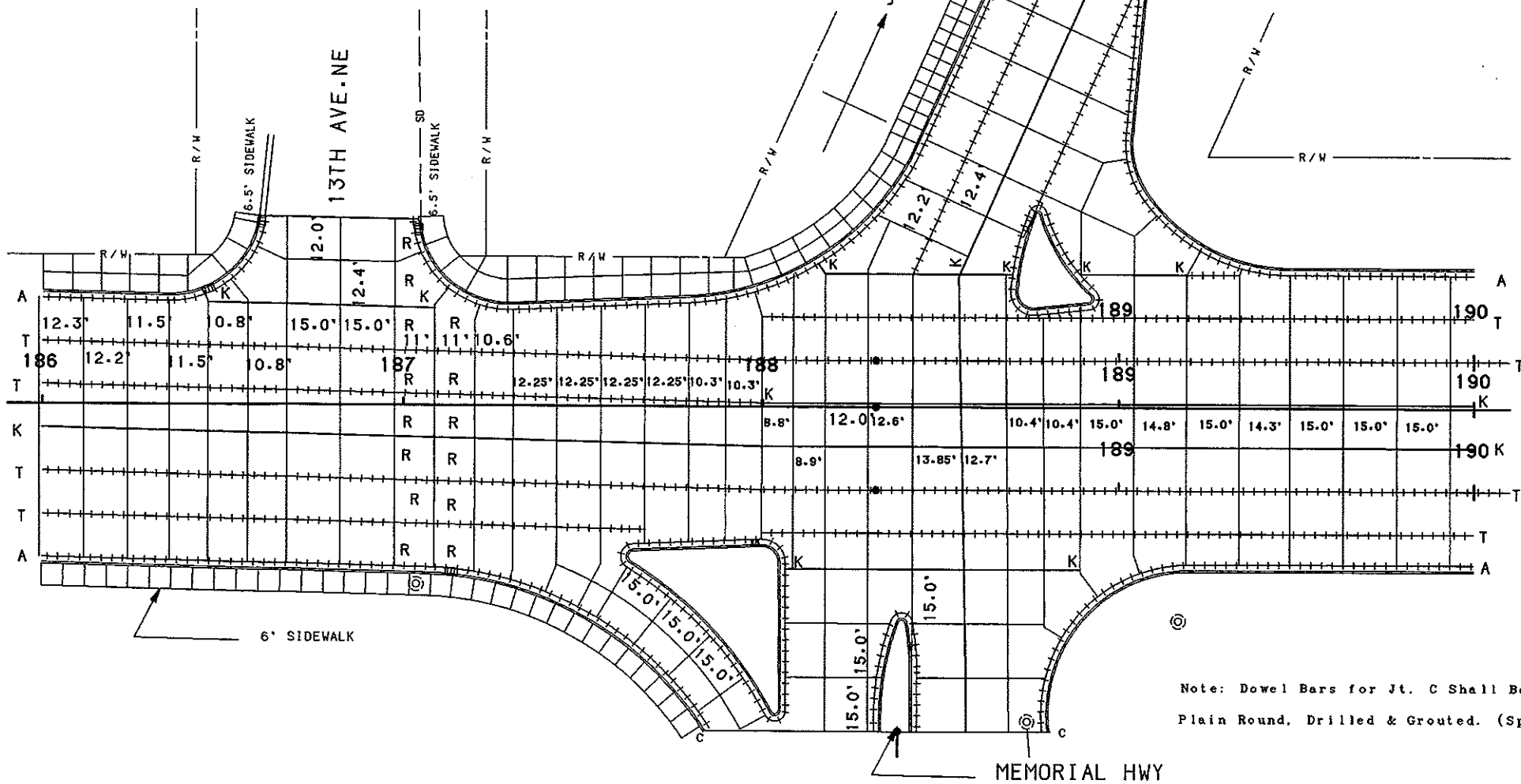
*City Funds Only

- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED
- A : NO. 3 TIE BARS, 1' - 6" @ 4' C TO C (CONTINUOUS)
- C : Doweled Contraction Joint - Silicone Seal

NOTE : SEE P & P SHEETS FOR SAW CUT LOCATIONS.

Note: See Conc. Med. Paving Detail

Note: High Early Strength Pvm't. Has Been Provided For The Intersection of Main Street & Memorial Hwy.



CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
MEMORIAL HWY ALI. SURVEY				
95'	187+03.87	141.3' RT	19959.876	12490.543
40'	189+19.8	85' RT	20160.894	12587.232
MEMORIAL HWY ISLAND ALI. SURVEY				
113.72'	187+03.87	141.3' RT	19959.876	12490.543
2'	187+62.7	41.7' RT	19998.466	12599.639
5'	187+99.83	43.3' RT	20035.206	12605.223
1.5'	188+03.46	83.4' RT	20046.480	12566.538
MEMORIAL HWY BULLIT NOSE ALI. SURVEY				
1.5'	188+39.04	59.16' RT	20076.681	12597.145
75'	189+07.46	86' RT	20148.976	12583.891
75'	187+66.85	73.29' RT	20008.607	12569.432

Note: Dowel Bars for Jt. C Shall Be 1'-1/2"x18" Plain Round, Drilled & Grouted. (Spaced @ 12"C-C.)

P.C.C. PAVEMENT LAYOUT
STA. 186+00 TO 190+00

FILE: JTS3.GRF

SCALE IN FEET

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
MAIN AVE.			ALI. N. RDWY	
1.5'	192+25.54	8' RT	20446.265	12721.283
BEG. TAPER	192+28.32	25.5' LT	20440.098	12767.457
END TAPER	193+22.82	22' LT	20533.524	12782.091
MAIN AVE.			ALI. MEDIAN	
BEG. TAPER	192+25.49	6.5' RT	20445.930	12722.745

10IN NON-REINF. CONC. PVMT CL-AE
190+00 TO 194+00 3367.56 S. Y

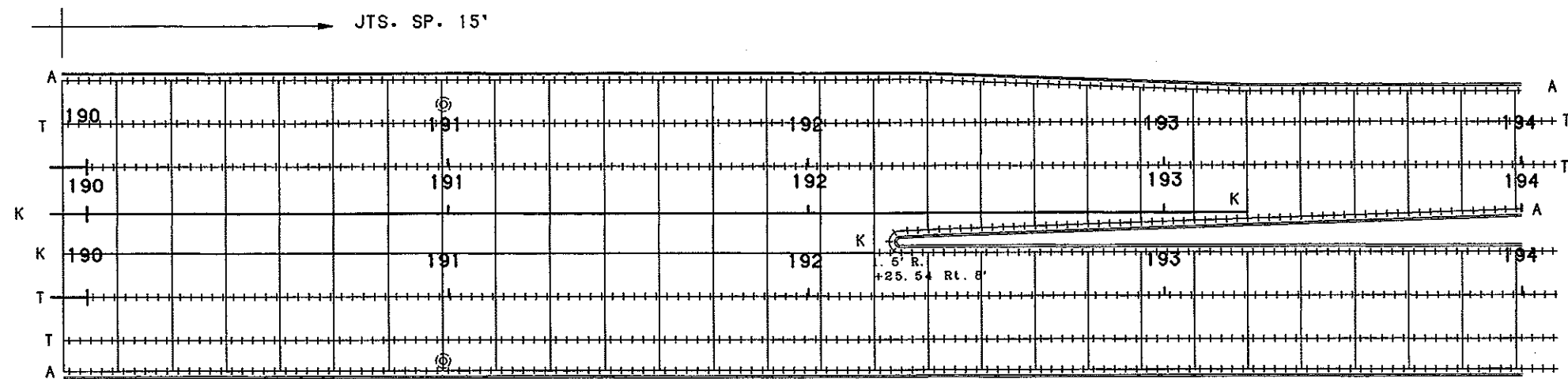
LONGITUDINAL JOINT SILICONE SEAL
190+00 TO 194+00 324 L. F
190+00 TO 192+20 220 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
190+00 TO 194+00 2035 L. F

PERMEABLE STABILIZED BASE
190+00 TO 194+00 3751.5 S. Y.

DENSE GRADED BASE
190+00 TO 194+00 1563.14 TON

- A ; NO. 3 TIE BARS, 1'-6" @ 4' C TO C (CONTINUOUS)
- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED



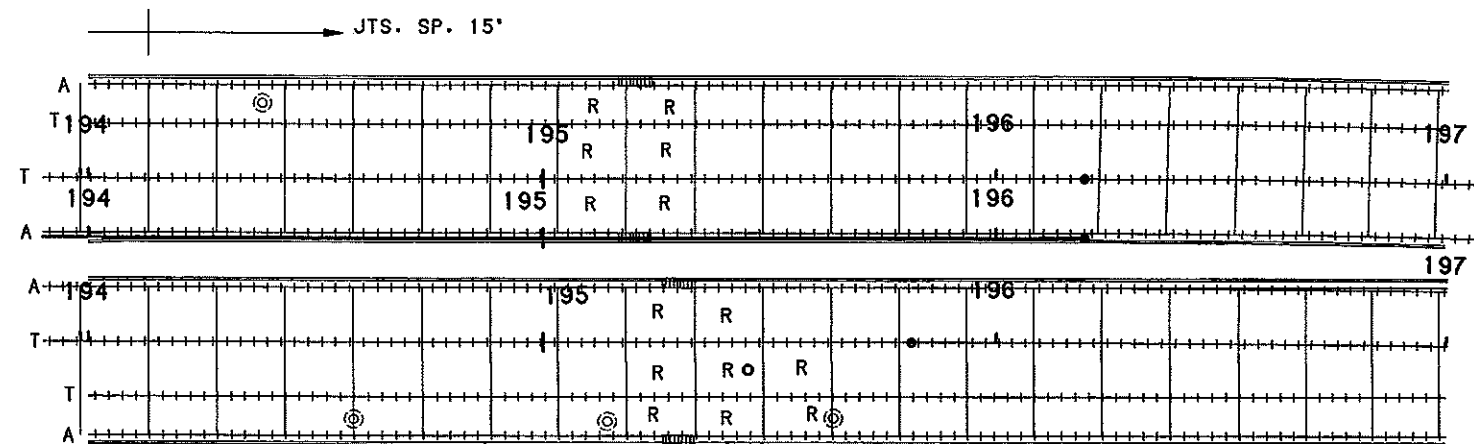
CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
MAIN AVE.			ALI. MEDIAN	
END TAPER	194+08.32	0.5' RT	20624.234	12763.598

10IN NON-REINF. CONC. PVMT CL-AE
194+00 TO 197+00 2166.66 S. Y

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
194+00 TO 197+00 1298 L. F

PERMEABLE STABILIZED BASE
194+00 TO 198+00 2566.7 S. Y.

DENSE GRADED BASE
194+00 TO 197+00 1069.44 TON



NOTE : FIELD ENGINEER WILL LOCATE SW JTS.
SEE SIDEWALK STD D-750-2

NOTE : SEE MANHOLE BLOCKOUT DETAIL.

A : NO. 3 TIE BARS 1' - 6" @ 4' C TO C (CONTINUOUS)
R : REINFORCED PAVEMENT (SEE DETAIL)
K : KEYED JOINT SILICONE SEAL (UNTIED)
T : TIED JOINT SAWED

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
MAIN AVE.			ALI. MEDIAN	
BEG. TAPER	197+80.2	16.97' LT	20991.779	12826.041
END TAPER	199+74.84	25.5' LT	21186.948	12852.130
MAIN AVE.			RT. TURN LANE	
BEG. TAPER	198+37.34	22' RT	21053.278	12794.535
END TAPER	199+31.76	25.5' RT	21146.469	12799.048

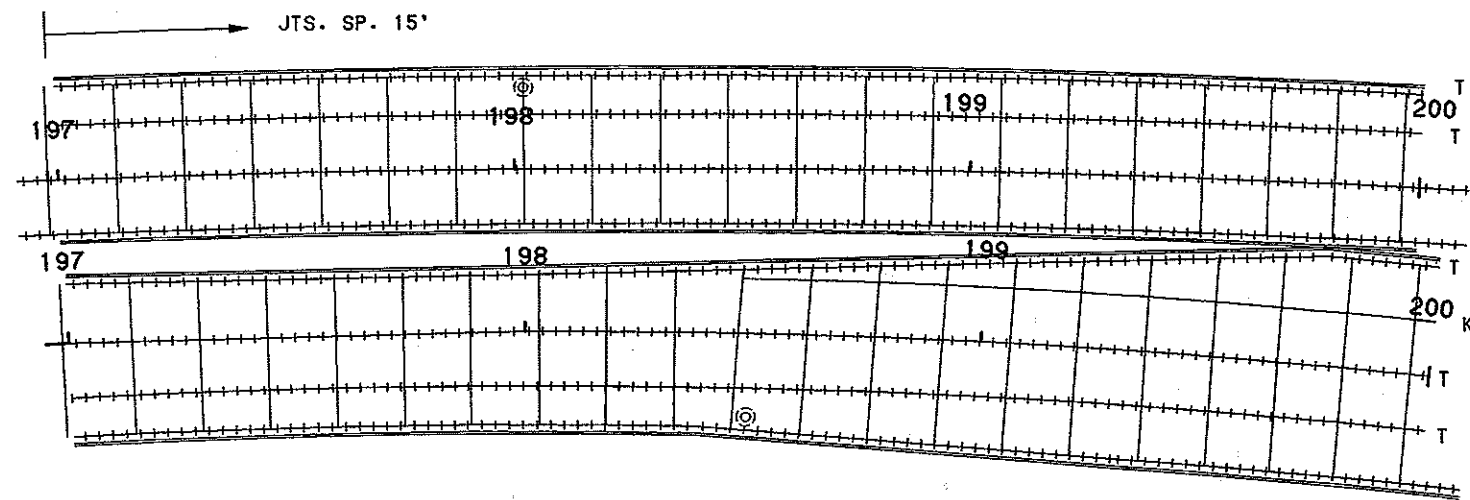
10IN NON-REINF. CONC. PVMT CL-AE
197+00 TO 200+00 2323.78 S. Y

LONGITUDINAL JOINT SILICONE SEAL
198+50 TO 200+00 150 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
198+50 TO 200+00 1413 L. F

PERMEABLE STABILIZED BASE
197+00 TO 200+00 2693.4 S. Y.

DENSE GRADED BASE
197+00 TO 200+00 1122.26 TON



R : REINFORCED PAVEMENT (SEE DETAIL)
K : KEYED JOINT SILICONE SEAL (UNTIED)
T : TIED JOINT SAWED

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
BULLIT NOSE			ALI. S. RDWY	
1.5'	200+99.19	28.1' LT	21313.005	12855.538
75'	200+79.91	42.8' LT	21292.288	12785.018
75'	200+86.7	100.5' LT	21301.777	12928.175
3'	202+08.38	25.3' LT	21423.382	12846.622
75'	202+33.62	42.2' LT	21442.326	12777.159
75'	202+38.05	90.5' LT	21459.776	12908.746

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
TWIN CITY DRIVE			ALI. N. RDWY	
40'	201+05.2	62.0' LT	21308.066	12936.440
10'	201+32.58	50.9' LT	21336.340	12926.413
50'	202+38.37	75.5' LT	21443.661	12953.165
10'	202+10.15	47.7' LT	21415.124	12925.136
TWIN CITY DRIVE			ALI. S. RDWY	
50'	200+81.21	75.5' RT	21293.001	12752.308

HOT BIT. PVMT CL-29
TWIN CITY DRIVE 55.2 TON

10IN NON-REINF. CONC. PVMT CL-AE
200+00 TO 204+00 4659.97 S. Y

LONGITUDINAL JOINT SILICONE SEAL
200+00 TO 204+00 850 L. F

PREFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
200+00 TO 204+00 2420 L. F

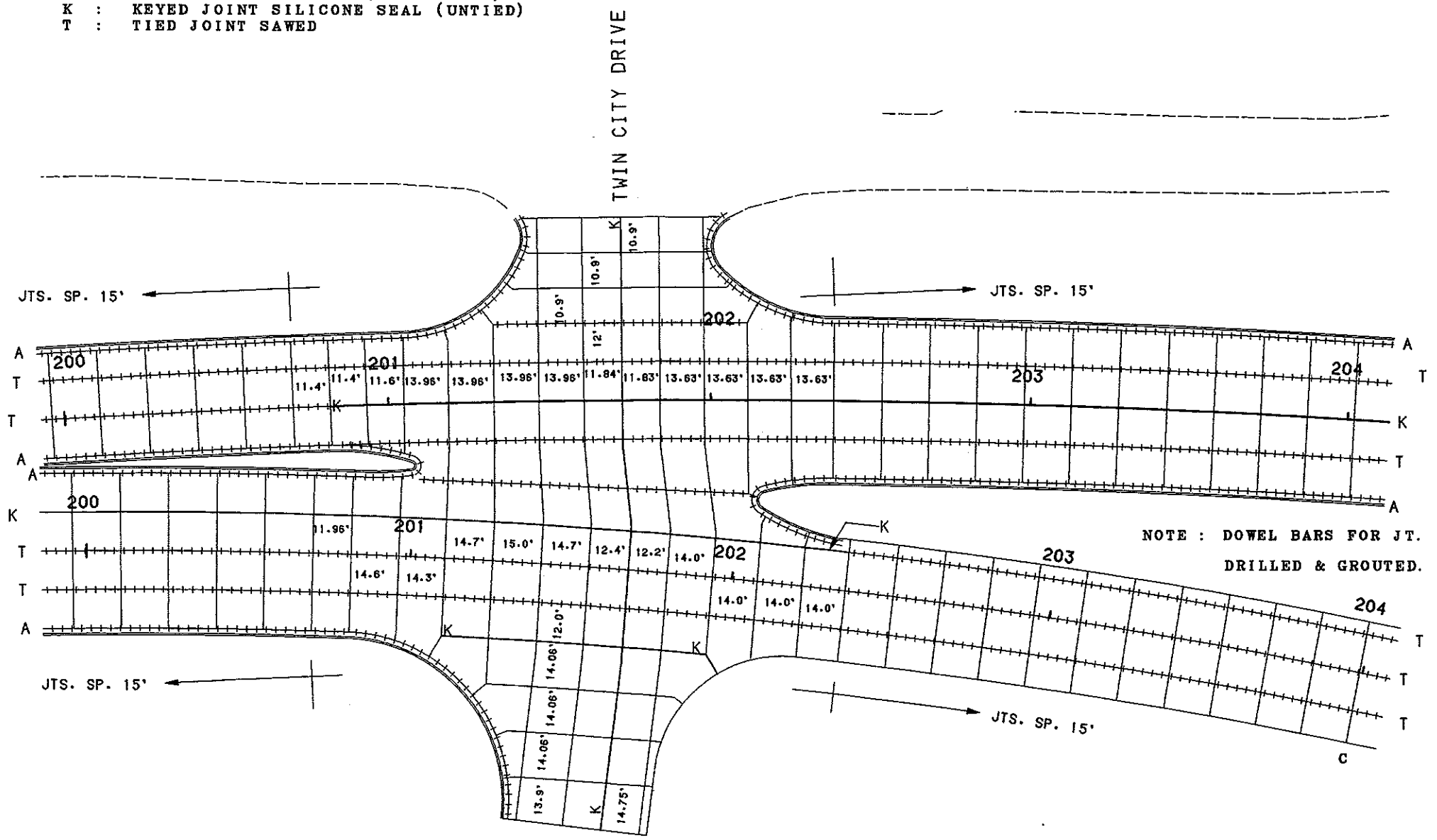
PERMEABLE STABILIZED BASE
200+00 TO 204+00 4360.2 S. Y. S. Y.

DENSE GRADED BASE
200+00 TO 204+00 2395.1 TON

CONTRACTION JT. SILICONE SEAL
Dogleg Jts. 469 L. F.
JT. C 38 L. F.

DOWEL BARS
JT. C 24 EA.

- C : DOWELED CONTRACTION JOINT - SILICONE SEAL
- A : NO. 3 TIE BARS 1' - 6" @ 4' C TO C (CONTINUOUS)
- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED



NOTE : DOWEL BARS FOR JT. C SHALL BE 1' - 1/2" X 18" PLAIN ROUND, DRILLED & GROUTED. (SEE STD. D-550-2)

CURB & GUTTER DATA				
RADIUS	STA.	OFFSET	EASTING	NORTHING
MANDAN AVE.			ALI. N. RDWY	
BEG. TAPER	204+55.73	25.5' LT	21662.752	12896.650
END TAPER	204+75.5	13.5' LT	21682.494	12893.341
BEG. TAPER	204+17.9	25.5' RT	21622.063	12847.896
END TAPER	205+08	17.5' RT	21711.905	12850.050

HOT BIT. PVM T CL-29
1-94 Shldr. Patch 2.6 TON

10 IN NON-REINF. CONC. PVM T CL-AE
204+00 TO 204+31.5 84.0 S. Y
204+00 TO 204+75.5 LT 100.67 S. Y
204+00 TO 205+08 RT 98.95 S. Y

LONGITUDINAL JOINT SILICONE SEAL
204+00 TO 204+31.5 31.5 L. F

PERFORMED ELASTOMERIC COMPRESS. JT. SEAL 9/16 IN.
204+00 TO 205+08 136 L. F

PERMEABLE STABILIZED BASE
204+00 TO 204+31.5 344.8 S. Y.

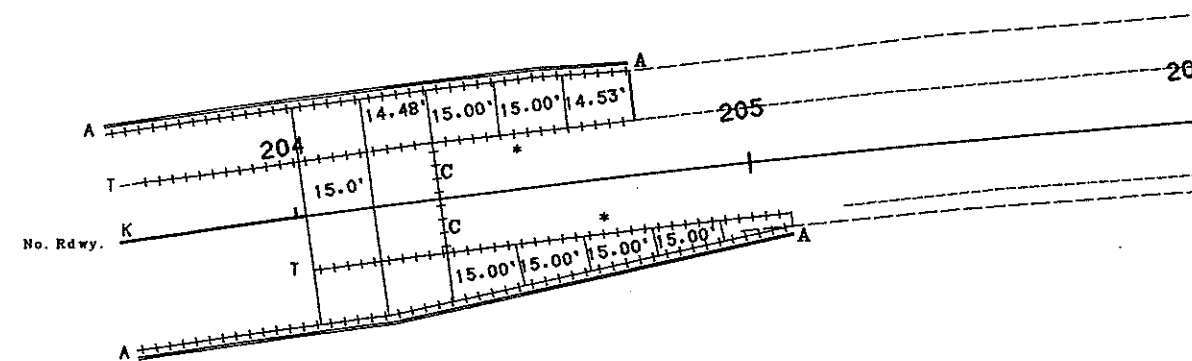
DENSE GRADED BASE
204+00 TO 205+15 149.2 TON

CONTRACTION JT. SILICONE SEAL

Jt. C 48 L. F.

DOWEL BARS

JT. C 24 EA.



- A : NO. 3 TIE BARS 1' - 6" @ 4" C TO C (CONTINUOUS)
- C : DOWELED CONTRACTION JOINT - SILICONE SEAL
- R : REINFORCED PAVEMENT (SEE DETAIL)
- K : KEYED JOINT SILICONE SEAL (UNTIED)
- T : TIED JOINT SAWED

*TIE BARS WILL BE DRILLED & GROUTED INTO PLACE WHERE EXISTING PAVEMENT ABUTTS NEW PAVEMENT LONGITUDINALY.
ALL COST TO BE INCLUDED IN PRICE BID FOR CONCRETE PVM T.

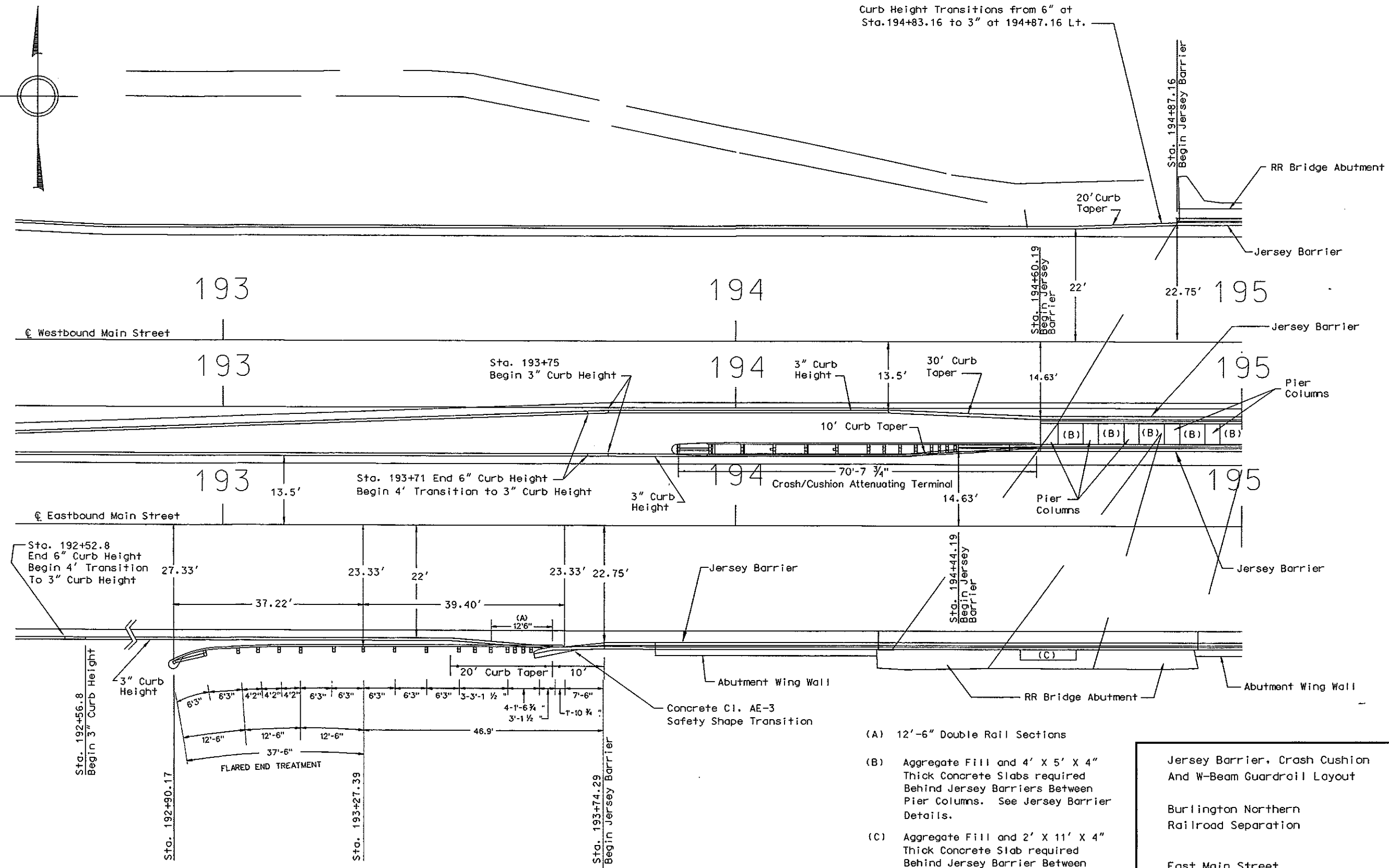
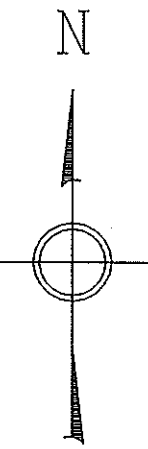
P.C.C. PAVEMENT LAYOUT

STA. 204+00 to End Proj.
& Mandan Ave.

FILE: JTS6.GRF



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	106



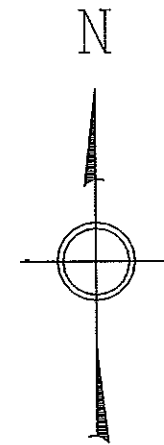
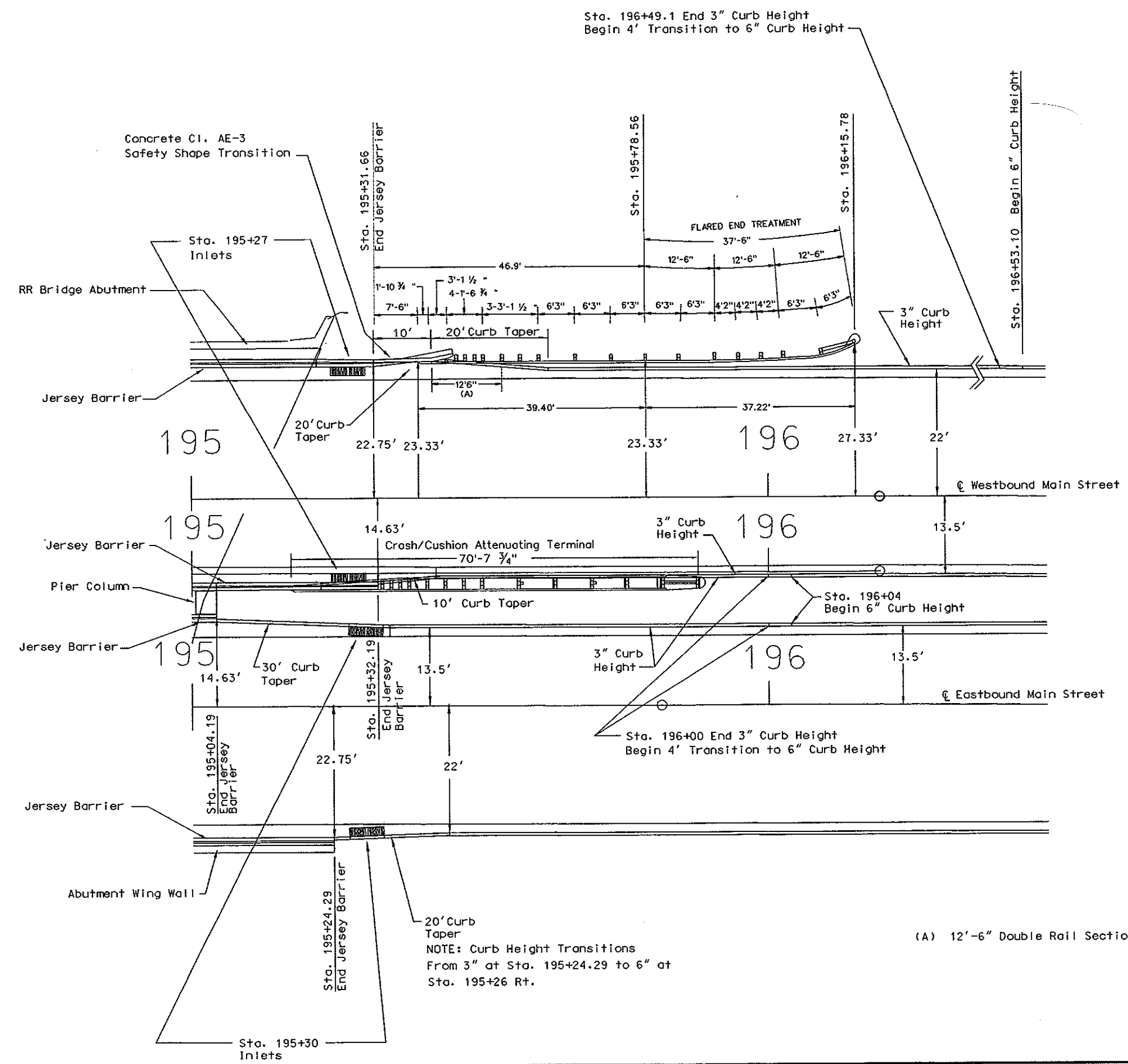
- (A) 12'-6" Double Rail Sections
- (B) Aggregate Fill and 4' X 5' X 4" Thick Concrete Slabs required Behind Jersey Barriers Between Pier Columns. See Jersey Barrier Details.
- (C) Aggregate Fill and 2' X 11' X 4" Thick Concrete Slab required Behind Jersey Barrier Between South Bridge Abutments. See Jersey Barrier Details.

Jersey Barrier, Crash Cushion And W-Beam Guardrail Layout

Burlington Northern Railroad Separation

East Main Street Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)1916	107



(A) 12'-6" Double Rail Sections

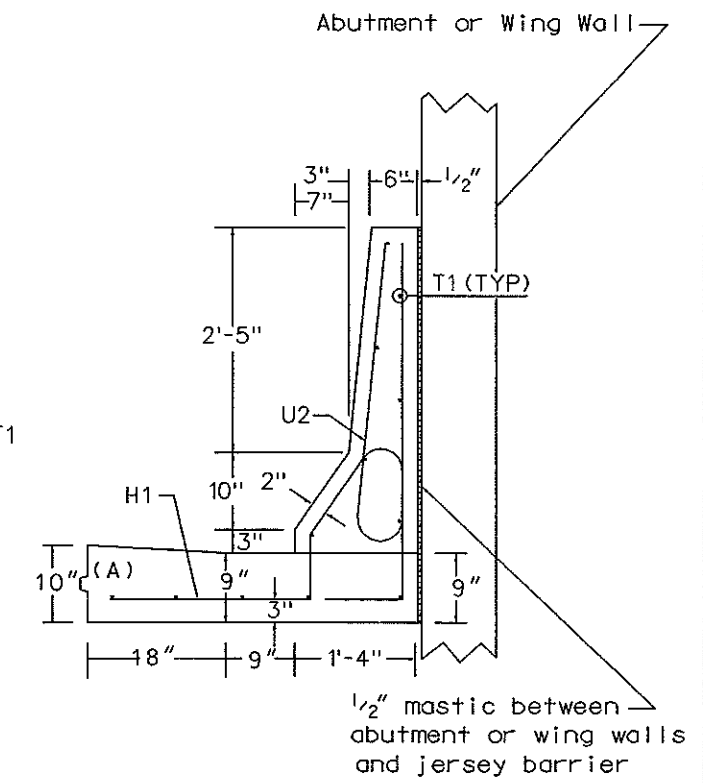
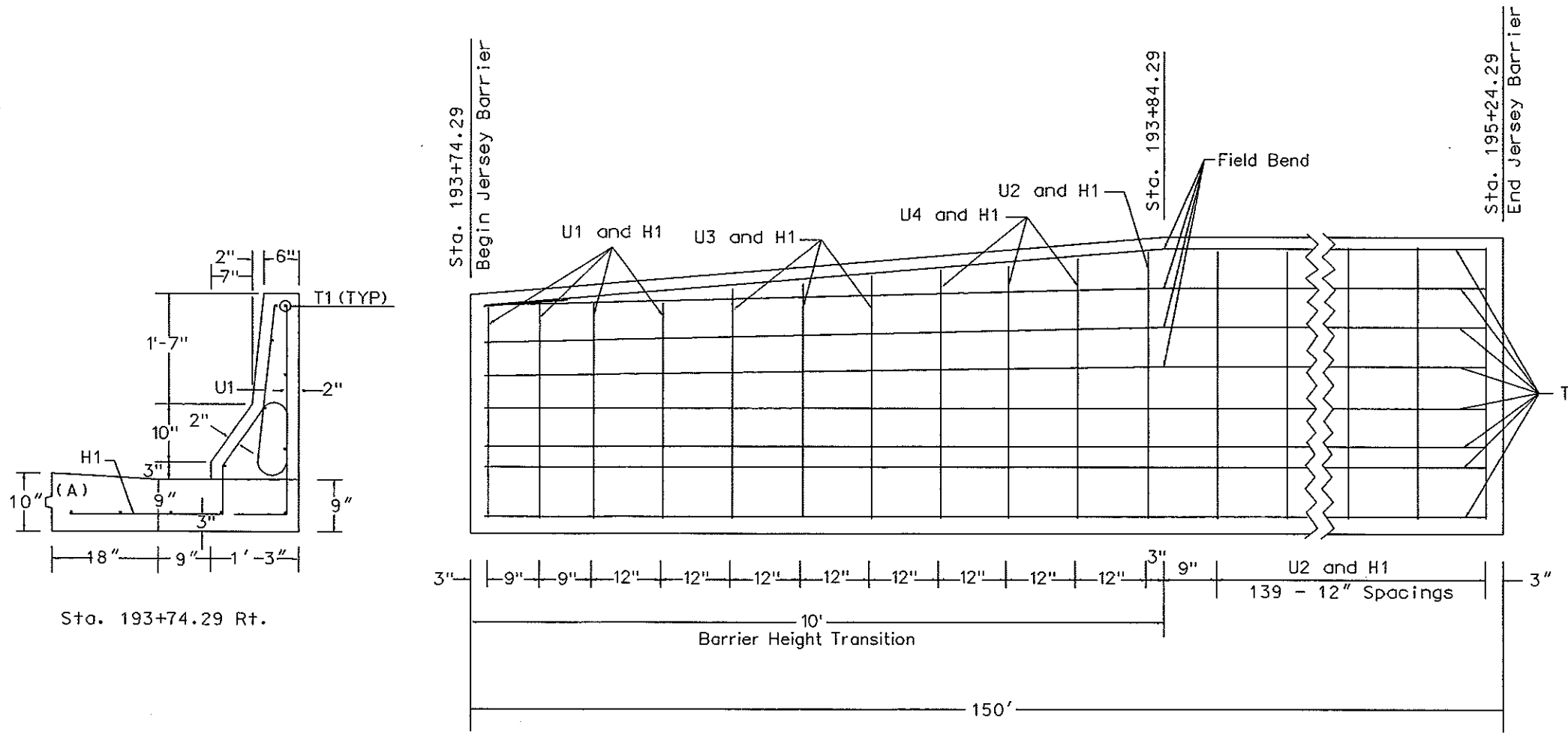
NOTE: Curb Height Transitions
From 3" at Sta. 195+24.29 to 6" at
Sta. 195+26 Rt.

Jersey Barrier, Crash Cushion
And W-Beam Guardrail Layout

Burlington Northern
Railroad Separation

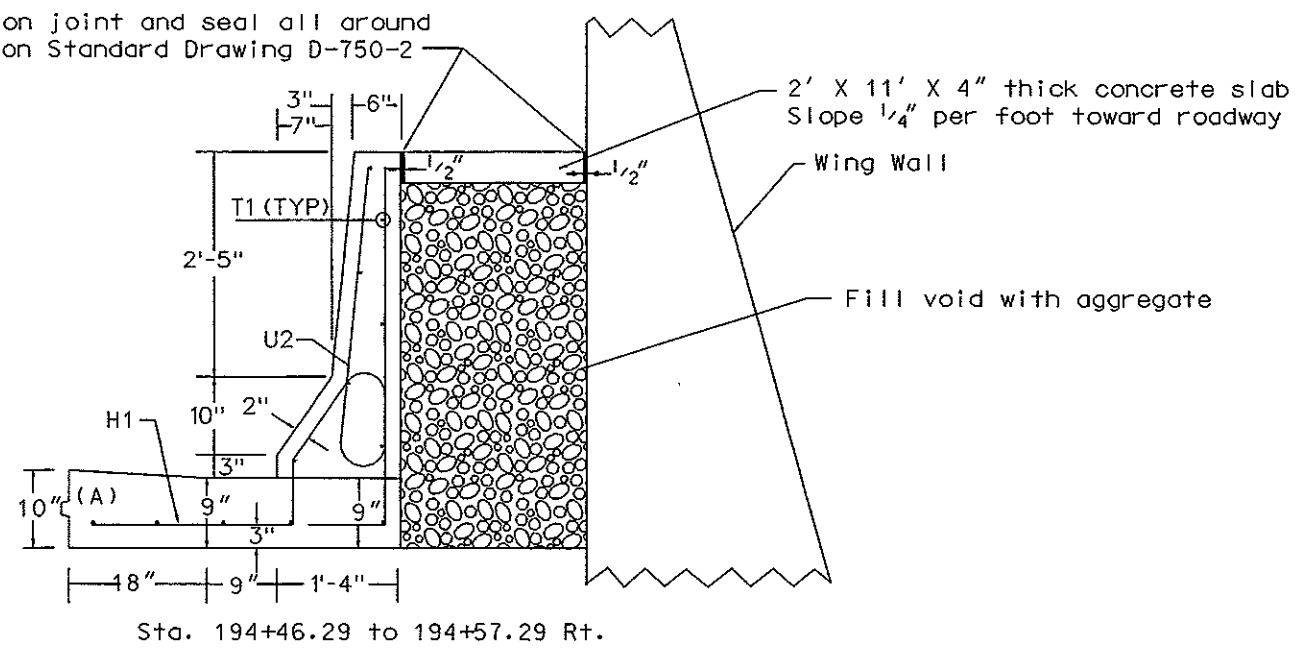
East Main Street
Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	108



Sta. 193+84.29 to 194+46.29 Rt.
 And
 Sta. 194+57.29 to 195+24.29 Rt.

Provide isolation joint and seal all around slab, as shown on Standard Drawing D-750-2



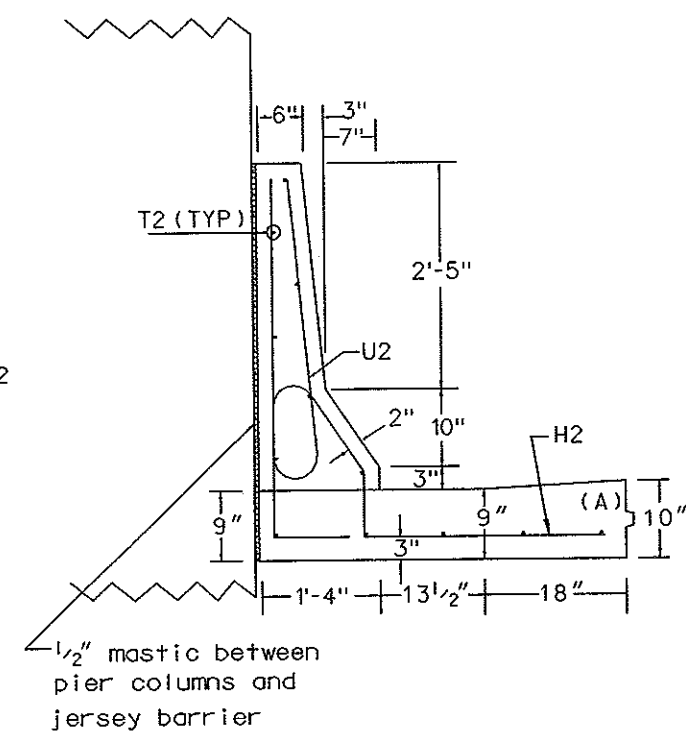
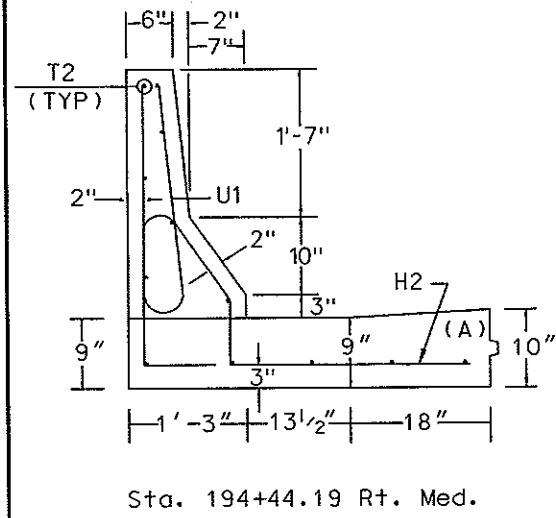
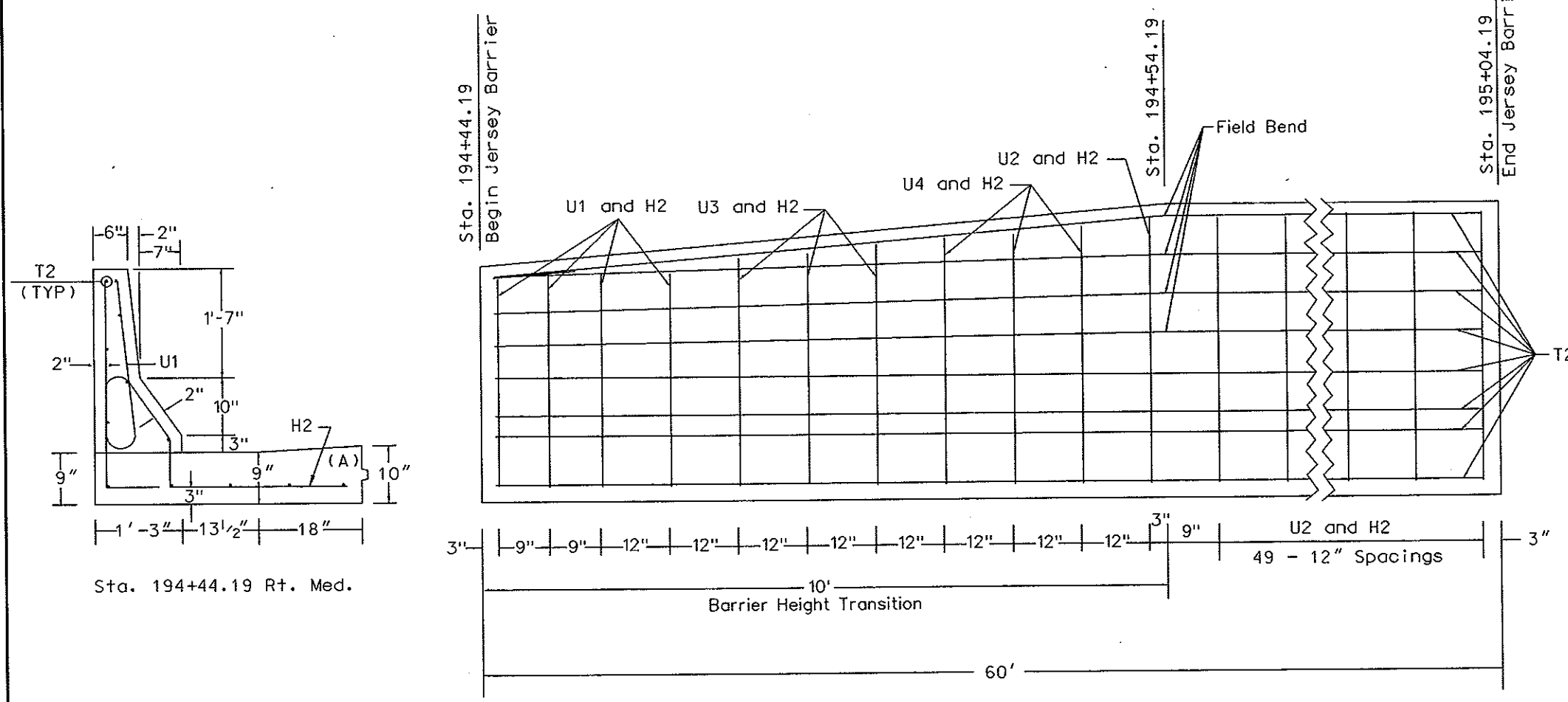
(A) Provide keyway as shown in Keyway Detail For Curb & Gutter on Standard Drawing D-748-1.

NOTE: The joint between barrier top and adjacent piers, wing walls or abutments shall be sealed as shown in the Typical Isolation Joint Seal detail on Standard Drawing D-750-2.

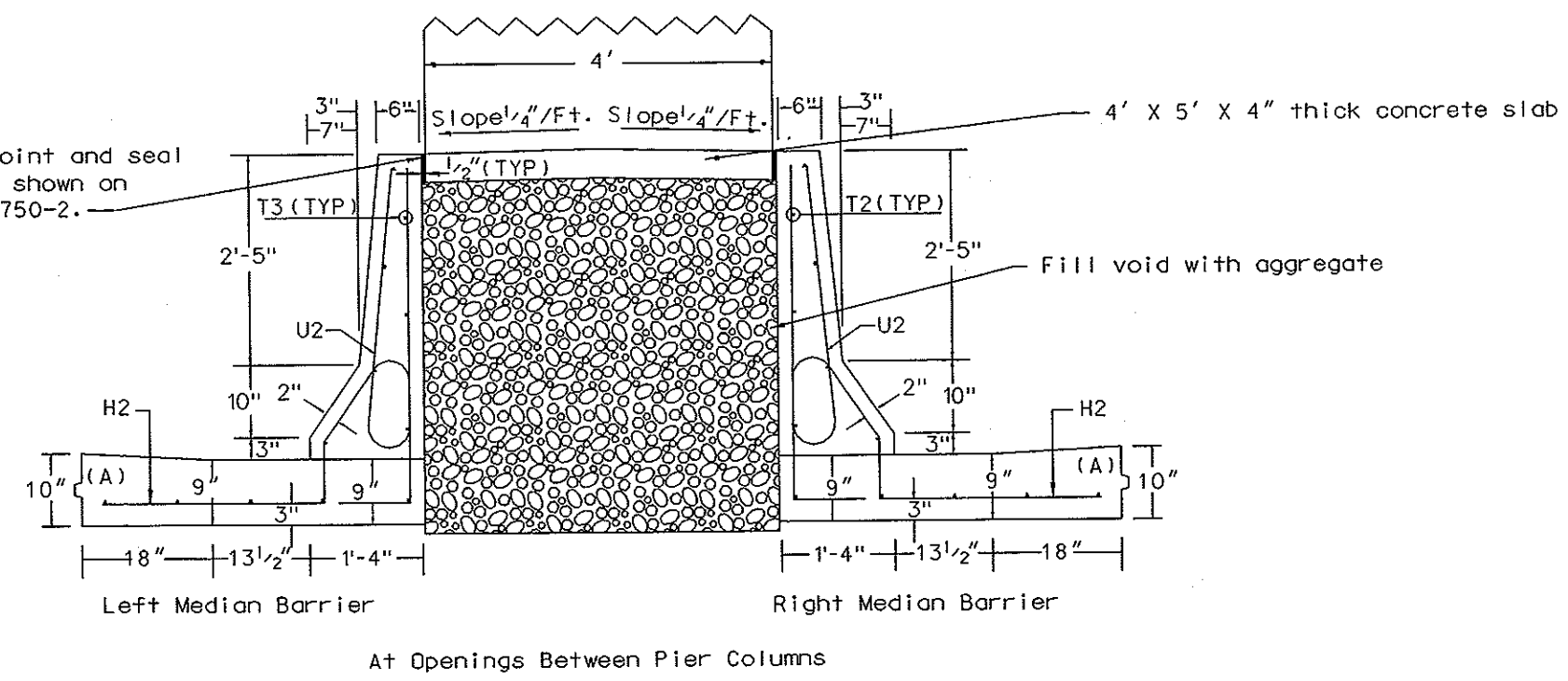
JERSEY BARRIER DETAILS

Right Barrier
 Burlington Northern
 Railroad Separation
 East Main Street
 Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
6	ND	NHU-1-094(039)916	109



Provide isolation joint and seal all around slab, as shown on Standard Drawing D-750-2.

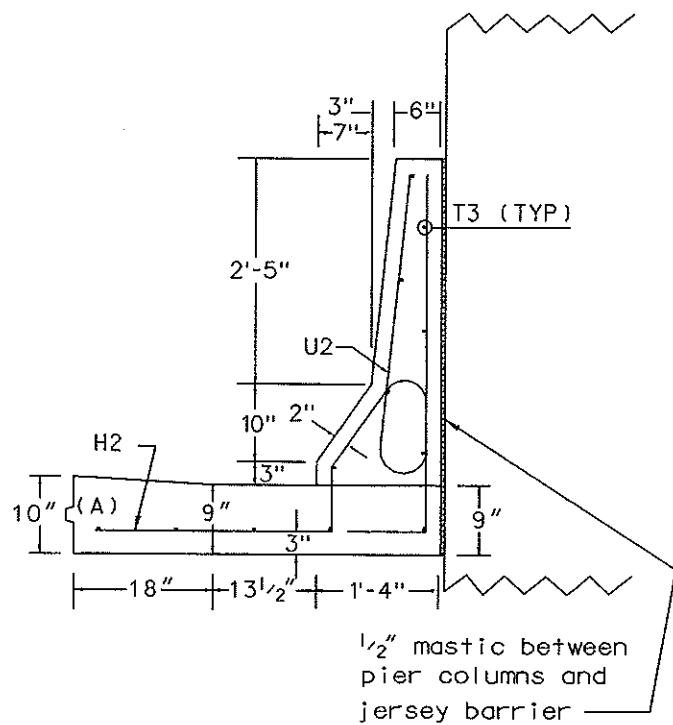


(A) Provide keyway as shown in Keyway Detail For Curb & Gutter on Standard Drawing D-748-1.

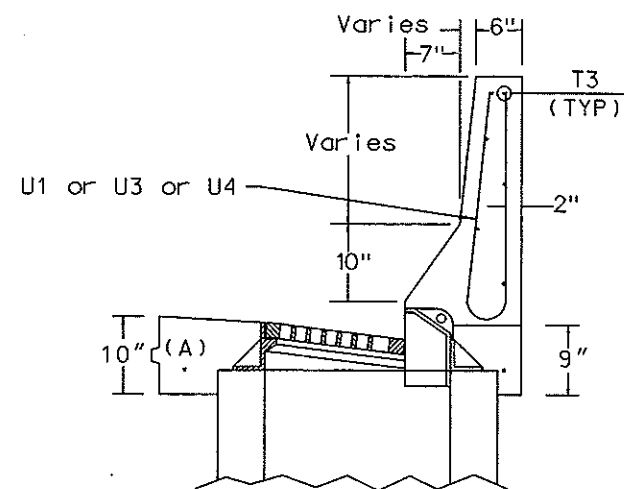
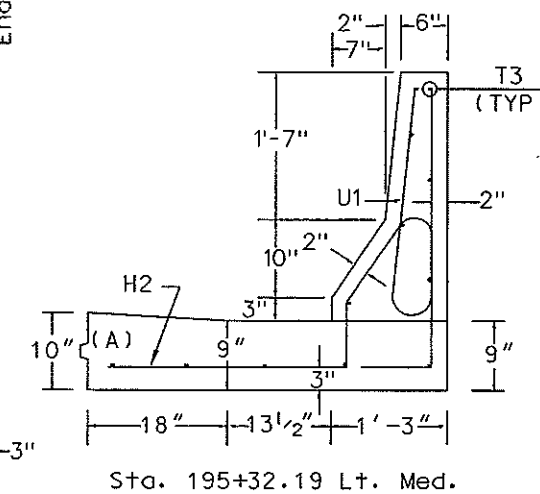
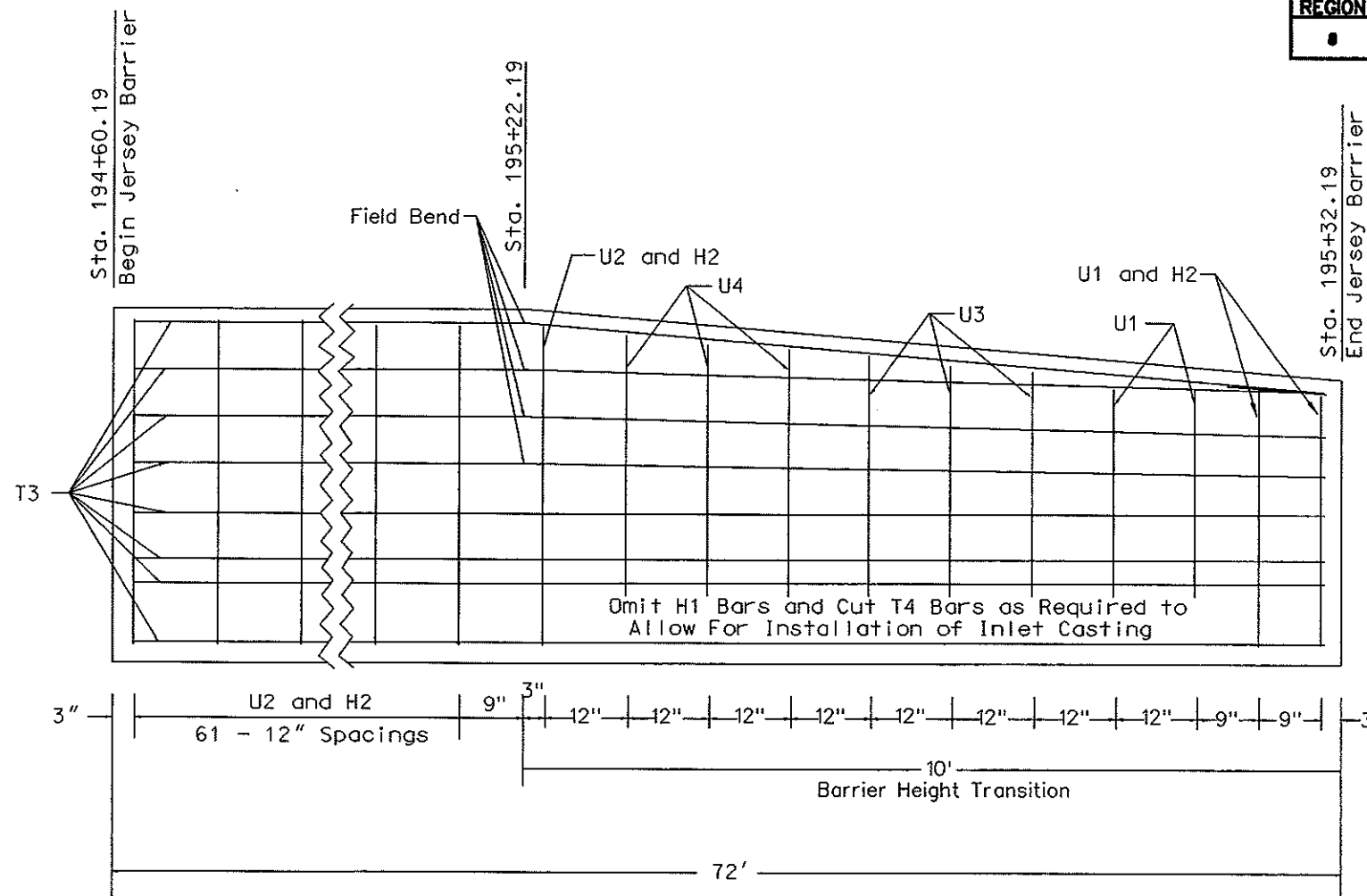
NOTE: The joint between barrier top and adjacent piers, wing walls or abutments shall be sealed as shown in the Typical Isolation Joint Seal detail on Standard Drawing D-750-2.

JERSEY BARRIER DETAILS
Right Median Barrier
Burlington Northern
Railroad Separation
East Main Street
Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	110



Sta. 194+60.19 To 195+22.19 Lt. Med.



Section Showing Inlet
Sta. 195+27.0 Lt. Med.

(A) Provide Keyway as shown in Keyway Detail For Curb & Gutter on Standard Drawing D-748-1.

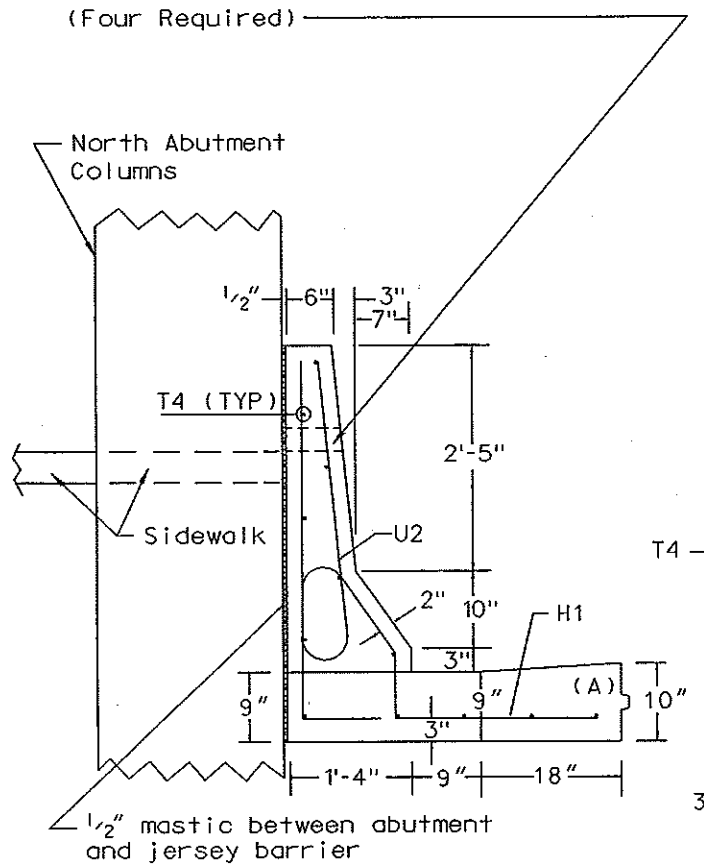
NOTE: The joint between barrier top and adjacent piers, wing walls or abutments shall be sealed as shown in the Typical Isolation Joint Seal detail on Standard Drawing D-750-2.

JERSEY BARRIER DETAILS

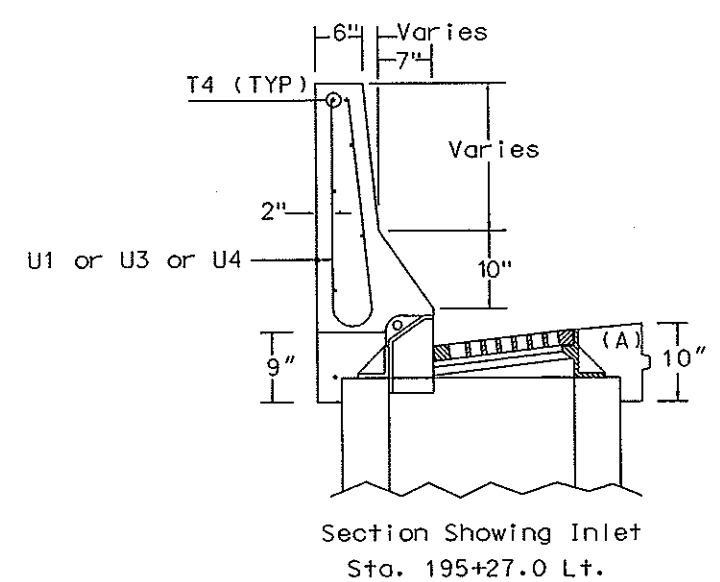
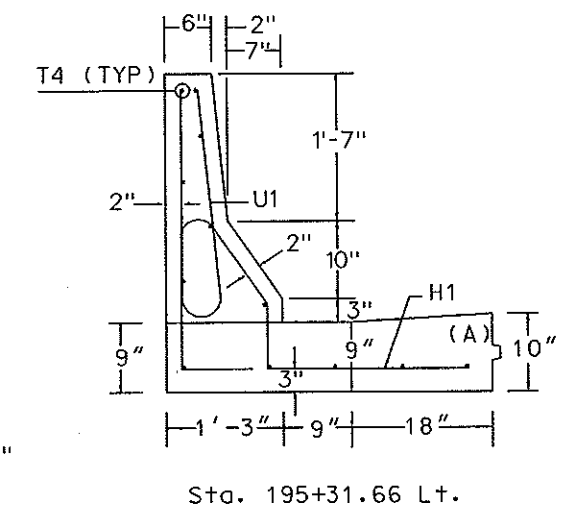
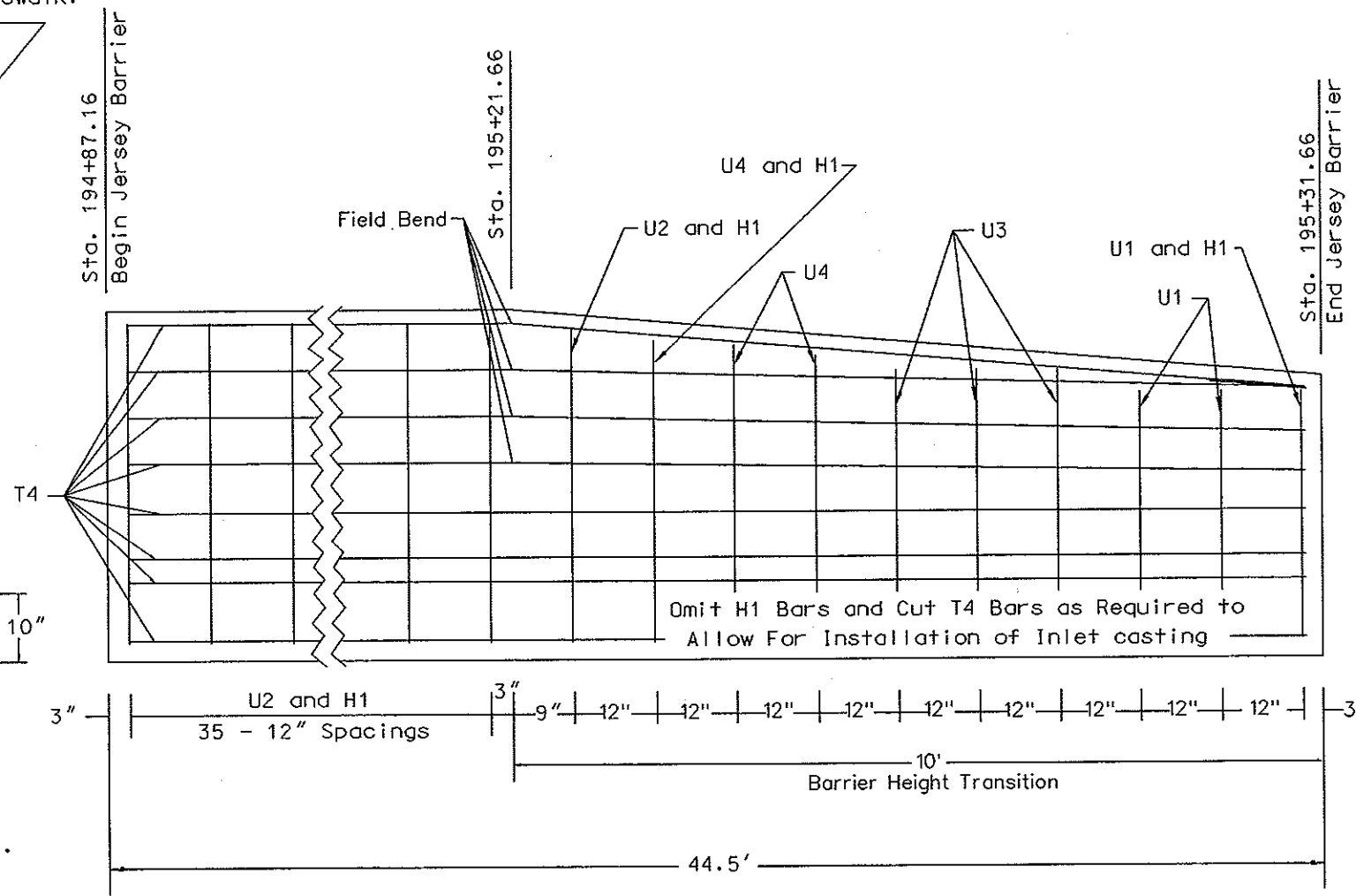
Left Median Barrier
Burlington Northern
Railroad Separation
East Main Street
Mandan

FHWA REGION	STATE	FED. AD PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	111

Provide 3" dia. drain holes through barrier, approximately centered between abutment columns, at elevation of sidewalk. (Four Required)



Sta. 194+87.16 To 195+21.66 Lt.



(A) Provide Keyway as shown in Keyway Detail For Curb & Gutter on Standard Drawing D-748-1.

NOTE: The joint between barrier top and adjacent piers, wing walls or abutments shall be sealed as shown in the Typical Isolation Joint Seal detail on Standard Drawing D-750-2.

JERSEY BARRIER DETAILS

Left Barrier

Burlington Northern Railroad Separation

East Main Street

Mandan

RIGHT BARRIER				
Sta. 193+74.29 to 195+24.29 Rt.				
BAR LIST				
MARK	SIZE	NO.	LENGTH	SHAPE
H1	5	151	6'-10"	BENT
T1	5	48	38'-7"	STRAIGHT
U1	5	4	5'-0"	BENT
U2	5	141	6'-8 ¹ / ₄ "	BENT
U3	5	3	5'-6"	BENT
U4	5	3	6'-0"	BENT

RIGHT MEDIAN BARRIER				
Sta. 194+44.19 to 195+04.19 Rt. Med.				
BAR LIST				
MARK	SIZE	NO.	LENGTH	SHAPE
H2	5	61	7'-2"	BENT
T2	5	24	30'-7"	STRAIGHT
U1	5	4	5'-0"	BENT
U2	5	51	6'-8 ¹ / ₄ "	BENT
U3	5	3	5'-6"	BENT
U4	5	3	6'-0"	BENT

LEFT MEDIAN BARRIER				
Sta. 194+60.19 to 195+32.19 Lt. Med.				
BAR LIST				
MARK	SIZE	NO.	LENGTH	SHAPE
H2	5	65	7'-2"	BENT
T3	5	24	36'-7"	STRAIGHT
U1	5	4	5'-0"	BENT
U2	5	63	6'-8 ¹ / ₄ "	BENT
U3	5	3	5'-6"	BENT
U4	5	3	6'-0"	BENT

LEFT BARRIER				
Sta. 194+87.16 to 195+31.66 Lt.				
BAR LIST				
MARK	SIZE	NO.	LENGTH	SHAPE
H1	5	39	6'-10"	BENT
T4	5	12	44'-0"	STRAIGHT
U1	5	3	5'-0"	BENT
U2	5	37	6'-8 ¹ / ₄ "	BENT
U3	5	3	5'-6"	BENT
U4	5	3	6'-0"	BENT

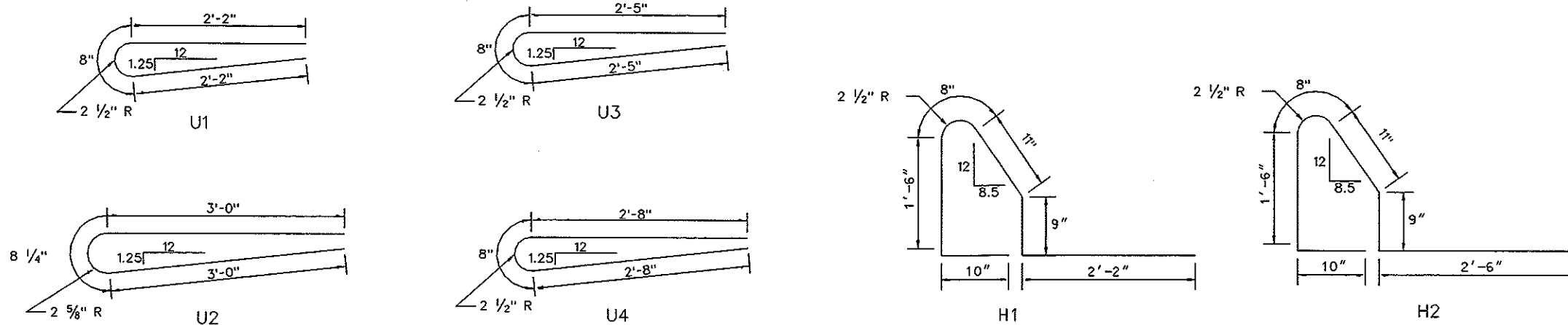
NOTES:

- 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 approximately 10-foot spacings.
- Dimensions of bent bars are given out to out. The length of bent bars listed is the sum of the detailing dimensions.
- Concrete shall be Class AE-3.
- Reinforcing steel shall be Grade 60.
- Surface finish "D" shall be required for all exposed surfaces of the barriers, except for the base slab surface.

JERSEY BARRIER FORMED OR SLIPFORMED

Sta. 193+74.29 to 195+24.29 Rt.	150 L.F.
Sta. 194+44.19 to 195+04.19 Rt. Med.	60 L.F.
Sta. 194+60.19 to 195+32.19 Lt. Med.	72 L.F.
Sta. 194+87.16 to 195+31.66 Lt.	44.5 L.F.
Total	326.5 L.F.

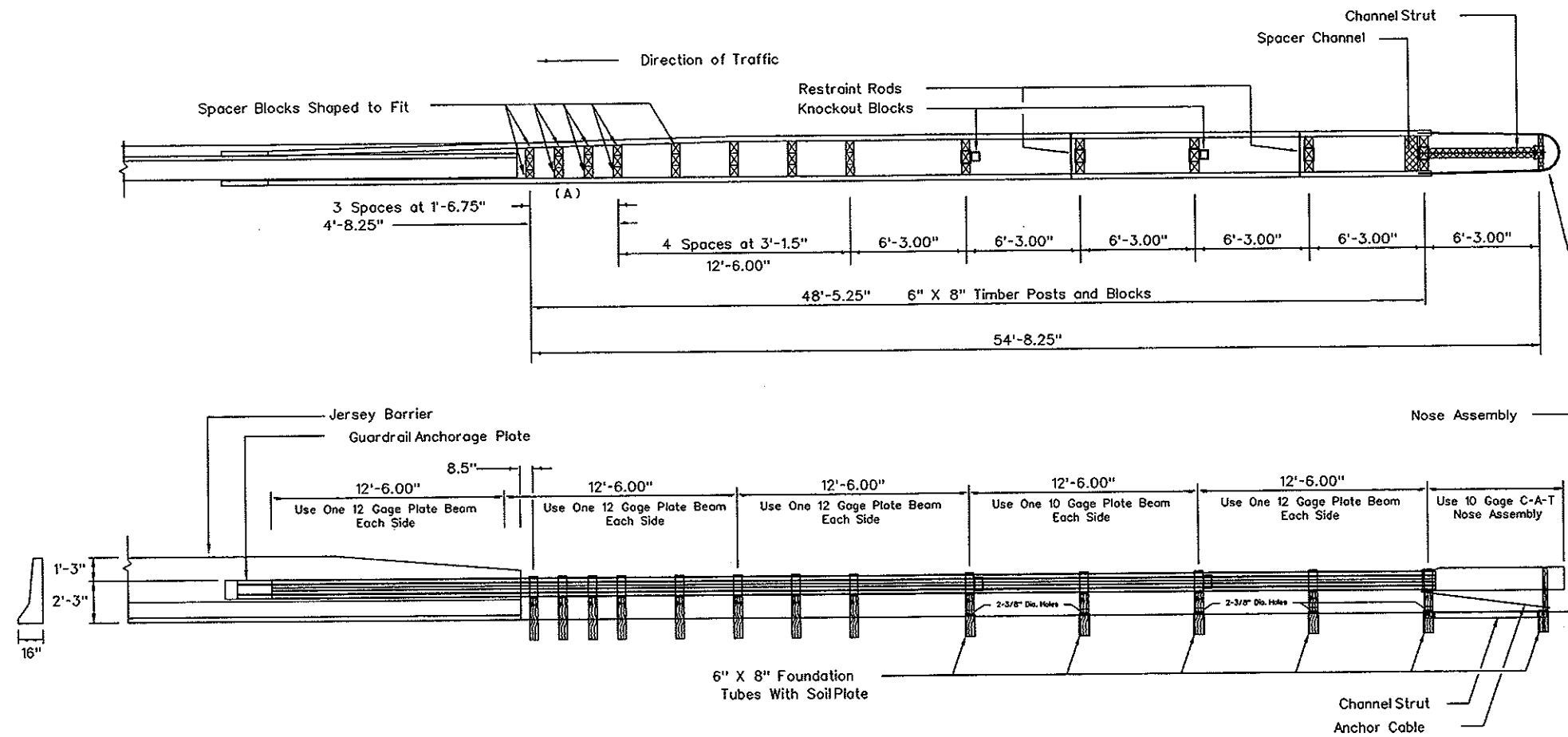
Longitudinal Reinforcing Shall Be Lap Spliced 19".



BENT BAR DETAILS

JERSEY BARRIER BAR LISTS,
BENT BAR DETAILS, AND
QUANTITIES

Burlington Northern
Railroad Separation
East Main Street
Mandan



(A) Adjust first four post offsets to allow for approximately equal thickness spacer blocks on each side.

CRASH/CUSHION ATTENUATING TERMINAL	
Sta. 193+88.79 to 194+59.44 Rt. Med.	1 EA.
Sta. 195+16.94 to 195+87.59 Lt. Med.	1 EA.
TOTAL	2 EA.

CRASH/CUSHION - ATTENUATING
 TERMINAL DETAILS
 Bridge Pier Protection
 Burlington Northern
 Railroad Separation
 East Main Street
 Mandan

W-BEAM SUMMARY SHEET

LOCATION	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(C)	(C)	(C)	(C)	(C)	(C)
	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	CONCRETE CLASS AE-3	REINFORCING STEEL	1/4" x 11 1/2" x 1'-2 1/2" PLATE	7/8" @ X 8 1/2" LONG CARRIAGE BOLT	1/4" x 4" x 2'-4" PLATE	MC 8 X 20 x 4'-0"
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CU FT	LBS	EACH	EACH	EACH	EACH
Sta. 193+27.39 to 193+66.79 Rt.	1	1	4	ERR	ERR	ERR	ERR	1	2	2	56.3	365.9	1	3	1	1
Sta. 195+39.16 to 195+78.56 Lt.	1	1	4	ERR	ERR	ERR	ERR	1	2	2	56.3	365.9	1	3	1	1
TOTAL	2	2	8	ERR	ERR	ERR	ERR	2	4	4	112.6	731.8	2	6	2	2

W-BEAM GUARDRAIL

Sta. 193+27.39 to 193+66.79 Rt.	39.4 LF
Sta. 195+39.16 to 195+78.56 Lt.	39.4 LF
TOTAL	78.8 LF

CONCRETE CL. AE-3 SAFETY SHAPE TRANSITION

Sta. 193+60.71 to 193+74.29 Rt.	1 EA
Sta. 195+31.66 to 195+45.24 Lt.	1 EA
TOTAL	2 EA

(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam Guardrail".

(C) These items are not to be bid separately, but shall be included in the price bid for the item "Concrete Cl AE-3 Safety Shape Transition".

W-BEAM GUARDRAIL QUANTITIES
 Burlington Northern Railroad
 Separation
 East Main Street
 Mandan, ND

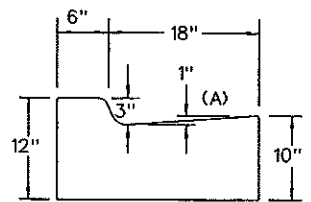
W-BEAM G. R.-FLARED END TREAT. & TRANSITION																								
W-BEAM G. R.-FLARED END TREAT. & TRANSITION QUANTITIES																								
LOCATION	(A) 5/8" DIA. x 16" LONG BUTTON HEAD BOLT	(A) 5/8" @ x 1 1/4" LONG BUTTON HEAD BOLT	(A) 5/8" DIA. x 10" LONG BUTTON HEAD BOLT	(A) 6"x8" x 6'-0" W P O O D T	(A) 6"x6" x 14" W B O O D C	(A) 6"x8" x 14" W B O O D C	(A) 2'x2' x 1/4" SSP E I A E L T	(A) BCT A S E L B M E L Y	(A) BCT A S E L B M E L Y	(A) BCT A S E L B M E L Y	(A) B E A U N S F E M E L D Y	(A) W- BEAM TER- MINAL CON- HEX HEAD BOLT	(A) 5/8" DIA. x 1 1/2" HEX HEAD BOLT	(A) 3/4" DIA. x 7 1/2" HEX HEAD BOLT	(A) R E F P E A C T O R	(A) 12'-6" W-BEAM RAIL SECTION	(A) BREAK AWAY TER- MINAL POST SLEEVE	(A) 8"x6" x 5' TER- MINAL E E L	(A) 5 1/2"x 7 1/2"x 3'-6 3/4" WOOD BREAK AWAY POST	(A) 6"x8" x 6'-0" WOOD BREAK AWAY POST	(A) 5/8" DIA. x 1 3/4" BUTTON HEAD BOLT	(A) 6" x 7 1/2" x 1/4" STEEL SHELF ANGLE	(A) STRUT AND YOKE ASS- SEMBLY	(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	
Sta. 192+90.17 to 193+27.39 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. 195+78.56 to 196+15.78 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	12	60	2	2	2	8	4	2	2	2	2	2	16	8	4	6	2	4	4	8	2	2	2	4

W-BEAM G.R. FLARED END TREAT. & TRANSITION	
Sta. 192+90.17 to 193+27.39 Rt.	1 EACH
Sta. 195+78.56 to 196+15.78 Lt.	1 EACH
TOTAL	2 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."

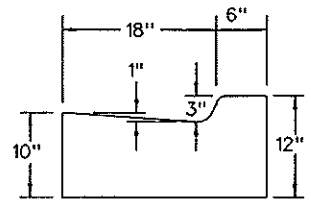
W-BEAM GUARDRAIL FLARED END
TREATMENT AND TRANSITION
QUANTITIES
Burlington Northern Railroad
Separation
East Main St. Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	116

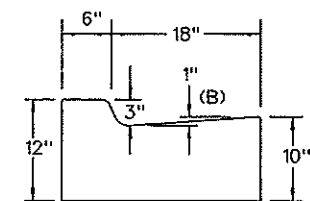


Sta. 195+61.66 to 196+49.1 Lt.

(A) Gutter Slope Varies from Sta. 195+81.08 to 196+49.1 Lt. To Match Roadway Cross Slope.

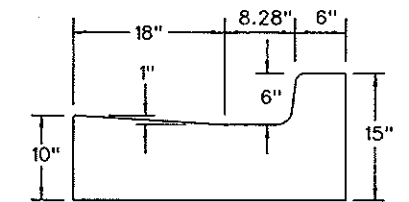


Sta. 195+42.19 to 196+00.0 Lt. Med.

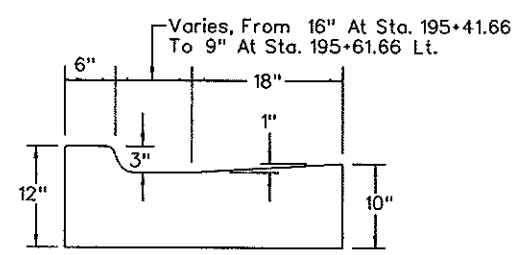


Sta. 195+34.19 to 196+00.0 Rt. Med.

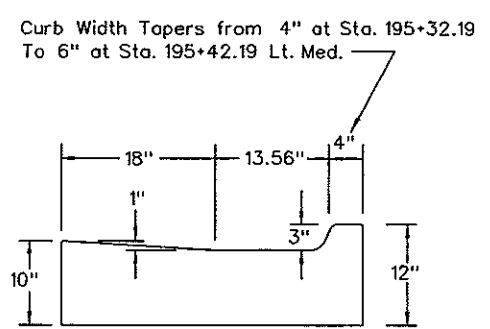
(B) Gutter Slope Varies From Sta. 195+81.08 To 196+00.0 Rt. Med. To Match Roadway Cross Slope.



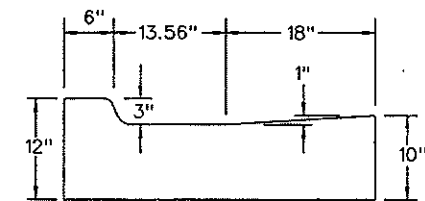
Sta. 195+26 Rt.



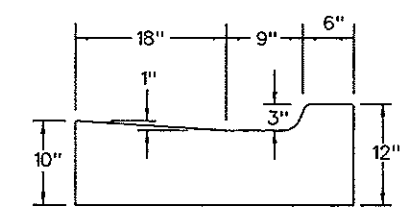
Sta. 195+41.66 To 195+61.66 Lt.



Sta. 195+32.19 Lt. Med.

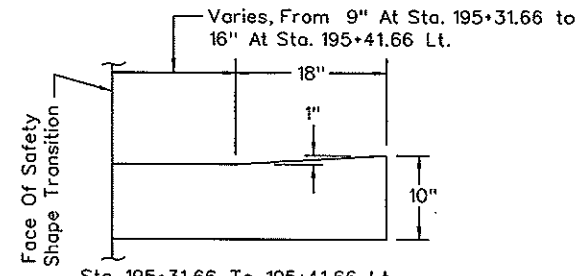


Sta. 195+04.19 Rt. Med.
Begin Curb and Gutter

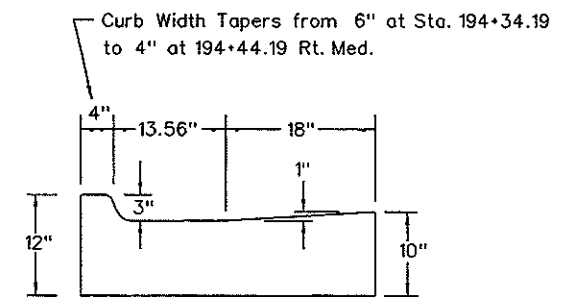


Sta. 195+24.29 Rt.

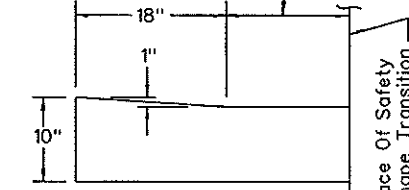
Varies, From 16" at Sta. 193+64.29 To 9" At Sta. 193+74.29 Rt.



Sta. 195+31.66 To 195+41.66 Lt.

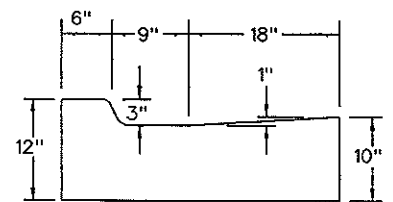


Sta. 194+44.19 Rt. Med.
End Curb and Gutter

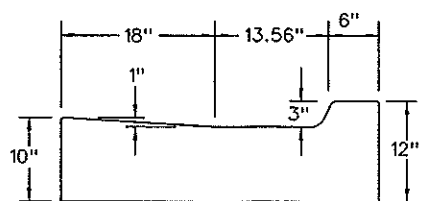


Sta. 193+64.29 to 193+74.29 Rt.

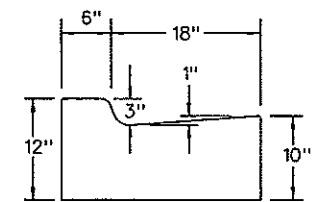
Varies, From 9" At Sta. 193+44.29 To 16" At Sta. 193+64.29



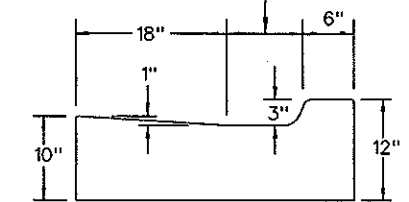
Sta. 194+87.16 Lt.



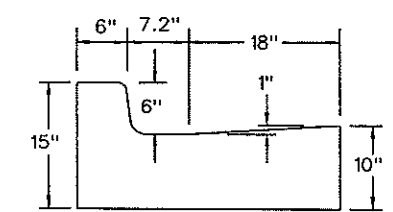
Sta. 194+60.19 Lt. Med.



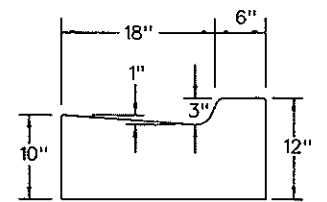
Sta. 193+75 to 194+34.19 Rt. Med.



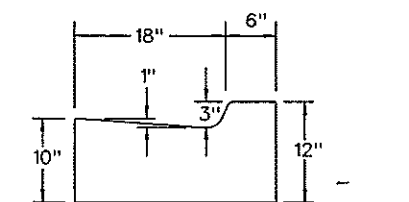
Sta. 193+44.29 To 193+64.29 Rt.



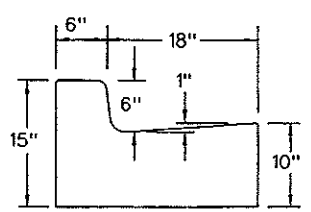
Sta. 194+83.16 Lt.



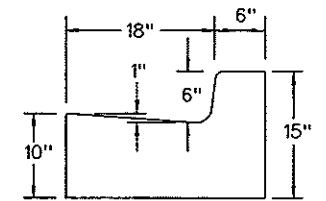
Sta. 193+75 to 194+30.19 Lt. Med.



Sta. 192+56.8 to 193+44.29 Rt.



Sta. 194+63.16 Lt.



Sta. 195+44.29 Rt.

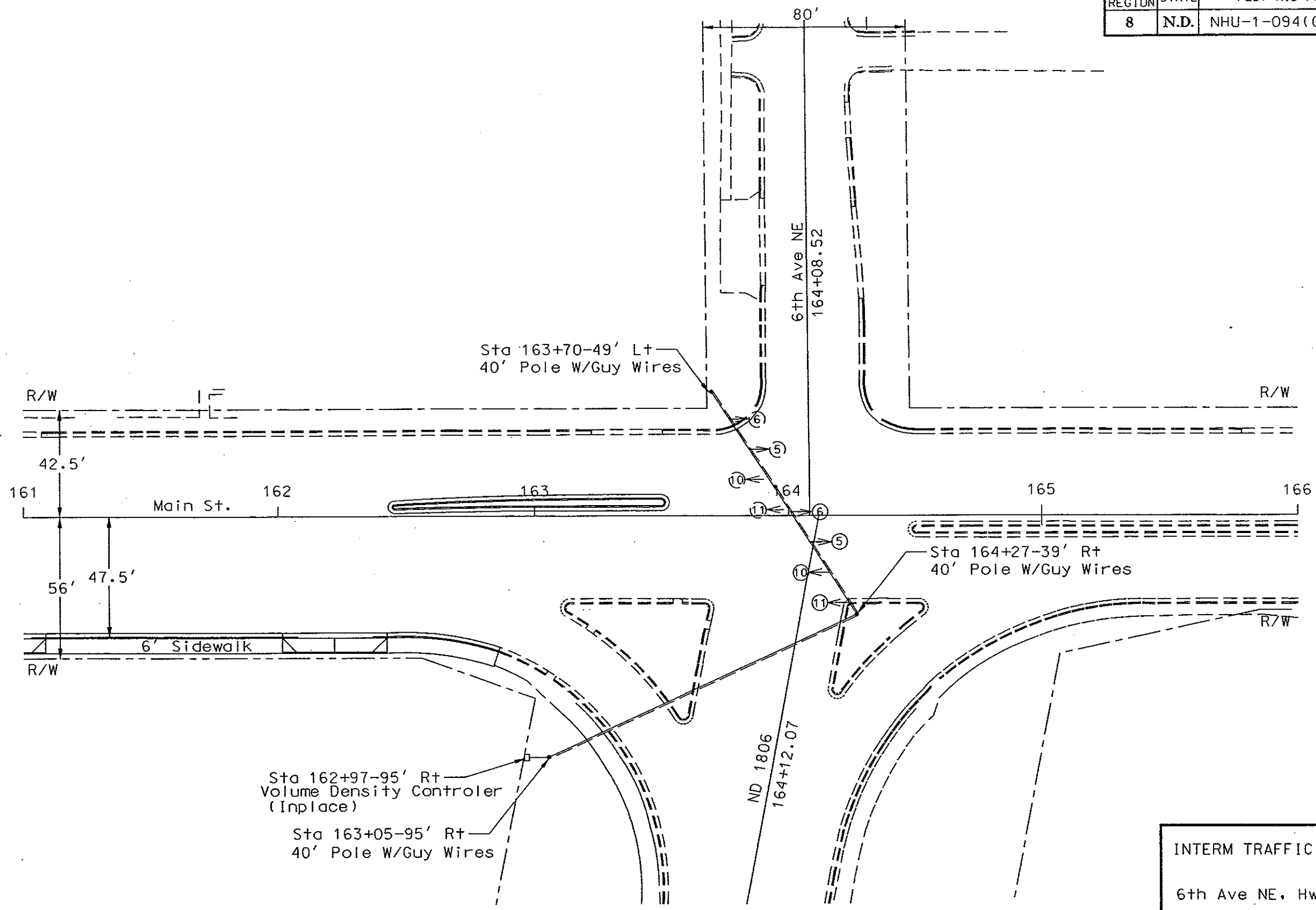
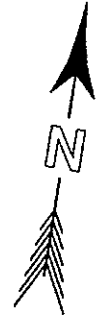
NOTE: These details modify the shape of Curb and Gutter Type I.
Other construction details shall be as shown on Standard Drawing D-748-1

Curb and Gutter Details

At Burlington Northern Railroad Separation

East Main Street
Mandan

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	117



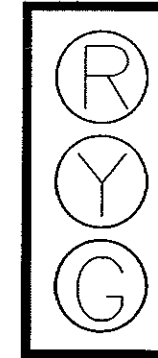
INTERM TRAFFIC SIGNALS

6th Ave NE, Hwy 1806

Main St

Mandan ND

CONDUCTOR		CABLE 1 (12-12)	
Base	Tracer	Head	Indication
1	Black		Spare
2	White		Neutral
3	Red	5,6	Red
4	Green		Ground
5	Orange	5,6	Yellow
6	Blue	5,6	Green
7	White	Black	Spare
8	Red	Black	10,11
9	Green	Black	
10	Orange	Black	10,11
11	Blue	Black	10,11
12	Black	White	Spare



Heads 5 6 10 11

5 In. Louvered Backplates



INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
6th Ave NE, Hwy 1806
Mandan, ND

INTERMQC 11-IPF

QUANTITIES (A)										
STATION	2" Diameter Rigid Conduit	No. 12 AWG 12 Conductor Cable	1-Way 3 Sec. Head W/12in. Lenses Span Mounted	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	Mounting Hardware	
	LF	LF	EA	EA	EA	LF	LF	EA	LS	
162+97-95' Rt	24	39						1		
163+05-95' Rt								1		
163+70-49' Lt								1		
Var. Locations	8	345	4	1	4	157	314		1	
TOTAL	32	394	4	1	4	157	314	3	1	

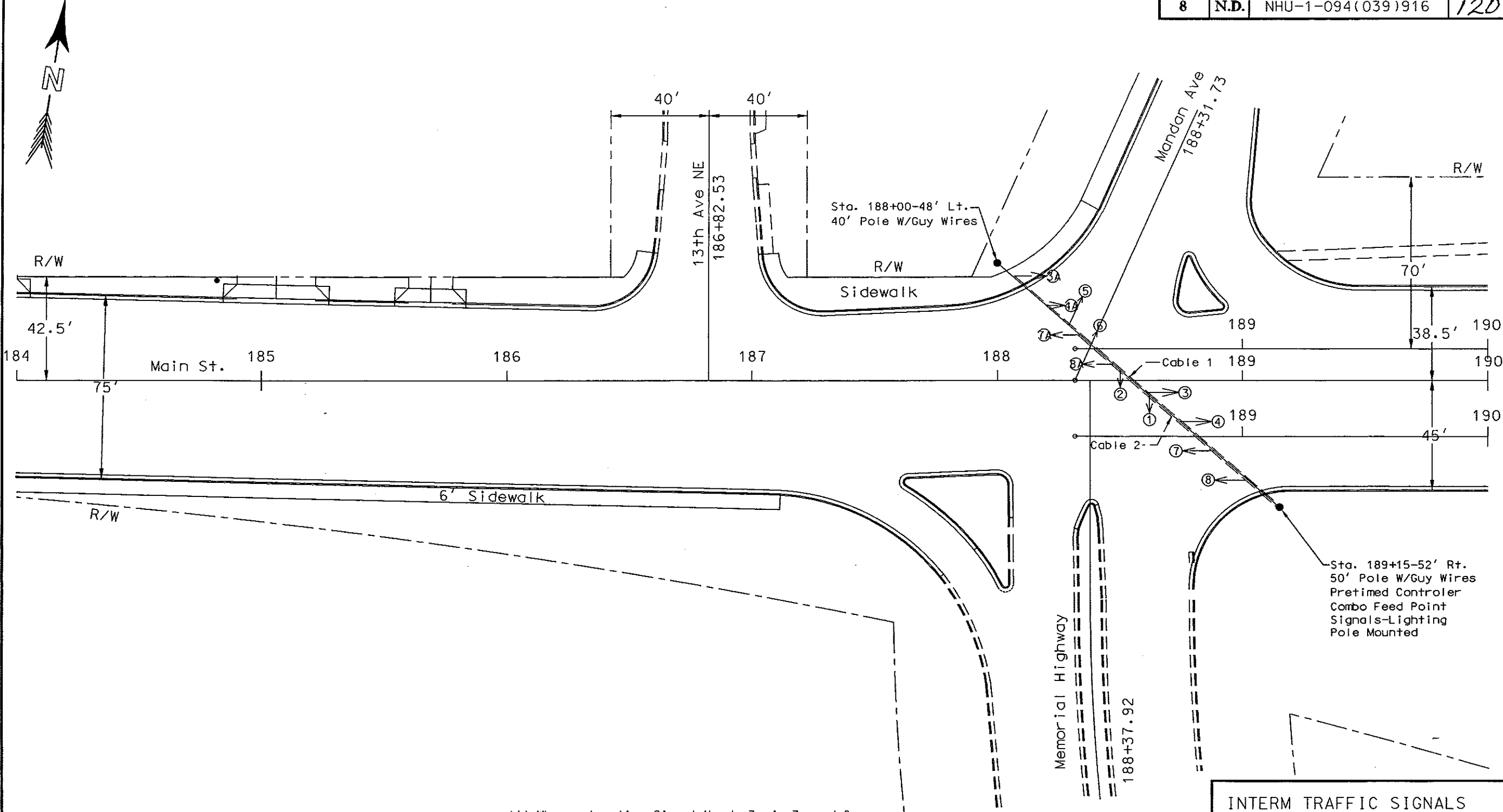
(A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
162+97-95' Rt to 163+05-95' Rt	8'	2"	9'	Cable 1
163+05-95' Rt	29'(B)	2"	24'	Cable 1
163+05-95' Rt to 164+27-39' Rt			138'	Cable 1
			138'	(1) Stability Wire
			176'	(2) Span Wire
164+27-39' Rt to 163+70-49' Rt			130'	Cable 1
			109'	(1) Stability Wire
			218'	(2) Span Wire

(B) These items shall be wood pole mounted.

INTERIM TRAFFIC SIGNALS
 Summary of Quantities
 6th Ave NE, Hwy 1806
 Mandan, ND

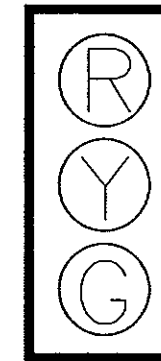
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	120



(A) When relocating Signal Heads 3, 4, 7, and 8 the contractor shall coil enough conductor to service their future Signal Head Locations.

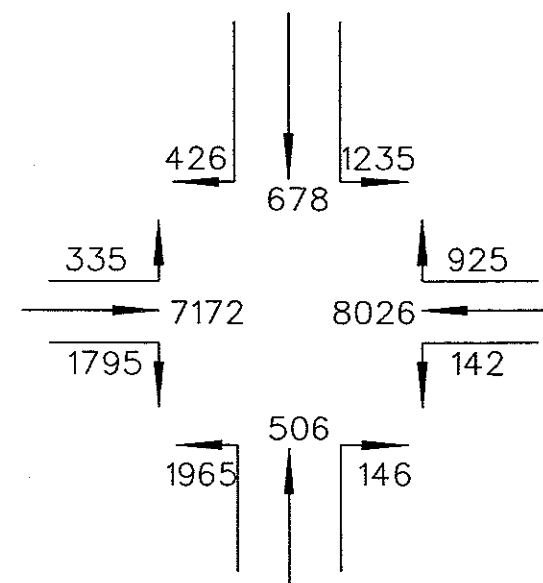
INTERM TRAFFIC SIGNALS
Mandan Ave. & Main St.
Mandan, ND

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	3,4	Red	1,2	Red
4	Green		Ground		Ground
5	Orange	3,4	Yellow	1,2	Yellow
6	Blue	3,4	Green	1,2	Green
7	White	Black	Spare		Spare
8	Red	Black	Red	7,8	Red
9	Green	Black	Spare		Spare
10	Orange	Black	Yellow	7,8	Yellow
11	Blue	Black	Green	7,8	Green
12	Black	White	Spare		Spare



Heads 1 2 3 4
5 6 7 8

5 In. Louvered Backplates



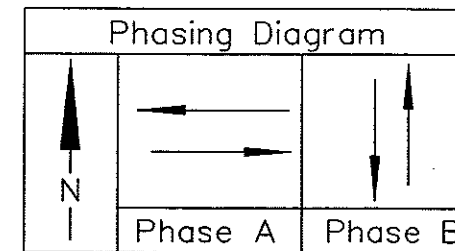
ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
Mandan Ave, Memorial Hwy
Mandan, ND

Main Street	Vehicles	← G1		Y1	R1 →	
Mandan Ave. Memorial Hwy.	Vehicles	← R2		G2	Y2	→
Time Cycle In Seconds (70 Second Cycle)		45		3	1	17
Percent of Cycle		64		4	2	24
				3	1	3
				4	2	4

ALL DIALS



CAM BREAKOUT CHART																
INTERNAL	CAM POSITION	CAMS										DIAL		SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2					Sec.	%	Setting
I	1	X	X	X										22.5	32	32
	2			X										22.5	32	64
II	3				X									3	4	68
III	4					X								1	2	70
	5					X	X							8.5	12	82
IV	6					X	X							8.5	12	94
	7					X		X						3	4	98
V	8					X			X					1	2	00
VI	9	X	X	X										22.5	32	32
	10			X										22.5	32	64
VII	11				X									3	4	68
VIII	12					X								1	2	70
	13					X	X							8.5	12	82
IX	14					X	X							8.5	12	94
	15					X		X						3	4	98
X	16					X			X					1	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 2:00 AM to 6:00 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
Mandan Ave.

INTERIM TRAFFIC SIGNALS

Controller Settings

Mandan Ave., Memorial Hwy.

Mandan, ND

QUANTITIES (A)																	
STATION	0.5" Diameter Rigid Conduit	1" Diameter Rigid Conduit	2-1/2" Diameter Rigid Conduit	Underground Conductor No. 8 - Type RHW	No. 12 AWG 12 Conductor Cable	Combo Feed Point-Traffic Signals-Lighting-Pole Mtd-Switch Box & Meter Trim	1-Way 3 Sec. Head W/12in. Lenses Span Mounted	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
	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	LS
189+15-52' Rt	6	29	29	120	39	1		1	1					1	1		
188+00-48' Lt			24		39									1			
Var. Locations					321		8			1	4	157	314				1
TOTAL	6	29	53	120	399	1	8	1	1	1	4	157	314	1	1	1	1

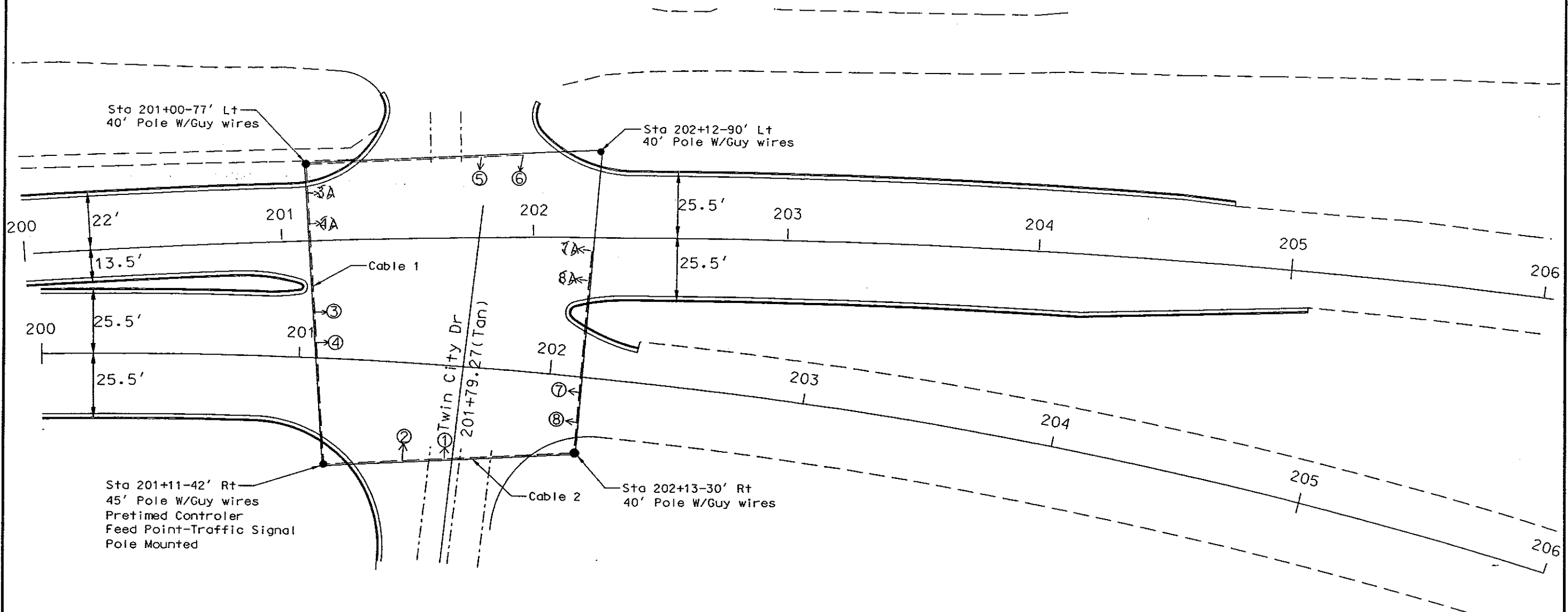
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
189+15-52' Rt	29'(B)	2 1/2"	39'	Cable 1
			39'	Cable 2
	29'(B)	1"	120'	(3) No. 8 RHW
189+15-52' Rt to 188+15-48' Lt			183'	Cable 1
			138'	Cable 2
			157'	(1) Stability Wire
			314'	(2) Span Wire

(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 wood pole mounted.

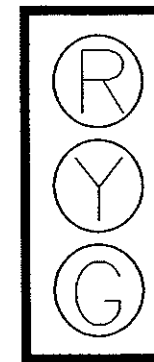
INTERIM TRAFFIC SIGNALS
 Summary of Quantities
 Mandan Ave, Memorial Hwy
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	124



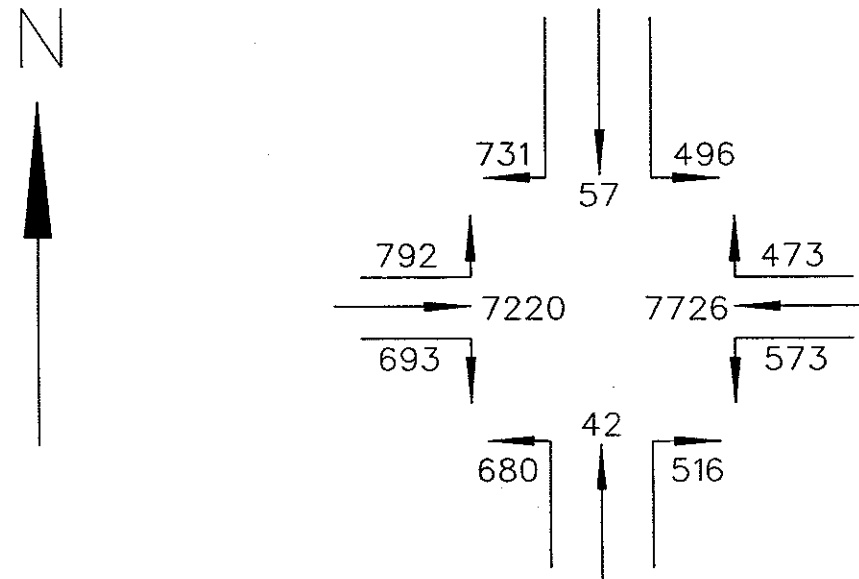
INTERM TRAFFIC SIGNALS
Twin City Drive
Main St.
Mandan, ND

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	3,4	Red	1,2	Red
4	Green		Ground		Ground
5	Orange	3,4	Yellow	1,2	Yellow
6	Blue	3,4	Green	1,2	Green
7	White	Black	Spare		Spare
8	Red	Black	Red	7,8	Red
9	Green	Black	Spare		Spare
10	Orange	Black	Yellow	7,8	Yellow
11	Blue	Black	Green	7,8	Green
12	Black	White	Spare		Spare



Heads 1 2 3 4
5 6 7 8

5 In. Louvered Backplates



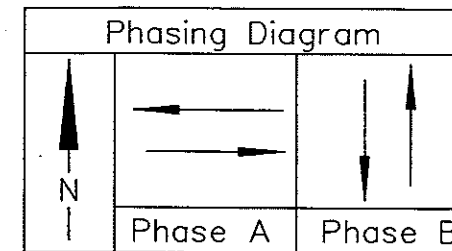
ESTIMATED 1993 ADT

INTERIM TRAFFIC SIGNALS

Conductors, Signal Heads,
and Traffic Volumes
Twin City Drive
Mandan, ND

Main Street	Vehicles	G1		Y1	R1	
Twin City Drive	Vehicles	R2			G2	Y2
Time Cycle In Seconds (85 Second Cycle)		66		3	1	11
Percent of Cycle		77		4	1	13

ALL DIALS



CAM BREAKOUT CHART																			
INTERNAL	CAM POSITION	CAMS										DIAL		SETTINGS					
		DL	DT	G1	Y1	R1	G2	Y2	R2				Sec.	%	Setting				
I	1	X	X	X							X						33	38.5	38.5
	2			X							X						33	38.5	77
II	3				X						X						3	4	81
III	4					X					X						1	1	82
	5					X	X										5.5	6.5	88.5
IV	6					X	X										5.5	6.5	99
V	7					X		X									3	4	98
VI	8					X					X						1	1	00
	9	X	X	X							X						33	38.5	38.5
VII	10			X							X						33	38.5	77
VIII	11				X						X						3	4	81
	12					X					X						1	1	82
IX	13					X	X										5.5	6.5	88.5
	14					X	X										5.5	6.5	99
X	15					X		X									3	4	98
XII	16					X					X						1	1	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 2:00 AM to 6:00 AM, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW
Main Street

FLASHING RED
Twin City Dr

INTERIM TRAFFIC SIGNALS

Controller Settings

Twin City Drive

Mandan, ND

QUANTITIES (A)																	
STATION	0.5" Diameter Rigid Conduit	1" 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	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	10' Copper Ground Rod	Mounting Hardware
	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	LS
201+11-42' Rt	6	29	29	120	78	1		1	1						1	1	
201+00-77' Lt			24											1			
202+12-90' Lt														1			
202+13-30' Rt														1			
Var. Locations					452		8			1	4	470	940				1
TOTAL	6	29	53	120	530	1	8	1	1	1	4	470	940	3	1	1	1

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
201+11-42' Rt	29'(B)	2 1/2"	39' 39'	Cable 1 Cable 2
	29'(B)	1"	120'	(3) No. 8 RHW
201+11-42' Rt to 201+00-77' Lt			145' 124' 248'	Cable 1 (1) Stability Wire (2) Span Wire
201+00-77' Lt to 202+12-90' Lt			92' 117' 234'	Cable 1 (1) Stability Wire (2) Span Wire
201+11-42' Rt to 202+13-30' Rt			116' 107' 114'	Cable 2 (1) Stability Wire (2) Span Wire
202+13-30' Rt to 202+12-90' Lt			99' 124' 248'	Cable 2 (1) Stability Wire (2) Span Wire

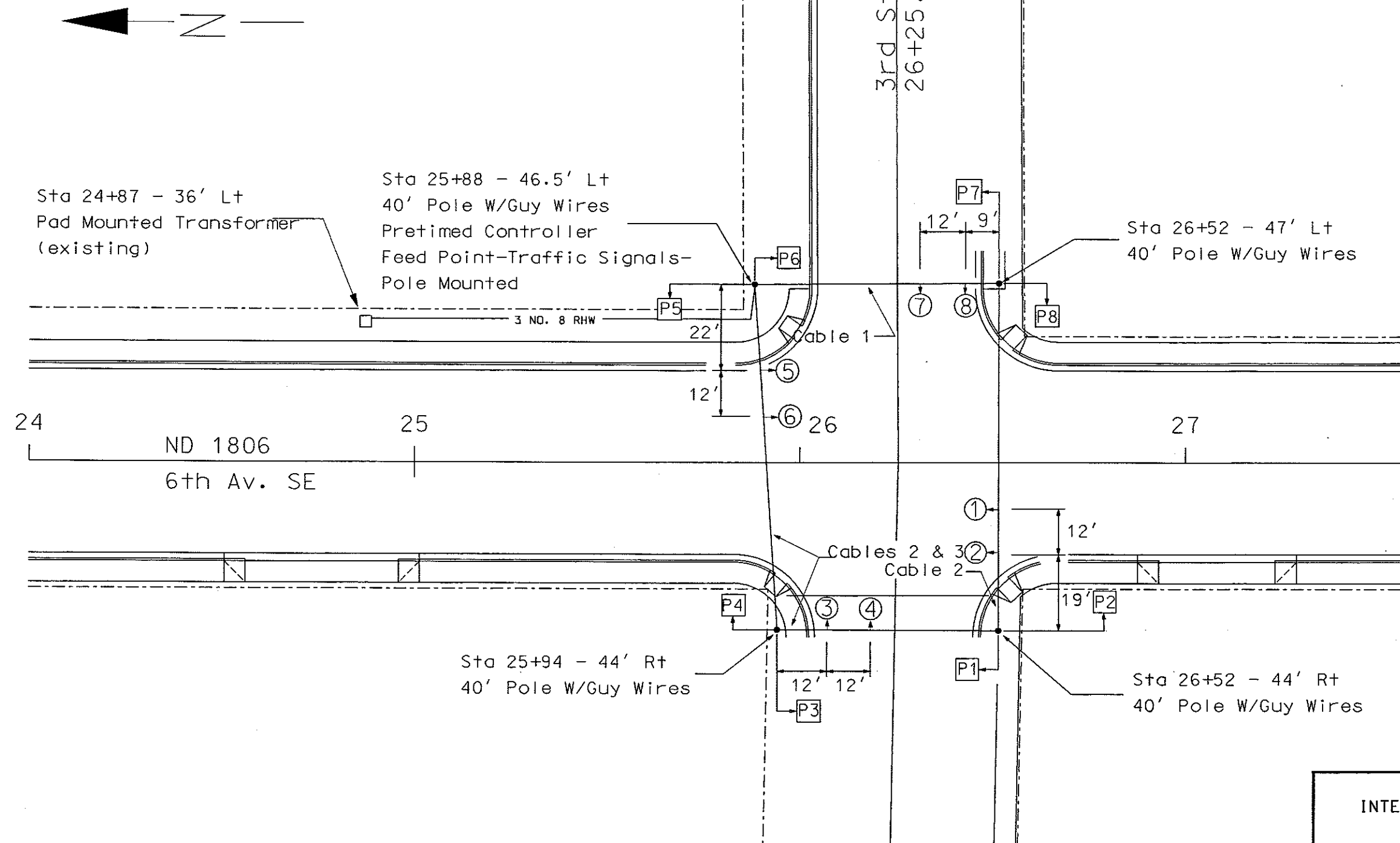
(A) These items shall not be bid separately but are to be included in the cost of the bid item "Interim Traffic Signals".

(B) These items shall be wood pole mounted.

INTERIM TRAFFIC SIGNALS
 Summary of Quantities
 Twin City Drive
 Mandan, ND

INTERIM TRAFFIC SIGNALS 1 EA

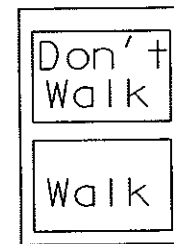
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(039)916	128



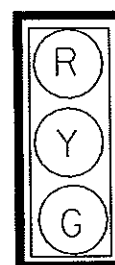
INTERIM TRAFFIC SIGNALS
Layout
1806 & 3rd Street
Mandan, ND

	CONDUCTOR		CABLE 1 NO.12 AWG 12		CABLE 2 NO.12 AWG 12		CABLE 3 NO.12 AWG 12	
	Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1	Black		P7	Walk		*	P1,P3,P6	Walk
2	White			Neutral		Neutral		Neutral
3	Red		P8	Walk		*	P2,P4,P5	Walk
4	Green			Ground		Ground		Ground
5	Orange			*	1,2,5,6	Red		*
6	Blue			*	1,2,5,6	Yellow		*
7	White	Black	P7	Don't Walk	1,2,5,6	Green	P1,P3,P6	Don't Walk
8	Red	Black	P8	Don't Walk		*	P2,P4,P5	Don't Walk
9	Green	Black	7,8	Red	3,4	Red		*
10	Orange	Black	7,8	Yellow	3,4	Yellow		*
11	Blue	Black	7,8	Green	3,4	Green		*
12	Black	White		*		*		*

* = SPARE



All Ped. Heads 12" Lenses



Heads 1 2 3 4
5 6 7 8

5" Louvered Backplates

INTERIM TRAFFIC SIGNALS
 Conductors & Signal Heads
 1806 & 3rd Street
 Mandan, ND

ESTIMATED QUANTITIES *

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-STNU-1-094(039)916	130

STATION	ITEM DESCRIPTION																				
	1/2" DIAMETER RIGID CONDUIT (A)	1" DIAMETER RIGID CONDUIT (A)	1-1/2" DIAMETER RIGID CONDUIT (A)	3" DIAMETER RIGID CONDUIT (A)	NO. 8 TYPE RHW SINGLE UNDERGROUND CONDUCTOR (3)	NO. 12 AWG 12 CONDUCTOR CABLE	FEED POINT, SWITCH BOX & METER TRIM (POLE MOUNTED)	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	3/8" HIGH STRENGTH SPAN WIRE	3/8" HIGH STRENGTH STABILITY WIRE	40' WOOD SERVICE POLE W/GUYS	10' COPPER GROUND ROD	MOUNTING HARDWARE	FLAT SHEET FOR SIGNS TYPE 3A REFLECTIVE SHEETING	STEEL GALV. POST TELESCOPIC PERFORATED TUBE	PAVEMENT MARKING PAINTED 6" LINE	PAVEMENT MARKING PAINTED 24" LINE	
	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	LF	EA	EA	LS	SF	LF	LF	LF	LF	
Sta 25+88 46.5' Lt	8	8		25	60	116	1	2	1	1			1	1							
Sta 25+94 44' Rt			25			30		2					1								
Sta 26+52 47' Lt			25			30		2					1								
Sta 26+52 44' Rt			25			30		2					1								
Various Locations				360	462		8				642	321			1	27	60	466	102		
TOTAL	8	8	75	25	420	668	1	8	8	1	1	642	321	4	1	1	27	60	466	102	

(A) Conduit Shall Be Wood Pole Mounted

*NOTE - All Items Shall Be Incidental to the Bid Item - INTERIM TRAFFIC SIGNALS

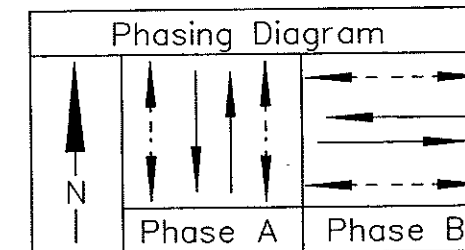
CABLE RUNS

STATION	LENGTH (FT)	TYPE
25+88-46.5' Lt.	37	Cable 1
	37	Cable 2
	42	Cable 3
25+88-46.5' Lt. to 26+52-47' Lt.	80	Cable 1
	68	Stability Wire
	136	Span Wire (2)
26+52-47' Lt.	30	Cable 1
25+88-46.5' Lt. to 25+94-44' Rt.	107	Cable 2
	95	Cable 3
	95	Stability Wire
	190	Span Wire (2)
25+94-44' Rt.	30	Cable 3
25+94-44' Rt. to 26+52-44' Rt.	74	Cable 2
	62	Cable 3
	62	Stability Wire
	124	Span Wire (2)
26+52-44' Rt.	30	Cable 3
26+52-44' Lt. to 26+52-47' Rt.	44	Cable 2
	96	Stability Wire
	192	Span Wire (2)

INTERIM TRAFFIC SIGNALS
Summary of Quantities
1806 & 3rd Street
Mandan, ND

CONTROLLER SETTINGS

1806	Vehicles	← G1 →				← Y1 →	← R1 →						
	Pedestrians	← W1 →		← FDW1 →		← DW1 →							
3rd Street	Vehicles	← R2 →				← G2 →		← Y2 →	← R2 →				
	Pedestrians	← DW2 →				← W2 →	← FDW2 →		← DW2 →				
Time Cycle In Seconds (70 Second Cycle)		25.2				9.1		3.5	1.4	11.9	13.3	3.5	1.4
Percent of Cycle		36				14		5	2	17	19	5	2



ALL DIALS

CAM BREAKOUT CHART																		
INTERVAL	CAM POSITION	CAMS													DIAL		SETTINGS	
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	FDW1	DW1	W2	FDW2	DW2	Sec.	%	Setting
I	1	X	X	X					X	X					X	25.2	36	36
II	2			X					X		X				X	9.1	14	50
III	3				X				X			X			X	3.5	5	55
IV	4					X			X			X			X	1.4	2	57
V	5					X	X				X	X				11.9	17	74
VI	6					X	X				X		X			13.3	19	93
VII	7					X		X			X			X		3.5	5	98
VIII	8					X			X		X			X		1.4	2	100
I	9	X	X	X					X	X					X	25.2	36	36
II	10			X					X		X				X	9.1	14	50
III	11				X				X		X				X	3.5	5	55
IV	12					X			X		X				X	1.4	2	57
V	13					X	X				X	X				11.9	17	74
VI	14					X	X				X		X			13.3	19	93
VII	15					X		X			X			X		3.5	5	98
VIII	16					X			X		X			X		1.4	2	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.

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
1806

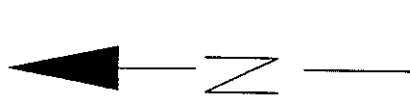
FLASHING RED
3rd Street

INTERIM TRAFFIC SIGNALS

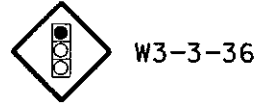
Controller Settings

1806 & 3rd Street
Mandan, ND

G-Green
Y-Yellow
R-Red
W-Walk
DW-Don't Walk
FDW-Flashing Don't Walk
X-Cam Broken Out



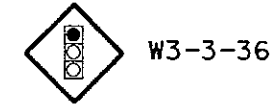
Sta 25+92 - 270' LT.
Assembly 20



W3-3-36

PAVEMENT MARKING PAINTED LINE
6" (Cross Walk) 466 LF
24" (Stop Bars) 102 LF

Sta. 29+13
Assembly 20
Light Std. Mounted



W3-3-36

STATION	ASSEMBLY	SIGN AREA FLAT SHEET	SIGN SUMMARY - PERFORATED TUBE				TOTAL SUPPORT WEIGHT	MAX. LNG. FOR SUP. SIZE				
			SIGN TYPE	SUPPORT TYPE	POST LENGTHS	ANCHOR UNIT						
		TYPE	3A	1ST	2ND	3RD	4TH	LNTH	SIZE	NO		
25+92 LT	20 WS	9.00	11.0	11.0			2.00	4.0	2.25	2	75.30	12.5
26+55 RT	20 WS	9.00	11.0	11.0			2.00	4.0	2.25	2	75.30	12.5
29+13 LT	20 WS	9.00	LIGHT STANDARD MOUNTED									

Sta. 29+13
REMOVE



Sta. 25+92
REMOVE



Sta. 26+60
REMOVE



Elim St.
28+42.05

24 ND 1806 25 27 28 29
6th Av. SE



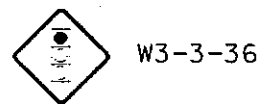
Sta. 24+25
REMOVE



Sta. 25+90
REMOVE



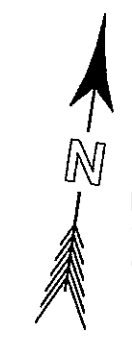
Sta. 26+55
REMOVE



W3-3-36

Sta. 26+55 - 300' Rt.
Assembly 20

INTERIM TRAFFIC SIGNALS
Pavement Marking & Sign Layout
1806 & 3rd Street
Mandan, ND



Pipe Bracket Banded to the Pole and hole drilled for wire entrance

Emergency Vehicle Detector See Details on Standard D-770-4 No Indication Light required

Volume Density Controller w/Ped. Timing	Volume Density Systems Controller	Emergency Vehicle Pre-emption Unit	Revise Concrete Foundation
EA	EA	EA	EA
1	1	1	1

EMERGENCY VEHICLE PRE-EMPTION UNIT

Sta 162+97-95'	Rt Phase Selector	1 EA
Sta 164+36-50'	Lt Detector Mast Arm Mtd at 4'	1 EA
Sta 164+33-40'	Rt Detector Mast Arm Mtd At 25'	1 EA
Sta 10+51-43'	Lt Detector Light Std Mtd	1 EA
Sta 162+97-95'	Rt Revise Concrete Foundation	2 EA
Sta 164+33-40'	Rt Revise Concrete Foundation	1 EA
Sta 164+36-50'	Lt Revise Concrete Foundation	1 EA
Sta 10+51-43'	Lt Revise Concrete Foundation	1 EA
Sta 9+78-52'	Rt Pull Box	1 EA
Various Locations	12-2 Conductor Cable	411 LF
Various Locations	Detector Cable	1118 LF
Various Locations	2" Dia Rigid Conduit	884 LF
Various Locations	2" Dia Steel Conduit	114 LF

EMERGENCY VEHICLE PRE-EMPTION DETECTOR DETAILS MOUNTED ON EXISTING LIGHT STANDARD STA 10+51-43' LT

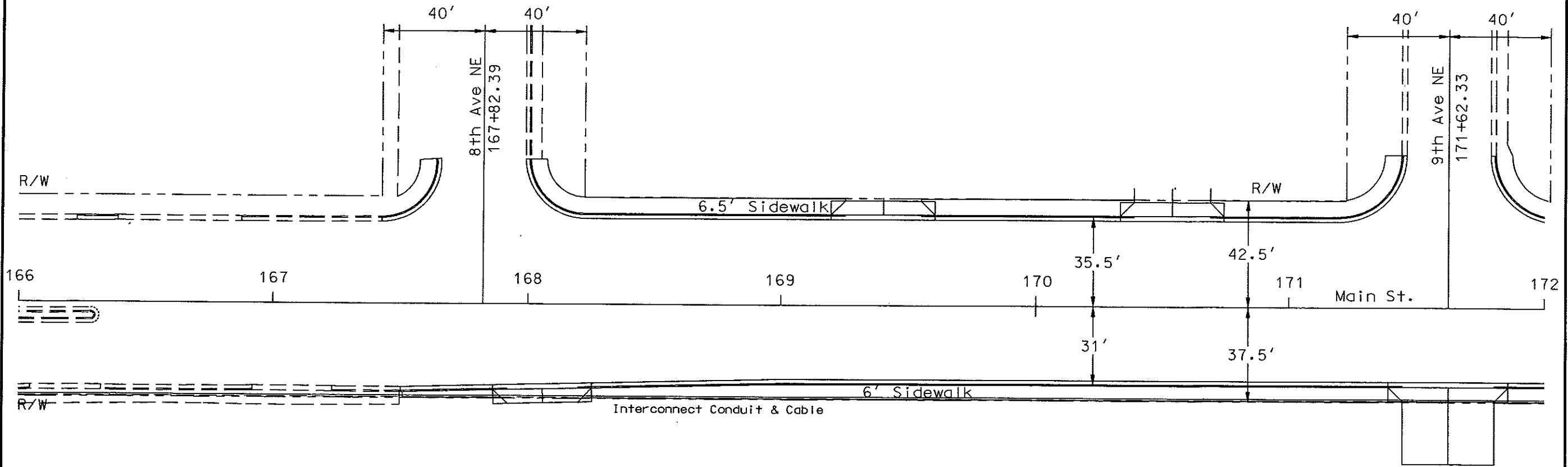
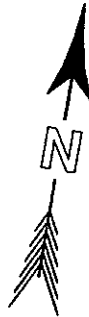
Sta 4+78-92' Rt 1806 = Sta 162+97-95' Rt Main St. Volume Density Controller & Volume Density Systems Controller Mounted in Existing Cabinet Revise Concrete Foundation

Sta 8+00-92' Rt
 Sta 9+00-52' Rt
 Sta 9+78-52' Rt Pull Box
 Sta 10+51-52' Rt

Sta 10+51-43' Lt Existing Light Std

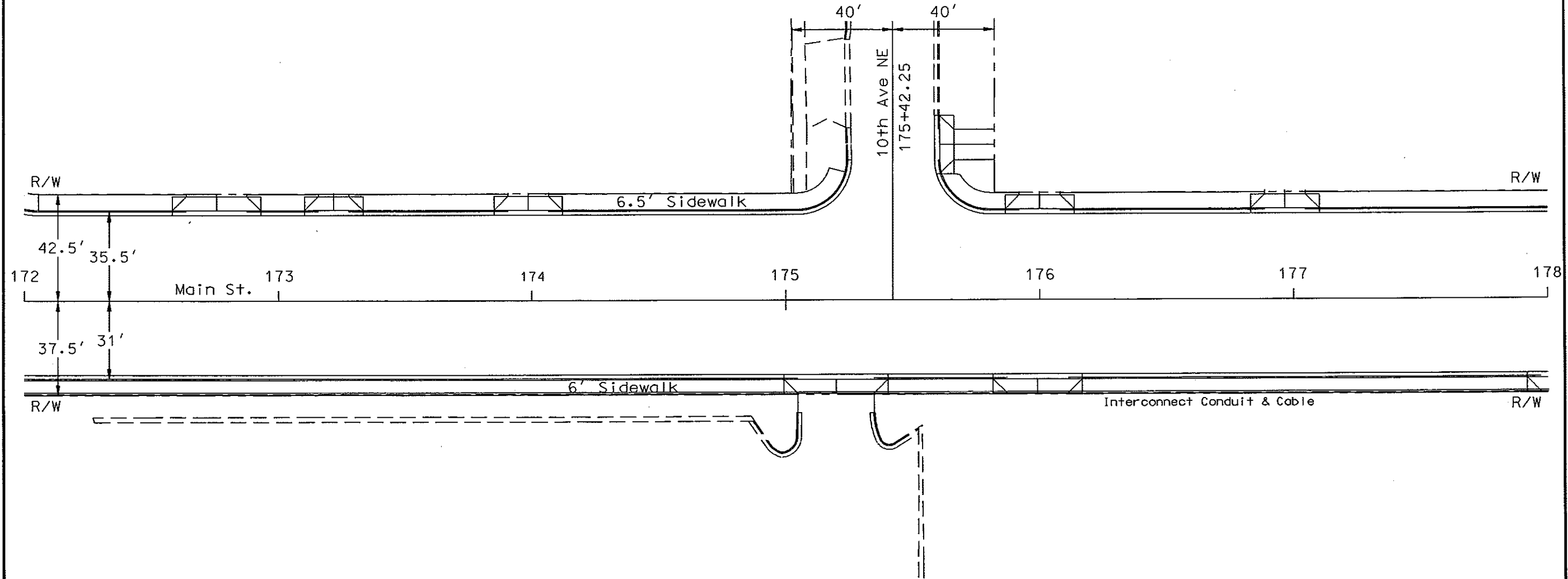
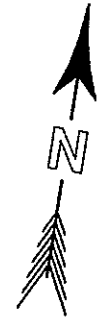
TRAFFIC SIGNALS
 6th Ave NE, Hwy 1806
 Main St
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	134



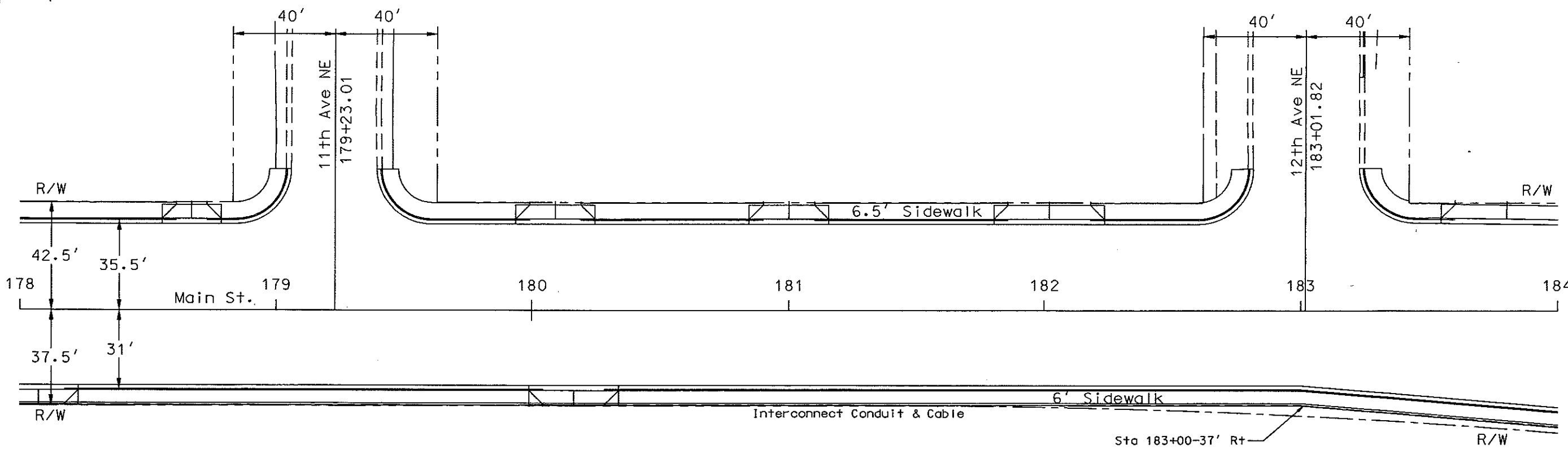
TRAFFIC SIGNALS
Sta. 166+00 to 172+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	135

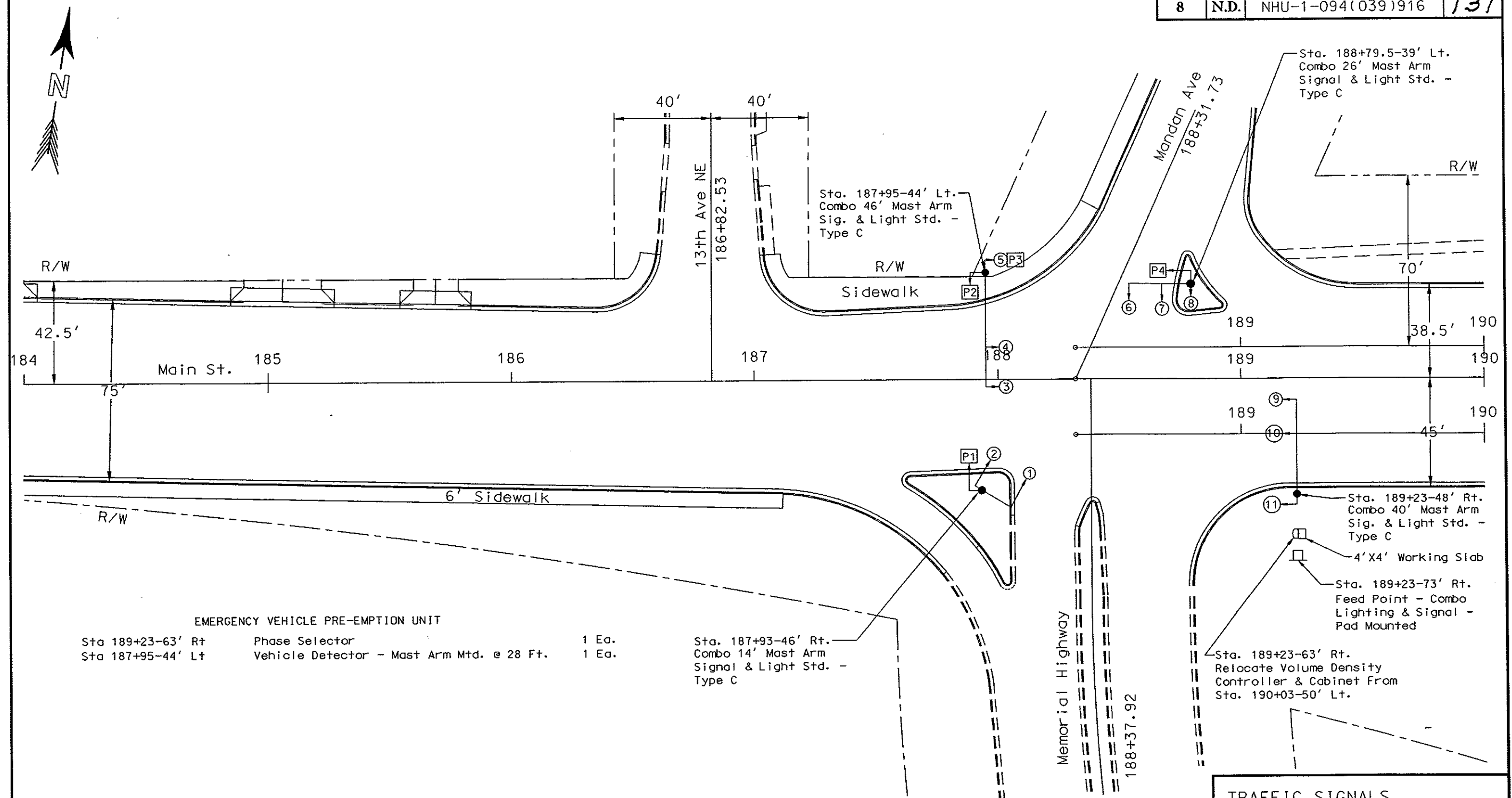


TRAFFIC SIGNALS
 Sta. 172+00 to 178+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	136



TRAFFIC SIGNALS
 Sta. 178+00 to 184+00
 Main St.
 Mandan, ND



EMERGENCY VEHICLE PRE-EMPTION UNIT

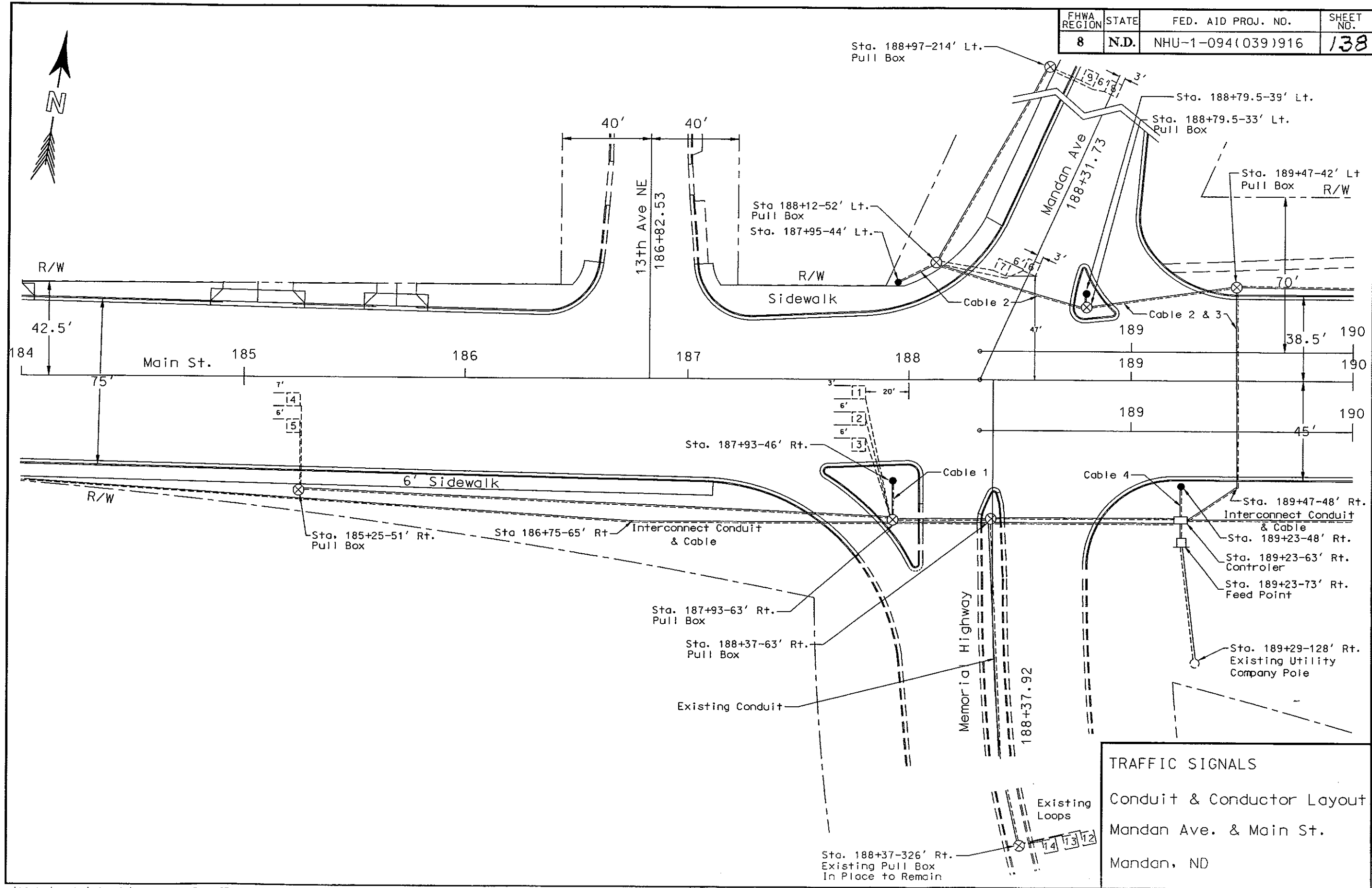
Sta 189+23-63' Rt	Phase Selector	1 Ea.
Sta 187+95-44' Lt	Vehicle Detector - Mast Arm Mtd. @ 28 Ft.	1 Ea.

PEDESTRIAN PUSHBUTTON & SIGN			
Station	Pushbutton & Sign Facing	Arrow Direction	Qty.
188+79.5-39' Lt	North	Right	1 Ea.
187+95-44' Lt	South	Right	1 Ea.
187+95-44' Lt	East	Left	1 Ea.
187+93-46' Rt	West	Left	1 Ea.

TRAFFIC SIGNALS

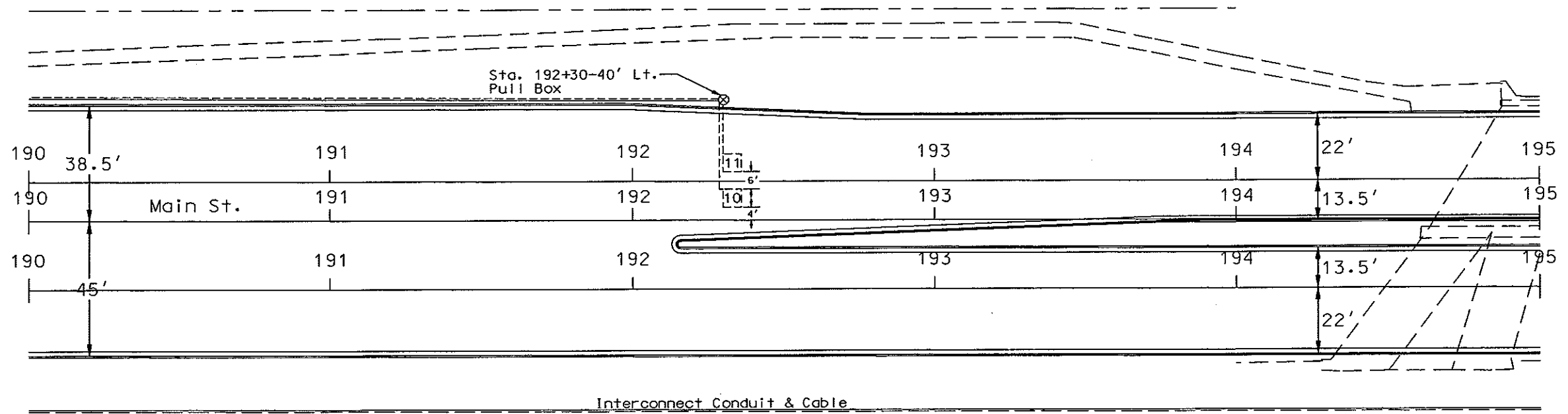
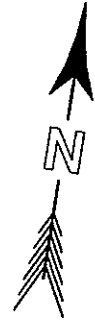
Mandan Ave., Memorial Hwy.
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	138



TRAFFIC SIGNALS
 Conduit & Conductor Layout
 Mandan Ave. & Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	13?



TRFFIC SIGNALS
 Conduit and Cable Layout
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE RUNS		STATION	CONDUIT RUNS		CABLE RUNS		FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	
	Length	Size	Length	Type		Length	Size	Length	Type	8	N.D.	NHU-1-094(039)916	142	
185+25-51' Rt to 187+93-63' Rt	267'	2"	274'	Loop Lead-in[4,5]	188+79.5-33' Lt to 189+47-42' Lt	67'	3"	68'	Loop Lead-in[8,9]					
187+93-46' Rt to 187+93-63' Rt	16'	2"	25' 22'	12-2 Conductor(A) Cable 1				68'	Loop Lead-in[6,7]					
187+93-63' Rt to 188+37-63' Rt	43'	2"	44' 50' 44' 44'	Loop Lead-in[4,5] Loop Lead-in[1,2,3] 12-2 Conductor(A) Cable 1	192+30-40' Lt to 189+47-42' Lt	282'	1"	289'	Loop Lead-in[10,11]					
188+37-326' Rt to 188+37-63' Rt	Existing	Conduit	269'	Loop Lead-in[12,13,14]	189+47-42' Lt to 189+47-48' Rt to 189+23-63' Rt	117'	3"	127' 127' 127' 381' 127' 127'	Loop Lead-in[6,7] Loop Lead-in[8,9] Loop Lead-in[10,11] (3) 12-2 Conductor(A) Cable 2 Cable 3					
188+37-63' Rt to 189+23-63' Rt	85'	2"	95' 95' 95' 95' 95'	Loop Lead-in[4,5] Loop Lead-in[1,2,3] Loop Lead-in[12,13,14] 12-2 Conductor(A) Cable 1	189+23-48' Rt to 189+23-63' Rt	13'	2"	29' 76' 76'	Cable 4 12-2 Conductor (B) Detector Cable (C)					
188+97-214' Lt to 188+12-52' Lt	182'	1"	189'	Loop Lead-in[8,9]	189+23-63' Rt to 189+23-73' Rt	8'	2"	58' 29'	(2) No. 6 RHW (1) No. 6 THW					
187+95-44' Lt to 188+12-52' Lt	18'	2"	54' 24'	(2) 12-2 Conductor(A) Cable 2	189+29-128' Rt to 189+23-73' Rt	80'(D)	2"	288'	(3) No. 8 RHW					
188+12-52' Lt to 188+79.5-33' Lt	69'	2"	70' 76' 70' 140'	Loop Lead-in[8,9] Loop Lead-in[6,7] Cable 2 (2) 12-2 Conductor(A)										
188+79.5-39' Lt to 188+79.5-33' Lt	5'	2"	14' 11'	12-2 Conductor(A) Cable 3										

- (A) Pedestrian Pushbutton Conductor
- (B) Emergency Vehicle Indicator Light Conductor
- (C) Emergency Vehicle Detector
- (D) 25' of This Length is Pole Mounted Conduit

Note: Internal wiring in the signal standard for the Emergency Vehicle Pre-emption is included in the emergency vehicle indicator light conductor and the emergency vehicle detector cable quantities.

TRAFFIC SIGNAL
CABLE & CONDUIT RUNS
Mandan Ave & Main St. E.
Mandan, ND

STATION	CONDUIT RUNS		CABLE RUNS		STATION	CONDUIT RUNS		CABLE RUNS		FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
	Length	Size	Length	Type		Length	Size	Length	Type	8	N.D.	NHU-1-094(039)916	143
162+97-95' Rt to 164+46-95' Rt to 165+05-53' Rt to 165+83-37' Rt to 183+00-37' Rt to 186+75-65' Rt to 189+23-63' Rt	2630'	2"	2632	Interconnect Cable									
189+23-63' Rt to 201+15-65' Rt	1190'	2"	1192	Interconnect Cable									

TRAFFIC SIGNAL
INTERCONNECT CABLE &
CONDUIT RUNS
Main St. E.
Mandan

SUMMARY OF QUANTITIES

STATION	Concrete Foundation- Feed Point- Type B	Concrete Foundation- Traffic Signals	Pull Box	1 Inch Dia. Rigid Conduit	2 Inch Dia. Rigid Conduit	3 Inch Dia. Rigid Conduit	Underground Conductor No. 6- Type RHW	Underground Conductor No. 6- Type THW	Underground Conductor No. 8- Type RHW	Preformed Loop Detector	Loop Lead-In Conductor	No. 12 AWG 2 Conductor Cable	No. 12 AWG 3 Conductor Cable	No. 12 AWG 5 Conductor Cable	No. 12 AWG 12 Conductor Cable	Feed Point-Combo Lighting & Signal-Pad Mounted	Combo 14 Ft. Mast Arm Signal & Light Standard - Type C	Combo 46 Ft. Mast Arm Signal & Light Standard - Type C	Combo 26 Ft. Mast Arm Signal & Light Standard - Type C	Combo 40 Ft. Mast Arm Signal & Light Standard - Type C	1-Way 3 Sec. Head w/12 In. Lenses- Post Mounted	1-Way 3 Sec. Head w/12 In. Lenses- Mast Arm Mounted	1-Way 2 Sec. Head Ped. Signal- Post Mounted	Relocate Controller	Emergency Vehicle Pre-Emption Unit	Interconnect Cable	Remove Traffic Signal System	Relocate Controller Cabinet						
	EA	EA	EA	LF	LF	LF	LF	LF	LF	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA						
187+93-46' Rt		1										12(A)	52(A)			1				1	1	1												
187+95-44' Lt		1										24(A)	138(A)				1			1	2	2												
188+79.5-39' Lt		1										12(A)	99(A)						1	1	2	1												
189+23-48' Rt		1											126(A)						1	1	2			1										
189+23-63' Rt		1																						1										
189+23-73' Rt	1														1																			
Various Locations			8	464	4424	184	58	29	288	11	2063	957		685										1	3824	1								
Total	1	5	8	464	4424	184	58	29	288	11	2063	957	48	415	685	1	1	1	1	1	4	7	4	1	1	3824	1	1						

(A) Used for Internal Wiring of Signal Standards

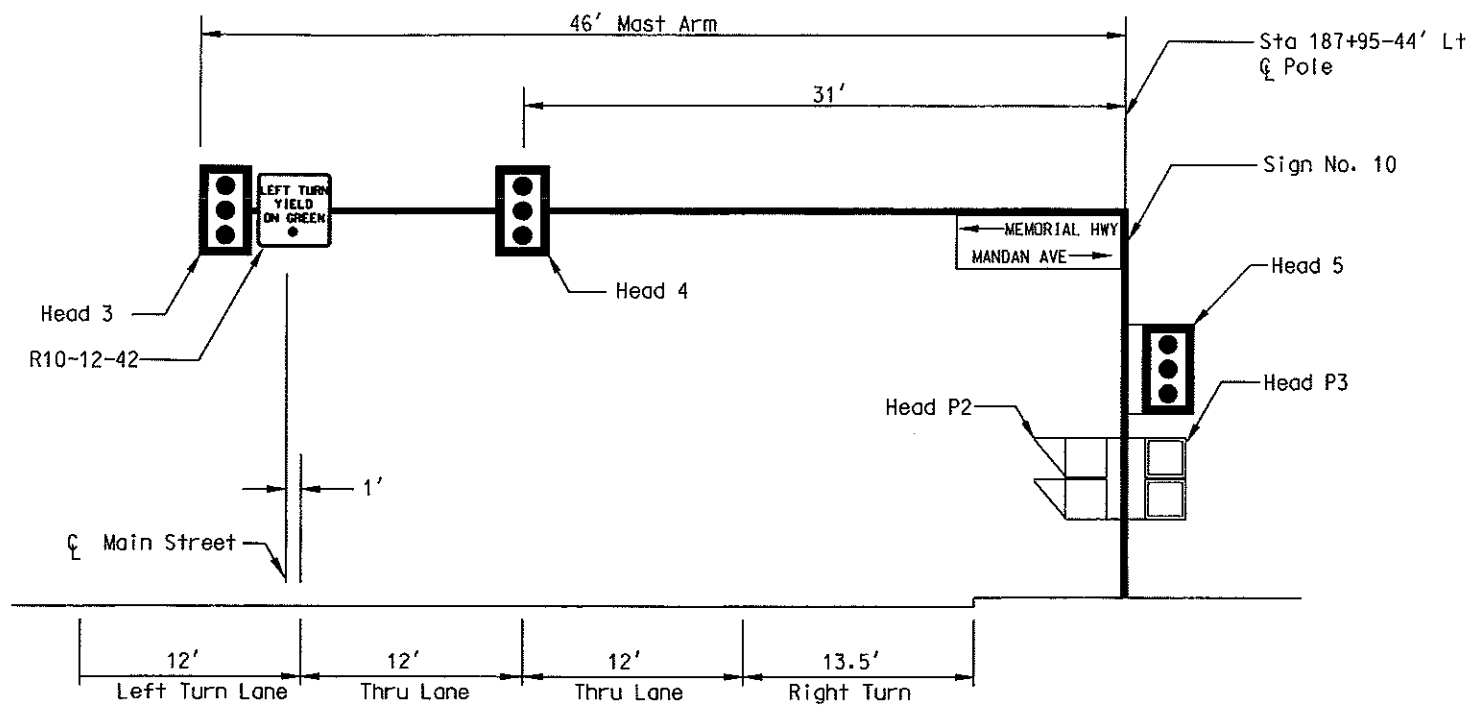
TRAFFIC SIGNALS
 Summary of Quantities
 Mandan Ave, Memorial Hwy
 Main St E

	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
BASIC INTERVALS (or FUNCTIONS)								
Minimum Initial		5.8		5.8		5.8		5.8
Passage Time		5.8		5.0		5.8		5.0
Maximum (Maximum Green or Ext. Limit)		35		25		35		25
Yellow Change		5.0		4.0		5.0		4.0
Red Clearance		1.0		1.0		1.0		1.0
Walk		10.5		24.0		10.5		24.0
Pedestrian Clearance		7.5		15.0		7.5		15.0
VOLUME DENSITY TIMING FUNCTIONS								
<u>Variable Initial Timing Options</u>								
Added Initial								
Minimum Initial	(Future Use)	5.8	(Future Use)	5.8	(Future Use)	5.8	(Future Use)	5.8
Added Initial per Actuation		2.1		2.1		2.1		2.1
Actuations Before Added Initial		1		1		1		1
Computed Initial								
Minimum Initial		5.8		5.8		5.8		5.8
Maximum Initial		27		21		27		21
Actuations to Reach Maximum Initial		14		7		14		7
Extensible Initial								
Minimum Initial		5.8		5.8		5.8		5.8
Maximum Initial		27		21		27		21
Added Initial per Actuation		2.1		2.1		2.1		2.1
TIME-WAITING GAP REDUCTION OPTIONS								
Passage Time		5.5		5.0		5.5		5.0
Minimum Gap		1.3		1.3		1.3		1.3
Time to Reduce to Minimum Gap		1.0		1.0		1.0		1.0
Reduce Gap Every		1.0		1.0		1.0		1.0
Reduce Gap Every Second By		4.2		3.7		4.2		3.7
Reduce Gap By		4.2		3.7		4.2		3.7
Locking Memory		X		X		X		X
Non-Locking Memory								
Flashing-Normal & Conflict Monitor		Y		R		Y		R
Start Up Phasing		G		R		G		R
Type of Detector	Presence							
Loop	Calling*					X		X
	Passage	X		X		X		X
Emergency Vehicle Pre-emption						X		

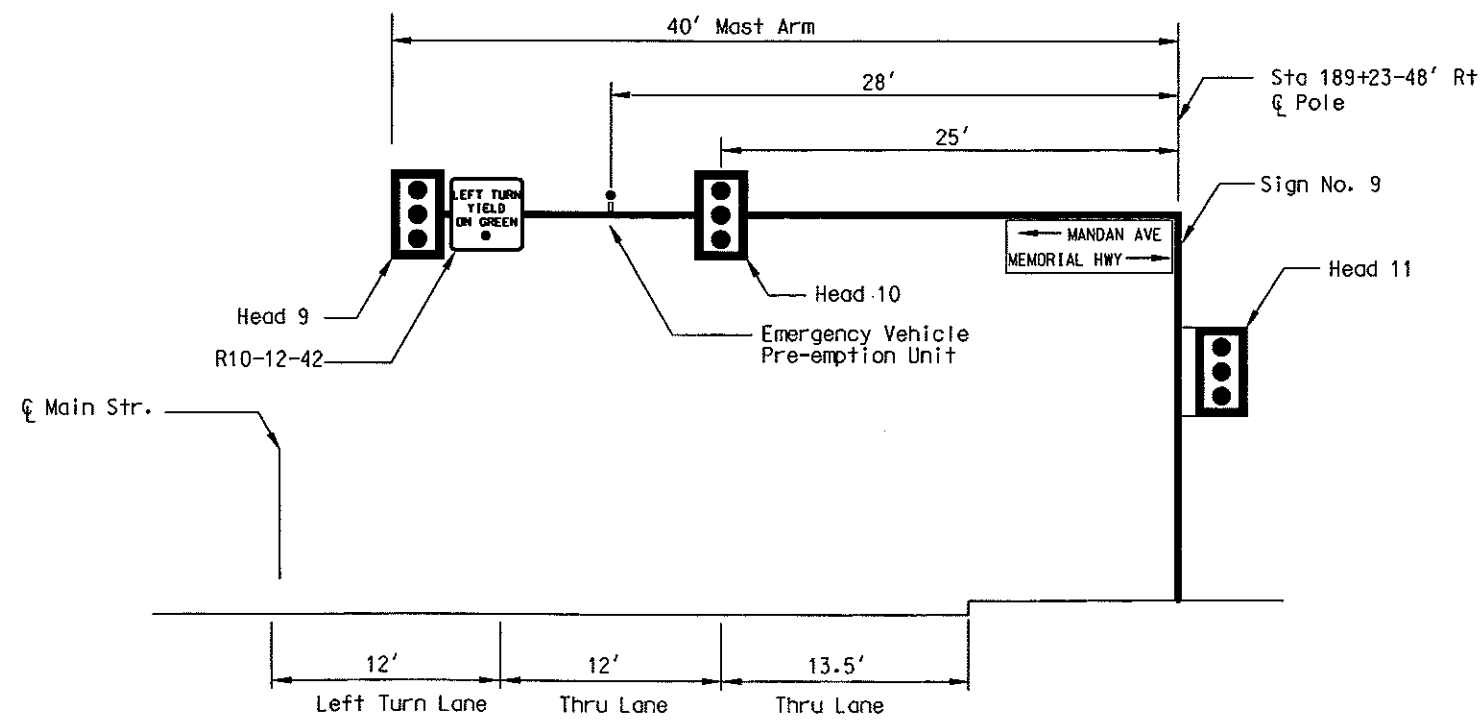
* Calling loops shall place one call into the controller on the yellow or red interval. Calling loops shall be disconnected during the green interval.

TRAFFIC SIGNALS
 Controller Settings
 Mandan Ave., Memorial Hwy.
 Mandan, ND

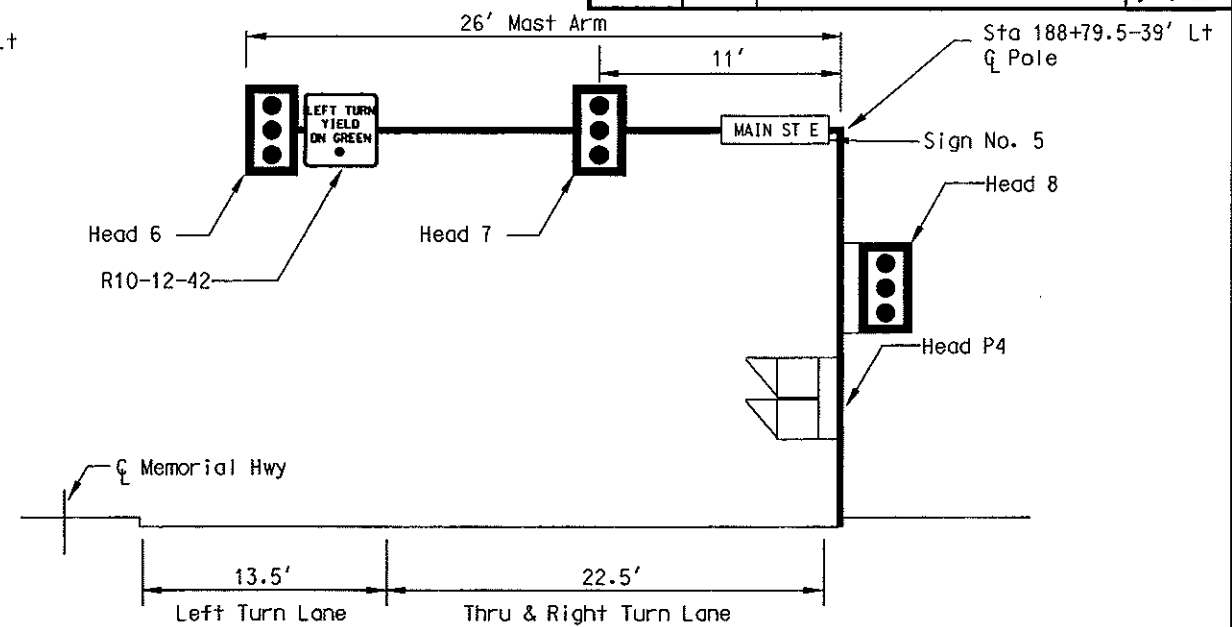
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	146



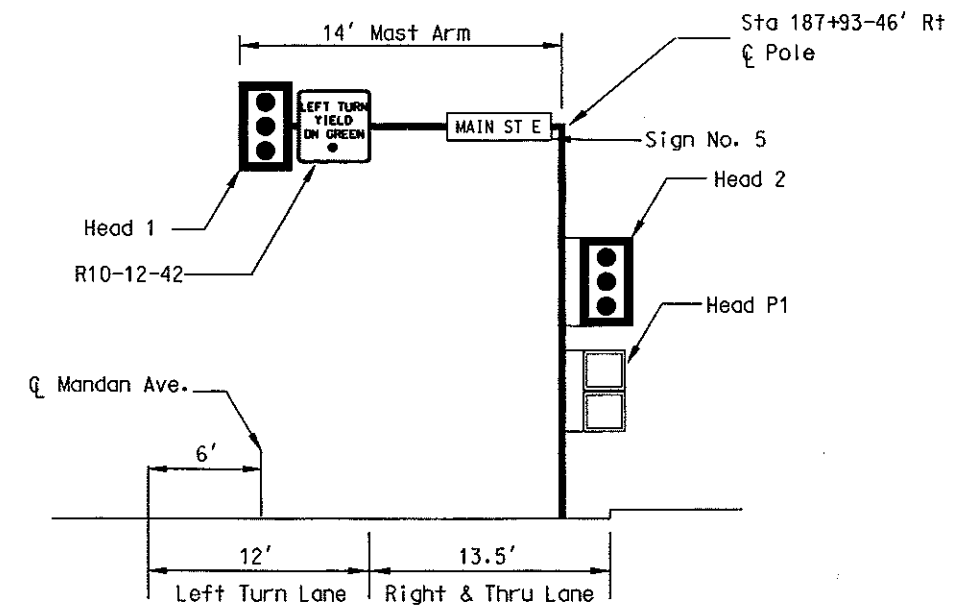
Main Street Westbound - viewed from the stop bar at Sta. 189+36 Rt of Main Str. ☐



Main Street Eastbound - viewed from the stop bar at Sta. 187+87 Lt of Main Str. ☐



Memorial Highway Northbound - viewed from the stop bar at 50' Rt of Main St. ☐



Mandan Ave. Southbound - viewed from the stop bar at 46' Lt of Main St. ☐

TRAFFIC SIGNALS

Signal Standard & Head Locations
Mandan Ave., Memorial Highway
Main Street East
Mandan, ND

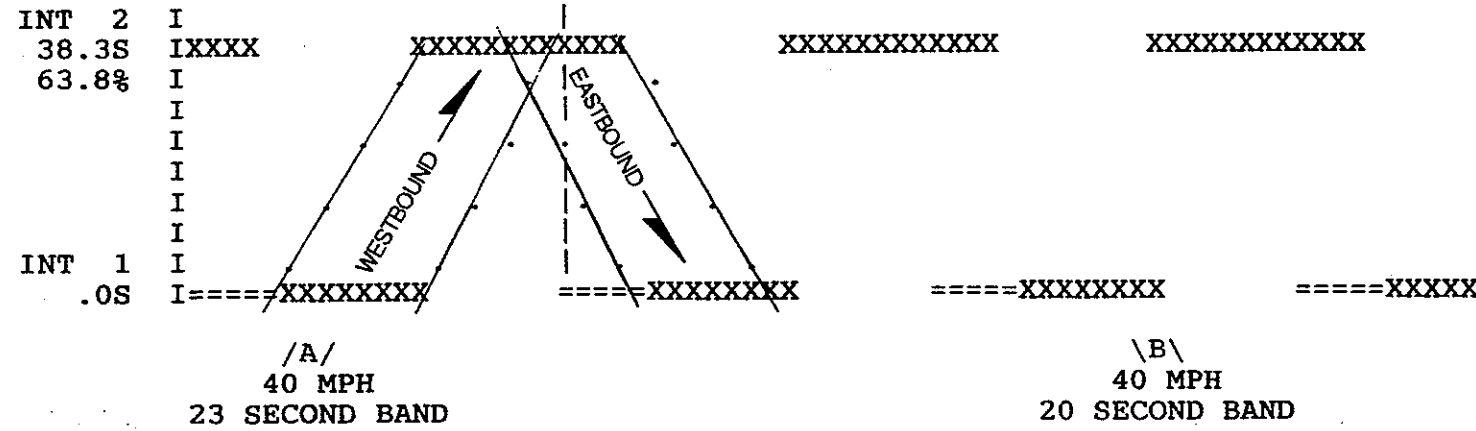
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	147

INTERSECTION	CROSSROAD
1	Twin City Drive
2	Mandan Avenue

(TS.DIAGM)

PASSER II-87 TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
 MULTIPHASE ARTERIAL PROGRESSION - 145101 VER 1.0 JUL 88

RUN NO 1 DISTRICT Street 12/13/95 CYCLE = 60 SECONDS
 HORIZONTAL SCALE 1 INCH = 30 SECS (1 inch = 10 characters)
 VERTICAL SCALE 1 INCH = 1000 FEET (1 inch = 6 lines)



TRAFFIC SIGNALS
 Coordination System
 Main St E
 Mandan, ND

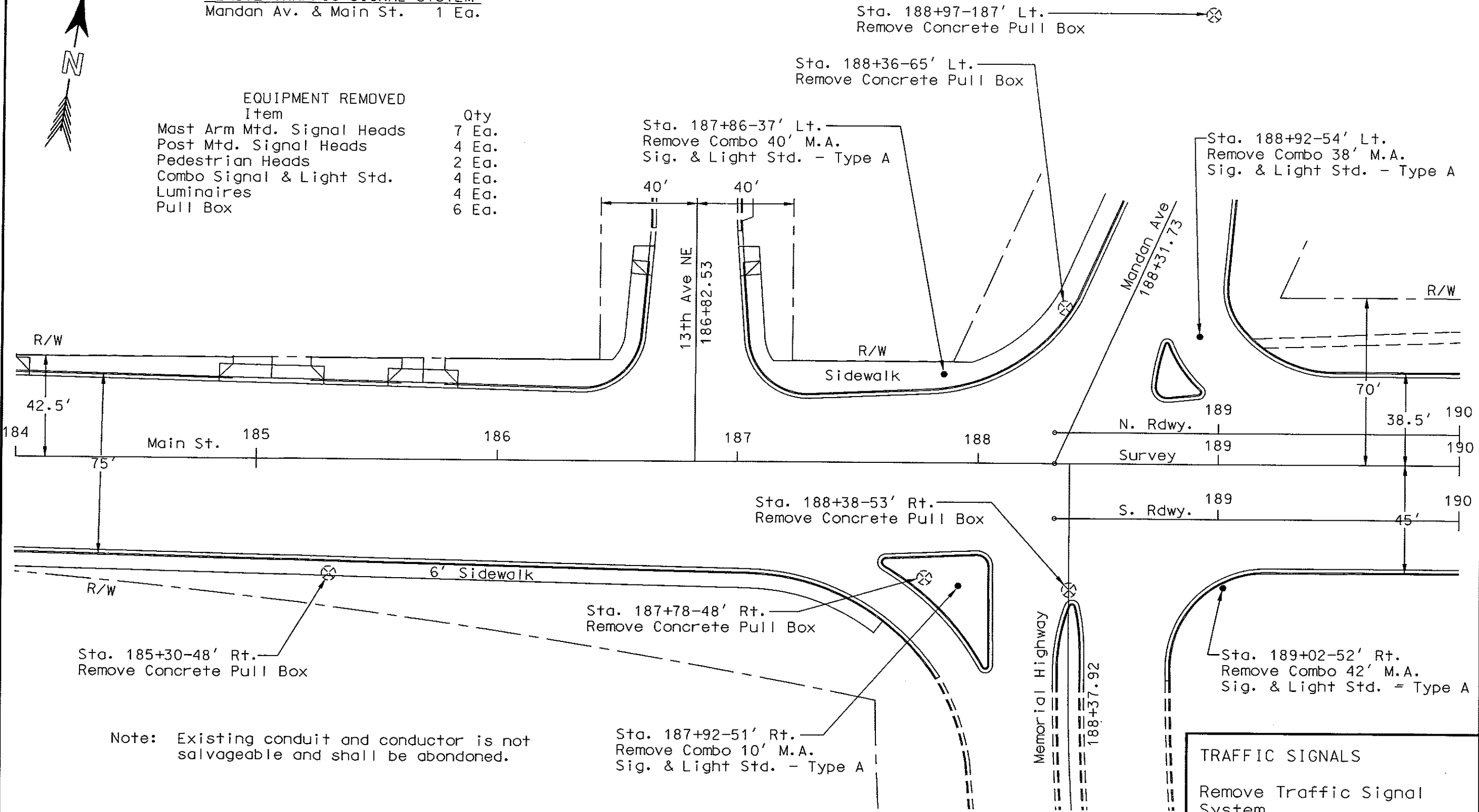
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	148

REMOVE TRAFFIC SIGNAL SYSTEM
Mandan Av. & Main St. 1 Ea.



EQUIPMENT REMOVED

Item	Qty
Mast Arm Mtd. Signal Heads	7 Ea.
Post Mtd. Signal Heads	4 Ea.
Pedestrian Heads	2 Ea.
Combo Signal & Light Std.	4 Ea.
Luminaires	4 Ea.
Pull Box	6 Ea.

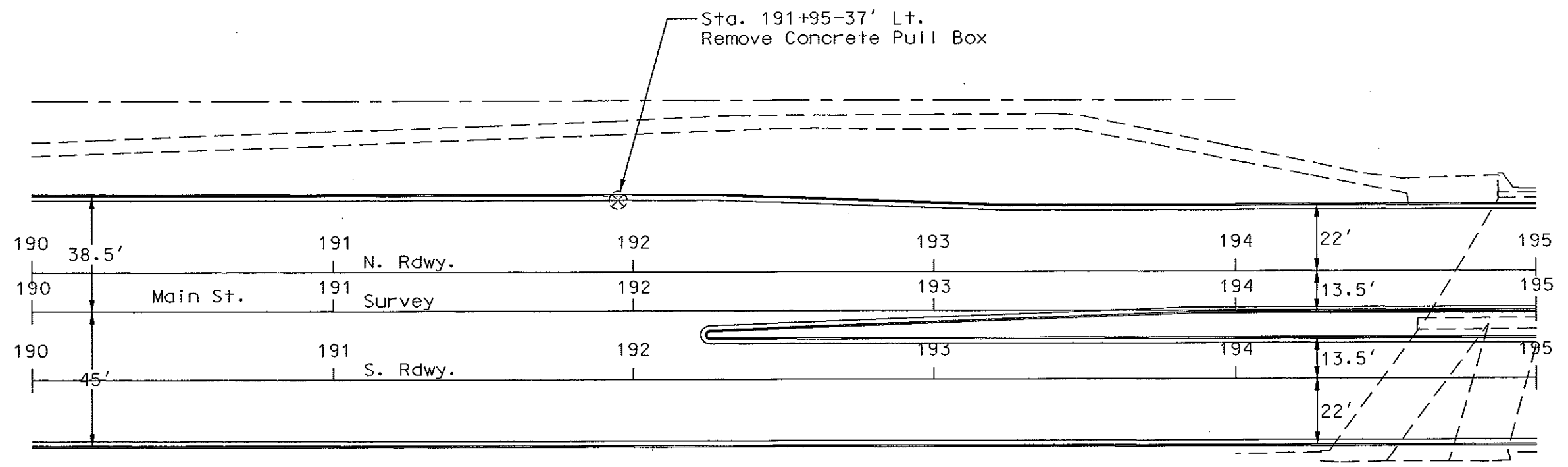
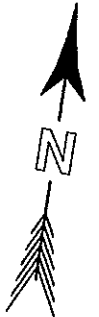


Note: Existing conduit and conductor is not salvageable and shall be abandoned.

Note: All Stationing From Survey Line

TRAFFIC SIGNALS
Remove Traffic Signal System
Mandan Av. & Main St.
Mandan, ND

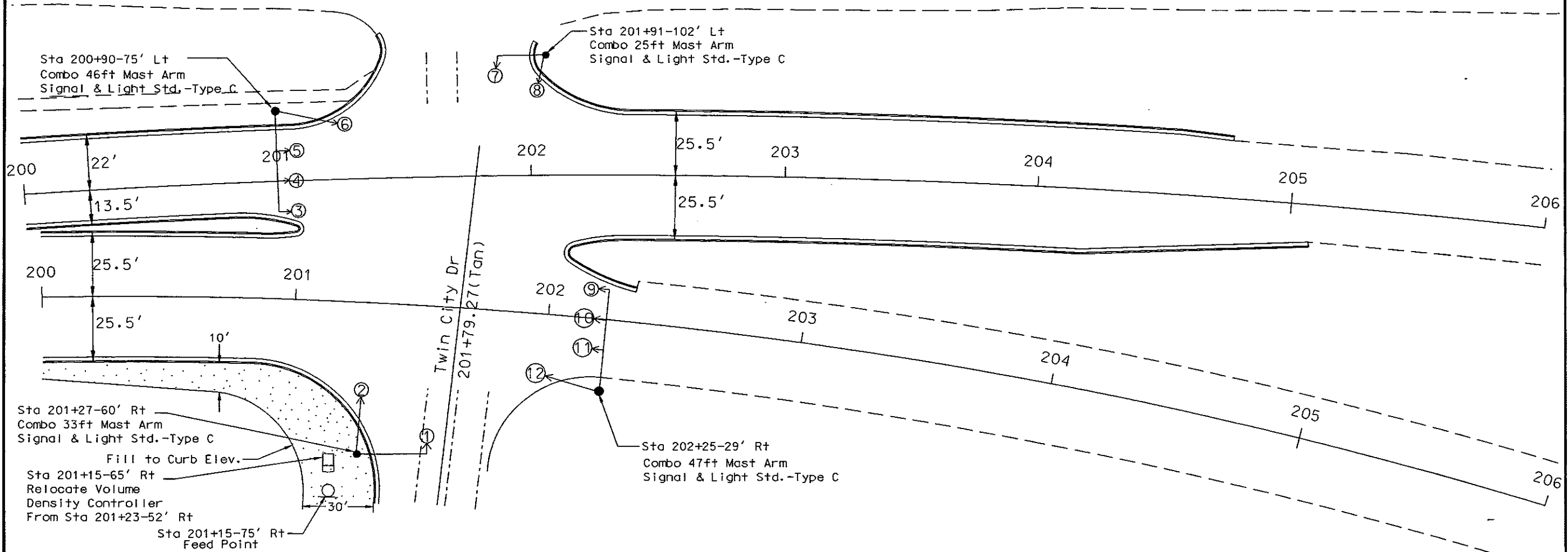
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	149



Note: All Stationing From Survey Line

TRAFFIC SIGNALS
 Remove Traffic Signal System
 Mandan Av. & Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	150



EMERGENCY VEHICLE PRE-EMPTION UNIT

Sta 201+15-65' Rt	Phase Selector	1 Ea.
Sta 200+90-75' Lt	Vehicle Detector - Mast Arm Mtd. @ 35 Ft.	1 Ea.

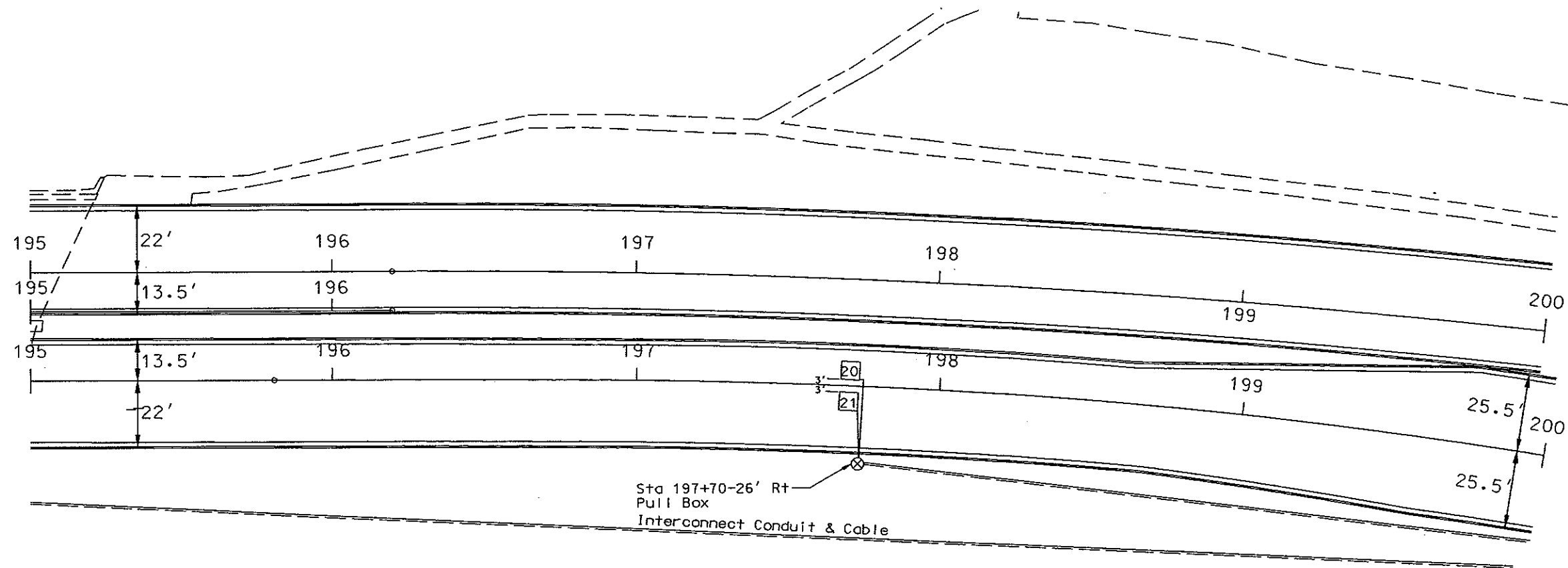
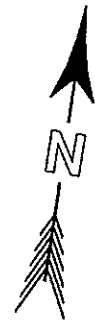
TRAFFIC SIGNALS

Twin City Drive

Main St.

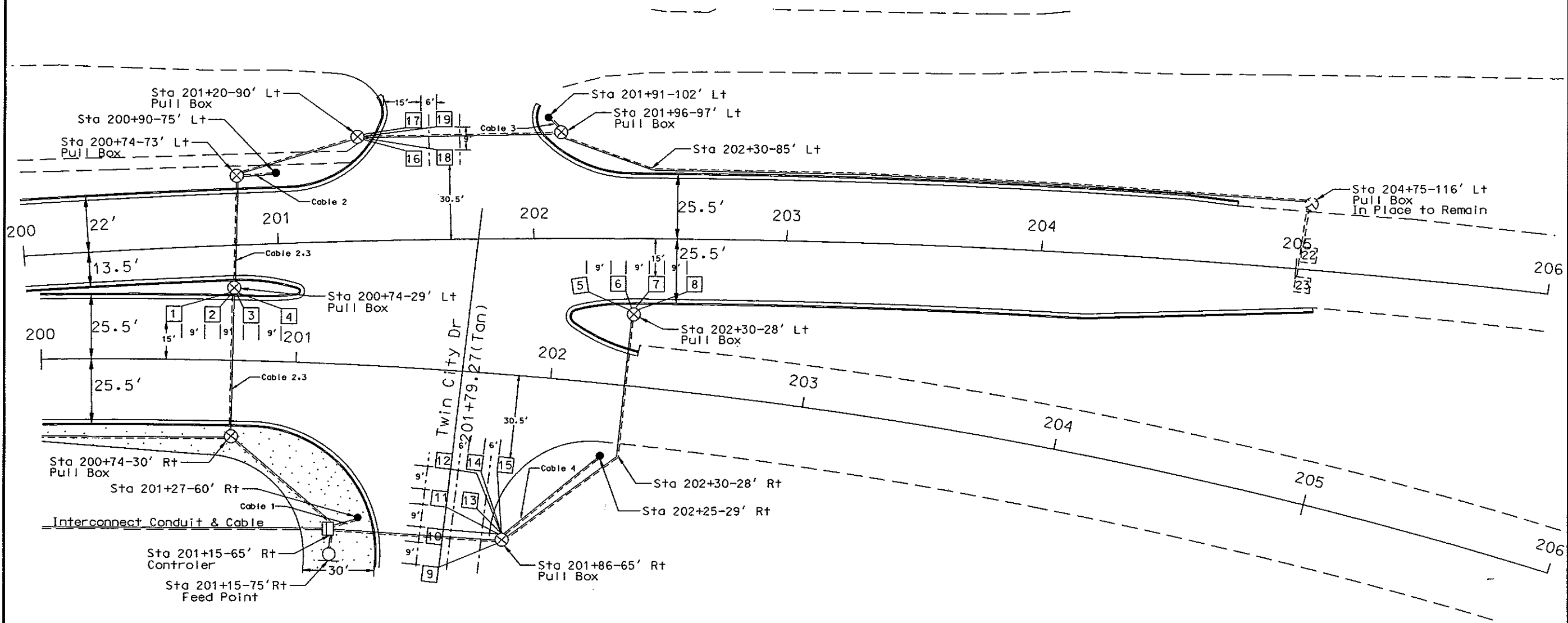
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	151



TRAFFIC SIGNALS
 Conduit & Conductor Layout
 Twin City Drive & Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	152



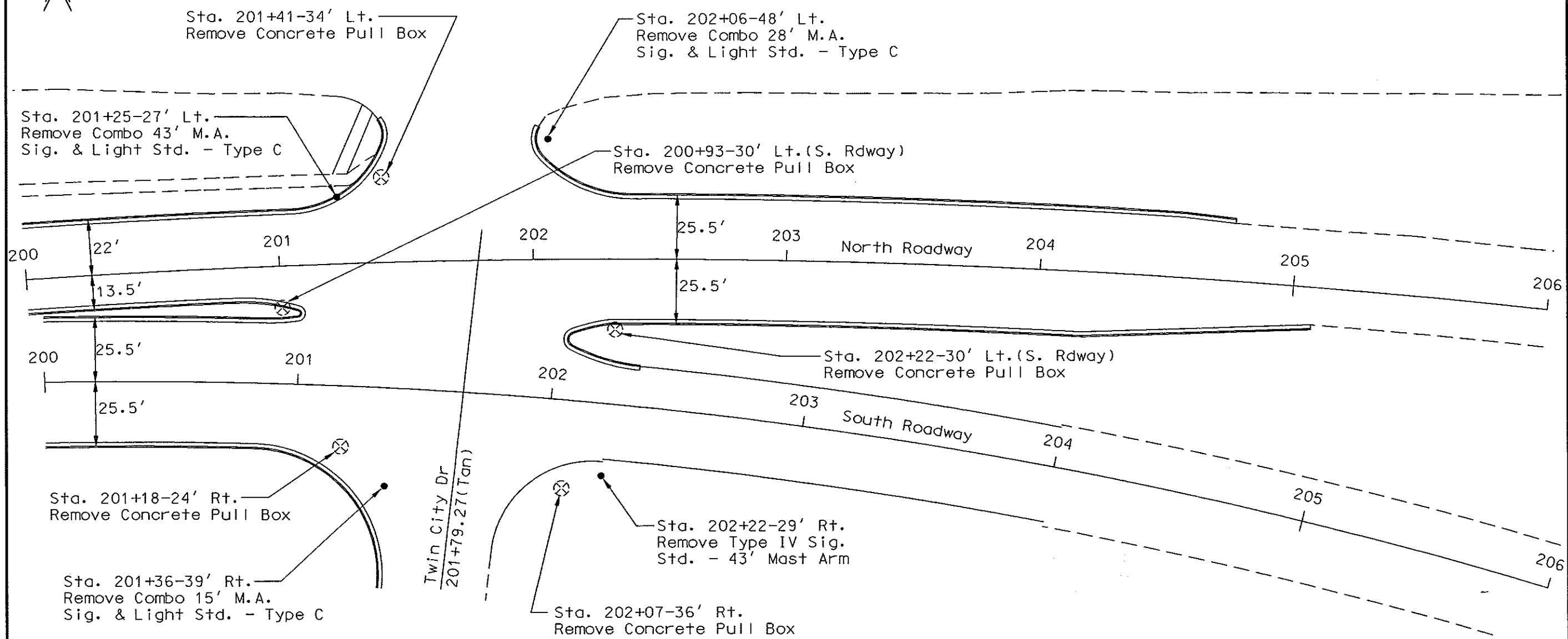
TRAFFIC SIGNALS
 Conduit and Conductor
 Layout
 Twin City Drive & Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	153

REMOVE TRAFFIC SIGNAL SYSTEM
Twin City Dr. & Main St. 1 Ea.

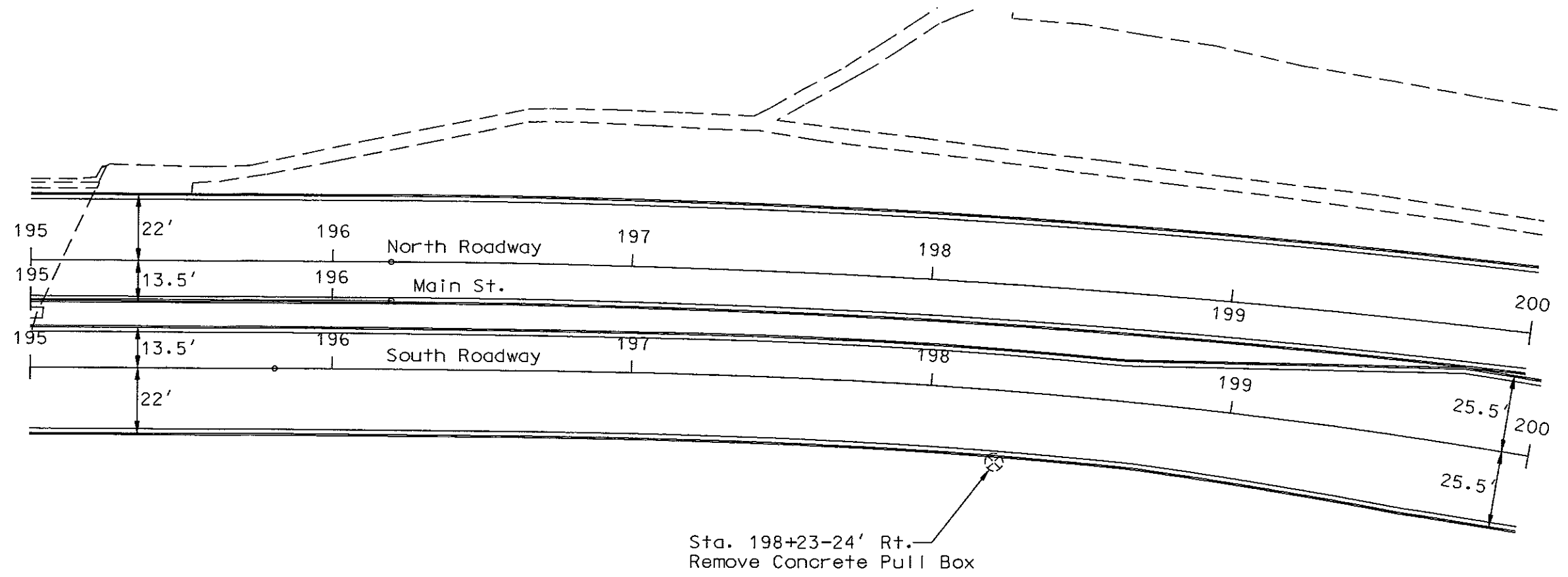
EQUIPMENT REMOVED

Item	Qty
Mast Arm Mtd. Signal Heads	8 Ea.
Post Mtd. Signal Heads	6 Ea.
Type IV Signal Std.	1 Ea.
Combo Signal & Light Std.	3 Ea.
Luminaires	1 Ea.
Pull Box	6 Ea.
Traffic Signal Feed Point	1 Ea.



TRAFFIC SIGNALS
Remove Traffic Signal System
Twin City Dr. & Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	154



Sta. 195+63-141' Rt. (S. Rdway)
Remove Traffic Signal Switch Box
(See Note A)

Sta. 198+23-24' Rt.
Remove Concrete Pull Box

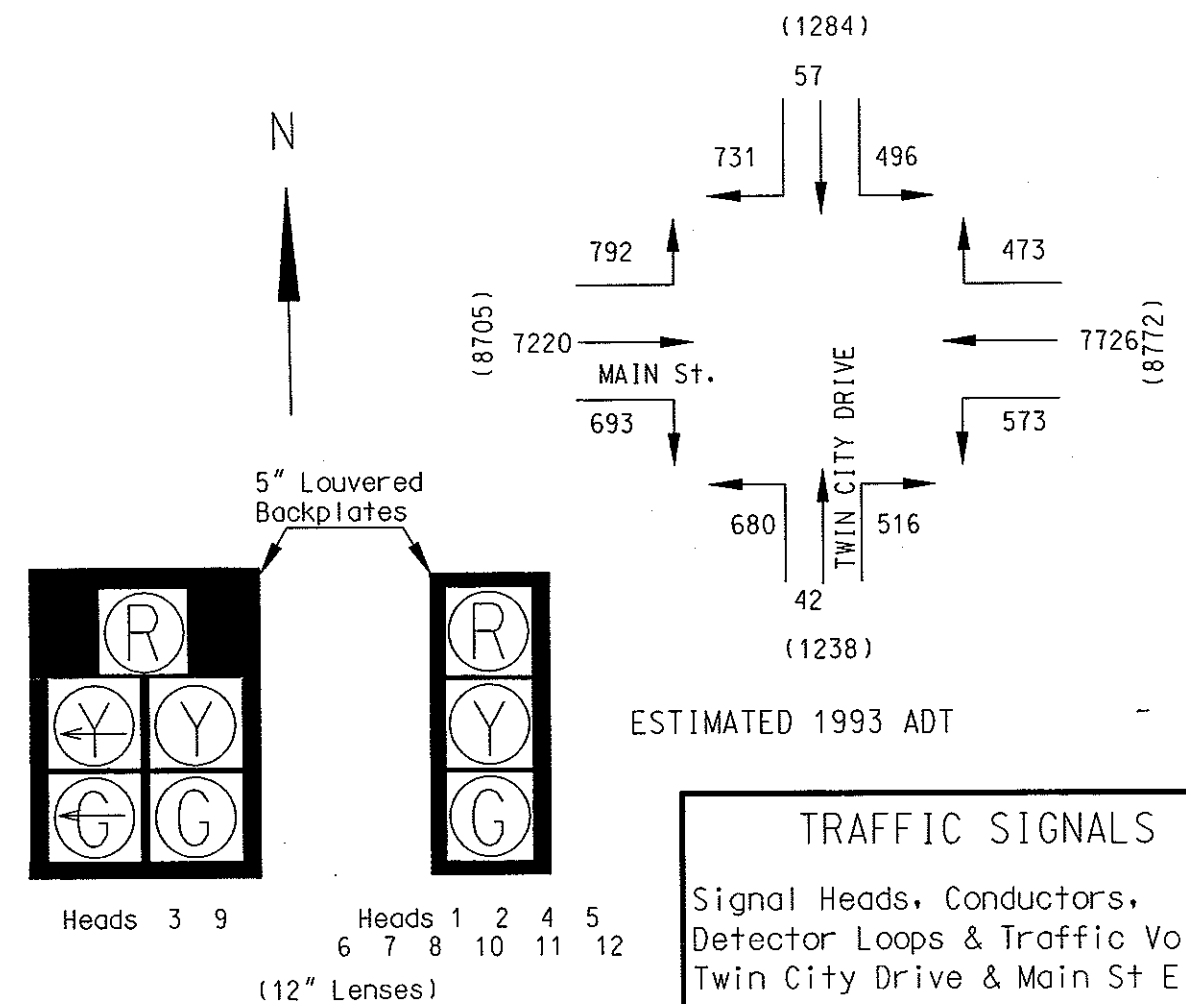
Note A: The traffic signal switch box is located on the same wood pole as the lift station feed point. The contractor shall only remove the traffic signal equipment. All lift station equipment shall be left in place.

TRAFFIC SIGNALS
Remove Traffic Signal System
Twin City Dr. & Main St.
Mandan, ND

CONDUCTORS		CABLE 1 (No. 12 AWG 12)		CABLE 2 (No. 12 AWG 12)		CABLE 3 (No. 12 AWG 12)		CABLE 4 (No. 12 AWG 12)		
	Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black			Spare	3	Yellow ←		Spare	9	Yellow ←
2	White			Neutral		Neutral		Neutral		Neutral
3	Red		1, 2	Red	4, 5, 6	Red	7, 8	Red	10, 11, 12	Red
4	Green			Ground		Ground		Ground		Ground
5	Orange		1, 2	Yellow	4, 5, 6	Yellow	7, 8	Yellow	10, 11, 12	Yellow
6	Blue		1, 2	Green	4, 5, 6	Green	7, 8	Green	10, 11, 12	Green
7	White	Black		Spare	3	Green ←		Spare	9	Green ←
8	Red	Black		Spare	3	Red		Spare	9	Red
9	Green	Black		Spare	3	Green		Spare	9	Green
10	Orange	Black		Spare	3	Yellow		Spare	9	Yellow
11	Blue	Black		Spare		Spare		Spare		Spare
12	Black	White		Spare		Spare		Spare		Spare

DETECTOR LOOPS

Loop No.	Amplifier No.	No. of Turns	Size	Type of Loop	Preformed Loop EA
1	1	3	6'x6'	Presence	1
2	1	3	6'x6'	Presence	1
3	1	3	6'x6'	Presence	1
4	1	3	6'x6'	Presence	1
5	2	3	6'x6'	Presence	1
6	2	3	6'x6'	Presence	1
7	2	3	6'x6'	Presence	1
8	2	3	6'x6'	Presence	1
9	3	3	6'x6'	Presence	1
10	3	3	6'x6'	Presence	1
11	3	3	6'x6'	Presence	1
12	3	3	6'x6'	Presence	1
13	3	3	6'x6'	Presence	1
14	3	3	6'x6'	Presence	1
15	3	3	6'x6'	Presence	1
16	4	3	6'x6'	Presence	1
17	4	3	6'x6'	Presence	1
18	4	3	6'x6'	Presence	1
19	4	3	6'x6'	Presence	1
20	5	3	6'x6'	Passage	1
21	5	3	6'x6'	Passage	1
22	6	3	6'x6'	Passage	IN PLACE
23	6	3	6'x6'	Passage	IN PLACE
Total					21



N 	←		→		(Future Use)		↓		↗		←		(Future Use)		↑																																		
	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8																																		
	Head No.	R/W	Clear To/0						R/W	Clear To/0						R/W	Clear To/0						R/W	Clear To/0						R/W	Clear To/0						R/W	Clear To/0						R/W	Clear To/0				
1															G	Y	*	*							Y	Y																							
2															G	Y	*	*							Y	Y																							
3				*	*																																												
3	G	←	←	*	*	←																																											
4																																																	
5																																																	
6																																																	
7																																																	
8																																																	
9								G	Y	*	*																																						
9										*	*																																						
10								G	Y	*	*																																						
11								G	Y	*	*																																						
12								G	Y	*	*																																						

CHART "A"

On Phase	Non-Conflicting Phase Allowed to Time Concurrently
1	5 or 6
2	5 or 6
3	Future
4	8
5	1 or 2
6	1 or 2
7	Future
8	4

Blank Squares Denote a Red Indication.

* When one phase is on alone, any nonconflicting phase may start timing concurrently without a clearance interval. (See Chart "A")

TRAFFIC SIGNALS
Controller Phasing
Twin City Drive & Main St E

STATION	CONDUIT RUNS		CABLE RUNS		STATION	CONDUIT RUNS		CABLE RUNS		FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
	Length	Size	Length	Type		Length	Size	Length	Type	8	N.D.	NHU-1-094(039)916	157
204+75-116' Lt to 202+30-85' Lt to 201+96-97' Lt	282'	2"	289'	Loop Lead-in[22,23]	200+74-30' Rt to 201+15-65' Rt	53'	3"	63'	Cable 2 Cable 3				
201+91-102' Lt to 201+96-97' Lt	6'	2"	12'	Cable 3				63'	Loop Lead-in[22,23]				
201+96-97' Lt to 201+20-90' Lt to	75'	2"	76'	Cable 3				63'	Loop Lead-in[16,17,18,19]				
			76'	Loop Lead-in[22,23]	201+27-60' Rt to 201+15-65' Rt	11'	2"	27'	Cable 1				
201+20-90' Lt to 200+74-73' Lt	48'	2"	49'	Cable 3	202+30-28' Lt to 202+30-28' Rt to 201+86-65' Rt	112'	2"	119'	Loop Lead-in[5,6,7,8]				
			49'	Loop Lead-in[22,23]									
			49'	Loop Lead-in[16,17,18,19]	202+25-29' Rt to 201+86-65' Rt	52'	2"	58'	Cable 4				
200+90-75' Lt to 200+74-73' Lt	15'	2"	21'	Cable 2				116'	12-2 Conductor (B)				
			21'	12-2 Conductor (B)				116'	Detector Cable (C)				
			21'	Detector Cable (C)	201+86-65' Rt to 201+15-65' Rt	70'	2"	80'	Cable 4				
200+74-73' Lt to 200+74-29' Lt	43'	2.5"	44'	Cable 2				80'	Loop Lead-in[5,6,7,8]				
			44'	Cable 3				86'	Loop Lead-in[13,14,15]				
			44'	Loop Lead-in[22,23]				86'	Loop Lead-in[9,10,11,12]				
			44'	Loop Lead-in[16,17,18,19]				80'	12-2 Conductor (B)				
200+74-29' Lt to 200+74-30' Rt	58'	2.5"	59'	Cable 2	201+15-65' Rt to 201+15-75' Rt	8'	2"	58'	(2) No. 6 RHW				
			59'	Cable 3				29'	(1) No. 6 THW				
			59'	Loop Lead-in[22,23]									
			59'	Loop Lead-in[16,17,18,19]									
			59'	Loop Lead-in[1,2,3,4]									
197+70-26' Rt to 200+74-30' Rt	303'	2"	310'	Loop Lead-in[20,21]									

(B) Emergency Vehicle Indicator Light Conductor

(C) Emergency Vehicle Detector Cable

Note: Internal wiring in the signal standard for the Emergency Vehicle Pre-emption is included in the emergency vehicle indicator light conductor and the emergency vehicle detector cable quantities.

TRAFFIC SIGNAL
CABLE & CONDUIT RUNS

Twin City Drive & Main St.

Mandan

SUMMARY OF QUANTITIES

STATION	Concrete Foundation- Feed Point- Type 'B'	Concrete Foundation- Traffic Signals	Pull Box	2 Inch Dia. Rigid Conduit	2.5 Inch Dia. Rigid Conduit	3 Inch Dia. Rigid Conduit	Underground Conductor No. 6- Type RHW	Underground Conductor No. 6- Type THW	Preformed Loop Detector	Loop Lead-in Conductor	No. 12 AWG 12 Conductor Cable	No. 12 AWG 5 Conductor Cable	Feed Point-Combo Lighting & Signal-Pad Mounted	Combo 46 Ft. Mast Arm Signal & Light Standard - Type C	Combo 47 Ft. Mast Arm Signal & Light Standard - Type C	Combo 25 Ft. Mast Arm Signal & Light Standard - Type C	Combo 33 Ft. Mast Arm Signal & Light Standard - Type C	1-Way 3 Sec. Head w/12 In. Lenses- Post Mounted	1-Way 3 Sec. Head w/12 In. Lenses- Mast Arm Mounted	1-Way 5 Sec. Head w/12 In. Lenses- Mast Arm Mounted	Relocate Controller	Relocate Controller Cabinet	Emergency Vehicle Pre-emption Unit	Remove Traffic Signal System											
	EA	EA	EA	LF	LF	LF	LF	LF	EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA											
201+27-60' Rt		1										[71]				1	1	1																	
200+90-75' Lt		1										[174]		1				1	2	1															
201+91-102' Lt		1										[63]			1			1	1																
202+25-29' Rt		1										[177]		1				1	2	1															
201+15-65' Rt		1																				1	1	1											
201+15-75' Rt	1												1																						
Various Locations			8	982	101	53	58	29	15	1631	655																								
Total	1	5	8	982	101	53	58	29	15	1631	655	485	1	1	1	1	1	4	6	2	1	1	1	1											

[] indicates quantities used for internal wiring.

TRAFFIC SIGNALS
 Summary of Quantities
 Twin City Drive & Main St E

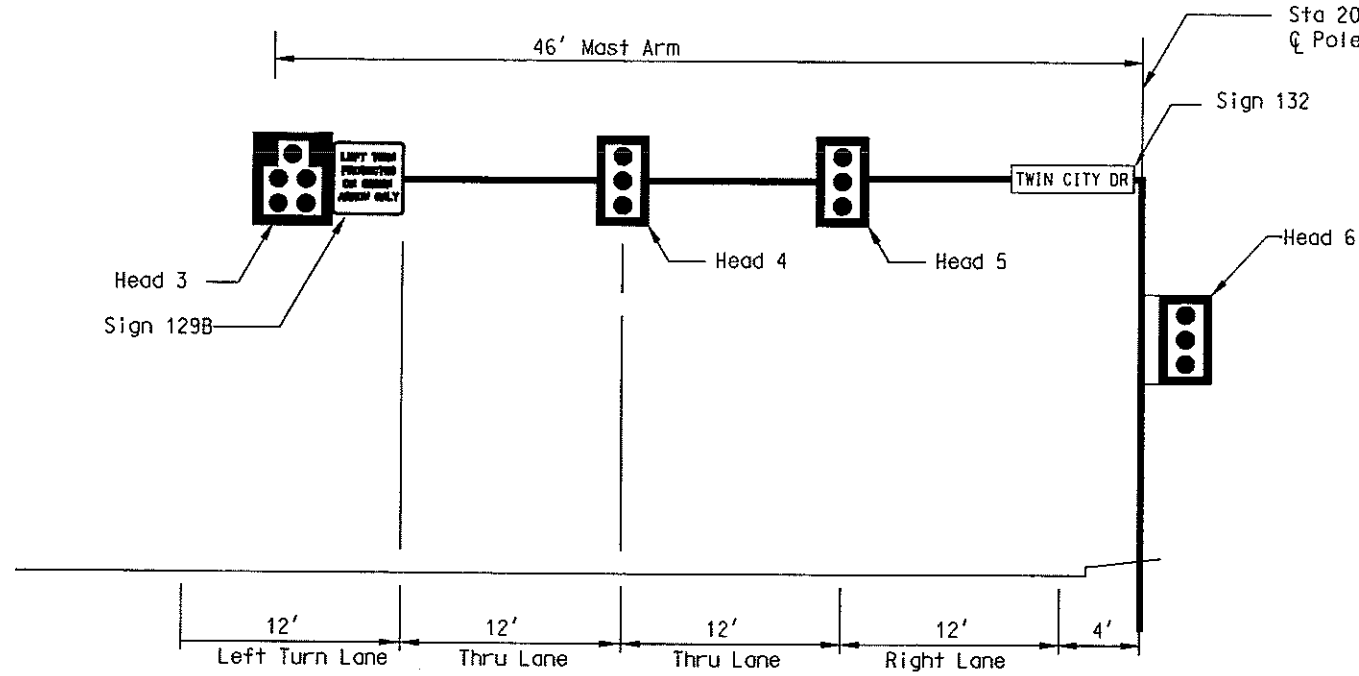
	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
BASIC INTERVALS (or FUNCTIONS)								
Minimum Initial	1.0	5.8		5.8	1.0	5.8		5.8
Passage Time	-	5.6		-	-	4.8		-
Maximum (Maximum Green or Ext. Limit)	15	40		20	15	40		20
Yellow Change	5.0	5.0		5.0	5.0	5.0		5.0
Red Clearance	1.0	1.0		1.0	1.0	1.0		1.0
Walk Pedestrian Clearance								
VOLUME DENSITY TIMING FUNCTIONS								
Variable Initial Timing Options								
Added Initial								
Minimum Initial		5.8				5.8		5.8
Added Initial per Actuation		2.1				2.1		2.1
Actuations Before Added Initial		2				2		2
Computed Initial								
Minimum Initial		5.8				5.8		
Maximum Initial		31				27		
Actuations to Reach Maximum Initial		12				10		
Extensible Initial								
Minimum Initial		5.8				5.8		
Maximum Initial		31				27		
Added Initial per Actuation		2.1				2.1		
TIME WAITING GAP REDUCTION OPTIONS								
Passage Time		5.6				4.9		
Minimum Gap		1.3				1.3		
Time to Reduce to Minimum Gap		1				5		
Reduce Gap Every		1.0				1.0		
Reduce Gap Every Second By		4.3				0.7		
Reduce Gap By		4.3				3.5		
Locking Memory		X				X		
Non-Locking Memory								
Flashing-Normal & Conflict Monitor		Y				Y		
Start Up Phasing	R	G		R		G		R
Type of Detector	Presence							
Loop	Calling*	X				X		
	Passage	X				X		
Emergency Vehicle Pre-emption		X						

(Future Use)

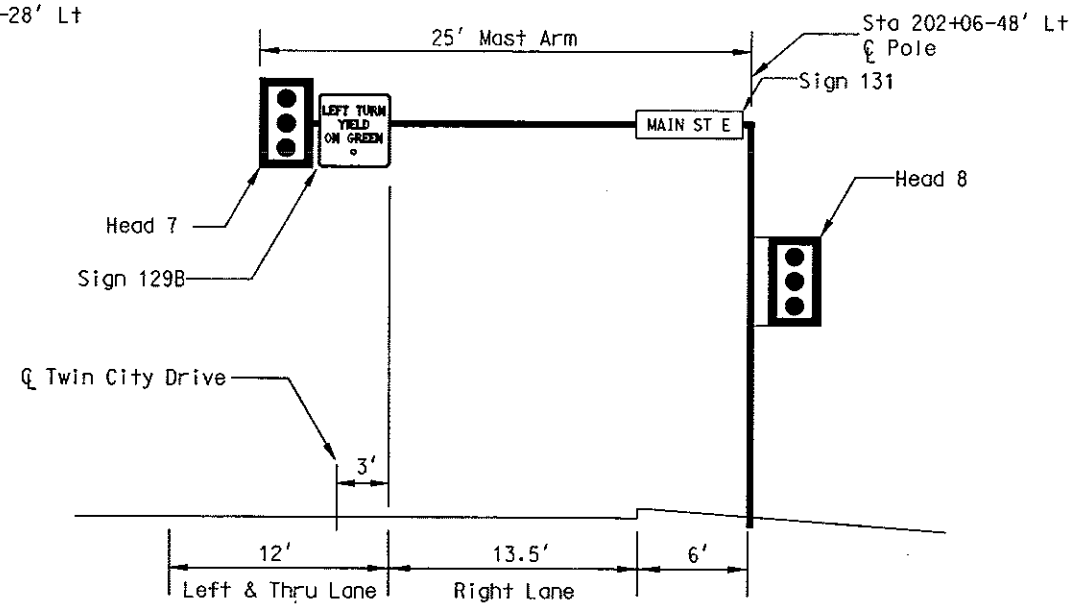
(Future Use)

TRAFFIC SIGNALS
 Controller Settings
 Twin City Drive
 Main Street East
 Mandan, ND

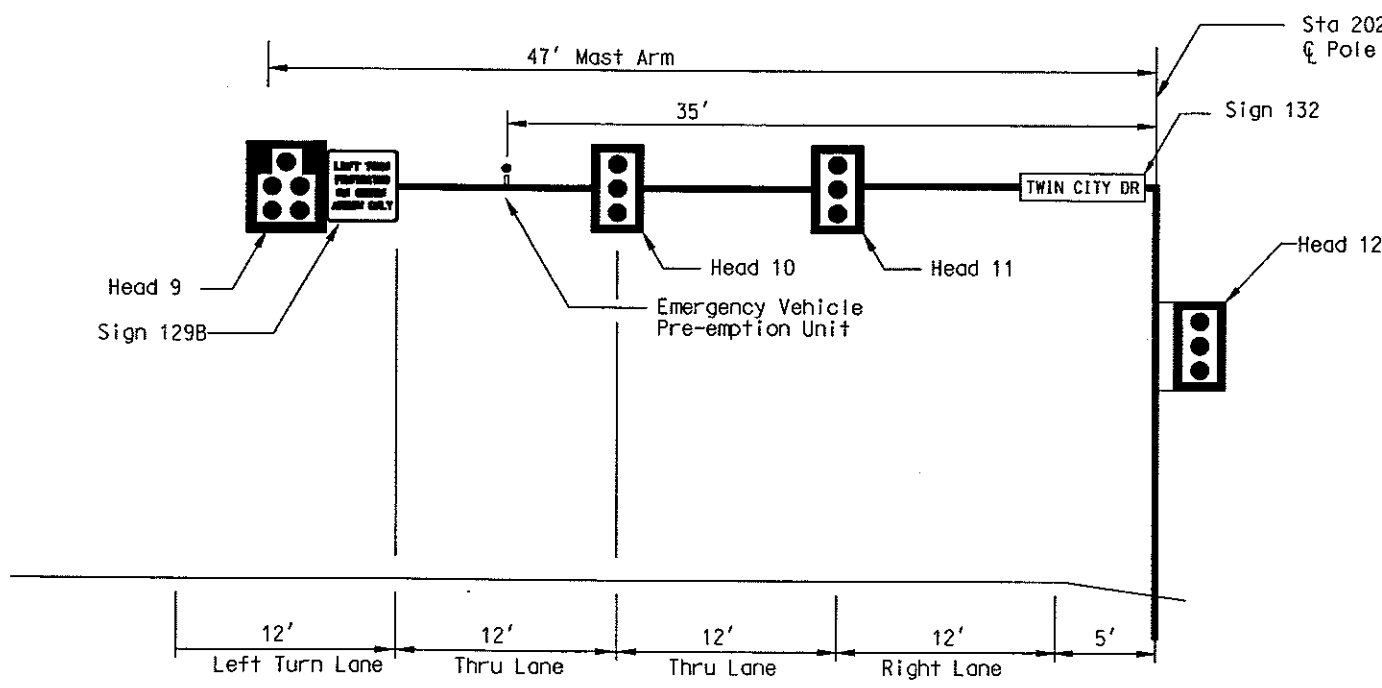
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	160



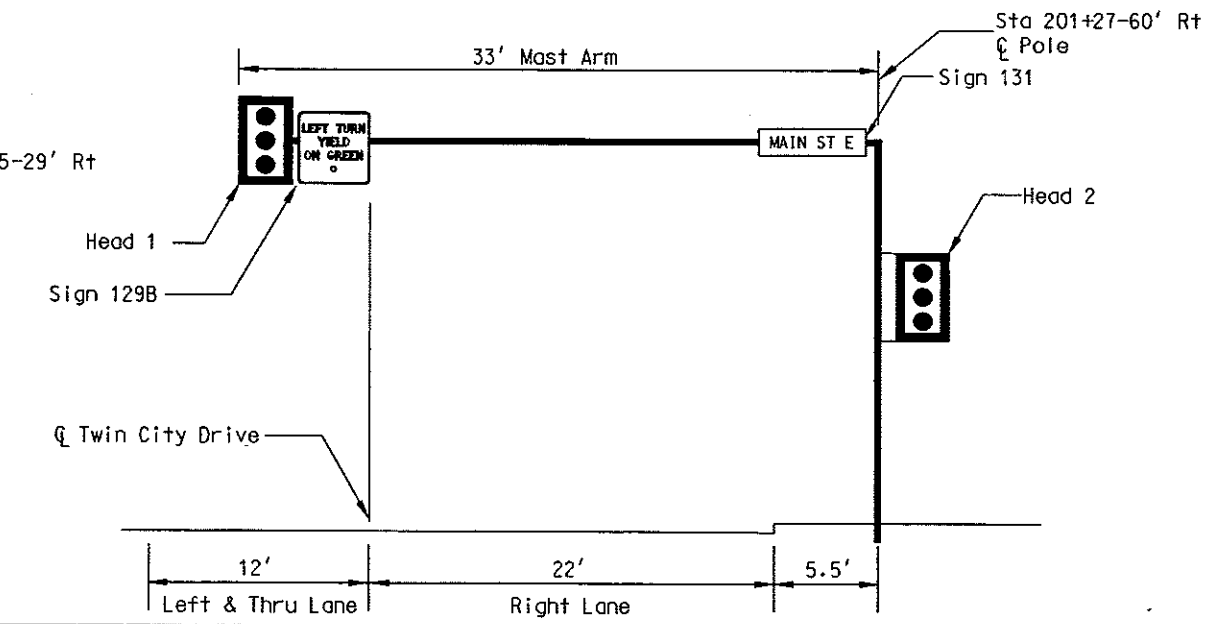
Main Street Westbound - viewed from the stop bar at Sta. 202+14



Twin City Drive Northbound - viewed from the stop bar at 34' Lt of Main Str. ☉

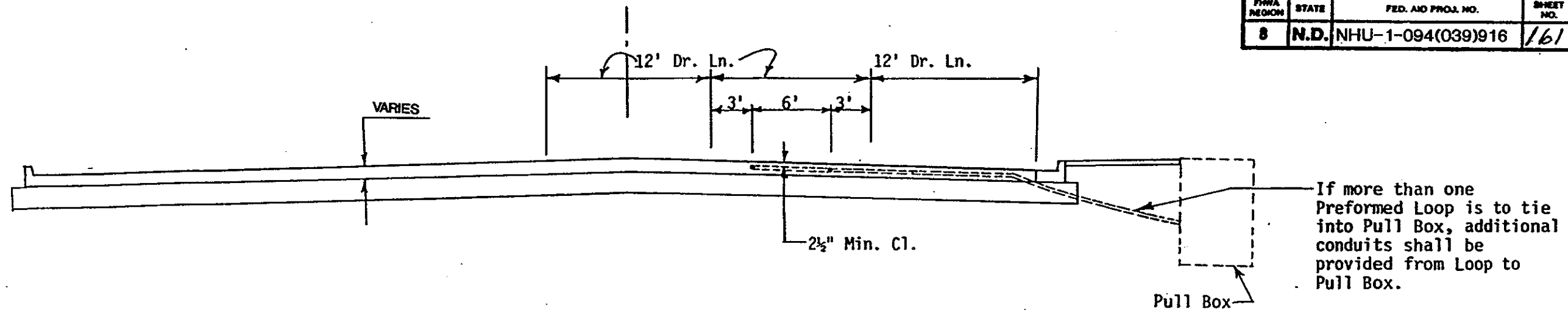


Main Street Eastbound - viewed from the stop bar at Sta. 201+00



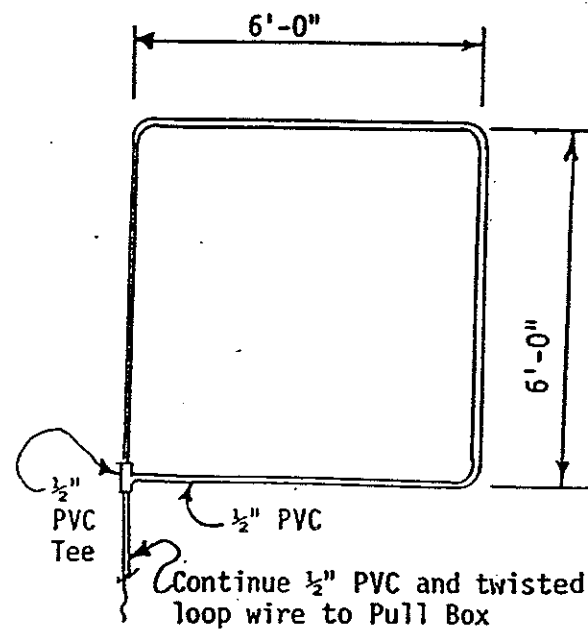
Twin City Drive Southbound - viewed from the stop bar at 34' Rt of Main Str. ☉

TRAFFIC SIGNALS
Signal Standard & Head Locations
Twin City Drive and Main Street
Mandan, ND



INSTALLATION OF PREFORMED LOOP DETECTOR when placed in new pavement.

NOTE: The Preformed Loop shall be securely tied down to prevent the loop from floating during placing of concrete.



PREFORMED LOOP DETECTOR LAYOUT

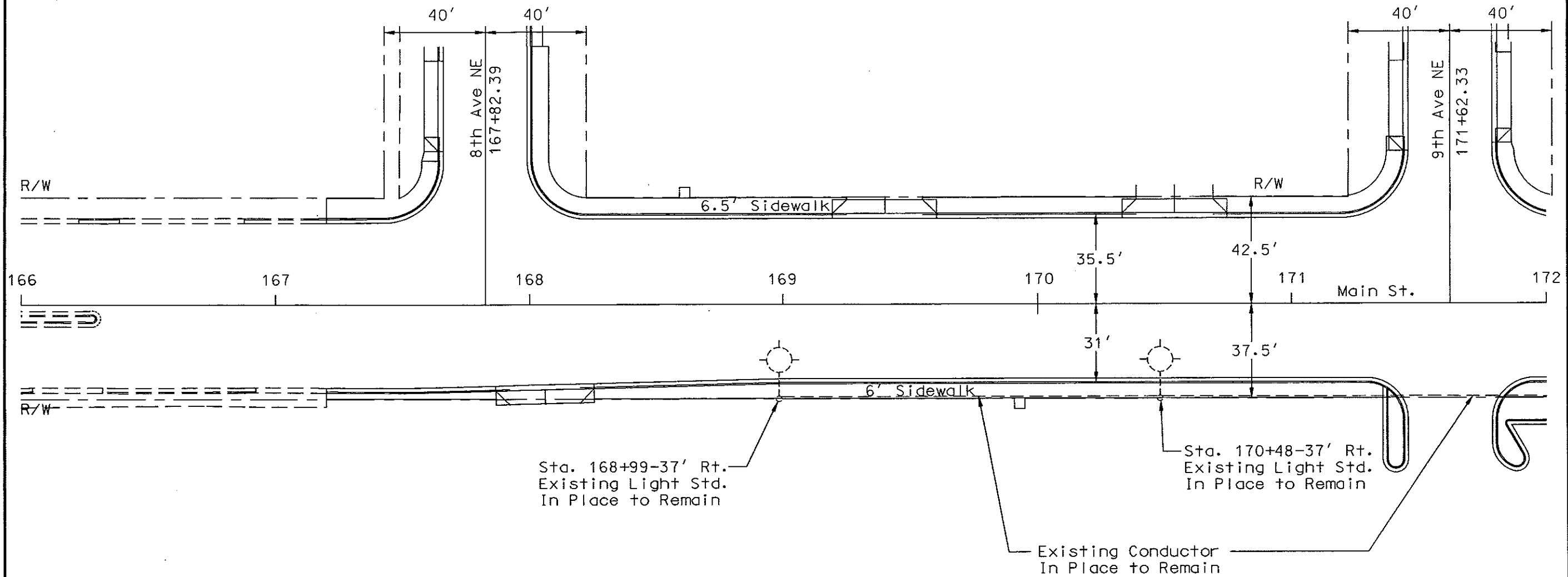
PREFORMED LOOP DETECTOR: The Preformed Loop Detector shall be constructed of PVC and loop conductor. The loop detector shall be totally encased in 1/2" schedule 40 PVC, (Sprinkler pipe, heavy wall construction) with pipe fittings and glue. One corner shall be terminated with a 1/2" PVC tee fitting to provide an exit to the pull box conduit. The PVC is to be sealed at the joints with water pipe fitting glue to prevent water entrenchment. The wire shall be No. 14 AWG, Type XHHW stranded single conductor. The wire loop shall be constructed from a continuous piece of wire with no splices throughout the entire length to the pull box. The number of turns as shown on the plans shall be placed in the preformed loop. The wire from the loop to the pull box shall be twisted to provide a minimum of two to five turns per foot. A minimum of 6 feet of loop wire slack shall be coiled and left in the pull box. The pull box end of the conduit shall be sealed to protect against water entrenchment. The item Preformed Loop Detectors will be measured as a unit. This item shall include the conduit, wire, labor and equipment necessary to complete the installation as shown on the plans.

PREFORMED LOOP DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	162

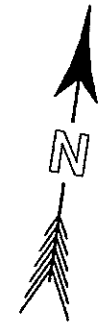


TEMPORARY LIGHTING SYSTEM
Sta. 166+00 to 206+00 1 Ea.

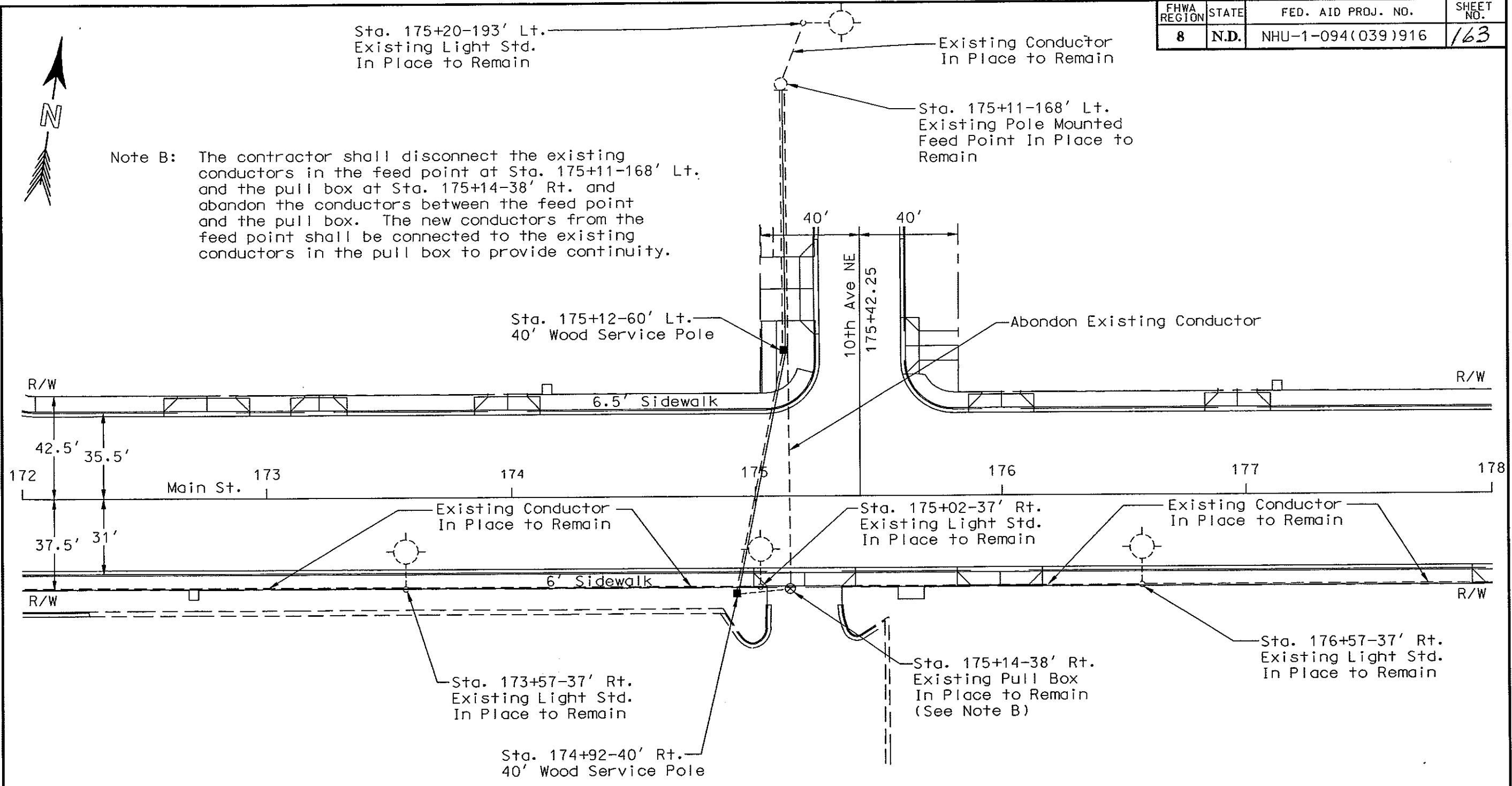


TEMPORARY LIGHTING
Sta. 166+00 to 172+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	163

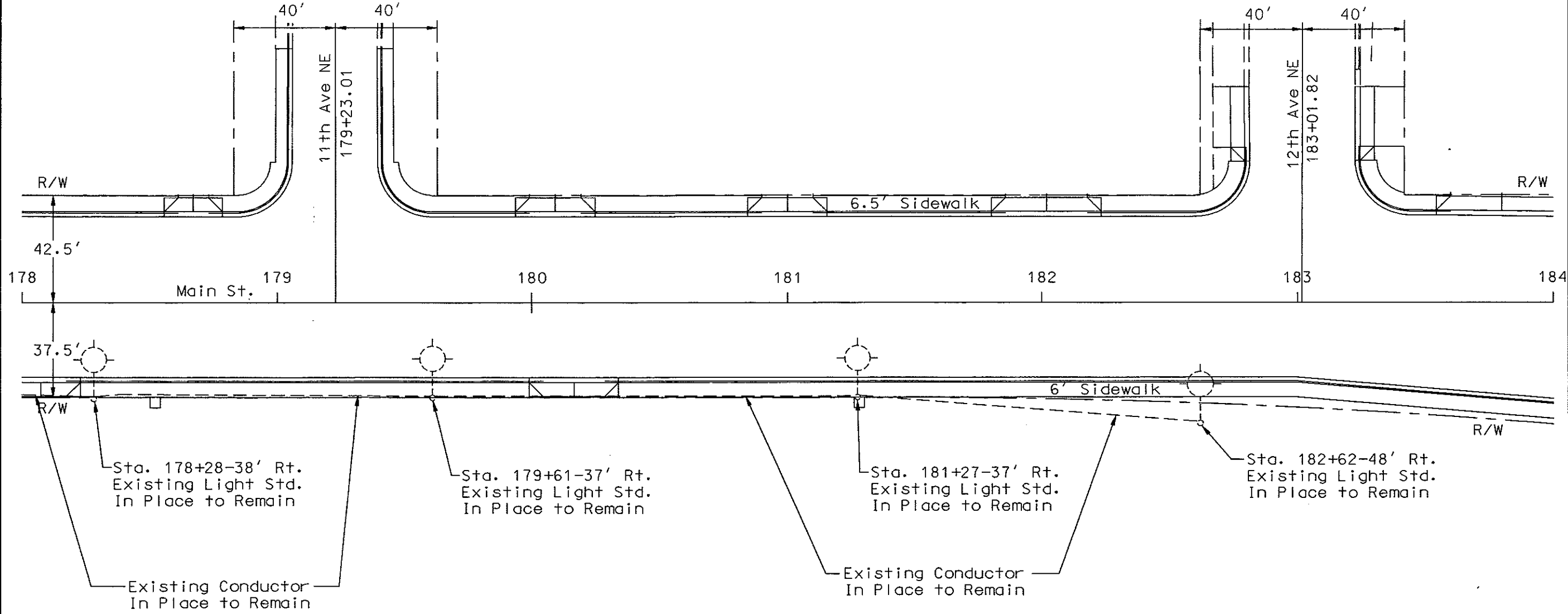
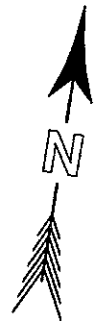


Note B: The contractor shall disconnect the existing conductors in the feed point at Sta. 175+11-168' Lt. and the pull box at Sta. 175+14-38' Rt. and abandon the conductors between the feed point and the pull box. The new conductors from the feed point shall be connected to the existing conductors in the pull box to provide continuity.



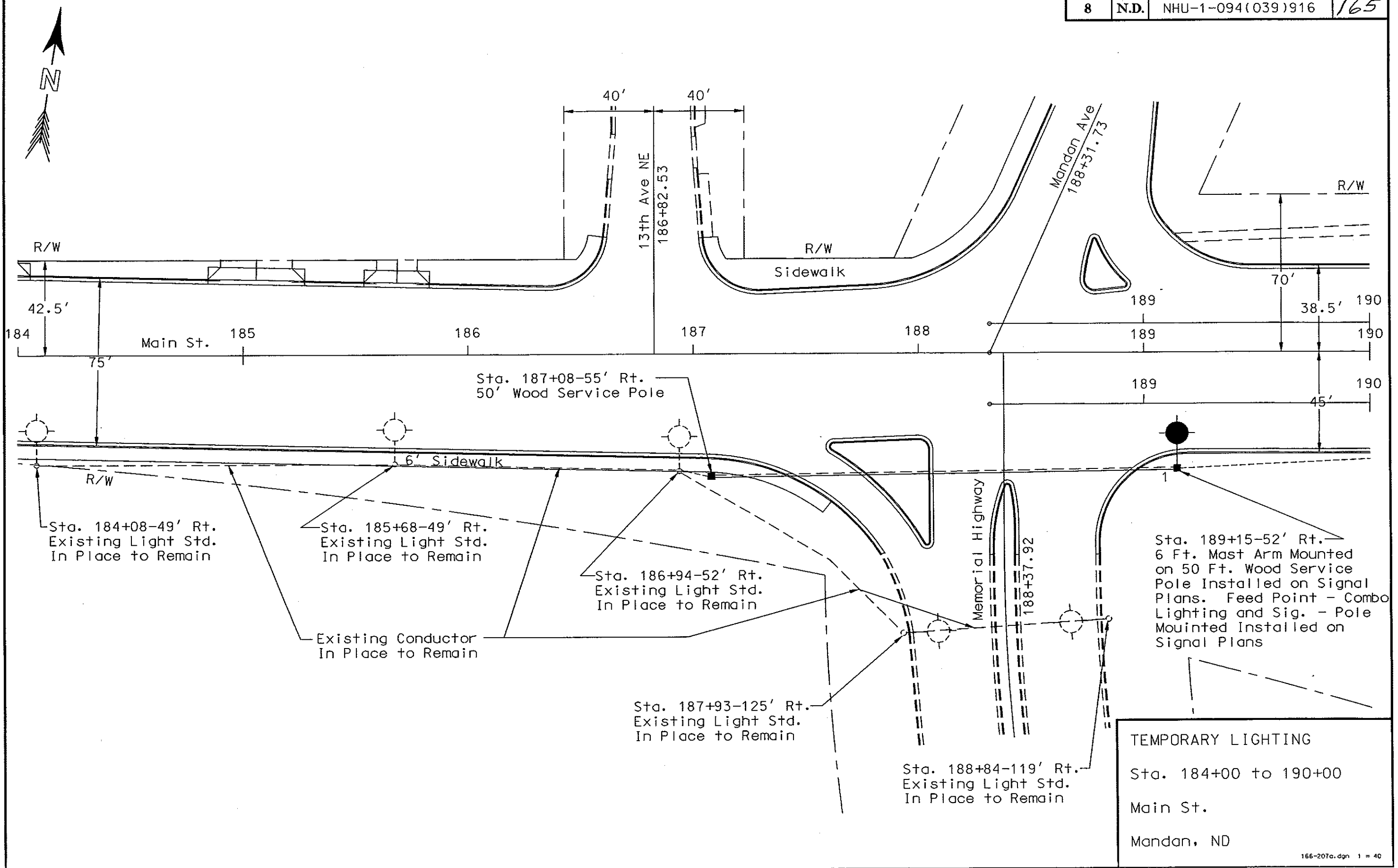
TEMPORARY LIGHTING
 Sta. 172+00 to 178+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	164



TEMPORARY LIGHTING
Sta. 178+00 to 184+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	165



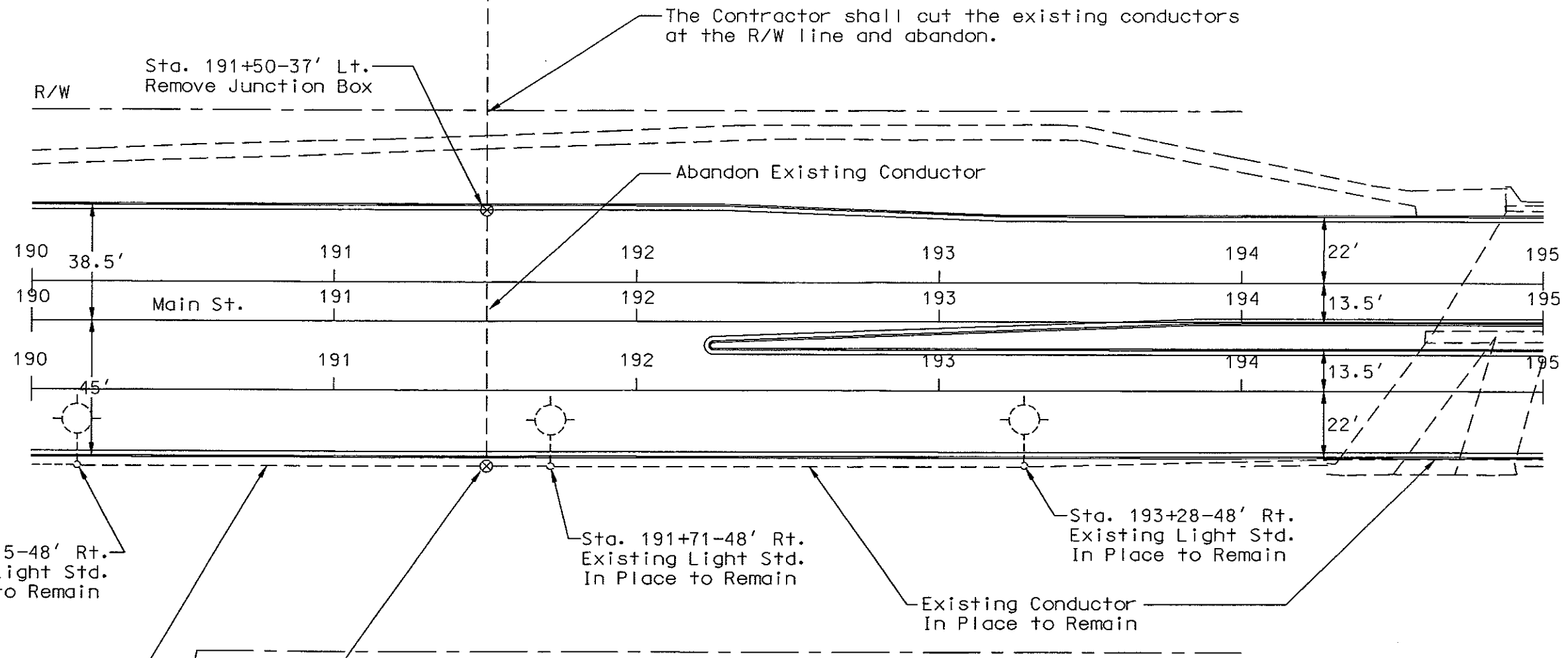
TEMPORARY LIGHTING
Sta. 184+00 to 190+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	166



Sta. 191+50-166' Lt.
Existing Feed Point
(See Note C)

Note C: The contractor shall arrange with the local utility company to have the feed point disconnected from the source of live power. The feed point will be removed by the utility company.



Sta. 190+15-48' Rt.
Existing Light Std.
In Place to Remain

Sta. 191+71-48' Rt.
Existing Light Std.
In Place to Remain

Sta. 193+28-48' Rt.
Existing Light Std.
In Place to Remain

Existing Conductor
In Place to Remain

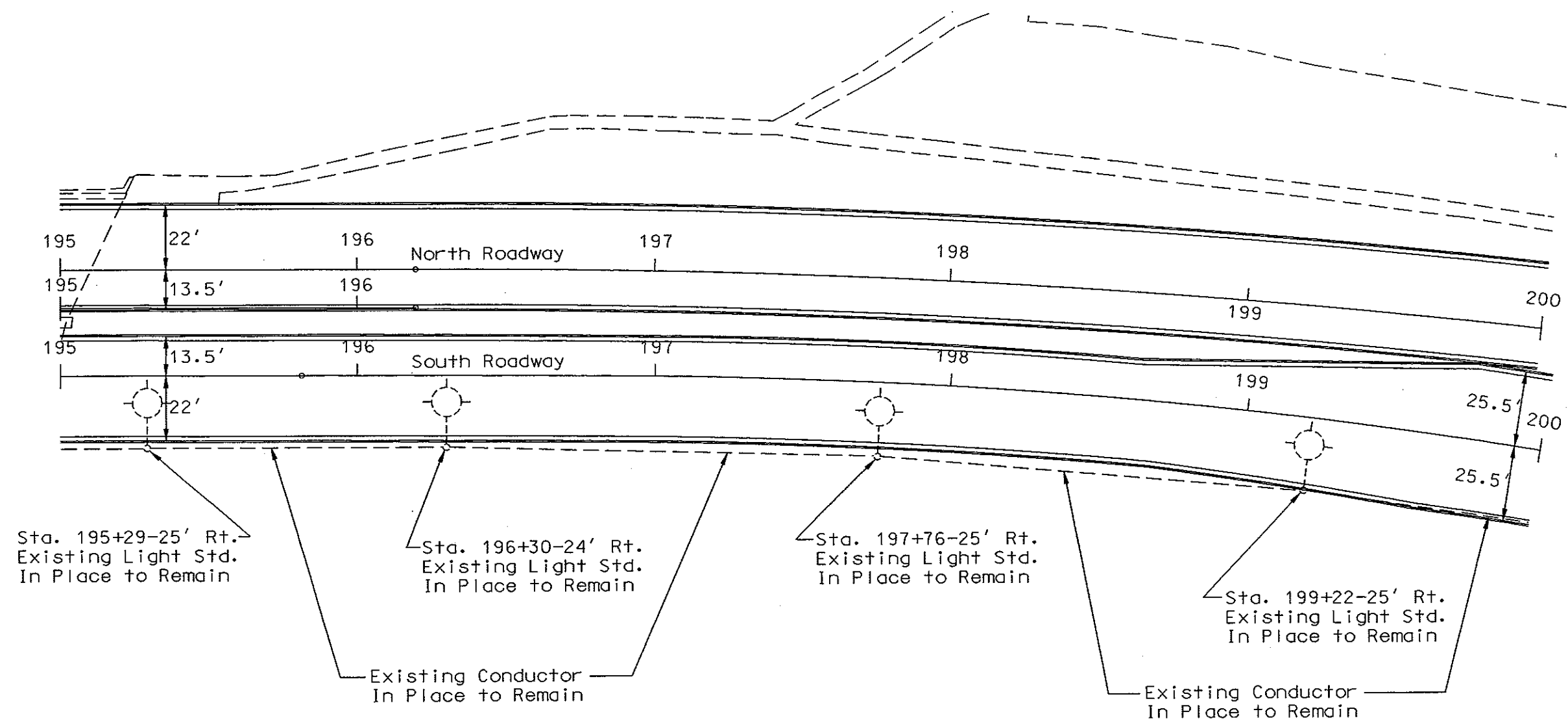
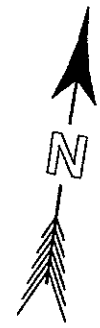
Sta. 191+50-48' Rt.
Existing Junction Box
In Place to Remain
(Removed after Temporary
Lighting is no Longer Needed)
(See Note D)

Existing Conductor
In Place to Remain

Note D: The contractor shall splice the existing conductors in the existing junction box at Sta. 191+50-48' Rt. to provide continuity. The splice shall be waterproof and approved by the Engineer. The contractor shall be responsible for any damage to the existing conductor and shall replace any damaged conductor at his own expense.

TEMPORARY LIGHTING
Sta. 190+00 to 195+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	167

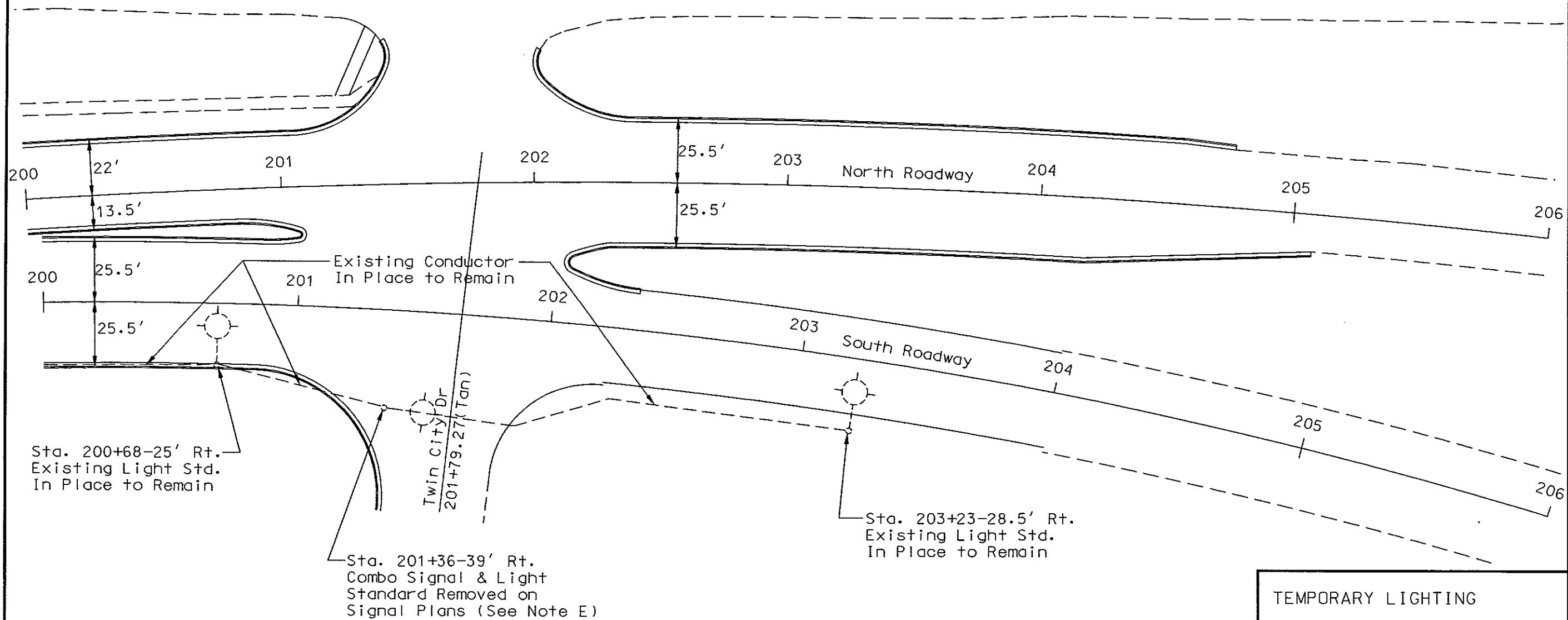


TEMPORARY LIGHTING
 Sta. 195+00 to 200+00
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	168



Note E: The contractor shall splice the existing conductors at the removed combo signal and light standard to provide continuity to the light standard at Sta. 203+23-28.5' Rt. The splice shall be waterproof and approved by the Engineer. The contractor shall be responsible for any damage to the existing conductor and shall replace any damaged conductor at his own expense.



TEMPORARY LIGHTING
 Sta. 200+00 to 206+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
175+11-168' Lt. to 175+12-60' Lt.	25'	2"(G)		144'	No. 4 AWG Aerial Cable
175+12-60' Lt. to 174+92-40' Rt.				106'	No. 4 AWG Aerial Cable
174+92-40' Rt. to	28'	2"(G)		108' 36'	(3) No. 4 RHW (1) No. 6 THW
174+92-40' Rt. to 175+14-38' Rt.			21'	84' 28'	(3) No. 4 RHW (1) No. 6 THW
186+94-52' Rt. to 187+08-55' Rt.			13'	54' 18'	(3) No. 4 RHW (1) No. 6 THW
187+08-55' Rt.	38'	2"(G)		129' 43'	(3) No. 4 RHW (1) No. 6 THW
187+08-55' Rt. to 189+15-52' Rt.	32'	2"(G)		254'	No. 4 AWG Aerial Cable
189+15-52' Rt. to 190+15-48' Rt.	6'	2"(G)	99'	342' 114'	(3) No. 4 RHW (1) No. 6 THW

(A) QUANTITIES											
Cable Trench	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type THW	No. 4 AWG Aerial Cable	H.P. Sodium Vapor Luminaire 200 Watt	40' Wood Service Pole	50' Wood Service Pole	6 Ft. Wood Pole Mounted Mast Arm	Mounting Hardware	Remove Temporary Lighting System	Remove Junction Box
LF	LF	LF	LF	LF	EA	EA	EA	EA	LS	EA	EA
133	129	717	239	504	1	2	1	1	1	1	2

(A) These items are not to be bid separately, but shall be included in the item "Temporary Lighting System."

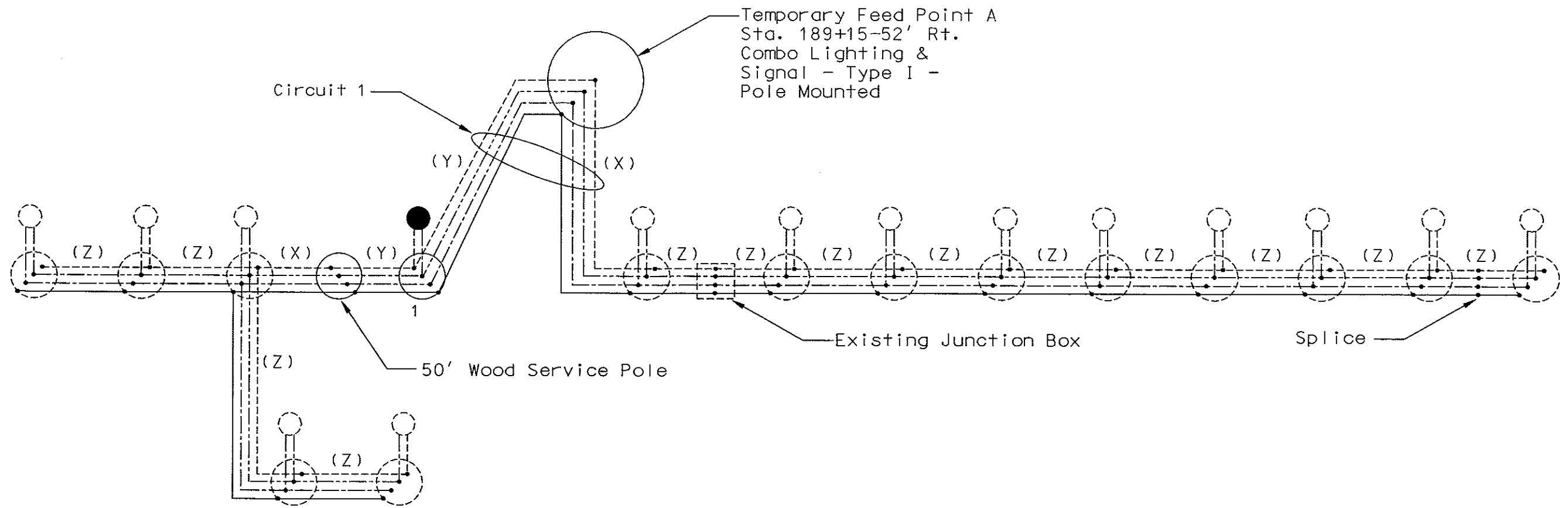
(G) Pole Mounted Conduit

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	MOUNTING HEIGHT	MAST ARM	WOOD POLE LENGTH
1	189+15	52' Rt.	250	1	MSC-II	40 Ft.	6 Ft.	50 Ft. (F)

(F) Installed on Signal Plans

TEMPORARY LIGHTING SYSTEM
Cable Runs and Summary of Quantities
Sta. 166+00 to 206+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	170

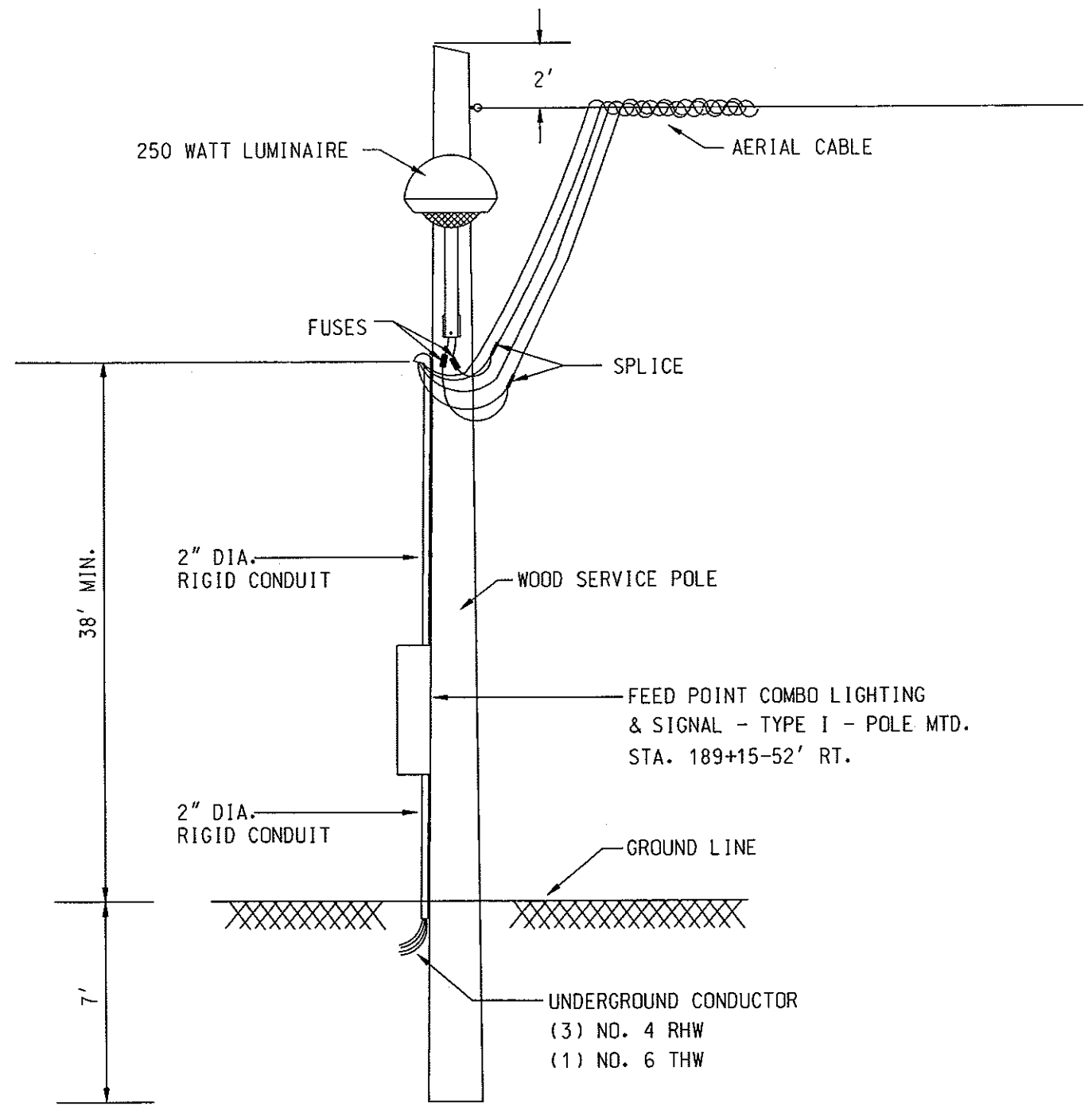


LEGEND

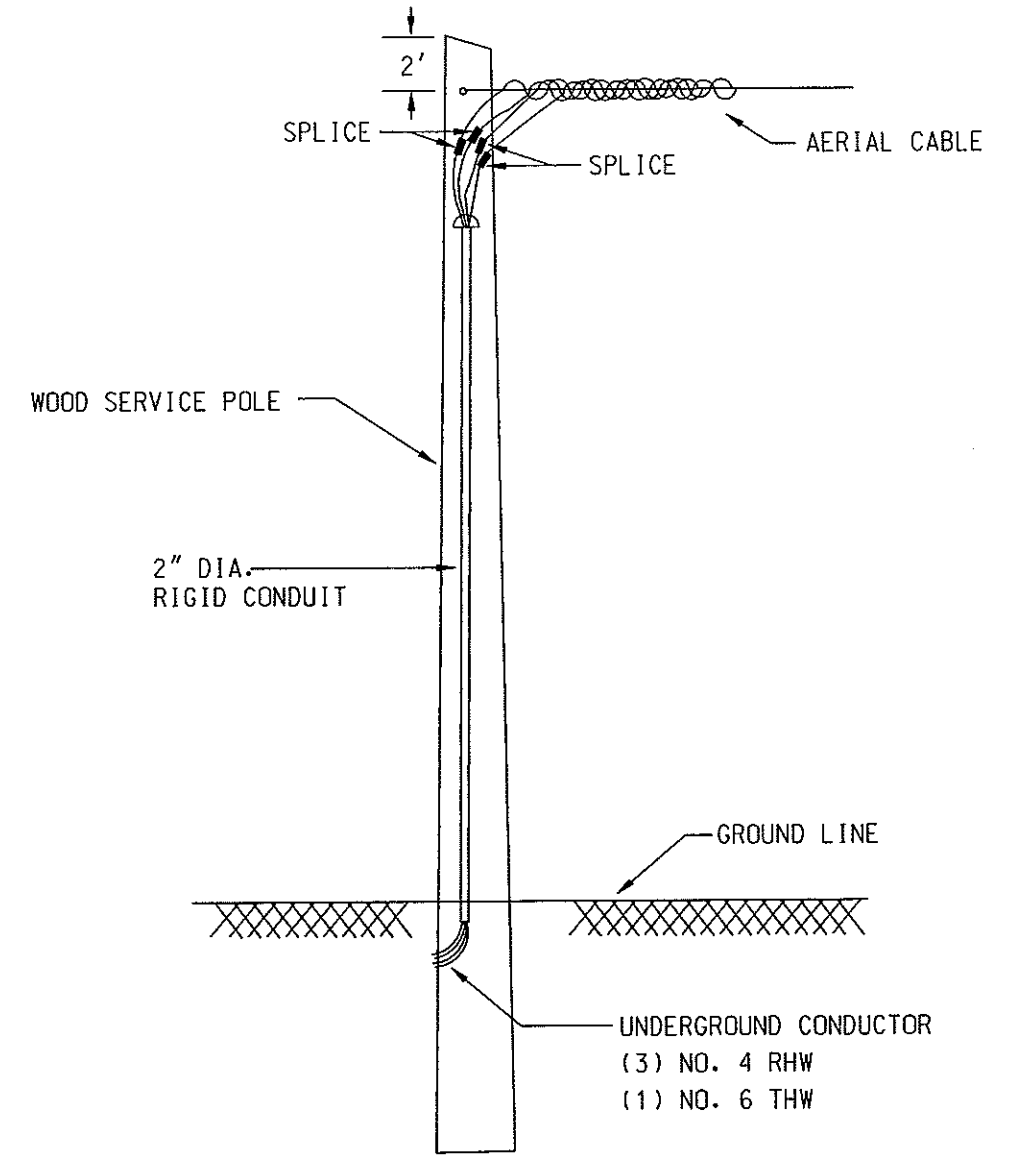
- Neutral Conductor
- Phase Conductor
- Phase Conductor
- Ground Conductor
- (X) (3) No. 4 RHW, (1) No. 6 THW
- (Y) No. 4 AWG Aerial Cable
- (Z) Existing Conductors
- 250 Watt HP Sodium Vapor Luminaire
120v x 240v operated on 120v
- Wood Pole Light Standard
- 1 Light Standard Number
- Existing Light Standard

LIGHTING SCHEMATIC
 Temporary Feed Point A
 Sta. 189+15-52' Rt.
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	171



TEMPORARY LIGHTING FEED POINT DETAIL



UNDERGROUND TO OVERHEAD WIRING DETAIL

TEMPORARY LIGHTING DETAIL

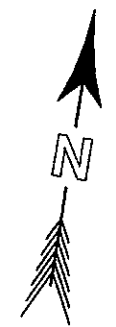
Main St.

Mandan, ND

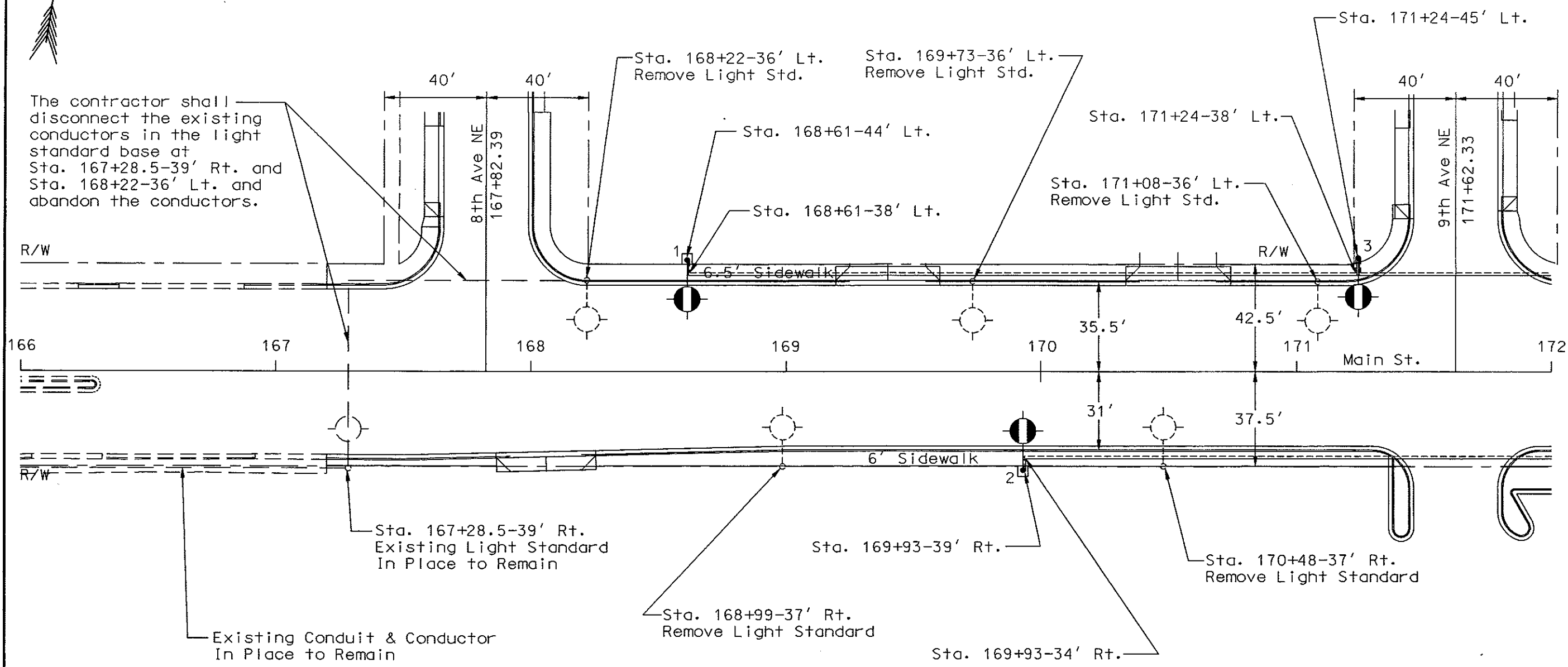
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	172

REMOVE LIGHT STANDARD

Sta. 168+22-36' Lt.	1 Ea.
Sta. 168+99-37' Rt.	1 Ea.
Sta. 169+73-36' Lt.	1 Ea.
Sta. 170+48-37' Rt.	1 Ea.
Sta. 171+08-36' Lt.	1 Ea.
Total	5 Ea.



The contractor shall disconnect the existing conductors in the light standard base at Sta. 167+28.5-39' Rt. and Sta. 168+22-36' Lt. and abandon the conductors.







LIGHTING LAYOUT
 Sta. 166+00 to 172+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
168+61-44' Lt. to	5' 263' 6'	2" 2" 2"		852'	(3) No. 4 RHW
168+61-38' Lt. to			284'	(1) No. 6 THW	
171+24-38' Lt. to					
171+24-45' Lt.					
171+24-45' Lt. to	6' 76'	2" 2"		261'	(3) No. 4 RHW
171+24-38' Lt. to			87'	(1) No. 6 THW	
172+00-38' Lt.					
169+93-39' Rt. to	4' 207'	2" 2"		648'	(3) No. 4 RHW
169+93-34' Rt. to			216'	(1) No. 6 THW	
172+00-34' Rt.					

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - 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				
3	567	1174	587	3	3	5				

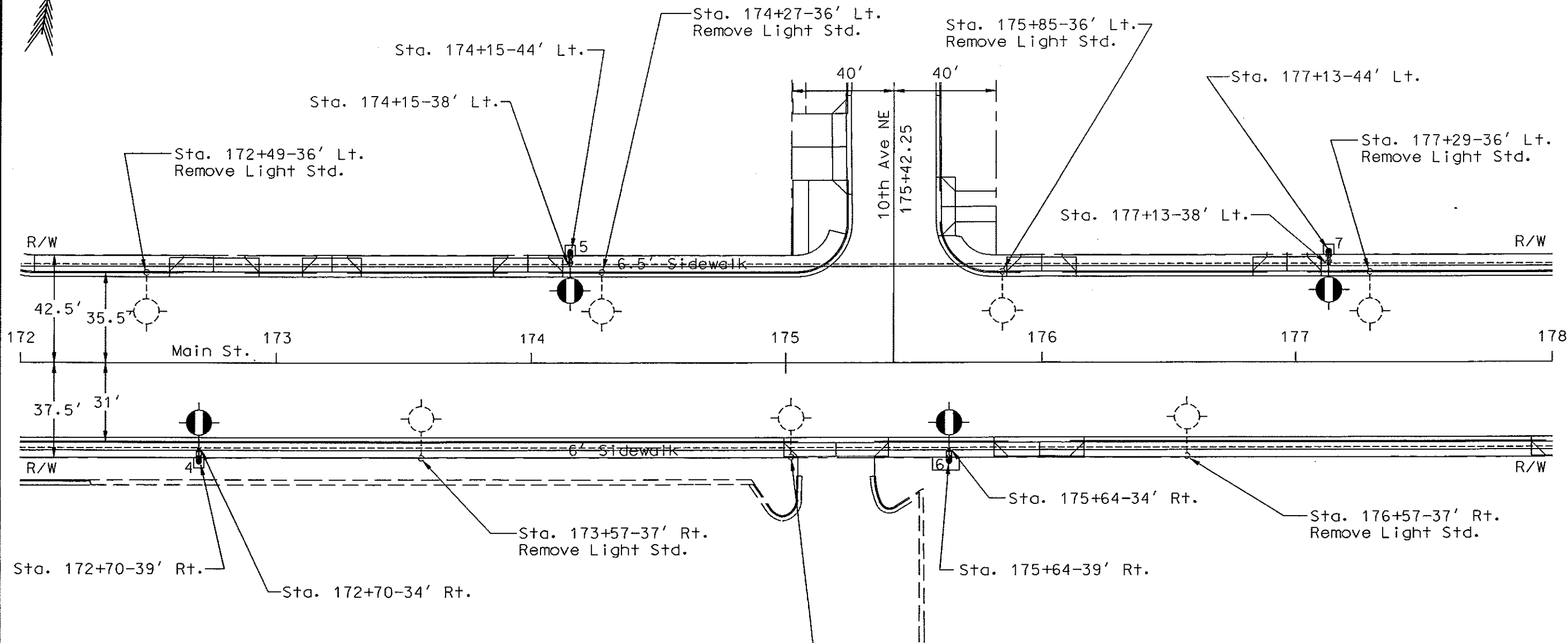
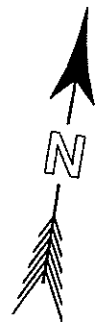
City Funds		587
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
1	168+61	44' Lt.	200	B1	MSC-IV	40 Ft. 	6 Ft.
2	169+93	39' Rt.	200	A1	MSC-IV	40 Ft. 	6 Ft.
3	171+24	45' Lt.	200	B1	MSC-IV	40 Ft. 	6 Ft.

 Festoon

LIGHTING QUANTITIES
Sta. 166+00 to 172+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	174



REMOVE LIGHT STANDARD	
Sta. 172+49-36' Lt.	1 Ea.
Sta. 173+57-37' Rt.	1 Ea.
Sta. 174+27-36' Lt.	1 Ea.
Sta. 175+02-37' Rt.	1 Ea.
Sta. 175+85-36' Lt.	1 Ea.
Sta. 176+57-37' Rt.	1 Ea.
Sta. 177+29-36' Lt.	1 Ea.
Total	7 Ea.

LIGHTING LAYOUT
 Sta. 172+00 to 178+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
178+00-34' Rt. to 178+52-34' Rt. to 178+52-39' Rt.	52' 4'	2" 2"		183' 61'	(3) No. 4 RHW (1) No. 6 THW
178+52-39' Rt. to 178+52-34' Rt. to 181+28-34' Rt. to 181+28-39' Rt.	4' 276' 4'	2" 2" 2"		882' 294'	(3) No. 4 RHW (1) No. 6 THW
181+28-39' Rt. to 181+28-34' Rt. to 182+45-34' Rt. to 183+93-46' Rt.	4' 117' 148'	2" 2" 2"		837' 279'	(3) No. 2 RHW (1) No. 6 THW
183+93-46' Rt. to 184+00-47' Rt.	6'	2"		33' 11'	(3) No. 2 RHW (1) No. 6 THW
178+00-38' Lt. to 179+90-38' Lt. to 179+90-41' Lt.	190' 2'	2" 2"		591' 197'	(3) No. 4 RHW (1) No. 6 THW
179+90-41' Lt. to 182+68.5-41' Lt. to 182+68.5-48' Lt.	278' 6'	2" 2"		882' 294'	(3) No. 4 RHW (1) No. 6 THW
182+68.5-48' Lt. to 182+68.5-41' Lt. to 184+00-41' Lt.	6' 131'	2" 2"		426' 142'	(3) No. 2 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 2 - Type RHW	Underground Conductor No. 4 - 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	LF	EA	EA	EA			
5	1228	864	1692	1278	5	5	8			

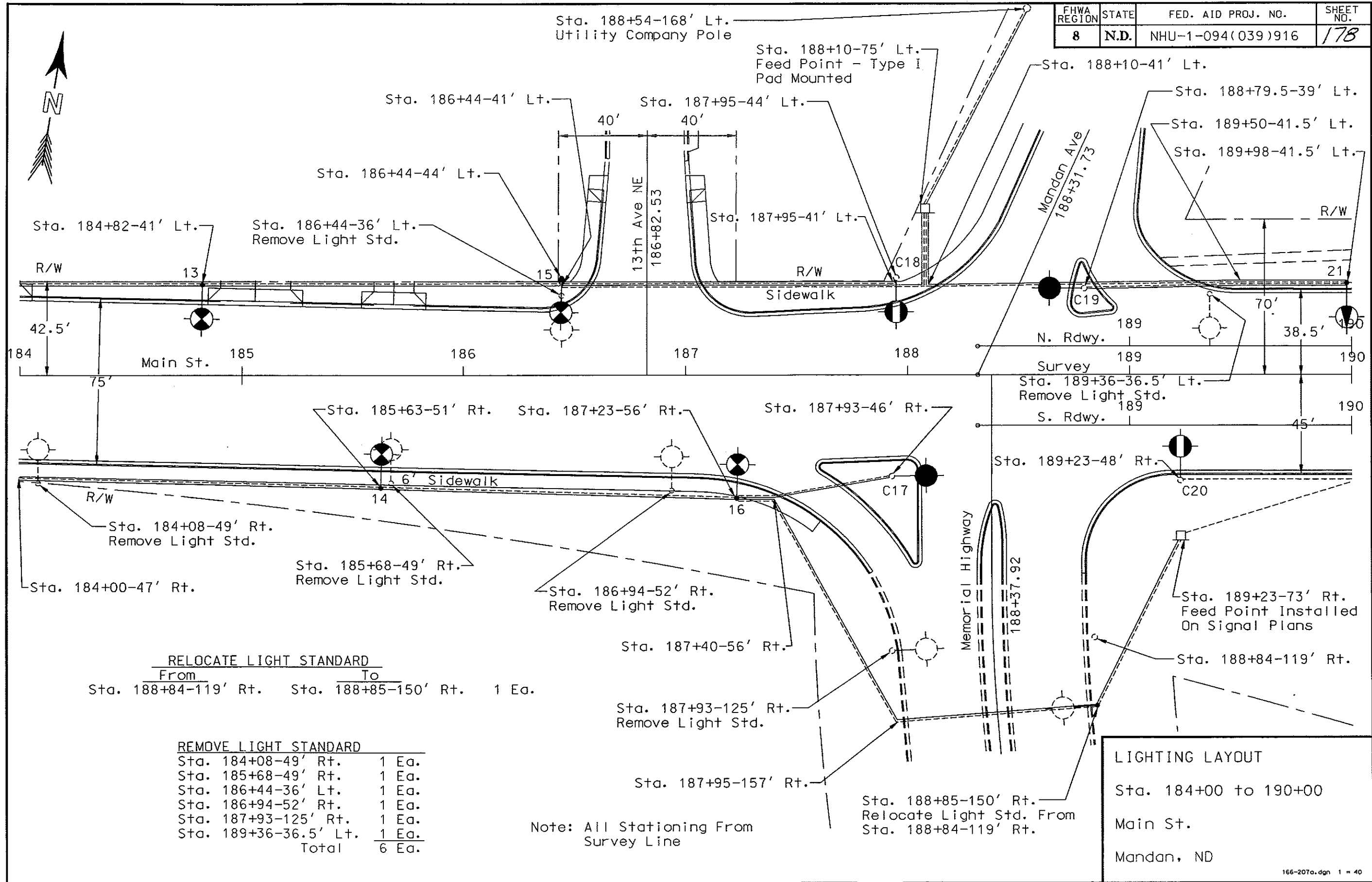
City Funds		432	846
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
8	178+52	39' Rt.	200	A1	MSC-IV	40 Ft. (A)	6 Ft.
9	179+90	41' Lt.	200	B1	MSC-IV	40 Ft. (A)	6 Ft.
10	181+28	39' Rt.	200	A1	MSC-IV	40 Ft. (A)	6 Ft.
11	182+62.5	48' Lt.	200	B1	MSC-IV	40 Ft. (A)	6 Ft.
12	183+93	46' Rt.	200	A1	MSC-IV	40 Ft. (A)	6 Ft.

(A) Festoon

LIGHTING QUANTITIES
Sta. 178+00 to 184+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	178



RELOCATE LIGHT STANDARD		
From	To	
Sta. 188+84-119' Rt.	Sta. 188+85-150' Rt.	1 Ea.

REMOVE LIGHT STANDARD	
Sta. 184+08-49' Rt.	1 Ea.
Sta. 185+68-49' Rt.	1 Ea.
Sta. 186+44-36' Lt.	1 Ea.
Sta. 186+94-52' Rt.	1 Ea.
Sta. 187+93-125' Rt.	1 Ea.
Sta. 189+36-36.5' Lt.	1 Ea.
Total	6 Ea.

Note: All Stationing From Survey Line

LIGHTING LAYOUT
 Sta. 184+00 to 190+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
172+00-34' Rt. to				237'	(3) No. 4 RHW
172+70-34' Rt. to	70'	2"		79'	(1) No. 6 THW
172+70-39' Rt.	4'	2"			
172+70-39' Rt. to				936'	(3) No. 4 RHW
172+70-34' Rt. to	4'	2"		312'	(1) No. 6 THW
175+64-34' Rt. to	294'	2"			
175+64-39' Rt.	4'	2"			
175+64-39' Rt. to				735'	(3) No. 4 RHW
175+64-34' Rt. to	4'	2"		245'	(1) No. 6 THW
178+00-34' Rt.	236'	2"			
172+00-38' Lt. to				675'	(3) No. 4 RHW
174+15-38' Lt. to	215'	2"		225'	(1) No. 6 THW
174+15-44' Lt.	5'	2"			
174+15-44' Lt. to				954'	(3) No. 4 RHW
174+15-38' Lt. to	5'	2"		318'	(1) No. 6 THW
177+13-38' Lt. to	298'	2"			
177+13-44' Lt.	5'	2"			
177+13-44' Lt. to				291'	(3) No. 4 RHW
177+13-38' Lt. to	5'	2"		97'	(1) No. 6 THW
178+00-38' Lt.	87'	2"			

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - 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	1236	2552	1276	4	4	7				

City Funds

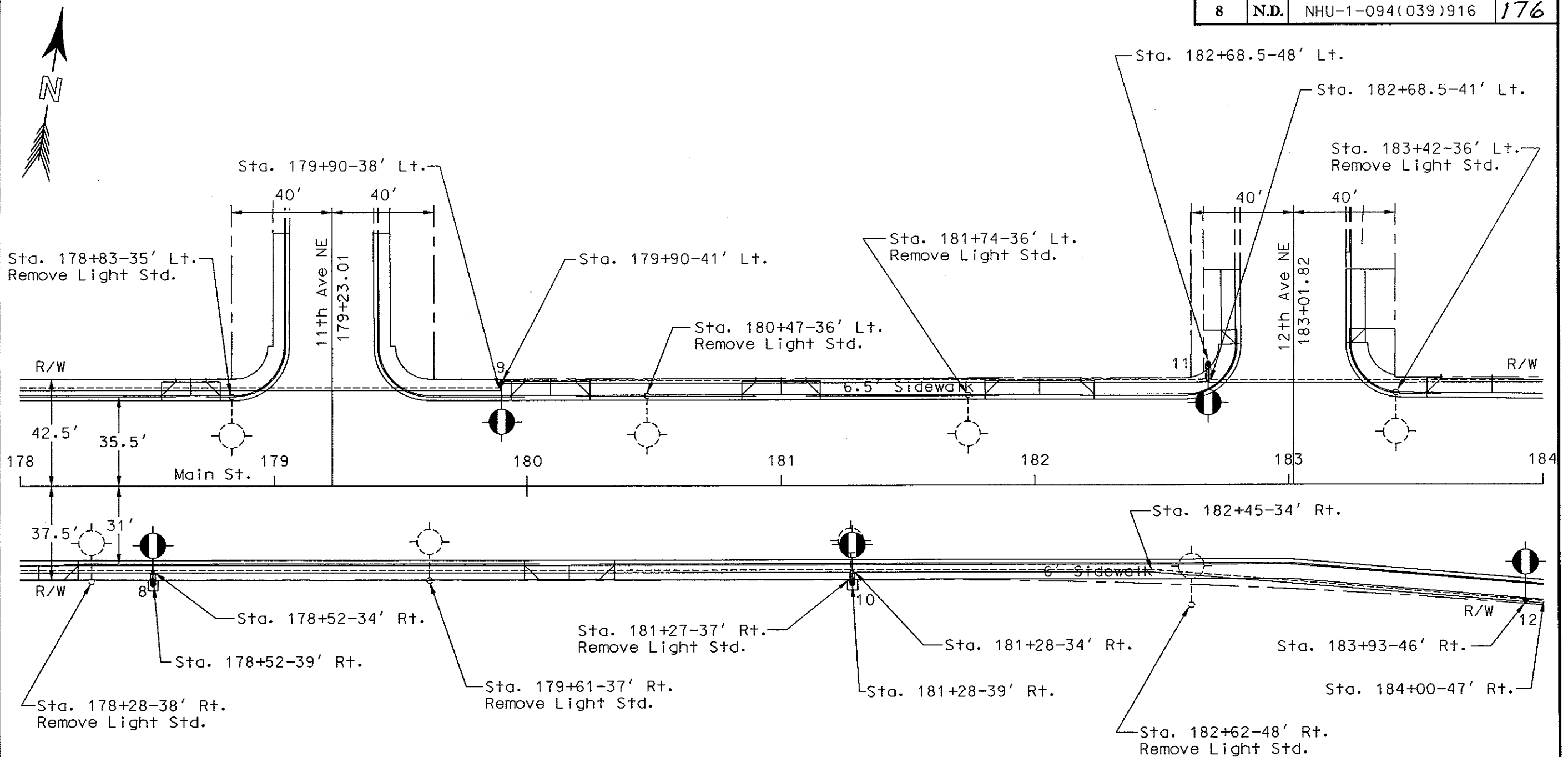
		1276
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NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
4	172+70	39' Rt.	200	A1	MSC-IV	40 Ft. (A)	6 Ft.
5	174+15	44' Lt.	200	B1	MSC-IV	40 Ft. (A)	6 Ft.
6	175+64	39' Rt.	200	A1	MSC-IV	40 Ft. (A)	6 Ft.
7	177+13	44' Lt.	200	B1	MSC-IV	40 Ft. (A)	6 Ft.

(A) Festoon

LIGHTING QUANTITIES
Sta. 172+00 to 178+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	176



REMOVE LIGHT STANDARD	
Sta. 178+28-38' Rt.	1 Ea.
Sta. 178+83-35' Lt.	1 Ea.
Sta. 179+61-37' Rt.	1 Ea.
Sta. 180+47-36' Lt.	1 Ea.
Sta. 181+27-37' Rt.	1 Ea.
Sta. 181+74-36' Lt.	1 Ea.
Sta. 182+62-48' Rt.	1 Ea.
Sta. 183+42-36' Lt.	1 Ea.
Total	8 Ea.

LIGHTING LAYOUT
 Sta. 178+00 to 184+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
184+00-47' Rt. to 185+63-51' Rt.	162'	2"		501' 167'	(3) No. 2 RHW (1) No. 6 THW
185+63-51' Rt. to 187+23-56' Rt.	158'	2"		504' 168'	(3) No. 2 RHW (1) No. 6 THW
187+23-56' Rt. to 187+40-56' Rt. to 187+93-46' Rt.	16' 53'	2" 2"		158' 79'	(2) No. 6 RHW (1) No. 6 THW
187+23-56' Rt. to 187+40-56' Rt. to 187+95-157' Rt. to 188+85-150' Rt.	16' 115' 89'	2" 2" 2"		690' 230'	(3) No. 2 RHW (1) No. 6 THW
188+85-150' Rt. to 189+23-73' Rt.	84'	2"		300' 100'	(3) No. 2 RHW (1) No. 6 THW
189+23-73' Rt. to 190+00-48' Rt.			80'	91'	3 - No. 6 USE
189+23-48' Rt. to 190+00-48' Rt.			76'	81'	3 - No. 6 USE
184+00-41' Lt. to 184+82-41' Lt.	81'	2"		258' 86'	(3) No. 2 RHW (1) No. 6 THW
184+82-41' Lt. to 186+44-41' Lt. to 186+44-44' Lt.	161' 2'	2" 2"		519' 173'	(3) No. 2 RHW (1) No. 6 THW
186+44-44' Lt. to 186+44-41' Lt. to 187+95-41' Lt. to 187+95-44' Lt.	2' 151' 2'	2" 2" 2"		330' 165'	(2) No. 6 RHW (1) No. 6 THW
186+44-44' Lt. to 186+44-41' Lt. to 188+10-41' Lt. to 188+10-75' Lt.	2' 166' 33'	2" 2" 2"		651' 217'	(3) No. 2 RHW (1) No. 6 THW
188+10-75' Lt. to 188+10-41' Lt. to 189+50-41.5' Lt. to 189+98-41.5' Lt.	33' 140' 47'	2" 2" 2"		472' 236'	(2) No. 6 RHW (1) No. 6 THW
188+79.5-39' Lt. to 189+50-41.5' Lt. to 189+98-41.5' Lt.	70' 47'	2" 2"		254' 127'	(2) No. 6 RHW (1) No. 6 THW
189+98-41.5' Lt. to 190+00-41.5' Lt.			1'	6'	3 - No. 6 USE
188+54-168' Lt. to 188+10-75' Lt.	137' (H)	2"		456'	(3) No. 8 RHW

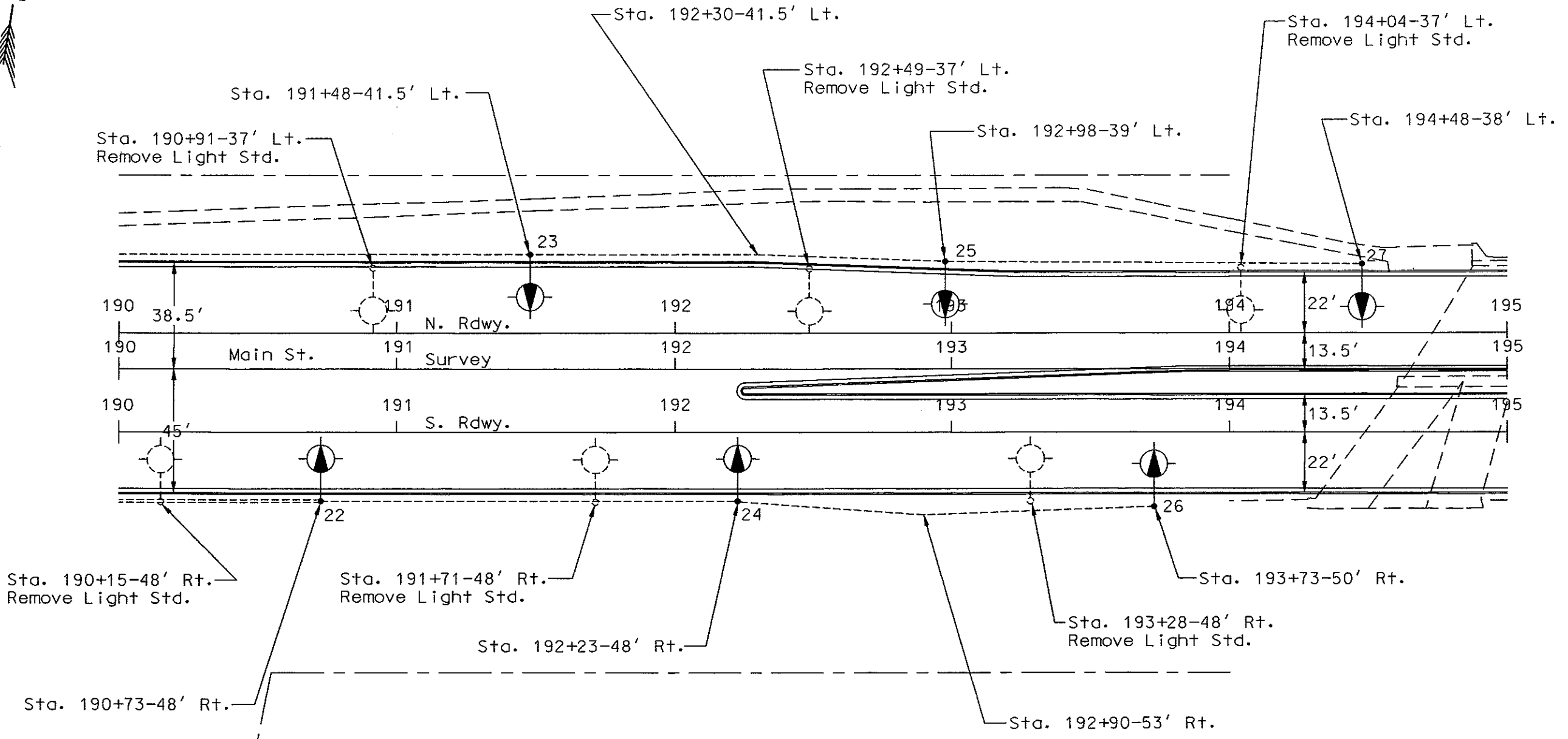
QUANTITIES																	
Concrete Foundation - Highway Lighting	Concrete Foundation - Feed Point - Type B	Cable Trench - Type II	2" Dia. Rigid Conduit	Underground Conductor No. 2 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 8 - Type RHW	Underground Conductor No. 6 - Type THW	Multiple Underground Cable 3-No. 6 Style USE	Feed Point - Type I - Pad Mounted	Light Standard 6 Foot M.A. 40 Foot Mounting Height	Light Standard 6 Foot M.A. 40 Foot Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire 100 watt	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 Light Standard
EA	EA	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA
6	1	157	1767	2282	1214	456	1748	178	1	1	4	.1	4	2	2	1	6
City Funds				1141													

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
13	184+82	41' Lt.	150	B1	MSC-II	40 Ft. (A)	6 Ft.
14	185+63	51' Rt.	150	A1	MSC-II	40 Ft. (A)	6 Ft.
15	186+44	44' Lt.	150	B1	MSC-II	40 Ft. (A)	6 Ft.
16	187+23	56' Rt.	150	A1	MSC-II	40 Ft. (A)	6 Ft.
C17	187+93	46' Rt.	250	A1	MSC-III	Combo	6 Ft.
C18	187+95	44' Lt.	200	B1	MSC-IV	Combo	6 Ft.
C19	188+79.5	39' Lt.	250	B1	MSC-III	Combo	6 Ft.
C20	189+23	48' Rt.	200	A1	MSC-IV	Combo	6 Ft.
21	189+98	41.5' Lt.	100	B1	MSC-II	40 Ft.	6 Ft.

(A) Festoon

(H) 35' of this length is pole mounted conduit.

LIGHTING QUANTITIES
Sta. 184+00 to 190+00
Main St.
Mandan, ND



REMOVE LIGHT STANDARD	
Sta. 190+15-48' Rt.	1 Ea.
Sta. 190+91-37' Lt.	1 Ea.
Sta. 191+71-48' Rt.	1 Ea.
Sta. 192+49-37' Lt.	1 Ea.
Sta. 193+28-48' Rt.	1 Ea.
Sta. 194+04-37' Lt.	1 Ea.
Total	6 Ea.

Note: All Stationing From Survey Line

LIGHTING LAYOUT
 Sta. 190+00 to 195+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
190+00-48' Rt. to 190+73-48' Rt.			72'	154'	(2) 3 - No. 6 USE
190+73-48' Rt. to 192+23-48' Rt.			148'	158'	3 - No. 6 USE
192+23-48' Rt. to 192+90-53' Rt. to 193+73-50' Rt.			66' 82'	158'	3 - No. 6 USE
190+00-41.5' Lt. to 191+48-41.5' Lt.			147'	152'	3 - No. 6 USE
191+48-41.5' Lt. to 192+30-41.5' Lt. to 192+98-39' Lt.			81' 67'	158'	3 - No. 6 USE
192+98-39' Lt. to 194+48-38' Lt.			148'	158'	3 - No. 6 USE

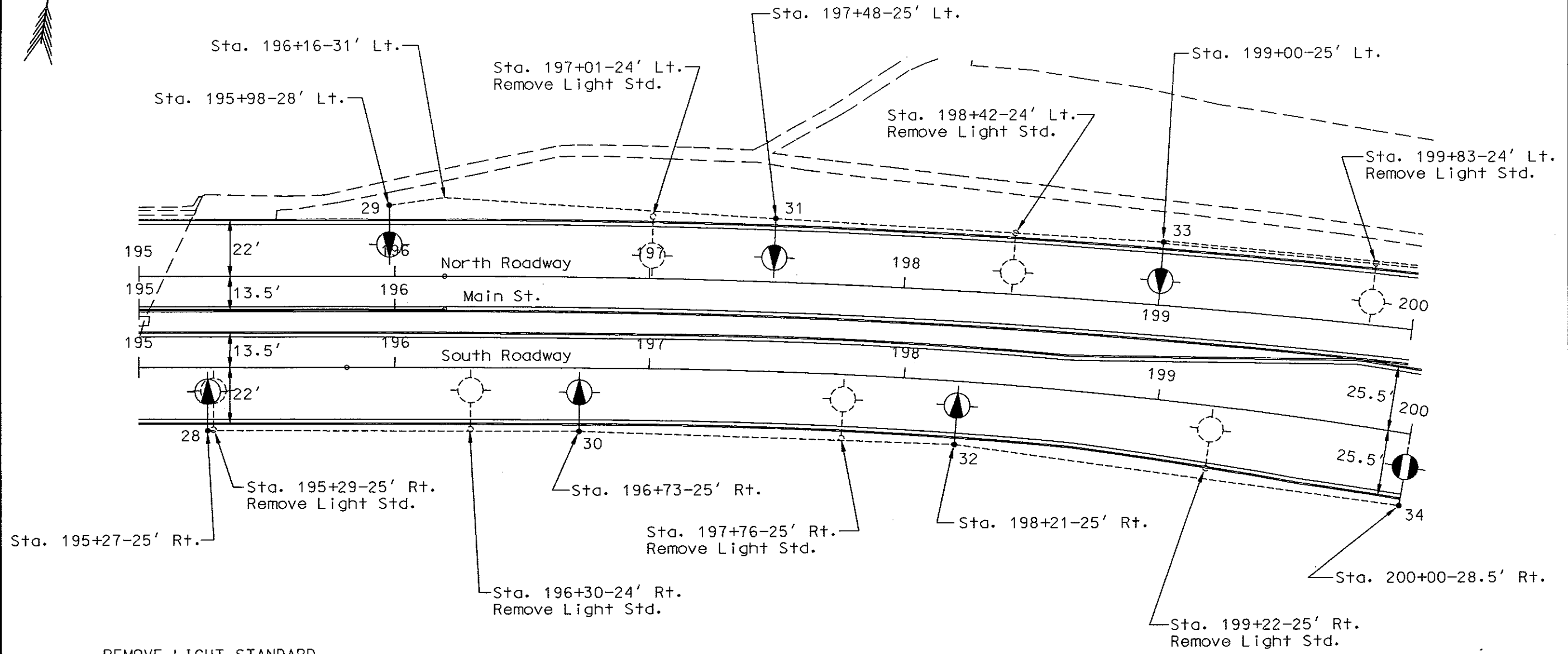
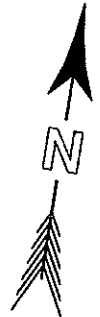
QUANTITIES										
Concrete Foundation - Highway Lighting										
Cable Trench - Type II										
Multiple Underground Cable 3 - No. 6 Style USE										
Light Standard 6 Foot M.A. 40 Ft. Mounting Height										
Light Standard 6 Foot M.A. 40 Ft. M.H. - Breakaway										
H.P. Sodium Vapor Luminaire 100 Watt										
Remove Light Standard										
EA	LF	LF	EA	EA	EA	EA				
6	811	938	2	4	6	6				

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
22	190+73	48' Rt.	100	A1	MSC-II	40 Ft. (B)	6 Ft.
23	191+48	41.5' Lt.	100	B1	MSC-II	40 Ft. (B)	6 Ft.
24	192+23	48' Rt.	100	A1	MSC-II	40 Ft. (B)	6 Ft.
25	192+98	39' Lt.	100	B1	MSC-II	40 Ft. (B)	6 Ft.
26	193+73	50' Rt.	100	A1	MSC-II	40 Ft.	6 Ft.
27	194+48	38' Lt.	100	B1	MSC-II	40 Ft.	6 Ft.

(B) Breakaway Light Std.

LIGHTING QUANTITIES
Sta. 190+00 to 195+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	182



REMOVE LIGHT STANDARD	
Sta. 195+29-25' Rt.	1 Ea.
Sta. 196+30-24' Rt.	1 Ea.
Sta. 197+01-24' Lt.	1 Ea.
Sta. 197+76-25' Rt.	1 Ea.
Sta. 198+42-24' Lt.	1 Ea.
Sta. 199+22-25' Rt.	1 Ea.
Sta. 199+83-24' Lt.	1 Ea.
Total	7 Ea.

LIGHTING LAYOUT
 Sta. 195+00 to 200+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
195+27-25' Rt. to 196+73-25' Rt.			144'	154'	3 - No. 6 USE
196+73-25' Rt. to 198+21-25' Rt.			146'	156'	3 - No. 6 USE
198+21-25' Rt. to 200+00-28.5' Rt.			177'	187'	3 - No. 6 USE
195+98-28' Lt. to 196+16-31' Lt. to 197+48-25' Lt.			17' 131'	158'	3 - No. 6 USE
197+48-25' Lt. to 199+00-25' Lt.			150'	160'	3 - No. 6 USE
199+00-25' Lt. to 200+00-25' Lt.			99'	208'	(2) 3 - No. 6 USE

QUANTITIES										
Concrete Foundation - Highway Lighting	Cable Trench - Type II	Multiple Underground Cable 3 - No. 6 Style USE	Light Standard 6 Foot M.A. 40 Ft. Mounting Height	Light Standard 6 Foot M.A. 40 Ft. M.H. - Breakaway	H.P. Sodium Vapor Luminaire 100 Watt	H.P. Sodium Vapor Luminaire 200 Watt	Remove Light Standard			
EA	LF	LF	EA	EA	EA	EA	EA			
7	864	1023	1	6	6	1	7			

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
28	195+27	25' Rt.	100	C1	MSC-II	40 Ft.(B)	6 Ft.
29	195+98	28' Lt.	100	C1	MSC-II	40 Ft.	6 Ft.
30	196+73	25' Rt.	100	C1	MSC-II	40 Ft.(B)	6 Ft.
31	197+48	25' Lt.	100	C1	MSC-II	40 Ft.(B)	6 Ft.
32	198+21	25' Rt.	100	C1	MSC-II	40 Ft.(B)	6 Ft.
33	199+00	25' Lt.	100	C1	MSC-II	40 Ft.(B)	6 Ft.
34	200+00	28.5' Rt.	200	C1	MSC-III	40 Ft.(B)	6 Ft.

(B) Breakaway Light Std.

LIGHTING QUANTITIES
Sta. 195+00 to 200+00
Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	184

RELOCATE LIGHT STANDARD

From	To	Quantity
Sta. 203+10-29' Lt.	Sta. 203+05-28.5' Lt.	1 Ea.
Sta. 203+23-28.5' Rt.	Sta. 204+00-28.5' Rt.	1 Ea.
Total		2 Ea.

REMOVE LIGHT STANDARD

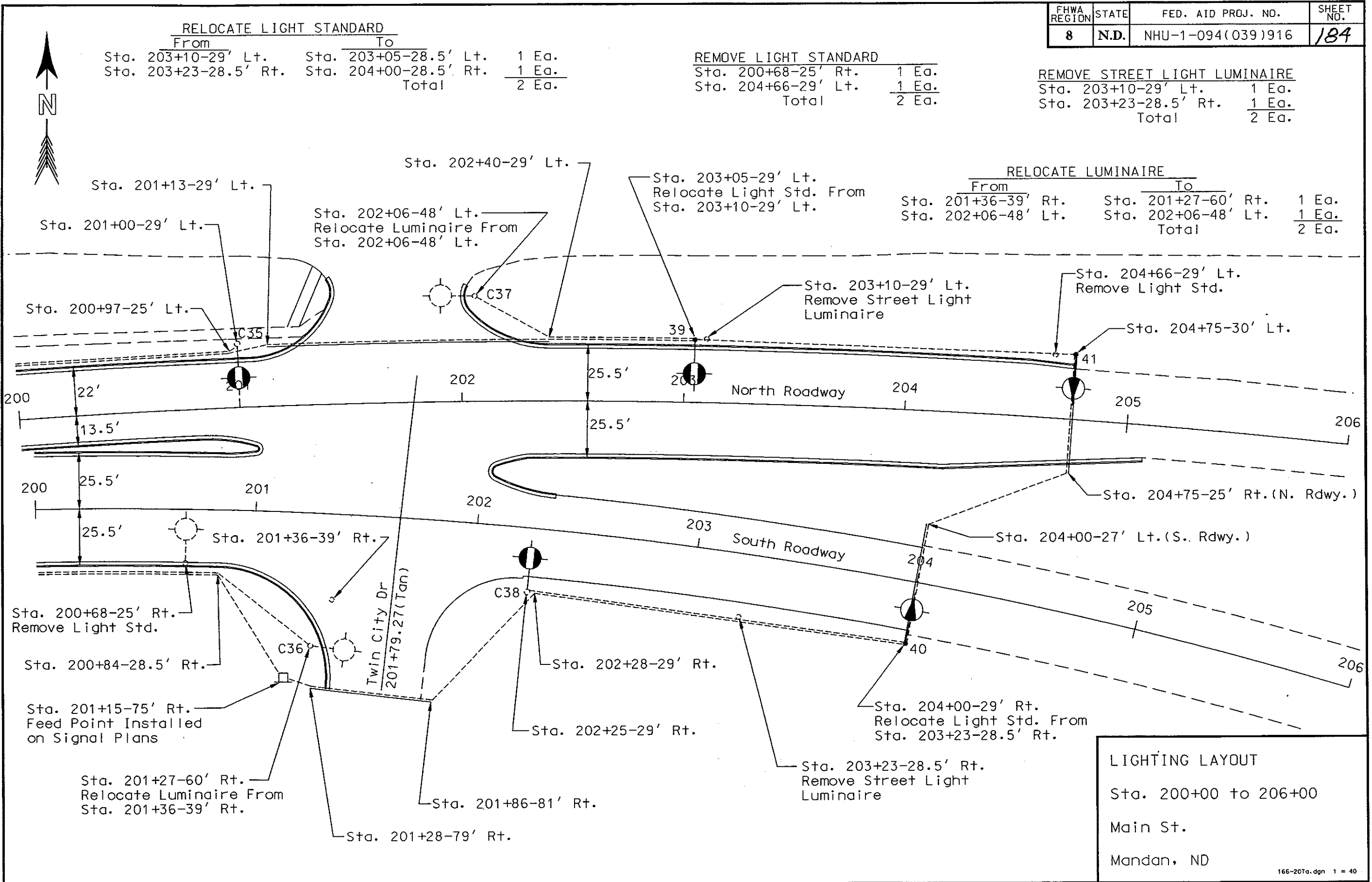
Sta. 200+68-25' Rt.	1 Ea.
Sta. 204+66-29' Lt.	1 Ea.
Total	2 Ea.

REMOVE STREET LIGHT LUMINAIRE

Sta. 203+10-29' Lt.	1 Ea.
Sta. 203+23-28.5' Rt.	1 Ea.
Total	2 Ea.

RELOCATE LUMINAIRE

From	To	Quantity
Sta. 201+36-39' Rt.	Sta. 201+27-60' Rt.	1 Ea.
Sta. 202+06-48' Lt.	Sta. 202+06-48' Lt.	1 Ea.
Total		2 Ea.



LIGHTING LAYOUT
 Sta. 200+00 to 206+00
 Main St.
 Mandan, ND

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
200+00-28.5' Rt. to 200+84-28.5' Rt. to 201+27-60' Rt.			83' 52'	145'	3 - No. 6 USE
200+00-28.5' Rt. to 200+84-28.5' Rt. to 201+15-75' Rt.			55'	154'	3 - No. 6 USE
201+15-75' Rt. to 201+28-79' Rt. to 201+86-81' Rt. to 202+28-29' Rt. to 204+00-29' Rt.	58'	2"	13' 67' 171'	325'	3 - No. 6 USE
202+25-29' Rt. to 202+28-29' Rt. to 204+00-29' Rt.			2'	183'	3 - No. 6 USE
204+00-29' Rt. to 204+00-27' Lt. to (E) 204+75-25' Rt. to (F) 204+75-30' Lt.	55' 54'	2" 2"	67'	186'	3 - No. 6 USE
200+00-25' Lt. to 200+97-25' Lt. to 201+00-29' Lt.			97' 4'	106'	3 - No. 6 USE
200+00-25' Lt. to 200+97-25' Lt. to 201+13-29' Lt. to 202+40-29' Lt. to 203+05-29' Lt.	127'	2"	16' 64'	309'	3 - No. 6 USE
202+06-48' Lt. to 202+40-29' Lt. to 203+05-29' Lt.			38'	112'	3 - No. 6 USE
203+05-29' Lt. to 204+75-30' Lt.			168'	178'	3 - No. 6 USE

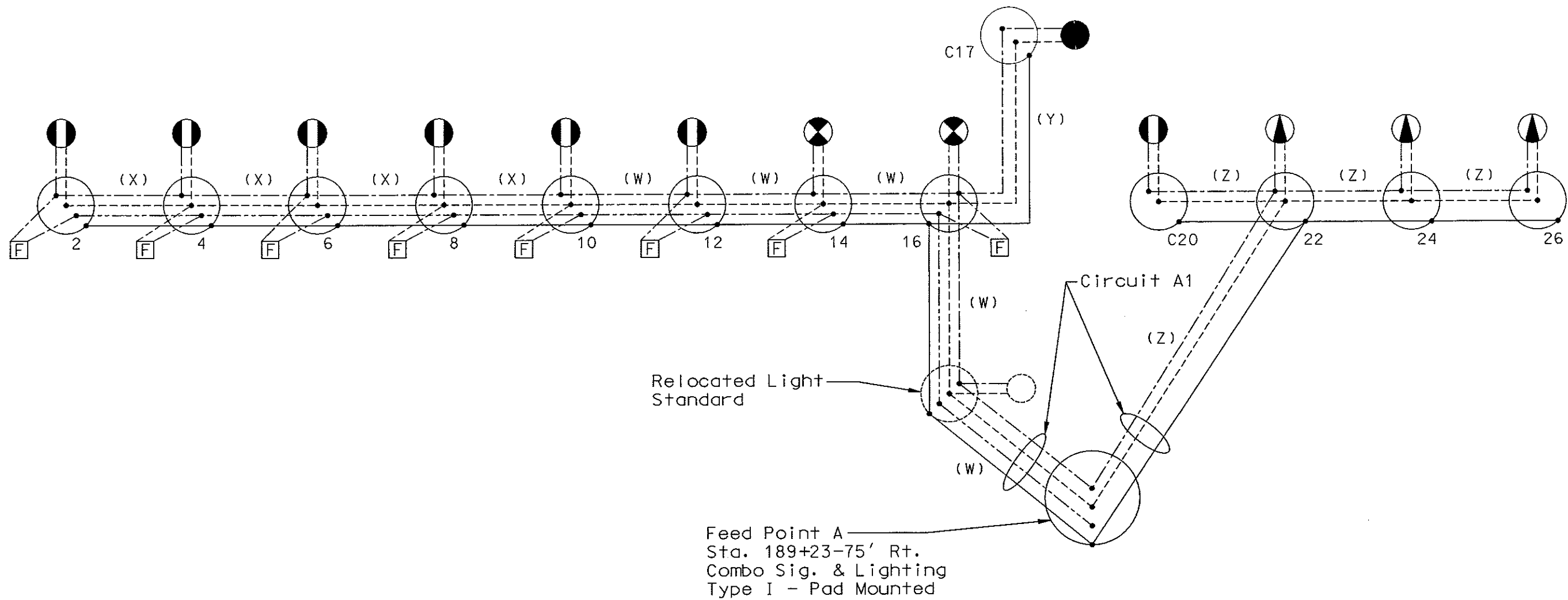
QUANTITIES											
Concrete Foundation - Highway Lighting	Cable Trench - Type II	2" Dia. Rigid Conduit	Multiple Underground Cable 3-No. 6 Style USE	Light Standard 6 Foot M.A. 40 Ft. M.H. - Breakaway	H.P. Sodium Vapor Luminaire 100 Watt	H.P. Sodium Vapor Luminaire 200 Watt	Relocate Light Standard	Relocate Luminaire	Remove Light Standard	Remove Street Light Luminaire	
EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	
3	897	294	1698	1	2	3	2	2	2	2	

(E) South Roadway Stationing
(F) North Roadway Stationing

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
C35	201+00	29' Lt.	200	C1	MSC-III	Combo	6 Ft.
C36	201+27	60' Rt.	(C)	C1	(C)	Combo	6 Ft.
C37	202+06	48' Lt.	(C)	C1	(C)	Combo	6 Ft.
C38	202+28	29' Rt.	200	C1	MSC-III	Combo	6 Ft.
39	203+05	29' Lt.	200	C1	MSC-III	40 Ft. (B)	6 Ft.
40	204+00	29' Rt.	100	C1	MSC-II	(D)	(D)
41	204+75	30' Lt.	100	C1	MSC-II	(D)	(D)

(B) Breakaway Light Std.
(C) Relocated Luminaire
(D) Relocated Breakaway Light Std.

LIGHTING QUANTITIES
Sta. 200+00 to 206+00
Main St.
Mandan, ND



LEGEND

----- Neutral Conductor
 ----- Phase Conductor
 ----- Phase Conductor
 ----- Ground Conductor

(W) (3) No. 2 RHW, (1) No. 6 THW
 (X) (3) No. 4 RHW, (1) No. 6 THW
 (Y) (2) No. 6 RHW, (1) No. 6 THW
 (Z) 3 - No. 6 USE

200 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

250 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

150 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

Light Standard

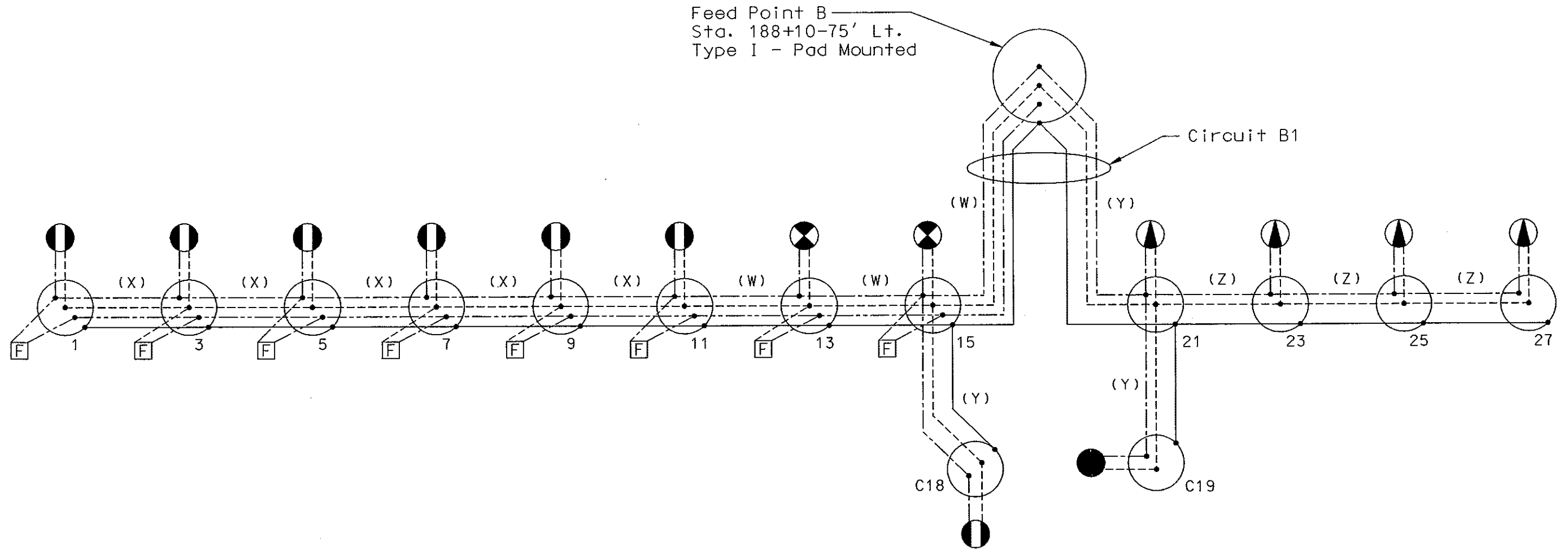
12 Light Standard Number

100 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

Festoon

LIGHTING SCHEMATIC

Feed Point A
 Sta. 189+50-75' Rt.
 Main St.
 Mandan, ND



LEGEND

----- Neutral Conductor
 - - - - - Phase Conductor
 - - - - - Phase Conductor
 _____ Ground Conductor

(W) (3) No. 2 RHW, (1) No. 6 THW
 (X) (3) No. 4 RHW, (1) No. 6 THW
 (Y) (2) No. 6 RHW, (1) No. 6 THW
 (Z) 3 - No. 6 USE

200 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

250 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

150 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

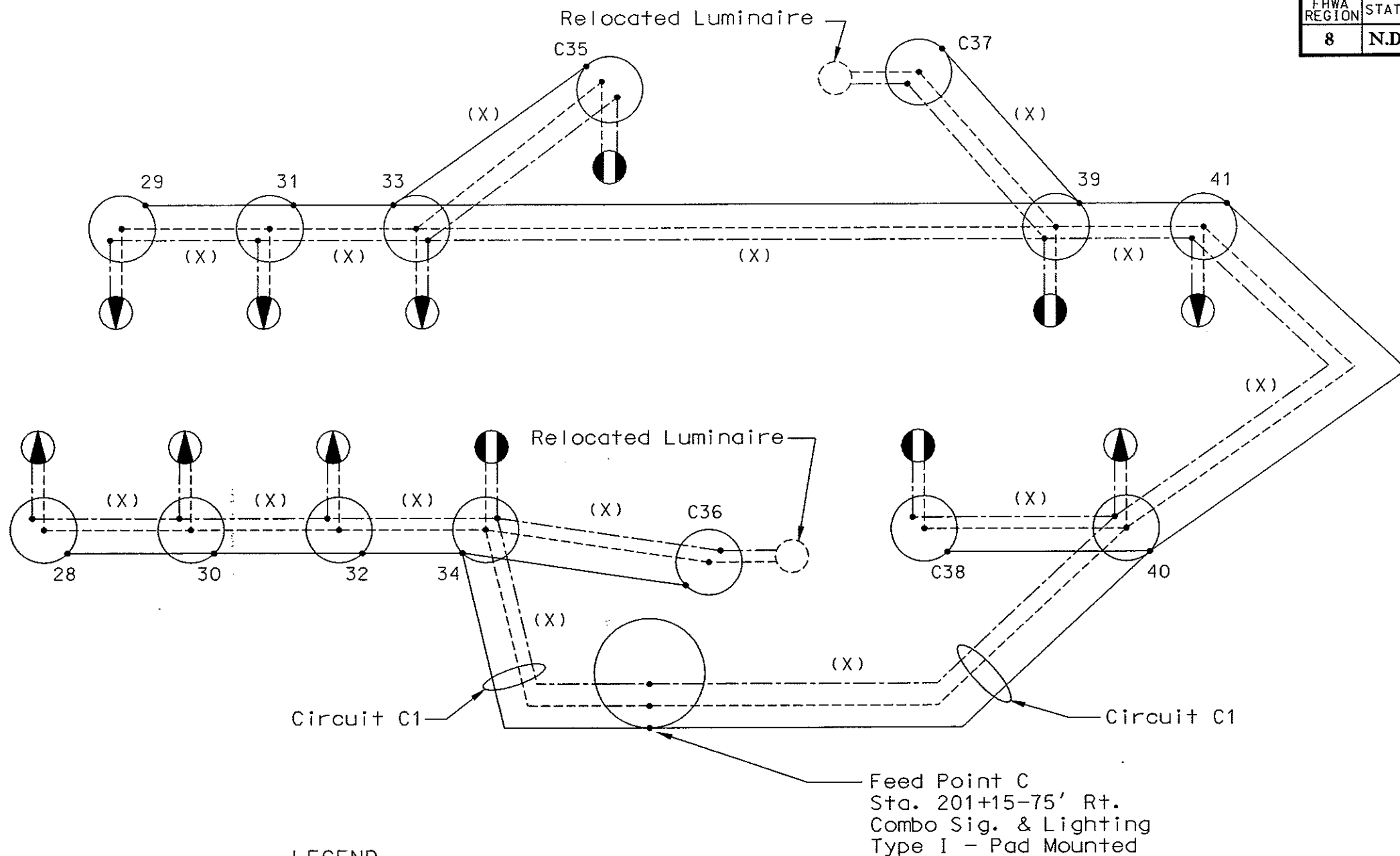
Light Standard

11 Light Standard Number

100 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

Festoon

LIGHTING SCHEMATIC
 Feed Point B
 Sta. 188+10-75' Lt.
 Main St.
 Mandan, ND



LEGEND

----- Phase Conductor
 - - - - - Phase Conductor
 _____ Ground Conductor

(X) 3 - No. 6 USE

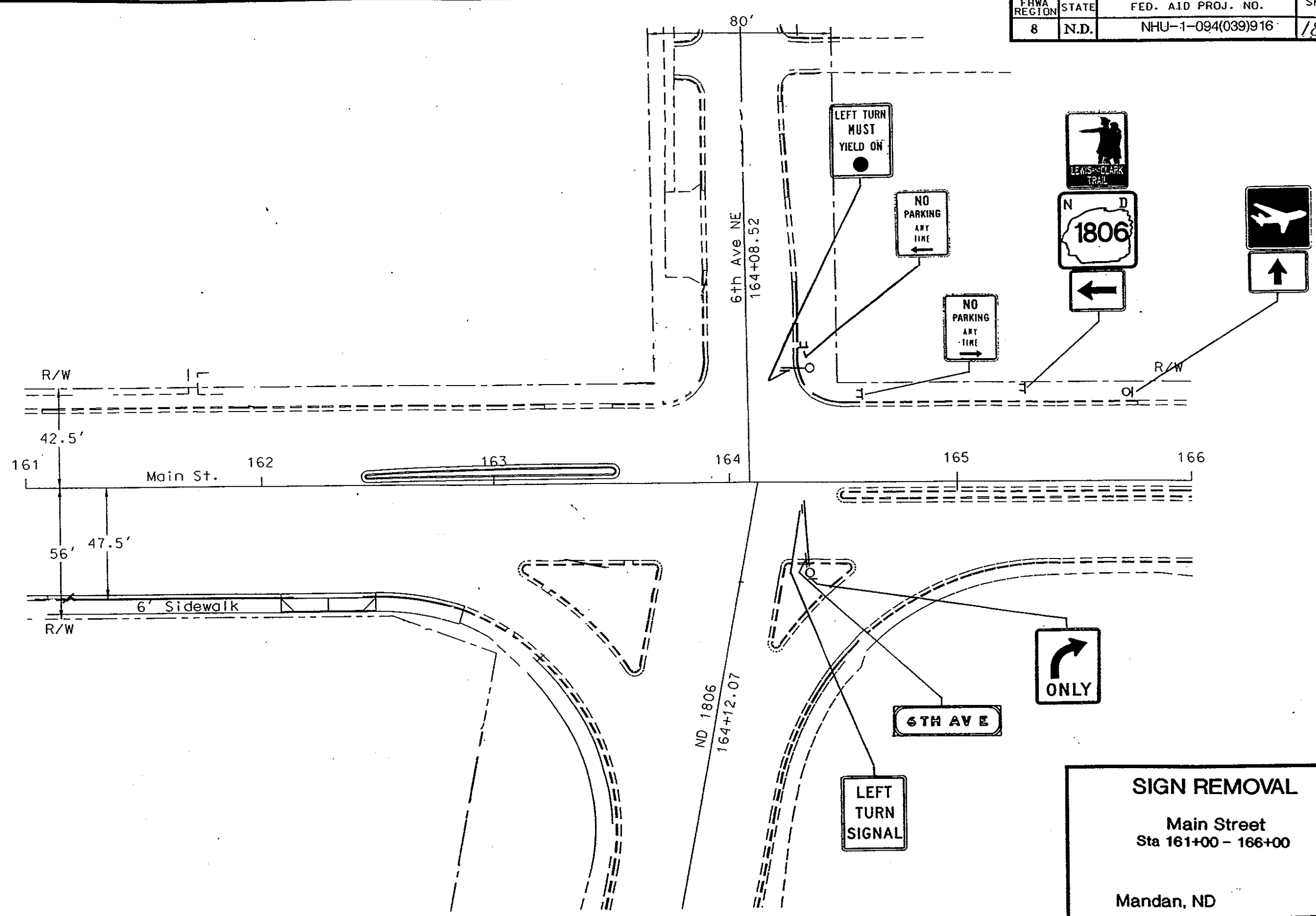
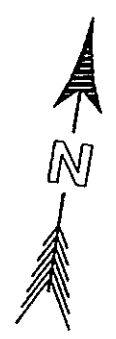
○ Light Standard
 34 Light Standard Number

▲ 100 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

◐ 200 Watt HP Sodium Vapor Luminaire
 120v x 240v operated on 240v

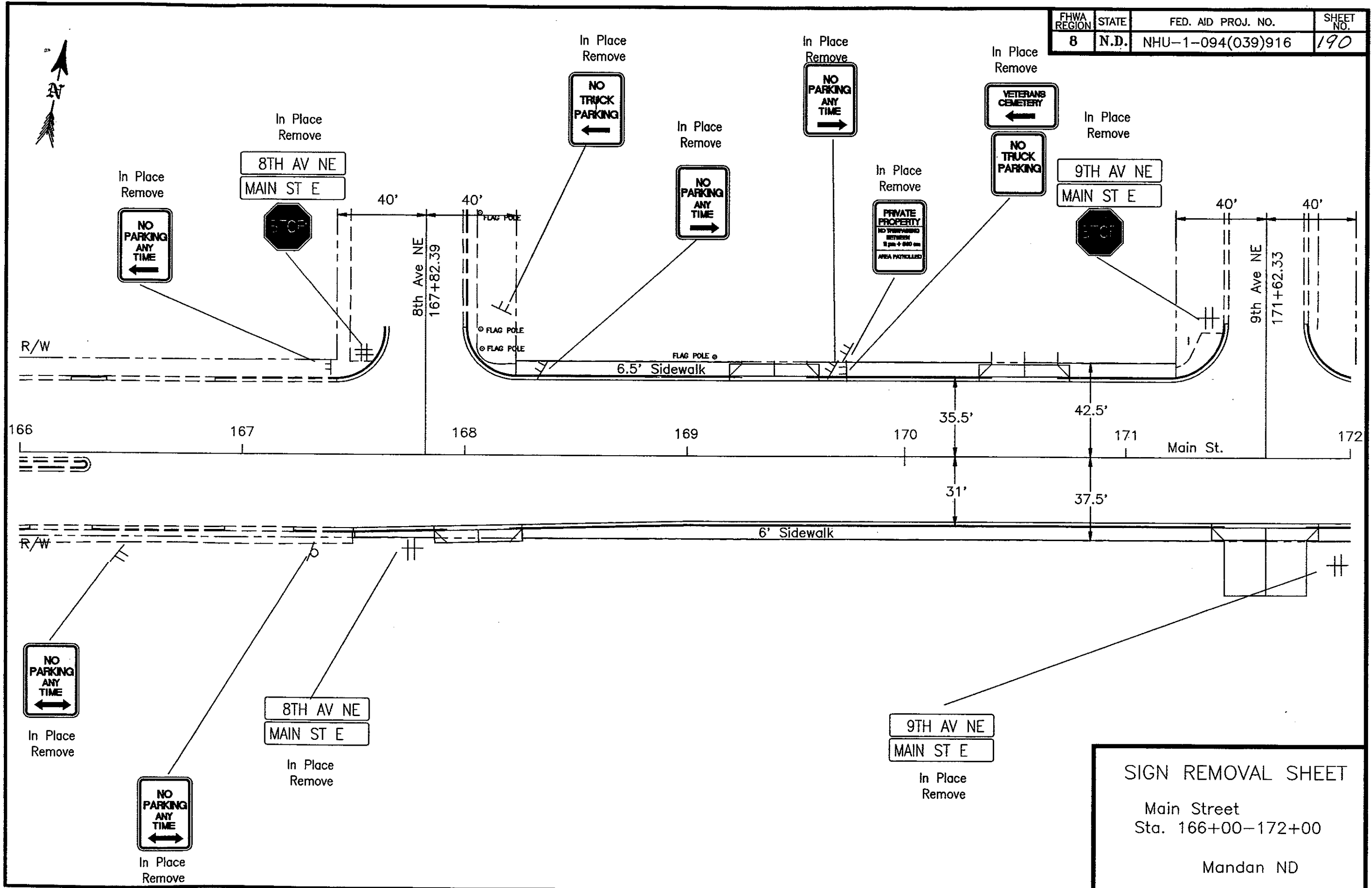
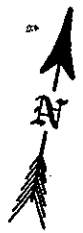
LIGHTING SCHEMATIC
 Feed Point C
 Sta. 201+15-75' Rt.
 Main St.
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	189



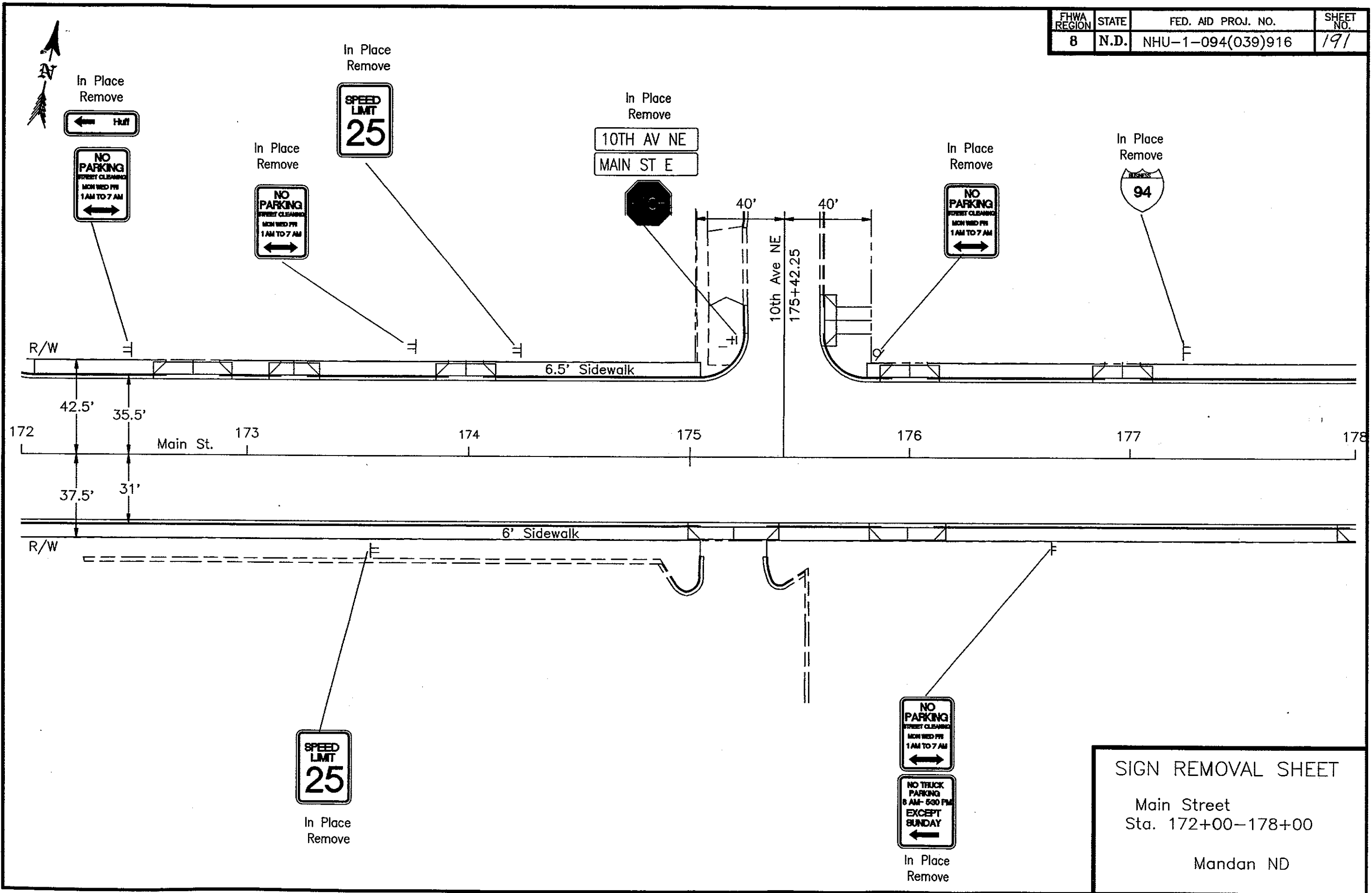
SIGN REMOVAL
 Main Street
 Sta 161+00 - 166+00
 Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	190



SIGN REMOVAL SHEET
 Main Street
 Sta. 166+00-172+00
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	191

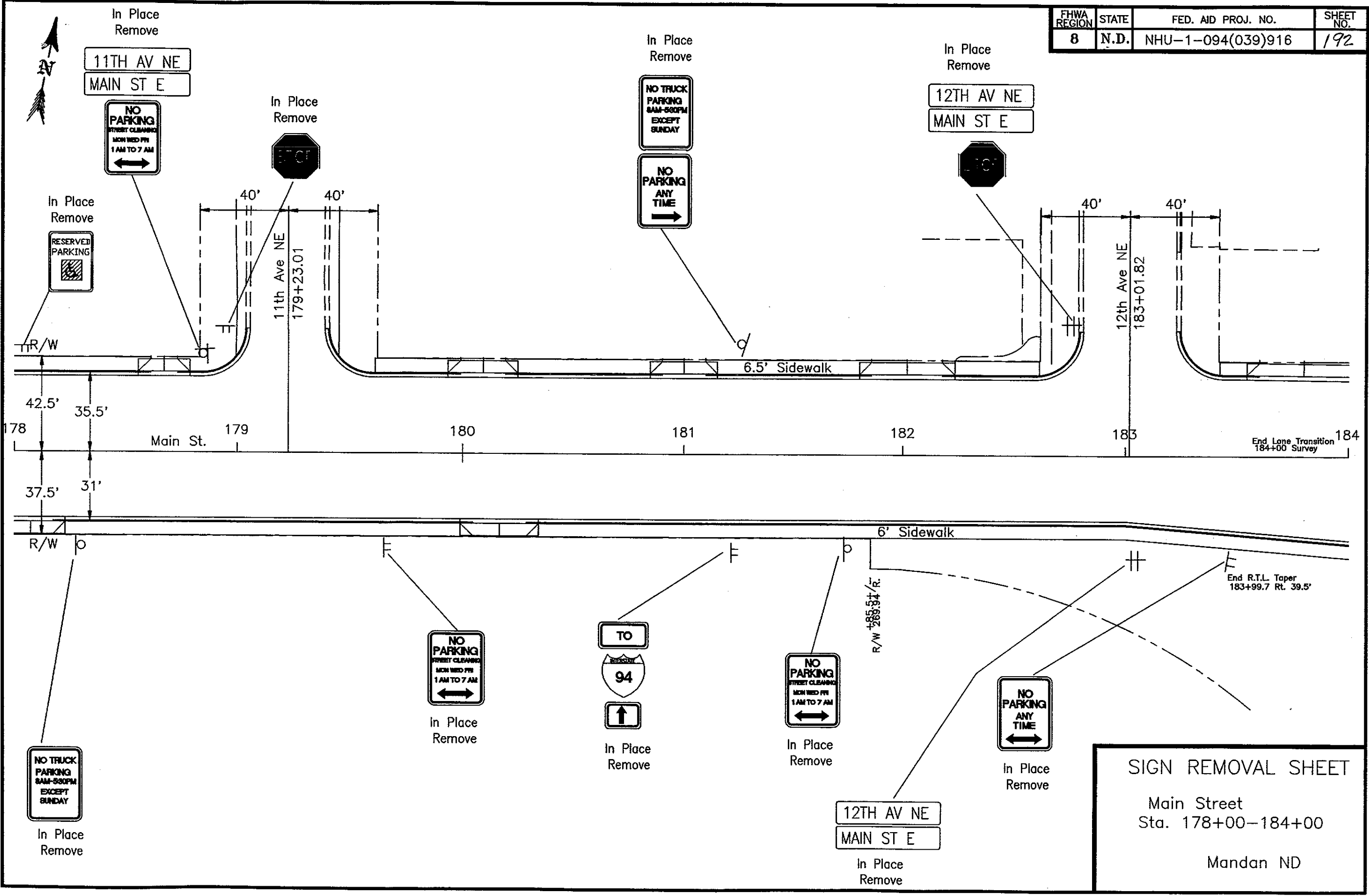


SIGN REMOVAL SHEET

Main Street
Sta. 172+00-178+00

Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	192

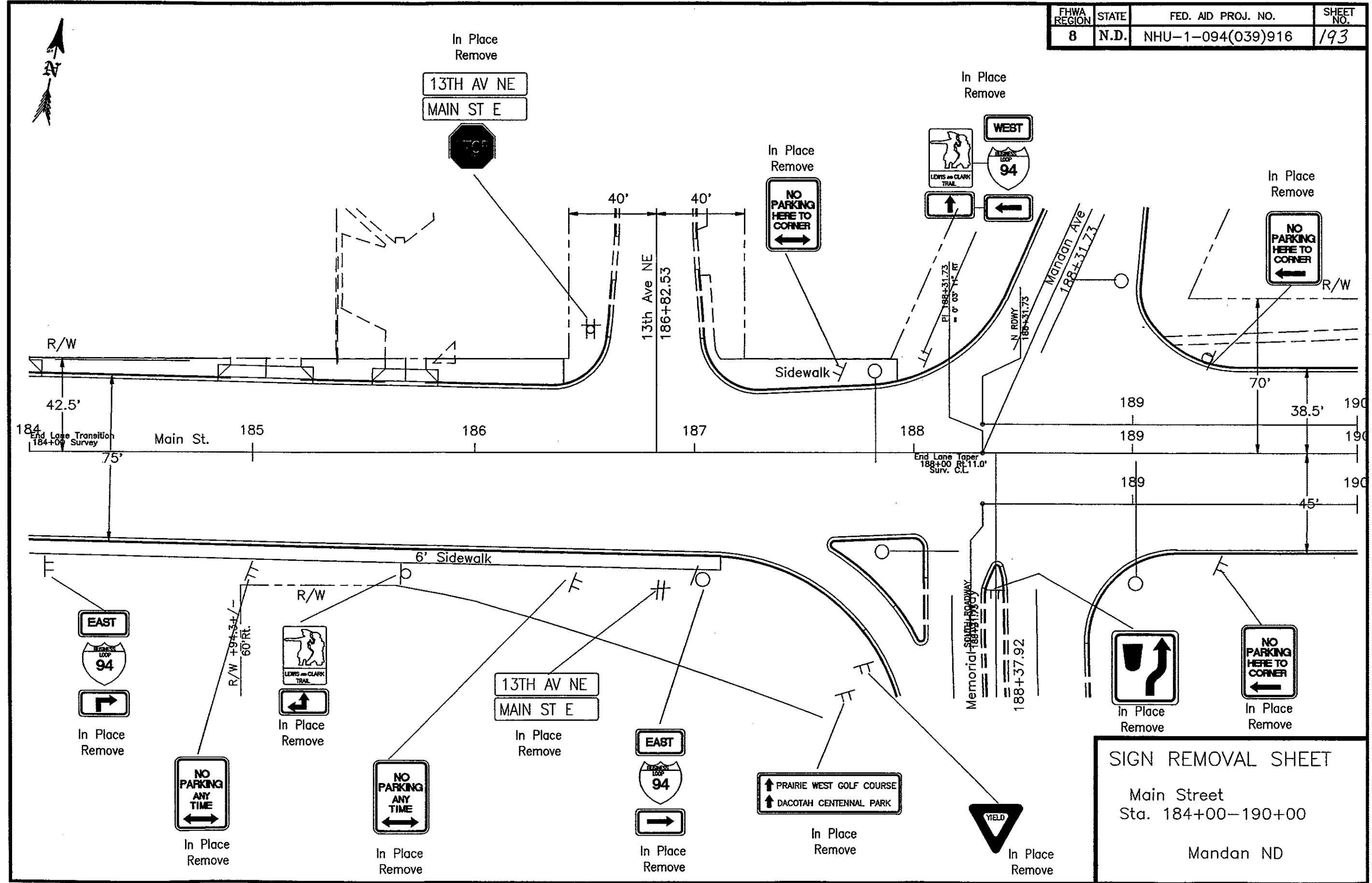


SIGN REMOVAL SHEET

Main Street
Sta. 178+00-184+00

Mandan ND

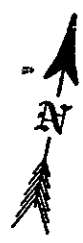
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	193



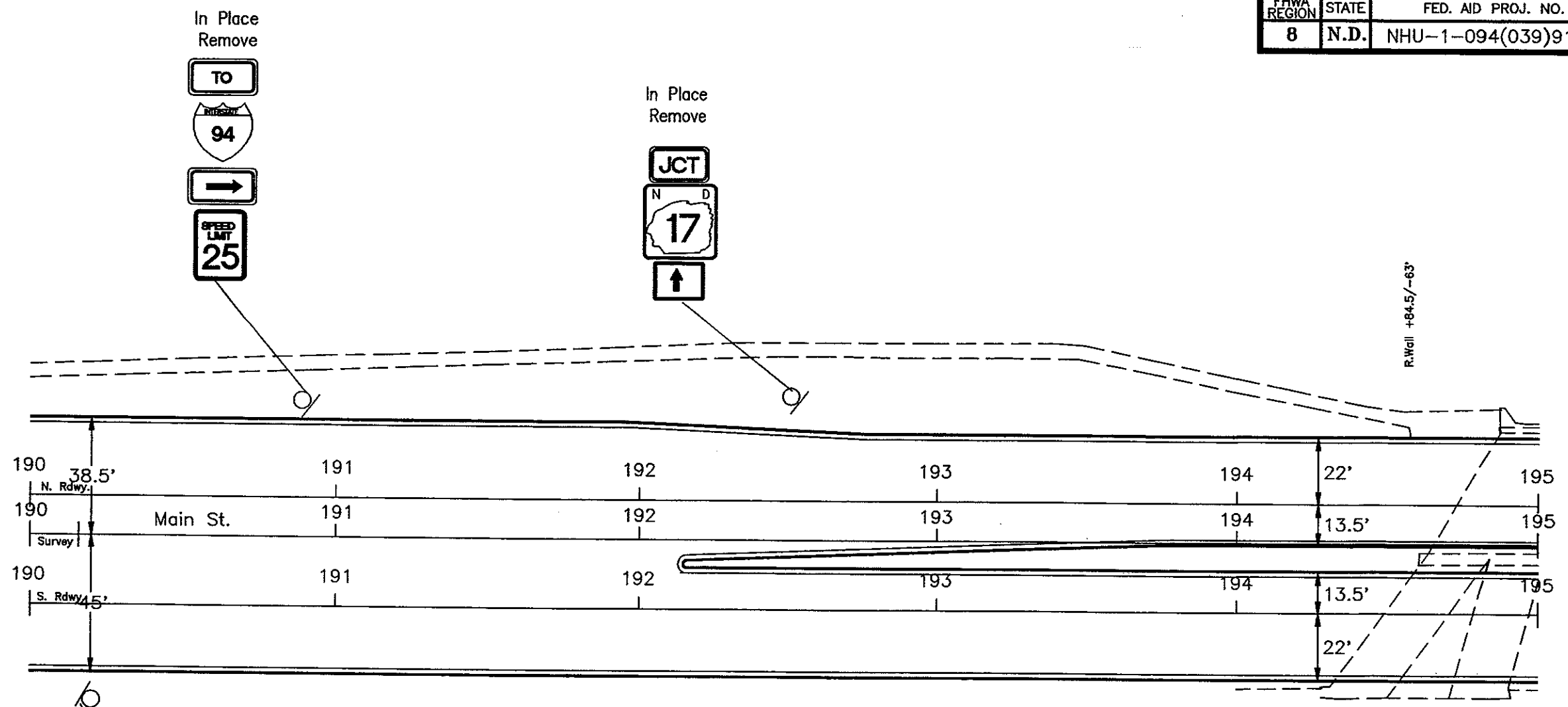
SIGN REMOVAL SHEET

Main Street
Sta. 184+00-190+00

Mandan ND



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	194



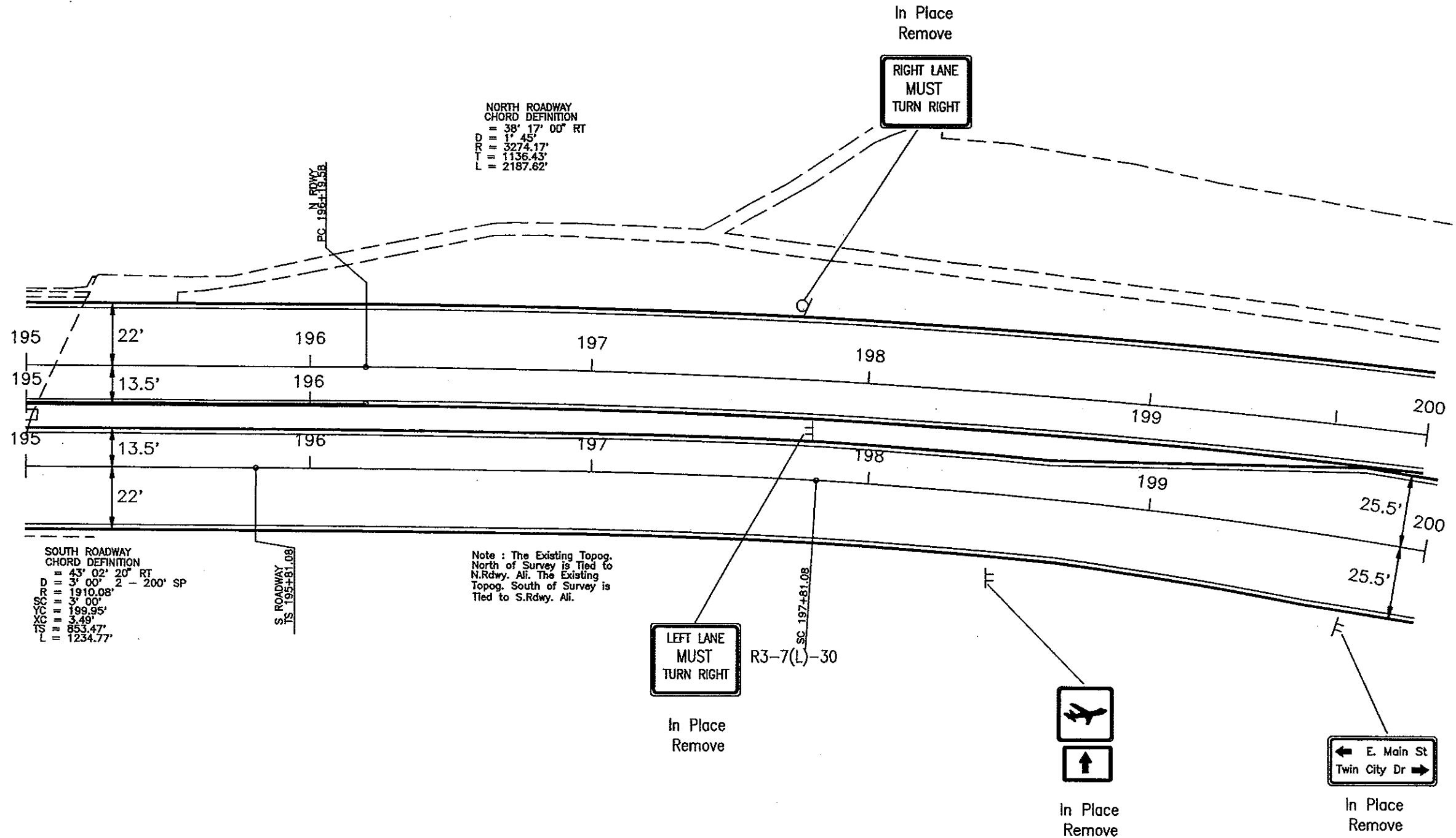
In Place
Remove

Note : The Existing Topog.North
of Survey is Tied to N.Rdwy.
The Existing Topog.South of
Survey is Tied to S.Rdwy.

SIGN REMOVAL SHEET

Main Street
Sta. 190+00-195+00

Mandan ND

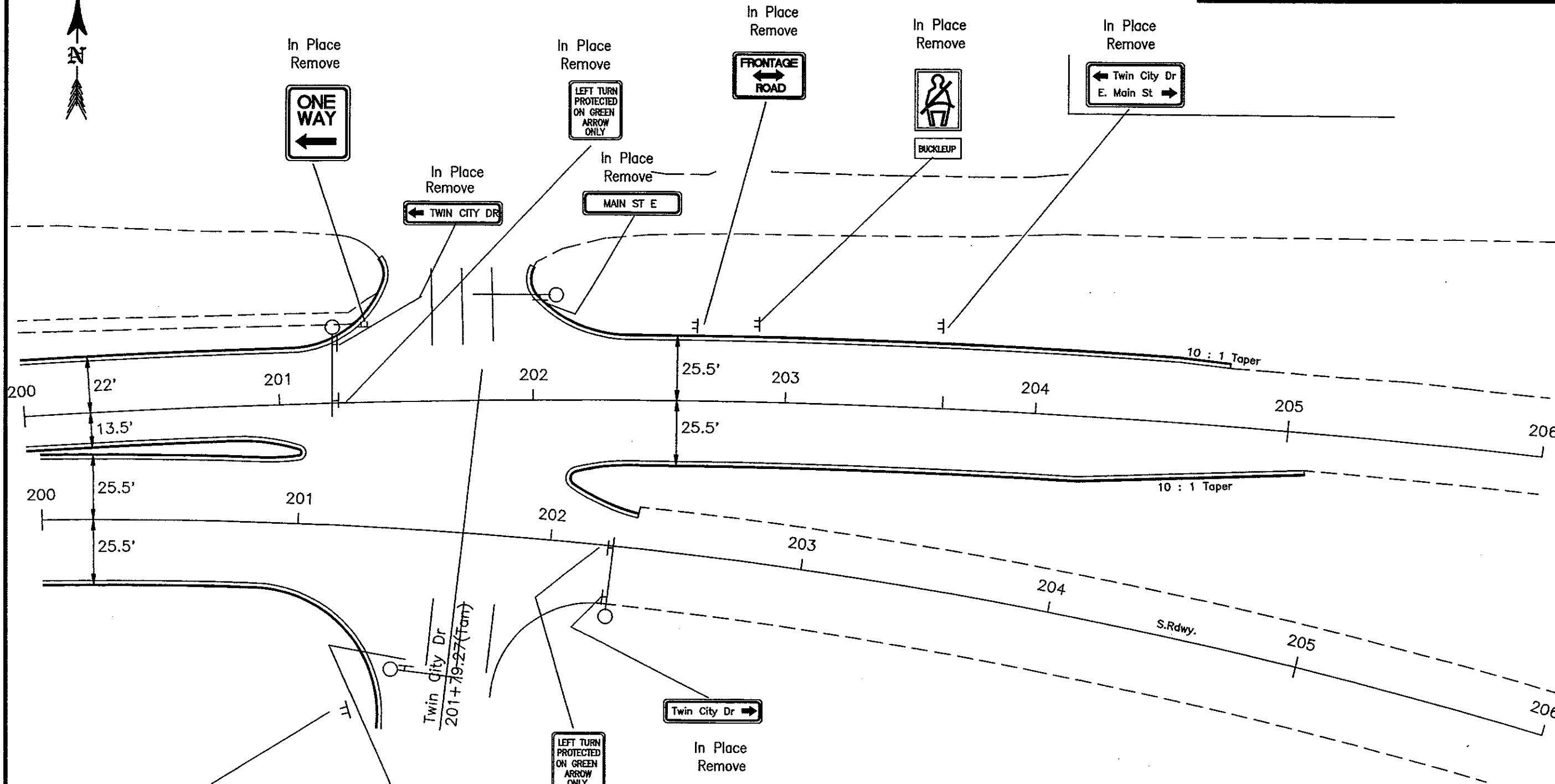


SIGN REMOVAL SHEET

Main Street
Sta. 195+00-200+00

Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	196



SIGN REMOVAL SHEET

Main Street
Sta. 200+00-206+00

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 SIZE	ANCHOR UNIT 1ST 2ND 3RD 4TH SIZE LNTH SIZE NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE- MAX. AK LNG. - FOR SUP. BASE SIZE			
				1ST	2ND	3RD	4TH								
164+33 LT	R10-12RS	14.00		MAST ARM MOUNTED											
164+37 RT	R10-10RS	9.00		MAST ARM MOUNTED											
164+37 RT	SIGN11GS	9.00		MAST ARM MOUNTED											
164+37 RT	R3-5 RS	7.50		MAST ARM MOUNTED											
164+36 LT	ASM 7 RS	1.50		8.8				2.00	4.0	2.25	1	32.23	16.0		
164+59 LT	ASM 7 RS	1.50		8.8				2.00	4.0	2.25	1	32.23	16.0		
165+27 LT	SA K RM	11.19		13.0	13.0			2.25	4.0	2.50	2	97.23	14.3		
165+75 LT	ASM 67GS	5.00		LIGHT STANDARD MOUNTED											
167+42 LT	ASM 9 RS	5.00		9.8				2.00	4.0	2.25	1	34.65	11.0		
167+28 RT	ASM 7 RS	1.50		LIGHT STANDARD MOUNTED											
167+54 LT	SNS 441	4.50		8.3				2.00	4.0	2.25	1	31.02	24.3		
167+58 LT	ASM 1 RS		5.18	9.8				2.00	4.0	2.25	1	34.65	10.7		
167+82 RT	SNS 441	4.50		8.3				2.00	4.0	2.25	1	31.02	24.3		
168+16 LT	ASM 7 RS	1.50		8.8				2.00	4.0	2.25	1	32.23	16.0		
168+61 LT	ASM 9 RS	5.00		9.8				2.00	4.0	2.25	1	34.65	11.0		
169+00 RT	ASM 7 RS	1.50		8.8				2.00	4.0	2.25	1	32.23	16.0		
169+73 LT	SIGN 2GS	17.50		8.2				2.50	3.2	2.25	4.0	2.50	1	47.00	1 8.4
171+24 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED											
171+38 LT	ASM 1	5.18		9.8				2.00	4.0	2.25	1	34.65	10.7		
171+95 RT	SNS 441	4.50		8.8				2.00	4.0	2.25	1	32.23	24.5		
172+70 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED											
174+15 LT	SA O RS	10.00		LIGHT STANDARD MOUNTED											
175+15 LT	SNS 441	4.50		8.3				2.00	4.0	2.25	1	31.02	24.3		
175+22 LT	ASM 1 RS		5.18	9.8				2.00	4.0	2.25	1	34.65	10.7		
175+64 RT	SIGN20RS	3.00		LIGHT STANDARD MOUNTED											
175+85 LT	ASM 8 RS	3.00		9.3				2.00	4.0	2.25	1	33.44	16.3		
177+13 LT	SA P RS	11.00		LIGHT STANDARD MOUNTED											
178+52 RT	SIGN20RS	3.00		LIGHT STANDARD MOUNTED											
178+84 LT	SNS 441	4.50		8.3				2.00	4.0	2.25	1	31.02	24.3		
178+98 LT	ASM 1 RS		5.18	9.8				2.00	4.0	2.25	1	34.65	10.7		
SUBTOTAL NO 1		157.87	15.54	LENGTH ALL SIZES 178.7						LGTH ALL SZ 76.0	670.81	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				TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE- AK - AWAY BASE	MAX. LNG. FOR SUP. SIZE				
				1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH					SIZE	LNTH	SIZE	NO
179+23 RT	SNS 441	4.50		8.3						4.0	2.25	1	31.02		24.3				
179+90 LT	ASM 9 RS20	1.50		LIGHT STANDARD MOUNTED															
181+28 RT	SIGN20RS	3.00		LIGHT STANDARD MOUNTED															
182+10 RT	ASM 7 RS	1.50		8.8						4.0	2.25	1	32.23		16.0				
182+68 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED															
182+77 LT	ASM 1 RS		5.18	9.8						4.0	2.25	1	34.65		10.7				
183+02 RT	SNS 441	4.50		8.3						4.0	2.25	1	31.02		24.3				
183+93 RT	ASM 379	8.19		LIGHT STANDARD MOUNTED															
184+82 LT	ASM 9 RS	5.00		9.8						4.0	2.25	1	34.65		11.0				
185+63 RT	SA Q RS	8.69		LIGHT STANDARD MOUNTED															
186+44 LT	SNS 441	4.50		LIGHT STANDARD MOUNTED															
186+55 LT	ASM 1 RS		5.18	9.8						4.0	2.25	1	34.65		10.7				
186+83 RT	SNS 441	4.50		8.3						4.0	2.25	1	31.02		24.3				
187+23 RT	SA R RS	9.69		LIGHT STANDARD MOUNTED															
187+60 RT	ASM 19WS		6.25	10.3						4.0	2.50	1	41.08		11.8				
187+80 RT	SIGN 3GS	37.50		9.7 9.7				3.8 3.8		2.19	4.0	4.00	2	158.15	2	10.3			
187+95 RT	ASM 6 RS		10.82	MAST ARM MOUNTED															
187+95 LT	R10-12	14.00		MAST ARM MOUNTED															
187+95 LT	SIGN10GS	23.75		MAST ARM MOUNTED															
187+93 RT	R10-12	14.00		MAST ARM MOUNTED															
187+93 RT	SIGN 5GS	8.25		MAST ARM MOUNTED															
188+32 LT	SA L	15.38		10.9					2.50	3.5			2.25	4.0	2.50	1	56.67	1	11.6
188+37 RT	ASM 10RS	7.50		10.3					2.25				4.0	2.50	1	40.99		10.3	
188+79 LT	R10-12	14.00		MAST ARM MOUNTED															
188+79 LT	SIGN 5GS	8.25		MAST ARM MOUNTED															
189+23 RT	SIGN 9GS	23.75		MAST ARM MOUNTED															
189+23 RT	R10-12	14.00		MAST ARM MOUNTED															
189+40 RT	ASM 8RS	3.00		9.3						4.0	2.25	1	33.44		16.3				
189+98 LT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED															
SUBTOTAL NO 2		448.45	27.43	LENGTH ALL SIZES 122.8						LGTH ALL SZ 52.0			559.58	0	0				

SIGN SUMMARY

I-94 Business Loop

Main Street

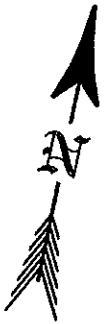
Mandan, ND

SIGN SUMMARY - PERFORATED TUBE

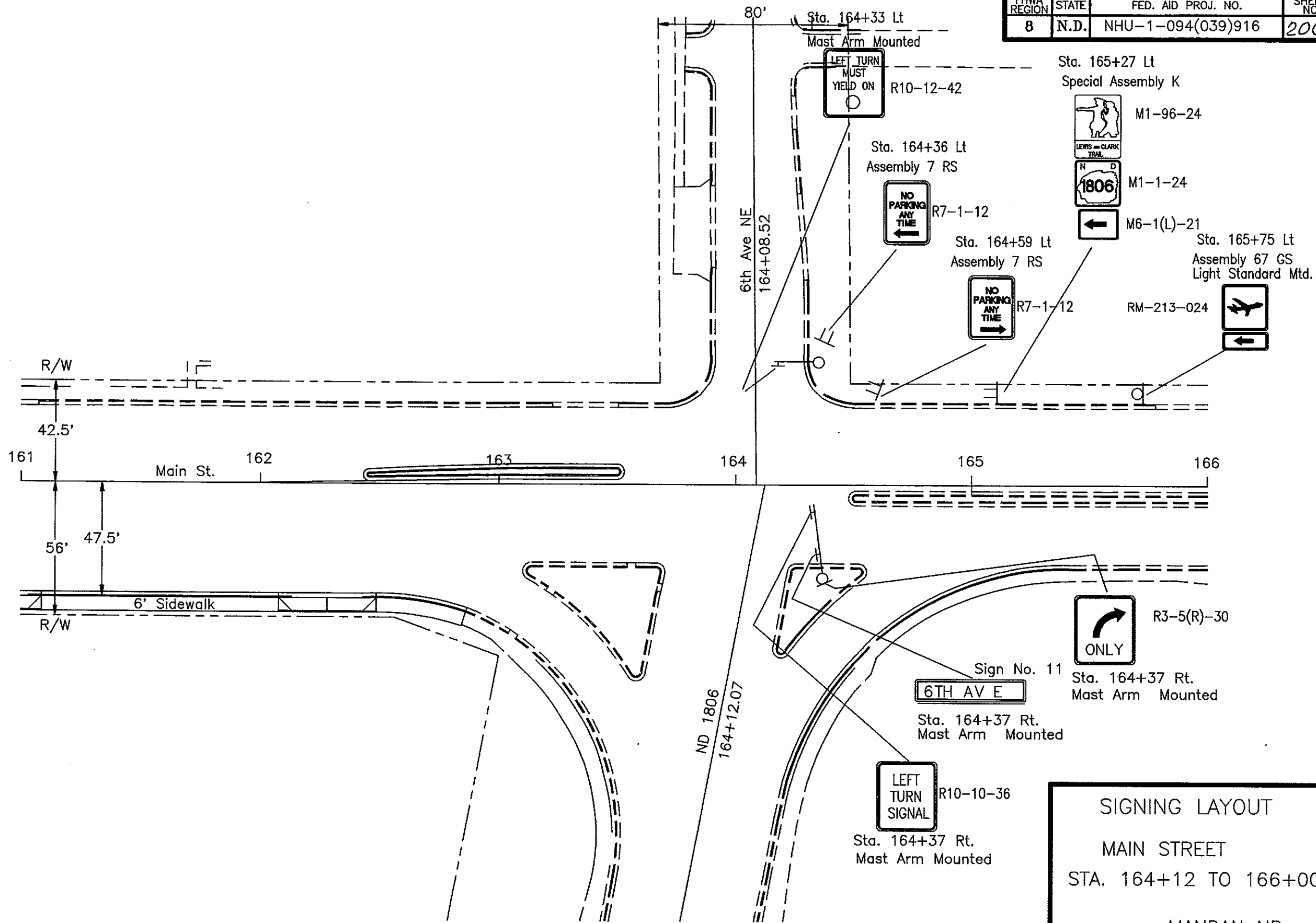
STATION	ASSEMBLY NUMBER	SIGN FLAT TYPE	AREA SHEET TYPE	SIGN SUPPORT POST LENGTHS					SIGN SUPPORT SLEEVE LENGTH ANCHOR UNIT					TOTAL SUPPORT WEIGHT	RESET SIGN PAN SUP	BRE- MAX. AK - FOR AWAY SUP. BASE SIZE
				1ST	2ND	3RD	4TH	SIZE	1ST	2ND	3RD	4TH	SIZE			
190+16 RT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED												
191+48 LT	SA S RS	13.19		LIGHT STANDARD MOUNTED												
192+98 LT	SA R RS	8.19		LIGHT STANDARD MOUNTED												
194+48 LT	ASM 9 RS	5.00		LIGHT STANDARD MOUNTED												
197+48 LT	RM-213GS	6.19		LIGHT STANDARD MOUNTED												
201+12 RT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
201+00 LT	SIGN 6GS	21.25		MAST ARM MOUNTED												
201+00 LT	R10-5A	16.00		MAST ARM MOUNTED												
201+27 RT	SIGN 5GS	8.25		MAST ARM MOUNTED												
202+06 LT	SIGN 5GS	8.25		MAST ARM MOUNTED												
2202+25 RT	R10-5A	16.00		MAST ARM MOUNTED												
202+25 RT	SIGN 7GS	21.25		MAST ARM MOUNTED												
202+41 LT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
202+65 LT	ASM 32RS	5.00		9.3				2.00				4.0	2.25	1	33.44	10.2
203+10 LT	R16-1 RS	4.00		LIGHT STANDARD MOUNTED												
203+63 LT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
204+75 LT	ASM 7 RS	1.50		LIGHT STANDARD MOUNTED												
197+90 LT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
198+30 LT	SIGN21GS	21.00		10.2	10.2			2.51				4.0	4.00	2	136.42	2 10.8
198+50 RT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
199+15 LT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
199+60 RT	SA M RS	6.50		11.3				2.25				4.0	2.50	1	43.76	11.8
199+70 LT	SIGN22GS	17.50		10.2				2.51	3.2			4.0	4.00	1	79.08	1 11.2
200+55 LT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
200+65 LT	SNS 442	6.00		8.3				2.25				4.0	2.50	1	35.44	10.4
200+75 LT	ASM 1 RS	5.18		9.8				2.00				4.0	2.25	1	34.65	10.7
201+05 RT	ASM 7 RS	1.50		8.8				2.00				4.0	2.25	1	32.23	16.0
201+65 RT	SNS 442	6.00		8.3				2.25				4.0	2.50	1	35.44	10.4
SUBTOTAL NO 3		213.25	0.00	LENGTH ALL SIZES 147.2					LGTH ALL SZ 64.0					656.08	0	0
SUBTOTAL NO 1		157.87	15.54	LENGTH ALL SIZES 178.7					LGTH ALL SZ 76.0					670.81	0	0
SUBTOTAL NO 2		448.45	27.43	LENGTH ALL SIZES 122.8					LGTH ALL SZ 52.0					559.58	0	0
SUBTOTAL NO 3		213.25	0.00	LENGTH ALL SIZES 147.2					LGTH ALL SZ 64.0					656.08	0	0
TOTAL		819.57	42.97	448.7					192.0					1886.46	0	0

BASIS OF ESTIMATE
 Vertical Clearance:
 6 TH AVE. E. TO TWIN CITY DR. - 84"

SIGN SUMMARY
 I-94 Business Loop
 Main Street
 Mandan, ND

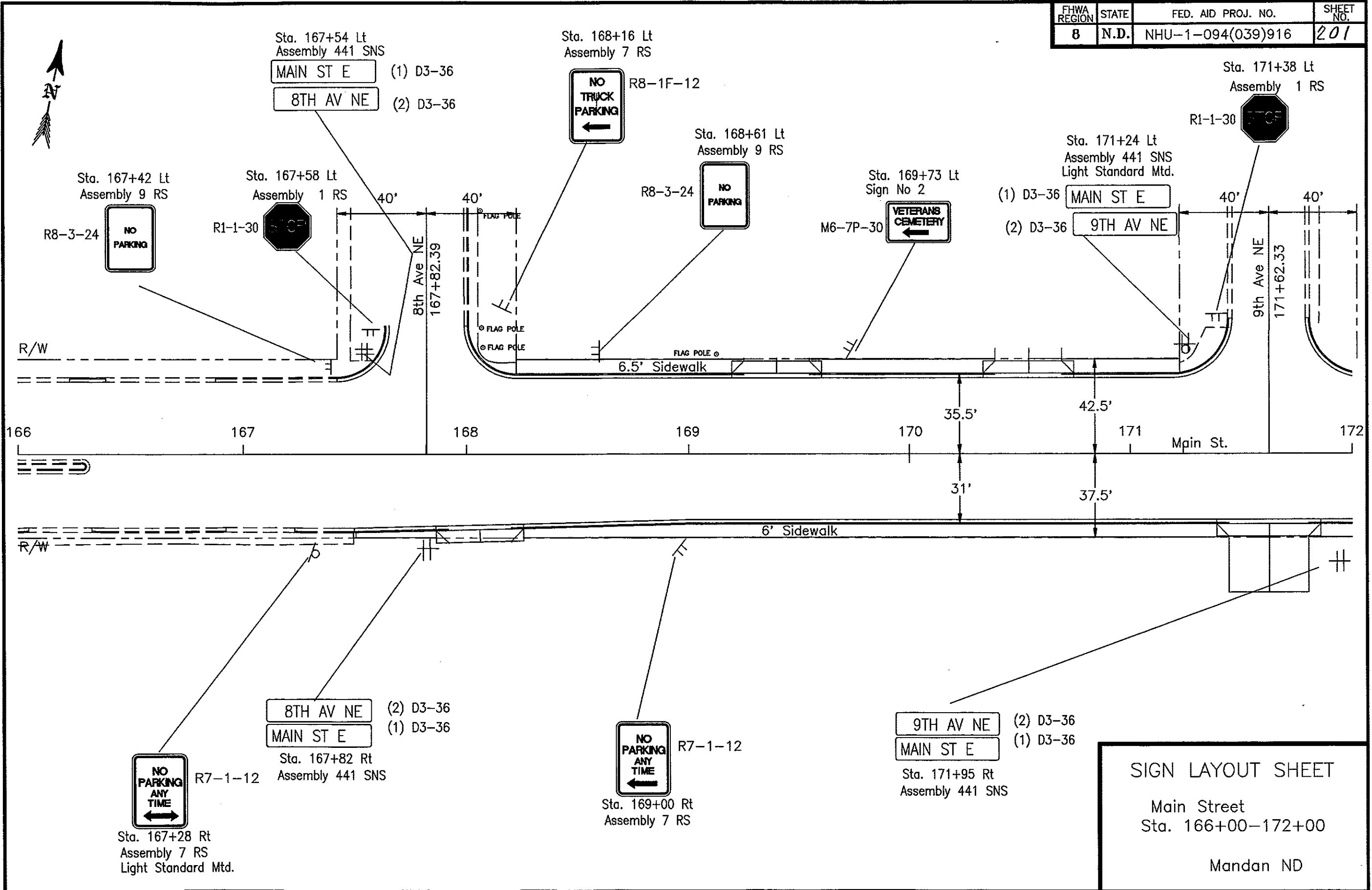


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	200

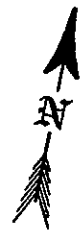


SIGNING LAYOUT
MAIN STREET
STA. 164+12 TO 166+00
MANDAN ND

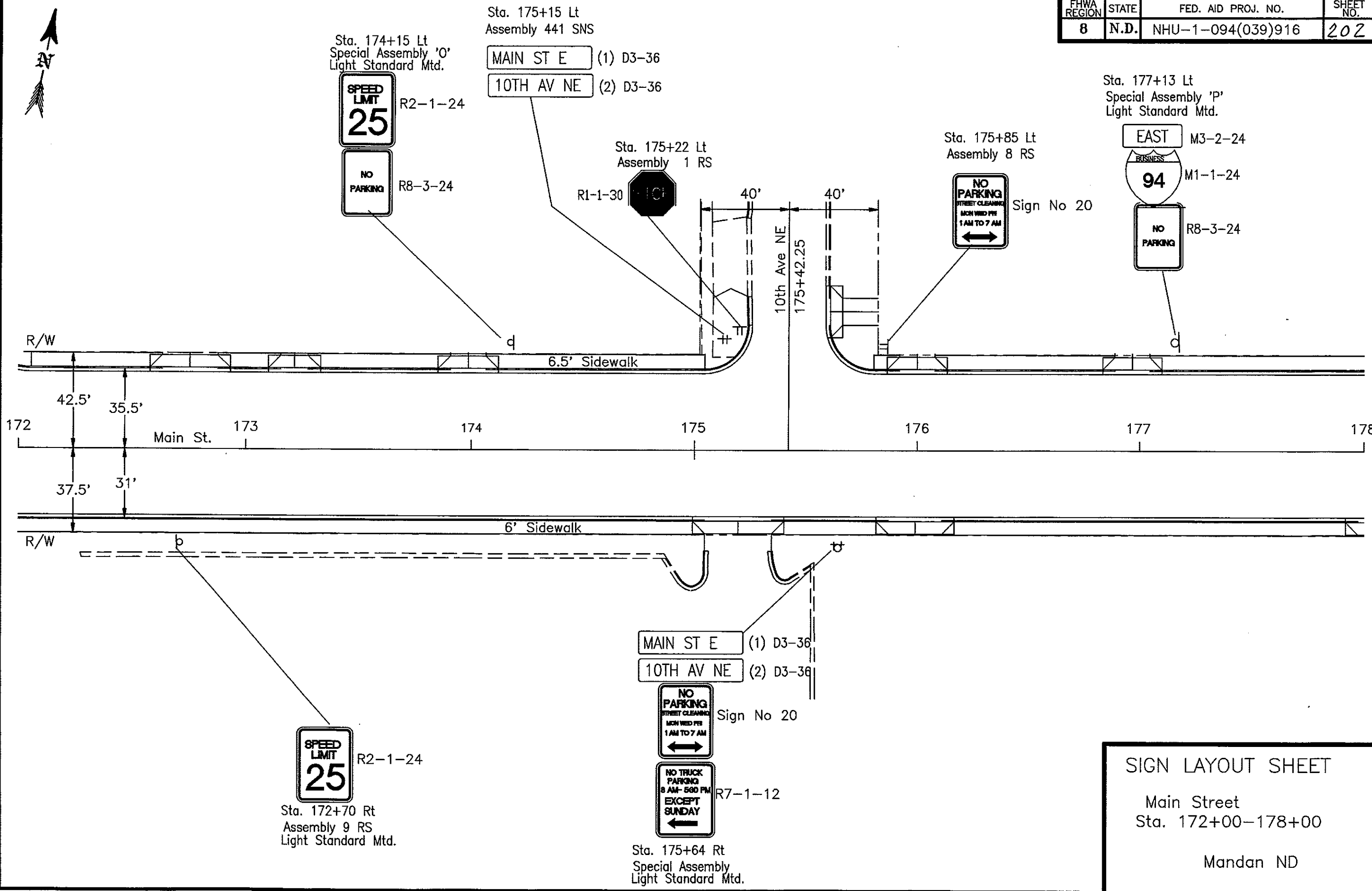
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	201



SIGN LAYOUT SHEET
Main Street
Sta. 166+00-172+00
Mandan ND



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	202

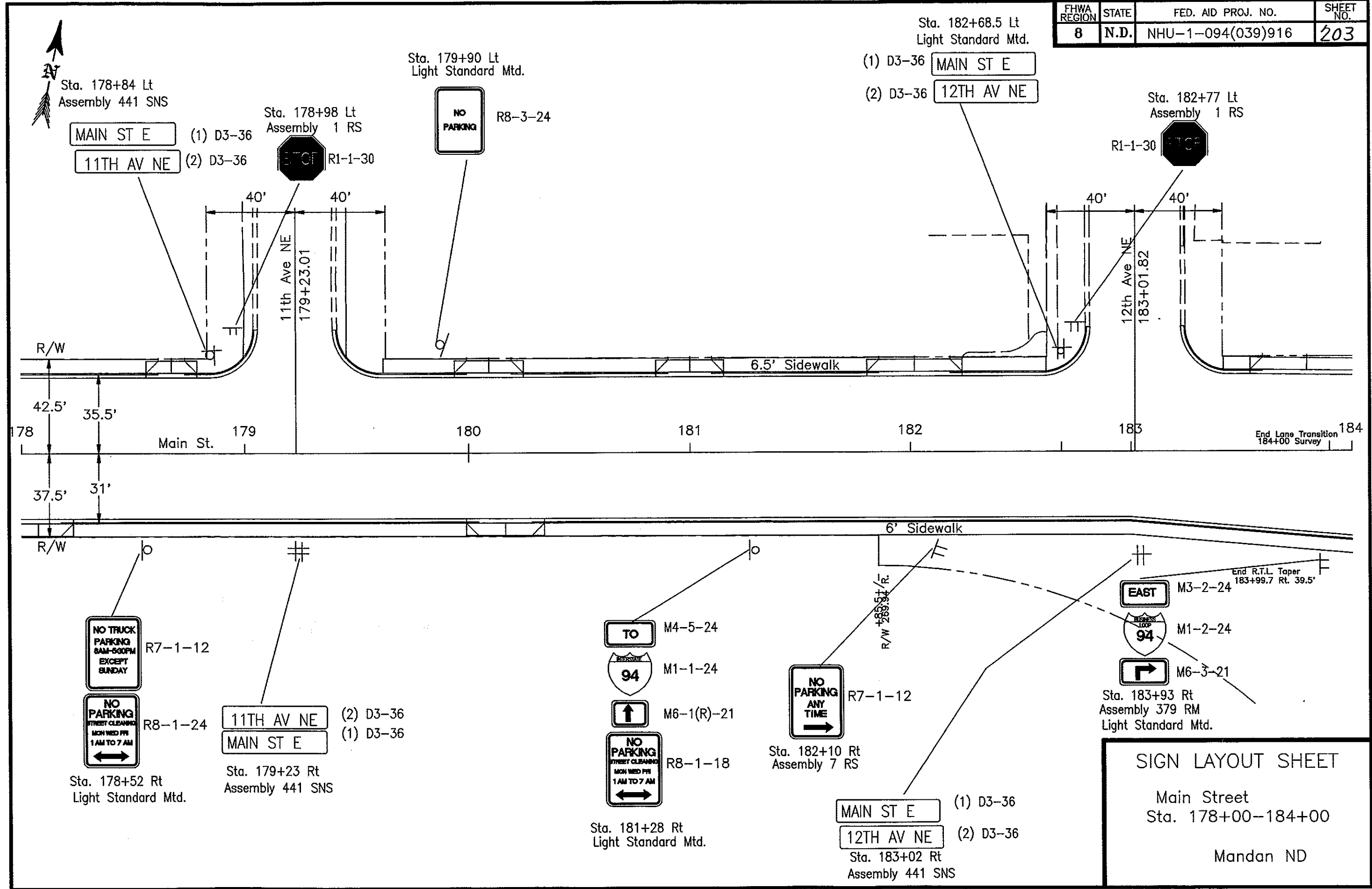


SIGN LAYOUT SHEET

Main Street
Sta. 172+00-178+00

Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	203

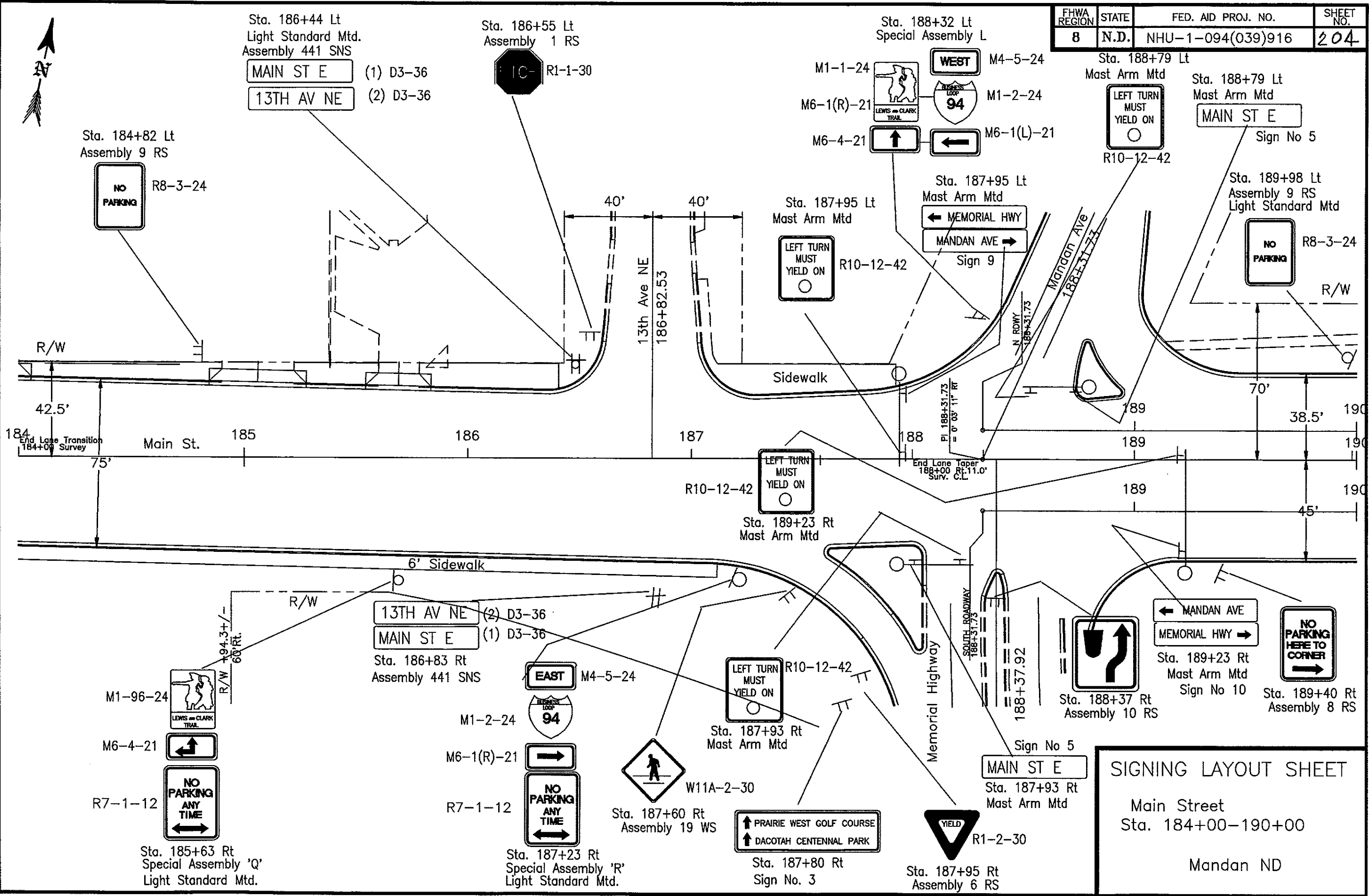


SIGN LAYOUT SHEET

Main Street
Sta. 178+00-184+00

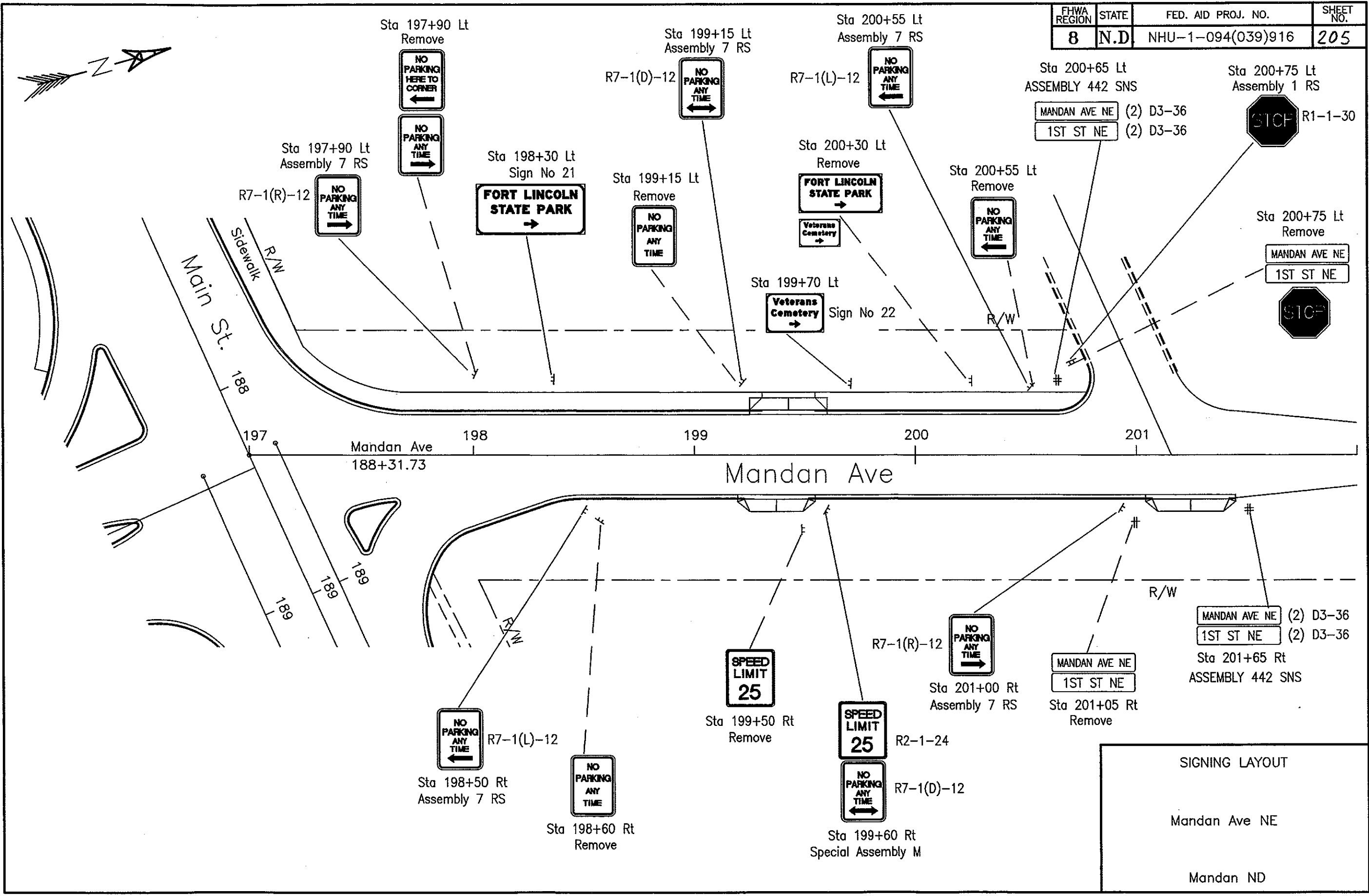
Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	204

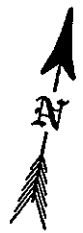


SIGNING LAYOUT SHEET
 Main Street
 Sta. 184+00-190+00
 Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	205



SIGNING LAYOUT
Mandan Ave NE
Mandan ND



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	206

Sta. 191+48 Lt
Special Assembly 'S'
Light Standard Mtd.

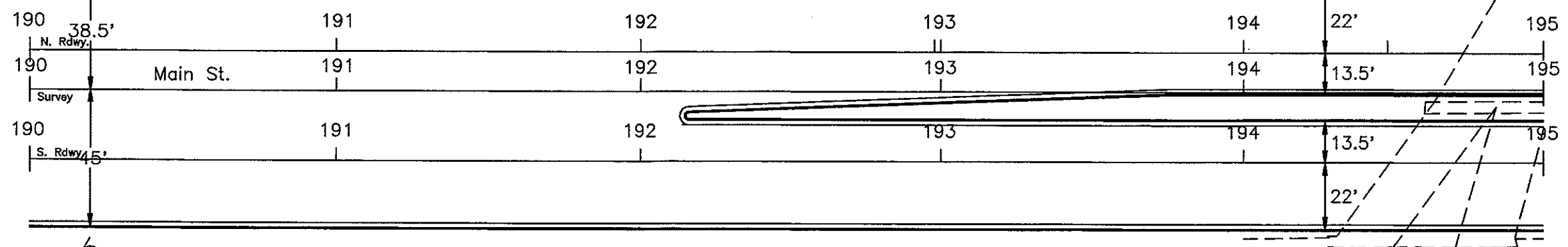
Sta. 192+98 Lt
Special Assembly 'R'
Light Standard Mtd.

Sta. 194+48 Lt
Assembly 9 RS
Light Standard Mtd.

- M2-1-24 TO
- M1-1-24 94
- M6-1(R)-21 →
- R2-1-24 SPEED LIMIT 25

- M2-1-24 TO
- M4-1-24 N D 6
- M6-1-21 ↑
- R7-1-12 NO PARKING ANY TIME ←

- NO PARKING R8-3-24



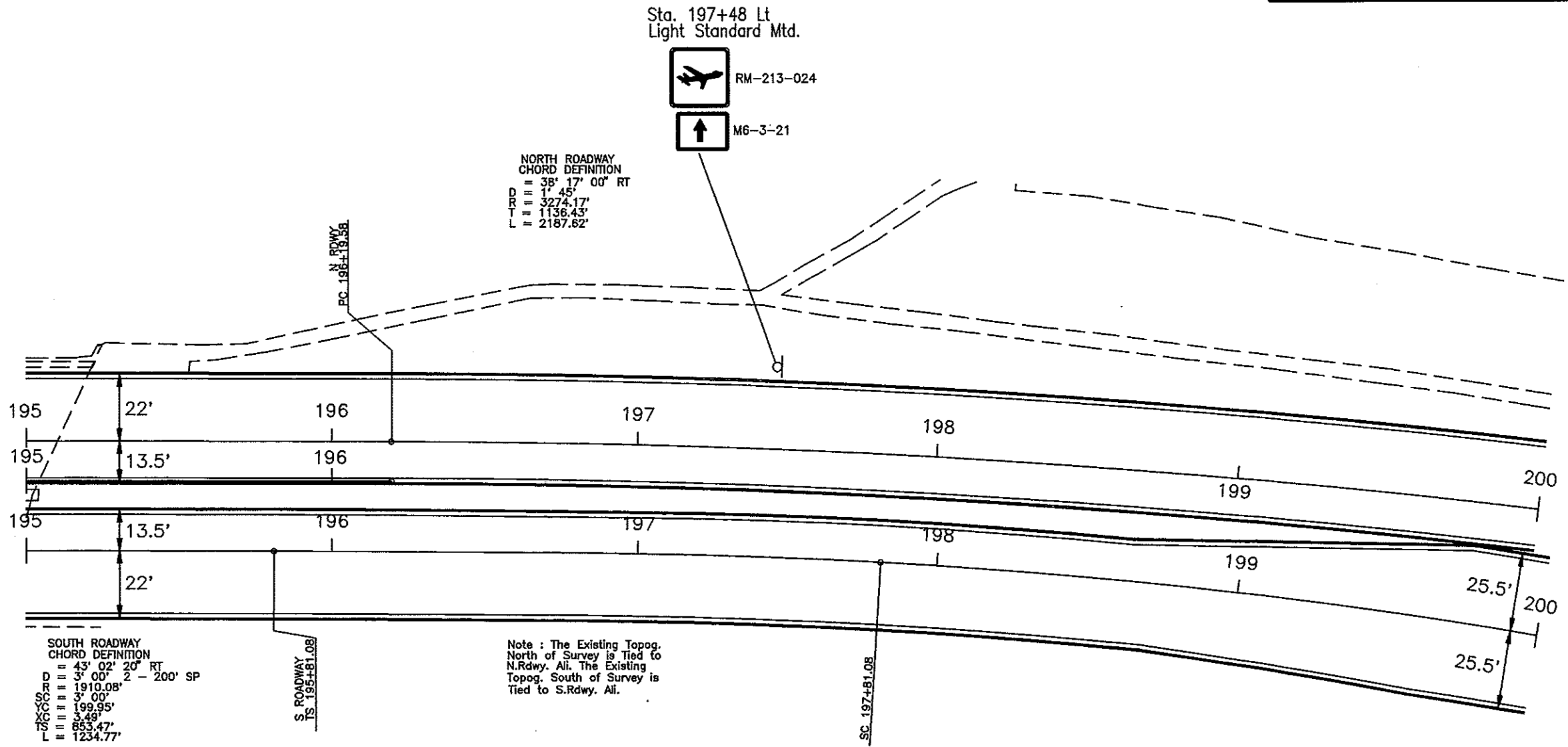
Note : The Existing Topog.North of Survey is Tied to N.Rdwy. The Existing Topog.South of Survey is Tied to S.Rdwy.

- R2-1-24 SPEED LIMIT 40

Sta. 190+16 Rt
Assembly 9 RS
Light Standard Mtd.

SIGN LAYOUT SHEET
Main Street
Sta. 190+00-195+00
Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	207

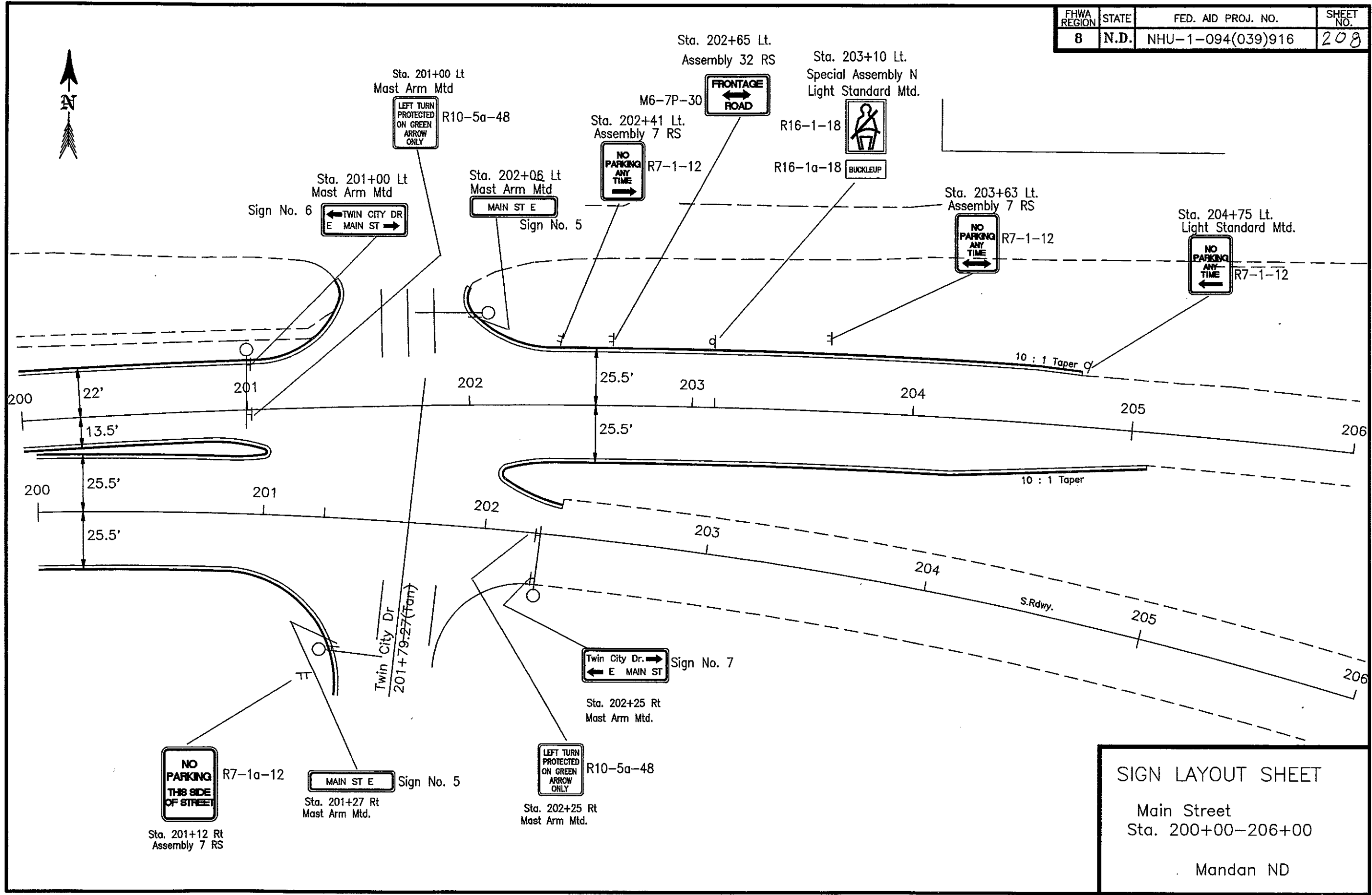


SIGN LAYOUT SHEET

Main Street
Sta. 195+00-200+00

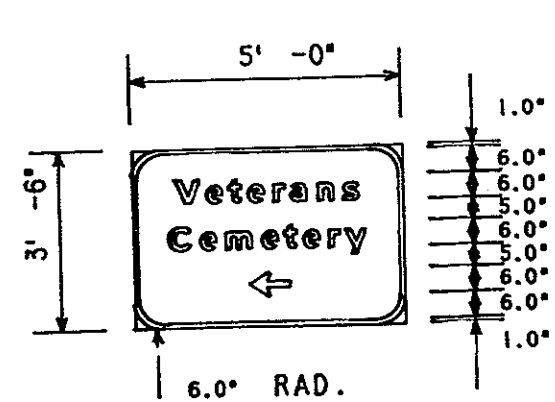
Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	208

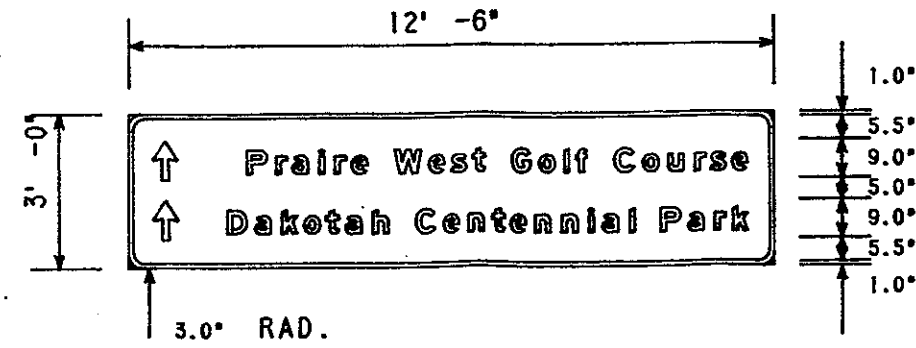


SIGN LAYOUT SHEET
 Main Street
 Sta. 200+00-206+00
 Mandan ND

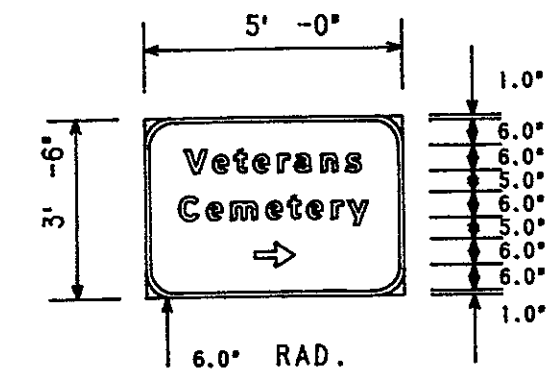
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	209



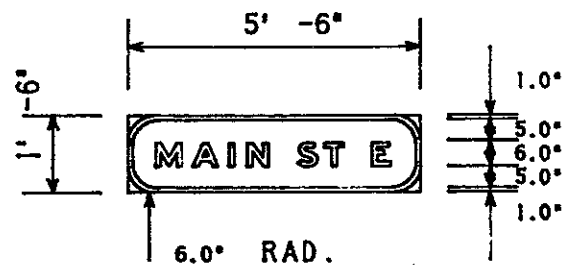
Sign No. 2
 AREA: 17.50 Sq.Ft.
 Sta. 169+69 Lt



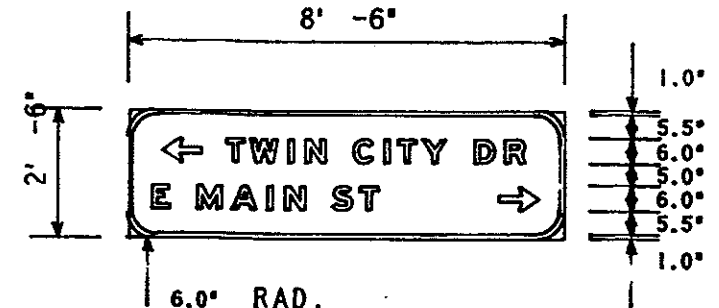
Sign No. 3
 AREA: 37.50 Sq.Ft.
 Sta. 187+80 RT



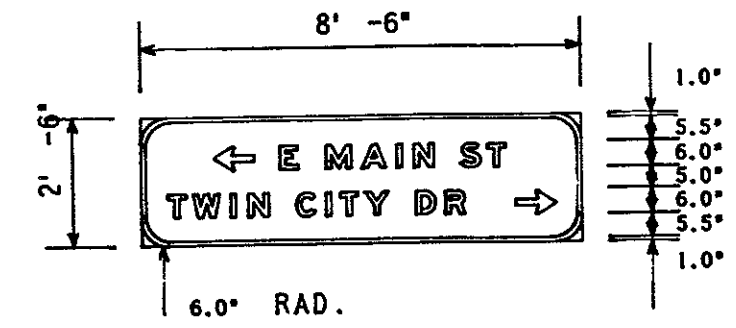
Sign No. 22
 AREA: 17.50 Sq.Ft.
 Sta. 199+70 Lt



Sign No. 5
 AREA: 8.25 Sq.Ft.
 Sta. 201+27 Rt Sta. 202+06 Lt
 Sta. 188+79 Lt Sta. 187+93 Rt

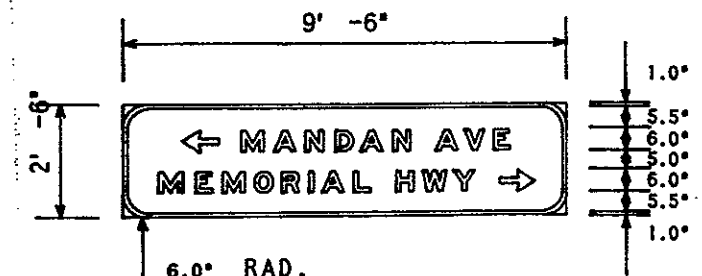


Sign No. 6
 AREA: 21.25 Sq.Ft.
 Sta. 201+00 Lt

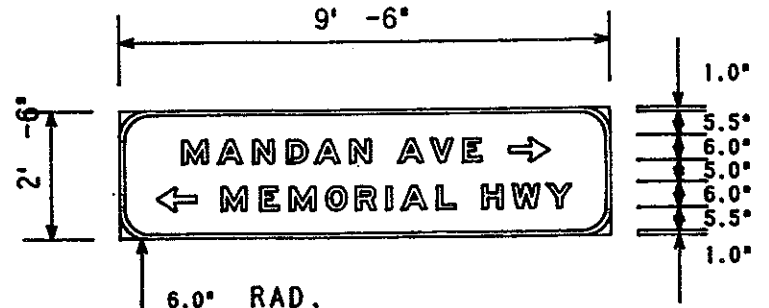


Sign No. 7
 AREA: 21.25 Sq.Ft.
 Sta. 202+25 Rt

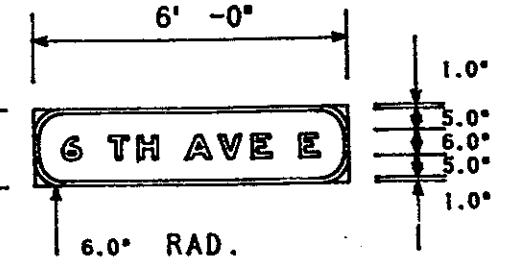
NOTE: All signs on this sheet have green background with white border and legend, Type 3A, except as noted.
 All letters shall be Series E modified, except as noted.



Sign No. 9
 AREA: 23.75 Sq.Ft.
 Sta. 187+95 Lt.



Sign No. 10
 AREA: 23.75 Sq.Ft.
 Sta. 189+23 Rt.

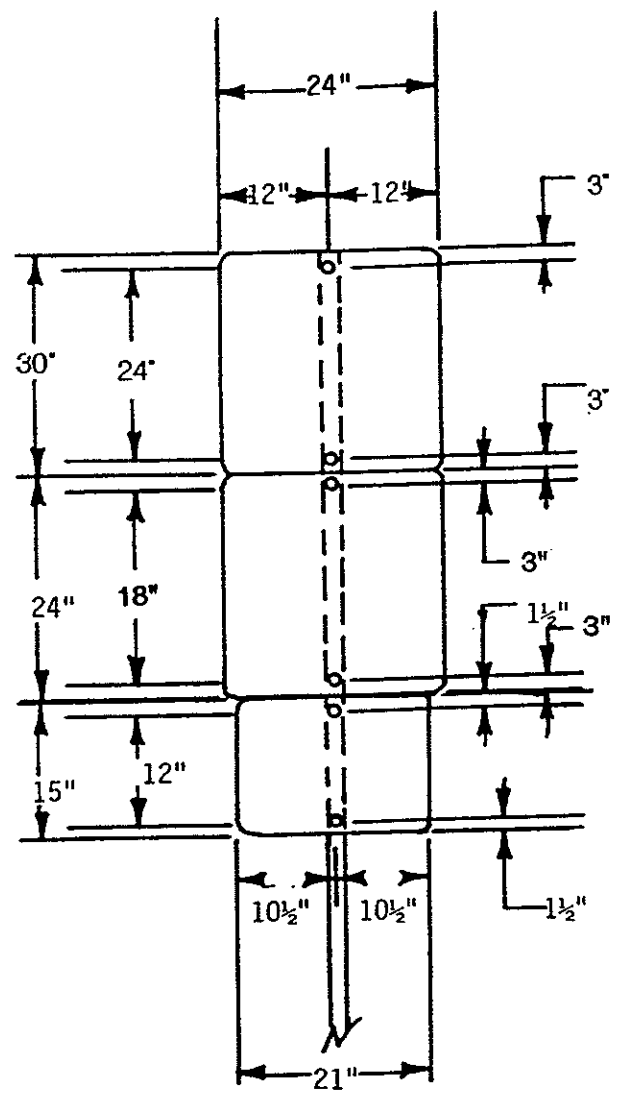


Sign No. 11
 AREA: 9.00 Sq.Ft.
 Sta. 164+37 Rt

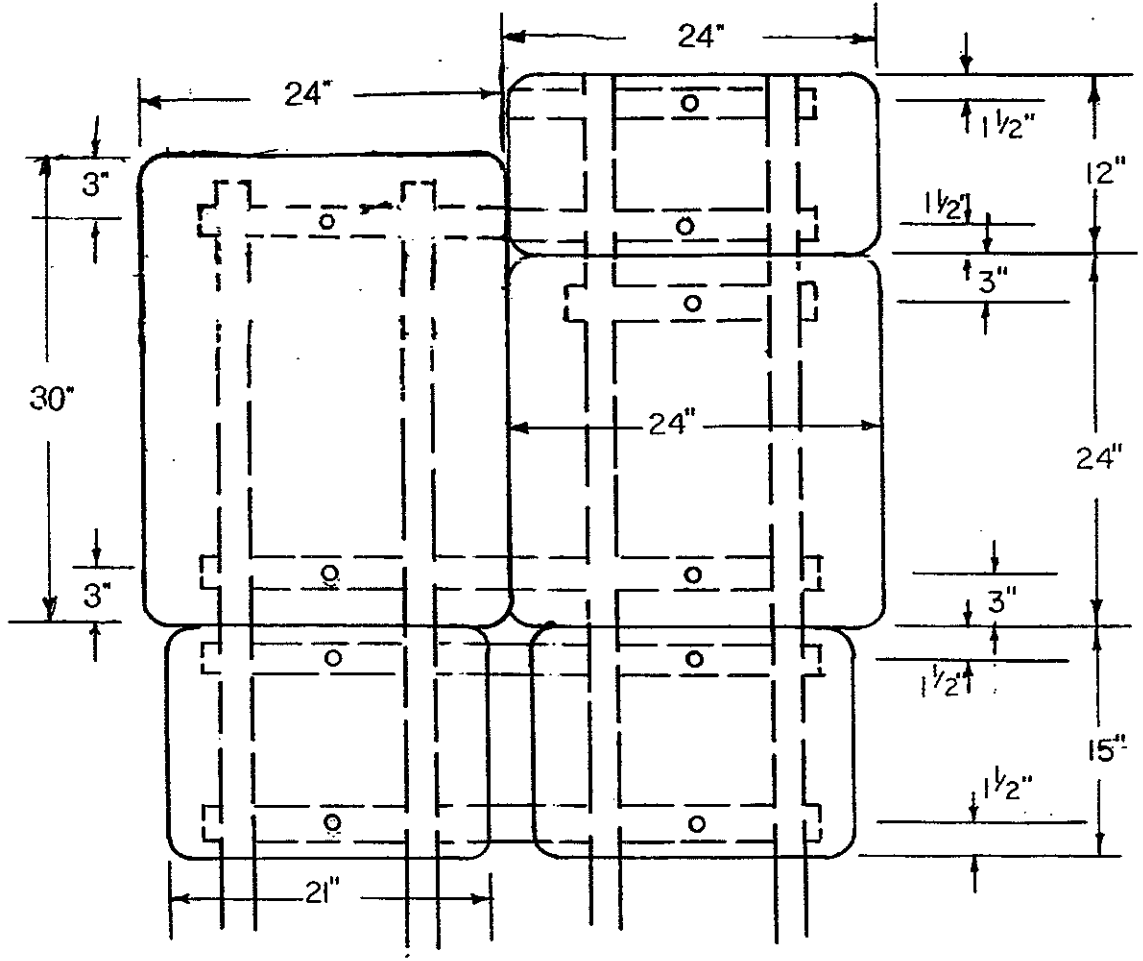
COLORS

Background- Green, Type 2 Reflective Sheeting
 Legend & Border- White, Type 3A Reflective Sheeting

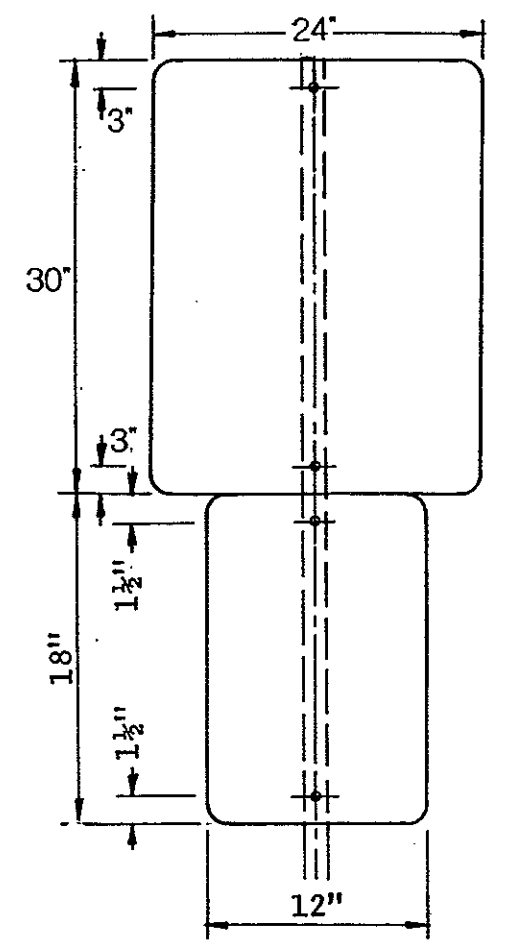
SIGN DETAIL SHEET
Main Street
Mandan ND



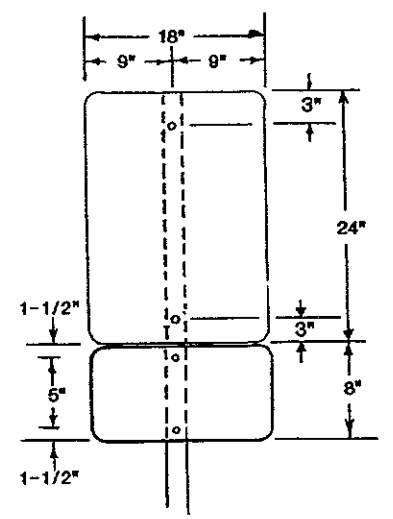
Special Assembly 'K'
Sta. 165+27 Rt.
Area: 11.19 Sq.Ft.



Special Assembly 'L'
Sta. 188+32 Lt.
Area: 15.38 Sq.Ft.



Special Assembly 'M'
Sta. 199+60 Rt.
Area: 6.50 Sq. Ft.



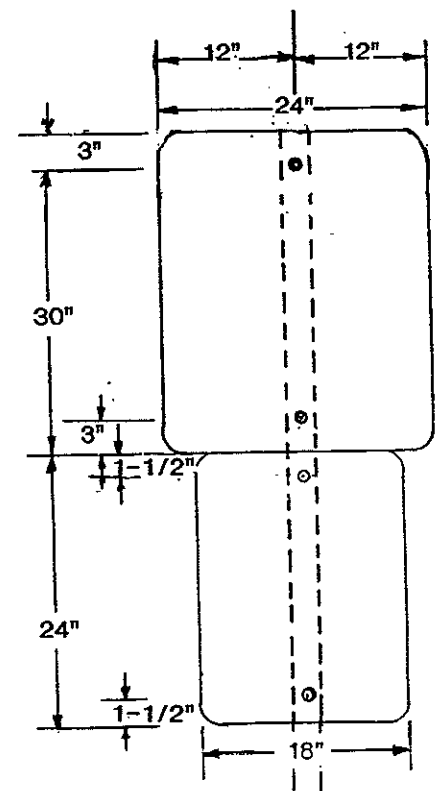
Special Assembly 'N'
Sta. 203+10 Lt.
Area: 4.00 Sq.Ft.

SIGN DETAIL SHEET

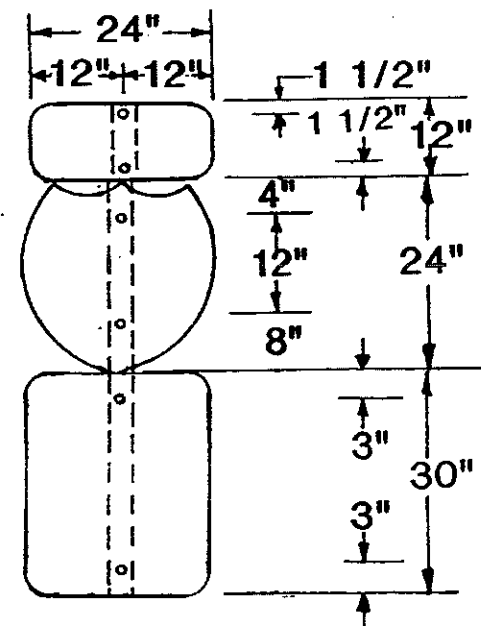
Main Street

Mandan ND

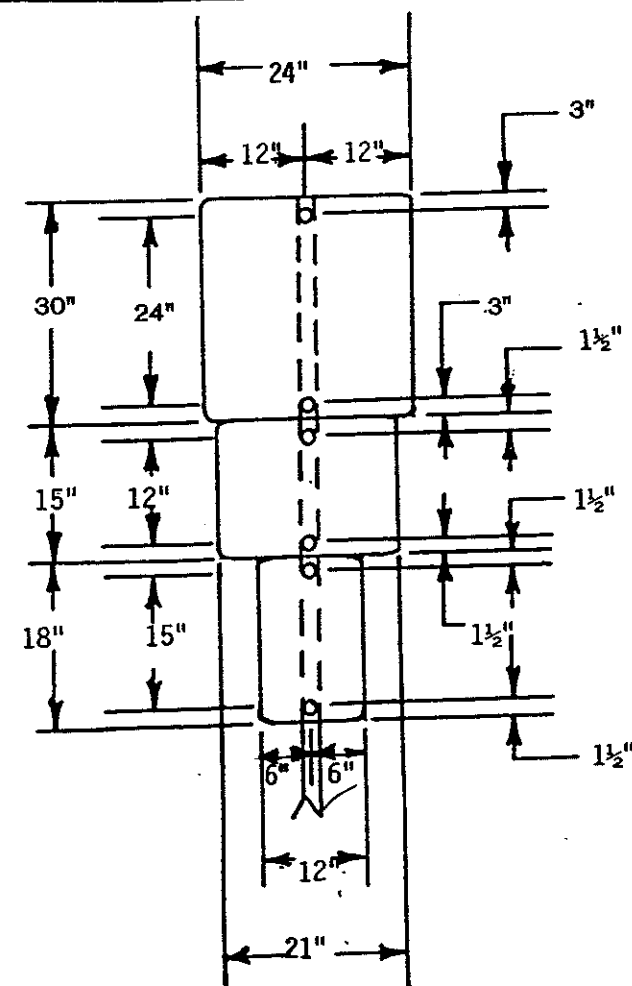
FY/FA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	2/2



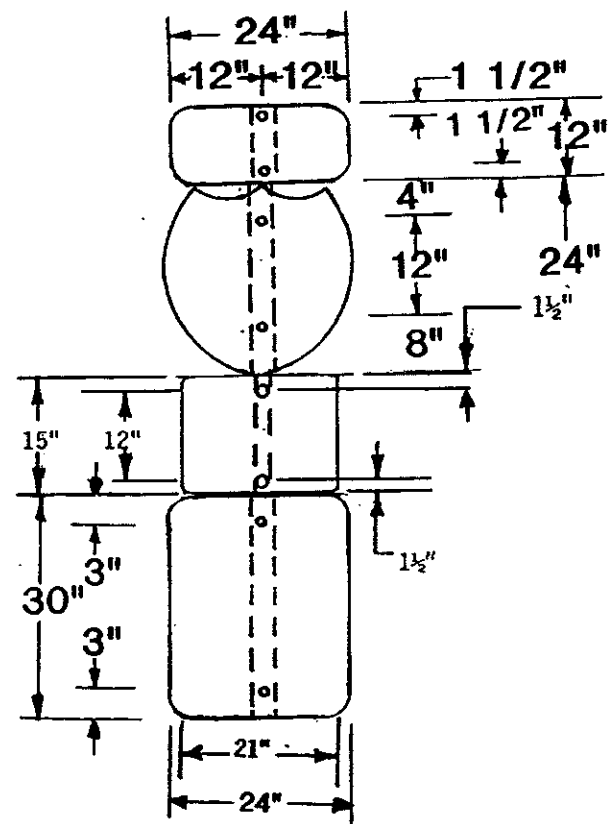
Special Assembly 'O'
Sta. 174+15 Lt.
Area: 10.00 Sq. Ft.



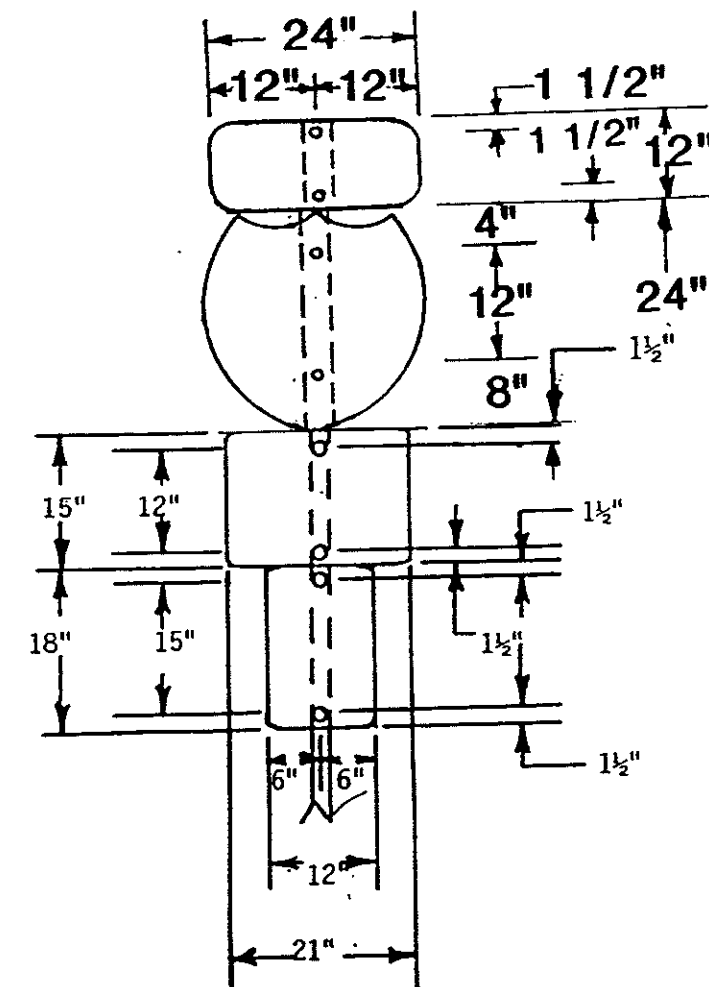
Special Assembly 'P'
Sta. 177+13 Lt.
Area: 11.00 Sq.Ft.



Special Assembly 'Q'
Sta. 185+63 Rt.
Area: 8.69 Sq. Ft.



Special Assembly 'S'
Sta. 191+48 Lt.
Area: 13.19 Sq.Ft.



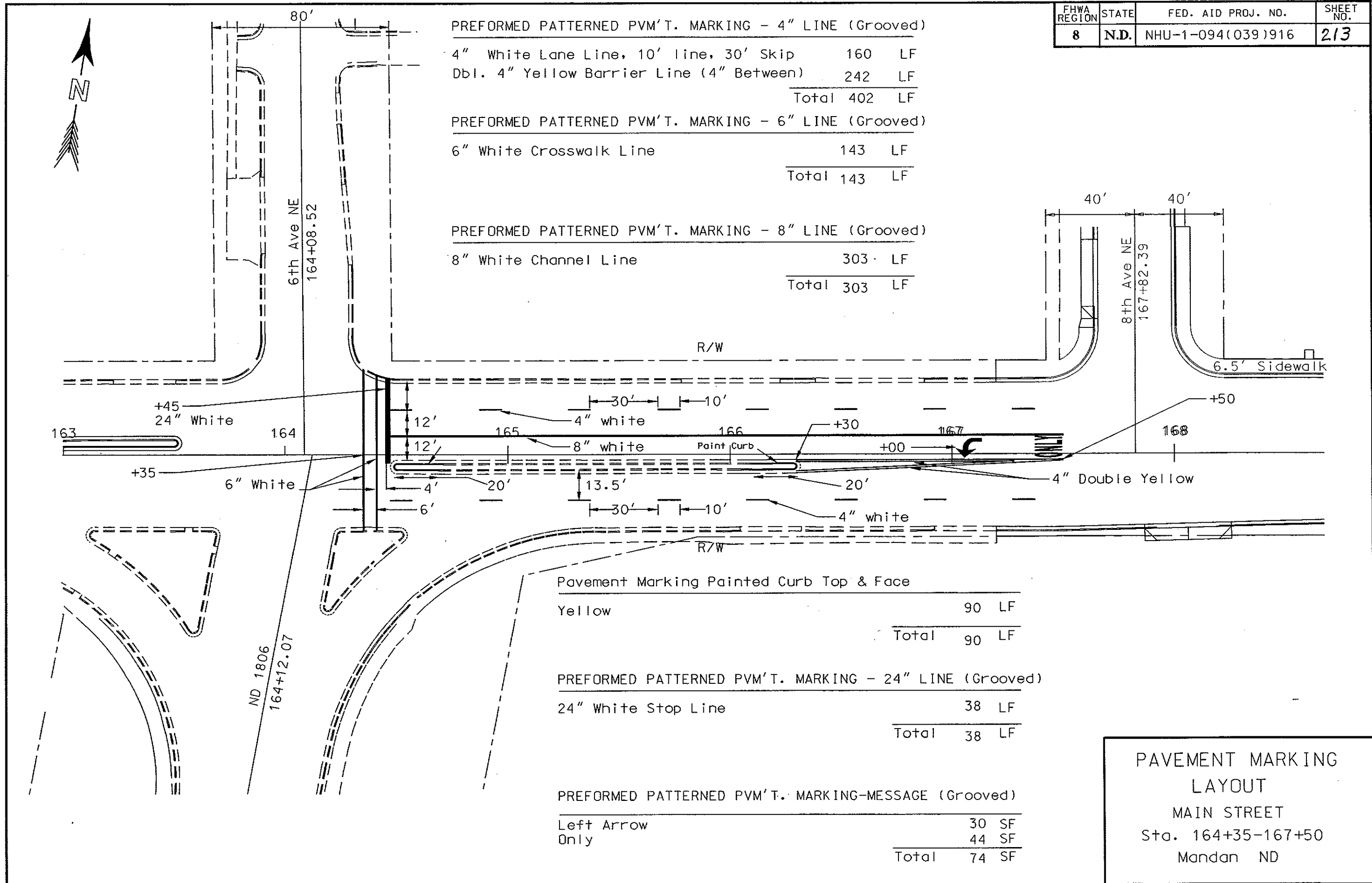
Special Assembly 'R'
Sta. 187+23 Rt.
Sta. 192+98 Lt.
Area: 9.69 Sq.Ft.

SIGN DETAIL SHEET

Main Street

Mandan ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	213



PREFORMED PATTERNED PVM'T. MARKING - 4" LINE (Grooved)

4" White Lane Line, 10' line, 30' Skip	160	LF
DbI. 4" Yellow Barrier Line (4" Between)	242	LF
<u>Total</u>	<u>402</u>	<u>LF</u>

PREFORMED PATTERNED PVM'T. MARKING - 6" LINE (Grooved)

6" White Crosswalk Line	143	LF
<u>Total</u>	<u>143</u>	<u>LF</u>

PREFORMED PATTERNED PVM'T. MARKING - 8" LINE (Grooved)

8" White Channel Line	303	LF
<u>Total</u>	<u>303</u>	<u>LF</u>

Pavement Marking Painted Curb Top & Face

Yellow	90	LF
<u>Total</u>	<u>90</u>	<u>LF</u>

PREFORMED PATTERNED PVM'T. MARKING - 24" LINE (Grooved)

24" White Stop Line	38	LF
<u>Total</u>	<u>38</u>	<u>LF</u>

PREFORMED PATTERNED PVM'T. MARKING-MESSAGE (Grooved)

Left Arrow Only	30	SF
	44	SF
<u>Total</u>	<u>74</u>	<u>SF</u>

PAVEMENT MARKING LAYOUT
 MAIN STREET
 Sta. 164+35-167+50
 Mandan ND



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	214

Preformed Patterned Pavement Marking 4"-Line(Grooved)

4" White Lane Line (10' Line, 30' Skip)	160 LF
Two-Way Left Turn Channelization (4" Yellow Lane Line, 10' Line, 30' skip)	780 LF
4" Yellow Line (45 Degree Lines)	261 LF
Total	1201 LF

Preformed Patterned Pavement Marking 6"-Line(Grooved)

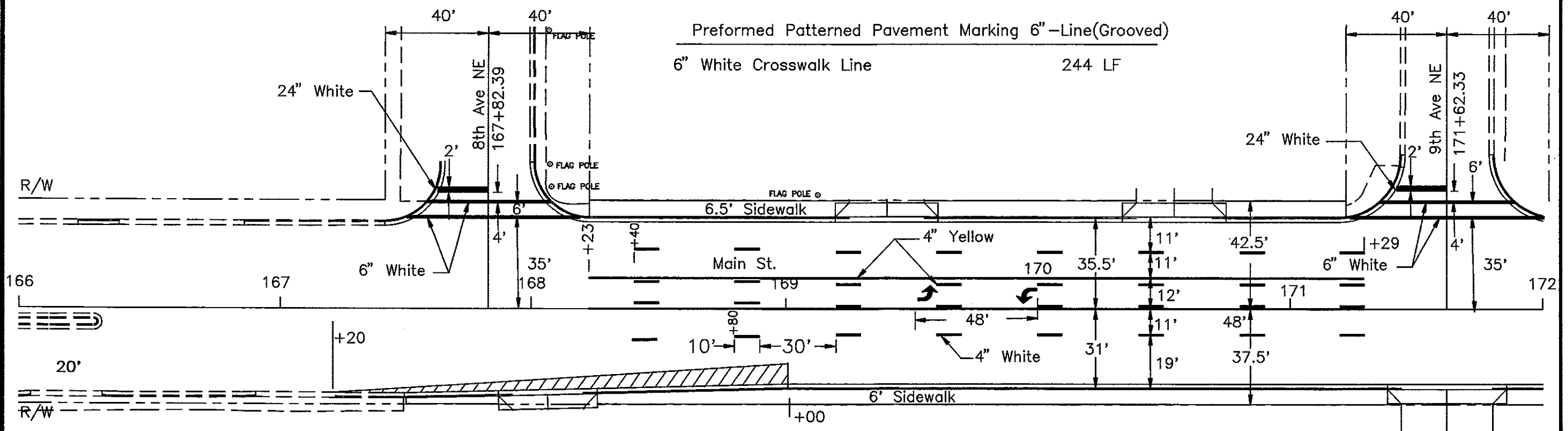
6" White Crosswalk Line	244 LF
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Preformed Patterned Pavement Marking 24"-Line(Grooved)

24" White Stop Line	40 LF
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Preformed Patterned Pavement Marking - Message (Grooved)

Left Arrow (2)	30 SF
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PAVEMENT MARKING
LAYOUT
MAIN STREET
Mandan ND

Sta. 166+00-172+00

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	215

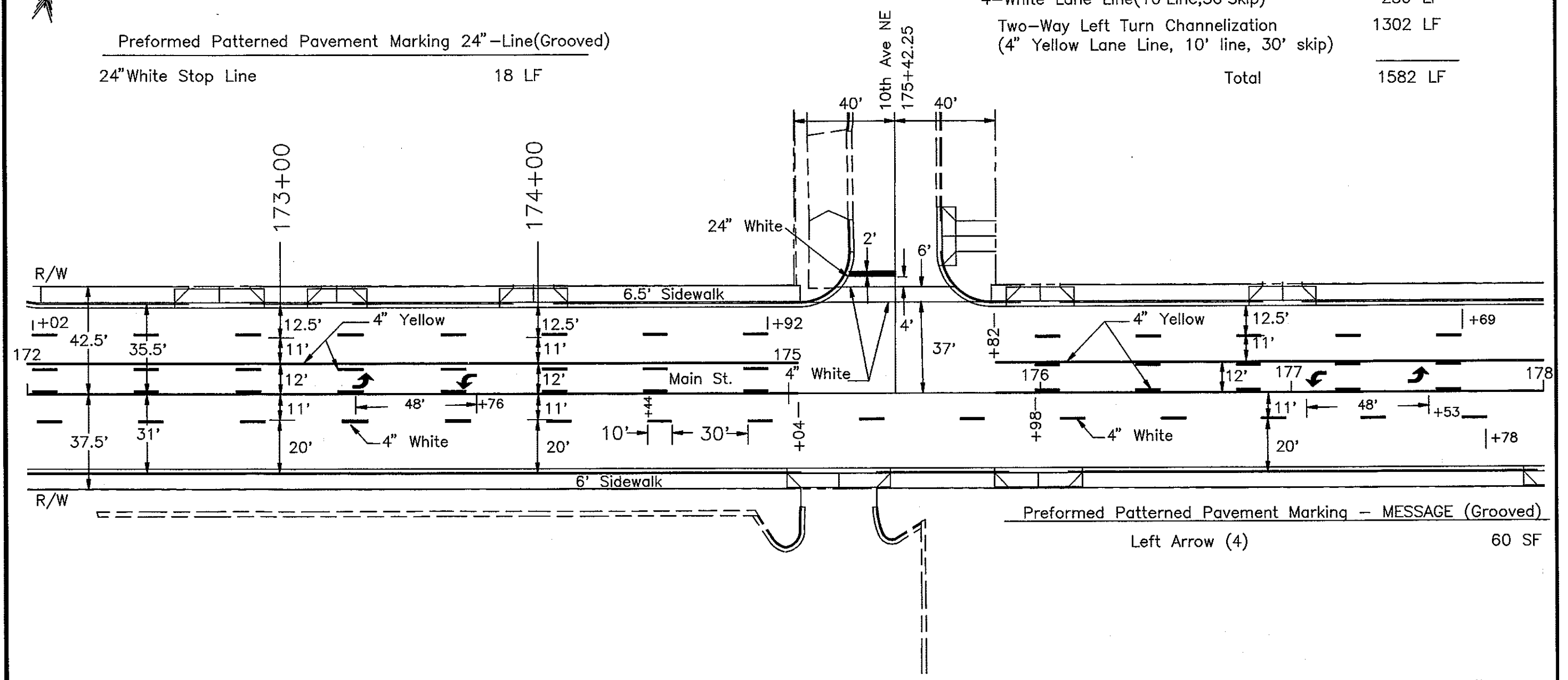


Preformed Patterned Pavement Marking 6"–Line(Grooved)
 6" White Crosswalk Line 105 LF

Preformed Patterned Pavement Marking 24"–Line(Grooved)
 24" White Stop Line 18 LF

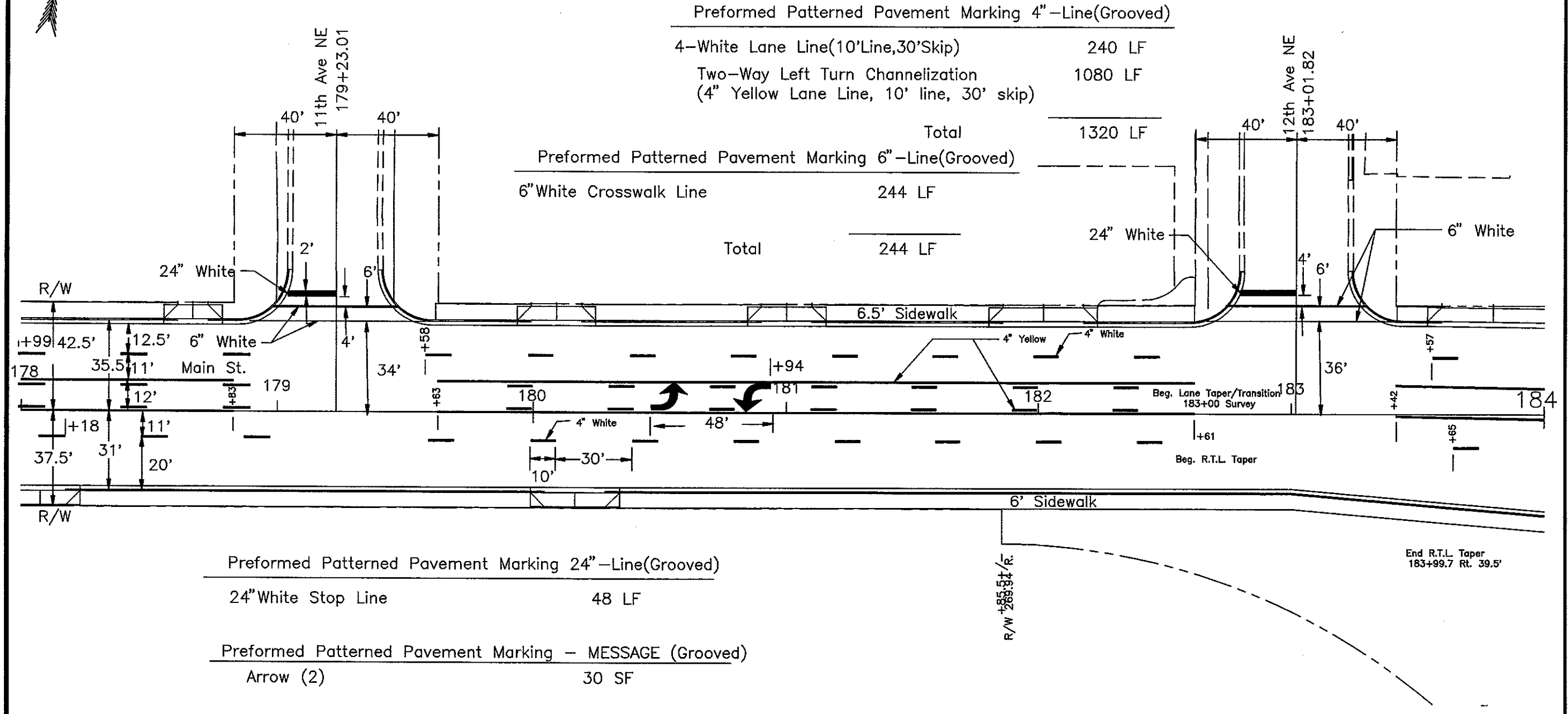
Preformed Patterned Pavement Marking 4"–Line(Grooved)
 4–White Lane Line(10'Line,30'Skip) 280 LF
 Two–Way Left Turn Channelization
 (4" Yellow Lane Line, 10' line, 30' skip) 1302 LF

Total 1582 LF



Preformed Patterned Pavement Marking – MESSAGE (Grooved)
 Left Arrow (4) 60 SF

PAVEMENT MARKING
 LAYOUT
 MAIN STREET
 Mandan ND
 Sta. 172+00–178+00



Preformed Patterned Pavement Marking 4"–Line(Grooved)

4–White Lane Line(10'Line,30'Skip)	240 LF
Two–Way Left Turn Channelization (4" Yellow Lane Line, 10' line, 30' skip)	1080 LF
Total	1320 LF

Preformed Patterned Pavement Marking 6"–Line(Grooved)

6"White Crosswalk Line	244 LF
Total	244 LF

Preformed Patterned Pavement Marking 24"–Line(Grooved)

24"White Stop Line	48 LF
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Preformed Patterned Pavement Marking – MESSAGE (Grooved)

Arrow (2)	30 SF
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PAVEMENT MARKING
LAYOUT
MAIN STREET
Mandan ND
Sta. 178+00–184+00

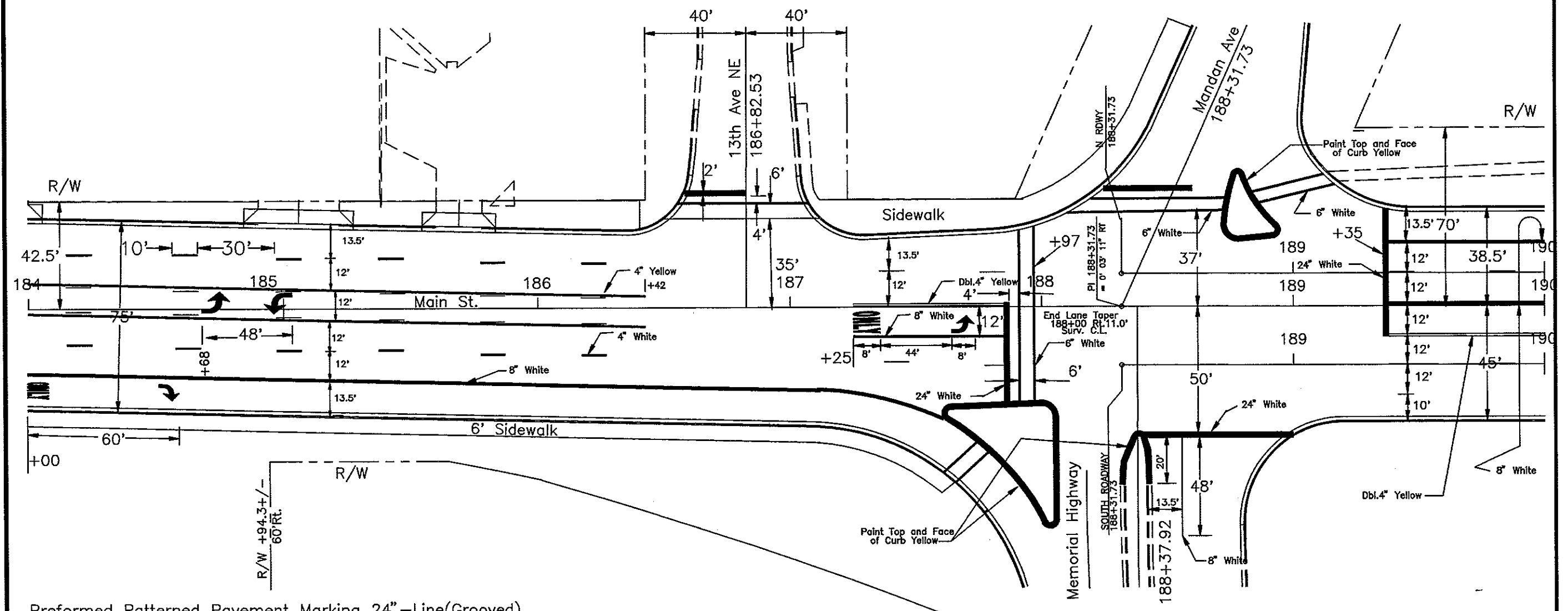


Preformed Patterned Pavement Marking 4"-Line(Grooved)

4" White Lane Line(10'Line,30'Skip)	240 LF
Two-Way Left Turn Channelization (4" Yellow Lane Line, 10' line, 30' skip)	970 LF
Dbl. 4" Yellow Barrier Line (4" Between)	246 LF
Total	1456 LF

PREFORMED PATTERNED PVMT MK MESSAGE (GROOVED)

Left Arrow (3)	45 SF
Right Arrow	15 SF
ONLY (2)	44 SF
Total	104 SF



Preformed Patterned Pavement Marking 24"-Line(Grooved)

24" White Stop Line	214 LF
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Preformed Patterned Pavement Marking 6"-Line(Grooved)

6" White Crosswalk Line	441 LF
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Preformed Patterned Pavement Marking 8"-Line(Grooved)

8" White Chan.Line	584 LF
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Pavement Marking Painted Curb Top & Face

Yellow	268 LF
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PAVEMENT MARKING LAYOUT

MAIN STREET
Mandan ND

Sta. 184+00-190+00

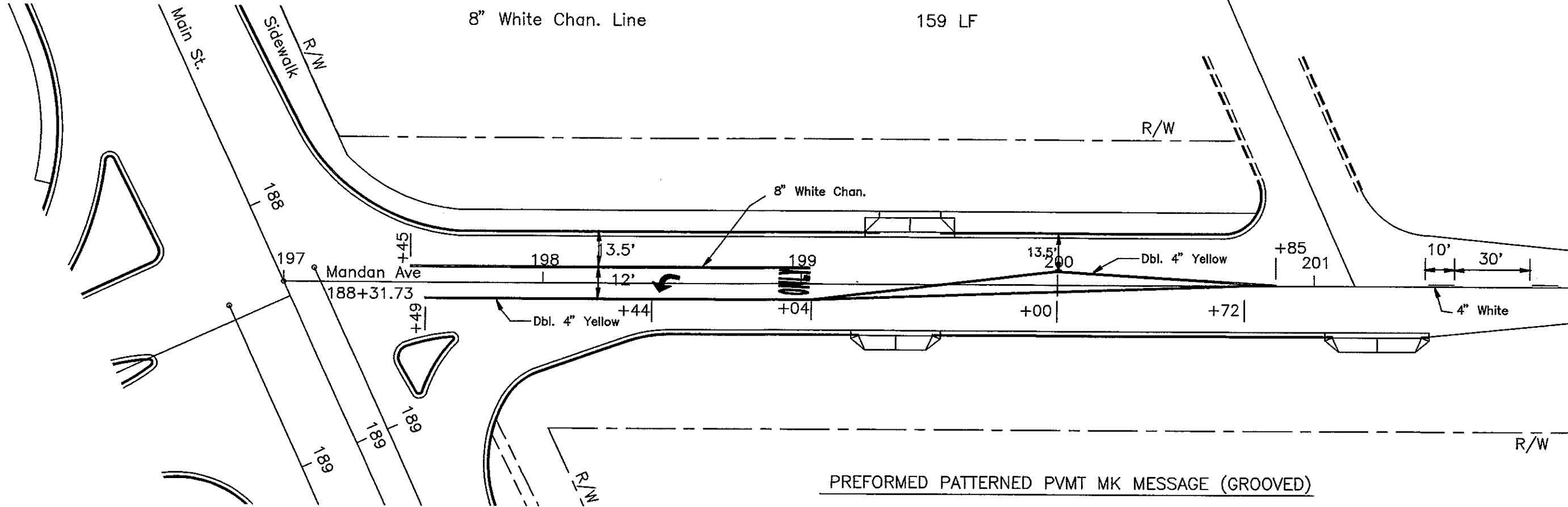
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	210

Preformed Patterned Pavement Marking 4"-Line(Grooved)

4" White Lane Line (10'line,30' skip)	20 LF
Dbl. 4" Yellow Barrier Line (4" Between)	1034 LF

Preformed Patterned Pavement Marking 8"-Line(Grooved)

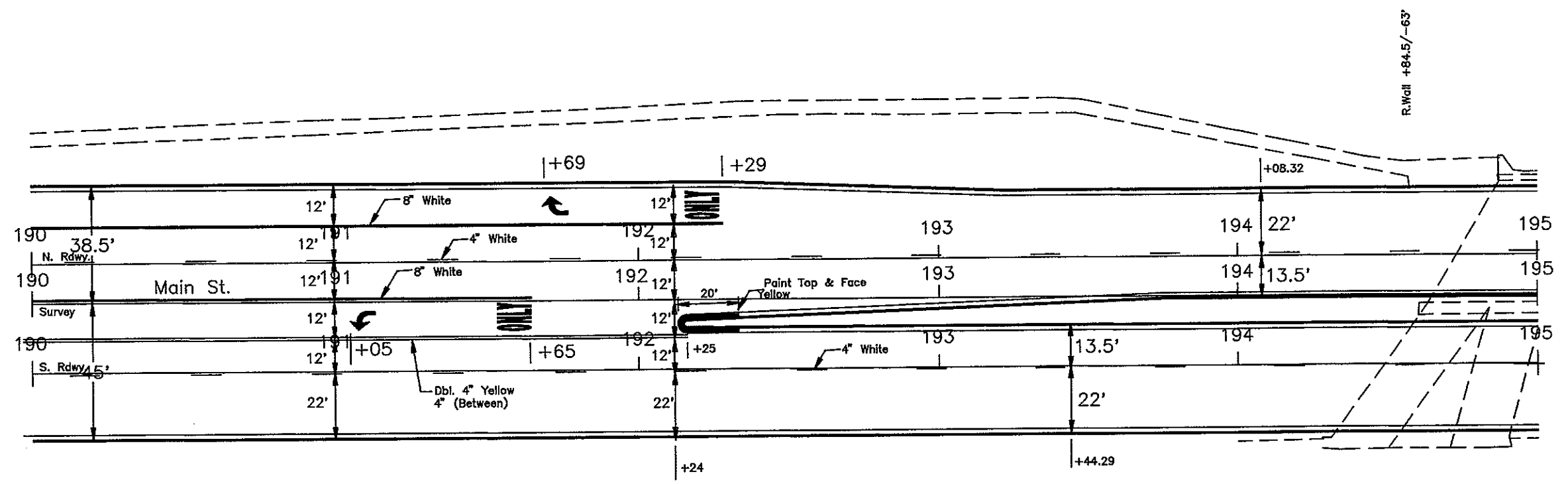
8" White Chan. Line	159 LF
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PREFORMED PATTERNED PVMT MK MESSAGE (GROOVED)

LEFT ARROW	15 SF
ONLY	22 SF
	<hr/>
	37 SF

PAVEMENT MARKING LAYOUT
 Main St & Mandan Av
 Mandan ND



PREFORMED PATTERNED PVMT MK MESSAGE (GROOVED)

Right Arrow	15 SF
Left Arrow	15 SF
Only	44 SF
Total	74 SF

Preformed Patterned Pavement Marking 4"-Line(Grooved)

4" White Lane Line (10' Line, 30' Skip)	260 LF
4" Yellow Barrier Line (4" Between)	450 LF
Total	710 LF

Pavement Marking Painted Curb Top & Face

Yellow	45 LF
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Preformed Patterned Pavement Marking 8"-Line(Grooved)

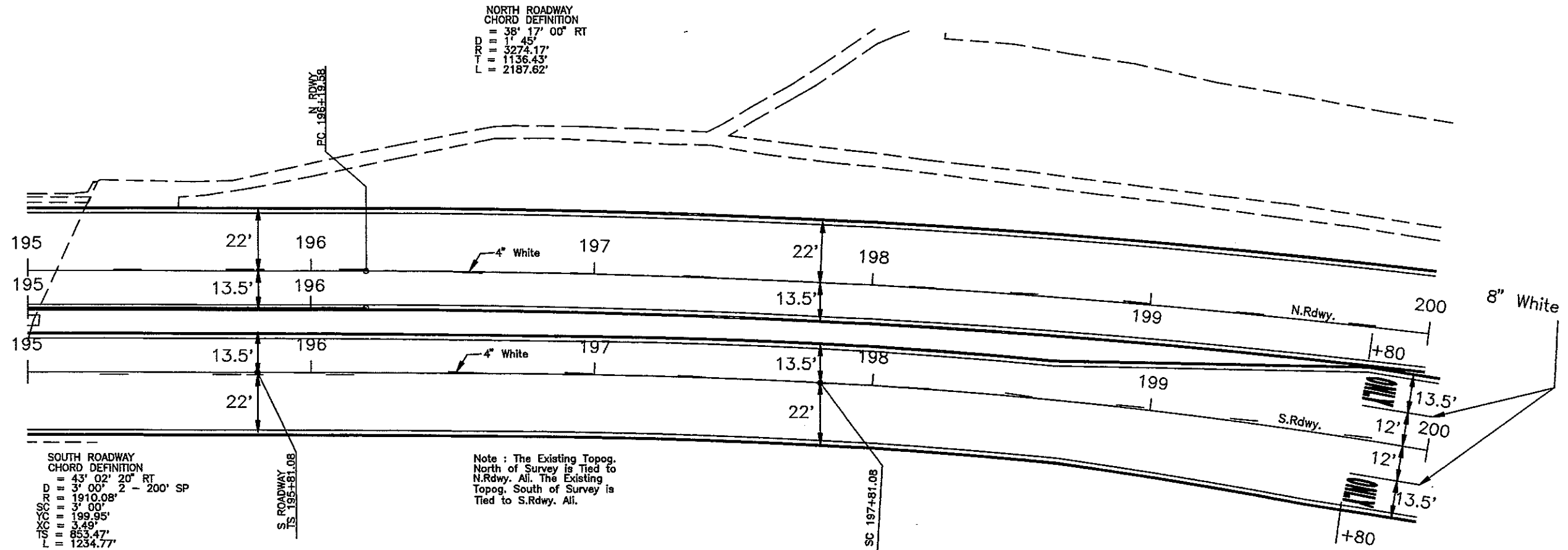
	394 LF
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PAVEMENT MARKING
LAYOUT
MAIN STREET
Mandan ND

Sta. 190+00-195+00



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	220



Preformed Patterned Pavement Marking 4" - Line (Grooved)

4" White Lane Line (10' Line, 30' Skip) 240 LF

Preformed Patterned Pavement Marking 8" - Line (Grooved)

8" White Chan. Line 40 LF

PREFORMED PATTERNED PVMT MK MESSAGE (GROOVED)
Only (2) 44 SF

PAVEMENT MARKING LAYOUT

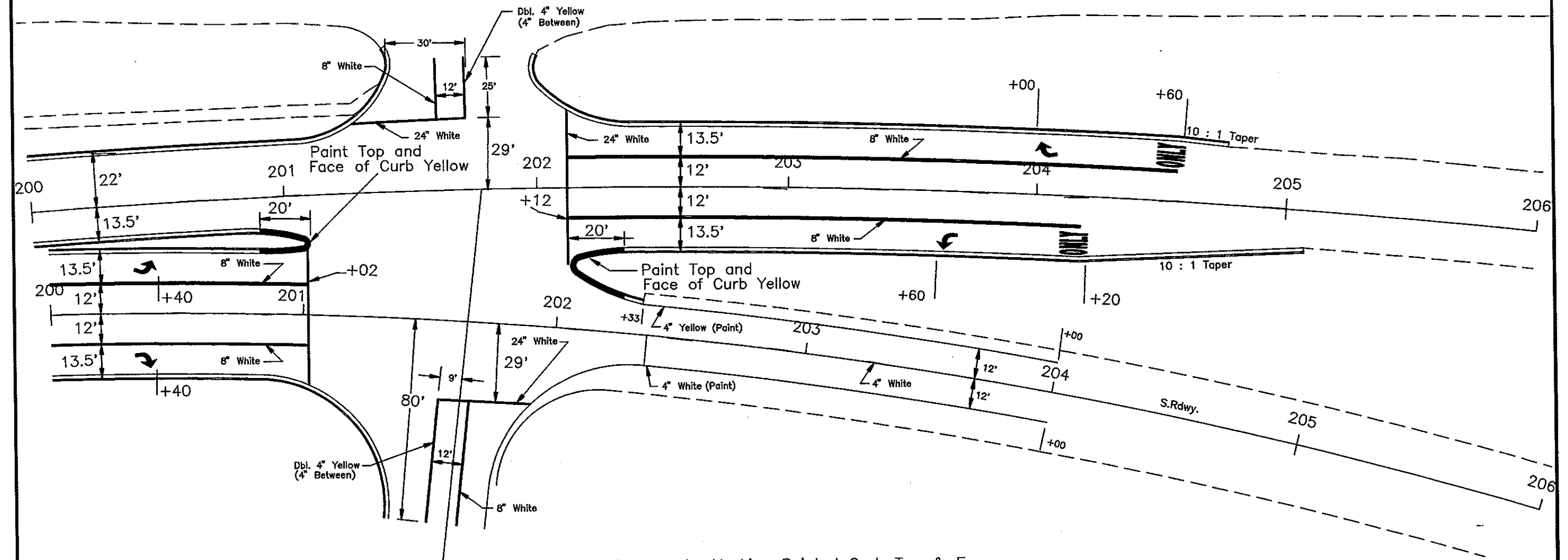
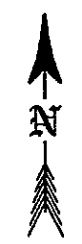
MAIN STREET
Mandan ND

Sta. 195+00-200+00

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	221

Preformed Patterned Pavement Marking 4" - Line (Grooved)	
4" White Lane Line (10' Line, 30' Skip)	190 LF
Preformed Patterned Pavement Marking 8" - Line (Grooved)	
8" White Chan. Line	747 LF
Preformed Patterned Pavement Marking 24" - Line (Grooved)	
24" White Stop Line	196 LF

PREFORMED PATTERNED PVMT MK MESSAGE (GROOVED)		
Right Arrow	(2)	30 SF
Left Arrow	(2)	30 SF
Only	(2)	44 SF
		<hr/>
		104 SF

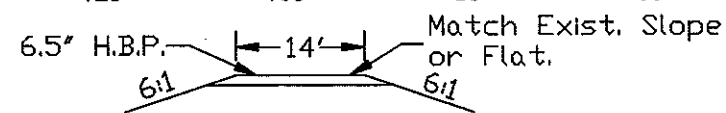
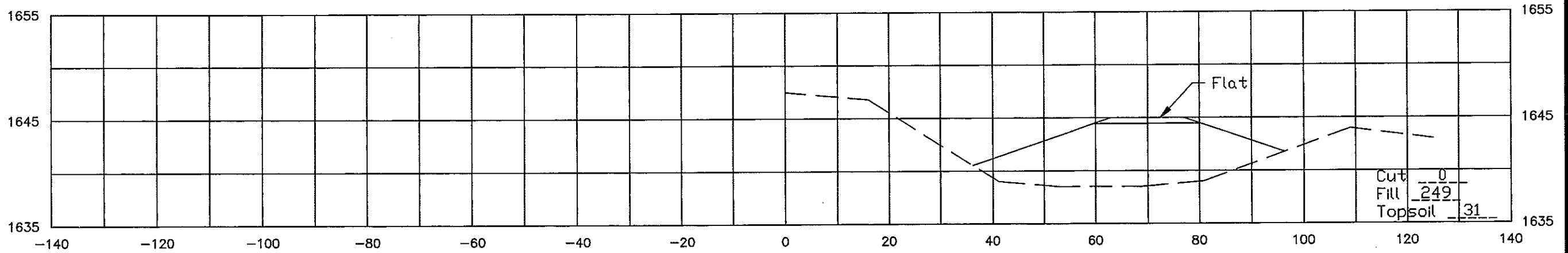


Pavement Marking Painted Curb Top & Face	
Yellow	91 LF
PVMT MKG PAINTED 4 IN. LINE	
Yellow	167 LF
White	267 LF
Total	434 LF

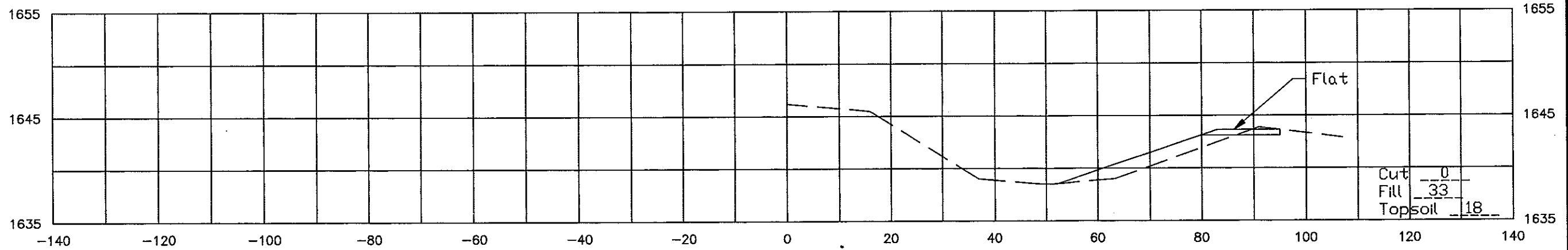
PAVEMENT MARKING LAYOUT
 MAIN STREET
 Sta. 200+00-206+00
 Mandan ND

PHASE 1

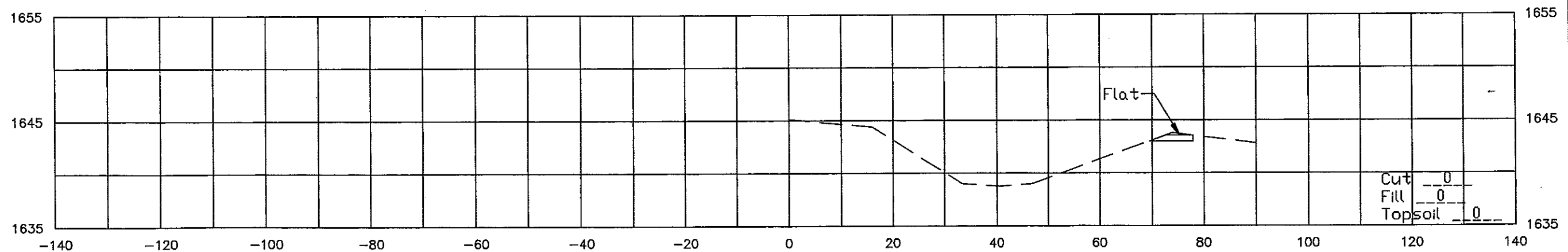
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
B	N.D.	NHU-1-094(039)916	222



X-OVER TYPICAL SECTION



206+00

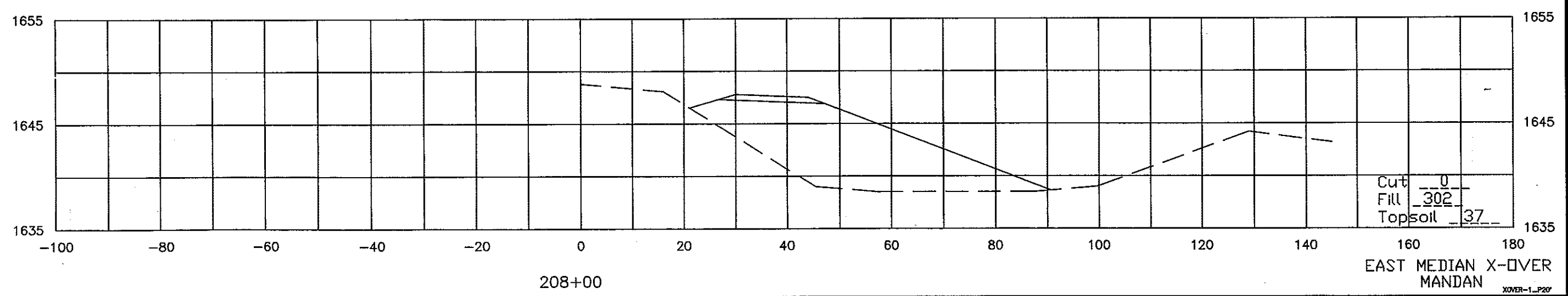
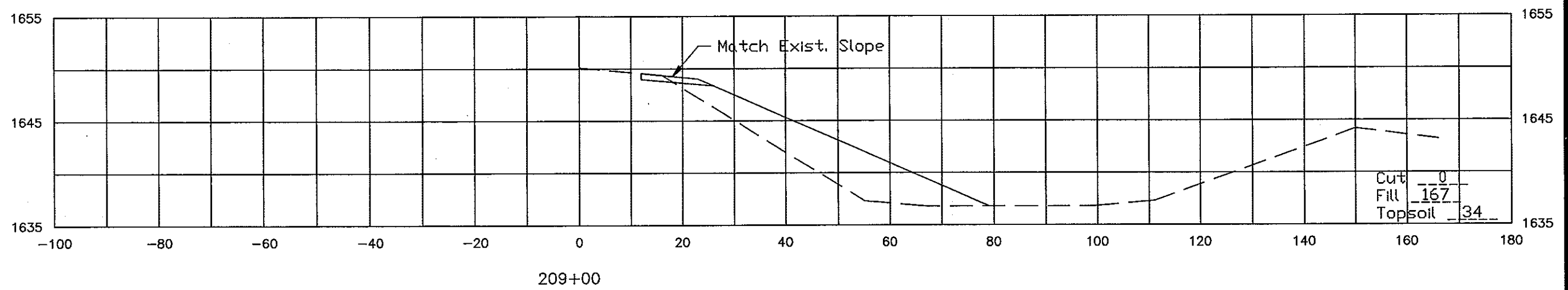
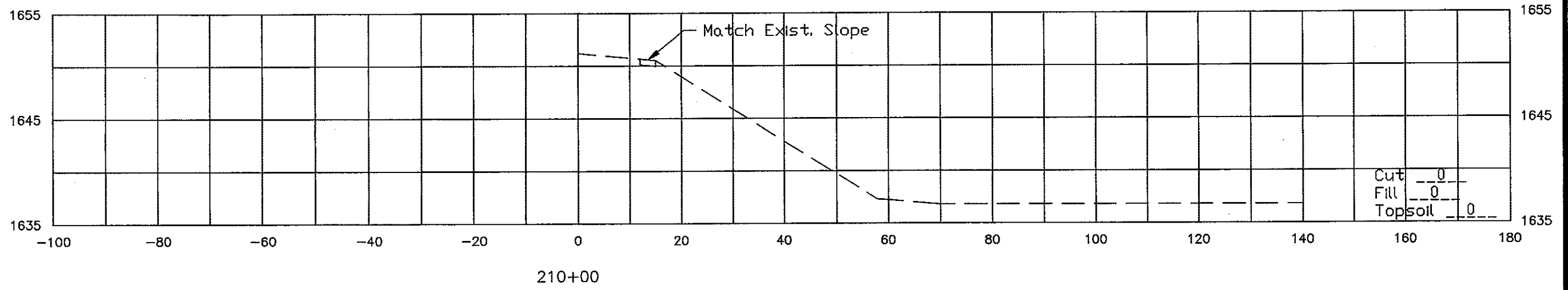


205+00

EAST MEDIAN X-OVER
MANDAN
XOVER-0_P20

PHASE 1

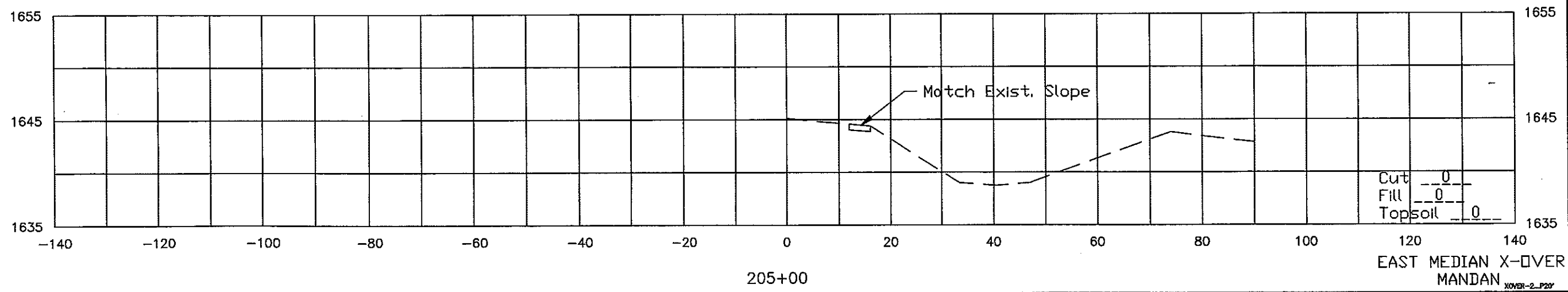
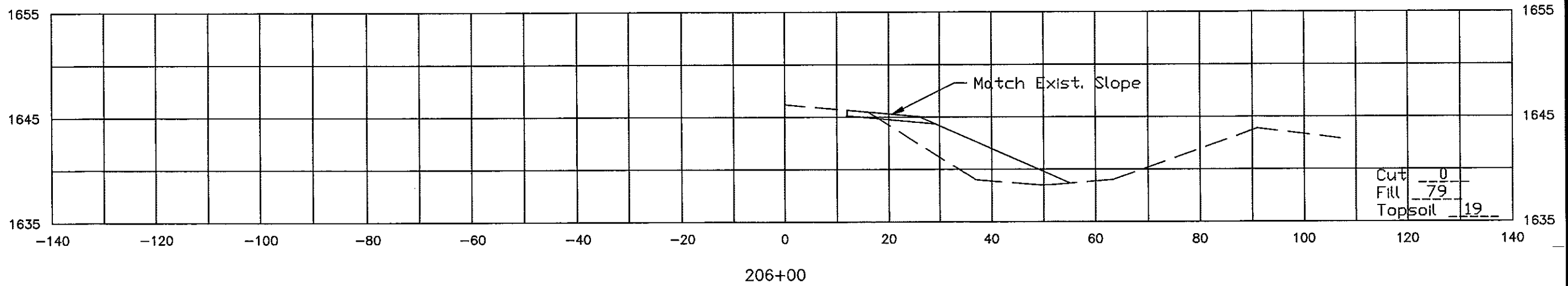
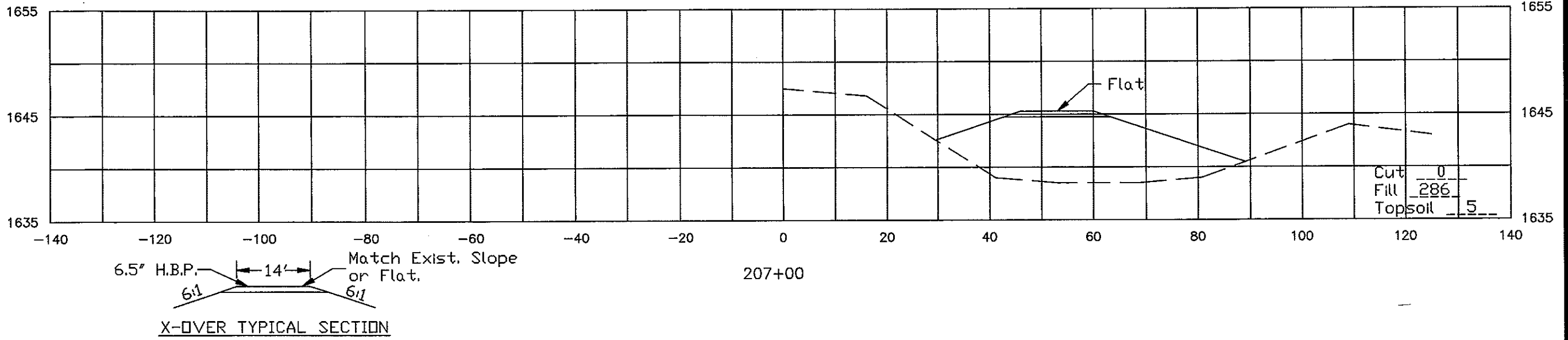
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	223



EAST MEDIAN X-OVER
MANDAN
XOVER-1_P20

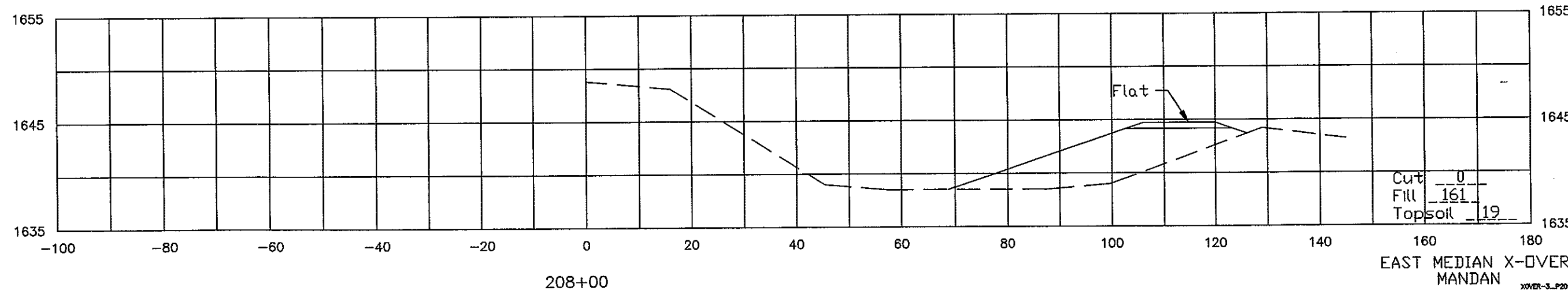
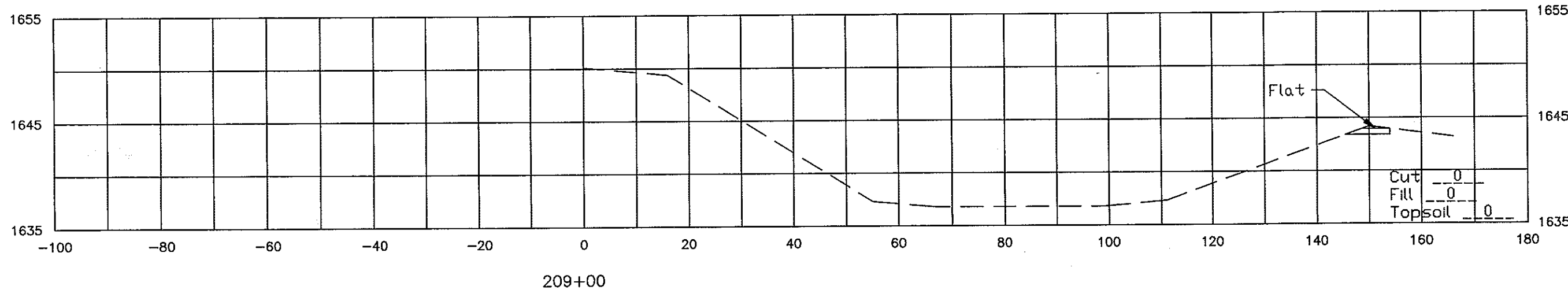
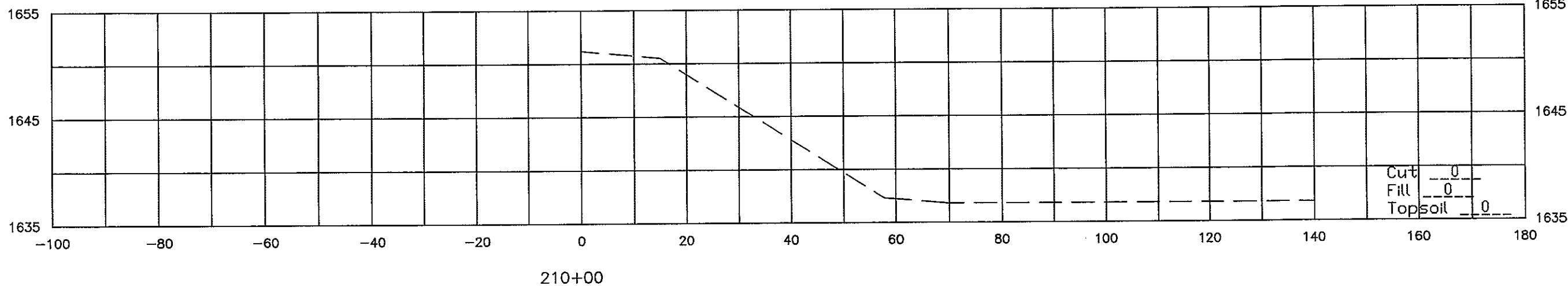
PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
B	N.D.	NHU-1-094(039)916	224



PHASE 2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(039)916	225



EAST MEDIAN X-OVER
MANDAN

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		OFFSET STATION	BASELINE STATION	OFFSET	ELEV	SLOPE
SIDE	ROADWAY MAIN	OFFSET STATION	BASELINE STATION	OFFSET	ELEV	SLOPE
LEFT		167+23.00	167+23.00	-45.1121	1643.8313	8.000
RIGHT		167+28.00	167+28.00	38.6736	1643.2221	-8.000
LEFT		167+28.00	167+28.00	-45.2041	1643.8155	8.000
RIGHT		167+48.00	167+48.00	38.4759	1643.2292	-8.000
LEFT		167+48.00	167+48.00	-44.0093	1643.5568	8.000
RIGHT		167+49.00	167+49.00	42.8199	1643.8209	8.000
LEFT		167+49.00	167+49.00	-43.8559	1643.5322	8.000
RIGHT		167+50.50	167+50.50	42.8871	1643.8257	8.000
LEFT		167+50.50	167+50.50	-43.7496	1643.5107	8.000
RIGHT		167+55.50	167+55.50	42.9884	1643.8331	8.000
LEFT		167+55.50	167+55.50	-43.8534	1643.4971	8.000
RIGHT		167+60.00	167+60.00	43.3141	1643.8571	8.000
LEFT		167+60.00	167+60.00	-44.0071	1643.4925	8.000
RIGHT		167+62.50	167+62.50	43.7708	1643.8786	8.000
LEFT		167+62.50	167+62.50	-44.1402	1643.4959	8.000
RIGHT		167+64.00	167+64.00	43.7708	1643.8907	8.000
LEFT		167+64.00	167+64.00	-44.1863	1643.4937	8.000
RIGHT		167+64.50	167+64.50	44.0870	1643.8786	8.000
LEFT		167+64.50	167+64.50	-43.8680	1643.8978	8.000
RIGHT		167+82.50	167+82.50	43.9014	1643.9003	8.000
LEFT		167+82.50	167+82.50	-45.2166	1643.5244	8.000
RIGHT		167+86.00	167+86.00	44.1242	1643.8678	8.000
LEFT		167+86.00	167+86.00	-45.0063	1643.4795	8.000
RIGHT		167+89.50	167+89.50	44.2474	1643.8715	8.000
LEFT		167+89.50	167+89.50	-44.7931	1643.4354	8.000
RIGHT		168+00.00	168+00.00	44.3500	1643.8737	8.000
LEFT		168+00.00	168+00.00	-43.6171	1642.8956	-8.000
RIGHT		168+00.50	168+00.50	43.1672	1643.7196	8.000
LEFT		168+00.50	168+00.50	-43.9228	1642.8581	-8.000
RIGHT		168+01.50	168+01.50	43.0906	1643.7107	8.000
LEFT		168+01.50	168+01.50	-43.8469	1642.8694	-8.000
RIGHT		168+02.50	168+02.50	42.9318	1643.6924	8.000
LEFT		168+02.50	168+02.50	-43.4777	1642.9177	-8.000
RIGHT		168+04.00	168+04.00	42.7653	1643.6736	8.000
LEFT		168+04.00	168+04.00	-42.9908	1642.9825	-8.000
RIGHT		168+05.50	168+05.50	42.6678	1643.6651	8.000
LEFT		168+05.50	168+05.50	-42.6866	1643.0252	-8.000
RIGHT		168+09.50	168+09.50	42.8394	1643.6910	8.000
LEFT		168+09.50	168+09.50	-42.8242	1643.1472	8.000
RIGHT		168+16.50	168+16.50	43.2277	1643.7553	8.000
LEFT		168+16.50	168+16.50	-42.4303	1643.1506	8.000
RIGHT		168+18.00	168+18.00	42.7197	1643.7330	8.000
LEFT		168+18.00	168+18.00	-42.6434	1643.1854	8.000
RIGHT		168+22.00	168+22.00	42.3411	1643.6968	8.000
LEFT		168+22.00	168+22.00	-42.8588	1643.2381	8.000
RIGHT		168+25.50	168+25.50	41.2893	1643.5989	8.000
LEFT		168+25.50	168+25.50	-42.7852	1643.2561	8.000
RIGHT		171+44.00	171+44.00	40.4090	1643.5229	8.000

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		OFFSET STATION	BASELINE STATION	OFFSET	ELEV	SLOPE
SIDE	ROADWAY MAIN	OFFSET STATION	BASELINE STATION	OFFSET	ELEV	SLOPE
LEFT		168+70.00	168+70.00	-44.1385	1643.6092	-8.000
RIGHT		169+00.00	169+00.00	38.4666	1643.8989	8.000
LEFT		169+00.00	169+00.00	-44.6617	1643.9819	-8.000
RIGHT		169+21.00	169+21.00	38.2556	1644.2417	-8.000
LEFT		169+21.00	169+21.00	-44.7452	1644.2597	-8.000
RIGHT		169+24.50	169+24.50	38.2458	1644.3196	8.000
LEFT		169+24.50	169+24.50	-44.8450	1644.2953	-8.000
RIGHT		169+56.00	169+56.00	38.0212	1644.3395	8.000
LEFT		169+56.00	169+56.00	-44.6035	1644.7577	-8.000
RIGHT		169+59.00	169+59.00	39.3889	1644.5956	8.000
LEFT		169+59.00	169+59.00	-44.5121	1644.8103	-8.000
RIGHT		169+61.50	169+61.50	39.5545	1644.6160	8.000
LEFT		169+61.50	169+61.50	-44.4501	1644.8524	-8.000
RIGHT		170+00.00	170+00.00	39.6920	1644.6332	8.000
LEFT		170+00.00	170+00.00	-44.5394	1645.3696	-8.000
RIGHT		170+26.00	170+26.00	43.7217	1644.6578	8.000
LEFT		170+26.00	170+26.00	-44.2643	1646.0268	-8.000
RIGHT		170+26.50	170+26.50	42.9154	1644.8606	8.000
LEFT		170+26.50	170+26.50	-46.6483	1646.3307	-8.000
RIGHT		170+27.00	170+27.00	43.0561	1644.8430	8.000
LEFT		170+27.00	170+27.00	-46.3358	1646.2976	-8.000
RIGHT		170+30.00	170+30.00	43.1958	1644.8256	8.000
LEFT		170+30.00	170+30.00	-45.5500	1646.2348	-8.000
RIGHT		170+65.50	170+65.50	44.0372	1644.7208	8.000
LEFT		170+65.50	170+65.50	-44.7428	1646.6611	-8.000
RIGHT		170+68.50	170+68.50	46.5815	1644.7157	8.000
LEFT		170+68.50	170+68.50	-46.8693	1646.9774	-8.000
RIGHT		170+69.50	170+69.50	46.0075	1644.8467	8.000
LEFT		170+69.50	170+69.50	-46.8131	1646.9873	-8.000
RIGHT		170+95.00	170+95.00	45.8161	1644.8904	8.000
LEFT		170+95.00	170+95.00	-46.5286	1647.3811	-8.000
RIGHT		170+99.50	170+99.50	38.7552	1646.3996	8.000
LEFT		170+99.50	170+99.50	-46.5374	1647.4580	-8.000
RIGHT		171+00.00	171+00.00	38.8144	1646.4453	8.000
LEFT		171+00.00	171+00.00	-46.5377	1647.4665	-8.000
RIGHT		171+14.50	171+14.50	38.8720	1646.4440	8.000
LEFT		171+14.50	171+14.50	-45.9388	1647.6358	-8.000
RIGHT		171+17.00	171+17.00	40.2995	1646.4367	8.000
LEFT		171+17.00	171+17.00	-45.7626	1647.6558	-8.000
RIGHT		171+21.00	171+21.00	40.2742	1646.4693	8.000
LEFT		171+21.00	171+21.00	-45.7425	1647.7207	-8.000
RIGHT		171+34.00	171+34.00	43.5050	1647.5337	8.000
LEFT		171+34.00	171+34.00	-43.5337	1646.5215	-8.000
RIGHT		171+37.50	171+37.50	39.6881	1646.7432	8.000
LEFT		171+37.50	171+37.50	-44.3696	1647.4845	-8.000
RIGHT		171+39.00	171+39.00	39.6927	1646.7839	8.000
LEFT		171+39.00	171+39.00	-44.7479	1647.4625	-8.000
RIGHT		171+44.00	171+44.00	39.5066	1646.8249	8.000
LEFT		171+44.00	171+44.00	-44.9887	1647.5166	-8.000

***** EARTHWORKS RUN FOR DIRT.DAT *****

T I E S L O P E S U M M A R Y

FROM STATION 187+20.00 TO STATION 189+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
171+44.50	171+44.50		RIGHT	39.3671	1646.9013	-8.000
			LEFT	-44.7730	1647.5495	-8.000
171+60.00	171+60.00		RIGHT	41.8989	1646.8637	-8.000
			LEFT	-45.9313	1648.3157	-8.000
171+62.00	171+62.00		RIGHT	41.3431	1647.1114	-8.000
			LEFT	-45.8756	1648.3302	-8.000
171+64.00	171+64.00		RIGHT	40.6794	1647.2158	-8.000
			LEFT	-45.8687	1648.3505	-8.000
171+74.00	171+74.00		RIGHT	39.8453	1647.3412	-8.000
			LEFT	-44.7854	1648.3150	-8.000
171+75.00	171+75.00		RIGHT	39.3081	1647.5083	-8.000
			LEFT	-44.6095	1648.3024	-8.000
171+75.50	171+75.50		RIGHT	39.2976	1647.5191	-8.000
			LEFT	-44.6342	1648.3102	-8.000
171+80.00	171+80.00		RIGHT	39.2921	1647.5244	-8.000
			LEFT	-44.3922	1648.3212	-8.000
171+80.50	171+80.50		RIGHT	39.2362	1647.5726	-8.000
			LEFT	-44.3555	1648.3211	-8.000
171+83.00	171+83.00		RIGHT	39.2293	1647.5780	-8.000
			LEFT	-44.1797	1648.3210	-8.000
171+85.00	171+85.00		RIGHT	39.1924	1647.6045	-8.000
			LEFT	-47.8748	1648.8000	-8.000
171+87.50	171+87.50		RIGHT	39.2703	1647.6119	-8.000
			LEFT	-50.1987	1649.1114	-8.000
171+89.50	171+89.50		RIGHT	39.2346	1647.6372	-8.000
			LEFT	-49.4657	1649.0361	-8.000
171+92.00	171+92.00		RIGHT	39.1971	1647.6582	-8.000
			LEFT	-48.9500	1648.9914	-8.000
171+93.00	171+93.00		RIGHT	39.1477	1647.6842	-8.000
			LEFT	-48.7430	1648.9733	-8.000
171+93.50	171+93.50		RIGHT	39.1271	1647.6945	-8.000
			LEFT	-48.6404	1648.9643	-8.000
171+94.00	171+94.00		RIGHT	39.3818	1647.6665	-8.000
			LEFT	-48.5381	1648.9553	-8.000
171+98.50	171+98.50		RIGHT	39.5260	1647.6523	-8.000
			LEFT	-48.5196	1648.9863	-8.000
172+00.00	172+00.00		RIGHT	39.5253	1647.6857	-8.000
			LEFT	-49.1334	1649.0737	-8.000
172+02.50	172+02.50		RIGHT	39.5151	1647.6976	-8.000
			LEFT	-49.7284	1649.1654	-8.000
172+03.00	172+03.00		RIGHT	39.4691	1647.7207	-8.000
			LEFT	-49.3659	1649.1234	-8.000
172+05.50	172+05.50		RIGHT	39.4599	1647.7252	-8.000
			LEFT	-49.0718	1649.1033	-8.000
172+12.50	172+12.50		RIGHT	39.4105	1647.7480	-8.000
			LEFT	-48.5682	1649.0836	-8.000
172+14.00	172+14.00		RIGHT	39.2575	1647.8104	-8.000
			LEFT	-49.2203	1649.1738	-8.000
			RIGHT	39.2218	1647.8235	-8.000

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
172+22.00	172+22.00		LEFT	-56.6325	1650.1429	-8.000
			RIGHT	39.0137	1647.8922	-8.000
172+22.50	172+22.50		LEFT	-56.6186	1650.1437	-8.000
			RIGHT	38.9291	1647.9057	-8.000
172+23.00	172+23.00		LEFT	-56.6041	1650.1443	-8.000
			RIGHT	38.6179	1647.9466	-8.000
172+27.50	172+27.50		LEFT	-56.4869	1650.1505	-8.000
			RIGHT	39.5106	1648.2335	-8.000
172+28.00	172+28.00		LEFT	-56.4742	1650.1511	-8.000
			RIGHT	39.3831	1648.2197	-8.000
172+28.50	172+28.50		LEFT	-56.4490	1650.1502	-8.000
			RIGHT	39.2134	1648.2007	-8.000
172+32.50	172+32.50		LEFT	-56.2456	1650.1413	-8.000
			RIGHT	38.0447	1648.0600	-8.000
172+33.00	172+33.00		LEFT	-56.2213	1650.1402	-8.000
			RIGHT	38.1028	1648.0547	-8.000
172+51.50	172+51.50		LEFT	-55.5021	1650.1062	-8.000
			RIGHT	39.5153	1647.9340	-8.000
172+52.00	172+52.00		LEFT	-55.4673	1650.1029	-8.000
			RIGHT	39.5212	1647.9343	-8.000
172+52.50	172+52.50		LEFT	-55.3058	1650.0837	-8.000
			RIGHT	39.5263	1647.9347	-8.000
172+53.50	172+53.50		LEFT	-45.1709	1648.8189	-8.000
			RIGHT	39.5362	1647.9355	-8.000
172+55.50	172+55.50		LEFT	-44.9567	1648.7958	-8.000
			RIGHT	39.5296	1647.9400	-8.000
172+59.00	172+59.00		LEFT	-45.2308	1648.8356	-8.000
			RIGHT	39.4800	1647.9518	-8.000
172+68.00	172+68.00		LEFT	-45.0123	1648.8173	-8.000
			RIGHT	39.3143	1647.9815	-8.000
172+69.00	172+69.00		LEFT	-45.0293	1648.8199	-8.000
			RIGHT	39.2926	1647.9847	-8.000
172+69.50	172+69.50		LEFT	-45.0384	1648.8213	-8.000
			RIGHT	39.2815	1647.9863	-8.000
172+84.50	172+84.50		LEFT	-45.0407	1648.8173	-8.000
			RIGHT	38.5279	1648.0762	-8.000
172+85.00	172+85.00		LEFT	-45.0432	1648.8170	-8.000
			RIGHT	38.4997	1648.875	-8.000
172+92.00	172+92.00		LEFT	-46.2344	1648.9563	-8.000
			RIGHT	38.0841	1648.1215	-8.000
172+92.50	172+92.50		LEFT	-46.2140	1648.9529	-8.000
			RIGHT	38.0533	1648.1244	-8.000
172+95.50	172+95.50		LEFT	-45.8854	1648.9061	-8.000
			RIGHT	38.1756	1648.1473	-8.000
172+96.00	172+96.00		LEFT	-45.8249	1648.8975	-8.000
			RIGHT	38.2168	1648.1515	-8.000
172+96.50	172+96.50		LEFT	-45.7640	1648.8888	-8.000
			RIGHT	38.2583	1648.1556	-8.000
173+00.00	173+00.00		LEFT	-45.8394	1648.8901	-8.000

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	227

MANDAN-EAST MAIN STREET
TIE SLOPE SUMMARY

FILE:	DIRT2.GRF	Note: Tie Slope Pts. are Not Saw Cut Locations.
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T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
173+01.00	173+01.00	RIGHT	38.0616	1648.1768	1.000
		LEFT	-45.9126	1648.8917	8.000
173+08.50	173+08.50	RIGHT	38.0714	1648.1841	1.000
		LEFT	-46.6529	1648.9245	8.000
173+09.00	173+09.00	RIGHT	38.0992	1648.1899	1.000
		LEFT	-46.7332	1648.9303	8.000
173+12.50	173+12.50	RIGHT	38.1006	1648.1897	1.000
		LEFT	-48.6379	1649.1385	8.000
173+13.00	173+13.00	RIGHT	38.1112	1648.1880	1.000
		LEFT	-50.5842	1649.3775	8.000
173+14.55	173+14.55	RIGHT	38.1128	1648.1878	1.000
		LEFT	-50.5241	1649.3313	8.000
173+15.50	173+15.50	RIGHT	38.1180	1648.1871	1.000
		LEFT	-50.2295	1649.3109	8.000
173+16.00	173+16.00	RIGHT	38.1213	1648.1867	1.000
		LEFT	-45.2571	1648.6849	8.000
173+19.00	173+19.00	RIGHT	38.1231	1648.1865	1.000
		LEFT	-45.2635	1648.6581	8.000
173+27.50	173+27.50	RIGHT	38.1343	1648.1852	1.000
		LEFT	-44.8303	1648.5213	8.000
173+28.00	173+28.00	RIGHT	38.1627	1648.1738	1.000
		LEFT	-47.0093	1648.7886	8.000
173+28.50	173+28.50	RIGHT	38.1641	1648.1726	1.000
		LEFT	-48.5136	1648.9715	8.000
173+47.00	173+47.00	RIGHT	38.1655	1648.1714	1.000
		LEFT	-44.6040	1648.2773	8.000
173+50.50	173+50.50	RIGHT	38.2354	1648.1290	1.000
		LEFT	-44.7364	1648.2513	8.000
173+84.50	173+84.50	RIGHT	38.2526	1648.1213	1.000
		LEFT	-45.5515	1647.9358	8.000
173+88.00	173+88.00	RIGHT	38.1744	1647.7971	1.000
		LEFT	-44.4770	1647.7585	8.000
173+96.00	173+96.00	RIGHT	38.1898	1647.7872	1.000
		LEFT	-44.4084	1647.6517	8.000
174+00.00	174+00.00	RIGHT	38.2252	1647.7647	1.000
		LEFT	-44.7780	1647.6488	8.000
174+03.50	174+03.50	RIGHT	38.2429	1647.7535	1.000
		LEFT	-44.9481	1647.6447	8.000
174+04.00	174+04.00	RIGHT	38.2584	1647.7436	1.000
		LEFT	-44.9849	1647.6457	8.000
174+06.00	174+06.00	RIGHT	38.2606	1647.7422	1.000
		LEFT	-45.1650	1647.6538	8.000
174+09.00	174+09.00	RIGHT	38.2695	1647.7366	1.000
		LEFT	-45.3395	1647.6539	8.000
174+10.50	174+10.50	RIGHT	38.2827	1647.7282	1.000
		LEFT	-45.3766	1647.6476	8.000
174+11.00	174+11.00	RIGHT	38.2893	1647.7239	1.000
		LEFT	-45.3887	1647.6455	8.000
		RIGHT	38.2916	1647.7225	1.000

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
174+12.50	174+12.50	LEFT	-45.4252	1647.6392	8.000
		RIGHT	38.2982	1647.7183	1.000
174+17.00	174+17.00	LEFT	-49.4926	1648.1151	8.000
		RIGHT	38.3182	1647.7057	1.000
174+27.00	174+27.00	LEFT	-50.3289	1648.1473	8.000
		RIGHT	38.3624	1647.6775	1.000
174+27.50	174+27.50	LEFT	-49.5917	1648.0515	8.000
		RIGHT	38.3645	1647.6761	1.000
174+28.00	174+28.00	LEFT	-46.0881	1647.6099	8.000
		RIGHT	38.3668	1647.6747	1.000
174+31.50	174+31.50	LEFT	-45.7666	1647.5444	8.000
		RIGHT	38.3792	1647.6618	1.000
174+32.00	174+32.00	LEFT	-45.7843	1647.5430	8.000
		RIGHT	38.3809	1647.6599	1.000
174+32.50	174+32.50	LEFT	-45.8018	1647.5416	8.000
		RIGHT	38.3827	1647.6580	1.000
174+34.00	174+34.00	LEFT	-45.8544	1647.5373	8.000
		RIGHT	38.3878	1647.6524	1.000
174+60.00	174+60.00	LEFT	-47.0496	1647.4986	8.000
		RIGHT	38.3004	1647.3767	1.000
174+64.50	174+64.50	LEFT	-47.5477	1647.5283	8.000
		RIGHT	38.2780	1647.3218	1.000
174+65.00	174+65.00	LEFT	-47.5966	1647.5308	8.000
		RIGHT	38.2755	1647.3156	1.000
174+65.50	174+65.50	LEFT	-47.5577	1647.5223	8.000
		RIGHT	38.2730	1647.3096	1.000
174+66.00	174+66.00	LEFT	-47.5188	1647.5138	8.000
		RIGHT	38.2705	1647.3035	1.000
174+68.50	174+68.50	LEFT	-47.4051	1647.4815	8.000
		RIGHT	38.2581	1647.2730	1.000
174+87.00	174+87.00	LEFT	-47.6774	1647.3817	8.000
		RIGHT	38.1800	1647.0610	1.000
174+87.50	174+87.50	LEFT	-47.7884	1647.3919	8.000
		RIGHT	38.1754	1647.0528	1.000
174+93.00	174+93.00	LEFT	-49.1817	1647.5263	8.000
		RIGHT	38.1249	1646.9625	1.000
174+98.50	174+98.50	LEFT	-47.1032	1647.2267	8.000
		RIGHT	38.0114	1646.8091	1.000
175+00.00	175+00.00	LEFT	-46.7920	1647.1769	8.000
		RIGHT	38.0267	1646.7602	1.000
175+02.50	175+02.50	LEFT	-46.2723	1647.0939	8.000
		RIGHT	38.0856	1646.6832	1.000
175+04.50	175+04.50	LEFT	-45.8994	1647.0328	8.000
		RIGHT	38.1162	1646.6375	1.000
175+05.00	175+05.00	LEFT	-45.9692	1647.0379	8.000
		RIGHT	38.5231	1646.6853	1.000
175+08.00	175+08.00	LEFT	-46.3853	1647.0682	8.000
		RIGHT	38.5283	1646.6630	1.000
175+10.50	175+10.50	LEFT	-45.9431	1646.9948	8.000

MANDAN-EAST MAIN STREET
TIE SLOPE SUMMARY

FILE: DIRT3.GRF Note: Tie Slope Pts. are Not Saw Cut Locations

T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	BASELINE STATION	OFFSET STATION
175+16.00	175+16.00	RIGHT	38.5327	1646.6443	-8.000	175+16.00	175+16.00
		LEFT	-45.2492	1646.8683	8.000		
175+22.50	175+22.50	RIGHT	38.5424	1646.6033	-8.000	175+22.50	175+22.50
		LEFT	-45.1201	1646.8051	8.000		
175+23.00	175+23.00	RIGHT	38.5536	1646.5549	-8.000	175+23.00	175+23.00
		LEFT	-45.1327	1646.8031	8.000		
175+24.00	175+24.00	RIGHT	38.5545	1646.5512	-8.000	175+24.00	175+24.00
		LEFT	-43.2310	1646.5004	8.000		
175+24.50	175+24.50	RIGHT	38.5561	1646.5437	-8.000	175+24.50	175+24.50
		LEFT	-44.0333	1646.3965	8.000		
175+25.00	175+25.00	RIGHT	38.5570	1646.5400	-8.000	175+25.00	175+25.00
		LEFT	-43.9777	1646.3998	8.000		
175+34.00	175+34.00	RIGHT	38.5577	1646.5363	-8.000	175+34.00	175+34.00
		LEFT	-43.1152	1646.4425	8.000		
175+34.50	175+34.50	RIGHT	38.6037	1646.4654	-8.000	175+34.50	175+34.50
		LEFT	-43.0764	1646.4437	8.000		
175+36.50	175+36.50	RIGHT	38.6078	1646.4613	-8.000	175+36.50	175+36.50
		LEFT	-43.1203	1646.4538	8.000		
175+40.00	175+40.00	RIGHT	38.5782	1646.4505	-8.000	175+40.00	175+40.00
		LEFT	-43.5403	1646.4810	8.000		
175+42.50	175+42.50	RIGHT	38.4806	1646.4374	-8.000	175+42.50	175+42.50
		LEFT	-43.8401	1646.5004	8.000		
175+43.50	175+43.50	RIGHT	38.0403	1646.4743	-8.000	175+43.50	175+43.50
		LEFT	-43.9603	1646.5082	8.000		
175+47.50	175+47.50	RIGHT	39.4078	1646.6481	-8.000	175+47.50	175+47.50
		LEFT	-43.8023	1646.4595	8.000		
175+48.50	175+48.50	RIGHT	39.4968	1646.6303	-8.000	175+48.50	175+48.50
		LEFT	-43.5455	1646.4201	8.000		
175+52.00	175+52.00	RIGHT	39.5194	1646.6259	-8.000	175+52.00	175+52.00
		LEFT	-43.4132	1646.2750	8.000		
175+52.50	175+52.50	RIGHT	39.5285	1646.6017	-8.000	175+52.50	175+52.50
		LEFT	-43.5632	1646.2526	8.000		
175+53.00	175+53.00	RIGHT	39.5296	1646.5982	-8.000	175+53.00	175+53.00
		LEFT	-43.7130	1646.2305	8.000		
175+60.00	175+60.00	RIGHT	39.4585	1646.5857	-8.000	175+60.00	175+60.00
		LEFT	-45.3334	1645.9771	8.000		
175+60.50	175+60.50	RIGHT	38.1615	1646.3325	-8.000	175+60.50	175+60.50
		LEFT	-45.5253	1645.9494	8.000		
175+61.00	175+61.00	RIGHT	38.2315	1646.3215	-8.000	175+61.00	175+61.00
		LEFT	-43.2208	1646.3215	8.000		
175+61.50	175+61.50	RIGHT	38.9346	1646.1447	-8.000	175+61.50	175+61.50
		LEFT	-43.9376	1646.3158	8.000		
175+62.00	175+62.00	RIGHT	38.2376	1646.3158	-8.000	175+62.00	175+62.00
		LEFT	-43.5692	1646.3290	8.000		
175+62.50	175+62.50	RIGHT	38.2315	1646.3129	-8.000	175+62.50	175+62.50
		LEFT	-43.8925	1646.3658	8.000		
175+63.00	175+63.00	RIGHT	38.2257	1646.3100	-8.000	175+63.00	175+63.00
		LEFT	-44.5393	1646.4394	8.000		
175+64.00	175+64.00	RIGHT	38.2139	1646.3043	-8.000	175+64.00	175+64.00
		LEFT	-45.1860	1646.5130	8.000		
		RIGHT	38.2160	1646.2968	-8.000		

T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	BASELINE STATION	OFFSET STATION
175+65.00	175+65.00	LEFT	-45.7223	1646.5728	8.000	175+65.00	175+65.00
		RIGHT	38.2289	1646.2879	-8.000		
175+66.50	175+66.50	LEFT	-45.9378	1646.5889	8.000	175+66.50	175+66.50
		RIGHT	38.2483	1646.2747	-8.000		
175+67.00	175+67.00	LEFT	-45.8473	1646.5740	8.000	175+67.00	175+67.00
		RIGHT	38.2549	1646.2702	-8.000		
175+75.50	175+75.50	LEFT	-45.7315	1646.4980	8.000	175+75.50	175+75.50
		RIGHT	38.3653	1646.1949	-8.000		
175+76.00	175+76.00	LEFT	-45.7604	1646.4980	8.000	175+76.00	175+76.00
		RIGHT	38.3716	1646.1905	-8.000		
175+78.50	175+78.50	LEFT	-45.7667	1646.4807	8.000	175+78.50	175+78.50
		RIGHT	38.4040	1646.1683	-8.000		
175+81.00	175+81.00	LEFT	-45.7709	1646.4631	8.000	175+81.00	175+81.00
		RIGHT	38.4450	1646.1451	-8.000		
175+83.50	175+83.50	LEFT	-45.8551	1646.4556	8.000	175+83.50	175+83.50
		RIGHT	38.5262	1646.1169	-8.000		
175+84.50	175+84.50	LEFT	-45.9963	1646.4660	8.000	175+84.50	175+84.50
		RIGHT	38.5585	1646.1056	-8.000		
175+87.50	175+87.50	LEFT	-46.4221	1646.4975	8.000	175+87.50	175+87.50
		RIGHT	38.6555	1646.0718	-8.000		
175+91.00	175+91.00	LEFT	-46.8653	1646.5276	8.000	175+91.00	175+91.00
		RIGHT	38.7041	1646.0404	-8.000		
176+00.00	176+00.00	LEFT	-47.8777	1646.5890	8.000	176+00.00	176+00.00
		RIGHT	38.5824	1645.9905	-8.000		
176+11.00	176+11.00	LEFT	-43.0000	1646.5069	8.000	176+11.00	176+11.00
		RIGHT	38.1843	1645.9606	-8.000		
176+14.00	176+14.00	LEFT	-43.0000	1646.6222	8.000	176+14.00	176+14.00
		RIGHT	38.0457	1645.9563	-8.000		
176+14.50	176+14.50	LEFT	-43.0000	1646.6780	8.000	176+14.50	176+14.50
		RIGHT	38.0226	1645.9555	-8.000		
176+18.00	176+18.00	LEFT	-43.0000	1646.8487	8.000	176+18.00	176+18.00
		RIGHT	38.0417	1645.9278	-8.000		
176+31.50	176+31.50	LEFT	-60.1504	1647.8951	8.000	176+31.50	176+31.50
		RIGHT	39.0070	1645.9612	-8.000		
176+33.00	176+33.00	LEFT	-47.9536	1646.3597	8.000	176+33.00	176+33.00
		RIGHT	39.0188	1645.9318	-8.000		
176+65.00	176+65.00	LEFT	-47.4583	1646.0662	8.000	176+65.00	176+65.00
		RIGHT	39.8305	1645.8217	-8.000		
176+84.00	176+84.00	LEFT	-46.7619	1645.8417	8.000	176+84.00	176+84.00
		RIGHT	40.5862	1645.7787	-8.000		
176+86.00	176+86.00	LEFT	-46.7477	1645.8254	8.000	176+86.00	176+86.00
		RIGHT	40.6749	1645.7753	-8.000		
176+94.00	176+94.00	LEFT	-46.7373	1645.7662	8.000	176+94.00	176+94.00
		RIGHT	41.5653	1645.8287	-8.000		
176+99.00	176+99.00	LEFT	-46.7763	1645.7349	8.000	176+99.00	176+99.00
		RIGHT	38.3125	1645.3078	-8.000		
177+00.00	177+00.00	LEFT	-46.7836	1645.7286	8.000	177+00.00	177+00.00
		RIGHT	38.5148	1645.2753	-8.000		
177+07.00	177+07.00	LEFT	-47.0222	1645.7078	8.000	177+07.00	177+07.00

T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
177+12.00	177+12.00		RIGHT	38.8882	1645.1780	-8.000
			LEFT	-47.3126	1645.7079	-8.000
177+50.00	177+50.00		RIGHT	38.8925	1645.1412	-8.000
			LEFT	-48.9415	1645.6365	-8.000
177+94.50	177+94.50		RIGHT	39.3050	1644.8147	-8.000
			LEFT	-50.1094	1645.4605	-8.000
177+97.50	177+97.50		RIGHT	38.5454	1644.5876	-8.000
			LEFT	-50.1385	1645.4424	-8.000
178+00.00	178+00.00		RIGHT	38.5575	1644.5644	-8.000
			LEFT	-50.1430	1645.4249	-8.000
178+22.00	178+22.00		RIGHT	38.5678	1644.5450	-8.000
			LEFT	-47.4305	1644.9758	-8.000
178+24.50	178+24.50		RIGHT	38.3650	1644.4604	-8.000
			LEFT	-47.0137	1644.9112	-8.000
178+53.50	178+53.50		RIGHT	39.9681	1644.2475	-8.000
			LEFT	-45.6229	1644.5924	-8.000
178+57.50	178+57.50		RIGHT	39.8570	1644.1164	-8.000
			LEFT	-45.4926	1644.5561	-8.000
178+77.00	178+77.00		RIGHT	39.7711	1644.1071	-8.000
			LEFT	-46.1576	1644.5417	-8.000
178+80.00	178+80.00		RIGHT	40.0056	1643.9803	-8.000
			LEFT	-46.5183	1644.5718	-8.000
178+89.50	178+89.50		RIGHT	39.9083	1643.9775	-8.000
			LEFT	-47.6617	1644.6672	-8.000
178+95.50	178+95.50		RIGHT	39.2906	1644.0072	-8.000
			LEFT	-47.5516	1644.6235	-8.000
179+00.00	179+00.00		RIGHT	38.5586	1644.0687	-8.000
			LEFT	-47.1618	1644.5522	-8.000
179+04.00	179+04.00		RIGHT	38.4199	1644.0635	-8.000
			LEFT	-43.0592	1644.0046	-8.000
179+04.50	179+04.50		RIGHT	38.2966	1644.0589	-8.000
			LEFT	-43.0319	1644.0055	-8.000
179+05.00	179+05.00		RIGHT	38.2813	1644.0583	-8.000
			LEFT	-43.0550	1644.0139	-8.000
179+11.30	179+11.30		RIGHT	38.2659	1644.0578	-8.000
			LEFT	-44.5839	1644.1735	-8.000
179+12.50	179+12.50		RIGHT	38.0718	1644.0505	-8.000
			LEFT	-44.8750	1644.2039	-8.000
179+18.00	179+18.00		RIGHT	38.0349	1644.0491	-8.000
			LEFT	-45.2879	1644.2280	-8.000
179+21.00	179+21.00		RIGHT	39.0266	1644.1543	-8.000
			LEFT	-45.8644	1644.2851	-8.000
179+23.00	179+23.00		RIGHT	47.8747	1645.2453	-8.000
			LEFT	-46.2491	1644.3231	-8.000
179+31.00	179+31.00		RIGHT	48.1243	1645.2665	-8.000
			LEFT	-45.9814	1644.2497	-8.000
179+31.50	179+31.50		RIGHT	49.1212	1645.3511	-8.000
			LEFT	-45.8866	1644.2353	-8.000
			RIGHT	48.5265	1645.2743	-8.000

T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
179+35.00	179+35.00		LEFT	-44.8093	1644.0832	-8.000
			RIGHT	48.5022	1645.2538	-8.000
179+36.00	179+36.00		LEFT	-44.4180	1644.0293	-8.000
			RIGHT	48.9172	1645.3007	-8.000
179+39.50	179+39.50		LEFT	-43.1323	1643.8510	-8.000
			RIGHT	44.0966	1644.6806	-8.000
179+40.00	179+40.00		LEFT	-43.1653	1643.8527	-8.000
			RIGHT	43.7589	1644.6359	-8.000
179+40.50	179+40.50		LEFT	-43.1977	1643.8542	-8.000
			RIGHT	43.9095	1644.6522	-8.000
179+41.00	179+41.00		LEFT	-48.5003	1644.5145	-8.000
			RIGHT	44.3319	1644.7025	-8.000
179+42.50	179+42.50		LEFT	-48.5569	1644.5141	-8.000
			RIGHT	45.5486	1644.8471	-8.000
179+44.50	179+44.50		LEFT	-48.3163	1644.4740	-8.000
			RIGHT	47.1720	1645.0400	-8.000
179+45.50	179+45.50		LEFT	-48.2062	1644.4553	-8.000
			RIGHT	47.4368	1645.0681	-8.000
179+46.00	179+46.00		LEFT	-48.4601	1644.4845	-8.000
			RIGHT	47.4574	1645.0682	-8.000
179+49.00	179+49.00		LEFT	-49.9845	1644.6601	-8.000
			RIGHT	47.5809	1645.0686	-8.000
179+50.00	179+50.00		LEFT	-50.4923	1644.7185	-8.000
			RIGHT	47.6126	1645.0676	-8.000
179+51.00	179+51.00		LEFT	-51.0006	1644.7771	-8.000
			RIGHT	48.3123	1645.1500	-8.000
179+53.50	179+53.50		LEFT	-52.2707	1644.9233	-8.000
			RIGHT	38.0186	1643.8462	-8.000
179+55.00	179+55.00		LEFT	-52.8308	1644.9859	-8.000
			RIGHT	38.1606	1643.8209	-8.000
179+57.00	179+57.00		LEFT	-52.7380	1644.9643	-8.000
			RIGHT	38.3503	1643.7872	-8.000
179+73.50	179+73.50		LEFT	-52.1814	1644.8122	-8.000
			RIGHT	48.2634	1645.0314	-8.000
179+74.00	179+74.00		LEFT	-52.1719	1644.8085	-8.000
			RIGHT	48.2624	1645.0288	-8.000
179+75.00	179+75.00		LEFT	-52.1519	1644.8010	-8.000
			RIGHT	48.4892	1645.1772	-8.000
179+75.50	179+75.50		LEFT	-52.1424	1644.7973	-8.000
			RIGHT	38.9899	1643.8622	-8.000
179+89.00	179+89.00		LEFT	-50.1669	1644.4829	-8.000
			RIGHT	41.1915	1644.0699	-8.000
179+91.00	179+91.00		LEFT	-49.7691	1644.4231	-8.000
			RIGHT	40.7794	1644.0084	-8.000
179+93.50	179+93.50		LEFT	-49.2845	1644.3501	-8.000
			RIGHT	40.2637	1643.9315	-8.000
179+95.00	179+95.00		LEFT	-48.9953	1644.3064	-8.000
			RIGHT	39.8141	1643.8678	-8.000
180+00.00	180+00.00		LEFT	-48.0294	1644.1607	-8.000

MANDAN-EAST MAIN STREET
TIE SLOPE SUMMARY

FILE:	DIRT5.GRF	Note: Tie Slope Pts. are Not Saw Cut Locations.
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T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
180+24.50	180+24.50	RIGHT	38.1327	1643.5994	-8.000
		LEFT	-48.0603	1644.0420	8.000
180+28.50	180+28.50	RIGHT	38.3974	1643.4438	-8.000
		LEFT	-48.6902	1644.1008	8.000
180+33.00	180+33.00	RIGHT	38.6665	1643.3902	-8.000
		LEFT	-49.3991	1644.1669	8.000
180+35.00	180+35.00	RIGHT	38.0929	1643.4394	-8.000
		LEFT	-49.6047	1644.1826	8.000
180+36.50	180+36.50	RIGHT	39.5619	1643.6362	8.000
		LEFT	-49.6567	1644.1816	8.000
180+81.00	180+81.00	RIGHT	39.4735	1643.6177	8.000
		LEFT	-50.6492	1644.0832	8.000
180+84.50	180+84.50	RIGHT	38.7391	1643.1186	-8.000
		LEFT	-50.6971	1644.0716	8.000
181+00.00	181+00.00	RIGHT	38.9495	1643.0748	8.000
		LEFT	-51.1540	1644.0513	8.000
181+15.00	181+15.00	RIGHT	38.7548	1643.0217	-8.000
		LEFT	-51.3178	1643.9967	8.000
181+19.00	181+19.00	RIGHT	38.0370	1643.0456	8.000
		LEFT	-51.3620	1643.9823	8.000
181+20.00	181+20.00	RIGHT	38.1525	1643.0401	8.000
		LEFT	-50.8267	1643.9103	8.000
181+23.00	181+23.00	RIGHT	38.1815	1643.0387	8.000
		LEFT	-47.5837	1643.4900	8.000
181+45.50	181+45.50	RIGHT	38.2682	1643.0345	8.000
		LEFT	-47.5926	1643.3786	8.000
181+46.00	181+46.00	RIGHT	38.9272	1643.0044	8.000
		LEFT	-47.6315	1643.3809	8.000
181+47.50	181+47.50	RIGHT	38.9418	1643.0037	8.000
		LEFT	-47.7574	1643.3892	8.000
181+48.00	181+48.00	RIGHT	38.9862	1643.0018	8.000
		LEFT	-47.9920	1643.4160	8.000
181+50.50	181+50.50	RIGHT	39.0007	1643.0011	8.000
		LEFT	-51.3874	1643.8279	8.000
181+64.50	181+64.50	RIGHT	39.0736	1642.9977	8.000
		LEFT	-45.5044	1643.0225	8.000
181+82.00	181+82.00	RIGHT	39.4843	1642.9790	8.000
		LEFT	-47.0421	1643.1273	8.000
181+83.50	181+83.50	RIGHT	39.6832	1642.9164	8.000
		LEFT	-47.1270	1643.1304	8.000
181+84.50	181+84.50	RIGHT	39.6848	1642.9091	8.000
		LEFT	-47.1835	1643.1324	8.000
181+85.00	181+85.00	RIGHT	39.6854	1642.9042	8.000
		LEFT	-47.2117	1643.1335	8.000
181+86.00	181+86.00	RIGHT	39.6858	1642.9017	8.000
		LEFT	-47.2691	1643.1356	8.000
181+94.00	181+94.00	RIGHT	39.6864	1642.8968	8.000
		LEFT	-47.8014	1643.1622	8.000
		RIGHT	39.6037	1642.8465	8.000

T I E S L O P E S U M M A R Y
FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
182+00.00	182+00.00	LEFT	-45.5308	1642.8483	8.000
		RIGHT	39.2307	1642.7698	8.000
182+21.00	182+21.00	LEFT	-47.8516	1642.9351	8.000
		RIGHT	38.5162	1642.4782	8.000
182+23.00	182+23.00	LEFT	-47.9595	1642.9303	8.000
		RIGHT	38.4484	1642.4504	8.000
182+23.50	182+23.50	LEFT	-47.9880	1642.9291	8.000
		RIGHT	38.4313	1642.4435	8.000
182+24.00	182+24.00	LEFT	-48.0167	1642.9278	8.000
		RIGHT	38.4140	1642.4365	8.000
182+27.00	182+27.00	LEFT	-47.7194	1642.8617	8.000
		RIGHT	38.2468	1642.3867	8.000
182+45.00	182+45.00	LEFT	-45.6136	1642.4251	8.000
		RIGHT	39.5522	1641.9883	-8.000
182+54.00	182+54.00	LEFT	-48.6815	1642.7218	8.000
		RIGHT	40.0505	1641.8393	-8.000
182+56.50	182+56.50	LEFT	-47.6094	1642.5637	8.000
		RIGHT	40.1423	1641.8038	-8.000
182+59.50	182+59.50	LEFT	-45.8050	1642.3093	8.000
		RIGHT	40.2540	1641.7609	-8.000
182+61.00	182+61.00	LEFT	-44.9021	1642.1819	8.000
		RIGHT	40.3099	1641.7394	-8.000
182+61.50	182+61.50	LEFT	-44.6026	1642.1397	8.000
		RIGHT	40.3285	1641.7323	-8.000
182+67.00	182+67.00	LEFT	-44.0984	1641.7491	8.000
		RIGHT	40.5323	1641.6538	-8.000
182+75.50	182+75.50	LEFT	-45.2513	1641.5325	8.000
		RIGHT	40.8478	1641.5325	-8.000
182+79.50	182+79.50	LEFT	-47.4943	1641.2041	8.000
		RIGHT	40.9964	1641.4734	-8.000
182+80.00	182+80.00	LEFT	-46.0476	1641.3801	8.000
		RIGHT	41.0044	1641.4695	-8.000
183+00.00	183+00.00	LEFT	-45.5379	1641.2511	8.000
		RIGHT	40.6306	1641.3235	-8.000
183+02.00	183+02.00	LEFT	-45.3858	1641.2505	8.000
		RIGHT	40.7613	1641.3060	-8.000
183+24.00	183+24.00	LEFT	-46.1930	1640.9303	8.000
		RIGHT	42.3610	1641.1035	-8.000
183+24.50	183+24.50	LEFT	-45.2914	1641.0380	8.000
		RIGHT	42.3974	1641.0989	-8.000
183+30.50	183+30.50	LEFT	-43.0660	1641.2556	8.000
		RIGHT	42.8335	1641.0437	-8.000
183+39.50	183+39.50	LEFT	-43.8403	1641.0673	8.000
		RIGHT	43.4880	1640.9608	-8.000
183+41.50	183+41.50	LEFT	-43.6995	1641.0645	8.000
		RIGHT	43.5955	1640.9471	-8.000
183+55.00	183+55.00	LEFT	-43.0327	1641.0446	8.000
		RIGHT	43.9553	1640.9006	-8.000
183+58.50	183+58.50	LEFT	-43.6224	1641.0837	8.000

TIE SLOPE SUMMARY

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
184+00.00	184+00.00	RIGHT	44.0398	1640.8896	-8.000
		LEFT	-43.8192	1640.6901	8.000
184+01.50	184+01.50	RIGHT	47.1469	1640.4964	-8.000
		LEFT	-44.9033	1640.8133	8.000
184+05.00	184+05.00	RIGHT	47.2070	1640.4785	-8.000
		LEFT	-44.8548	1640.7786	8.000
184+38.00	184+38.00	RIGHT	47.0030	1640.4799	-8.000
		LEFT	-42.4420	1640.2058	0.000
184+58.50	184+58.50	RIGHT	47.6119	1640.1956	8.000
		LEFT	-42.2489	1640.1059	0.000
184+81.50	184+81.50	RIGHT	48.4627	1640.0480	8.000
		LEFT	-45.4352	1640.2604	8.000
184+84.00	184+84.00	RIGHT	52.4014	1640.2917	8.000
		LEFT	-45.0785	1640.2093	8.000
184+90.50	184+90.50	RIGHT	52.8107	1640.3258	8.000
		LEFT	-43.0546	1639.6624	-8.000
184+96.00	184+96.00	RIGHT	53.5444	1640.3732	8.000
		LEFT	-44.9075	1639.4034	-8.000
185+00.00	185+00.00	RIGHT	53.0218	1640.2703	8.000
		LEFT	-44.1699	1639.4757	-8.000
185+33.00	185+33.00	RIGHT	52.7966	1640.2149	8.000
		LEFT	-44.2898	1639.2962	-8.000
185+37.00	185+37.00	RIGHT	56.6805	1640.4753	8.000
		LEFT	-43.9882	1639.3140	-8.000
185+38.00	185+38.00	RIGHT	56.8291	1640.4666	8.000
		LEFT	-42.0924	1639.6941	8.000
185+38.50	185+38.50	RIGHT	56.8662	1640.4644	8.000
		LEFT	-45.1515	1640.0751	8.000
185+39.00	185+39.00	RIGHT	56.8848	1640.4634	8.000
		LEFT	-45.0836	1640.0853	8.000
185+40.50	185+40.50	RIGHT	56.9034	1640.4623	8.000
		LEFT	-44.5446	1639.9940	8.000
185+41.00	185+41.00	RIGHT	56.9591	1640.4590	8.000
		LEFT	-44.4131	1639.9763	8.000
185+55.00	185+55.00	RIGHT	56.9777	1640.4579	8.000
		LEFT	-42.7464	1639.7311	8.000
185+59.50	185+59.50	RIGHT	56.3581	1640.2850	8.000
		LEFT	-44.9970	1640.0006	8.000
185+60.00	185+60.00	RIGHT	56.1361	1640.2266	8.000
		LEFT	-45.7870	1640.0980	8.000
185+60.50	185+60.50	RIGHT	56.1014	1640.2188	8.000
		LEFT	-41.4224	1639.5512	8.000
185+61.50	185+61.50	RIGHT	56.0660	1640.2110	8.000
		LEFT	-41.4087	1639.5468	8.000
185+73.50	185+73.50	RIGHT	55.9960	1640.1954	8.000
		LEFT	-41.2521	1639.4957	8.000
185+79.50	185+79.50	RIGHT	56.2540	1640.1458	8.000
		LEFT	-41.1739	1639.4701	8.000
		RIGHT	56.7318	1640.1646	8.000

TIE SLOPE SUMMARY

FROM STATION 167+20.00 TO STATION 189+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
185+81.00	185+81.00	LEFT	-41.1391	1639.4508	-8.000
		RIGHT	56.7108	1640.1518	8.000
185+81.50	185+81.50	LEFT	-41.1928	1639.4416	-8.000
		RIGHT	56.7037	1640.1475	8.000
185+90.50	185+90.50	LEFT	-41.2514	1639.3894	-8.000
		RIGHT	56.8776	1640.1078	8.000
185+91.00	185+91.00	LEFT	-41.2718	1639.3844	-8.000
		RIGHT	56.9007	1640.1073	8.000
186+00.00	186+00.00	LEFT	-43.0643	1639.1155	-8.000
		RIGHT	56.6428	1640.0137	8.000
186+20.00	186+20.00	LEFT	-42.8503	1639.0425	-8.000
		RIGHT	55.9862	1639.7952	8.000
186+44.50	186+44.50	LEFT	-42.5244	1638.9612	-8.000
		RIGHT	56.5387	1639.6972	8.000
186+59.00	186+59.00	LEFT	-43.8951	1638.7176	-8.000
		RIGHT	55.1333	1639.4236	8.000
186+62.00	186+62.00	LEFT	-49.1822	1638.0417	-8.000
		RIGHT	54.6047	1639.3361	8.000
186+62.50	186+62.50	LEFT	-49.0875	1638.0511	-8.000
		RIGHT	54.6904	1639.3434	8.000
186+63.00	186+63.00	LEFT	-48.8534	1638.0778	-8.000
		RIGHT	54.7742	1639.3505	8.000
186+64.00	186+64.00	LEFT	-48.3852	1638.1314	-8.000
		RIGHT	54.9423	1639.3647	8.000
186+64.50	186+64.50	LEFT	-48.1506	1638.1582	-8.000
		RIGHT	55.0261	1639.3717	8.000
186+82.00	186+82.00	LEFT	-45.5325	1638.3983	-8.000
		RIGHT	57.5494	1639.5878	8.000
186+83.50	186+83.50	LEFT	-45.5882	1638.3838	-8.000
		RIGHT	57.5807	1639.5615	8.000
187+00.00	187+00.00	LEFT	-48.5115	1637.9362	-8.000
		RIGHT	58.5587	1639.5712	8.000
187+00.50	187+00.50	LEFT	-48.6850	1637.9155	-8.000
		RIGHT	58.6304	1639.5768	8.000
187+01.00	187+01.00	LEFT	-48.8589	1637.8947	-8.000
		RIGHT	58.6699	1639.5783	8.000
187+01.50	187+01.50	LEFT	-49.0323	1637.8740	-8.000
		RIGHT	58.6455	1639.5718	8.000
187+02.00	187+02.00	LEFT	-49.2063	1637.8532	-8.000
		RIGHT	58.6210	1639.5653	8.000
187+04.00	187+04.00	LEFT	-47.8178	1638.0305	-8.000
		RIGHT	58.5235	1639.5395	8.000
187+04.50	187+04.50	LEFT	-45.6145	1638.3069	-8.000
		RIGHT	58.4989	1639.5330	8.000
187+05.00	187+05.00	LEFT	-44.5761	1638.4377	-8.000
		RIGHT	58.4747	1639.5266	8.000
187+06.50	187+06.50	LEFT	-42.1472	1638.7442	-8.000
		RIGHT	58.3707	1639.5034	8.000

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

		ROADWAY MAIN				
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	
187+13.00	187+13.00	RIGHT	58.2879	1639.4862	8.000	
		LEFT	-41.6258	1639.0333	8.000	
		RIGHT	58.2689	1639.4463	8.000	
187+14.00	187+14.00	LEFT	-42.0724	1639.0755	8.000	
		RIGHT	58.3155	1639.4453	8.000	
187+20.00	187+20.00	LEFT	-42.8350	1639.0893	8.000	
		RIGHT	58.5954	1639.4593	8.000	
187+21.00	187+21.00	LEFT	-42.9342	1639.0881	8.000	
		RIGHT	58.6317	1639.4370	8.000	
187+44.50	187+44.50	LEFT	-45.2600	1639.0597	8.000	
		RIGHT	54.6757	1638.6827	-8.000	
187+72.00	187+72.00	LEFT	-48.7928	1639.1277	8.000	
		RIGHT	56.7562	1638.3864	-8.000	
187+72.50	187+72.50	LEFT	-48.8584	1639.1291	8.000	
		RIGHT	56.8769	1638.3707	-8.000	
187+75.00	187+75.00	LEFT	-49.1861	1639.1361	8.000	
		RIGHT	57.3738	1638.3053	-8.000	
187+75.50	187+75.50	LEFT	-49.2516	1639.1375	8.000	
		RIGHT	57.4093	1638.3002	-8.000	
187+87.50	187+87.50	LEFT	-50.8225	1639.1709	8.000	
		RIGHT	57.0952	1638.7912	8.000	
187+89.50	187+89.50	LEFT	-51.0786	1639.1757	8.000	
		RIGHT	57.3973	1638.8154	8.000	
187+94.00	187+94.00	LEFT	-51.2097	1639.1310	8.000	
		RIGHT	57.6637	1638.8180	8.000	
188+00.00	188+00.00	LEFT	-50.4515	1638.9547	8.000	
		RIGHT	57.9447	1638.8121	8.000	
188+01.00	188+01.00	LEFT	-50.2807	1638.9293	8.000	
		RIGHT	57.9711	1638.8114	8.000	
188+02.50	188+02.50	LEFT	-50.0248	1638.8912	8.000	
		RIGHT	58.0268	1638.8122	8.000	
188+03.00	188+03.00	LEFT	-49.9398	1638.8785	8.000	
		RIGHT	58.0460	1638.8126	8.000	
188+04.00	188+04.00	LEFT	-49.6864	1638.8428	8.000	
		RIGHT	57.9091	1638.7914	8.000	
188+04.50	188+04.50	LEFT	-49.5498	1638.8237	8.000	
		RIGHT	57.8343	1638.7800	8.000	
188+05.00	188+05.00	LEFT	-49.4135	1638.8046	8.000	
		RIGHT	57.2433	1638.7041	8.000	
188+12.00	188+12.00	LEFT	-47.5029	1638.5373	8.000	
		RIGHT	57.5456	1638.2020	8.000	
188+19.00	188+19.00	LEFT	-46.7348	1638.2723	8.000	
		RIGHT	56.1030	1638.3538	-8.000	
188+31.73	188+31.73	LEFT	-52.4709	1637.5035	-8.000	
		RIGHT	56.5769	1638.2428	-8.000	
188+32.00	188+32.00	LEFT	-52.4726	1637.5022	-8.000	
		RIGHT	56.5829	1638.2409	-8.000	
188+32.50	188+32.50	LEFT	-52.4762	1637.4997	-8.000	
		RIGHT	56.1729	1638.4584	8.000	

T I E S L O P E S U M M A R Y

FROM STATION 167+20.00 TO STATION 189+00.00

		ROADWAY MAIN				
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	
188+33.50	188+33.50	LEFT	-52.8415	1637.4500	-8.000	
		RIGHT	58.3422	1638.7255	8.000	
188+35.50	188+35.50	LEFT	-53.7111	1637.3331	-8.000	
		RIGHT	58.4731	1638.7337	8.000	
188+37.00	188+37.00	LEFT	-54.3633	1637.2455	-8.000	
		RIGHT	58.5708	1638.7398	8.000	
188+38.50	188+38.50	LEFT	-54.7685	1637.1887	-8.000	
		RIGHT	58.5913	1638.7362	8.000	
188+41.00	188+41.00	LEFT	-54.6522	1637.1931	-8.000	
		RIGHT	58.5047	1638.7153	8.000	
188+41.50	188+41.50	LEFT	-54.6287	1637.1940	-8.000	
		RIGHT	57.4410	1638.5803	8.000	
188+42.00	188+42.00	LEFT	-54.6052	1637.1949	-8.000	
		RIGHT	57.4534	1638.0939	8.000	
188+42.50	188+42.50	LEFT	-54.5825	1637.1957	-8.000	
		RIGHT	57.8874	1638.0351	8.000	
188+45.50	188+45.50	LEFT	-54.3980	1637.2066	-8.000	
		RIGHT	57.6727	1638.0498	8.000	
188+51.50	188+51.50	LEFT	-52.4901	1637.4206	-8.000	
		RIGHT	56.5646	1638.1638	8.000	
188+60.00	188+60.00	LEFT	-50.2468	1637.6664	-8.000	
		RIGHT	55.8509	1638.2185	8.000	
188+68.00	188+68.00	LEFT	-51.0915	1637.5283	-8.000	
		RIGHT	55.5239	1638.2327	8.000	
188+79.00	188+79.00	LEFT	-52.4499	1637.3137	-8.000	
		RIGHT	58.6781	1637.7877	8.000	
188+79.50	188+79.50	LEFT	-52.4759	1637.3084	-8.000	
		RIGHT	59.1010	1637.7328	8.000	
188+80.00	188+80.00	LEFT	-52.5018	1637.3031	-8.000	
		RIGHT	59.5231	1637.6780	8.000	
188+85.50	188+85.50	LEFT	-52.7848	1637.2454	-8.000	
		RIGHT	58.3226	1638.5113	8.000	
188+86.00	188+86.00	LEFT	-52.8109	1637.2401	-8.000	
		RIGHT	58.5007	1638.5316	8.000	
188+86.50	188+86.50	LEFT	-52.8368	1637.2348	-8.000	
		RIGHT	58.6787	1638.5518	8.000	
188+88.00	188+88.00	LEFT	-51.8280	1637.3548	-8.000	
		RIGHT	58.9986	1638.5857	8.000	
188+89.50	188+89.50	LEFT	-50.1643	1637.5567	-8.000	
		RIGHT	59.1444	1638.5978	8.000	
188+90.00	188+90.00	LEFT	-49.9836	1637.5772	-8.000	
		RIGHT	59.1933	1638.6019	8.000	
188+91.00	188+91.00	LEFT	-49.9867	1637.5715	-8.000	
		RIGHT	59.2905	1638.6099	8.000	
188+92.50	188+92.50	LEFT	-48.7973	1637.7153	-8.000	
		RIGHT	59.5474	1638.6360	8.000	
188+96.00	188+96.00	LEFT	-47.5540	1638.2017	-8.000	
		RIGHT	60.5657	1638.7490	8.000	

DETAILED EARTHWORK QUANTITIES

FROM STATION 167+20.00 TO STATION 189+00.00

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)
167+20.00	0.000	0.000	0.000	0.000	1.2000	0.000	0.000
167+23.00	144.163	8.009	0.111	0.006	1.2000	0.007	8.002
167+28.00	146.449	26.908	0.053	0.015	1.2000	0.018	34.892
167+48.00	149.196	109.498	0.000	0.020	1.2000	0.024	144.366
167+49.00	149.051	5.523	0.000	0.000	1.2000	0.000	149.889
167+50.50	148.932	8.277	0.000	0.000	1.2000	0.000	158.166
167+55.50	149.538	27.636	0.000	0.000	1.2000	0.000	185.802
167+60.00	149.917	24.955	0.000	0.000	1.2000	0.000	210.757
167+62.50	150.357	13.902	0.000	0.000	1.2000	0.000	224.659
167+64.00	150.434	8.355	0.000	0.000	1.2000	0.000	233.014
167+64.50	150.426	2.786	0.000	0.000	1.2000	0.000	235.800
167+82.50	153.936	101.454	0.000	0.000	1.2000	0.000	337.254
167+86.00	154.341	19.981	0.000	0.000	1.2000	0.000	357.235
167+89.50	154.875	20.042	0.000	0.000	1.2000	0.000	377.277
168+00.00	153.278	59.919	0.249	0.048	1.2000	0.058	437.137
168+00.50	153.026	2.836	0.337	0.005	1.2000	0.007	439.967
168+01.50	152.539	5.659	0.424	0.014	1.2000	0.017	445.608
168+02.50	152.135	5.642	0.287	0.013	1.2000	0.016	451.235
168+04.00	151.755	8.441	0.189	0.013	1.2000	0.016	459.660
168+05.50	151.616	8.427	0.159	0.010	1.2000	0.012	468.076
168+09.50	150.887	22.408	0.017	0.013	1.2000	0.016	480.468
168+16.50	151.371	39.181	0.000	0.002	1.2000	0.003	529.646
168+18.00	151.395	8.410	0.000	0.000	1.2000	0.000	538.057
168+22.00	151.313	22.423	0.000	0.000	1.2000	0.000	560.479
168+25.50	150.994	19.594	0.000	0.000	1.2000	0.000	580.073
168+70.00	138.089	238.226	0.282	0.232	1.2000	0.279	818.020
169+00.00	135.282	151.873	0.453	0.408	1.2000	0.450	969.403
169+24.50	137.166	17.638	0.459	0.355	1.2000	0.425	1074.071
169+56.00	136.083	159.395	0.504	0.062	1.2000	0.075	1091.634
169+59.00	135.208	15.072	0.718	0.081	1.2000	0.856	1250.173
169+61.50	134.222	12.474	0.734	0.069	1.2000	0.097	1265.148
170+00.00	136.640	193.114	3.291	2.886	1.2000	3.463	1467.190
170+26.50	141.573	133.954	2.897	2.980	1.2000	3.576	1597.569
170+27.00	142.564	2.637	2.918	0.054	1.2000	0.065	1600.132
170+30.00	146.130	16.039	2.944	0.054	1.2000	0.065	1602.704
170+65.50	145.045	191.420	3.221	3.343	1.2000	0.411	1818.332
170+68.50	146.627	16.204	4.701	5.208	1.2000	6.250	1803.502
170+69.50	146.882	16.204	4.141	0.491	1.2000	0.589	1819.117
170+95.00	144.489	5.435	3.970	0.150	1.2000	0.180	1824.372
170+99.50	142.673	23.930	0.336	2.034	1.2000	2.440	1959.523
171+00.00	142.549	2.641	0.345	0.057	1.2000	0.068	1983.385
171+14.50	137.766	75.270	0.354	0.008	1.2000	0.008	1986.019
171+17.00	137.269	12.733	1.034	0.373	1.2000	0.448	2060.841
171+21.00	136.262	20.262	1.152	0.101	1.2000	0.121	2073.453
171+34.00	131.557	64.475	1.272	0.613	1.2000	0.735	2093.499
171+37.50	131.513	17.051	1.359	0.171	1.2000	0.171	2157.238
171+39.00	131.364	7.302	1.572	0.081	1.2000	0.205	2174.084
						0.098	2181.289

DETAILED EARTHWORK QUANTITIES

FROM STATION 167+20.00 TO STATION 189+00.00

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)
171+44.00	131.331	24.324	1.013	0.239	1.2000	0.287	2205.325
171+44.50	131.058	2.430	1.831	0.026	1.2000	0.032	2207.723
171+60.00	136.140	76.696	1.253	0.885	1.2000	1.062	2283.357
171+62.00	136.620	10.102	0.989	0.083	1.2000	0.100	2293.359
171+64.00	137.023	10.135	0.729	0.064	1.2000	0.076	2303.418
171+74.00	138.212	50.969	0.657	0.257	1.2000	0.308	2354.079
171+75.50	138.276	5.120	0.648	0.024	1.2000	0.029	2359.170
171+75.50	138.314	2.561	0.641	0.012	1.2000	0.014	2361.717
171+80.00	138.547	23.072	0.565	0.101	1.2000	0.121	2384.668
171+80.50	138.563	2.566	0.555	0.010	1.2000	0.012	2387.231
171+83.00	138.602	12.832	0.505	0.049	1.2000	0.059	2399.994
171+85.00	138.908	10.278	0.475	0.036	1.2000	0.044	2410.229
171+87.50	140.150	12.919	0.513	0.046	1.2000	0.055	2423.093
171+89.50	140.383	10.390	0.602	0.041	1.2000	0.050	2433.434
171+92.00	140.353	12.998	0.781	0.064	1.2000	0.077	2446.354
171+93.00	140.330	5.198	0.801	0.029	1.2000	0.035	2451.517
171+93.50	140.310	2.599	0.877	0.016	1.2000	0.019	2454.097
171+94.00	140.278	2.598	0.878	0.016	1.2000	0.020	2456.676
171+98.50	139.654	23.328	0.814	0.141	1.2000	0.169	2479.834
172+00.50	139.376	7.751	0.787	0.044	1.2000	0.053	2487.532
172+02.50	138.759	12.877	0.736	0.071	1.2000	0.085	2500.324
172+03.00	138.680	2.569	0.726	0.014	1.2000	0.016	2502.876
172+05.50	138.424	12.829	0.669	0.065	1.2000	0.077	2515.628
172+12.50	137.513	35.770	0.491	0.150	1.2000	0.180	2551.217
172+14.00	137.696	7.645	0.453	0.026	1.2000	0.031	2558.830
172+22.00	137.739	40.805	1.170	0.241	1.2000	0.289	2599.347
172+22.50	137.775	2.551	1.151	0.021	1.2000	0.026	2601.872
172+23.00	137.860	2.552	1.081	0.021	1.2000	0.025	2604.399
172+27.50	138.570	23.036	1.364	0.204	1.2000	0.244	2627.190
172+28.00	138.747	2.568	1.414	0.026	1.2000	0.031	2629.727
172+28.50	138.867	2.570	1.465	0.027	1.2000	0.032	2632.266
172+32.50	138.818	20.569	1.905	0.250	1.2000	0.300	2652.535
172+33.00	138.818	2.571	1.964	0.036	1.2000	0.043	2655.063
172+51.50	136.405	94.290	3.535	1.884	1.2000	2.261	2747.092
172+52.50	136.234	2.524	3.600	0.066	1.2000	0.079	2749.538
172+53.50	136.207	5.045	3.600	0.066	1.2000	0.080	2751.982
172+55.50	136.647	10.106	0.314	0.072	1.2000	0.087	2756.941
172+59.00	136.994	17.736	0.323	0.024	1.2000	0.028	2767.018
172+68.00	136.733	45.621	0.327	0.042	1.2000	0.051	2784.703
172+69.00	136.664	5.063	0.295	0.104	1.2000	0.124	2830.200
172+69.50	136.626	2.530	0.287	0.005	1.2000	0.013	2835.250
172+84.50	133.614	75.067	0.174	0.128	1.2000	0.006	2837.774
172+85.00	133.560	2.474	0.171	0.003	1.2000	0.004	2915.157
172+92.00	133.290	34.592	0.133	0.039	1.2000	0.047	2949.702
172+92.50	133.370	2.469	0.131	0.002	1.2000	0.003	2952.168
172+95.50	135.998	14.965	0.129	0.014	1.2000	0.017	2967.115
172+96.00	136.864	2.527	0.129	0.002	1.2000	0.003	2969.639
172+96.50	137.122	2.537	0.129	0.002	1.2000	0.003	2972.173
173+00.00	136.956	17.764	0.128	0.017	1.2000	0.020	2989.917

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	234

MANDAN-EAST MAIN STREET
EARTHWORK SUMMARY

FILE:	DIRT9.GRF	Note: Existing Rdwy Surface Shall be Subtracted From Quant
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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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
173+01.00	137.125	5.076	0.127	0.005	1.2000	0.006	2994.987
173+08.50	138.662	38.304	0.117	0.034	1.2000	0.041	3033.250
173+09.00	138.827	2.569	0.116	0.002	1.2000	0.003	3035.817
173+12.50	140.592	18.110	0.108	0.015	1.2000	0.017	3053.910
173+13.00	141.232	8.091	0.107	0.002	1.2000	0.002	3056.517
173+14.55	140.649	4.921	0.099	0.006	1.2000	0.007	3064.601
173+15.00	139.072	2.564	0.098	0.004	1.2000	0.004	3069.518
173+16.00	137.853	15.264	0.087	0.002	1.2000	0.002	3072.080
173+19.00	136.901	43.668	0.064	0.010	1.2000	0.012	3087.332
173+27.50	140.522	2.613	0.067	0.024	1.2000	0.029	3130.971
173+28.00	141.685	2.638	0.070	0.001	1.2000	0.001	3133.583
173+28.50	143.200	97.710	0.070	0.001	1.2000	0.002	3136.219
173+47.00	142.009	18.438	0.158	0.075	1.2000	0.090	3233.840
173+50.50	142.460	182.216	0.158	0.020	1.2000	0.024	3252.254
173+84.50	146.942	18.919	0.278	0.274	1.2000	0.329	3434.141
173+88.00	144.954	43.533	0.258	0.035	1.2000	0.042	3453.018
173+96.00	148.893	22.123	0.213	0.070	1.2000	0.084	3496.467
174+00.00	149.771	19.344	0.191	0.030	1.2000	0.036	3518.555
174+03.50	148.687	10.985	0.173	0.024	1.2000	0.028	3537.871
174+04.00	148.546	2.752	0.171	0.003	1.2000	0.004	3540.619
174+06.00	148.053	10.985	0.160	0.012	1.2000	0.015	3551.590
174+09.00	147.396	16.414	0.145	0.017	1.2000	0.020	3567.983
174+10.50	148.226	8.212	0.138	0.008	1.2000	0.009	3576.185
174+11.00	148.801	2.750	0.136	0.007	1.2000	0.003	3578.933
174+32.00	148.320	8.309	0.128	0.007	1.2000	0.009	3587.232
174+34.00	147.442	8.200	0.107	0.020	1.2000	0.024	3612.420
174+60.00	148.343	142.415	0.063	0.032	1.2000	0.038	3669.063
174+64.50	148.290	24.719	0.038	0.001	1.2000	0.001	3671.910
174+65.00	148.416	2.747	0.039	0.001	1.2000	0.001	3674.728
174+65.50	148.494	2.749	0.040	0.001	1.2000	0.001	3694.102
174+66.00	148.567	2.751	0.041	0.001	1.2000	0.001	3696.845
174+68.50	148.823	13.768	0.046	0.004	1.2000	0.005	3699.583
174+87.00	148.450	101.843	0.088	0.046	1.2000	0.055	3707.781
174+87.50	148.423	8.200	0.089	0.002	1.2000	0.002	3850.158
174+93.00	148.010	30.192	0.102	0.019	1.2000	0.023	3874.870
174+98.50	147.197	30.067	0.188	0.030	1.2000	0.038	3877.617
175+00.00	146.934	8.170	0.238	0.012	1.2000	0.011	3880.365
175+02.50	146.487	13.584	0.291	0.024	1.2000	0.017	3883.115
175+04.50	146.812	10.863	0.084	0.014	1.2000	0.002	3896.878
175+05.00	147.075	2.721	0.109	0.002	1.2000	0.005	3998.667
175+08.00	147.739	16.379	0.111	0.012	1.2000	0.012	4001.413
175+10.50	145.145	13.655	0.111	0.010	1.2000	0.015	4031.582
175+16.00	145.145	29.778	0.114	0.023	1.2000	0.014	4069.770
							4083.325
							4094.172
							4349.709
							4385.254
							4387.752
							4390.247
							4392.749
							4395.273
							4400.314
							4405.320
							4410.344
							4417.930
							4420.470
							4464.001
							4466.582
							4479.502
							4492.453
							4505.448
							4510.661
							4526.340
							4544.673
							4592.272
							4651.238
							4667.369
							4670.058
							4688.994
							4763.854
							4772.166
							4946.248
							5049.940
							5104.256
							5131.250
							5136.617
							5174.159
							5201.057
							5407.149

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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
175+22.50	143.638	34.761	0.117	0.028	1.2000	0.033	4191.375
175+23.00	143.239	2.656	0.118	0.002	1.2000	0.003	4194.029
175+24.00	142.007	5.282	0.219	0.006	1.2000	0.007	4199.304
175+24.50	141.899	2.629	0.269	0.005	1.2000	0.005	4201.927
175+25.00	141.791	2.627	0.258	0.005	1.2000	0.006	4204.548
175+34.50	140.144	46.989	0.344	0.100	1.2000	0.120	4251.417
175+34.50	140.097	2.595	0.389	0.007	1.2000	0.008	4254.004
175+36.50	139.988	10.374	0.579	0.036	1.2000	0.043	4264.334
175+40.00	139.945	18.144	0.673	0.081	1.2000	0.097	4282.381
175+42.50	140.266	12.973	0.515	0.046	1.2000	0.055	4295.298
175+43.50	140.634	5.202	0.302	0.011	1.2000	0.014	4300.487
175+47.50	140.678	20.838	0.509	0.060	1.2000	0.072	4321.252
175+52.00	140.138	5.210	0.520	0.019	1.2000	0.023	4326.439
175+53.00	140.008	18.199	0.600	0.073	1.2000	0.087	4344.551
175+60.00	136.458	2.591	0.616	0.011	1.2000	0.014	4347.131
175+61.00	136.152	2.524	1.128	0.012	1.2000	0.014	4349.709
175+61.50	135.838	2.518	0.633	0.028	1.2000	0.026	4385.254
175+62.00	137.690	2.519	0.918	0.022	1.2000	0.026	4387.752
175+63.00	135.756	5.064	0.563	0.020	1.2000	0.024	4390.247
175+64.00	135.811	5.029	0.532	0.010	1.2000	0.016	4392.749
175+64.00	136.684	5.046	0.508	0.019	1.2000	0.023	4395.273
175+65.00	137.619	5.046	0.488	0.019	1.2000	0.023	4400.314
175+65.50	137.796	7.620	0.487	0.027	1.2000	0.023	4405.320
175+67.00	139.851	2.550	0.483	0.009	1.2000	0.011	4410.344
175+75.50	139.851	45.704	0.431	0.009	1.2000	0.011	4417.930
175+76.00	139.921	2.590	0.429	0.008	1.2000	0.010	4420.470
175+76.50	140.187	12.968	0.429	0.040	1.2000	0.010	4464.001
175+78.50	140.508	12.995	0.369	0.037	1.2000	0.044	4466.582
175+81.00	140.508	13.031	0.276	0.030	1.2000	0.044	4479.502
175+83.50	141.188	5.225	0.271	0.010	1.2000	0.036	4505.448
175+87.50	141.675	15.715	0.271	0.010	1.2000	0.012	4510.661
176+00.00	141.793	18.373	0.243	0.033	1.2000	0.030	4526.340
176+11.00	145.444	47.676	0.143	0.064	1.2000	0.077	4544.673
176+14.50	145.224	59.014	0.052	0.040	1.2000	0.048	4592.272
176+18.00	145.224	16.148	0.212	0.040	1.2000	0.018	4651.238
176+33.00	147.329	2.694	0.247	0.004	1.2000	0.005	4667.369
176+33.00	147.329	18.998	0.551	0.052	1.2000	0.062	4688.994
176+65.00	147.870	75.180	0.515	0.266	1.2000	0.320	4763.854
176+84.00	147.923	8.346	0.511	0.028	1.2000	0.034	4772.166
176+84.00	147.129	174.777	0.465	0.578	1.2000	0.694	4946.248
176+94.00	147.034	104.075	0.445	0.320	1.2000	0.384	5049.940
176+99.00	147.034	43.580	0.411	0.033	1.2000	0.039	5104.256
177+00.00	145.674	27.109	0.625	0.096	1.2000	0.151	5131.250
177+00.00	145.675	5.397	0.688	0.024	1.2000	0.029	5136.617
177+12.00	146.663	37.767	0.764	0.188	1.2000	0.226	5174.159
177+50.00	148.277	207.551	0.771	0.142	1.2000	0.171	5201.057
			0.956	1.216	1.2000	1.459	5407.149

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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
177+94.50	158.752	253.015	0.414	1.129	1.2000	1.354	5658.810
177+97.50	159.478	17.679	0.372	0.044	1.2000	0.052	5676.437
178+00.00	160.100	14.795	0.333	0.033	1.2000	0.039	5691.193
178+22.00	154.334	128.103	0.223	0.226	1.2000	0.272	5819.024
178+24.50	152.168	14.190	0.987	0.056	1.2000	0.067	5833.147
178+53.50	147.112	160.724	0.556	0.828	1.2000	0.994	5992.877
178+57.50	145.676	21.688	0.528	0.080	1.2000	0.096	6014.469
178+77.00	143.648	104.478	0.651	0.426	1.2000	0.511	6118.436
178+80.00	145.548	16.066	0.656	0.073	1.2000	0.087	6134.415
178+89.50	149.233	51.860	0.390	0.184	1.2000	0.221	6186.054
178+95.50	150.803	33.537	0.181	0.083	1.2000	0.076	6219.315
179+00.00	150.855	25.138	0.123	0.025	1.2000	0.030	6244.423
179+04.00	147.858	22.127	0.087	0.016	1.2000	0.019	6266.531
179+04.50	147.754	2.737	0.080	0.002	1.2000	0.002	6269.266
179+05.00	147.656	2.735	0.072	0.001	1.2000	0.002	6272.000
179+11.30	148.756	34.581	0.024	0.011	1.2000	0.013	6306.568
179+12.50	148.933	6.615	0.018	0.001	1.2000	0.001	6313.182
179+18.00	148.878	30.333	0.000	0.002	1.2000	0.002	6343.512
179+21.00	149.331	16.567	0.874	0.049	1.2000	0.058	6360.021
179+23.00	149.901	11.083	0.673	0.057	1.2000	0.069	6371.035
179+31.00	152.419	44.788	0.143	0.121	1.2000	0.145	6415.678
179+31.50	152.490	2.823	0.123	0.002	1.2000	0.003	6418.499
179+35.00	152.625	19.776	0.024	0.010	1.2000	0.011	6438.263
179+36.00	152.211	5.645	0.011	0.001	1.2000	0.001	6443.907
179+39.50	149.967	19.586	0.000	0.001	1.2000	0.001	6463.492
179+40.00	149.670	2.774	0.000	0.000	1.2000	0.000	6466.267
179+40.50	149.366	2.769	0.000	0.000	1.2000	0.000	6469.035
179+41.00	150.202	2.774	0.000	0.000	1.2000	0.000	6471.809
179+42.50	150.575	8.355	0.000	0.000	1.2000	0.000	6480.164
179+44.50	150.312	11.144	0.000	0.000	1.2000	0.000	6491.308
179+45.50	150.222	5.565	0.000	0.000	1.2000	0.000	6496.874
179+46.00	150.323	2.783	0.000	0.000	1.2000	0.000	6499.656
179+49.00	150.337	16.703	0.000	0.000	1.2000	0.000	6516.360
179+50.00	150.257	5.567	0.000	0.000	1.2000	0.000	6521.926
179+51.00	149.876	5.558	0.004	0.000	1.2000	0.000	6527.484
179+53.50	148.483	13.813	0.015	0.001	1.2000	0.001	6541.296
179+55.00	147.911	8.233	0.035	0.001	1.2000	0.002	6549.527
179+57.00	147.237	10.931	0.070	0.004	1.2000	0.005	6560.454
179+73.50	147.024	89.913	2.711	0.850	1.2000	1.020	6649.347
179+74.00	147.190	2.724	2.673	0.050	1.2000	0.060	6652.012
179+75.00	147.633	5.460	2.582	0.097	1.2000	0.117	6657.355
179+75.50	147.648	2.734	0.000	0.024	1.2000	0.029	6660.060
179+89.00	150.865	74.628	0.000	0.000	1.2000	0.000	6734.688
179+91.00	149.106	11.110	0.000	0.000	1.2000	0.000	6745.798
179+93.50	146.402	13.681	0.000	0.000	1.2000	0.000	6759.479
179+95.00	146.201	8.128	0.000	0.000	1.2000	0.000	6767.607
180+00.00	146.320	27.085	0.018	0.002	1.2000	0.002	6794.690
180+24.50	148.637	133.823	0.044	0.028	1.2000	0.034	6928.480
180+28.50	151.653	22.244	0.088	0.010	1.2000	0.012	6950.712
180+33.00	152.850	25.375	0.015	0.009	1.2000	0.010	6976.077

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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
180+35.00	154.092	11.368	0.000	0.001	1.2000	0.001	6987.444
180+36.50	154.886	8.583	0.000	0.000	1.2000	0.000	6996.027
180+81.00	150.880	251.974	0.064	0.053	1.2000	0.064	7247.937
180+84.50	147.656	19.350	0.093	0.010	1.2000	0.012	7267.274
181+00.00	152.787	86.238	0.055	0.043	1.2000	0.051	7353.461
181+15.00	149.420	83.946	0.008	0.018	1.2000	0.021	7437.387
181+19.00	151.169	22.266	0.003	0.001	1.2000	0.001	7459.651
181+20.00	151.487	5.605	0.002	0.000	1.2000	0.000	7465.256
181+23.00	151.472	16.831	0.000	0.000	1.2000	0.000	7482.087
181+45.50	151.631	126.293	0.000	0.000	1.2000	0.000	7608.380
181+46.00	151.714	2.809	0.000	0.000	1.2000	0.000	7611.188
181+47.50	151.978	8.436	0.000	0.000	1.2000	0.000	7619.624
181+48.00	152.198	2.816	0.000	0.000	1.2000	0.000	7622.441
181+50.50	153.167	14.137	0.186	0.009	1.2000	0.010	7636.568
181+64.50	153.672	79.551	0.000	0.048	1.2000	0.058	7716.060
181+82.00	151.999	99.060	0.035	0.011	1.2000	0.014	7815.107
181+83.50	152.125	8.448	0.041	0.002	1.2000	0.003	7823.552
181+84.50	152.089	5.634	0.045	0.002	1.2000	0.002	7829.184
181+85.00	151.310	2.809	0.047	0.001	1.2000	0.001	7831.992
181+86.00	150.425	5.588	0.052	0.002	1.2000	0.002	7837.577
181+94.00	148.666	44.310	0.046	0.015	1.2000	0.017	7881.870
182+00.00	146.254	32.769	0.008	0.006	1.2000	0.007	7914.631
182+21.00	150.767	115.508	0.000	0.003	1.2000	0.004	8030.136
182+23.00	151.752	11.204	0.000	0.000	1.2000	0.000	8041.340
182+23.50	152.281	2.815	0.000	0.000	1.2000	0.000	8044.155
182+24.00	152.342	2.821	0.000	0.000	1.2000	0.000	8046.976
182+27.00	151.212	16.864	0.000	0.000	1.2000	0.000	8063.840
182+45.00	145.527	98.913	0.163	0.054	1.2000	0.065	8162.688
182+54.00	137.845	47.229	0.423	0.098	1.2000	0.117	8209.799
182+56.50	135.227	12.642	0.520	0.044	1.2000	0.052	8222.389
182+59.50	132.244	14.860	0.595	0.062	1.2000	0.074	8237.174
182+61.00	131.087	7.315	0.628	0.034	1.2000	0.041	8244.448
182+61.50	130.809	2.425	0.639	0.012	1.2000	0.014	8246.859
182+67.00	128.785	26.440	0.942	0.161	1.2000	0.193	8273.106
182+75.50	126.907	40.248	1.541	0.391	1.2000	0.469	8312.885
182+79.50	126.142	18.744	1.843	0.251	1.2000	0.301	8331.329
182+80.00	125.853	2.333	1.799	0.034	1.2000	0.040	8333.621
183+00.00	120.864	91.377	2.339	1.533	1.2000	1.839	8423.159
183+02.00	121.279	8.968	2.236	0.169	1.2000	0.203	8431.923
183+24.00	123.115	99.568	2.621	1.979	1.2000	2.374	8529.117
183+24.50	123.290	2.282	2.500	0.047	1.2000	0.057	8531.341
183+30.50	128.183	27.941	1.250	0.417	1.2000	0.500	8558.783
183+39.50	128.434	42.770	1.228	0.413	1.2000	0.495	8601.057
183+41.50	128.416	9.513	1.168	0.089	1.2000	0.106	8610.463
183+55.00	133.340	65.439	0.742	0.478	1.2000	0.573	8675.329
183+58.50	133.546	17.298	0.608	0.088	1.2000	0.105	8692.522
184+00.00	153.969	220.960	0.028	0.489	1.2000	0.586	8912.896
184+01.50	154.599	8.571	0.034	0.002	1.2000	0.002	8921.466
184+05.00	157.623	20.237	0.026	0.004	1.2000	0.005	8941.698
184+38.00	168.107	199.057	0.140	0.101	1.2000	0.122	9140.633

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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
184+58.50	171.867	129.064	0.197	0.128	1.2000	0.154	9269.544
184+61.50	187.148	152.914	0.139	0.143	1.2000	0.172	9422.285
184+64.00	187.585	17.349	0.084	0.010	1.2000	0.012	9439.621
184+90.50	182.899	44.595	0.372	0.055	1.2000	0.066	9484.151
184+84.80	184.848	37.456	0.989	0.139	1.2000	0.166	9521.441
185+00.00	177.329	26.828	0.416	0.104	1.2000	0.125	9548.144
185+33.00	139.915	193.871	1.219	0.999	1.2000	1.199	9740.816
185+37.00	145.047	21.108	0.730	0.144	1.2000	0.173	9761.751
185+38.00	146.612	5.401	0.526	0.023	1.2000	0.028	9767.124
185+38.50	147.836	2.726	0.522	0.010	1.2000	0.012	9759.839
185+39.00	148.051	2.740	0.518	0.010	1.2000	0.012	9772.567
185+40.50	148.448	8.236	0.506	0.028	1.2000	0.034	9780.769
185+41.00	148.597	2.750	0.502	0.009	1.2000	0.011	9783.508
185+55.00	148.506	77.027	0.326	0.214	1.2000	0.257	9860.277
185+59.50	148.415	24.743	0.267	0.049	1.2000	0.059	9884.961
185+60.00	148.405	2.748	0.262	0.005	1.2000	0.006	9887.704
185+60.50	147.142	2.737	0.257	0.005	1.2000	0.006	9890.435
185+61.50	147.003	5.447	0.249	0.009	1.2000	0.011	9895.870
185+73.50	149.265	65.837	0.406	0.145	1.2000	0.175	9961.533
185+79.50	150.629	33.322	0.239	0.072	1.2000	0.086	9994.769
185+81.00	150.844	8.374	0.239	0.013	1.2000	0.016	10003.127
185+81.50	150.824	2.793	0.240	0.004	1.2000	0.005	10005.915
185+90.50	151.037	50.310	0.249	0.082	1.2000	0.098	10056.127
185+91.00	151.086	2.797	0.250	0.005	1.2000	0.006	10058.919
186+00.00	150.627	50.285	0.522	0.129	1.2000	0.154	10109.050
186+20.00	152.175	112.149	0.418	0.348	1.2000	0.418	10220.782
186+44.50	154.556	139.165	0.230	0.294	1.2000	0.353	10359.594
186+59.00	150.640	81.951	3.831	1.090	1.2000	1.309	10440.236
186+62.00	150.761	16.744	5.470	0.517	1.2000	0.620	10456.361
186+62.50	150.905	2.793	5.178	0.099	1.2000	0.118	10459.035
186+63.00	151.128	2.797	4.873	0.093	1.2000	0.112	10461.720
186+64.00	151.590	5.606	4.261	0.169	1.2000	0.203	10467.123
186+64.50	151.790	2.809	3.985	0.076	1.2000	0.092	10469.841
186+82.00	155.984	99.742	3.097	2.295	1.2000	2.754	10566.829
186+83.50	156.178	8.671	3.185	0.175	1.2000	0.209	10573.290
187+00.00	158.642	96.195	5.632	2.694	1.2000	3.233	10668.252
187+00.50	158.740	2.939	5.909	0.107	1.2000	0.128	10671.063
187+01.50	158.840	2.941	6.181	0.112	1.2000	0.134	10676.671
187+01.50	158.966	2.943	6.449	0.117	1.2000	0.140	10679.470
187+02.00	159.099	2.945	6.713	0.122	1.2000	0.146	10679.470
187+04.00	159.735	11.809	7.022	0.509	1.2000	0.610	10690.668
187+04.50	159.920	2.960	6.280	0.123	1.2000	0.148	10693.480
187+05.00	160.113	2.963	5.480	0.109	1.2000	0.131	10696.313
187+06.50	160.697	8.911	3.010	0.236	1.2000	0.283	10704.941
187+07.50	161.349	5.964	1.924	0.091	1.2000	0.110	10710.795
187+13.00	167.110	33.454	0.191	0.215	1.2000	0.259	10743.991
187+14.00	167.991	6.206	0.109	0.006	1.2000	0.007	10750.190
187+20.00	171.281	37.697	0.017	0.014	1.2000	0.017	10787.870
187+21.00	171.614	6.350	0.019	0.001	1.2000	0.001	10794.219
187+44.50	177.415	151.892	0.532	0.240	1.2000	0.288	10945.823

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

FROM STATION 167+20.00 TO STATION 189+00.00

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)
187+72.00	191.726	187.989	0.267	0.407	1.2000	0.488	11133.324
187+72.50	193.076	3.563	0.294	0.005	1.2000	0.006	11136.880
187+75.00	197.156	18.066	0.440	0.034	1.2000	0.041	11154.906
187+87.50	205.514	3.656	0.456	0.008	1.2000	0.010	11158.552
187+89.50	206.532	15.261	0.000	0.101	1.2000	0.122	11248.039
187+94.00	208.320	34.571	0.000	0.000	1.2000	0.000	11263.300
188+00.00	208.488	46.312	0.000	0.000	1.2000	0.000	11297.871
188+01.00	208.016	7.713	0.000	0.000	1.2000	0.000	11344.183
188+02.50	207.357	11.538	0.000	0.000	1.2000	0.000	11351.896
188+03.00	207.149	3.838	0.000	0.000	1.2000	0.000	11363.434
188+04.00	206.488	7.660	0.000	0.000	1.2000	0.000	11367.272
188+04.50	205.699	3.817	0.000	0.000	1.2000	0.000	11374.932
188+05.00	204.651	3.800	0.000	0.000	1.2000	0.000	11378.748
188+12.00	205.091	53.115	0.372	0.048	1.2000	0.058	11382.548
188+19.00	206.673	97.314	0.713	0.141	1.2000	0.169	11435.605
188+31.73	206.129	2.061	5.042	1.357	1.2000	1.628	11488.813
188+32.50	206.143	2.061	5.088	0.051	1.2000	0.061	11584.499
188+33.50	206.187	3.818	5.067	0.094	1.2000	0.113	11586.499
188+35.50	208.369	7.677	5.226	0.191	1.2000	0.229	11590.204
188+35.50	211.673	15.557	5.779	0.408	1.2000	0.489	11597.652
188+37.00	212.665	11.787	6.383	0.338	1.2000	0.405	11612.720
188+38.50	212.585	11.812	6.918	0.369	1.2000	0.443	11624.102
188+41.00	209.258	19.530	6.345	0.614	1.2000	0.737	11635.471
188+41.50	208.092	3.864	6.198	0.116	1.2000	0.139	11654.264
188+42.00	208.436	3.857	6.423	0.117	1.2000	0.140	11657.989
188+45.50	210.454	23.271	6.274	0.118	1.2000	0.141	11661.702
188+51.50	214.694	47.239	4.942	0.623	1.2000	0.748	11665.418
188+60.00	219.252	68.306	0.775	0.505	1.2000	0.883	11687.941
188+68.00	222.181	65.397	1.184	0.290	1.2000	0.506	11734.196
188+79.50	225.168	91.122	1.684	0.580	1.2000	0.696	11801.897
188+80.00	225.191	4.170	1.769	0.032	1.2000	0.038	11866.946
188+85.50	225.432	45.897	1.555	0.350	1.2000	0.420	11957.371
188+86.00	225.803	4.178	1.693	0.030	1.2000	0.036	11961.503
188+86.50	226.215	4.185	1.857	0.033	1.2000	0.041	11965.632
188+88.00	227.420	12.601	2.415	0.119	1.2000	0.041	12011.109
188+88.50	228.396	12.662	2.711	0.142	1.2000	0.039	12015.251
188+90.00	228.754	4.233	2.711	0.050	1.2000	0.039	12019.397
188+91.00	229.633	8.489	2.240	0.092	1.2000	0.142	12031.855
188+92.50	231.605	12.812	0.949	0.062	1.2000	0.060	12044.346
188+96.00	239.149	30.512	0.001	0.062	1.2000	0.110	12056.897
189+00.00	248.054	36.089	0.000	0.000	1.2000	0.074	12069.603
Project totals	12209.948	61.515	73.818	0.000		0.000	12136.130

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 205+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
189+00.00	189+00.00		LEFT	-29.6678	1638.6253	3.000
			RIGHT	24.1000	1638.6503	0.000
189+03.00	189+03.00		LEFT	-30.5386	1638.9152	3.000
			RIGHT	24.1000	1638.6157	0.000
189+13.00	189+13.00		LEFT	-31.4978	1639.2340	3.000
			RIGHT	24.1000	1638.4666	0.000
189+19.00	189+19.00		LEFT	-32.2285	1639.4769	3.000
			RIGHT	24.1000	1638.3770	0.000
189+55.00	189+55.00		LEFT	-33.4813	1639.8909	3.000
			RIGHT	24.1000	1637.9801	0.000
190+00.00	190+00.00		LEFT	-34.9637	1640.2968	3.000
			RIGHT	24.1000	1637.6803	0.000
190+38.50	190+38.50		LEFT	-36.3971	1640.4244	3.000
			RIGHT	24.1000	1637.1470	0.000
190+39.00	190+39.00		LEFT	-36.4149	1640.4247	3.000
			RIGHT	24.1000	1637.1359	0.000
190+42.50	190+42.50		LEFT	-36.5396	1640.4268	3.000
			RIGHT	24.1000	1637.0641	0.000
190+70.00	190+70.00		LEFT	-38.2318	1640.6808	3.000
			RIGHT	24.1000	1636.4999	0.000
191+00.00	191+00.00		LEFT	-38.6593	1640.4852	3.000
			RIGHT	24.1000	1636.2798	0.000
191+10.50	191+10.50		LEFT	-33.1663	1638.5358	3.000
			RIGHT	24.1000	1636.0359	0.000
191+29.50	191+29.50		LEFT	-34.5969	1638.7985	3.000
			RIGHT	24.1000	1635.7554	0.000
191+70.00	191+70.00		LEFT	-39.4992	1639.9760	3.000
			RIGHT	24.1000	1635.3981	0.000
192+00.00	192+00.00		LEFT	-39.1731	1639.5292	3.000
			RIGHT	24.1000	1635.1181	0.000
192+50.00	192+50.00		LEFT	-33.3431	1637.3317	3.000
			RIGHT	19.5163	1634.9655	0.000
193+00.00	193+00.00		LEFT	-27.2383	1635.3657	3.000
			RIGHT	18.4662	1634.3500	0.000
193+50.00	193+50.00		LEFT	-25.6878	1634.5739	3.000
			RIGHT	17.9911	1633.6591	0.000
193+64.50	193+64.50		LEFT	-26.6606	1634.7348	3.000
			RIGHT	17.9933	1633.6291	0.000
193+82.50	193+82.50		LEFT	-26.3682	1634.4344	3.000
			RIGHT	17.9961	1633.5466	0.000
193+83.00	193+83.00		LEFT	-26.3176	1634.4119	3.000
			RIGHT	17.9962	1633.5404	0.000
194+00.00	194+00.00		LEFT	-23.8446	1633.6056	1.000
			RIGHT	17.9987	1633.3509	0.000
194+27.50	194+27.50		LEFT	-24.6945	1634.1455	1.000
			RIGHT	18.0000	1633.1426	0.000
194+28.00	194+28.00		LEFT	-24.7243	1634.1697	1.000
			RIGHT	18.0000	1633.1400	0.000

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 205+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN	SIDE	OFFSET	ELEV	SLOPE
194+28.50	194+28.50		LEFT	-24.7542	1634.1939	1.000
			RIGHT	18.0000	1633.1374	0.000
194+31.50	194+31.50		LEFT	-24.9334	1634.3394	1.000
			RIGHT	18.0000	1633.1220	0.000
194+50.00	194+50.00		LEFT	-23.5300	1633.7422	0.000
			RIGHT	18.0000	1633.0398	0.000
194+55.00	194+55.00		LEFT	-23.5300	1633.6601	0.000
			RIGHT	18.0000	1633.0803	0.000
194+55.50	194+55.50		LEFT	-23.5300	1633.7148	0.000
			RIGHT	18.0000	1633.0843	0.000
194+87.00	194+87.00		LEFT	-23.5300	1633.4167	0.000
			RIGHT	18.0000	1633.2736	0.000
194+90.50	194+90.50		LEFT	-23.5300	1633.4729	0.000
			RIGHT	18.0000	1633.2751	0.000
194+92.50	194+92.50		LEFT	-23.5300	1633.5051	0.000
			RIGHT	18.0000	1633.2760	0.000
195+00.00	195+00.00		LEFT	-23.5300	1633.6258	0.000
			RIGHT	18.0000	1633.2793	0.000
195+21.00	195+21.00		LEFT	-23.5300	1633.6540	0.000
			RIGHT	18.0000	1633.2968	0.000
195+24.00	195+24.00		LEFT	-23.5300	1633.6996	0.000
			RIGHT	18.0000	1633.3013	0.000
195+24.50	195+24.50		LEFT	-23.5300	1633.7172	0.000
			RIGHT	18.0000	1633.3021	0.000
195+25.50	195+25.50		LEFT	-23.5300	1633.7523	0.000
			RIGHT	18.0000	1633.3036	0.000
195+26.00	195+26.00		LEFT	-23.5300	1633.7698	0.000
			RIGHT	18.0000	1633.3043	0.000
195+58.00	195+58.00		LEFT	-23.5300	1634.2486	0.000
			RIGHT	18.0000	1633.4488	0.000
195+58.50	195+58.50		LEFT	-23.5300	1634.2507	0.000
			RIGHT	18.0000	1633.4556	0.000
195+86.00	195+86.00		LEFT	-23.5300	1634.1561	0.000
			RIGHT	18.0000	1633.7875	0.000
196+00.00	196+00.00		LEFT	-29.1622	1635.4867	2.000
			RIGHT	18.0000	1633.9568	0.000
196+19.60	196+19.60		LEFT	-27.0541	1634.7404	2.000
			RIGHT	18.0000	1633.9888	0.000
196+50.00	196+50.00		LEFT	-33.6414	1636.9299	3.000
			RIGHT	18.0000	1634.1803	0.000
197+00.00	197+00.00		LEFT	-31.3826	1637.2566	3.000
			RIGHT	18.0000	1634.5948	0.000
197+50.00	197+50.00		LEFT	-28.7045	1637.4035	3.000
			RIGHT	18.0000	1635.5893	0.000
198+00.00	198+00.00		LEFT	-27.1679	1637.7942	3.000
			RIGHT	17.6218	1636.0193	0.000
198+50.00	198+50.00		LEFT	-25.6062	1637.9191	3.000
			RIGHT	16.8224	1636.9125	0.000
198+66.00	198+66.00		LEFT	-26.5079	1638.4262	3.000

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 205+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	BASELINE STATION	OFFSET STATION
198+72.00	198+72.00	RIGHT	16.3026	1637.0922	0.000	198+72.00	198+72.00
	-28.6837	LEFT	-28.6837	1638.5623	3.000		-28.6837
198+96.50	198+96.50	RIGHT	16.1827	1637.1593	0.000	198+96.50	198+96.50
	-27.1379	LEFT	-27.1379	1639.0300	3.000		-27.1379
199+00.00	199+00.00	RIGHT	15.6930	1637.4407	0.000	199+00.00	199+00.00
	-27.1925	LEFT	-27.1925	1639.0934	3.000		-27.1925
199+12.00	199+12.00	RIGHT	15.6230	1637.4834	0.000	199+12.00	199+12.00
	-27.3393	LEFT	-27.3393	1639.2972	3.000		-27.3393
199+41.00	199+41.00	RIGHT	15.3832	1637.6284	0.000	199+41.00	199+41.00
	-26.9105	LEFT	-26.9105	1639.5287	3.000		-26.9105
199+55.50	199+55.50	RIGHT	14.8035	1637.9391	0.000	199+55.50	199+55.50
	-25.9744	LEFT	-25.9744	1639.4038	3.000		-25.9744
199+74.00	199+74.00	RIGHT	14.5137	1638.2775	0.000	199+74.00	199+74.00
	-25.5878	LEFT	-25.5878	1639.5138	3.000		-25.5878
200+00.00	200+00.00	RIGHT	14.1439	1638.5639	0.000	200+00.00	200+00.00
	-25.7503	LEFT	-25.7503	1639.7388	3.000		-25.7503
200+26.00	200+26.00	RIGHT	14.5688	1638.8871	0.000	200+26.00	200+26.00
	-27.1830	LEFT	-27.1830	1640.6971	3.000		-27.1830
200+66.00	200+66.00	RIGHT	15.2895	1639.1564	0.000	200+66.00	200+66.00
	-25.9086	LEFT	-25.9086	1640.7859	3.000		-25.9086
200+87.00	200+87.00	RIGHT	16.3982	1639.9925	0.000	200+87.00	200+87.00
	-26.4080	LEFT	-26.4080	1641.2221	3.000		-26.4080
201+00.00	201+00.00	RIGHT	16.8350	1640.2265	0.000	201+00.00	201+00.00
	-27.8582	LEFT	-27.8582	1641.8725	3.000		-27.8582
201+14.00	201+14.00	RIGHT	16.8350	1640.3741	0.000	201+14.00	201+14.00
	-35.5878	LEFT	-35.5878	1642.0147	3.000		-35.5878
201+24.00	201+24.00	RIGHT	13.5861	1640.5695	0.000	201+24.00	201+24.00
	-50.0605	LEFT	-50.0605	1639.4955	3.000		-50.0605
201+24.50	201+24.50	RIGHT	13.5722	1640.2166	0.000	201+24.50	201+24.50
	-50.4970	LEFT	-50.4970	1639.5216	3.000		-50.4970
201+26.50	201+26.50	RIGHT	13.5715	1640.2120	0.000	201+26.50	201+26.50
	-52.5250	LEFT	-52.5250	1639.5317	3.000		-52.5250
201+27.00	201+27.00	RIGHT	13.5688	1640.1939	0.000	201+27.00	201+27.00
	-53.1219	LEFT	-53.1219	1639.5042	3.000		-53.1219
201+28.00	201+28.00	RIGHT	13.5681	1640.1894	0.000	201+28.00	201+28.00
	-54.3156	LEFT	-54.3156	1639.4494	3.000		-54.3156
201+30.00	201+30.00	RIGHT	13.5667	1640.1803	0.000	201+30.00	201+30.00
	-56.1048	LEFT	-56.1048	1639.5391	3.000		-56.1048
201+31.00	201+31.00	RIGHT	13.5639	1640.1623	0.000	201+31.00	201+31.00
	-56.6104	LEFT	-56.6104	1639.7137	3.000		-56.6104
201+32.00	201+32.00	RIGHT	13.5625	1640.1450	0.000	201+32.00	201+32.00
	-57.1376	LEFT	-57.1376	1639.8810	3.000		-57.1376
201+32.50	201+32.50	RIGHT	13.5611	1640.1276	0.000	201+32.50	201+32.50
	-57.4013	LEFT	-57.4013	1639.9646	3.000		-57.4013
201+33.00	201+33.00	RIGHT	13.5604	1640.1189	0.000	201+33.00	201+33.00
	-57.6650	LEFT	-57.6650	1640.0483	3.000		-57.6650
201+35.00	201+35.00	RIGHT	13.5597	1640.1243	0.000	201+35.00	201+35.00
	-58.7690	LEFT	-58.7690	1640.3664	3.000		-58.7690
	13.5569	RIGHT	13.5569	1640.1574	0.000		13.5569

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 205+00.00

ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN		ROADWAY MAIN	
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	BASELINE STATION	OFFSET STATION
201+44.00	201+44.00	LEFT	-55.8222	1641.2496	20.000	201+44.00	201+44.00
	14.5338	RIGHT	14.5338	1640.3702	0.000		14.5338
201+44.50	201+44.50	LEFT	-55.6786	1641.2461	20.000	201+44.50	201+44.50
	14.6978	RIGHT	14.6978	1640.3778	0.000		14.6978
201+45.00	201+45.00	LEFT	-55.5121	1641.2415	20.000	201+45.00	201+45.00
	14.8617	RIGHT	14.8617	1640.3854	0.000		14.8617
201+47.00	201+47.00	LEFT	-55.7057	1641.2098	-20.000	201+47.00	201+47.00
	15.5176	RIGHT	15.5176	1640.3888	0.000		15.5176
201+47.50	201+47.50	LEFT	-56.0234	1641.1975	-20.000	201+47.50	201+47.50
	15.6816	RIGHT	15.6816	1640.3613	0.000		15.6816
201+65.00	201+65.00	LEFT	-65.2267	1640.8654	-20.000	201+65.00	201+65.00
	21.4204	RIGHT	21.4204	1640.6406	0.000		21.4204
201+71.00	201+71.00	LEFT	-67.9703	1640.7797	-20.000	201+71.00	201+71.00
	23.3880	RIGHT	23.3880	1640.6775	0.000		23.3880
201+89.00	201+89.00	LEFT	-73.4641	1640.3525	-20.000	201+89.00	201+89.00
	26.1000	RIGHT	26.1000	1640.9107	0.000		26.1000
201+93.00	201+93.00	LEFT	-70.1981	1640.4239	-20.000	201+93.00	201+93.00
	26.1000	RIGHT	26.1000	1640.9903	0.000		26.1000
201+97.00	201+97.00	LEFT	-66.7801	1640.5030	-20.000	201+97.00	201+97.00
	26.1000	RIGHT	26.1000	1640.8666	0.000		26.1000
201+98.00	201+98.00	LEFT	-65.9252	1640.5227	-20.000	201+98.00	201+98.00
	26.1000	RIGHT	26.1000	1640.8123	0.000		26.1000
201+99.00	201+99.00	LEFT	-65.0708	1640.5425	-20.000	201+99.00	201+99.00
	26.1000	RIGHT	26.1000	1640.7813	0.000		26.1000
201+99.50	201+99.50	LEFT	-64.6420	1640.5524	-20.000	201+99.50	201+99.50
	26.1000	RIGHT	26.1000	1640.7896	0.000		26.1000
202+00.00	202+00.00	LEFT	-64.2159	1640.5623	-20.000	202+00.00	202+00.00
	26.1000	RIGHT	26.1000	1640.7979	0.000		26.1000
202+10.00	202+10.00	LEFT	-68.0891	1640.1389	-20.000	202+10.00	202+10.00
	26.1000	RIGHT	26.1000	1641.4699	0.000		26.1000
202+14.00	202+14.00	LEFT	-67.9380	1640.0546	-20.000	202+14.00	202+14.00
	26.1000	RIGHT	26.1000	1641.5131	0.000		26.1000
202+19.00	202+19.00	LEFT	-67.4520	1639.9640	-20.000	202+19.00	202+19.00
	26.1000	RIGHT	26.1000	1641.5483	0.000		26.1000
202+36.00	202+36.00	LEFT	-35.1487	1640.2793	-3.000	202+36.00	202+36.00
	27.2506	RIGHT	27.2506	1641.6303	3.000		27.2506
202+65.00	202+65.00	LEFT	-41.1012	1638.8584	-3.000	202+65.00	202+65.00
	27.3802	RIGHT	27.3802	1641.8421	3.000		27.3802
203+00.00	203+00.00	LEFT	-44.6148	1638.3670	-3.000	203+00.00	203+00.00
	27.7060	RIGHT	27.7060	1642.5119	3.000		27.7060
203+16.00	203+16.00	LEFT	-45.2161	1638.4773	-3.000	203+16.00	203+16.00
	27.6770	RIGHT	27.6770	1642.6429	3.000		27.6770
203+44.75	203+44.75	LEFT	-47.0722	1638.3809	-3.000	203+44.75	203+44.75
	27.8633	RIGHT	27.8633	1642.9414	3.000		27.8633
203+77.50	203+77.50	LEFT	-47.8925	1638.4539	-3.000	203+77.50	203+77.50
	27.7722	RIGHT	27.7722	1643.2574	3.000		27.7722
203+89.00	203+89.00	LEFT	-48.4230	1638.3803	-3.000	203+89.00	203+89.00
	27.6241	RIGHT	27.6241	1643.3113	3.000		27.6241
204+00.00	204+00.00	LEFT	-48.6972	1638.3875	-3.000	204+00.00	204+00.00

TIE SLOPE SUMMARY
FROM STATION 189+00.00 TO STATION 205+00.00

ROADWAY MAIN		SLOPE	
BASELINE STATION	OFFSET STATION	ELEV	ADJ FILL (Cu Yd)
204+03.50	204+03.50	1643.2671	0.000
		1638.3904	0.000
204+19.50	204+19.50	1643.1320	0.000
		1638.5245	0.000
204+47.50	204+47.50	1641.9008	0.000
		1638.5959	0.000
204+64.50	204+64.50	1641.6995	0.000
		1638.3531	0.000
204+69.50	204+69.50	1641.7089	0.000
		1638.2229	0.000
205+00.00	205+00.00	1645.1050	0.000
		1641.0445	0.000

DETAILED EARTHWORK QUANTITIES

FROM STATION 189+00.00 TO STATION 205+00.00

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)
189+00.00	136.435	0.000	0.000	0.000	1.2000	0.000	0.000
189+03.00	138.717	15.286	0.000	0.000	1.2000	0.000	15.286
189+13.00	142.420	52.062	0.000	0.000	1.2000	0.000	67.549
189+19.00	140.563	31.443	0.000	0.000	1.2000	0.000	98.791
189+55.00	127.332	178.596	0.000	0.000	1.2000	0.000	277.387
190+00.00	112.247	199.649	0.000	0.000	1.2000	0.000	477.036
190+38.50	102.320	152.979	0.009	0.006	1.2000	0.008	630.007
190+39.00	102.914	1.900	0.009	0.000	1.2000	0.000	631.907
190+42.50	105.248	13.492	0.012	0.001	1.2000	0.002	645.398
190+70.00	107.641	108.416	0.030	0.021	1.2000	0.025	753.788
191+00.00	101.289	116.072	0.000	0.016	1.2000	0.020	869.841
191+10.50	101.158	39.365	0.000	0.000	1.2000	0.000	909.205
191+29.50	101.088	71.161	0.000	0.000	1.2000	0.000	980.366
191+70.00	108.980	157.551	0.000	0.000	1.2000	0.000	1137.917
192+00.00	105.584	119.202	0.000	0.000	1.2000	0.000	1257.119
192+50.00	85.794	177.202	0.048	0.044	1.2000	0.053	1434.267
193+00.00	74.984	148.869	0.285	0.308	1.2000	0.370	1582.766
193+50.00	75.232	139.089	0.653	0.869	1.2000	1.042	1720.812
193+64.50	79.020	41.419	0.428	0.290	1.2000	0.348	1761.883
193+82.50	81.775	53.598	0.111	0.180	1.2000	0.216	1815.266
193+83.00	81.843	1.515	0.108	0.002	1.2000	0.002	1816.778
194+00.00	83.829	52.156	0.118	0.071	1.2000	0.085	1868.849
194+28.00	89.646	88.344	0.029	0.075	1.2000	0.090	1957.102
194+28.50	89.837	1.662	0.027	0.001	1.2000	0.001	1958.763
194+28.50	90.029	1.665	0.026	0.000	1.2000	0.001	1960.428
194+31.50	91.219	10.069	0.016	0.002	1.2000	0.003	1970.495
194+50.00	98.310	64.931	0.000	0.005	1.2000	0.007	2035.420
194+55.00	100.699	18.427	0.000	0.000	1.2000	0.000	2053.846
194+55.50	100.971	1.867	0.000	0.000	1.2000	0.000	2055.714
194+87.00	111.637	124.021	0.000	0.000	1.2000	0.000	2179.735
194+90.50	112.708	14.541	0.000	0.000	1.2000	0.000	2194.276
194+92.50	113.293	8.370	0.000	0.000	1.2000	0.000	2202.646
195+00.00	115.318	31.751	0.000	0.000	1.2000	0.000	2234.398
195+24.00	120.331	91.641	0.000	0.000	1.2000	0.000	2326.039
195+24.50	121.357	13.427	0.000	0.000	1.2000	0.000	2339.466
195+24.50	121.538	2.249	0.000	0.000	1.2000	0.000	2341.715
195+25.50	121.894	4.508	0.000	0.000	1.2000	0.000	2346.223
195+26.00	122.070	2.259	0.000	0.000	1.2000	0.000	2348.482
195+58.00	128.398	148.425	0.000	0.000	1.2000	0.000	2496.907
195+58.50	128.583	2.378	0.000	0.000	1.2000	0.000	2499.285
195+86.00	125.909	65.974	0.000	0.000	1.2000	0.000	2628.786
196+18.60	125.888	92.356	0.000	0.000	1.2000	0.000	2694.760
196+50.00	122.105	139.610	0.000	0.000	1.2000	0.000	2787.115
197+00.00	106.624	211.786	0.000	0.000	1.2000	0.000	2926.726
197+50.00	106.525	197.360	0.000	0.000	1.2000	0.000	3138.511
198+00.00	84.473	176.850	0.000	0.000	1.2000	0.000	3335.871
198+50.00	79.598	151.918	0.000	0.000	1.2000	0.000	3512.721
198+66.00	76.536	46.262	0.000	0.000	1.2000	0.000	3664.639
							3710.901

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	240

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

FROM STATION 189+00.00 TO STATION 205+00.00

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)
198+72.00	76.659	17.022	0.000	0.000	1.2000	0.000	3727.923
198+96.50	76.636	69.550	0.000	0.000	1.2000	0.000	3797.473
199+00.00	75.485	9.860	0.000	0.000	1.2000	0.000	3807.332
199+12.00	73.729	33.159	0.000	0.000	1.2000	0.000	3840.491
199+41.00	68.660	76.468	0.040	0.021	1.2000	0.026	3916.934
199+55.50	65.431	36.006	0.037	0.021	1.2000	0.025	3952.915
199+74.00	63.685	44.234	0.183	0.075	1.2000	0.091	3997.059
200+00.00	70.856	64.779	0.587	0.371	1.2000	0.445	4061.393
200+26.00	71.739	68.657	0.274	0.414	1.2000	0.497	4129.552
200+66.00	71.270	105.932	0.237	0.378	1.2000	0.454	4235.030
200+87.00	70.828	55.260	0.224	0.179	1.2000	0.215	4290.075
201+00.00	71.466	34.256	0.099	0.078	1.2000	0.093	4324.237
201+14.00	102.053	44.986	0.000	0.026	1.2000	0.031	4369.192
201+24.00	128.700	42.732	6.473	1.199	1.2000	1.439	4410.486
201+26.50	131.448	2.390	6.901	1.124	1.2000	0.149	4412.727
201+28.00	131.734	9.662	7.953	0.550	1.2000	0.660	4421.729
201+28.00	132.104	2.437	8.251	0.150	1.2000	0.180	4423.986
201+30.00	132.291	9.792	8.829	0.316	1.2000	0.380	4428.492
201+31.00	132.411	4.902	9.957	0.696	1.2000	0.835	4437.450
201+32.00	132.875	4.913	10.171	0.373	1.2000	0.447	4441.904
201+32.50	133.210	2.464	9.713	0.368	1.2000	0.442	4446.375
201+33.00	133.566	2.470	8.758	0.176	1.2000	0.201	4448.627
201+35.00	135.147	9.952	6.625	0.570	1.2000	0.684	4450.897
201+44.00	140.238	45.898	0.000	1.104	1.2000	1.325	4460.166
201+45.00	139.610	2.591	0.000	0.000	1.2000	0.000	4504.738
201+45.00	138.901	2.579	0.000	0.000	1.2000	0.000	4507.329
201+47.00	136.545	10.202	0.008	0.000	1.2000	0.000	4520.109
201+47.50	135.762	2.521	0.017	0.000	1.2000	0.000	4522.631
201+65.00	145.399	91.117	1.227	0.403	1.2000	0.484	4613.264
201+71.00	146.696	32.455	2.238	0.885	1.2000	0.462	4645.257
201+89.00	139.215	95.304	3.263	1.834	1.2000	2.200	4738.360
201+89.00	131.425	20.047	3.986	0.537	1.2000	0.644	4757.763
201+97.00	123.867	18.910	4.127	0.601	1.2000	0.721	4775.952
201+98.00	122.152	4.556	4.144	0.153	1.2000	0.184	4780.324
201+99.00	120.173	4.487	4.164	0.154	1.2000	0.185	4784.627
201+99.50	119.131	2.216	4.189	0.077	1.2000	0.093	4786.750
202+00.00	118.090	4.264	4.264	0.078	1.2000	0.094	4788.853
202+10.00	110.304	42.295	12.580	3.119	1.2000	3.743	4827.405
202+14.00	107.577	16.139	14.868	2.033	1.2000	2.440	4841.104
202+19.00	103.881	19.580	17.887	3.033	1.2000	3.639	4857.044
202+36.00	97.613	63.433	4.486	7.043	1.2000	8.452	4912.026
202+65.00	99.200	105.696	11.011	8.323	1.2000	9.987	5007.734
203+00.00	95.926	126.470	19.618	19.852	1.2000	23.823	5110.382
203+16.00	91.425	55.511	24.828	13.168	1.2000	15.802	5150.091
203+44.75	94.146	98.799	30.239	29.317	1.2000	35.180	5213.710
203+77.50	99.901	117.686	22.588	32.039	1.2000	38.447	5292.949
203+89.00	97.606	42.062	23.308	9.774	1.2000	11.729	5323.282
204+00.00	96.840	39.609	23.128	9.459	1.2000	11.351	5351.540
204+03.50	97.009	12.564	22.149	2.935	1.2000	3.522	5360.583
Project totals							5587.587

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

FROM STATION 189+00.00 TO STATION 205+00.00

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)
204+19.50	97.613	57.666	19.860	12.447	1.2000	14.936	5403.312
204+47.50	88.093	96.292	20.140	20.741	1.2000	24.889	5474.715
204+64.50	85.848	54.759	13.286	10.523	1.2000	12.628	5516.847
204+69.50	84.715	15.793	8.516	2.019	1.2000	2.422	5530.217
205+00.00	34.570	67.373	6.243	8.336	1.2000	10.004	5587.587
Project totals							5587.587

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 204+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN		ELEV	SLOPE
		SIDE	OFFSET		
189+00.00	189+00.00	LEFT	-12.1000	1638.6508	0.000
189+03.00	189+03.00	RIGHT	26.9299	1639.2028	3.000
189+13.00	189+13.00	LEFT	-12.1000	1638.6186	0.000
189+19.00	189+19.00	RIGHT	27.0076	1639.2089	3.000
189+55.00	189+55.00	LEFT	-12.1000	1638.4694	0.000
190+00.00	190+00.00	RIGHT	27.4882	1639.3031	3.000
190+38.50	190+38.50	LEFT	-12.1000	1638.3799	0.000
190+39.00	190+39.00	RIGHT	27.2875	1639.1966	3.000
190+42.50	190+42.50	LEFT	-12.1000	1637.9860	0.000
190+70.00	190+70.00	RIGHT	29.4753	1639.6883	3.000
191+00.00	191+00.00	LEFT	-12.1000	1637.6867	0.000
191+10.50	191+10.50	RIGHT	28.7449	1639.1143	3.000
191+29.50	191+29.50	LEFT	-12.1000	1637.1433	0.000
191+70.00	191+70.00	RIGHT	28.5216	1638.5613	3.000
192+00.00	192+00.00	LEFT	-12.1000	1637.1321	0.000
192+50.00	192+50.00	RIGHT	28.5389	1638.5604	3.000
193+00.00	193+00.00	LEFT	-12.1000	1637.0601	0.000
193+50.00	193+50.00	RIGHT	28.4134	1638.4720	3.000
194+00.00	194+00.00	LEFT	-12.1000	1636.4933	0.000
194+27.50	194+27.50	RIGHT	30.3721	1638.3602	3.000
194+28.00	194+28.00	LEFT	-12.1000	1636.0557	0.000
		RIGHT	29.8635	1638.0852	3.000
		LEFT	-12.1000	1635.7494	0.000
		RIGHT	30.0400	1637.9532	3.000
		LEFT	-12.1000	1635.3958	0.000
		RIGHT	29.6497	1637.4163	3.000
		LEFT	-12.1000	1635.1144	0.000
		RIGHT	29.4883	1637.0611	3.000
		LEFT	-15.4188	1634.9906	0.000
		RIGHT	29.4682	1636.5209	3.000
		LEFT	-16.2340	1634.3344	0.000
		RIGHT	17.0492	1635.6049	3.000
		LEFT	-17.0492	1633.6290	0.000
		RIGHT	29.8120	1635.6310	3.000
		LEFT	-17.2856	1633.5906	0.000
		RIGHT	32.0989	1636.2477	3.000
		LEFT	-17.5790	1633.4952	0.000
		RIGHT	23.6000	1634.2137	0.000
		LEFT	-17.5872	1633.4900	0.000
		RIGHT	23.6000	1634.2089	0.000
		LEFT	-17.8644	1633.3344	0.000
		RIGHT	23.6000	1637.0267	0.000
		LEFT	-18.0000	1633.1427	0.000
		RIGHT	23.6000	1642.1915	0.000
		LEFT	-18.0000	1633.1401	0.000
		RIGHT	23.6000	1642.2855	0.000

T I E S L O P E S U M M A R Y
FROM STATION 189+00.00 TO STATION 204+00.00

BASELINE STATION	OFFSET STATION	ROADWAY MAIN		ELEV	SLOPE
		SIDE	OFFSET		
194+28.50	194+28.50	LEFT	-18.0000	1633.1375	0.000
194+31.50	194+31.50	RIGHT	23.6000	1642.3790	0.000
194+50.00	194+50.00	LEFT	-18.0000	1633.1220	0.000
194+55.00	194+55.00	RIGHT	23.6000	1638.1911	0.000
194+55.50	194+55.50	LEFT	-18.0000	1633.0398	0.000
194+87.00	194+87.00	RIGHT	23.6000	1636.6313	0.000
194+90.50	194+90.50	LEFT	-18.0000	1633.0803	0.000
194+92.50	194+92.50	RIGHT	23.6000	1636.5834	0.000
195+00.00	195+00.00	LEFT	-18.0000	1633.0843	0.000
195+21.00	195+21.00	RIGHT	23.6000	1636.5789	0.000
195+24.00	195+24.00	LEFT	-18.0000	1633.2736	0.000
195+24.50	195+24.50	RIGHT	23.6000	1636.2786	0.000
195+25.00	195+25.00	LEFT	-18.0000	1633.2751	0.000
195+26.00	195+26.00	RIGHT	23.6000	1636.2452	0.000
195+58.00	195+58.00	LEFT	-18.0000	1633.2760	0.000
195+58.50	195+58.50	RIGHT	23.6000	1636.2265	0.000
195+81.09	195+81.09	LEFT	-18.0000	1633.2793	0.000
198+63.00	198+63.00	RIGHT	23.6000	1637.3838	0.000
198+69.00	198+69.00	LEFT	-18.0000	1633.2968	0.000
198+83.00	198+83.00	RIGHT	23.6000	1633.3152	0.000
198+93.00	198+93.00	LEFT	-18.0000	1633.3013	0.000
199+00.00	199+00.00	RIGHT	23.6000	1633.3386	0.000
199+15.00	199+15.00	LEFT	-18.0000	1633.3021	0.000
199+36.50	199+36.50	RIGHT	23.6000	1633.3036	0.000
199+50.00	199+50.00	LEFT	-18.0000	1633.3504	0.000
		RIGHT	23.6000	1633.3043	0.000
		LEFT	-18.0000	1633.3542	0.000
		RIGHT	23.6000	1633.4488	0.000
		LEFT	-18.0000	1634.3620	3.000
		RIGHT	29.9591	1634.4556	0.000
		LEFT	-18.0000	1633.4514	0.000
		RIGHT	29.9218	1634.3514	3.000
		LEFT	-18.0002	1633.7358	0.000
		RIGHT	32.6034	1635.3589	3.000
		LEFT	-25.5499	1636.1808	0.000
		RIGHT	25.1247	1636.2618	3.000
		LEFT	-25.6095	1636.2787	0.000
		RIGHT	25.2062	1636.2948	3.000
		LEFT	-25.7486	1636.4736	0.000
		RIGHT	25.5528	1636.4241	3.000
		LEFT	-25.8479	1636.5835	0.000
		RIGHT	25.7517	1636.5002	3.000
		LEFT	-25.9175	1636.8042	0.000
		RIGHT	26.0106	1636.5934	3.000
		LEFT	-26.0665	1637.1845	0.000
		RIGHT	26.5572	1636.7380	3.000
		LEFT	-26.2102	1637.3583	0.000
		RIGHT	27.3747	1637.1462	3.000
		LEFT	-26.1453	1637.7469	0.000

T I E S L O P E S U M M A R Y

FROM STATION 189+00.00 TO STATION 204+00.00

		ROADWAY MAIN				
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	
199+50.50	199+50.50	RIGHT	27.7350	1637.4569	3.000	
		LEFT	-26.1429	1637.7616	0.000	
199+68.00	199+68.00	RIGHT	27.7387	1637.4652	3.000	
		LEFT	-26.0587	1638.5574	0.000	
199+82.50	199+82.50	RIGHT	27.6800	1637.6926	3.000	
		LEFT	-26.0642	1638.7653	0.000	
200+00.00	200+00.00	RIGHT	27.9413	1637.9745	3.000	
		LEFT	-26.5527	1638.9476	0.000	
200+50.00	200+50.00	RIGHT	27.8431	1638.1658	3.000	
		LEFT	-27.9484	1639.8007	0.000	
200+88.50	200+88.50	RIGHT	27.6896	1638.7546	3.000	
		LEFT	-28.8350	1640.3159	0.000	
200+94.00	200+94.00	RIGHT	27.2412	1639.0980	3.000	
		LEFT	-28.8350	1640.3745	0.000	
201+00.00	201+00.00	RIGHT	27.3801	1639.2147	3.000	
		LEFT	-26.0300	1640.3551	0.000	
201+06.00	201+06.00	RIGHT	32.1780	1638.9408	20.000	
		LEFT	-24.0306	1639.9987	0.000	
201+17.00	201+17.00	RIGHT	33.1491	1638.9187	20.000	
		LEFT	-24.0322	1640.1234	0.000	
201+19.00	201+19.00	RIGHT	46.7231	1639.3330	20.000	
		LEFT	-24.0325	1640.1134	0.000	
201+22.00	201+22.00	RIGHT	49.8904	1639.4433	20.000	
		LEFT	-24.0329	1640.1475	0.000	
201+22.50	201+22.50	RIGHT	53.3542	1639.5444	20.000	
		LEFT	-24.0330	1640.1576	0.000	
201+23.00	201+23.00	RIGHT	53.9092	1639.5601	20.000	
		LEFT	-24.0331	1640.1676	0.000	
201+24.00	201+24.00	RIGHT	54.4638	1639.5758	20.000	
		LEFT	-24.0332	1640.1875	0.000	
201+24.50	201+24.50	RIGHT	55.5730	1639.6073	20.000	
		LEFT	-24.0333	1640.1976	0.000	
201+25.00	201+25.00	RIGHT	56.1268	1639.6229	20.000	
		LEFT	-24.0334	1640.2076	0.000	
201+31.50	201+31.50	RIGHT	56.5513	1639.6322	20.000	
		LEFT	-24.0343	1640.4102	0.000	
201+34.50	201+34.50	RIGHT	58.8097	1639.5889	20.000	
		LEFT	-24.0348	1640.4784	0.000	
201+35.00	201+35.00	RIGHT	59.7063	1639.5617	20.000	
		LEFT	-24.0349	1640.4891	0.000	
201+42.00	201+42.00	RIGHT	59.8313	1639.5559	20.000	
		LEFT	-24.0359	1640.3863	0.000	
201+42.50	201+42.50	RIGHT	64.4945	1639.6210	20.000	
		LEFT	-24.0360	1640.3970	0.000	
201+50.00	201+50.00	RIGHT	64.8925	1639.6289	20.000	
		LEFT	-24.0371	1640.5591	0.000	
201+58.00	201+58.00	RIGHT	70.8085	1639.7446	20.000	
		LEFT	-24.0382	1640.6174	0.000	
		RIGHT	77.0055	1639.8624	20.000	

T I E S L O P E S U M M A R Y

FROM STATION 189+00.00 TO STATION 204+00.00

		ROADWAY MAIN				
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE	
201+68.00	201+68.00	LEFT	-24.0397	1640.6902	0.000	
		RIGHT	80.3961	1639.7920	20.000	
201+82.00	201+82.00	LEFT	-24.0400	1640.9634	0.000	
		RIGHT	68.2853	1639.5923	-20.000	
201+87.00	201+87.00	LEFT	-24.0400	1641.0604	0.000	
		RIGHT	75.8677	1639.0750	-20.000	
201+89.00	201+89.00	LEFT	-24.0400	1641.0305	0.000	
		RIGHT	96.0867	1638.0088	-20.000	
201+89.50	201+89.50	LEFT	-24.0400	1641.0130	0.000	
		RIGHT	99.9747	1637.8006	-20.000	
201+90.00	201+90.00	LEFT	-24.6658	1641.0454	3.000	
		RIGHT	61.8861	1639.1508	-3.000	
201+90.50	201+90.50	LEFT	-24.6887	1641.0595	3.000	
		RIGHT	61.9240	1639.0099	-3.000	
201+96.00	201+96.00	LEFT	-25.0029	1641.2346	3.000	
		RIGHT	62.2625	1637.4858	-3.000	
201+98.00	201+98.00	LEFT	-25.0408	1641.2728	3.000	
		RIGHT	61.4266	1637.2512	-3.000	
202+00.00	202+00.00	LEFT	-24.9700	1641.2748	3.000	
		RIGHT	59.9719	1637.2230	-3.000	
202+18.00	202+18.00	LEFT	-24.2308	1641.2589	3.000	
		RIGHT	47.4574	1636.7759	-3.000	
202+26.00	202+26.00	LEFT	-24.4880	1641.1483	-3.000	
		RIGHT	38.9448	1637.5607	-3.000	
202+50.00	202+50.00	LEFT	-16.3088	1641.4554	-3.000	
		RIGHT	22.1692	1640.5302	3.000	
203+00.00	203+00.00	LEFT	-17.0865	1642.1093	-3.000	
		RIGHT	22.3930	1640.4957	-3.000	
203+36.00	203+36.00	LEFT	-17.1008	1642.5713	-3.000	
		RIGHT	22.7407	1640.8054	3.000	
203+50.00	203+50.00	LEFT	-16.9626	1642.6930	-3.000	
		RIGHT	22.6521	1642.8515	3.000	
203+62.00	203+62.00	LEFT	-17.2934	1642.6475	-3.000	
		RIGHT	22.5701	1640.8890	3.000	
203+74.00	203+74.00	LEFT	-17.3774	1642.6843	-3.000	
		RIGHT	22.5075	1640.9329	3.000	
203+87.00	203+87.00	LEFT	-17.4711	1642.7233	-3.000	
		RIGHT	22.4252	1640.9757	3.000	
204+00.00	204+00.00	LEFT	-17.6218	1642.7433	-3.000	
		RIGHT	22.3278	1641.0134	3.000	

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

FROM STATION 189+00.00 TO STATION 204+00.00

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 Or-d)
189+00.00	88.817	0.000	0.000	0.000	1.2000	0.000	0.000
189+03.00	90.522	9.963	0.000	0.000	1.2000	0.000	9.963
189+13.00	93.226	34.027	0.000	0.000	1.2000	0.000	43.991
189+19.00	93.440	20.741	0.000	0.000	1.2000	0.000	64.731
189+55.00	90.735	122.783	0.000	0.000	1.2000	0.000	187.515
190+00.00	83.740	145.395	0.000	0.000	1.2000	0.000	332.910
190+38.50	83.516	119.247	0.000	0.000	1.2000	0.000	452.157
190+39.00	83.499	1.546	0.000	0.000	1.2000	0.000	453.704
190+42.50	83.326	10.813	0.000	0.000	1.2000	0.000	464.516
190+70.00	82.146	84.268	0.000	0.000	1.2000	0.000	548.785
191+00.00	81.899	91.136	0.000	0.000	1.2000	0.000	639.921
191+10.50	79.311	31.346	0.000	0.000	1.2000	0.000	671.267
191+28.50	82.353	56.882	0.000	0.000	1.2000	0.000	728.149
191+70.00	81.884	123.178	0.000	0.000	1.2000	0.000	851.327
192+00.00	81.786	90.928	0.000	0.000	1.2000	0.000	942.255
192+50.00	86.629	155.940	0.000	0.000	1.2000	0.000	1098.195
193+00.00	78.333	152.743	0.000	0.000	1.2000	0.000	1250.937
193+50.00	79.043	145.719	0.326	0.302	1.2000	0.362	1396.295
193+64.50	81.824	43.196	0.223	0.147	1.2000	0.177	1439.314
193+82.50	82.939	54.921	0.256	0.160	1.2000	0.192	1494.043
193+83.00	82.998	1.536	0.259	0.005	1.2000	0.006	1495.573
194+00.00	83.715	52.484	0.304	0.177	1.2000	0.213	1547.844
194+27.50	86.537	86.702	0.214	0.264	1.2000	0.317	1634.230
194+28.00	86.663	1.604	0.213	0.004	1.2000	0.005	1635.829
194+28.50	86.798	1.606	0.211	0.004	1.2000	0.005	1637.431
194+31.50	85.528	9.574	0.202	0.023	1.2000	0.028	1646.977
194+50.00	89.373	58.920	0.081	0.097	1.2000	0.116	1706.780
194+55.00	90.800	16.683	0.016	0.009	1.2000	0.011	1723.452
194+55.50	90.940	1.683	0.013	0.000	1.2000	0.000	1725.135
194+87.00	97.898	110.156	0.000	0.007	1.2000	0.009	1835.281
194+90.50	98.402	12.723	0.000	0.000	1.2000	0.000	1848.005
194+92.50	98.665	7.299	0.000	0.000	1.2000	0.000	1855.303
195+00.00	99.823	27.568	0.000	0.000	1.2000	0.000	1882.871
195+21.00	108.703	81.094	0.000	0.000	1.2000	0.000	1963.965
195+24.00	109.854	12.142	0.000	0.000	1.2000	0.000	1976.107
195+24.50	110.030	2.036	0.000	0.000	1.2000	0.000	1978.143
195+25.50	110.370	4.081	0.000	0.000	1.2000	0.000	1982.224
195+26.00	110.534	2.045	0.000	0.000	1.2000	0.000	1984.270
195+58.00	114.957	133.624	0.000	0.000	1.2000	0.000	2117.894
195+58.50	114.894	2.128	0.000	0.000	1.2000	0.000	2120.022
195+81.09	117.558	97.242	0.000	0.000	1.2000	0.000	2217.264
198+63.00	95.152	1110.461	2.615	13.650	1.2000	16.380	3311.345
198+69.00	96.795	21.327	2.530	0.572	1.2000	0.686	3331.987
198+83.00	97.563	50.389	2.132	1.209	1.2000	1.450	3380.926
198+93.00	96.692	35.973	1.911	0.749	1.2000	0.898	3416.001
199+00.00	97.326	25.151	1.661	0.463	1.2000	0.556	3440.595
199+15.00	99.351	54.633	1.265	0.813	1.2000	0.975	3494.253
199+36.50	107.160	82.222	1.001	0.902	1.2000	1.083	3575.392
199+50.00	107.413	53.643	0.587	0.347	1.2000	0.416	3628.619

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

FROM STATION 189+00.00 TO STATION 204+00.00

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 Or-d)
199+50.50	107.407	1.989	0.369	0.007	1.2000	0.008	3630.599
199+68.00	107.602	69.679	0.054	0.137	1.2000	0.164	3700.113
199+82.50	109.778	58.370	0.002	0.015	1.2000	0.018	3758.466
200+00.00	111.414	71.682	0.044	0.015	1.2000	0.049	3830.131
200+50.00	111.974	206.841	0.000	0.041	1.2000	0.000	4036.923
200+88.50	114.445	161.428	0.000	0.000	1.2000	0.000	4198.351
200+94.00	115.371	23.407	0.000	0.000	1.2000	0.000	4221.758
201+00.00	113.163	25.393	0.000	0.000	1.2000	0.000	4247.151
201+06.00	114.198	25.262	0.000	0.000	1.2000	0.000	4272.413
201+17.00	136.591	51.087	0.000	0.000	1.2000	0.000	4323.500
201+19.00	141.984	10.318	0.000	0.000	1.2000	0.000	4333.817
201+22.00	150.711	16.261	0.000	0.000	1.2000	0.000	4350.078
201+22.50	152.280	2.805	0.000	0.000	1.2000	0.000	4352.883
201+23.00	153.844	2.834	0.000	0.000	1.2000	0.000	4355.718
201+24.00	156.919	5.755	0.000	0.000	1.2000	0.000	4361.473
201+24.50	158.338	2.919	0.000	0.000	1.2000	0.000	4364.392
201+25.00	159.511	2.943	0.000	0.000	1.2000	0.000	4367.335
201+31.50	170.541	39.728	0.000	0.000	1.2000	0.000	4407.063
201+34.50	173.845	19.133	0.000	0.000	1.2000	0.000	4426.196
201+35.00	174.295	3.224	0.000	0.000	1.2000	0.000	4429.419
201+42.00	175.334	45.322	0.000	0.000	1.2000	0.000	4474.742
201+42.50	175.453	3.248	0.000	0.000	1.2000	0.000	4477.990
201+50.00	190.279	50.796	0.000	0.000	1.2000	0.000	4528.786
201+58.00	206.685	58.809	0.000	0.000	1.2000	0.000	4587.595
201+68.00	216.152	78.303	0.000	0.000	1.2000	0.000	4665.899
201+82.00	180.662	102.878	0.104	0.027	1.2000	0.032	4768.744
201+87.00	169.684	32.439	2.454	0.237	1.2000	0.284	4800.899
201+89.00	164.755	12.387	12.497	0.554	1.2000	0.664	4812.621
201+89.50	163.423	3.039	16.572	0.269	1.2000	0.323	4815.337
201+90.00	162.084	3.014	0.579	0.159	1.2000	0.191	4818.161
201+90.50	160.665	2.988	0.731	0.012	1.2000	0.015	4821.134
201+96.00	141.442	30.770	4.877	0.571	1.2000	0.685	4851.219
201+98.00	134.275	10.212	6.324	0.415	1.2000	0.498	4860.933
202+00.00	128.010	9.714	7.800	0.523	1.2000	0.628	4870.020
202+18.00	106.364	78.125	10.323	6.041	1.2000	7.249	4940.895
202+26.00	102.642	30.964	3.853	2.070	1.2000	2.485	4969.375
202+50.00	73.276	78.186	0.020	1.632	1.2000	1.959	5045.602
203+00.00	65.617	128.604	0.361	0.353	1.2000	0.424	5173.782
203+36.00	71.831	91.632	0.372	0.489	1.2000	0.586	5264.828
203+50.00	72.818	37.502	0.374	0.193	1.2000	0.232	5302.097
203+62.00	72.219	32.230	0.505	0.195	1.2000	0.234	5334.093
203+74.00	69.974	31.598	0.530	0.230	1.2000	0.276	5365.416
203+87.00	70.962	33.929	0.515	0.251	1.2000	0.302	5399.043
204+00.00	70.951	34.164	0.500	0.244	1.2000	0.293	5432.914
Project totals	5474.415	5474.415	34.584	34.584		41.501	5432.914

T I E S L O P E S U M M A R Y
FROM STATION 173+34.80 TO STATION 174+00.00

ROADWAY MAIN					
BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
173+34.80	173+34.80	LEFT	-69.4840	1643.4614	0.000
		RIGHT	69.4840	1642.7499	0.000
173+35.10	173+35.10	LEFT	-68.3080	1643.4729	0.000
		RIGHT	68.3080	1642.7729	0.000
173+37.20	173+37.20	LEFT	-60.0760	1643.5532	0.000
		RIGHT	60.0760	1642.9362	0.000
173+38.20	173+38.20	LEFT	-56.1560	1643.5879	0.000
		RIGHT	56.1560	1643.0160	0.000
173+39.40	173+39.40	LEFT	-51.4520	1643.6207	0.000
		RIGHT	51.4520	1643.1117	0.000
173+40.30	173+40.30	LEFT	-47.9240	1643.6248	0.000
		RIGHT	47.9240	1643.1715	0.000
173+41.60	173+41.60	LEFT	-42.8280	1643.6092	0.000
		RIGHT	42.8280	1643.2488	8.000
173+47.80	173+47.80	LEFT	-37.1629	1643.6326	8.000
		RIGHT	37.1629	1643.3166	8.000
173+57.60	173+57.60	LEFT	-34.1141	1643.6975	8.000
		RIGHT	34.1141	1643.5910	8.000
174+00.00	174+00.00	LEFT	-24.7889	1643.8062	-8.000
		RIGHT	24.7889	1643.7073	-8.000

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

FROM STATION 173+34.80 TO STATION 174+00.00							
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)
173+34.80	307.783	0.000	0.806	0.000	1.2000	0.000	0.000
173+35.10	305.877	3.409	0.575	0.008	1.2000	0.009	3.400
173+37.20	288.794	23.126	0.000	0.022	1.2000	0.027	26.499
173+38.20	277.938	10.495	0.000	0.000	1.2000	0.000	36.994
173+38.40	262.481	12.009	0.000	0.000	1.2000	0.000	49.004
173+40.30	249.335	8.530	0.000	0.000	1.2000	0.000	57.534
173+41.60	228.978	11.515	0.000	0.000	1.2000	0.000	69.049
173+47.80	167.267	45.495	0.000	0.000	1.2000	0.000	114.543
173+57.60	118.391	51.842	0.000	0.000	1.2000	0.000	166.365
174+00.00	41.354	125.429	3.671	2.882	1.2000	3.459	288.356
.....
Project totals	291.850	2.912	3.495	288.366

NOTE: Tie Slope Pts. Are Not The Saw Cut Locations.

MANDAN - 8TH AVENUE N.E. TIE SLOPE & EARTHWORK SUMMARY	
FILE: SIDE1.GRF	Note: Existing Rdwy. Surface Shall be Subtracted From Quant.

T I E S L O P E S U M M A R Y
FROM STATION 177+33.50 TO STATION 178+00.00

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
177+33.50	177+33.50	LEFT	-58.2098	1647.2193	0.000
		RIGHT	58.2098	1646.4439	0.000
177+40.30	177+40.30	LEFT	-64.2882	1647.3214	0.000
		RIGHT	64.2882	1648.5046	0.000
177+41.50	177+41.50	LEFT	-52.3667	1647.4198	0.000
		RIGHT	52.3667	1648.6708	0.000
177+41.50	177+41.50	LEFT	-49.6785	1647.6039	0.000
		RIGHT	49.6785	1648.9992	0.000
177+42.00	177+42.00	LEFT	-49.3114	1647.5206	0.000
		RIGHT	47.7649	1648.7218	0.000
177+45.00	177+45.00	LEFT	-38.6051	1647.7492	0.000
		RIGHT	40.3366	1648.9263	0.000
177+52.00	177+52.00	LEFT	-31.8519	1647.9284	0.000
		RIGHT	35.3718	1649.0571	0.000
177+53.80	177+53.80	LEFT	-31.7173	1647.9553	0.000
		RIGHT	35.9368	1649.1715	0.000
177+56.50	177+56.50	LEFT	-31.3968	1647.9951	0.000
		RIGHT	36.9288	1649.3755	0.000
177+58.30	177+58.30	LEFT	-31.2174	1648.0367	0.000
		RIGHT	37.0259	1649.4506	0.000
177+60.00	177+60.00	LEFT	-31.1514	1648.0941	0.000
		RIGHT	36.1028	1649.4018	0.000
177+61.00	177+61.00	LEFT	-27.1102	1648.1431	0.000
		RIGHT	31.6289	1649.3891	0.000
177+67.00	177+67.00	LEFT	-28.1728	1648.3059	0.000
		RIGHT	33.5414	1649.4045	0.000
177+92.50	177+92.50	LEFT	-26.2727	1648.5641	-8.000
		RIGHT	28.5493	1649.2543	0.000
177+93.00	177+93.00	LEFT	-26.3436	1648.5894	-8.000
		RIGHT	28.4949	1649.2526	0.000
177+95.20	177+95.20	LEFT	-28.6126	1648.5913	-8.000
		RIGHT	28.3229	1649.2484	0.000
177+95.90	177+95.90	LEFT	-26.8839	1648.5977	-8.000
		RIGHT	28.2904	1649.2449	0.000
177+96.40	177+96.40	LEFT	-28.7306	1648.6021	-8.000
		RIGHT	26.2745	1649.2441	0.000
178+00.00	178+00.00	LEFT	-27.0298	1648.6217	-8.000
		RIGHT	28.4172	1649.2532	0.000

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

FROM STATION 177+33.50 TO STATION 178+00.00

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)
177+33.50	0.000	0.000	0.000	0.000	1.2000	0.000	0.000
177+38.80	248.428	28.983	0.140	0.016	1.2000	0.020	28.963
177+40.30	244.469	4.564	0.000	0.001	1.2000	0.002	33.528
177+40.80	289.719	4.483	0.000	0.000	1.2000	0.000	38.008
177+41.50	290.929	6.101	0.000	0.000	1.2000	0.000	44.110
177+42.00	223.968	4.212	0.000	0.000	1.2000	0.000	48.322
177+46.00	175.128	22.172	0.000	0.000	1.2000	0.000	70.494
177+52.00	153.176	42.558	0.000	0.000	1.2000	0.000	113.052
177+53.80	155.584	10.282	0.000	0.000	1.2000	0.000	123.344
177+56.50	158.107	15.585	0.000	0.000	1.2000	0.000	139.028
177+58.30	157.136	10.508	0.000	0.000	1.2000	0.000	149.536
177+60.00	154.723	8.818	0.000	0.000	1.2000	0.000	159.354
177+61.00	95.075	4.628	0.000	0.000	1.2000	0.000	163.980
177+67.00	91.869	20.772	0.000	0.000	1.2000	0.000	194.751
177+92.50	42.335	63.374	2.212	1.045	1.2000	1.254	248.872
177+93.00	41.948	0.780	2.290	0.042	1.2000	0.050	247.693
177+95.20	40.550	3.351	2.592	0.169	1.2000	0.239	250.726
177+95.90	40.227	1.047	2.674	0.088	1.2000	0.082	251.891
177+96.40	40.022	0.749	2.728	0.050	1.2000	0.060	252.374
178+00.00	38.328	5.290	3.005	0.332	1.2000	0.459	257.205
Project totals		259.369		1.803		2.164	257.205

P L O T T I N G I N F O R M A T I O N

HORIZONTAL: 1 in. = 10.0 ft. Sheet size = 17.0 in.
VERTICAL: 1 in. = 5.0 ft. Sheet size = 11.0 in.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	246

MANDAN - 9TH AVENUE N.E.
TIE SLOPE & EARTHWORK SUMMARY

FILE: SIDE2.GRF Note: Existing Rdwy. Surface Shall be Subtracted From Quant.

Note: Tie Pts. Are Not Saw Cut Location.

TIE SLOPE SUMMARY

FROM STATION 181+35.00 TO STATION 182+06.50

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
181+35.00	181+35.00	LEFT	-73.9419	1646.9835	0.000
		RIGHT	73.9419	1645.9846	0.000
181+38.60	181+38.60	LEFT	-57.5328	1647.0324	0.000
		RIGHT	57.5328	1646.2116	0.000
181+39.80	181+39.80	LEFT	-52.0628	1647.0553	0.000
		RIGHT	52.0628	1646.2340	0.000
181+41.30	181+41.30	LEFT	-45.2256	1647.0334	0.000
		RIGHT	49.9772	1646.3952	8.000
181+42.00	181+42.00	LEFT	-42.0349	1647.0324	0.000
		RIGHT	46.9125	1646.4194	8.000
181+42.80	181+42.80	LEFT	-48.3115	1647.1406	8.000
		RIGHT	43.1984	1646.4256	8.000
181+45.50	181+45.50	LEFT	-39.3070	1647.0393	8.000
		RIGHT	34.4501	1646.4922	8.000
181+47.00	181+47.00	LEFT	-39.6022	1647.1223	8.000
		RIGHT	34.5763	1646.4941	8.000
181+55.50	181+55.50	LEFT	-35.7282	1647.1670	8.000
		RIGHT	32.2763	1646.6337	8.000
181+56.00	181+56.00	LEFT	-35.7373	1647.1730	8.000
		RIGHT	32.2583	1646.6426	8.000
181+60.00	181+60.00	LEFT	-35.6775	1647.2194	8.000
		RIGHT	32.0127	1646.7156	8.000
181+60.50	181+60.50	LEFT	-35.6523	1647.2248	8.000
		RIGHT	31.9691	1646.7250	8.000
181+62.00	181+62.00	LEFT	-35.5606	1647.2416	8.000
		RIGHT	31.8217	1646.7536	8.000
181+63.00	181+63.00	LEFT	-35.4850	1647.2531	8.000
		RIGHT	31.7092	1646.7730	8.000
181+66.50	181+66.50	LEFT	-35.1296	1647.2949	8.000
		RIGHT	31.2264	1646.8429	8.000
181+84.00	181+84.00	LEFT	-30.0223	1647.4116	8.000
		RIGHT	26.7941	1647.0981	8.000
182+00.00	182+00.00	LEFT	-24.2049	1647.1570	-8.000
		RIGHT	25.1308	1647.4140	8.000
182+02.90	182+02.90	LEFT	-24.8263	1647.1353	-8.000
		RIGHT	25.1011	1647.4563	8.000
182+06.50	182+06.50	LEFT	-25.0940	1647.1394	-8.000
		RIGHT	27.3451	1647.2131	-8.000

DETAILED EARTHWORK QUANTITIES

FROM STATION 181+35.00 TO STATION 182+06.50

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)
181+35.00	346.701	0.000	0.000	0.000	1.2000	0.000	0.000
181+38.60	298.153	43.057	0.000	0.000	1.2000	0.000	43.057
181+39.80	275.803	12.777	0.000	0.000	1.2000	0.000	55.834
181+41.30	243.574	14.427	0.000	0.000	1.2000	0.000	70.261
181+42.00	225.814	6.085	0.000	0.000	1.2000	0.000	76.345
181+42.80	210.357	6.462	0.000	0.000	1.2000	0.000	82.807
181+45.50	156.808	18.358	0.022	0.001	1.2000	0.001	101.164
181+47.00	159.688	8.791	0.009	0.001	1.2000	0.001	109.954
181+55.50	112.435	42.831	0.000	0.001	1.2000	0.002	152.783
181+56.00	112.367	2.081	0.000	0.000	1.2000	0.000	154.865
181+60.00	109.660	16.448	0.000	0.000	1.2000	0.000	171.311
181+60.50	109.107	2.026	0.000	0.000	1.2000	0.000	173.337
181+62.00	109.796	6.081	0.000	0.000	1.2000	0.000	179.418
181+63.00	109.048	4.053	0.000	0.000	1.2000	0.000	183.470
181+66.50	104.338	13.831	0.000	0.000	1.2000	0.000	197.301
181+84.00	68.195	65.914	0.000	0.000	1.2000	0.000	253.215
182+00.00	43.160	32.994	0.022	0.006	1.2000	0.008	286.201
182+02.90	41.559	4.550	0.450	0.025	1.2000	0.030	290.720
182+06.50	41.617	5.545	0.827	0.085	1.2000	0.102	298.163
Project totals		296.308		0.120		0.144	296.163

PLOTTING INFORMATION

HORIZONTAL: 1 in. = 10.0 ft. Sheet size = 17.0 in.
 VERTICAL: 1 in. = 5.0 ft. Sheet size = 11.0 in.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	247

MANDAN - 10TH AVENUE TIE SLOPE & EARTHWORK SUMMARY	
FILE: SIDE3.GRF	Note: Existing Rdwy. Surface Shall be Subtracted From Quant.

Note: Tie Pts. Are Not Saw Cut Location.

TIE SLOPE SUMMARY
FROM STATION 185+37.20 TO STATION 186+13.70

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
185+37.20	185+37.20	LEFT	-63.9140	1644.1919	0.000
		RIGHT	63.9140	1643.8369	0.000
185+38.00	185+38.00	LEFT	-60.2674	1644.2212	0.000
		RIGHT	60.2674	1643.9197	0.000
185+41.00	185+41.00	LEFT	-46.5930	1644.3501	0.000
		RIGHT	46.5930	1644.2198	0.000
185+45.00	185+45.00	LEFT	-37.5558	1644.5467	8.000
		RIGHT	37.5558	1644.5030	8.000
185+50.00	185+50.00	LEFT	-37.7750	1644.7266	8.000
		RIGHT	38.1941	1644.7790	8.000
185+67.20	185+67.20	LEFT	-39.2038	1645.0751	8.000
		RIGHT	37.8652	1645.4345	8.000
186+00.00	186+00.00	LEFT	-25.5821	1644.7283	-8.000
		RIGHT	27.1081	1645.0892	-8.000
186+13.70	186+13.70	LEFT	-25.5213	1644.8089	-8.000
		RIGHT	28.6826	1644.9655	-8.000

DETAILED EARTHWORK QUANTITIES

FROM STATION 185+37.20 TO STATION 186+13.70

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)
185+37.20	316.296	0.000	0.000	0.000	1.2000	0.000	0.000
185+38.00	306.156	9.222	0.000	0.000	1.2000	0.000	9.222
185+41.00	254.898	31.170	0.000	0.000	1.2000	0.000	40.391
185+45.00	169.211	31.416	0.000	0.000	1.2000	0.000	71.807
185+50.00	174.585	31.831	0.000	0.000	1.2000	0.000	103.638
185+67.20	118.300	93.283	0.000	0.000	1.2000	0.000	196.921
186+00.00	36.096	93.781	2.244	1.383	1.2000	1.635	289.066
186+13.70	37.112	18.573	3.823	1.539	1.2000	1.847	305.783
Project totals		309.275		2.902		3.483	305.793

PLOTTING INFORMATION

HORIZONTAL: 1 in. = 10.0 ft. Sheet size = 17.0 in.
VERTICAL: 1 in. = 5.0 ft. Sheet size = 11.0 in.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	248

MANDAN - 11TH AVENUE TIE SLOPE & EARTHWORK SUMMARY	
FILE: SIDE4.GRF	Note: Existing Rdwy. Surface Shall be Subtracted From Quant.

Note: Tie Pts. Are Not Saw Cut Locations.

T I E S L O P E S U M M A R Y
FROM STATION 189+33.90 TO STATION 189+91.50

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
189+34.40	189+34.40	LEFT	-76.6767	1641.8193	0.000
		RIGHT	76.6767	1640.9020	0.000
189+41.40	189+41.40	LEFT	-49.0755	1641.9593	8.000
		RIGHT	46.2614	1641.0243	8.000
189+47.50	189+47.50	LEFT	-32.1436	1641.7451	8.000
		RIGHT	28.3934	1641.1369	8.000
189+48.70	189+48.70	LEFT	-31.7342	1641.7356	8.000
		RIGHT	27.8727	1641.1362	8.000
189+51.30	189+51.30	LEFT	-31.1599	1641.7864	8.000
		RIGHT	26.9709	1641.1718	8.000
189+54.00	189+54.00	LEFT	-30.4989	1641.8052	8.000
		RIGHT	26.9323	1641.2059	8.000
189+56.00	189+56.00	LEFT	-28.7417	1641.8059	8.000
		RIGHT	26.2419	1641.2363	8.000

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

FROM STATION 189+33.90 TO STATION 189+91.50

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)
189+33.90	0.000	0.000	0.000	0.000	1.2000	0.000	0.000
189+34.40	308.101	2.862	1.639	0.015	1.2000	0.018	2.844
189+41.40	182.216	84.986	0.000	0.212	1.2000	0.255	87.574
189+47.50	112.451	34.416	0.000	0.000	1.2000	0.000	101.980
189+48.70	110.130	4.948	0.000	0.000	1.2000	0.000	106.936
189+51.30	109.715	10.585	0.000	0.000	1.2000	0.000	117.521
189+54.00	108.395	10.905	0.000	0.000	1.2000	0.000	128.427
189+56.00	106.888	7.973	0.000	0.000	1.2000	0.000	136.400
189+91.50	106.888	140.535	0.000	0.000	1.2000	0.000	276.938

Project totals		277.209		0.228		0.273	276.938

P L O T T I N G I N F O R M A T I O N

HORIZONTAL: 1 in. = 10.0 ft. Sheet size = 17.0 in.
VERTICAL: 1 in. = 6.0 ft. Sheet size = 11.0 in.

Note: Tie Pts. Are Not Saw Cut Locations.

T I E S L O P E S U M M A R Y
FROM STATION 193+34.00 TO STATION 193+83.00

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
193+34.00	193+34.00	LEFT	-82.5000	1639.0976	0.000
		RIGHT	92.5000	1638.8281	0.000
193+38.00	193+38.00	LEFT	-64.6918	1639.0586	0.000
		RIGHT	64.6918	1639.0389	0.000
193+40.50	193+40.50	LEFT	-53.5455	1639.0447	0.000
		RIGHT	53.5455	1639.0736	0.000
193+45.00	193+45.00	LEFT	-34.9689	1638.9185	8.000
		RIGHT	37.1184	1639.0885	8.000
193+46.00	193+46.00	LEFT	-34.8483	1638.8980	8.000
		RIGHT	38.8973	1639.0681	8.000
193+49.00	193+49.00	LEFT	-33.6076	1638.8369	8.000
		RIGHT	36.2133	1639.0872	8.000
193+63.00	193+63.00	LEFT	-26.9267	1638.6747	8.000
		RIGHT	25.3678	1638.4980	-8.000
193+76.00	193+76.00	LEFT	-26.3183	1638.5493	8.000
		RIGHT	25.2302	1638.4611	-8.000
193+78.00	193+78.00	LEFT	-26.0121	1638.4990	8.000
		RIGHT	25.1670	1638.4542	-8.000
193+80.00	193+80.00	LEFT	-24.9776	1638.1298	-8.000
		RIGHT	25.1680	1638.4497	-8.000
193+83.00	193+83.00	LEFT	-25.3601	1638.1193	-8.000
		RIGHT	26.2390	1638.3845	-8.000

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

FROM STATION 193+34.00 TO STATION 193+83.00

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)
193+34.00	395.053	0.000	0.986	0.000	1.2000	0.000	0.000
193+38.00	279.743	45.543	0.000	0.072	1.2000	0.086	45.457
193+40.50	226.698	23.446	0.000	0.000	1.2000	0.000	88.903
193+45.00	118.059	28.730	0.000	0.000	1.2000	0.000	87.833
193+46.00	116.380	4.341	0.000	0.000	1.2000	0.000	101.974
193+49.00	110.394	12.599	0.000	0.000	1.2000	0.000	114.573
193+63.00	48.058	41.080	0.447	0.118	1.2000	0.139	156.513
193+76.00	47.571	21.251	0.019	0.104	1.2000	0.124	178.699
193+78.00	46.106	5.204	0.013	0.002	1.2000	0.002	181.542
193+80.00	45.583	3.395	0.279	0.011	1.2000	0.013	185.224
193+83.00	42.190	4.875	2.429	0.150	1.2000	0.181	189.918
Project totals		190.463		0.454		0.546	189.918

P L O T T I N G I N F O R M A T I O N

HORIZONTAL: 1 in. = 10.0 ft. Sheet size = 17.0 in.
VERTICAL: 1 in. = 5.0 ft. Sheet size = 11.0 in.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	250

MANDAN- 13TH AVENUE TIE SLOPE & EARTHWORK SUMMARY	
FILE: SIDE6.GRF	Note: Existing Rdwy Surface Shall be Subtracted From Quant.

Note: Tie Pts. Are Not Saw Cut Locations.

T I E S L O P E S U M M A R Y

FROM STATION 197+41.00 TO STATION 201+40.00

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
197+41.00	197+41.00	LEFT	-36.4652	1698.4659	20.000
		RIGHT	36.4652	1698.6832	20.000
197+61.00	197+61.00	LEFT	-44.1688	1698.3612	20.000
		RIGHT	28.4535	1697.8140	20.000
197+83.00	197+83.00	LEFT	-48.7723	1698.3123	20.000
		RIGHT	26.6689	1697.6398	20.000
197+83.50	197+83.50	LEFT	-48.9510	1698.3021	20.000
		RIGHT	24.9218	1697.5949	20.000
197+86.50	197+86.50	LEFT	-42.7013	1698.2843	20.000
		RIGHT	21.8945	1697.3598	-20.000
197+87.50	197+87.50	LEFT	-42.3076	1698.2098	20.000
		RIGHT	22.9126	1697.8126	-20.000
197+89.00	197+89.00	LEFT	-41.6428	1698.1709	20.000
		RIGHT	22.9586	1697.2513	-20.000
197+70.50	197+70.50	LEFT	-41.0079	1698.1328	20.000
		RIGHT	43.9179	1698.6454	4.000
197+77.00	197+77.00	LEFT	-31.5643	1697.6231	20.000
		RIGHT	60.4782	1699.4772	4.000
197+84.70	197+84.70	LEFT	-29.2924	1697.3451	-20.000
		RIGHT	53.4913	1698.0595	4.000
197+89.00	197+89.00	LEFT	-30.2424	1697.2733	-20.000
		RIGHT	55.1762	1698.0800	6.000
197+91.00	197+91.00	LEFT	-30.7129	1697.2399	-20.000
		RIGHT	62.3097	1698.6379	6.000
197+93.40	197+93.40	LEFT	-31.2770	1697.1938	-20.000
		RIGHT	48.9166	1698.5588	6.000
197+97.50	197+97.50	LEFT	-32.2147	1697.1328	-20.000
		RIGHT	42.8996	1698.0368	6.000
198+00.00	198+00.00	LEFT	-32.2940	1697.1163	-20.000
		RIGHT	39.1068	1697.6993	6.000
198+30.00	198+30.00	LEFT	-32.9413	1698.9404	-20.000
		RIGHT	28.9382	1698.7952	-20.000
198+61.00	198+61.00	LEFT	-32.3704	1698.8441	-20.000
		RIGHT	30.6231	1698.4280	-20.000
198+73.00	198+73.00	LEFT	-32.5117	1698.8531	-20.000
		RIGHT	30.9130	1698.4426	-20.000
199+00.00	199+00.00	LEFT	-38.0031	1698.6558	-20.000
		RIGHT	29.7272	1698.6941	-20.000
199+20.00	199+20.00	LEFT	-38.9556	1698.6797	-20.000
		RIGHT	28.2165	1698.7502	-20.000
199+28.00	199+28.00	LEFT	-37.1992	1698.8307	-20.000
		RIGHT	30.4183	1698.6842	-20.000
199+31.50	199+31.50	LEFT	-38.6616	1698.7847	-20.000
		RIGHT	28.0767	1698.8034	-20.000
199+42.00	199+42.00	LEFT	-39.0310	1698.8035	-20.000
		RIGHT	23.6027	1697.0694	-20.000
199+52.50	199+52.50	LEFT	-38.3790	1698.8594	-10.000
		RIGHT	21.3092	1697.2234	-10.000

T I E S L O P E S U M M A R Y

FROM STATION 197+41.00 TO STATION 201+40.00

ROADWAY MAIN

BASELINE STATION	OFFSET STATION	SIDE	OFFSET	ELEV	SLOPE
199+57.00	199+57.00	LEFT	-31.8101	1697.0344	-10.000
		RIGHT	21.6924	1697.2917	10.000
199+60.50	199+60.50	LEFT	-32.4658	1698.9809	-10.000
		RIGHT	22.0903	1697.3455	10.000
199+68.00	199+68.00	LEFT	-34.0507	1698.8646	-10.000
		RIGHT	22.7470	1697.4414	10.000
199+80.00	199+80.00	LEFT	-36.1045	1698.7976	-10.000
		RIGHT	21.8279	1697.3778	10.000
199+86.00	199+86.00	LEFT	-34.5617	1698.8760	-10.000
		RIGHT	21.4811	1697.3410	-10.000
200+00.00	200+00.00	LEFT	-33.2299	1697.0655	-10.000
		RIGHT	23.7357	1697.1719	-10.000
200+10.00	200+10.00	LEFT	-32.0788	1697.2279	-10.000
		RIGHT	24.8038	1697.1124	-10.000
200+20.00	200+20.00	LEFT	-32.1737	1697.3153	-10.000
		RIGHT	24.8573	1697.2039	-10.000
200+30.00	200+30.00	LEFT	-32.5819	1697.4279	-10.000
		RIGHT	26.4826	1697.2668	-10.000
200+40.00	200+40.00	LEFT	-33.1749	1697.5715	-10.000
		RIGHT	26.5068	1697.3963	-10.000
200+50.00	200+50.00	LEFT	-35.5028	1697.5487	-10.000
		RIGHT	28.3129	1697.4247	-10.000
200+58.10	200+58.10	LEFT	-36.4649	1697.6806	-10.000
		RIGHT	29.6858	1697.4155	-10.000
200+64.40	200+64.40	LEFT	-37.7970	1697.6217	-10.000
		RIGHT	28.4574	1697.7127	-10.000
200+68.70	200+68.70	LEFT	-40.6739	1697.4243	-10.000
		RIGHT	28.3292	1697.8158	-10.000
200+75.70	200+75.70	LEFT	-49.4787	1698.8910	-10.000
		RIGHT	27.2301	1698.0727	-10.000
200+80.00	200+80.00	LEFT	-48.7384	1698.8652	-10.000
		RIGHT	26.7038	1698.2166	-10.000
200+81.00	200+81.00	LEFT	-48.7754	1698.8725	-10.000
		RIGHT	26.5313	1698.2489	-10.000
200+90.00	200+90.00	LEFT	-48.0206	1697.1369	-10.000
		RIGHT	28.6748	1698.4285	-10.000
200+98.10	200+98.10	LEFT	-48.7874	1697.2534	-10.000
		RIGHT	29.2282	1698.3845	-10.000
201+00.00	201+00.00	LEFT	-48.6206	1697.2869	-10.000
		RIGHT	29.4789	1698.9581	-10.000
201+11.80	201+11.80	LEFT	-49.2315	1697.4886	-10.000
		RIGHT	31.8515	1698.3888	-10.000
201+17.00	201+17.00	LEFT	-47.3350	1697.7725	-10.000
		RIGHT	31.9184	1698.4714	-10.000
201+18.80	201+18.80	LEFT	-48.8815	1697.8777	-10.000
		RIGHT	32.0245	1698.4985	-10.000
201+30.00	201+30.00	LEFT	-42.9081	1698.4884	-10.000
		RIGHT	34.1874	1698.5173	-10.000
201+40.00	201+40.00	LEFT	-41.3711	1698.8619	-10.000

DETAILED EARTHWORK QUANTITIES

FROM STATION 197+41.00 TO STATION 201+40.00

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)
197+41.00	113.383	0.000	0.023	0.000	1.2000	0.000	0.000
197+61.00	101.279	78.504	0.000	0.000	1.2000	0.010	79.494
197+63.00	98.975	7.417	0.000	0.000	1.2000	0.000	98.911
197+63.50	98.421	1.828	0.000	0.000	1.2000	0.000	98.739
197+66.50	95.021	10.747	0.013	0.001	1.2000	0.001	98.484
197+67.50	93.860	3.498	0.039	0.001	1.2000	0.001	102.981
197+69.00	92.072	5.185	0.105	0.004	1.2000	0.005	108.142
197+70.50	137.486	6.377	0.000	0.003	1.2000	0.004	114.515
197+77.00	195.478	40.879	0.049	0.008	1.2000	0.007	154.587
197+84.70	176.388	53.925	0.922	0.139	1.2000	0.168	207.448
197+89.00	162.783	27.004	1.344	0.180	1.2000	0.217	234.234
197+91.00	162.762	11.685	1.484	0.105	1.2000	0.126	245.793
197+93.40	142.322	13.115	1.454	0.131	1.2000	0.157	258.761
197+97.50	126.083	20.377	1.360	0.214	1.2000	0.258	278.872
198+00.00	117.494	11.273	2.145	0.182	1.2000	0.195	299.950
198+30.00	88.740	114.541	4.046	3.489	1.2000	4.137	400.364
198+61.00	80.689	97.198	6.139	5.847	1.2000	7.016	490.544
198+73.00	57.720	30.731	6.194	2.741	1.2000	3.239	517.998
199+00.00	53.750	55.735	14.072	10.133	1.2000	12.130	581.581
199+20.00	59.279	41.893	9.593	8.876	1.2000	10.861	632.772
199+26.00	62.935	13.579	7.220	1.901	1.2000	2.262	604.070
199+31.50	67.149	19.249	6.011	1.348	1.2000	1.617	616.702
199+42.00	71.408	26.941	5.432	2.225	1.2000	2.870	639.973
199+52.50	79.493	28.176	3.755	1.786	1.2000	2.144	688.004
199+57.00	74.568	12.340	3.368	0.594	1.2000	0.712	677.632
199+60.50	75.249	9.712	3.721	0.459	1.2000	0.551	688.782
199+68.00	74.819	20.843	5.881	1.334	1.2000	1.600	708.036
199+80.00	72.920	32.931	8.265	3.144	1.2000	3.772	735.094
199+86.00	72.402	18.147	7.652	1.789	1.2000	2.122	749.118
200+00.00	72.685	37.618	5.519	3.415	1.2000	4.088	762.639
200+10.00	71.111	26.631	4.493	1.864	1.2000	2.225	807.044
200+20.00	69.966	26.014	4.666	1.898	1.2000	2.036	831.023
200+30.00	68.484	25.157	5.576	1.897	1.2000	2.278	853.905
200+40.00	60.314	23.481	7.046	2.387	1.2000	2.806	874.591
200+50.00	53.852	21.105	10.141	3.183	1.2000	3.819	891.897
200+56.10	51.339	11.660	11.749	2.473	1.2000	2.987	900.760
200+64.40	51.611	15.824	12.082	3.663	1.2000	4.396	912.188
200+68.70	51.391	8.202	16.664	2.209	1.2000	2.851	917.739
200+76.00	51.647	13.357	22.937	5.004	1.2000	6.006	926.031
200+80.00	51.865	8.243	29.238	4.155	1.2000	4.988	928.348
200+81.00	51.640	1.917	31.336	1.122	1.2000	1.346	928.918
200+90.00	53.578	17.598	28.031	9.894	1.2000	11.873	934.591
200+99.10	56.852	18.676	32.984	10.279	1.2000	12.934	940.832
201+00.00	56.983	1.893	33.159	1.102	1.2000	1.322	941.393
201+11.80	56.008	24.680	31.398	14.107	1.2000	16.928	949.144
201+17.00	56.942	10.780	31.233	6.031	1.2000	7.237	952.637
201+18.80	56.028	3.732	30.165	2.047	1.2000	2.458	953.984
201+30.00	53.860	22.750	21.026	10.617	1.2000	12.741	963.973
201+40.00	49.893	19.176	28.602	9.227	1.2000	11.073	972.078

DETAILED EARTHWORK QUANTITIES

FROM STATION 197+41.00 TO STATION 201+40.00

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)
197+41.00	113.383	0.000	0.023	0.000	1.2000	0.000	0.000
197+61.00	101.279	78.504	0.000	0.000	1.2000	0.010	79.494
197+63.00	98.975	7.417	0.000	0.000	1.2000	0.000	98.911
197+63.50	98.421	1.828	0.000	0.000	1.2000	0.000	98.739
197+66.50	95.021	10.747	0.013	0.001	1.2000	0.001	98.484
197+67.50	93.860	3.498	0.039	0.001	1.2000	0.001	102.981
197+69.00	92.072	5.185	0.105	0.004	1.2000	0.005	108.142
197+70.50	137.486	6.377	0.000	0.003	1.2000	0.004	114.515
197+77.00	195.478	40.879	0.049	0.008	1.2000	0.007	154.587
197+84.70	176.388	53.925	0.922	0.139	1.2000	0.168	207.448
197+89.00	162.783	27.004	1.344	0.180	1.2000	0.217	234.234
197+91.00	162.762	11.685	1.484	0.105	1.2000	0.126	245.793
197+93.40	142.322	13.115	1.454	0.131	1.2000	0.157	258.761
197+97.50	126.083	20.377	1.360	0.214	1.2000	0.258	278.872
198+00.00	117.494	11.273	2.145	0.182	1.2000	0.195	299.950
198+30.00	88.740	114.541	4.046	3.489	1.2000	4.137	400.364
198+61.00	80.689	97.198	6.139	5.847	1.2000	7.016	490.544
198+73.00	57.720	30.731	6.194	2.741	1.2000	3.239	517.998
199+00.00	53.750	55.735	14.072	10.133	1.2000	12.130	581.581
199+20.00	59.279	41.893	9.593	8.876	1.2000	10.861	632.772
199+26.00	62.935	13.579	7.220	1.901	1.2000	2.262	604.070
199+31.50	67.149	19.249	6.011	1.348	1.2000	1.617	616.702
199+42.00	71.408	26.941	5.432	2.225	1.2000	2.870	639.973
199+52.50	79.493	28.176	3.755	1.786	1.2000	2.144	688.004
199+57.00	74.568	12.340	3.368	0.594	1.2000	0.712	677.632
199+60.50	75.249	9.712	3.721	0.459	1.2000	0.551	688.782
199+68.00	74.819	20.843	5.881	1.334	1.2000	1.600	708.036
199+80.00	72.920	32.931	8.265	3.144	1.2000	3.772	735.094
199+86.00	72.402	18.147	7.652	1.789	1.2000	2.122	749.118
200+00.00	72.685	37.618	5.519	3.415	1.2000	4.088	762.639
200+10.00	71.111	26.631	4.493	1.864	1.2000	2.225	807.044
200+20.00	69.966	26.014	4.666	1.898	1.2000	2.036	831.023
200+30.00	68.484	25.157	5.576	1.897	1.2000	2.278	853.905
200+40.00	60.314	23.481	7.046	2.387	1.2000	2.806	874.591
200+50.00	53.852	21.105	10.141	3.183	1.2000	3.819	891.897
200+56.10	51.339	11.660	11.749	2.473	1.2000	2.987	900.760
200+64.40	51.611	15.824	12.082	3.663	1.2000	4.396	912.188
200+68.70	51.391	8.202	16.664	2.209	1.2000	2.851	917.739
200+76.00	51.647	13.357	22.937	5.004	1.2000	6.006	926.031
200+80.00	51.865	8.243	29.238	4.155	1.2000	4.988	928.348
200+81.00	51.640	1.917	31.336	1.122	1.2000	1.346	928.918
200+90.00	53.578	17.598	28.031	9.894	1.2000	11.873	934.591
200+99.10	56.852	18.676	32.984	10.279	1.2000	12.934	940.832
201+00.00	56.983	1.893	33.159	1.102	1.2000	1.322	941.393
201+11.80	56.008	24.680	31.398	14.107	1.2000	16.928	949.144
201+17.00	56.942	10.780	31.233	6.031	1.2000	7.237	952.637
201+18.80	56.028	3.732	30.165	2.047	1.2000	2.458	953.984
201+30.00	53.860	22.750	21.026	10.617	1.2000	12.741	963.973
201+40.00	49.893	19.176	28.602	9.227	1.2000	11.073	972.078

Project totals

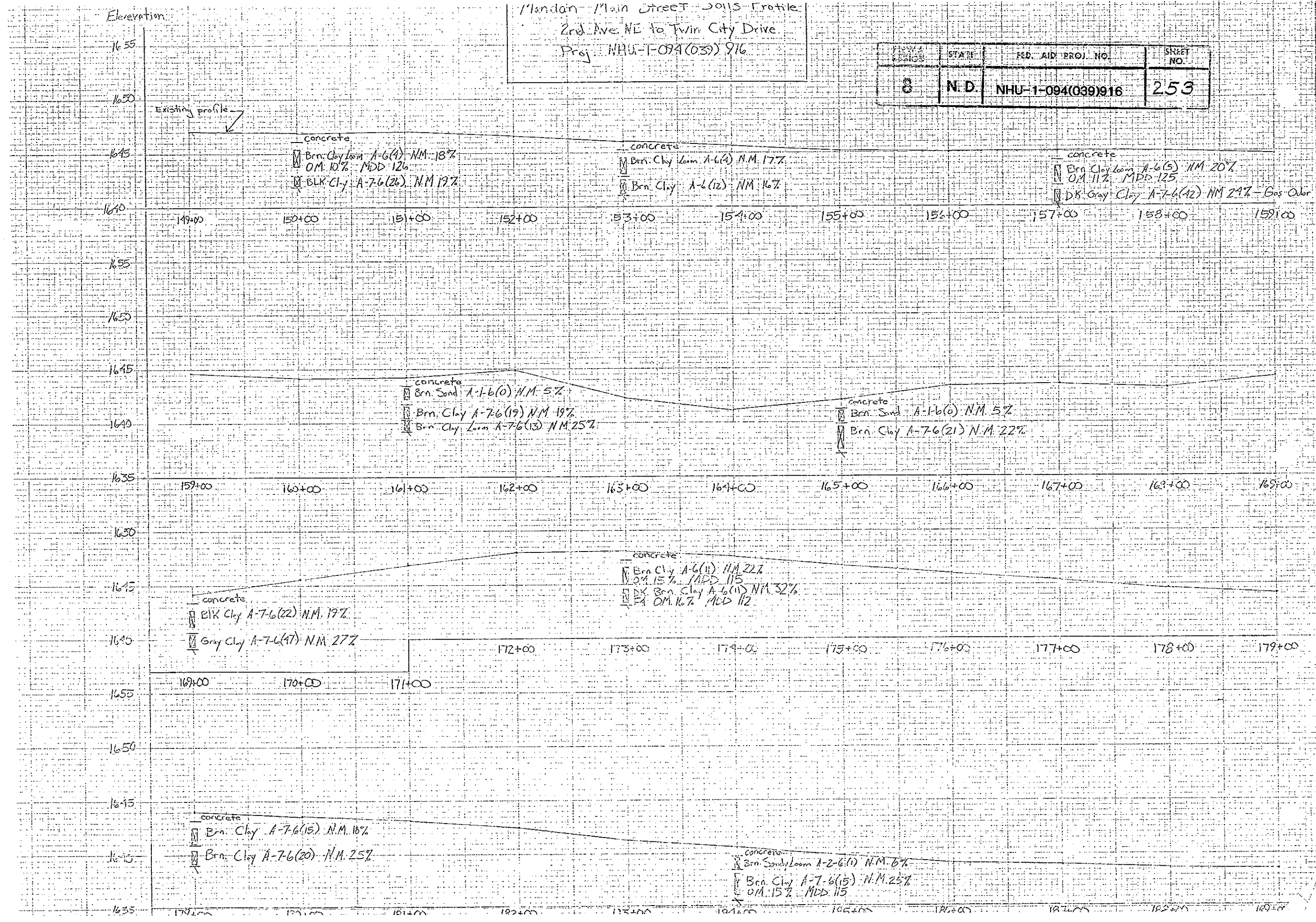
1143.608 142.860 171.432 972.078

MANDAN AVENUE EARTHWORK SUMMARY	
FILE: SIDES.GRF	Note: Existing Rdwy. Surface Shall be Subtracted From Quant.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND	NHU-1-094 (039) 916	252

London Main Street 2013 Profile
 2nd Ave. NE to Twin City Drive
 Proj. NHU-1-094(03) 916

COUNTY	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	NHU-1-094(03)916	253



Existing profile

concrete

Brn. Clay Loom A-6(4) N.M. 18%
 O.M. 10% MDD 126
 BLK. Clay A-7-6(26) N.M. 19%

concrete

Brn. Clay Loom A-6(4) N.M. 17%
 Brn. Clay A-6(12) N.M. 16%

concrete

Brn. Clay Loom A-6(5) N.M. 20%
 O.M. 11% MDD 125
 DK. Gray Clay A-7-6(42) N.M. 24% - Gas Odor

concrete

Brn. Sand A-1-6(0) N.M. 5%
 Brn. Clay A-7-6(19) N.M. 19%
 Brn. Clay Loom A-7-6(13) N.M. 25%

concrete

Brn. Sand A-1-6(0) N.M. 5%
 Brn. Clay A-7-6(21) N.M. 22%

concrete

Brn. Clay A-6(11) N.M. 22%
 O.M. 15% MDD 115
 DK Brn. Clay A-6(11) N.M. 32%
 O.M. 16% MDD 112

concrete

BLK. Clay A-7-6(22) N.M. 19%
 Gray Clay A-7-6(47) N.M. 27%

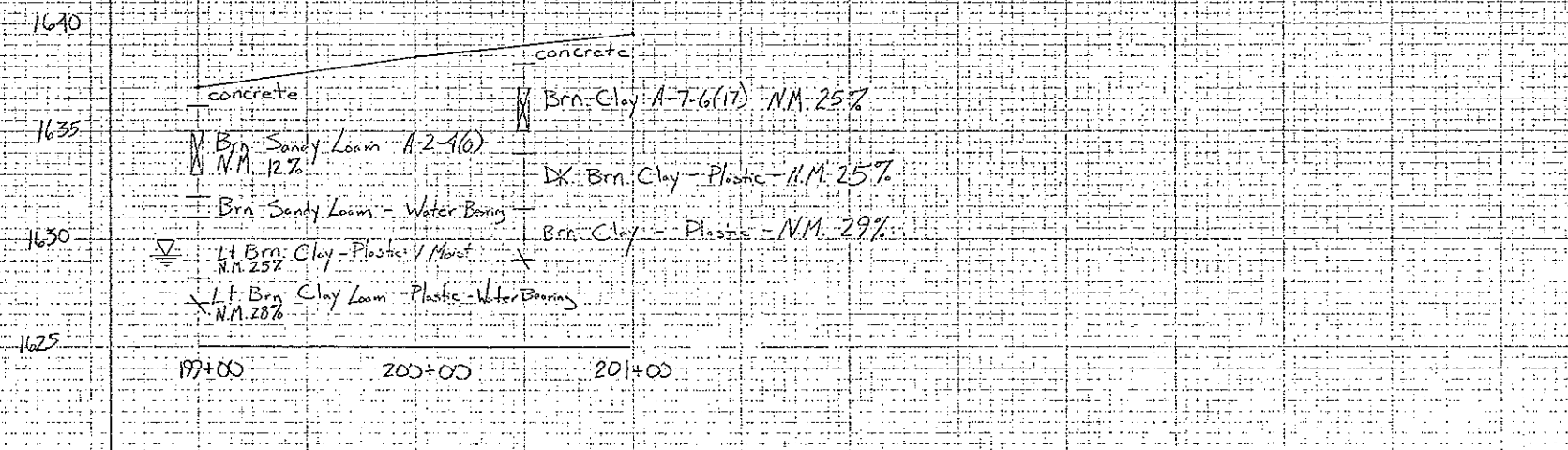
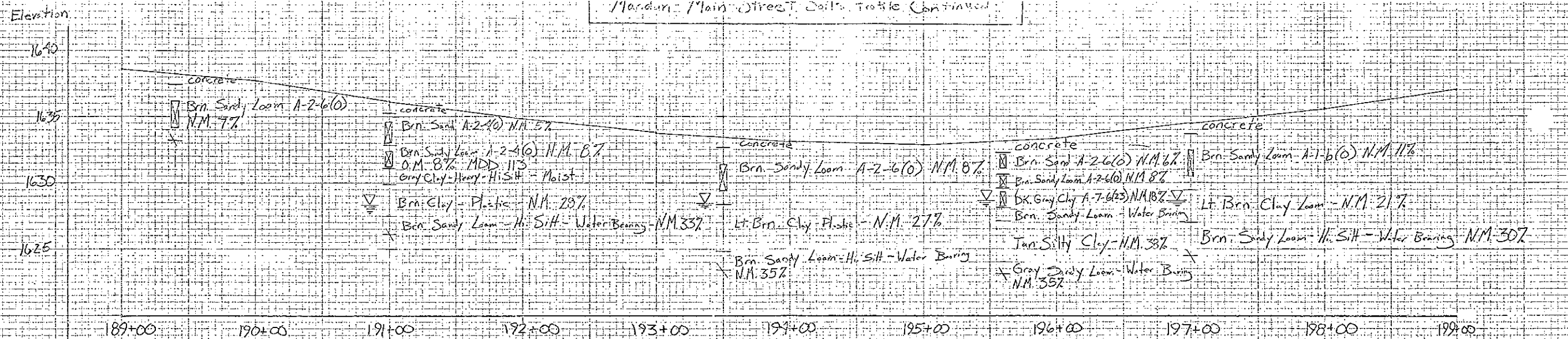
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Brn. Clay A-7-6(15) N.M. 18%
 Brn. Clay A-7-6(20) N.M. 25%

concrete

Brn. Sand Loom A-2-6(1) N.M. 6%
 Brn. Clay A-7-6(15) N.M. 25%
 O.M. 15% MDD 115

Mardun - Main Street Curb Profile (Continued)



SECTION	STATE	FED. AID PROJ. NO.	SHEET NO.
E	N. D.	NHU-1-094(039)916	254

CITY OF MANDAN, NORTH DAKOTA MAIN STREET WATER IMPROVEMENTS DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III

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 IMPROVEMENT PROJECT 96-2, PHASE III, MANDAN, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

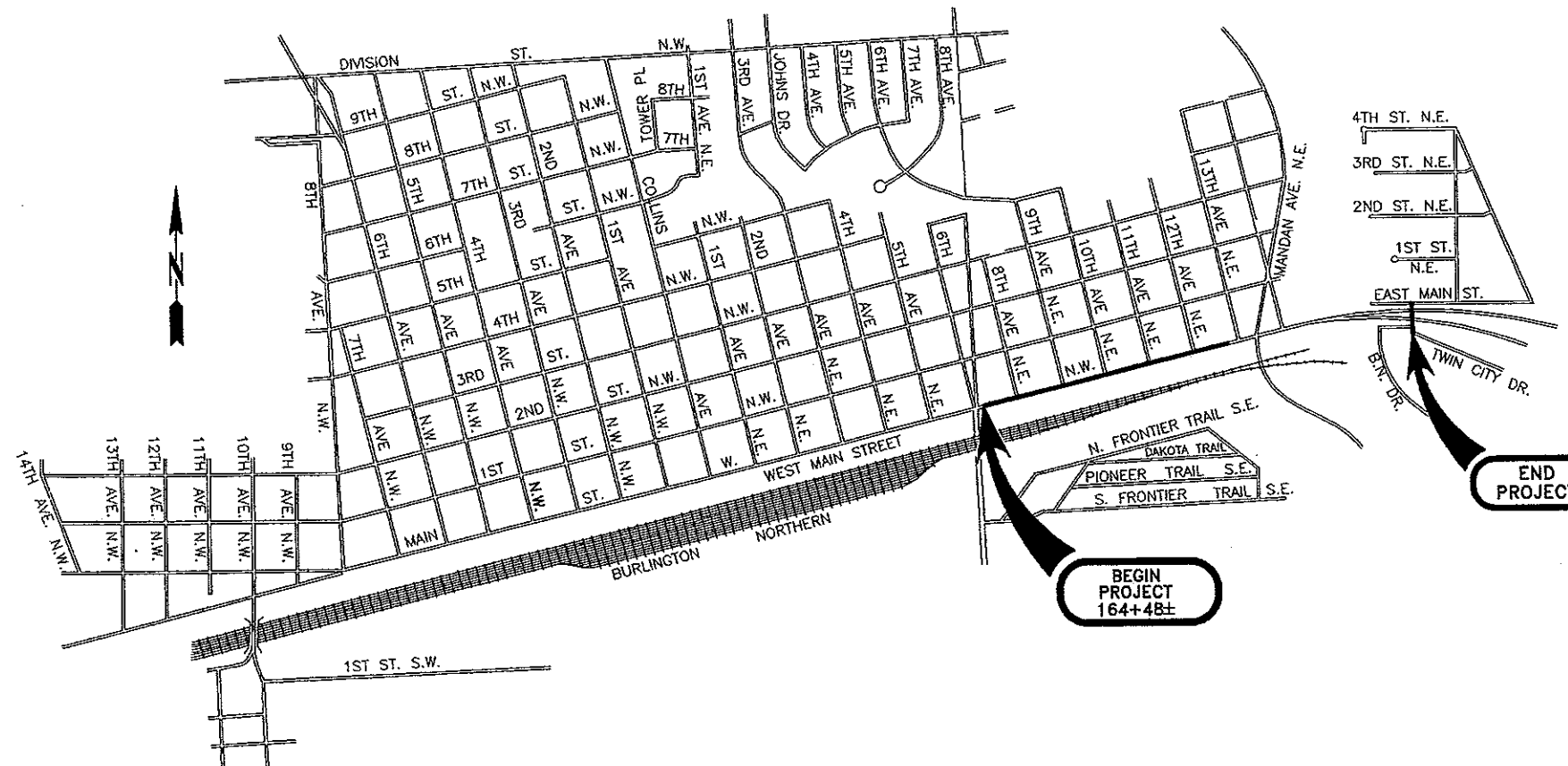
Brant P. Malsam
BRANT P. MALSAM, P.E.
REGISTERED PROFESSIONAL ENGINEER
NORTH DAKOTA REGISTRATION NO. 2847



APPROVAL OF CITY ENGINEER

I, THOMAS R. LITTLE, CITY ENGINEER FOR THE CITY OF MANDAN, NORTH DAKOTA, HEREBY APPROVE THESE PLANS FOR DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III, MANDAN, NORTH DAKOTA SHOWN ON THE ACCOMPANYING PLANS.

Thomas R. Little
THOMAS R. LITTLE, P.E.
CITY ENGINEER
MANDAN, NORTH DAKOTA



ULTEIG ENGINEERS, INC.
BISMARCK • FARGO • MINNEAPOLIS
UEI #95834

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GENERAL NOTES

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QUESTIONS: ALL TECHNICAL QUESTIONS PRIOR TO BIDDING OR AFTER BID AWARD IN REGARDS TO DISTRICT #39, WATER AND SEWER IMPROVEMENT PROJECT 96-2, PHASE III ARE TO BE DIRECTED TO ULTEIG ENGINEERS, INC., 1701 SOUTH 12TH STREET, BOX 2041, BISMARCK, ND. TELEPHONE 701-258-6507. FAX 701-224-1163.

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P02

PROJECT OVERVIEW AND SPECIAL COORDINATION REQUIREMENTS: DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III SHALL BE BID AND CONSTRUCTED IN CONJUNCTION WITH NDDOT PROJECT NHU-1-094(035)916. NDDOT'S PROJECT WILL BE CONSTRUCTED IN PHASES WITH THE NORTH HALF OF MAIN STREET BEING RECONSTRUCTED FIRST. CONSTRUCTION OF WATER 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 OR CONTRACTOR MAY SUBMIT FOR APPROVAL A DETAIL 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 ADDITIONAL 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 ENGINEERS APPROVAL. THE 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.

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P01

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, *ie.*, 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 ENCASEMENT 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 LAID 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.

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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 LABRATORIES AND PAYING THE APPROPRIATE FEE. A CORPORATION COCK 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

SHEET

NO.

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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

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
P06

THE UNIT PRICE BID FOR TAPPING SLEEVES OR TAPPING CROSSES SHALL INCLUDE ALL COSTS FOR FURNISHING AND INSTALLING THE FL X MJ VALVE AND BOX.

724
P07

WHEN THE 8" VALVE IS CUT IN AT 184+05 - 150' RT A 12" VALVE SHALL BE CUT IN AT ±201+50 - 400' RT. CONTRACTOR WILL BE REQUIRED TO VERIFY TYPE OF 12" PIPE AND LOCATION PRIOR TO INSTALLING 12" VALVE, ALL COSTS INCIDENTAL. INSTALLING THE 8" AND 12" VALVES AT THE SAME TIME WILL ASSURE THAT WATER SERVICE TO THE STRIP AREA WILL ONLY NEED TO BE SHUT DOWN ONCE.

724
P08

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".

GENERAL NOTES

SHEET
NO.

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724
P09

THE CITY OF MANDAN WILL SECURE A PERMIT FROM BURLINGTON NORTHERN RAILROAD (BNRR) TO INSTALL THE WATERMAIN FROM STA 184+00 - 40' RT TO STA 184+00 - 150' RT. CONTRACTOR MUST ABIDE BY THE FOLLOWING BNRR REQUIREMENTS IN ORDER TO COMPLETE THE WORK WITHIN THE PERMIT AREA:

1. CONTRACTOR AND/OR SUBCONTRACTORS MUST PROVIDE EVIDENCE OF GENERAL LIABILITY, VEHICLE, AND WORKERS COMPENSATION INSURANCE. BNRR MUST BE LISTED AS A CERTIFICATE HOLDER. LIMITS OF INSURANCE COVERAGES SHALL BE AS FOLLOWS:
 - A. COMMERCIAL GENERAL LIABILITY INSURANCE, INCLUDING CONTRACTUAL LIABILITY AND PRODUCTS COMPLETED/OPERATIONS, AGAINST CLAIMS ARISING OUT OF BODILY INJURY, ILLNESS AND DEATH FROM DAMAGE TO OR DESTRUCTION OF PROPERTY OF OTHERS, INCLUDING LOSS OR USE THEREOF, AND INCLUDING LIABILITY OF BURLINGTON NORTHERN RAILROAD COMPANY, WITH MINIMUM LIMITS FOR BODILY INJURY AND PROPERTY DAMAGE OF \$1,000,000 FOR EACH OCCURRENCE, WITH AN AGGREGATE OF \$2,000,000. THIS POLICY SHALL CONTAIN A "WAIVER OF TRANSFER RIGHTS" ENDORSEMENT TO WAIVE ANY RIGHT OF RECOVERY THAT THE INSURANCE COMPANY MAY HAVE AGAINST BURLINGTON NORTHERN RAILROAD COMPANY BECAUSE OF PAYMENTS MADE FOR BODILY INJURIES AND PROPERTY DAMAGE.
 - B. BUSINESS AUTOMOBILE POLICY INSURANCE, INCLUDING OWNED, NON-OWNED, AND HIRED VEHICLES WITH MINIMUM LIMITS FOR BODILY INJURY AND PROPERTY DAMAGE OF \$1,000,000 PER OCCURRENCE, ON ALL VEHICLES THAT THE PERMITTEE OR ANY OF ITS AGENTS OR EMPLOYEES MAY USE AT ANY TIME IN CONNECTION WITH THE PERFORMANCE OF THE AGREEMENT.
 - C. WORKER'S COMPENSATION INSURANCE OR COVERAGE AS REQUIRED UNDER THE WORKER'S COMPENSATION ACT OF THE APPLICABLE STATE. THE POLICY SHOULD INCLUDE OCCUPATIONAL DISEASE TO REQUIRED STATUTORY LIMITS, EMPLOYER'S LIABILITY OF \$1,000,000 TO INCLUDE FELA, IF APPROPRIATE, AND AN "ALL STATES" ENDORSEMENT.
2. CONTRACTOR MUST PROVIDE A RAILROAD PROTECTION LIABILITY INSURANCE POLICY ISSUED IN THE NAME OF BURLINGTON NORTHERN RAILROAD COMPANY WITH LIMITS OF \$2,000,000 FOR BODILY INJURY AND PROPERTY DAMAGE PER OCCURRENCE, WITH AN AGGREGATE OF \$6,000,000 MUST BE PROVIDED WHEN CONSTRUCTION WORK WILL BE WITHIN 50 (FIFTY) FEET OF THE TRACKS. POLICY WILL REMAIN IN FORCE DURING THE CONSTRUCTION PHASE OF THIS PROJECT OR CONTRACTOR CAN PURCHASE PARTICIPATION IN BNRR'S BLANKET RAILROAD PROTECTIVE LIABILITY INSURANCE POLICY FOR A FEE. FEE IS ESTIMATED TO BE \$300.00.
3. CONTRACTOR AND/OR SUBCONTRACTORS MUST ACKNOWLEDGE THE REQUIREMENTS FOR CONTRACTORS AND SUBCONTRACTORS WORKING ON BNRR RIGHT-OF-WAY DOCUMENT.
4. CONTRACTOR CANNOT BEGIN WORK IN THIS AREA UNTIL OWNER PROVIDES NOTICE THAT PERMIT IS IN EFFECT.

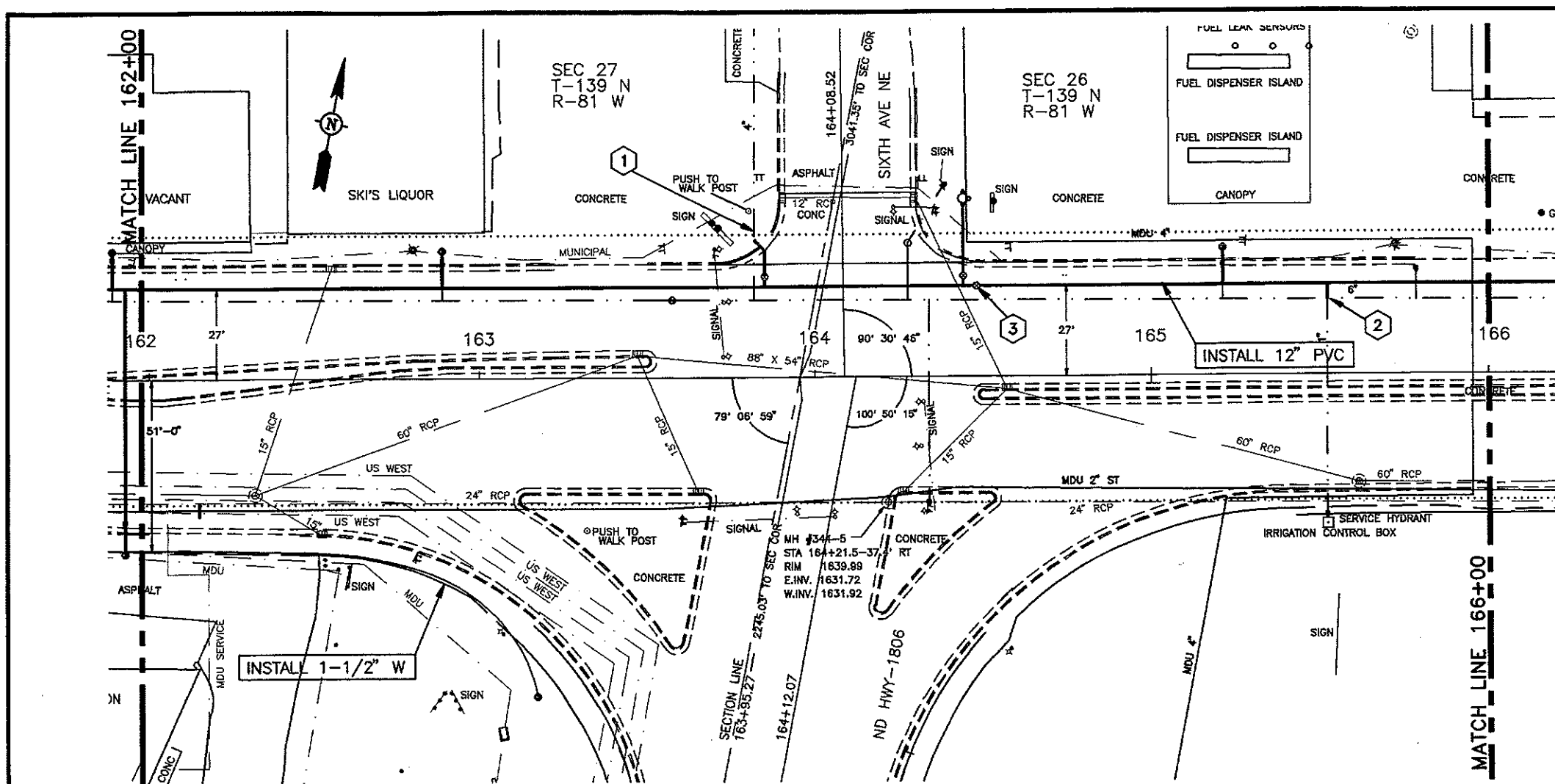
ALL COSTS FOR PROVIDING THE NECESSARY INSURANCE CERTIFICATES AND OTHER RELATED ITEMS SHALL BE INCIDENTAL TO THEIR ITEMS BID.

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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 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).

QUANTITIES

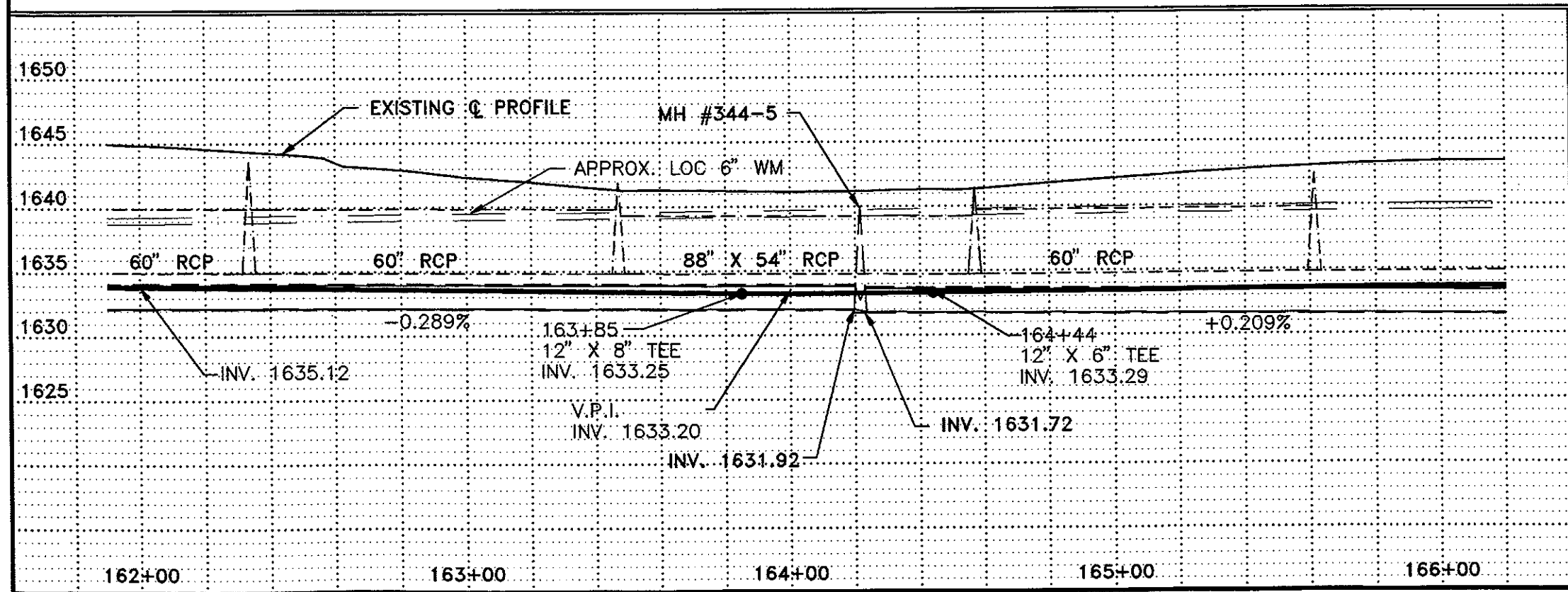
SPEC	CODE	ITEM DESCRIPTION	UNIT	NHU FUNDS	CITY FUNDS	TOTAL
202	0112	REMOVAL OF CONCRETE, SIDEWALK	SY		8	8
202	0114	REMOVAL OF CONCRETE, PAVEMENT	SY		808	808
202	0130	REMOVAL OF CURB AND GUTTER	LF		13	13
550	0710	10 INCH CONCRETE PAVEMENT REPAIR	SY		808	808
722	6695	AIR RELIEF VALVE AND MANHOLE	EA		1	1
724	0210	FITTINGS, DUCTILE IRON	LBS		5650	5650
724	0300	GATE VALVE & BOX, 6 INCH	EA		10	10
724	0310	GATE VALVE & BOX, 8 INCH	EA		9	9
724	0320	GATE VALVE & BOX, 12 INCH	EA		11	11
724	0400	HYDRANT, INSTALL 6 INCH	EA		7	7
724	0430	REMOVE HYDRANT	EA		6	6
724	0605	WATER SERVICE PIPE, 1 1/2 INCH COPPER	LF		419	419
724	0607	WATER SERVICE PIPE, 2 INCH COPPER	LF		23	23
724	0810	WATERMAIN, 6 INCH PVC	LF		481	481
724	0830	WATERMAIN, 8 INCH PVC	LF		334	334
724	0850	WATERMAIN, 12 INCH PVC	LF		2599	2599
724	0852	WATERMAIN, 16 INCH PVC	LF		176	176
724	0907	CURB STOP & BOX, 1 1/2 INCH	EA		20	20
724	0910	CURB STOP & BOX, 2 INCH	EA		2	2
724	0958	WATER SERVICE CONNECTION, 1-1/2 INCH	EA		20	20
724	0960	WATER SERVICE CONNECTION, 2 INCH	EA		2	2
724	6013	ABANDON EXISTING VALVE BOX	EA		16	16
724	6426	HYDRANT EXTENSION	LF		10	10
744	0100	POLYSTYRENE INSULATION	BDFT		256	256
748	0140	CURB AND GUTTER TYPE I	LF		13	13
750	0100	SIDEWALK, CONCRETE	SY		8	8



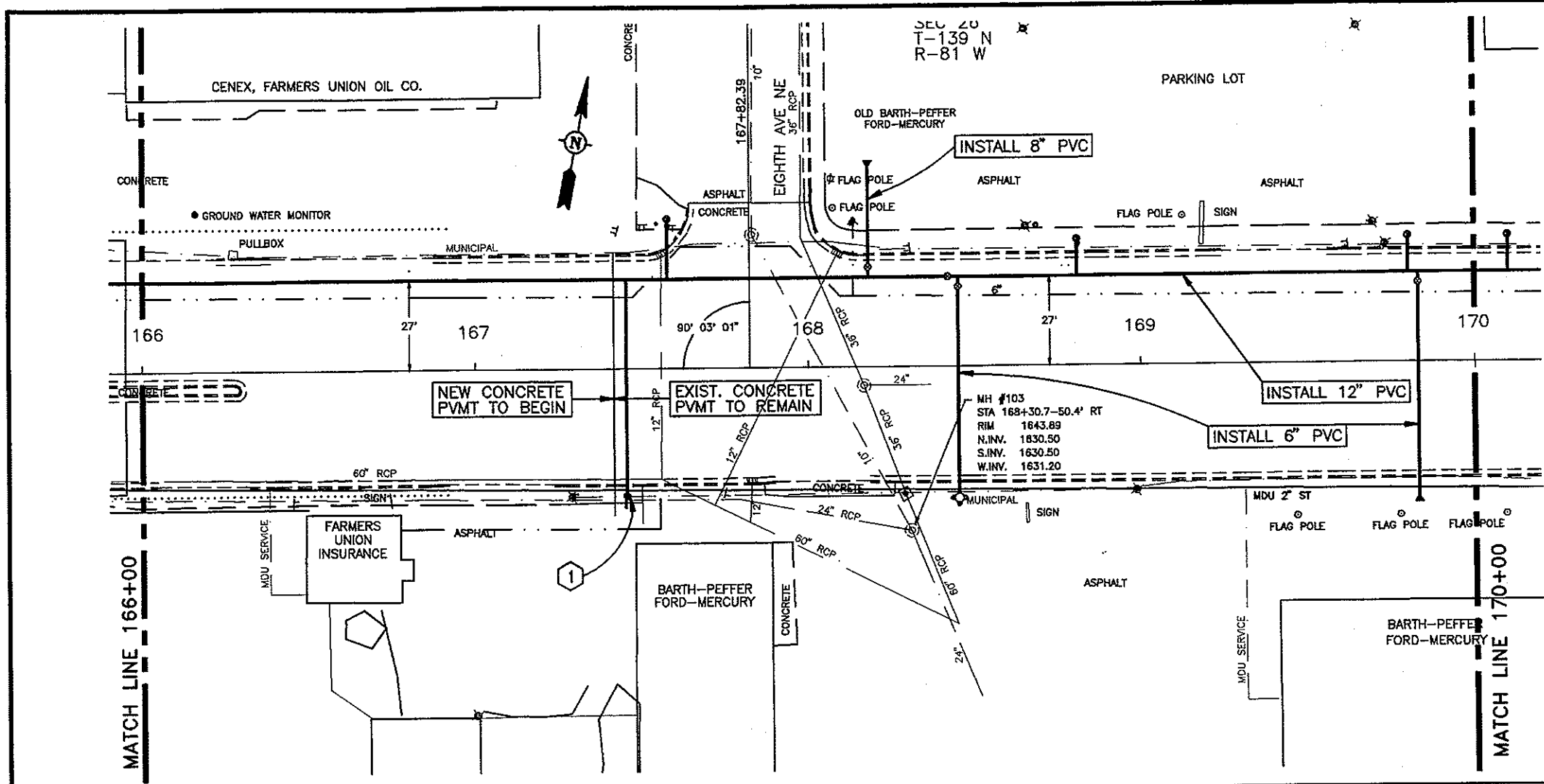
GATE VALVE AND BOX, 12"	164+48 - 27' LT	1 EA
WATERMAIN, 12" PVC	164+48 - 27' LT TO 166+00 - 27' LT	152 LF
FITTINGS, DUCTILE IRON	164+48 - 27' LT	12" PLUG 49 LBS
WATER SERVICE LINE 1-1/2" COPPER	165+21 - 27' LT TO 165+21 - 38' LT	11 LF
	165+52 - 27' LT TO 165+52 - 22' LT	5 LF
WATER SERVICE CONNECTION	165+21 - 27' LT	1 EA
	165+52 - 27' LT	1 EA
CURB STOP AND BOX 1-1/2"	165+21 - 38' LT	1 EA

CONSTRUCTION NOTES

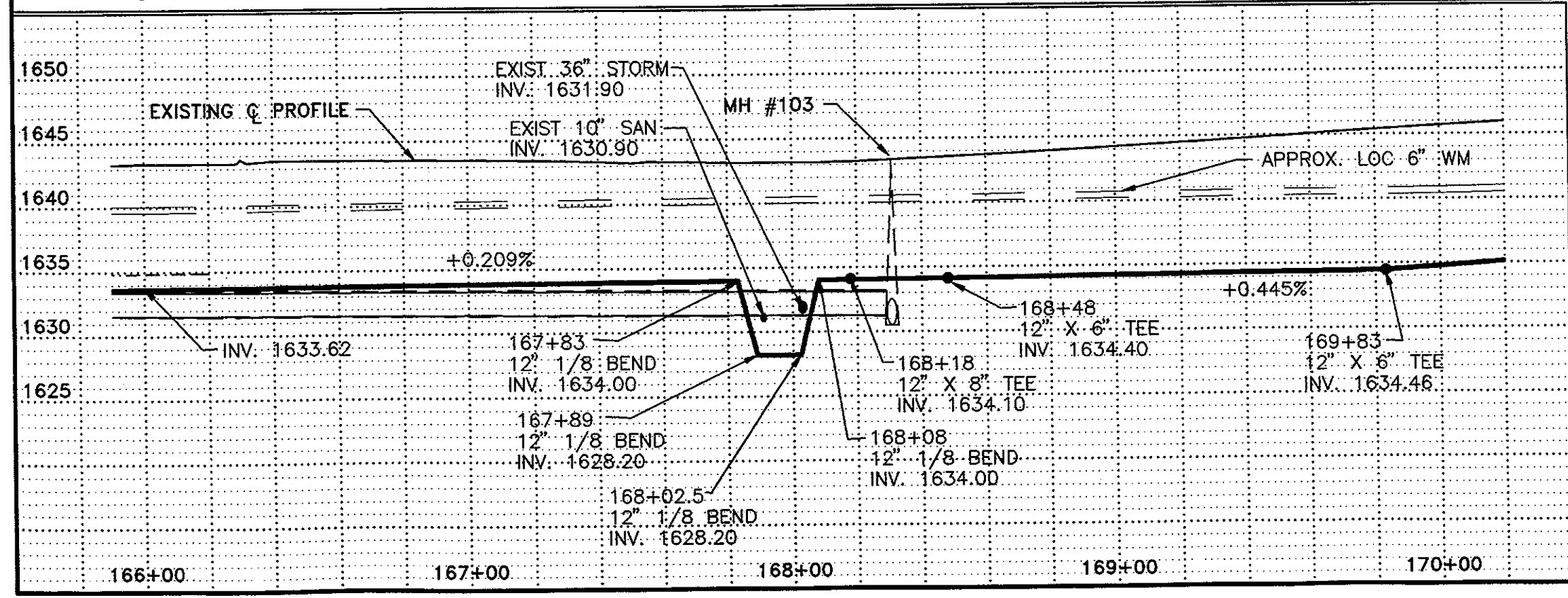
- ① CONNECT EXISTING 4" W.M. TO NEW 8" W.M.
- ② CONNECT NEW 1-1/2" COPPER TO EXISTING 1" COPPER
- ③ QUANTITIES FOR THIS PROJECT BEGIN AT 164+48. INSTALL 12" VALVE AND BOX AND PLUG IF PHASE II CONTRACTOR HAS NOT COMPLETED WORK IN THIS AREA. IF PHASE III CONTRACTOR HAS COMPLETED WORK IN THIS AREA, REMOVE PLUG AND CONNECT TO 12" WATERMAIN.



REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT #59, WATER IMPROVEMENT PROJECT 96-2, PHASE III STA 164+48 TO STA 166+00			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS <small>RESEARCH • DESIGN • CONSTRUCTION</small>			
<small>DRAWN BY: MJH</small> <small>CHECKED BY: BPM</small> <small>APPROVED BY: BPM</small>	<small>SCALE: 1" = 40'</small> <small>DATE: MAY 17, 1995</small>	<small>PROJECT NO. 95834</small> <small>SHEET 8 OF 20</small>	



6" HYDRANT		
168+45 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
168+45 - 24' LT	1 EA	
169+83 - 24' LT	1 EA	
GATE VALVE AND BOX, 8"		
168+18 - 30' LT	1 EA	
GATE VALVE AND BOX, 12"		
168+42 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
168+45 - 27' LT TO 168+45 - 39.5' RT	66.5 LF	
169+83 - 27' LT TO 169+83 - 40' RT	67 LF	
WATERMAIN, 8" PVC		
168+18 - 27' LT TO 168+18 - 60' LT	33 LF	
WATERMAIN, 12" PVC		
166+00 - 27' LT TO 170+00 - 27' LT	400 LF	
FITTINGS, DUCTILE IRON		
167+83 - 27' LT	12" 1/8 BEND	92 LBS
167+89 - 27' LT	12" 1/8 BEND	92 LBS
168+02.5 - 27' LT	12" 1/8 BEND	92 LBS
168+08 - 27' LT	12" 1/8 BEND	92 LBS
168+18 - 27' LT	12" X 8" TEE	137 LBS
168+18 - 60' LT	8" PLUG	26 LBS
168+45 - 27' LT	12" X 6" TEE	123 LBS
169+83 - 27' LT	12" X 6" TEE	123 LBS
169+83 - 40' RT	6" PLUG	15 LBS
WATER SERVICE LINE 1-1/2" COPPER		
167+45 - 27' LT TO 167+45 - 38' RT	65 LF	
167+58 - 27' LT TO 167+58 - 45' LT	18 LF	
168+81 - 27' LT TO 168+81 38' LT	11 LF	
169+80 - 27' LT TO 169+80 40' LT	13 LF	
WATER SERVICE CONNECTION		
167+45 - 27' LT	1 EA	
167+58 - 27' LT	1 EA	
168+81 - 27' LT	1 EA	
169+80 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
167+45 - 38' RT	1 EA	
167+58 - 45' LT	1 EA	
168+81 - 38' LT	1 EA	
169+80 - 40' LT	1 EA	
REMOVE HYDRANT		
168+42 - 43' LT	1 EA	



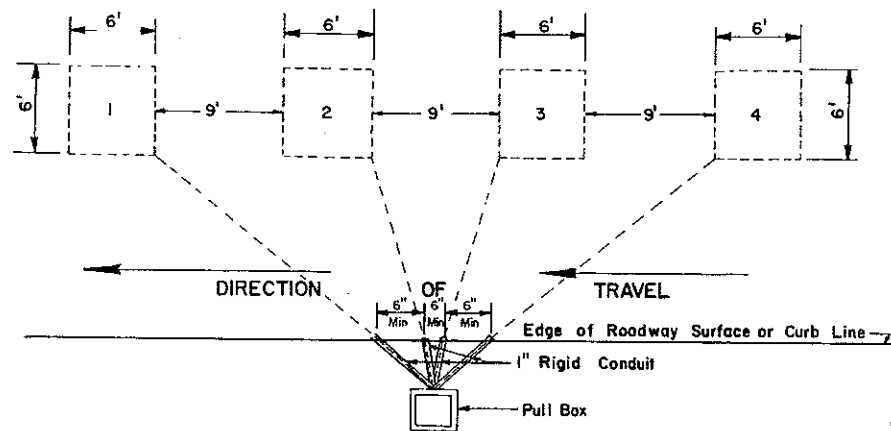
CONSTRUCTION NOTES

① CONNECT NEW 1-1/2" COPPER TO EXISTING SERVICE LINE

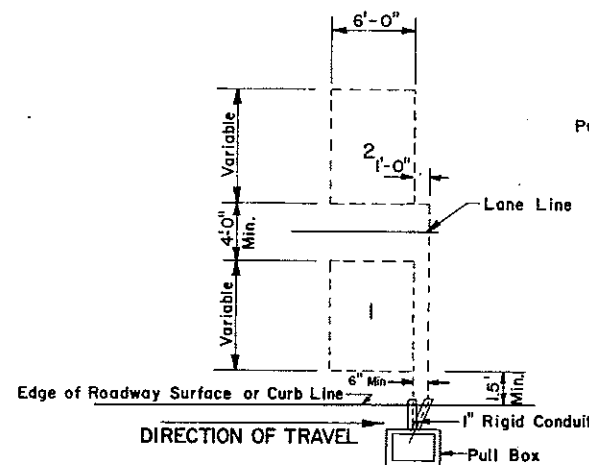
REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III			
STA 166+00 TO STA 170+00			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS RESOURCES & OFFICE - MINNEAPOLIS			
DRAWN BY: M.J.H.	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 9 OF 20	
APPROVED BY: BPM			

LOOP DETECTORS DETAILS

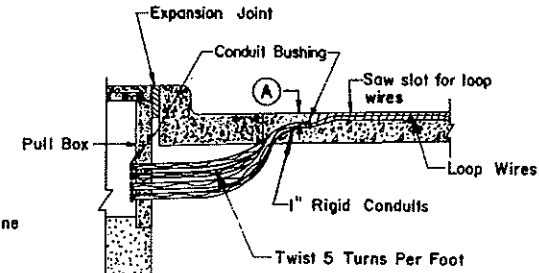
(A) 1" Concrete Surfacing Min.
2" Asphalt Surfacing Min.



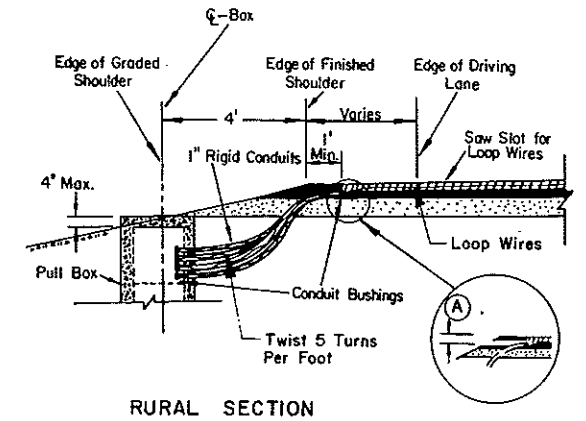
**MULTIPLE LOOP DETECTOR DETAIL
(PRESENCE LOOPS)**



**LOOP DETECTOR DETAIL
(PASSAGE OR CALLING)**
(Number of Loops and Number of Turns as shown in the Plans)

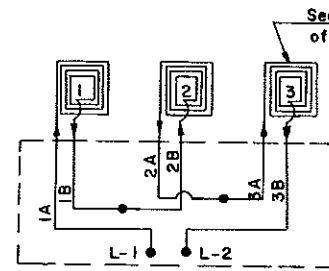


CURB SECTION



RURAL SECTION

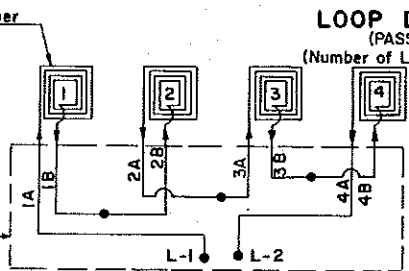
**SAW SLOT TO PULL BOX
DETAILS**



MULTIPLE LOOP CONNECTION

All conductors shall be labeled in the pull box as shown. (1A, 1B, 2A, etc.)

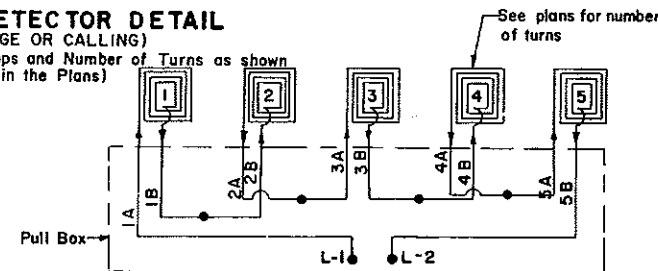
The loop connections shall be spliced in the pull box: 1A to L-1, 1B to 2B, 2A to 3A, and 3B to L-2



MULTIPLE LOOP CONNECTION

All conductors shall be labeled in the pull box as shown. (1A, 1B, 2A, etc.)

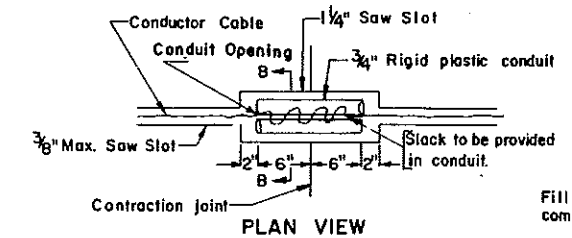
The loop connections shall be spliced in the pull box: 1A to L-1, 1B to 2B, 2A to 3A, 3B to 4B, and 4A to L-2



MULTIPLE LOOP CONNECTION

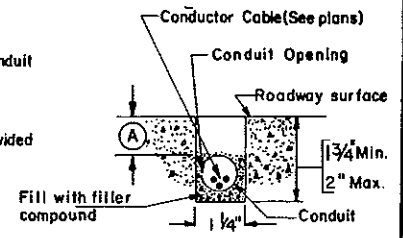
All conductors shall be labeled in the pull box as shown. (1A, 1B, 2A, etc.)

The loop connections shall be spliced in the pull box: 1A to L-1, 1B to 2B, 2A to 3A, 3B to 4B, 4A to 5A, and 5B to L-2



CONTRACTION JOINT DETAIL

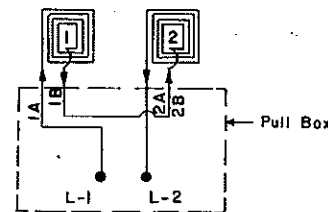
(This detail shall also be used whenever a crack in the roadway is encountered.)



SECTION BB

NOTES:

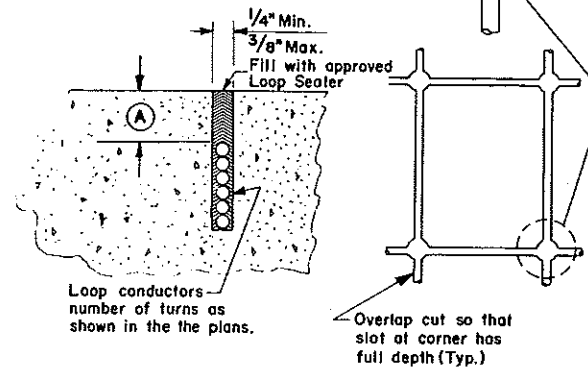
1. Each loop shall be saw cut in the roadway.
2. The number of turns, size of loop and size of conductor shall be as shown on the plans. The first loop dimension figure is the length in the direction of travel and the second dimension is the width across the traffic lane.
3. The lead routing shall be in separate slots to conduit leading to pull box to minimize interaction.



MULTIPLE LOOP CONNECTION

All conductors shall be labeled in the pull box as shown. (1A, 1B, 2A, etc.)

The loop connections shall be spliced in the pull box: 1A to L-1, 1B to 2B, and 2A to L-2.



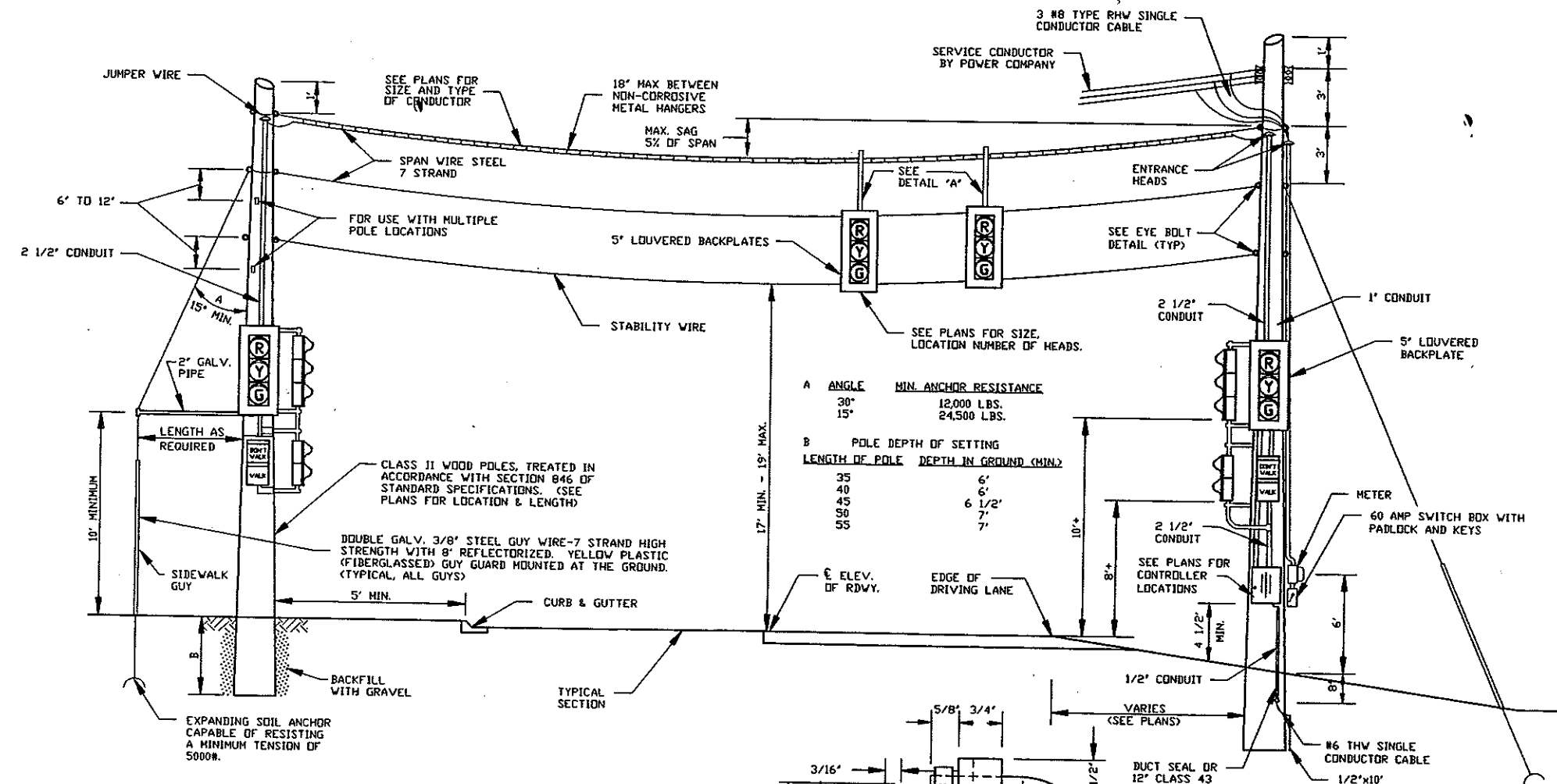
SAW SLOT DETAILS

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	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGES		
8-3-87	NOTE	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER	
11-20-89	RIGID CONDUIT AT CURB SPACING		
12-8-89	MULTIPLE LOOP CONNECTION		
9-3-91	SAW SLOT		
10-12-94	Delete Loop Lead-in Lightning Prot		

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

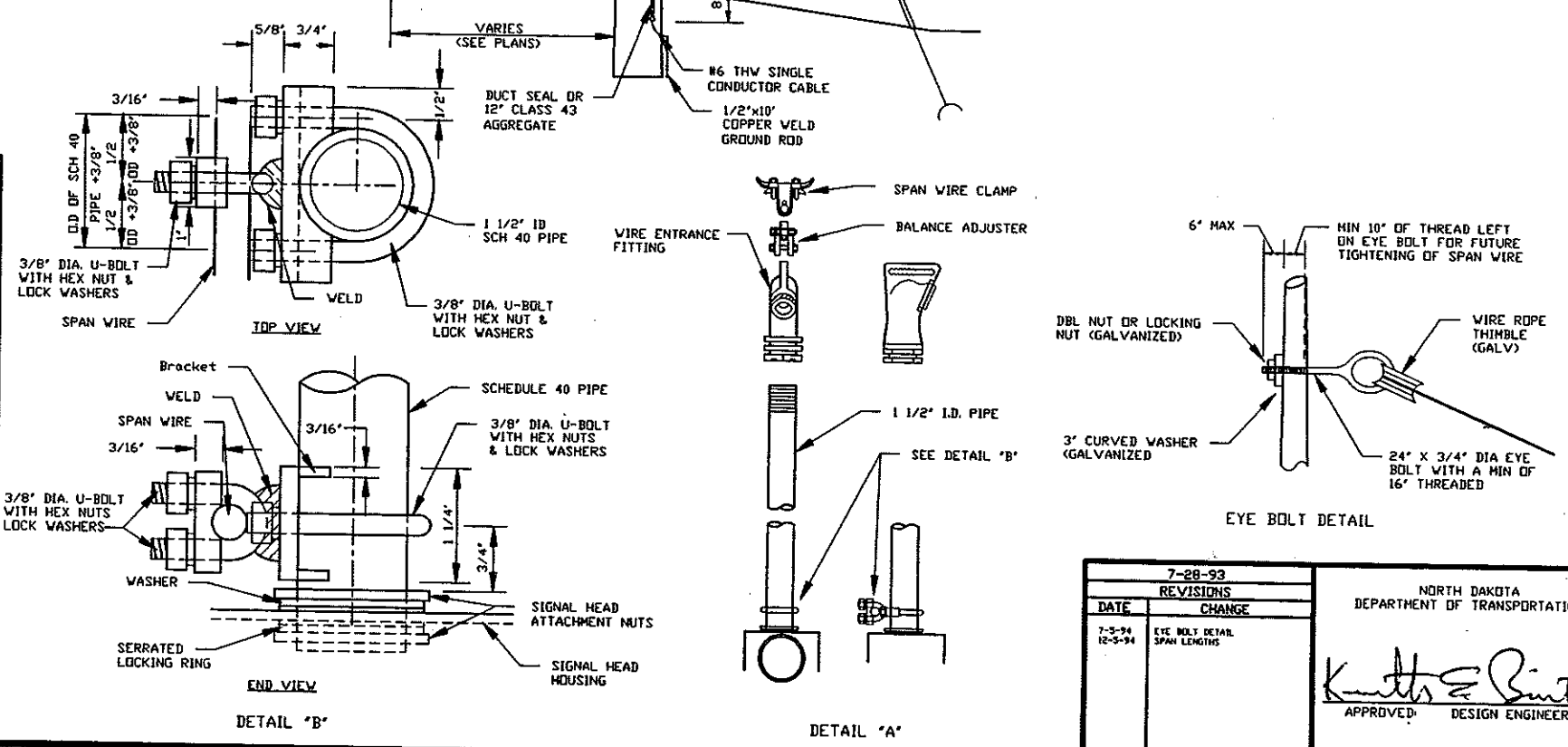
30°	12,000 LBS.
15°	24,500 LBS.

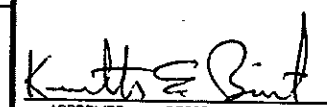
B POLE DEPTH OF SETTING LENGTH OF POLE DEPTH IN GROUND (MIN.)

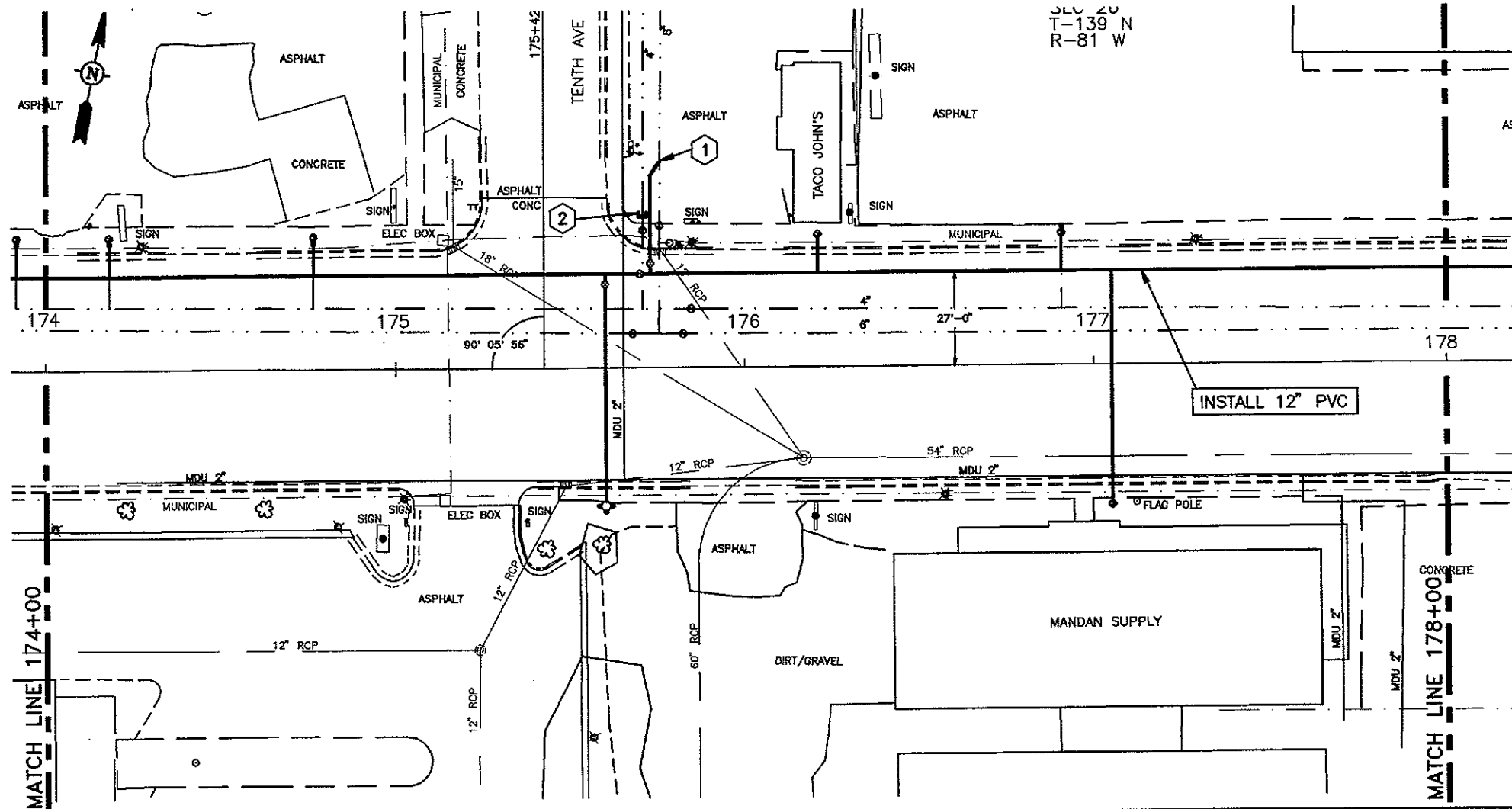
35	6'
40	6'
45	6 1/2'
50	7'
55	7'

OVERHEAD INTERIM TRAFFIC SIGNAL SPAN LENGTHS

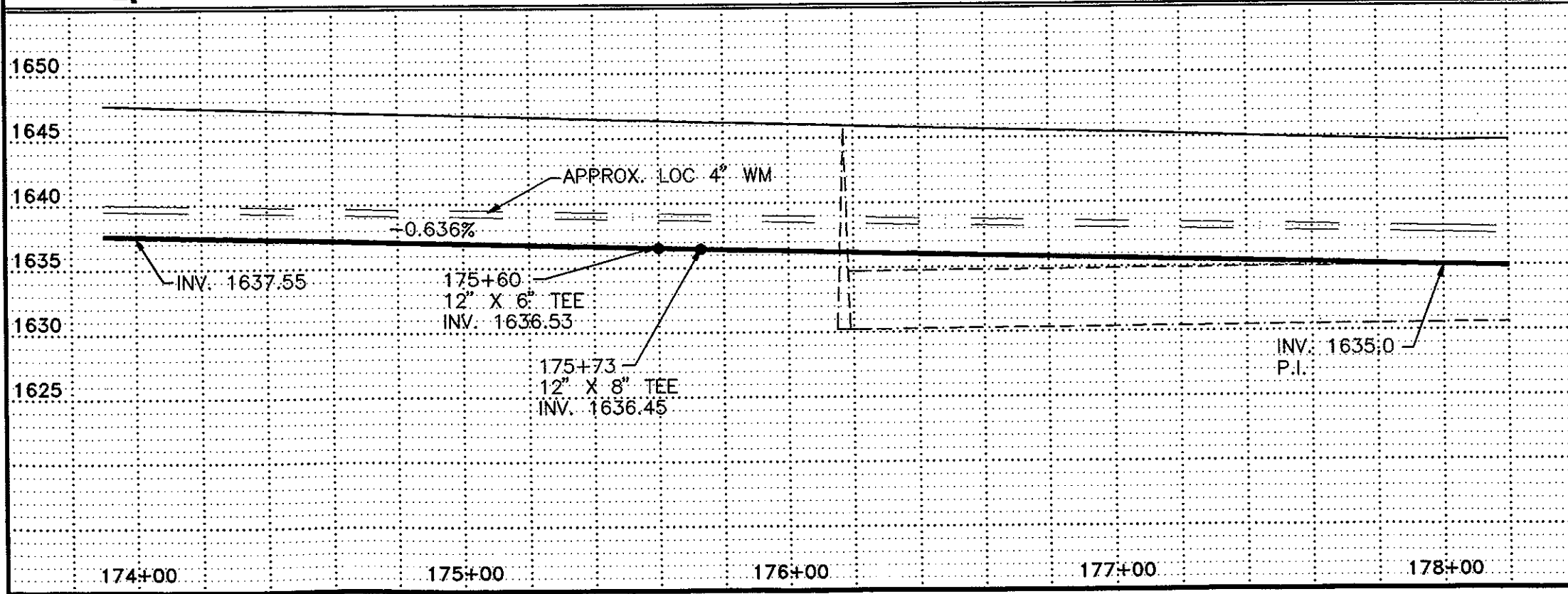
	ONE TRAFFIC SIGNAL HEAD				TWO TRAFFIC SIGNAL HEAD			
	1/8 INCH STABILIZATION WIRE	3/8 INCH STABILIZATION WIRE	1/2 INCH STABILIZATION WIRE	5/8 INCH STABILIZATION WIRE	1/8 INCH STABILIZATION WIRE	3/8 INCH STABILIZATION WIRE	1/2 INCH STABILIZATION WIRE	5/8 INCH STABILIZATION WIRE
MAXIMUM SPAN LENGTH	133	163	199	225	71	98	153	199
	EXTRA HIGH STRENGTH STEEL				EXTRA HIGH STRENGTH STEEL			
MAXIMUM SPAN LENGTH	189	215	254	277	101	132	192	234
	THREE TRAFFIC SIGNAL HEAD				FOUR TRAFFIC SIGNAL HEAD			
MAXIMUM SPAN LENGTH	48	67	113	163	36	51	86	129
	EXTRA HIGH STRENGTH STEEL				EXTRA HIGH STRENGTH STEEL			
MAXIMUM SPAN LENGTH	68	95	157	218	51	72	123	181



7-28-93		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
7-5-94	EYE BOLT DETAIL SPAN LENGTHS	 APPROVED: DESIGN ENGINEER
12-5-94		



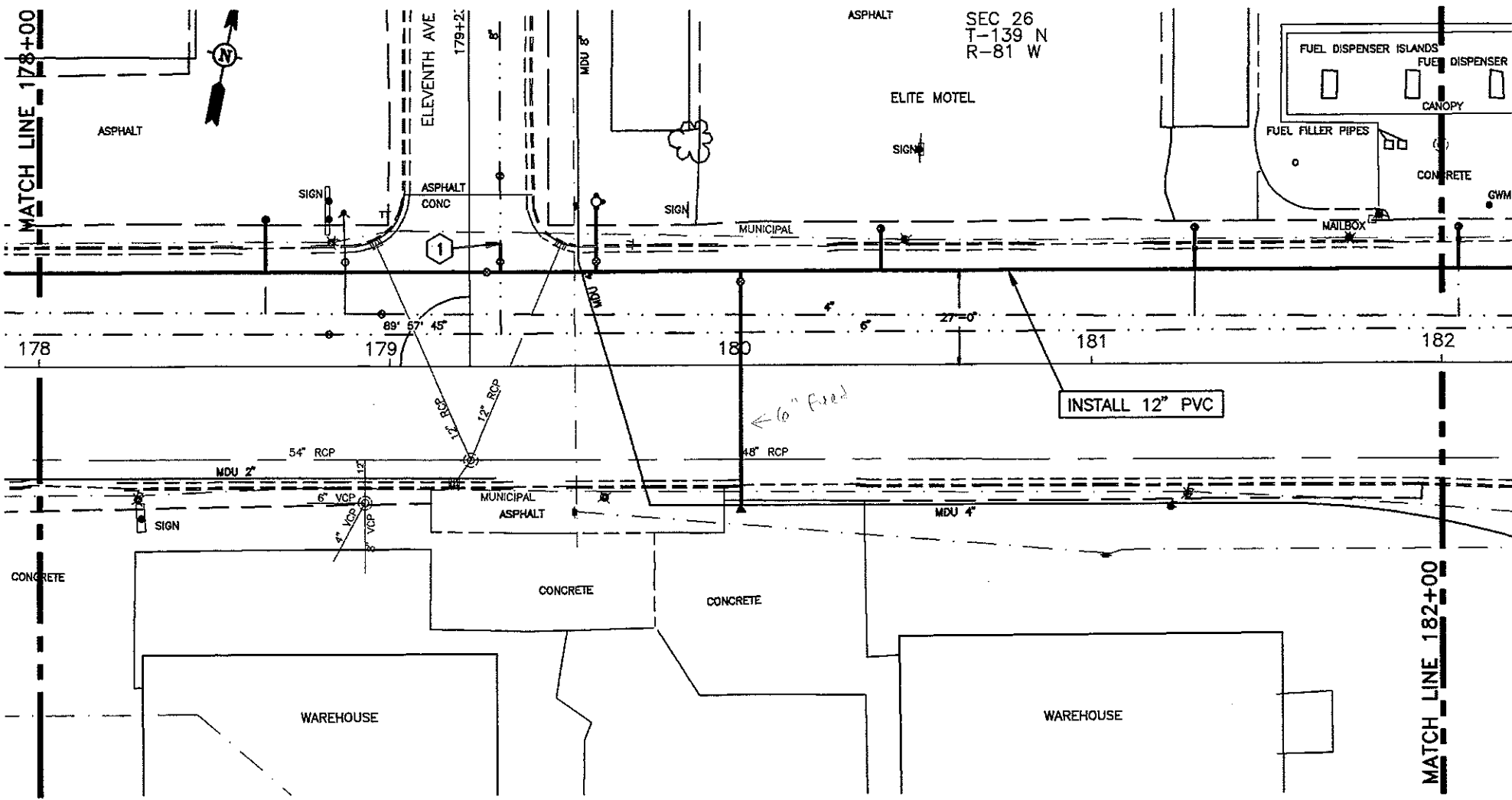
6" HYDRANT		
175+60 - 39.5' RT	1 EA	
GATE VALVE AND BOX, 6"		
175+60 - 24' LT	1 EA	
GATE VALVE AND BOX, 8"		
175+73 - 30' LT	1 EA	
GATE VALVE AND BOX, 12"		
175+70 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
175+60 - 27' LT TO 175+60 - 39.5' RT	66.5 LF	
WATERMAIN, 8" PVC		
175+73 - 27' LT TO 175+73 - 55' LT	28 LF	
WATERMAIN, 12" PVC		
174+00 - 27' LT TO 178+00 - 27' LT	400 LF	
FITTINGS, DUCTILE IRON		
175+60 - 27' LT	12" X 6" TEE	123 LBS
175+70 - 55' LT	4" PLUG	8 LBS
175+73 - 27' LT	12" X 8" TEE	137 LBS
175+73 - 55' LT	2 - 8" 1/8 BENDS	184 LBS
WATER SERVICE LINE 1-1/2" COPPER		
174+76 - 27' LT TO 174+76 - 38' LT	11 LF	
176+21 - 27' LT TO 176+21 - 38' LT	11 LF	
176+91 - 27' LT TO 176+91 - 38' LT	11 LF	
177+05 - 27' LT TO 177+05 - 40' RT	67 LF	
WATER SERVICE LINE 2" COPPER		
174+18 - 27' LT TO 174+18 - 38' LT	11 LF	
WATER SERVICE CONNECTION		
174+76 - 27' LT	1 EA - 2" CONNECTION	
174+76 - 27' LT	1 EA	
176+21 - 27' LT	1 EA	
176+91 - 27' LT	1 EA	
177+05 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
174+76 - 38' LT	1 EA	
176+21 - 38' LT	1 EA	
176+91 - 38' LT	1 EA	
177+05 - 40' RT	1 EA	
CURB STOP AND BOX 2"		
174+18 - 38' LT	1 EA	
REMOVE HYDRANT		
175+80 - 36' LT	1 EA	



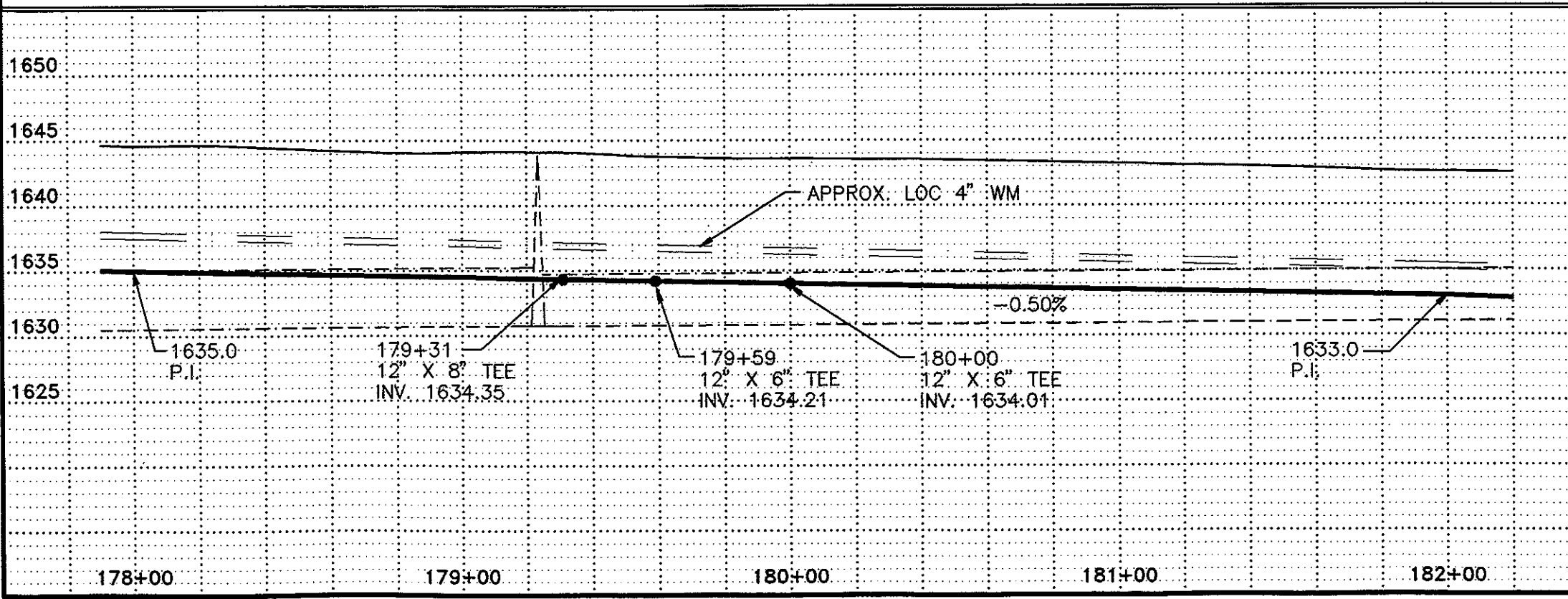
- CONSTRUCTION NOTES**
- ① CONNECT NEW 8" W.M. TO EXISTING 8" W.M.
 - ② PLUG EXISTING 4"

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III			
STA 174+00 TO STA 178+00			
ULTEIG ENGINEERS, INC.			
CONTRACT NO.	PROJECT NO.	DATE	
	95834	MAY 17, 1995	
DRAWN BY: M.J.H.	CHECKED BY: BPM	APPROVED BY: BPM	SCALE: 1" = 40'
SHEET 11 OF 20		PROJECT NO. 95834	





6" HYDRANT		
179+59 - 47' LT	1 EA	
GATE VALVE AND BOX, 6"		
179+59 - 30' LT	1 EA	
180+00 - 24' LT	1 EA	
GATE VALVE AND BOX, 8"		
179+31 - 30' LT	1 EA	
GATE VALVE AND BOX, 12"		
179+28 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
179+59 - 27' LT TO 179+59 - 47' LT	20 LF	
180+00 - 27' LT TO 180+00 - 40' RT	67 LF	
WATERMAIN, 8" PVC		
179+31 - 27' LT TO 179+31 - 35' LT	8 LF	
WATERMAIN, 12" PVC		
178+00 - 27' LT TO 182+00 - 27' LT	400 LF	
FITTINGS, DUCTILE IRON		
179+31 - 27' LT	12" X 8" TEE	137 LBS
179+59 - 27' LT	12" X 6" TEE	123 LBS
180+00 - 27' LT	12" X 6" TEE	123 LBS
180+00 - 40' RT	6" PLUG	15 LBS
WATER SERVICE LINE 1-1/2" COPPER		
178+65 - 27' LT TO 178+65 - 42' LT	15 LF	
181+30 - 27' LT TO 181+30 - 39' LT	12 LF	
WATER SERVICE LINE 2" COPPER		
180+40 - 27' LT TO 180+40 - 39' LT	12 LF	
WATER SERVICE CONNECTION		
178+65 - 27' LT	1 EA	
180+40 - 27' LT	1 EA - 2" CONNECTION	
181+30 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
178+65 - 42' LT	1 EA	
181+30 - 39' LT	1 EA	
CURB STOP AND BOX 2"		
180+40 - 39' LT	1 EA	
REMOVE HYDRANT		
178+90 - 30' LT	1 EA	

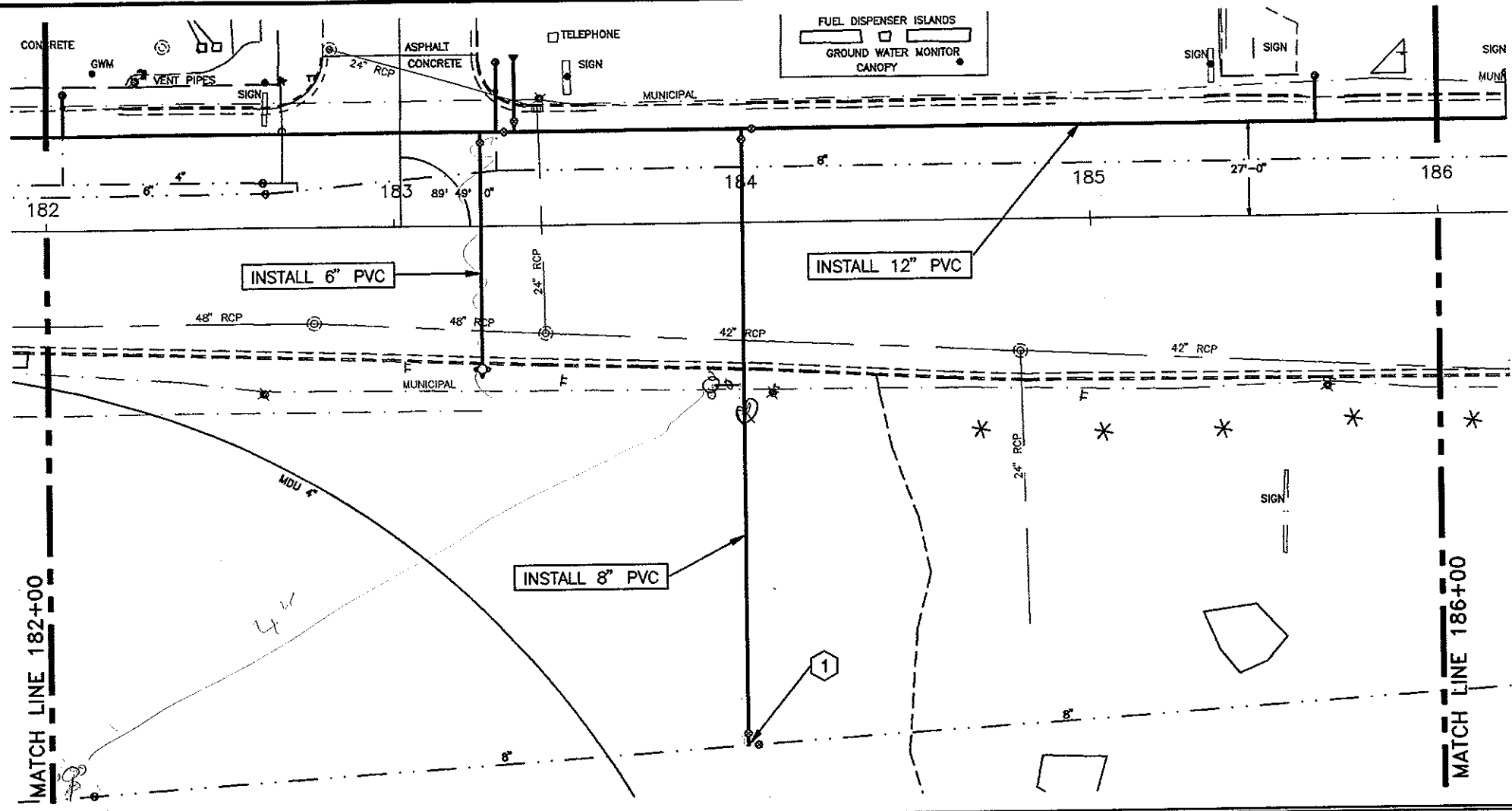


CONSTRUCTION NOTES

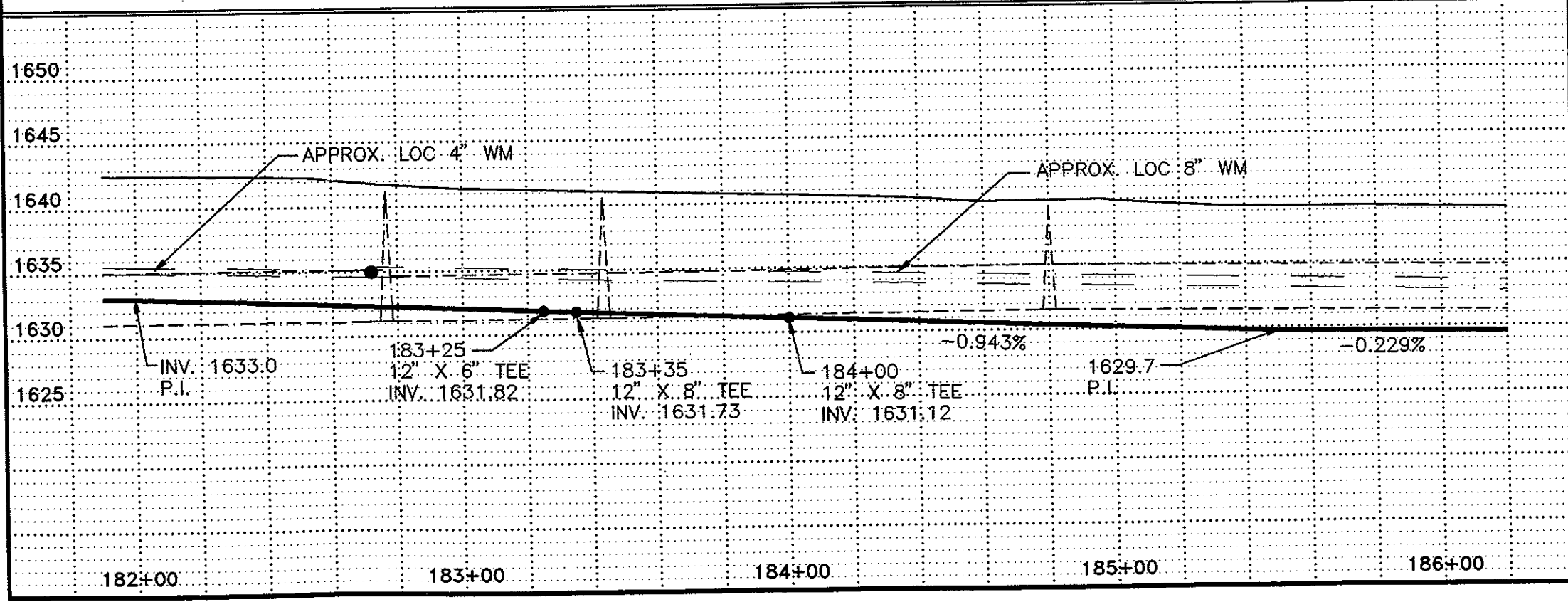
① CONNECT NEW 8" W.M. TO EXISTING 8" W.M.

REV.	DATE	DESCRIPTION	BY

CITY OF MANDAN	
DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III	
STA 178+00 TO STA 182+00	
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS RESOURCES • PARK • MINNEAPOLIS	
DRAWN BY: MJH	SCALE: 1" = 40'
CHECKED BY: BPM	PROJECT NO.: 95834
APPROVED BY: BPM	DATE: MAY 17, 1995 SHEET 12 OF 20



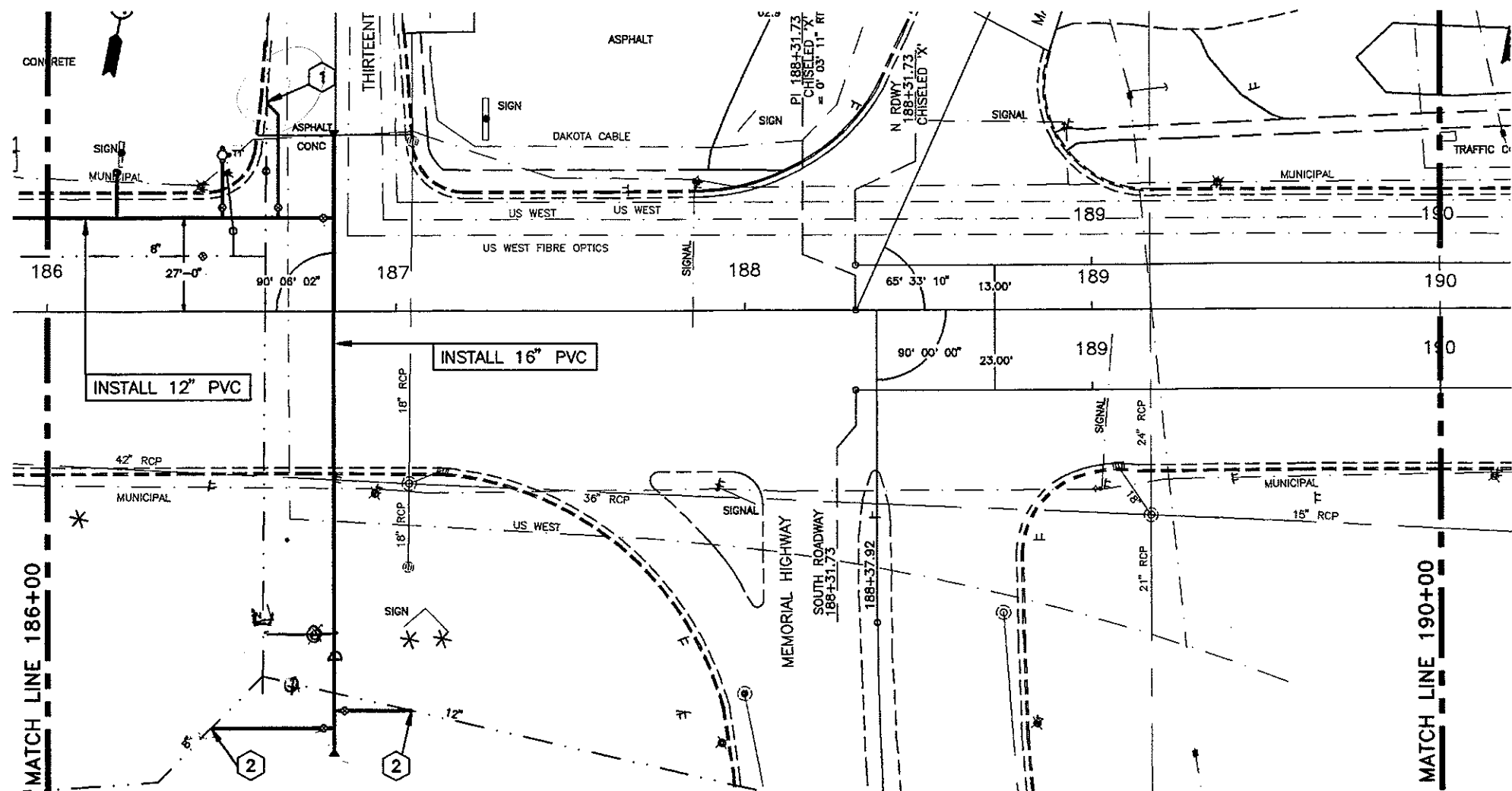
6" HYDRANT		
183+25 - 41' RT	1 EA	
GATE VALVE AND BOX, 6"		
183+25 - 24' LT	1 EA	
GATE VALVE AND BOX, 8"		
183+35 - 30' LT	1 EA	
184+00 - 24' LT	1 EA	
184+00 - 147' RT	1 EA	
184+03 - 150' RT	1 EA	
GATE VALVE AND BOX, 12"		
183+32 - 27' LT	1 EA	
184+03 - 27' LT	1 EA	
WATERMAIN, 6" PVC		
183+25 - 27' LT TO 183+25 - 41' RT	68 LF	
WATERMAIN, 8" PVC		
183+35 - 27' LT TO 183+35 - 47' LT	20 LF	
184+00 - 27' LT TO 184+00 - 150' RT	177 LF	
WATERMAIN, 12" PVC		
182+00 - 27' LT TO 186+00 - 27' LT	400 LF	
FITTINGS, DUCTILE IRON		
183+25 - 27' LT	12" X 6" TEE	123 LBS
183+25 - 25' RT	6" 1/8 BEND	31 LBS
183+25 - 28.5' RT	6" 1/8 BEND	31 LBS
183+35 - 27' LT	12" X 8" TEE	137 LBS
183+35 - 47' LT	8" PLUG	26 LBS
184+00 - 27' LT	12" X 8" TEE	137 LBS
184+00 - 150' LT	8" X 8" TEE	82 LBS
WATER SERVICE LINE 1-1/2" COPPER		
182+05 - 27' LT TO 182+05 - 39' LT	12 LF	
183+30 - 27' LT TO 183+30 - 47' LT	20 LF	
185+65 - 27' LT TO 185+65 - 40' LT	13 LF	
WATER SERVICE CONNECTION		
182+05 - 27' LT	1 EA	
183+30 - 27' LT	1 EA	
185+65 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
182+05 - 39' LT	1 EA	
183+30 - 47' LT	1 EA	
185+65 - 40' LT	1 EA	
REMOVE HYDRANT		
182+67 - 43' LT	1 EA	



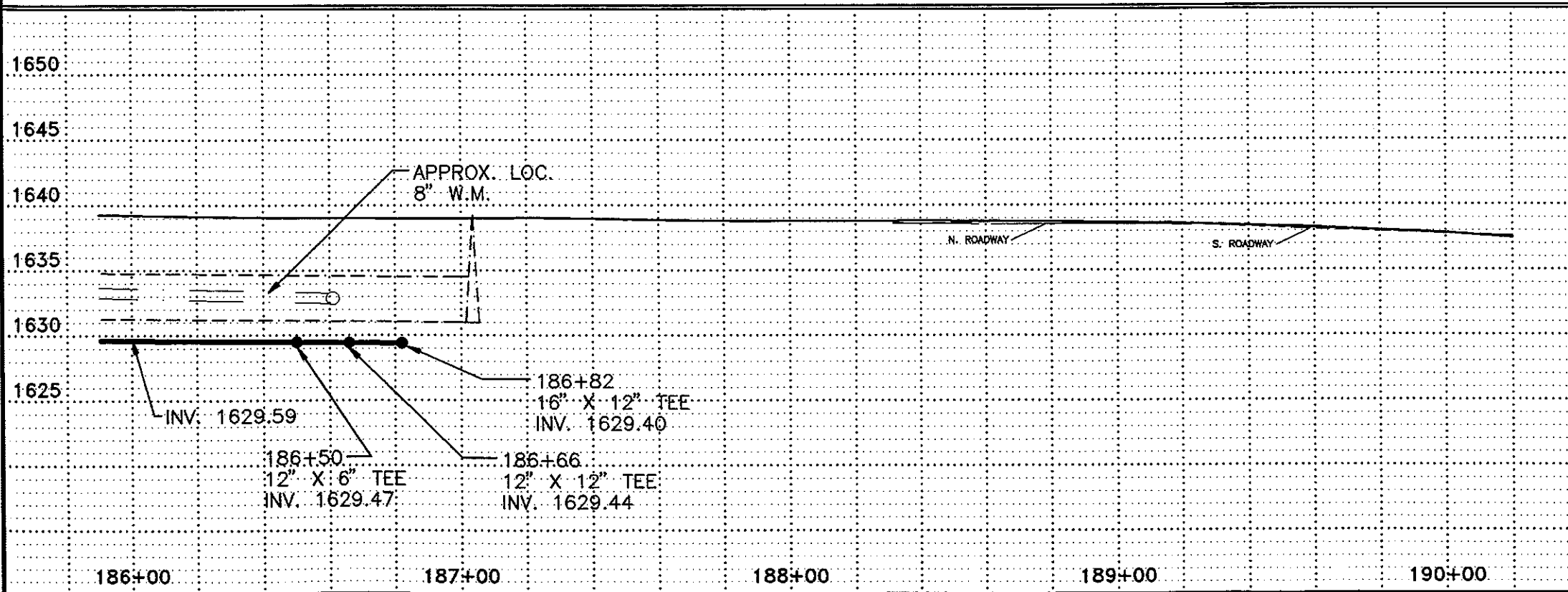
CONSTRUCTION NOTES

① CUT IN 8" X 8" TEE AND 8" VALVE AND BOX ON EAST LEG

CITY OF MANDAN		DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III	
STA 182+00 TO STA 186+00			
ULTEIG ENGINEERS, INC.		CONSULTING ENGINEERS	
SEARCHED	INDEXED	DESIGNED	
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 13 OF 20	
APPROVED BY: BPM			

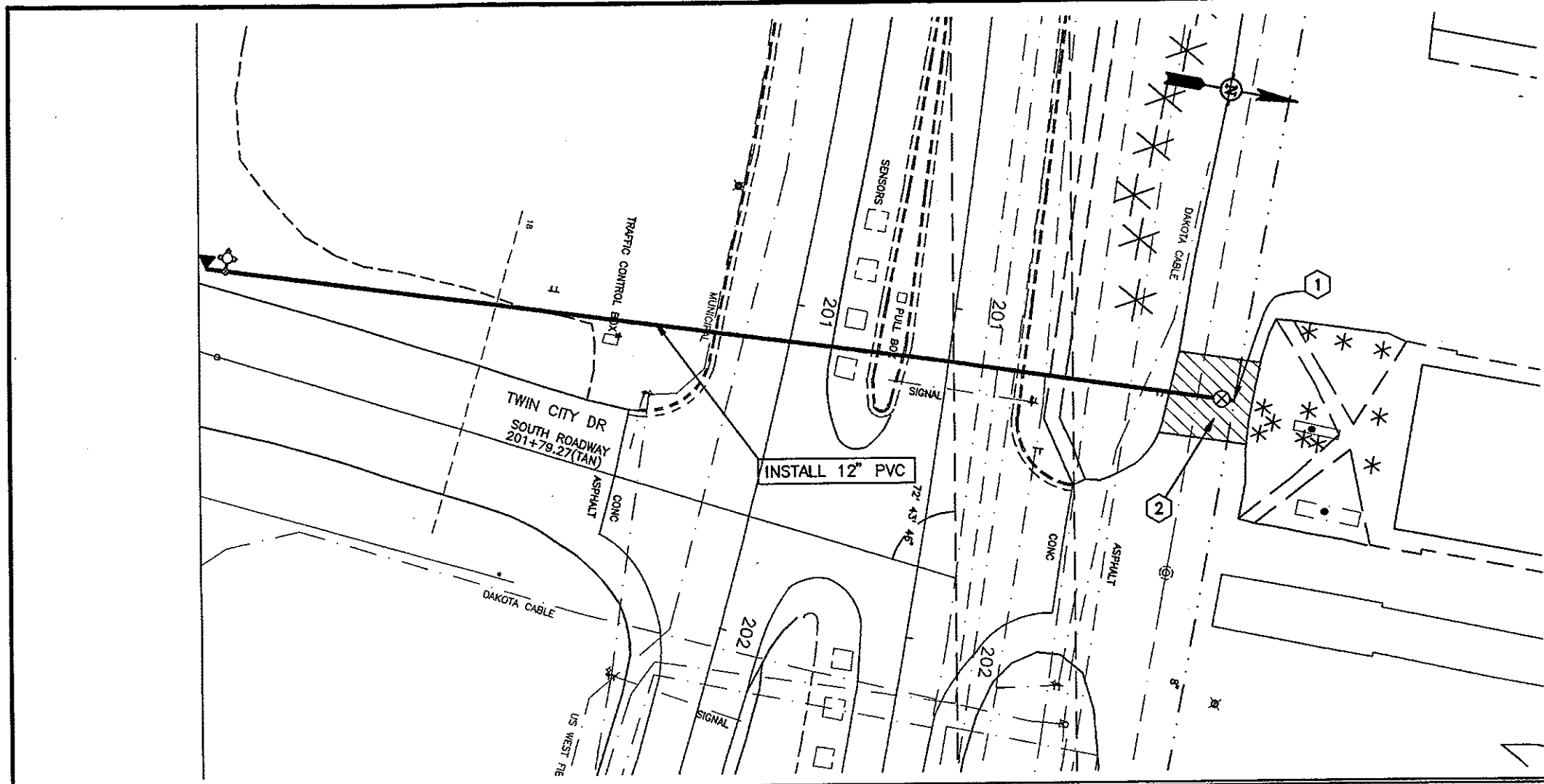


6" HYDRANT		
186+50 - 45' LT	1 EA	
GATE VALVE AND BOX, 6"		
186+50 - 30' LT	1 EA	
GATE VALVE AND BOX, 8"		
186+79 - 120' RT	1 EA	
GATE VALVE AND BOX, 12"		
186+66 - 30' LT	1 EA	
186+79 - 27' LT	1 EA	
186+85 - 115' RT	1 EA	
WATERMAIN, 6" PVC		
186+50 - 27' LT TO 186+50 - 45' LT	18 LF	
WATERMAIN, 8" PVC		
186+47 - 120' RT TO 186+82 - 120' RT	35 LF	
WATERMAIN, 12" PVC		
186+00 - 27' LT TO 186+82 - 27' LT	82 LF	
186+66 - 27' LT TO 186+62 - 60' LT	33 LF	
186+82 - 115' RT TO 187+04 - 115' RT	22 LF	
WATERMAIN, 16" PVC (OR 18")		
186+82 - 50' LT TO 186+82 - 126' RT	176 LF	
FITTINGS, DUCTILE IRON		
186+47 - 120' RT	8" 1/8 BEND	45 LBS
186+50 - 27' LT	12" X 6" TEE	123 LBS
186+62 - 60' LT	2 - 12" 1/8 BENDS	184 LBS
186+66 - 27' LT	12" X 12" TEE	164 LBS
186+82 - 27' LT	16" X 12" TEE	590 LBS
186+82 - 50' LT	16" PLUG	150 LBS
186+82 - 115' RT	16" X 12" TEE	590 LBS
186+82 - 120' RT	16" X 8" TEE	550 LBS
186+82 - 126' RT	16" PLUG	150 LBS
187+04 - 115' RT	12" 1/32 BEND	65 LBS
WATER SERVICE LINE 1-1/2" COPPER		
186+20 - 27' LT TO 186+20 - 40' LT	13 LF	
WATER SERVICE CONNECTION 1-1/2"		
186+20 - 27' LT	1 EA	
CURB STOP AND BOX 1-1/2"		
186+20 - 40' LT	1 EA	
REMOVE HYDRANT		
186+50 - 35' LT	1 EA	



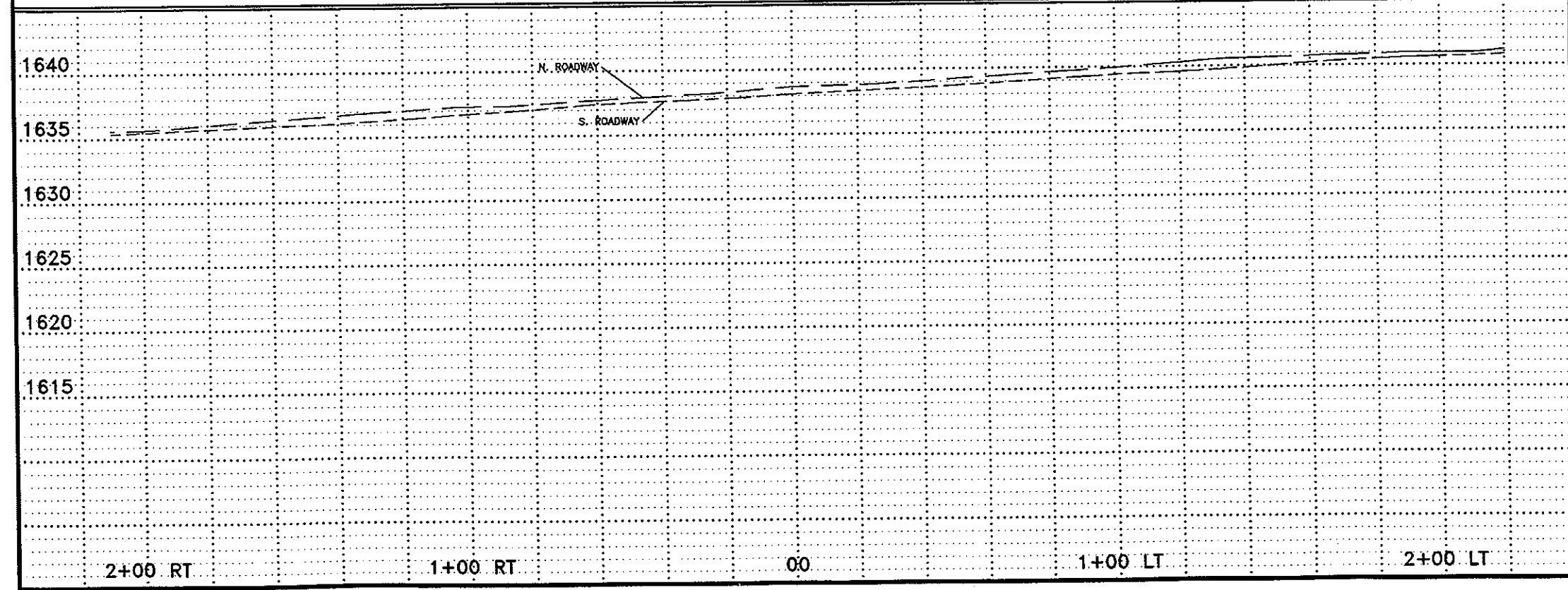
- CONSTRUCTION NOTES**
- ① CONNECT NEW 12" TO EXISTING 12" GOING NORTH ONCE EXISTING 12" UNDER MAIN CAN BE ABANDONED
 - ② CONNECT NEW LINE TO EXISTING LINE

CITY OF MANDAN		DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III	
STA 186+00 TO STA 190+00			
ULTEIG ENGINEERS, INC.		CONSULTING ENGINEERS	
MINNEAPOLIS, MN		MINNEAPOLIS, MN	
DESIGN BY: MJH	SCALE: 1" = 40'	PROJECT NO. 95834	
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 14 OF 20	
APPROVED BY: BPM			



6" HYDRANT		
201+12 - 218' RT OF N RDWY C	1 EA	
GATE VALVE AND BOX, 6"		
201+18 - 218' RT OF N RDWY C	1 EA	
GATE VALVE AND BOX, 12"		
201+18 - 83' LT OF N RDWY C	1 EA	
WATERMAIN, 6" PVC		
201+12 - 218' RT TO 201+18 - 218' RT	6 LF	
WATERMAIN, 12" PVC		
201+18 - 86' LT TO 201+18 - 224' RT	310 LF	
FITTINGS, DUCTILE IRON		
201+18 - 86' LT	8"X12" TEE	137 LBS
201+18 - 218' RT	12"X6" TEE	123 LBS
201+18 - 224' RT	12" PLUG	49 LBS

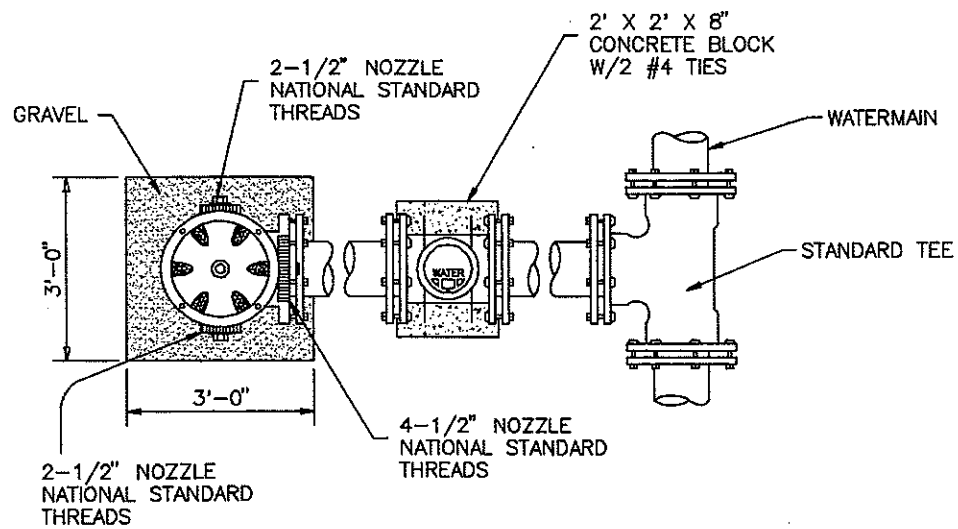
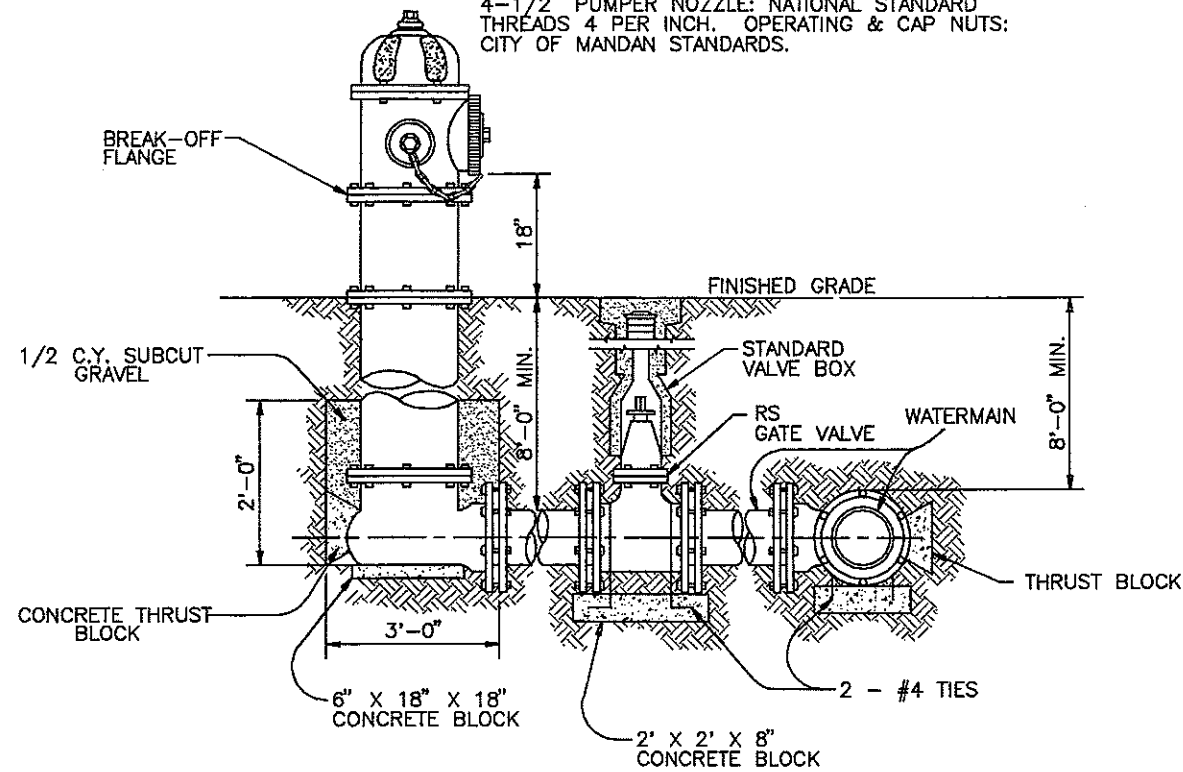
- CONSTRUCTION NOTES**
- ① CUT IN 12" X 8" TEE
 - ② REMOVE AND REPLACE ASPHALT PAVEMENT AS REQUIRED, ALL COSTS INCIDENTAL



REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN			
DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III			
STA 201+18 - 86' LT TO STA 201+18 - 224' RT			
ULTEIG ENGINEERS, INC.			
CONSULTING ENGINEERS		MINNEAPOLIS	
DRAWN BY: MJH	SCALE: 1" = 40'	PROJECT NO.:	95834
CHECKED BY: BPM	DATE: MAY 17, 1995	SHEET 15 of 20	
APPROVED BY: BPM			

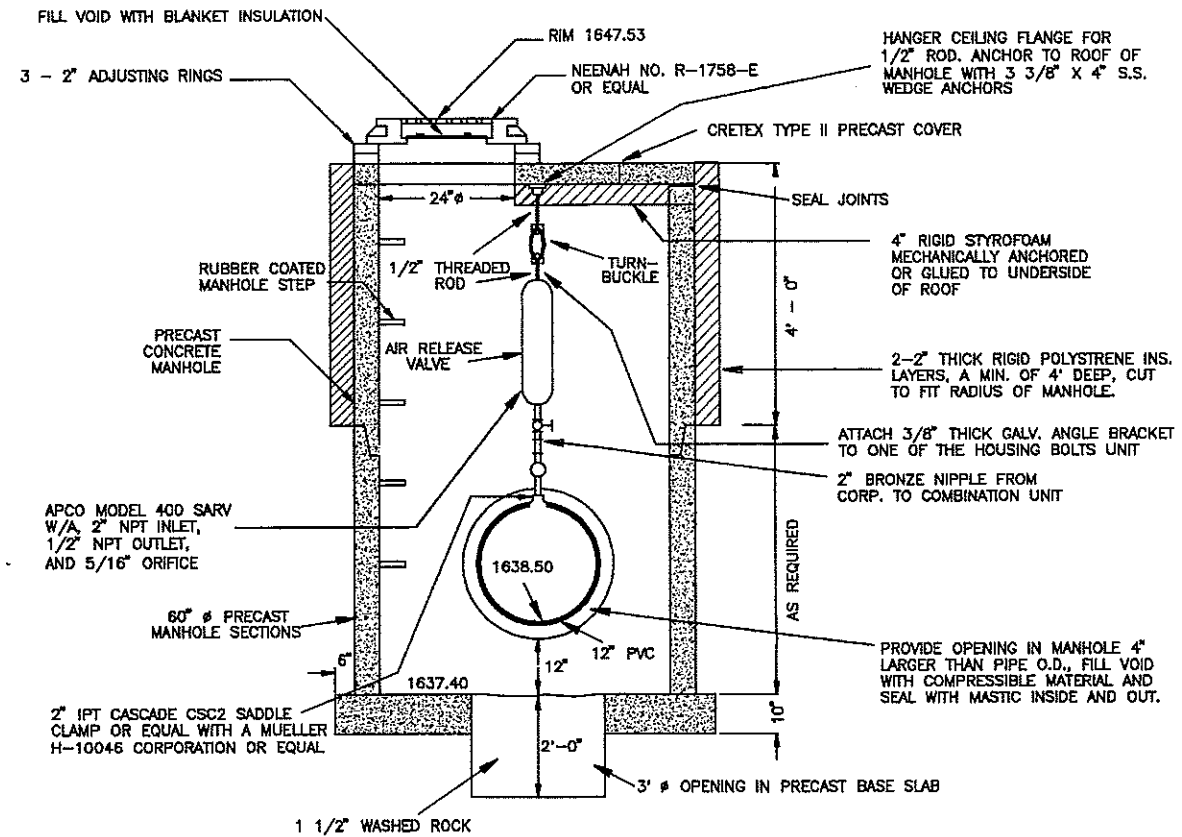
2-1/2" HOSE NOZZLES: NATIONAL STANDARD THREADS, 2-1/16" O.D. MALE THREADS, 7-1/2 THREADS PER INCH L.H. THREADS.

4-1/2" PUMPER NOZZLE: NATIONAL STANDARD THREADS 4 PER INCH. OPERATING & CAP NUTS: CITY OF MANDAN STANDARDS.



HYDRANT & VALVE DETAIL

NOT TO SCALE



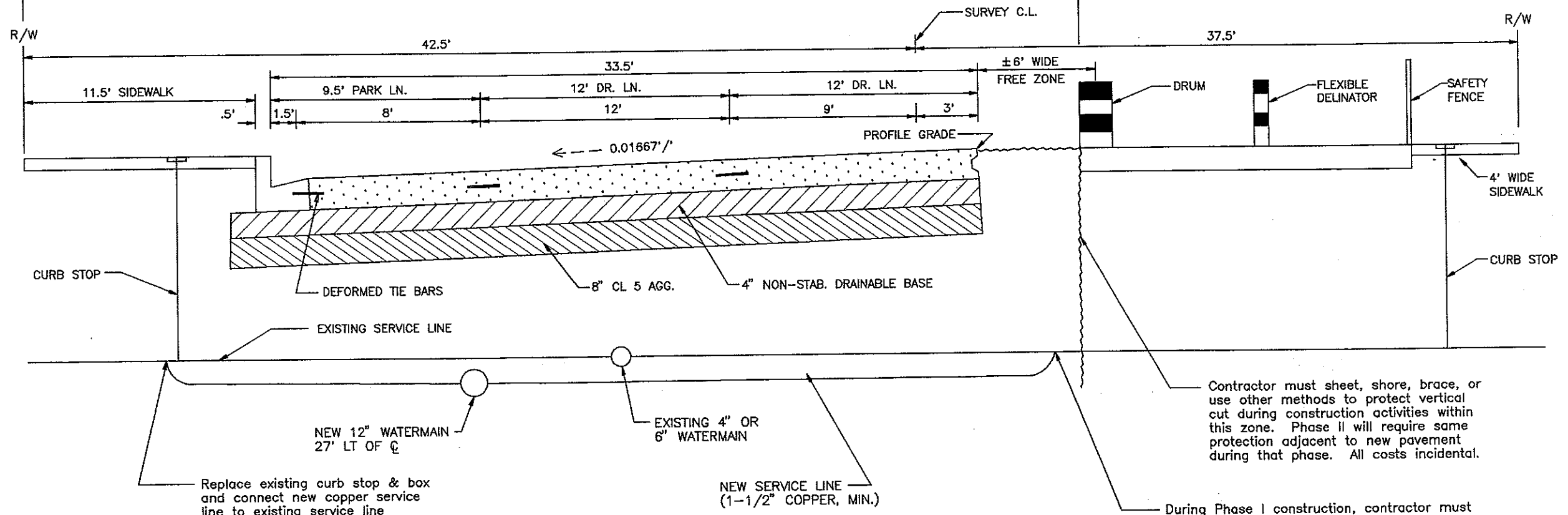
AIR RELIEF VALVE AND MANHOLE DETAIL

CONSTRUCTION NOTES

- 1 THE UNIT PRICE BID PER EACH (EA) "AIR RELIEF VALVE AND MANHOLE" SHALL COVER ALL COSTS FOR PROVIDING ALL MATERIALS SHOWN ON THE DETAIL AND THEIR INSTALLATION.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT #39, WATER IMPROVEMENT PROJECT 96-2, PHASE III			
DETAILS			
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS <small>FARGO • MINNEAPOLIS • SIOUX FALLS</small>			
DRAWN BY: MJH CHECKED BY: BPM APPROVED BY: BPM	SCALE: NO SCALE DATE: SEPT, 27, 1995	PROJECT NO. 95834 SHEET 16 of 20	

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.

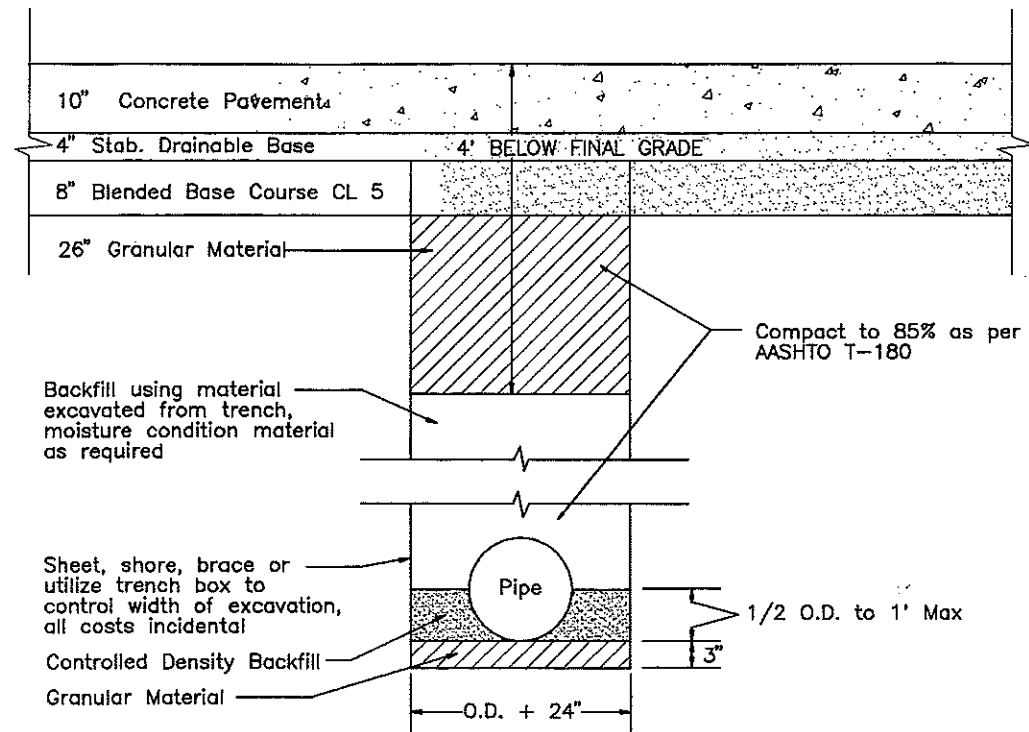
Replace existing curb stop & box and connect new copper service line to existing service line

NEW SERVICE LINE (1-1/2" COPPER, MIN.)

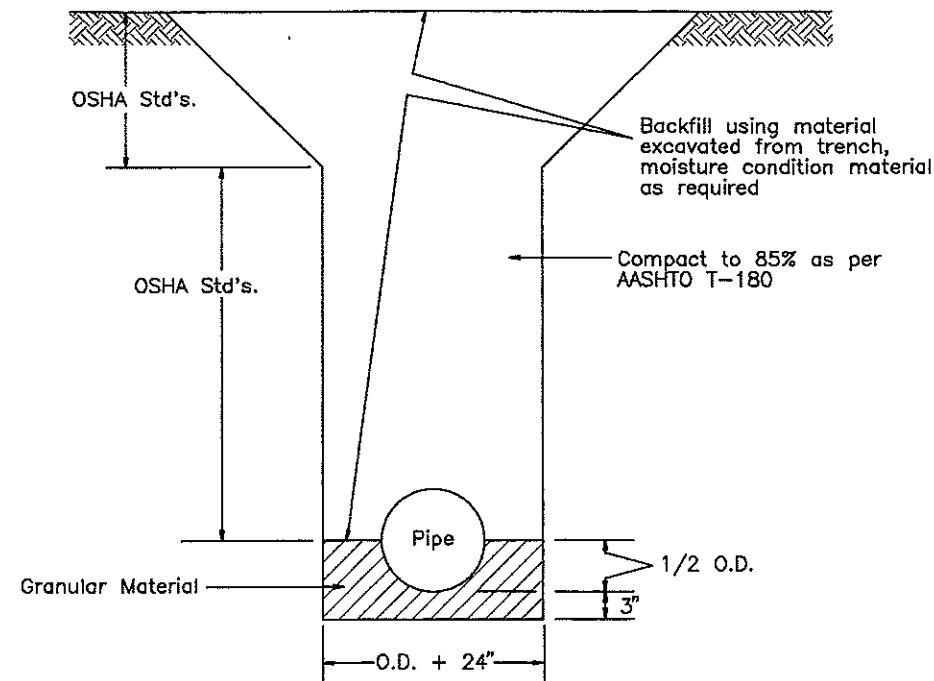
REV.	DATE	DESCRIPTION	BY

CITY OF MANDAN	
DISTRICT #38, WATER IMPROVEMENT PROJECT 98-2, PHASE III	
PHASING DETAILS	
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS FAROS • RESNAULT • MINNEAPOLIS	
DRAWN BY: DMS	SCALE: NO SCALE
CHECKED BY: BPM	DATE: SEPT. 27, 1995
APPROVED BY: BPM	PROJECT NO. 95834
	SHEET 17 of 20





BEDDING AND BACKFILL FOR PIPE UNDER THE ROADWAY



BEDDING AND BACKFILL FOR PIPE NOT UNDER ROADWAY

CONTROLLED DENSITY BACKFILL:

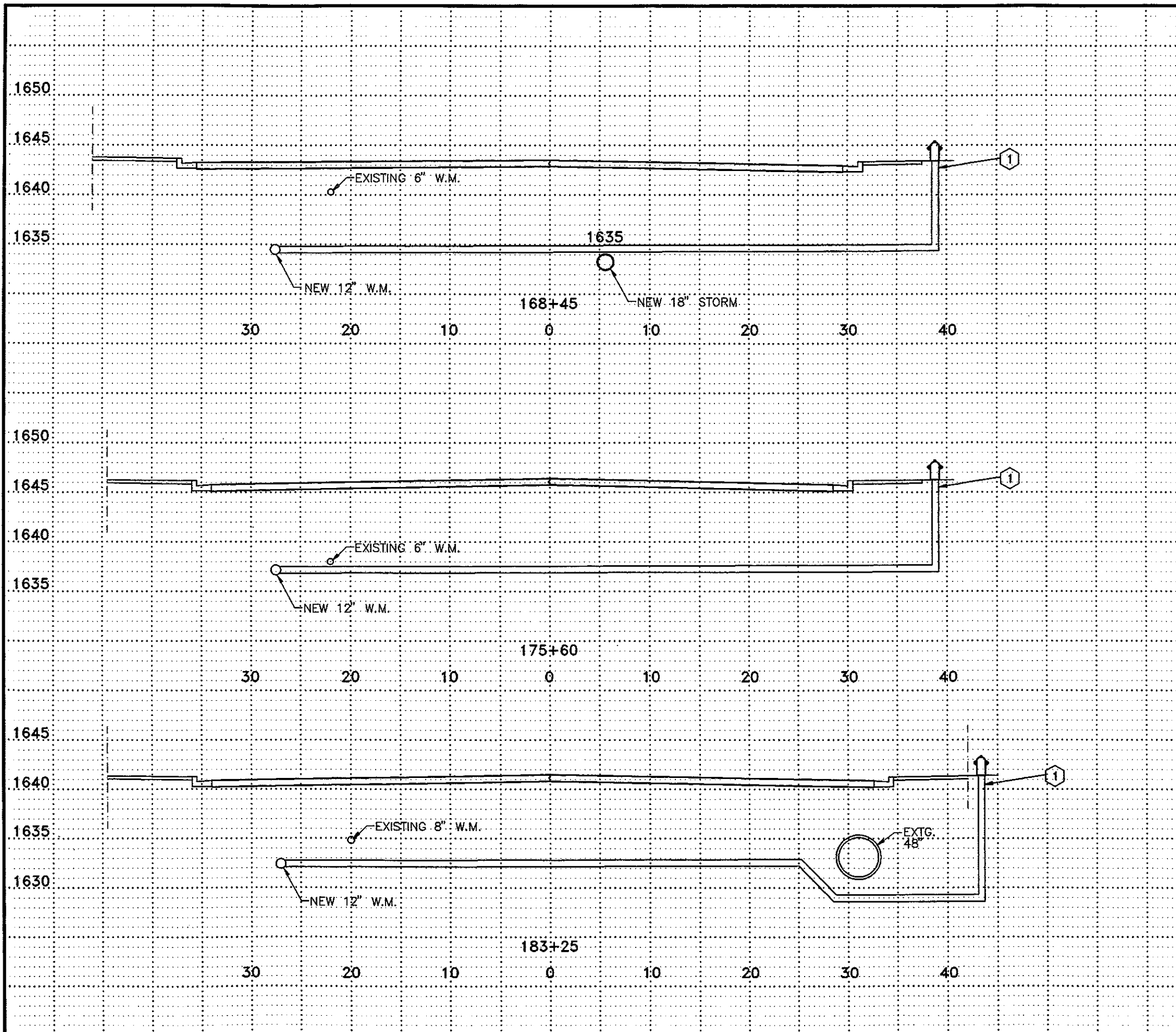
Shall be a blend of cement, water, pozzolanic materials and fillers. The material shall be fluid on placement to flow around and fill voids around pipes in the backfill area. The material shall be able to support normal loads after six hours and shall have a compressive strength in the range of 75 psi. 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.

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 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.
- 5) Controlled density backfill not required on copper service lines.

REV.	DATE	DESCRIPTION	BY
CITY OF MANDAN DISTRICT #39, WATER IMPROVEMENT PROJECT 98-2, PHASE III			
TRENCH 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 18 of 20	
APPROVED BY: BPM			



CONSTRUCTION NOTES

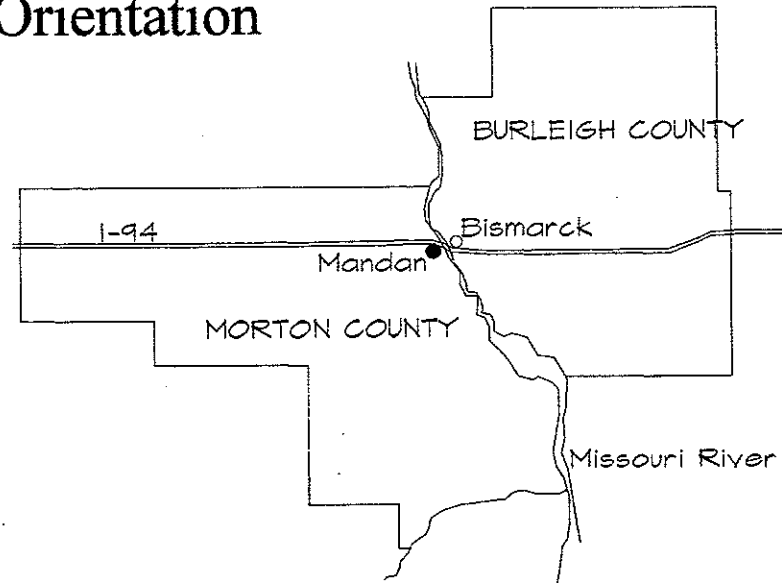
- ① INSTALL HYDRANT EXTENSIONS OF LENGTH REQUIRED TO BRING TOP OF HYDRANT TO PROPER GRADE

REV.	DATE	DESCRIPTION	BY

CITY OF MANDAN	
DISTRICT #39, WATER IMPROVEMENT PROJECT 98-2, PHASE III	
CROSS-SECTIONS AT HYDRANTS	
ULTEIG ENGINEERS, INC. <small>CONSULTING ENGINEERS SOLUTIONS & DESIGN • MINNEAPOLIS</small>	
DRAWN BY: DMS	SCALE: AS SHOWN
CHECKED BY: BPM	DATE: SEPT. 27, 1995
APPROVED BY: BPM	PROJECT NO. 95834
	SHEET 20 of 20

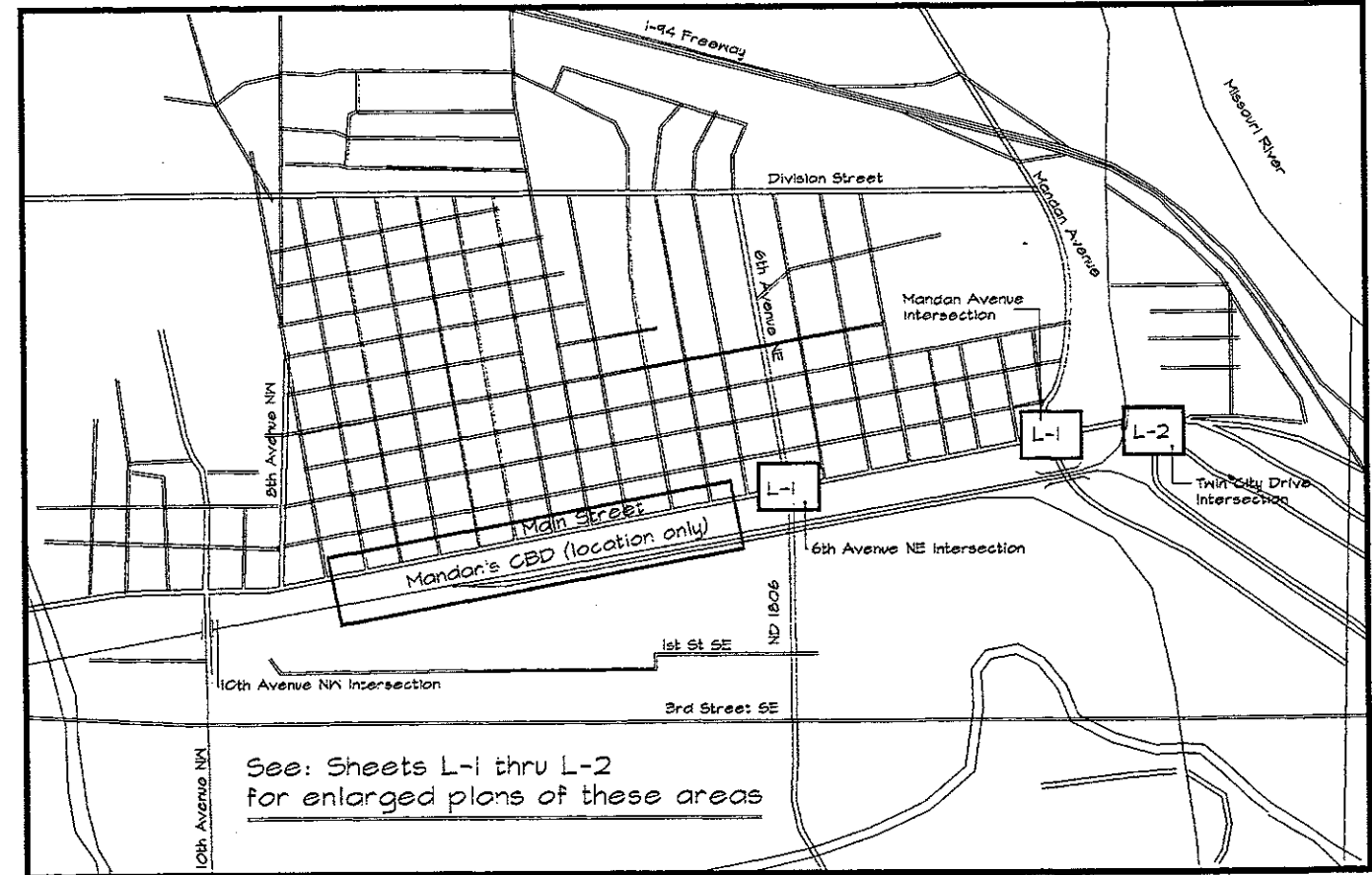
State of North Dakota
 Department of Transportation
Mandan East Main Street Landscape Enhancement Project
 STNU-1-094(039)916

Orientation



Sheet Index

G-1	Index/ Orientation
G-2	Plant List/ Planting Details #1
G-3	Planting Details #2
G-4	Planting Details #3
L-1	6th Avenue NE Planting Plan
L-1	Mandan Avenue Planting Plan
L-2	Twin City Drive Planting Plan
S-1	Sign Details



Locator Map for East Main Street Intersections



Drawn By: M.S. 7/5/94
 Revised: M.L. 8/16/95
 DCC 1/8/95
 DCC 5/31/95

I, Dennis C. Colton, ASLA,
 a Landscape Architect,
 certify that these plans and
 specifications are in accordance
 with good landscape architecture
 practices.

U.S. Department of Transportation
 Federal Highway Administration

Approved Division Administrator Date
 Project Number: NHU-1-094(039)916

Approved Chief Engineer Date
 North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation
Mandan East Main Street Landscape Enhancement
 NHU-1-094(039)916

Sheet Title:

Index/Orientation

Sheet Number:

G-1

East Mainstreet Mandan Plant List

Deciduous Trees

#	SYMBOL	SCIENTIFIC/Common Name	SIZE/CA	COMMENTS
47	AM	Acer glabral Amur Maple	2"ca.	Container Grown -- Mulched ring or mulched bed
14	CH	Celtis occidentalis Common Hackberry	2"ca.	B&B -- Mulched ring or mulched bed
8	FA	Fraxinus nigra 'Fallgold' Fallgold Ash	2"ca.	Container Grown -- Mulched ring or mulched bed
22	SC	Malus x 'Seikirk' Seikirk Flowering Crabapple	2"ca.	Container Grown -- Mulched ring or mulched bed
12	SDC	Malus x 'Snow Drift' Snow Drift Flowering Crabapple	2"ca.	Container Grown -- Mulched ring or mulched bed
12	AL	Tilia americana American Linden	2"ca.	Container Grown -- Mulched ring or mulched bed
8	NB	Viburnum lentago Nannyberry (Tree form)	2"ca.	Container Grown -- Mulched ring or mulched bed

Coniferous Trees

#	SYMBOL	SCIENTIFIC/Common Name	SIZE/CA	COMMENTS
18	CBS	Picea pungens 'Glauca' Colorado Blue Spruce	5'	Field Grown or Container Grown -- Mulch Bed
21	PP	Pinus ponderosa Ponderosa Pine	5'	Field Grown or Container Grown -- Mulch Bed

Deciduous Shrubs

#	SYMBOL	SCIENTIFIC/Common Name	SIZE	COMMENTS
14B	RTD	Cornus sericea 'Isanti' Isanti Red-Twigged Dogwood	2 gal.	Container Grown -- Mulched ring or mulched bed
35	DSH	Lonicera x brownii 'Dropmore Scarlet' Dropmore Scarlet Honeysuckle	6" pot	4" mulched bed
57	SS	Rhus glabra Smooth Sumac	2 gal.	Container Grown -- Mulched ring or mulched bed
53	FS	Spiraea x bumalda 'Froebelii' Froebel Spiraea	2 gal.	Container Grown -- Mulched ring or mulched bed

Coniferous Shrubs

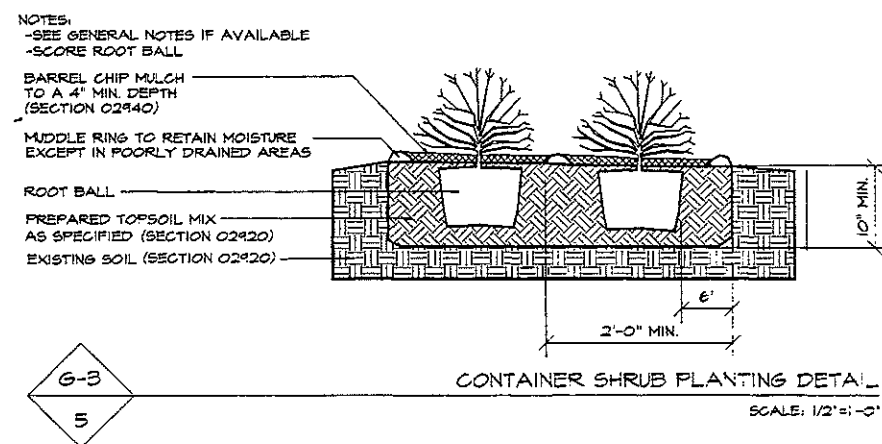
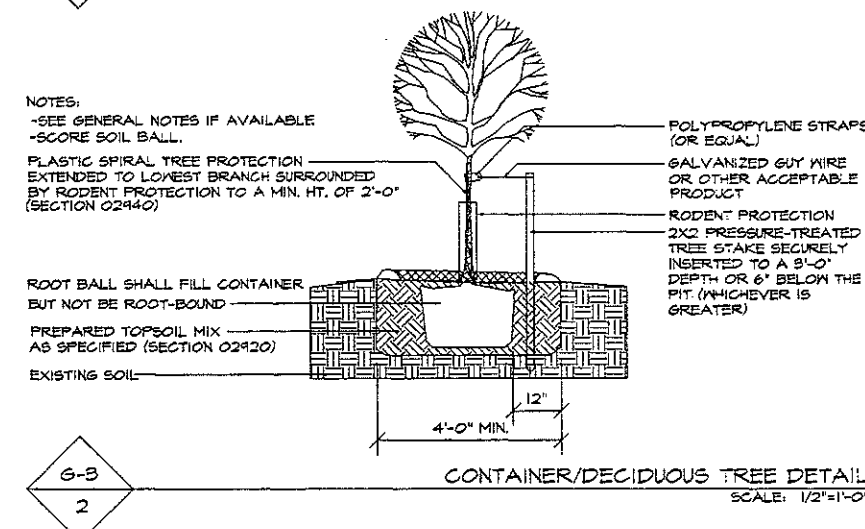
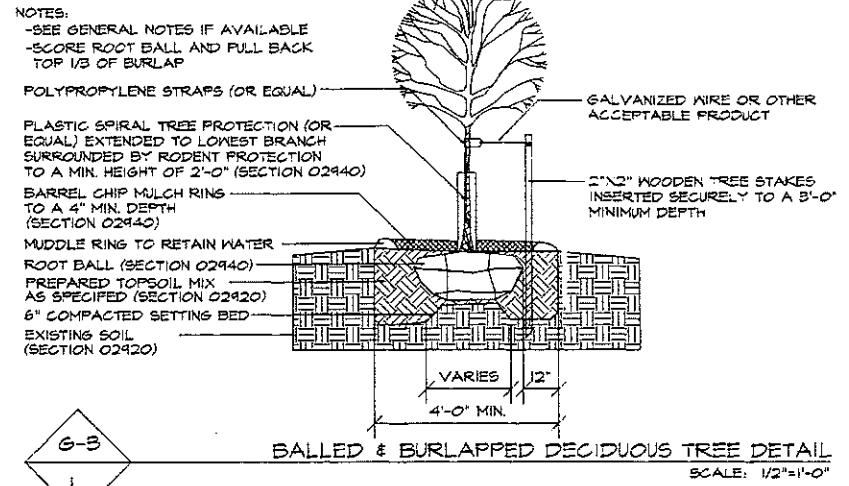
#	SYMBOL	SCIENTIFIC/Common Name	SIZE	COMMENTS
55	BJ	Juniperus sabina 'Broadmoor' Broadmoor Savin Juniper	2 gal.	Container Grown -- Mulched ring or mulched bed

Hardy Shrub Roses

#	SYMBOL	SCIENTIFIC/Common Name	SIZE	COMMENTS
42	HSR	Rosa x 'Parkland' Assiniboine (Parkland series)	1 gal.	Container Grown -- Mulched ring or mulched bed
63	RR	Rosa rugosa Rugosa Rose	1 gal.	Container Grown -- Mulched ring or mulched bed

Perennials & Groundcovers

#	SYMBOL	SCIENTIFIC/Common Name	SIZE	COMMENTS
85I	MH	Hemerocallis (mixed) Red, Yellow, and Orange Daylilies	2" BR	Mixed colors (equal #s) 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 02940 - REMOVE ONLY DEAD OR BROKEN BRANCHES)
- ALL TREES SHALL COMPLY WITH THE AMERICAN STANDARDS FOR NURSERY STOCK INCLUDING TREE PIT DEPTH AND WIDTH. (SECTION 02940).
- IN SOME CASES, THE MULCH IS ONLY LISTED AS A SPECIFIED DIAMETER. SEE PLANS AND SPECIFICATIONS FOR FURTHER COORDINATION OF MULCHING (SECTION 02940).
- TREE HEIGHT AND CALIPERS VARY ACCORDING TO TREE SPECIFIED. SEE ASSOCIATED PLANS, PLANT LISTS, AND SPECIFICATIONS (SECTION 02940).
- 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 THROUGHOUT THE MAINTENANCE PERIOD
- ADJUST PLANTING HOLE DIMENSIONS AND SHAPE TO PROPERLY CONTAIN PLANT, PLUMB AND BACKFILL SECURELY. NO AIR POCKETS SHALL REMAIN.

Revised:	Drawn By:

U.S. Department of Transportation
Federal Highway Administration

Approved Division Administrator _____ Date _____
Project Number: NHU-1-094(039)916

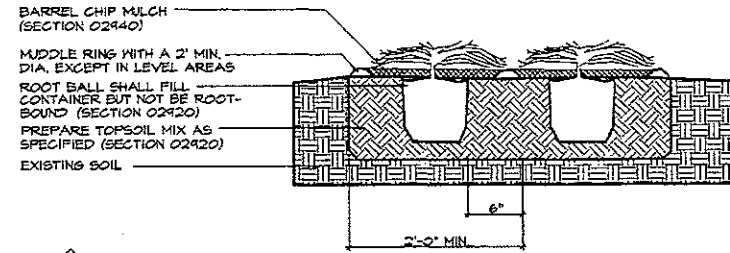
Approved Chief Engineer _____ Date _____
North Dakota Dept. of Transportation

Project Title:
State of North Dakota Department of Transportation
Mandan East Mainstreet Landscape Enhancement
NHU-1-094(039)916

Sheet Title:
Planting Details

Sheet Number:
G-2

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCARIFY SIDES OF HOLE IF SMOOTH
 -SCORE ROOT BALL (SECTION 02940)
 -SET ROOT FLARE AT SAME ELEV. AS WAS GROWN IN THE NURSERY (SECTION 02940)



G-4
 1
 CONTAINER CONIFEROUS SHRUB DETAIL
 SCALE: 3/4"=1'-0"

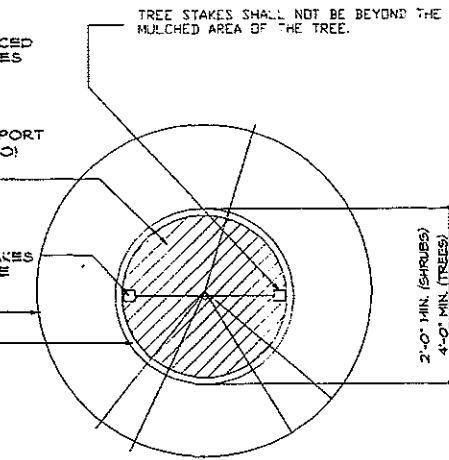
NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -MIDDLE RING SHOULD NOT BE PLACED ON UPSLOPE SIDE OF STEEP SLOPES WITH MORE THAN A 10% GRADE

-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 UNFORMLY 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



G-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

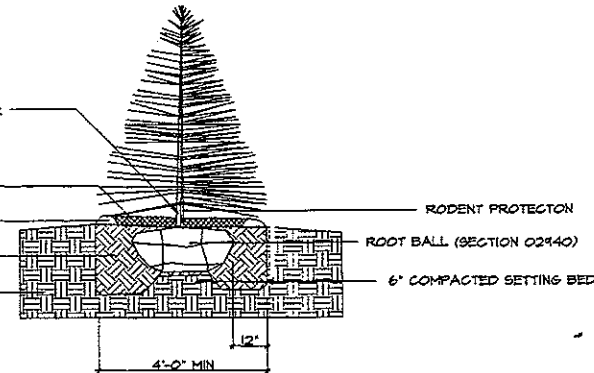
PLASTIC SPIRAL TREE PROTECTION (OR EQUAL) EXTENDED TO LOWEST BRANCH SURROUNDED BY RODENT PROTECTION (SECTION 02940)

BARREL CHIP MULCH RING TO A 4' MIN. DEPTH (SECTION 02940)

MIDDLE RINGS TO 3-4" HEIGHT

PREPARED TOPSOIL MIX AS SPECIFIED (SECTION 02920)

EXISTING SOIL (SECTION 02920)

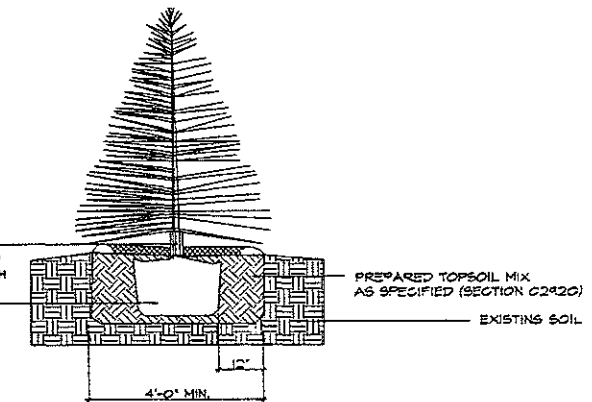


G-4
 2
 BALLED & BURLAPPED CONIFEROUS TREE DETAIL
 SCALE: 1/2"=1'-0"

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCORE SIDES AND BOTTOM OF ROOT-BALL AND PULL BACK TOP 1/3

PLASTIC SPIRAL TREE PROTECTION EXTENDED TO LOWEST BRANCH SURROUNDED BY RODENT PROTECTION TO LOWEST BRANCH

ROOT BALL SHALL FILL CONTAINER BUT NOT BE ROOT-BOUND



G-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

G-4
 5
 OFF-VMJ 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(039)916

Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

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 NHU-1-094(039)916

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-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

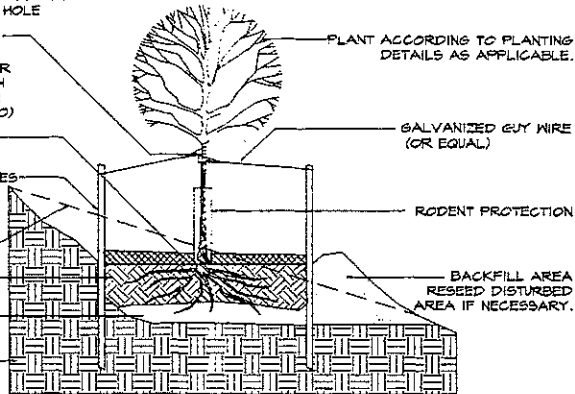
EXISTING SOIL

NOTES:

-SEE GENERAL NOTES IF AVAILABLE

-KEEP ROOTS MOIST AT ALL TIMES

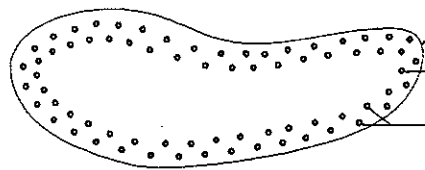
-IT IS RECOMMENDED THAT THE CONTRACTOR FRAME OFF THE ROOT ENDS OVER 1/4" IN DIA. TO STIMULATE NEW ROOT GROWTH GENERATION AT THAT POINT



G-5
1

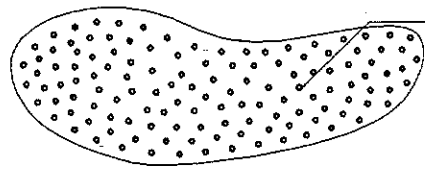
PLANTING DETAIL FOR STEEP SLOPES

SCALE: 1/2"=1'-0"



SHRUB BED EDGE AS PER DRAWINGS WITH 1'-6" MOWING STRIP REMAINING AT MATURITY
 TYPICAL SHRUB INSTALLED IN A STAGGERED PATTERN. SPACING VARIES ACCORDING TO SHRUB SPECIES.
 INSTALL PERIMETER ROWS FIRST IN A STAGGERED FASHION WITH O.C. AS SPECIFIED.

NOTE: ALL TREES PLANTED IN MULCHED BED WILL HAVE A 5' X 5' 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

G-5
2

MASS SHRUB/TREE PLANTING BED DETAIL

NO SCALE

NOTES:
 -SEE GENERAL NOTES IF AVAILABLE
 -SCORE ROOT BALL

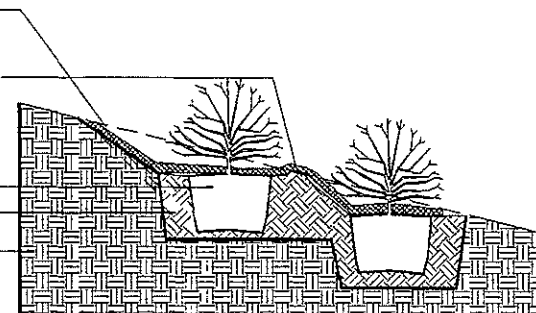
BARREL CHIP MULCH TO A 4" MIN. DEPTH (SECTION 02940)

MIDDLE RING TO RETAIN MOISTURE EXCEPT IN POORLY DRAINED AREAS

SHRUB ROOT BALL

PREPARED TOPSOIL MIX AS SPECIFIED (SECTION 02920)

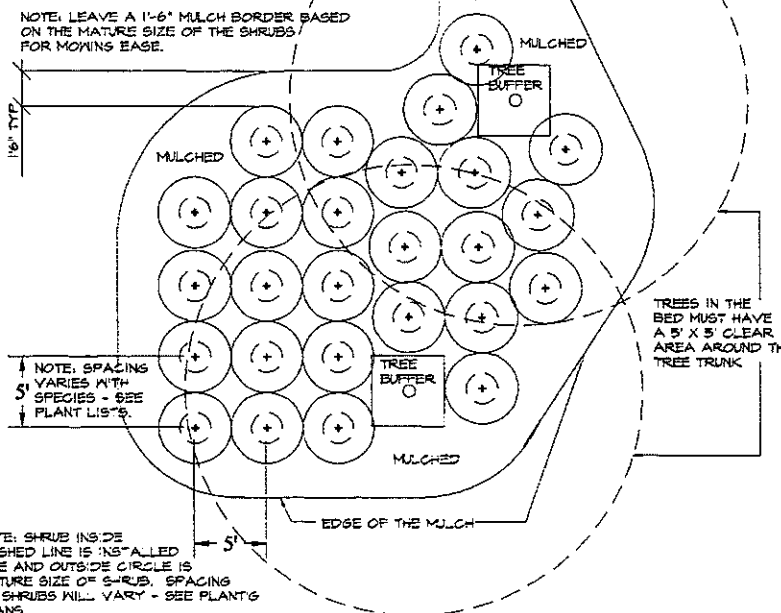
EXISTING SOIL (SECTION 02920)



G-5
3

SLOPED SHRUB PLANTING TYPICAL DETAIL

SCALE: 1/2"=1'-0"



G-5
4

TYPICAL MASS SHRUB PLANT SPACING

NO SCALE

Revised:	Drawn By:

U.S. Department of Transportation
 Federal Highway Administration

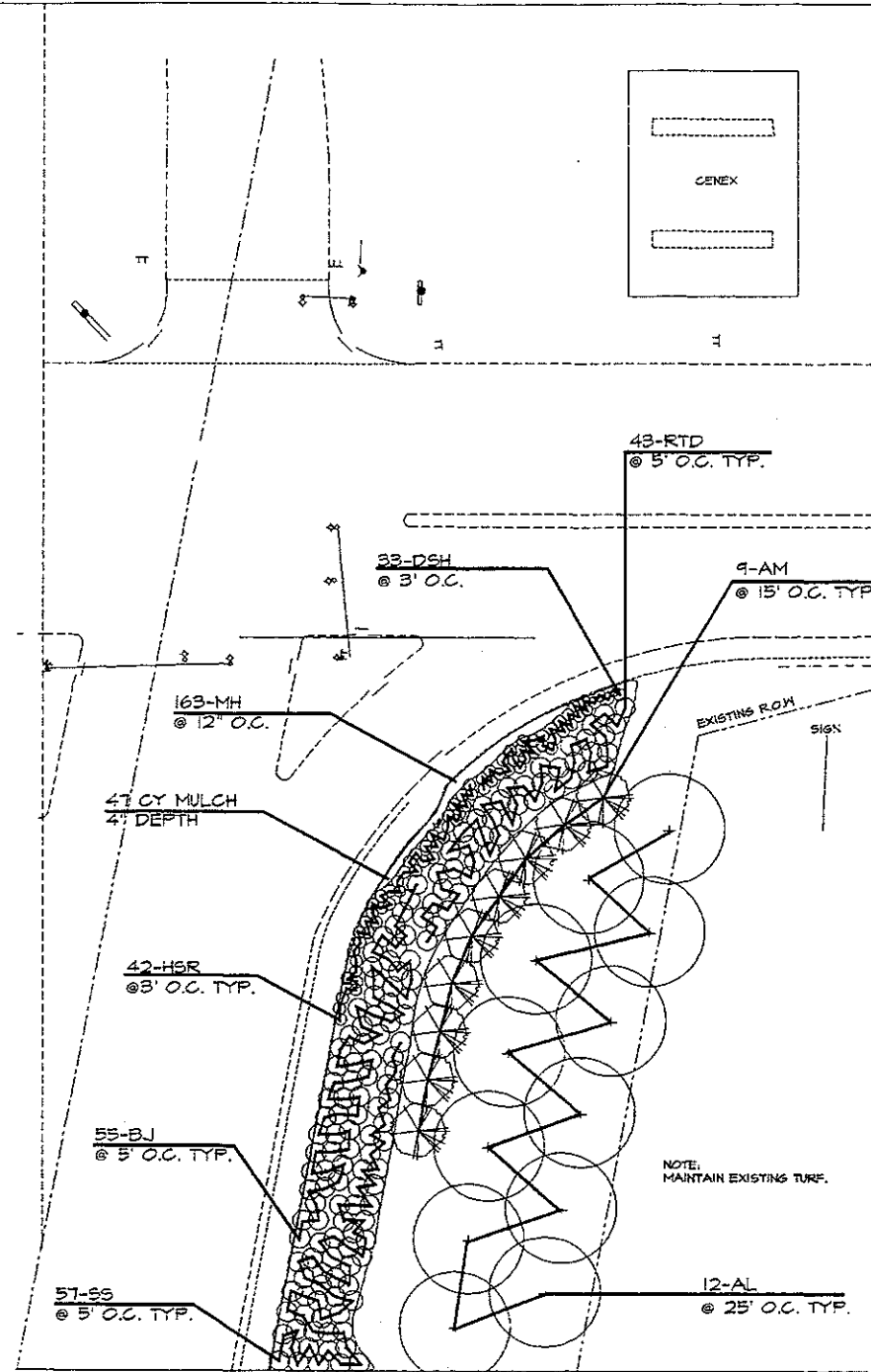
Approved Division Administrator _____ Date _____
 Project Number: NHU-1-094(039)916

Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

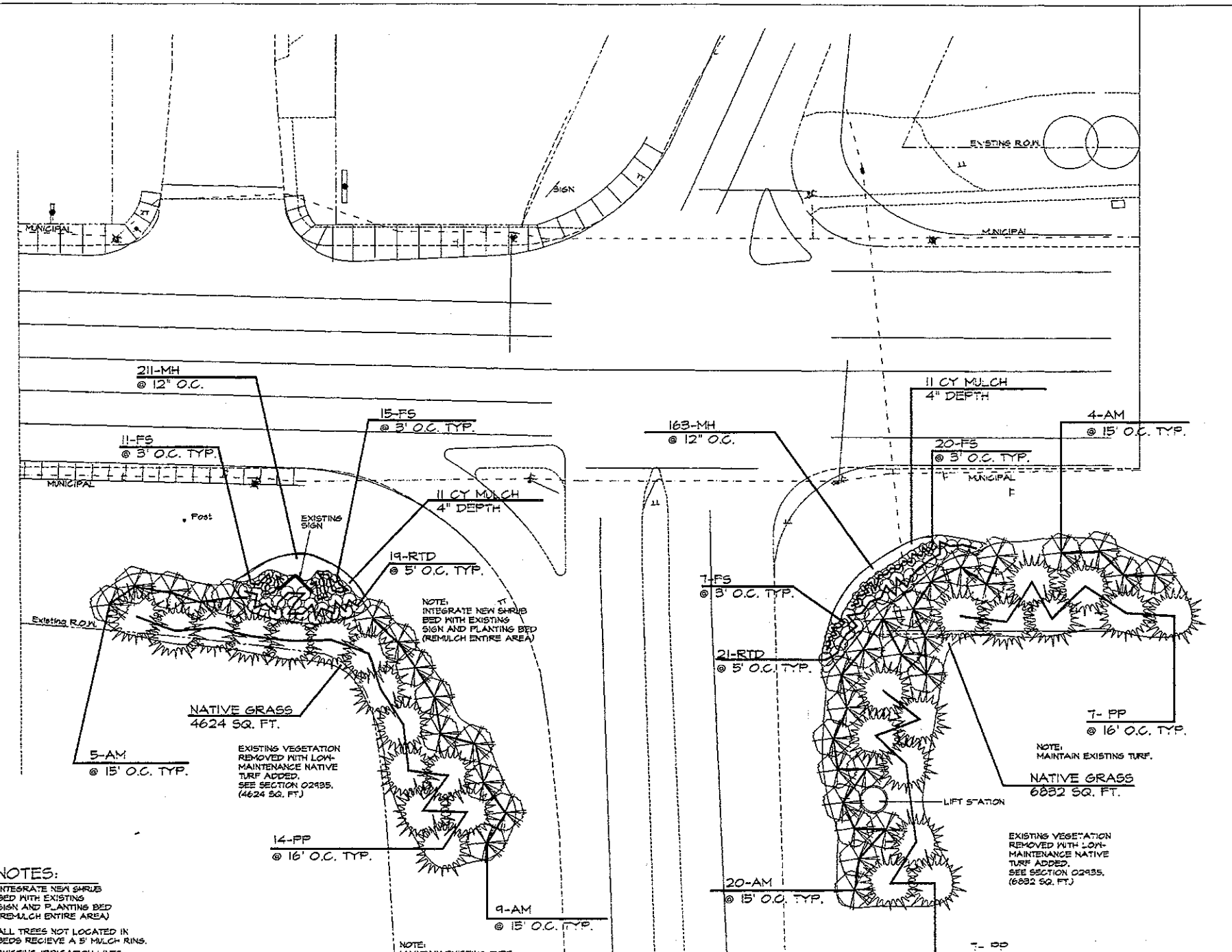
Project Title: State of North Dakota Department of Transportation
Mandan East Mainstreet Landscape Enhancement
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Sheet Title:
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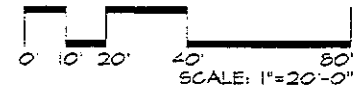


Sixth Avenue NE



Mandan Avenue

NOTES:
 INTEGRATE NEW SHRUB BED WITH EXISTING SIGN AND PLANTING BED (RE-MULCH ENTIRE AREA)
 ALL TREES NOT LOCATED IN BEDS RECEIVE A 5" MULCH RING.
 EXISTING IRRIGATION LINES MUST BE CAREFULLY LOCATED A MINIMUM OF 10' SHOULD EXIST BETWEEN THE ROAD AND ANY PLANTING BEDS.
 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: M.L. 7/15/04
 M.L. 1/2/05
 M.L. 5/2/05

I. Dennis C. Gallon, A.S.A.
 a Landscape Architect,
 certifies that these plans and specifications are in accordance with good landscape architecture practices.

U.S. Department of Transportation
 Federal Highway Administration

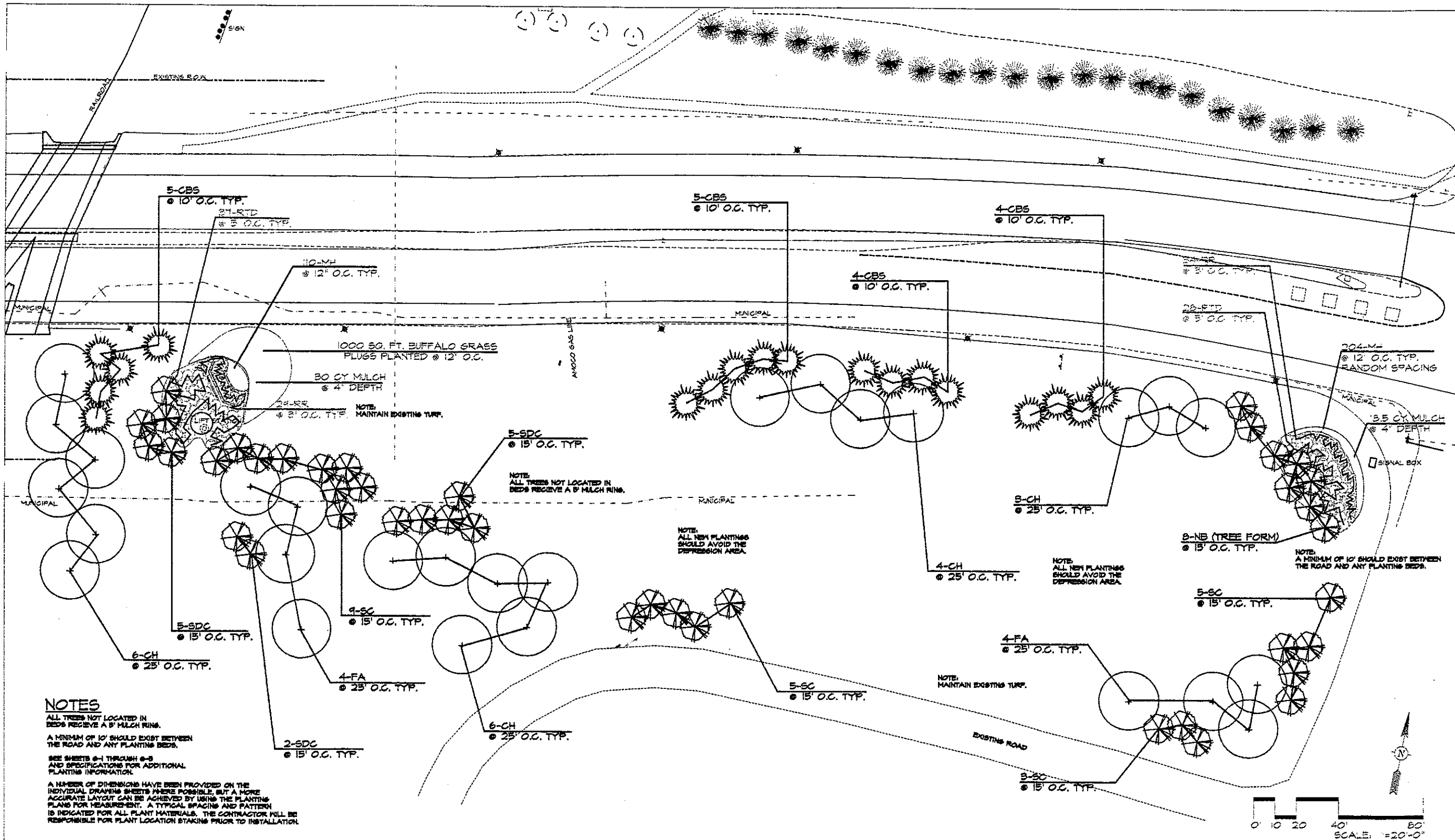
Approved Division Administrator Date
 Project Number: NHU-1-094(039)916

Approved Chief Engineer Date
 North Dakota Dept. of Transportation

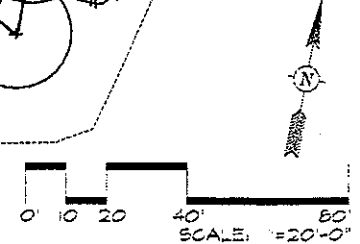
Project Title:
 State of North Dakota Department of Transportation
Mandan East Mainstreet Landscape Enhancement
 NHU-1-094(039)916

Sheet Title:
**6th Avenue NE
 and
 Mandan Avenue**

Sheet Number:
L-1



NOTES
 ALL TREES NOT LOCATED IN BEDS RECEIVE A 5' MULCH RING.
 A MINIMUM OF 10' SHOULD EXIST BETWEEN THE ROAD AND ANY PLANTING BEDS.
 SEE SHEETS #1 THROUGH #3 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: M.L. 7/15/04	Revised: M.L. 8/16/05
M.L. 1/8/05	
M.L. 5/21/05	

U.S. Department of Transportation
 Federal Highway Administration

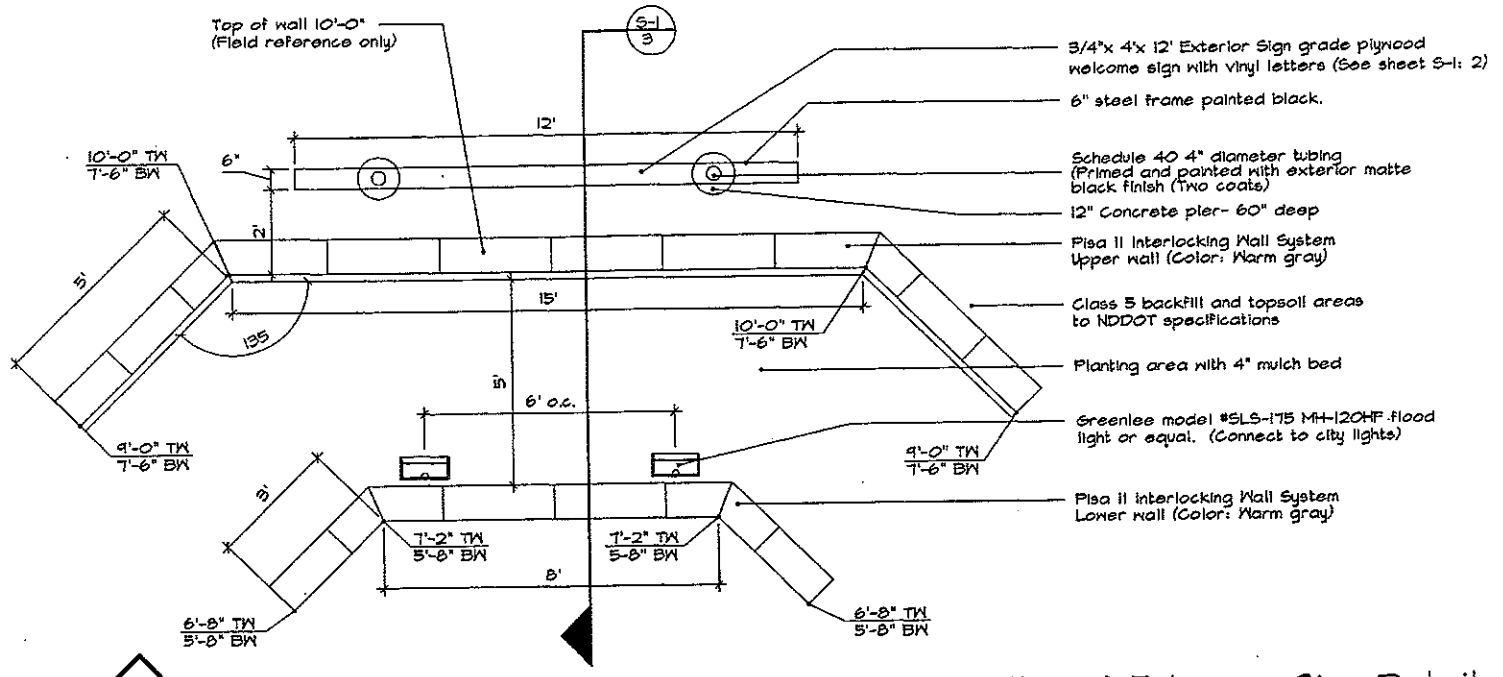
Approved Division Administrator _____ Date _____
 Project Number: NHU-1-094(039)916

Approved Chief Engineer _____ Date _____
 North Dakota Dept. of Transportation

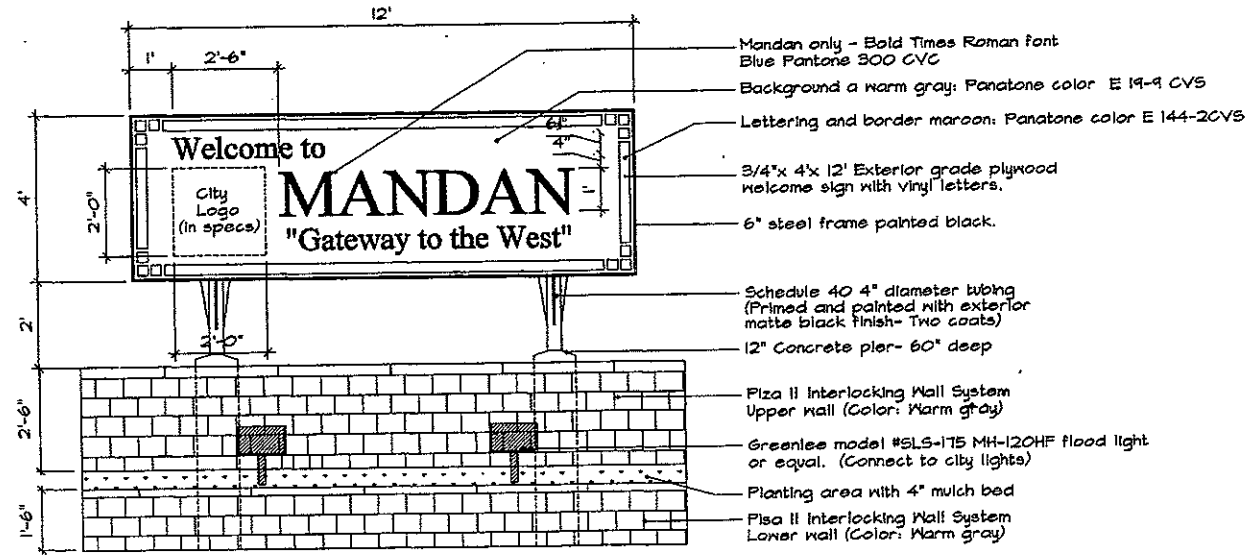
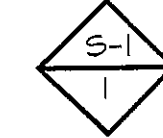
Project Title:
 State of North Dakota Department of Transportation
Mandan East Mainstreet Landscape Enhancement
 NHU-1-094(039)916

Sheet Title:
Twin City Avenue

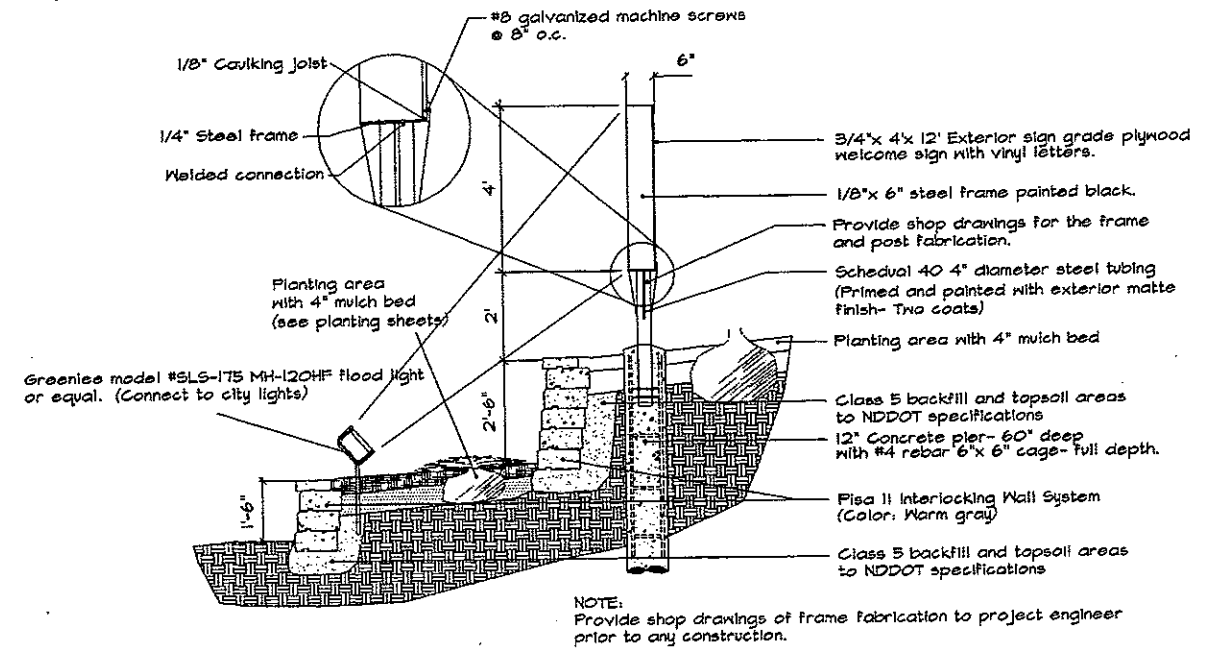
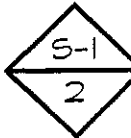
Sheet Number:
L-2



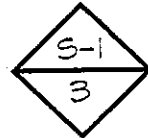
Plan of Entrance Sign Detail
Scale: 1/2"=1'-0"



Elevation of Entrance Sign Detail
Scale: 1/2"=1'-0"



Section 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(039)916

Approved Chief Engineer _____ Date _____
North Dakota Dept. of Transportation

Project Title:

State of North Dakota Department of Transportation

Mandan East Mainstreet Landscape Enhancement

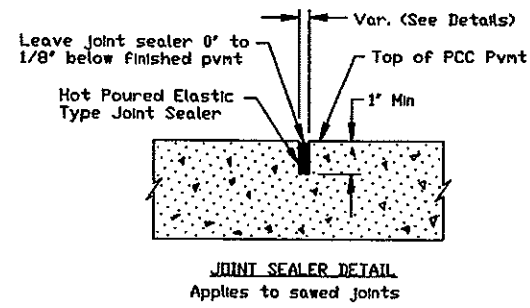
NHU-1-094(039)916

Sheet Title:

Sign Details

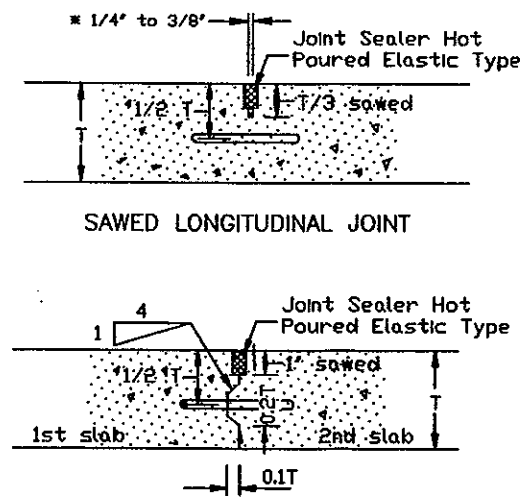
Sheet Number:

S-1

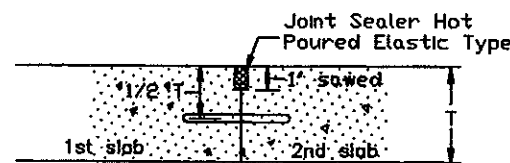


* Width requirement for top 1" only bottom portion of sawcut may be narrower.

TIED JOINTS (With Hot Poured Elastic Seal)



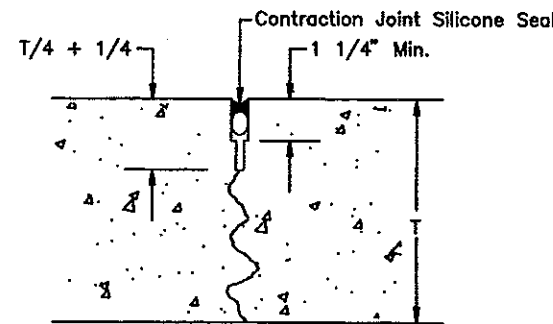
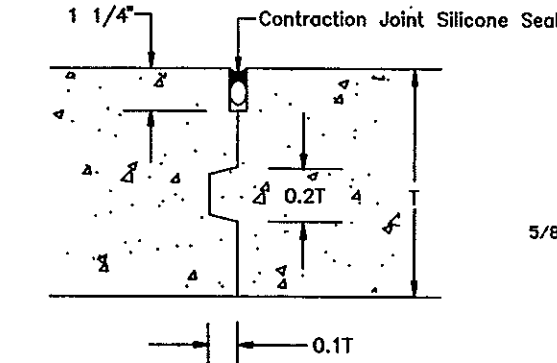
LONGITUDINAL CONSTRUCTION JOINT (KEYED TIED JOINT)



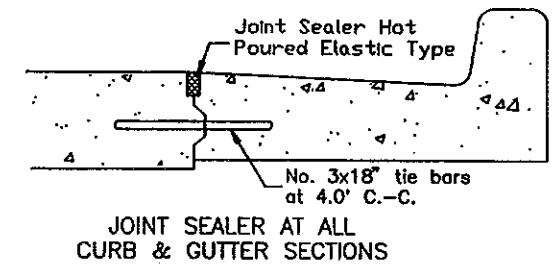
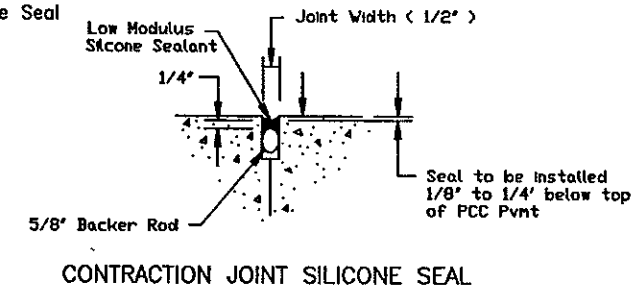
LONGITUDINAL CONSTRUCTION JOINT (TIED BUTT JOINT)

LONGITUDINAL JOINT DETAILS

UNTIED JOINTS (With Silicone Seal)



SAWED LONGITUDINAL JOINTS



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.

BAR SIZE
GRADE STEEL
LENGTH OF BAR
DIST. TO FREE EDGE (FT)
TYPE OF JOINT
P.V.M.T. THICKNESS

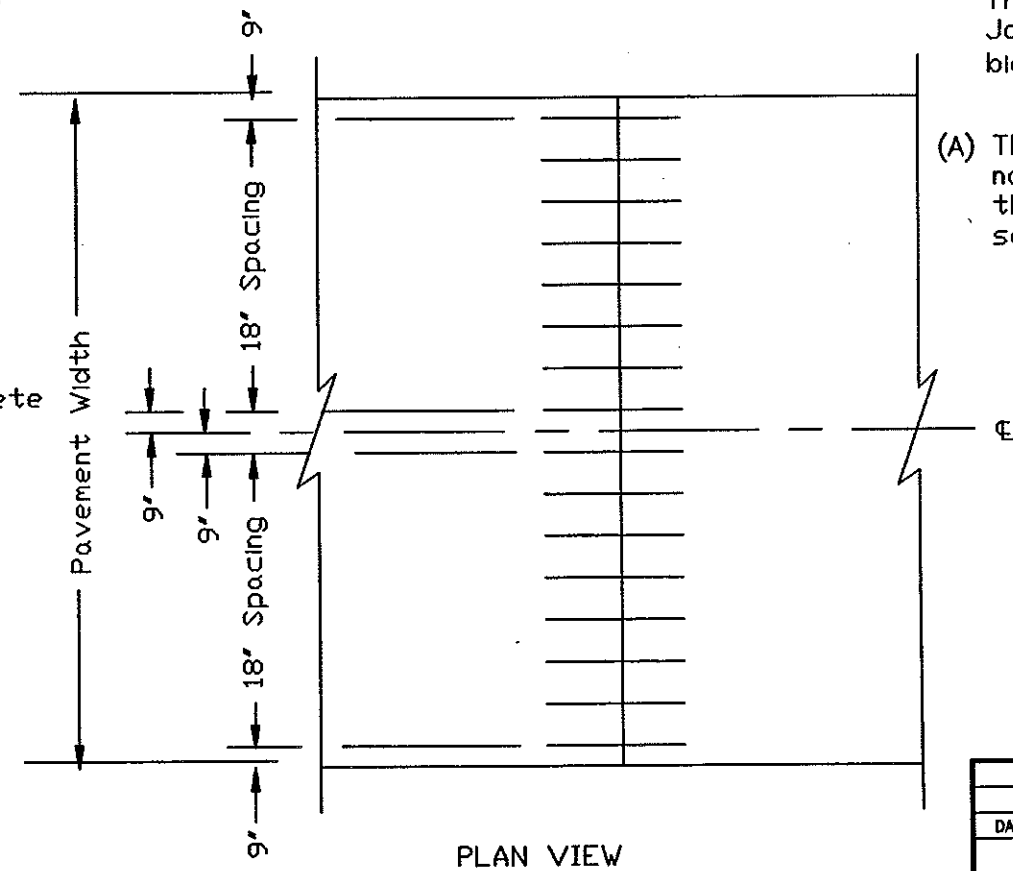
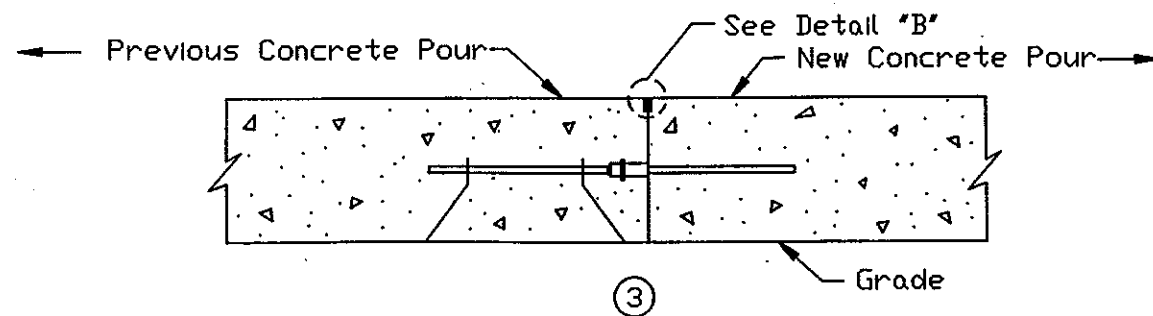
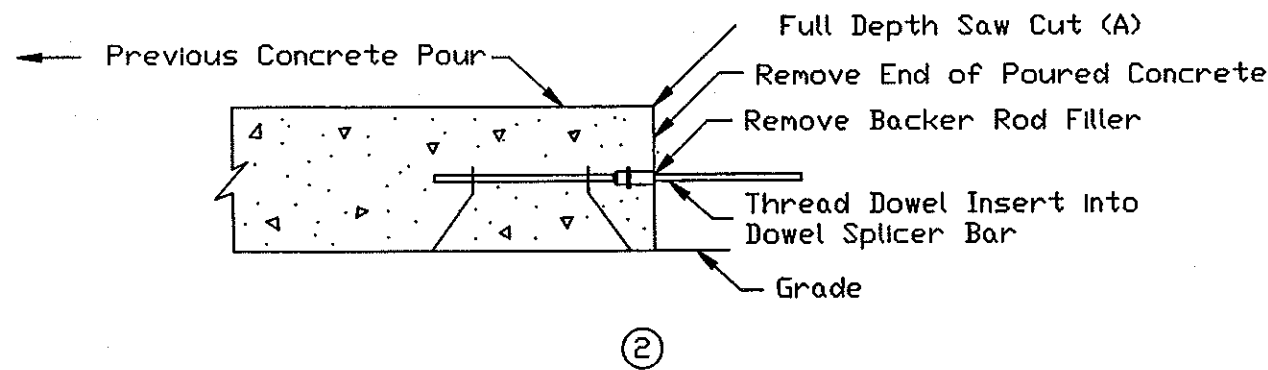
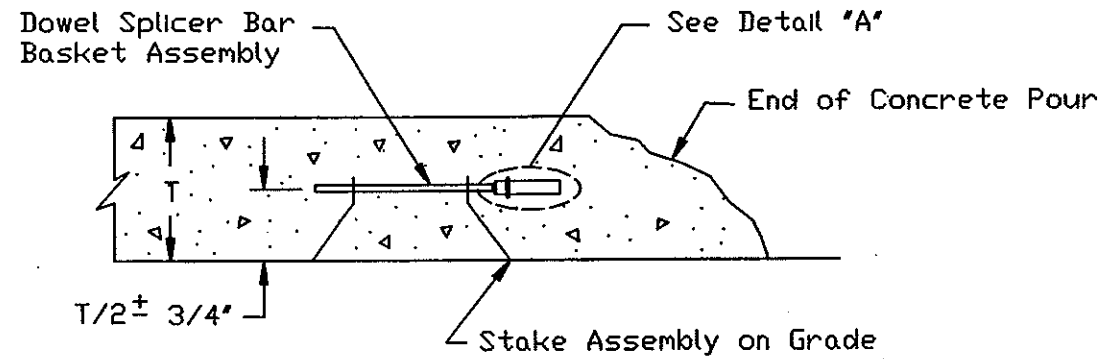
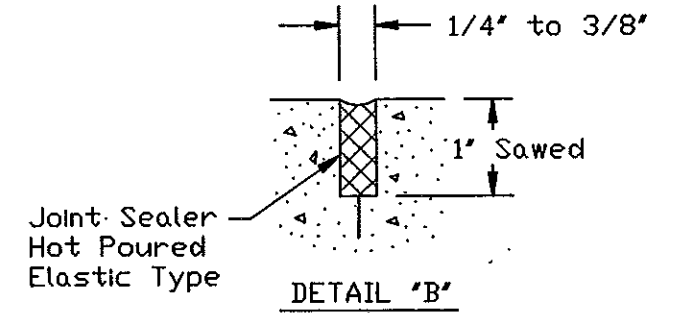
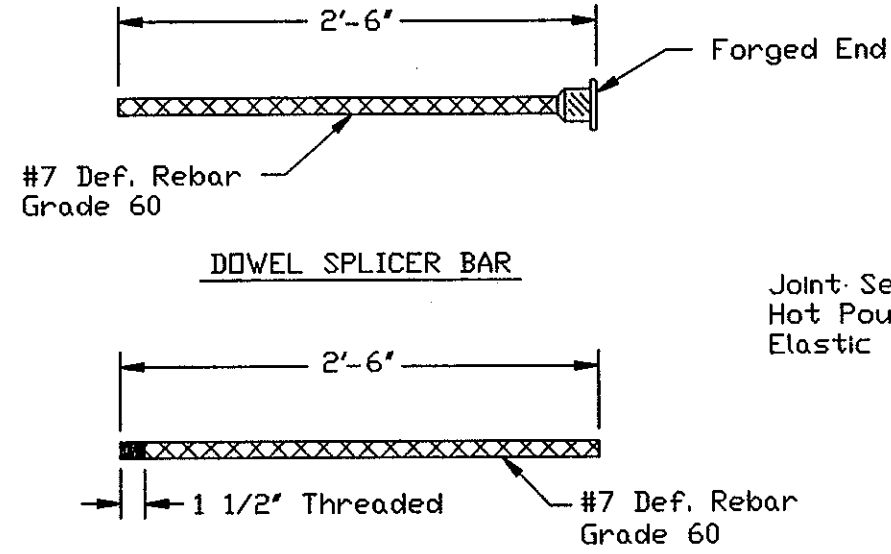
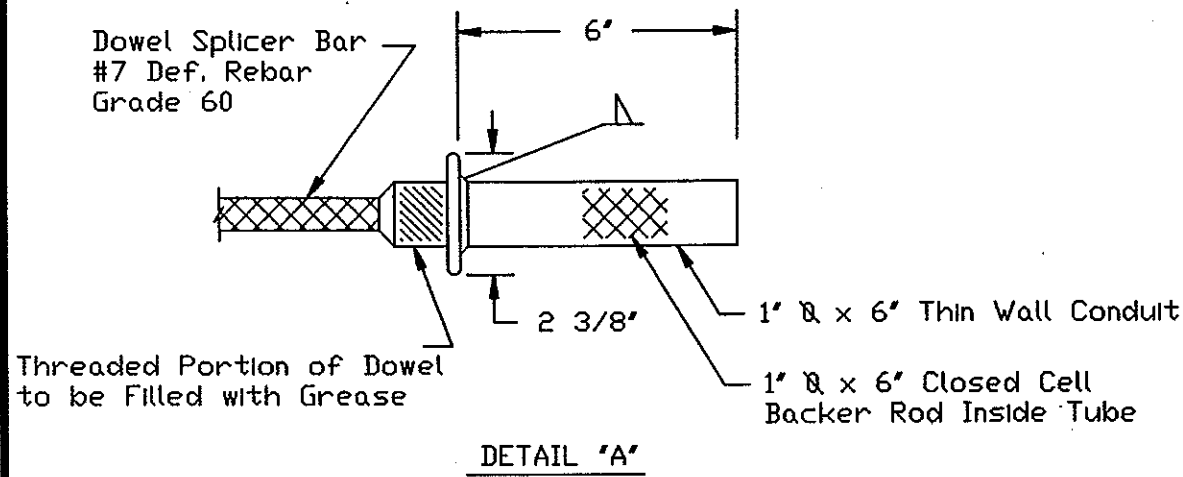
TIEBAR SPACINGS (In.)

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"	24"	30"	36"												
8"	WARP	48	40	24	20	15	48	48	35	29	22	42	35	26	19	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	29	
9"	WARP	48	35	21	18	13	48	48	32	26	19	37	31	23	17	48	47	35	25	23	48	48	36	26	24	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	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
REVISIONS		
DATE	CHANGE	APPROVED: DESIGN ENGINEER <i>David K. O'Sim</i>
12-8-95	JOINT DEPTH	

TRANSVERSE CONSTRUCTION JOINT

D-550-5




Notes:

Construction Joints Shall Be Sawed to a Depth of 1' & a Width of 1/4" to 3/8" & Sealed.

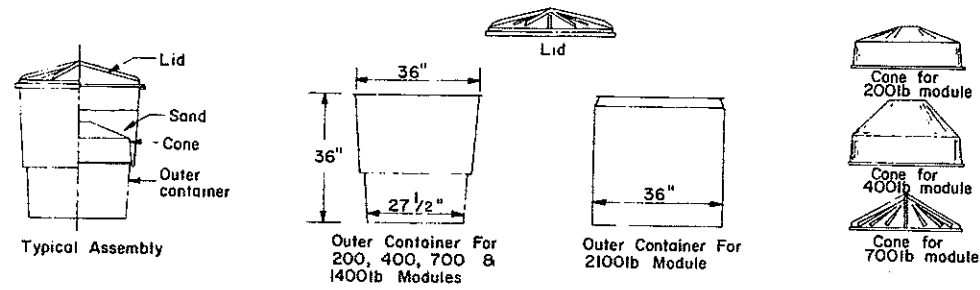
The Transverse Construction Joint shall be included in price bid for P.C.C. Pavement

(A) The contractor shall not saturate the subgrade during the sawing operation

11-1-92		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	 APPROVED: DESIGN ENGINEER

ATTENUATION DEVICE

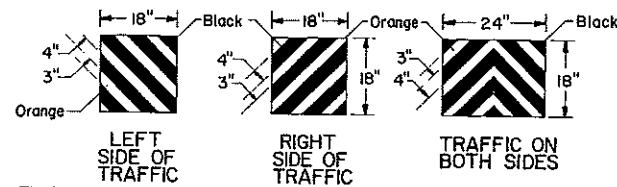
D-704-1



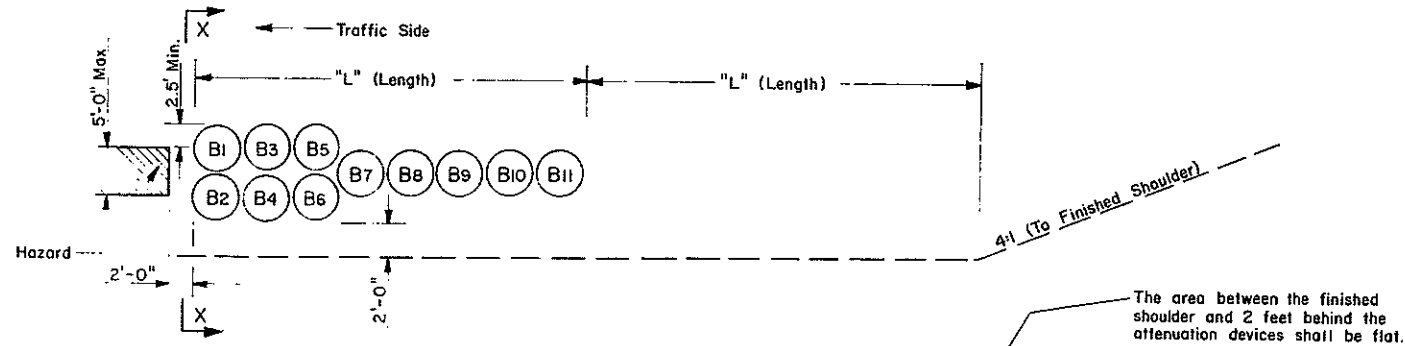
TYPICAL MODULE CONSTRUCTION DETAIL

SAND FILL CHART
Module Weights (lbs)

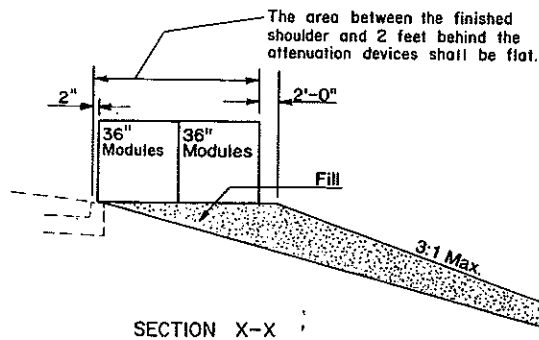
INCHES FROM TOP EDGE	200	400	700	1400	2100
8"	3 1/2"	4 1/2"	3"	3 1/2"	



The last attenuation device toward traffic shall have reflective sheeting 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.



NOTE:
When attenuation devices are placed at piers offset from the roadway, they shall be angled toward traffic 10°.



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	200	200	200	200	200	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 Modules 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 109.04. 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".

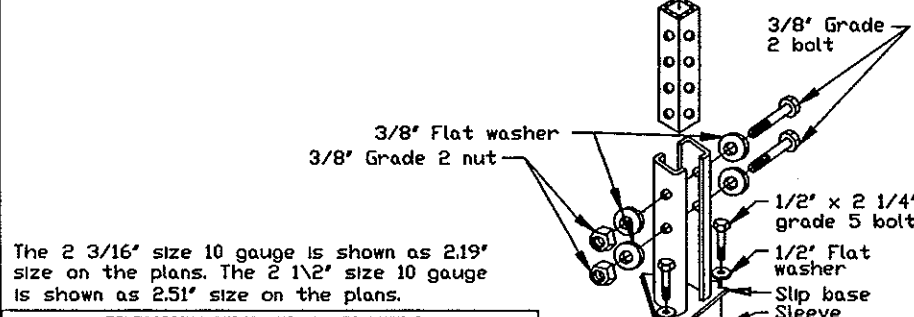
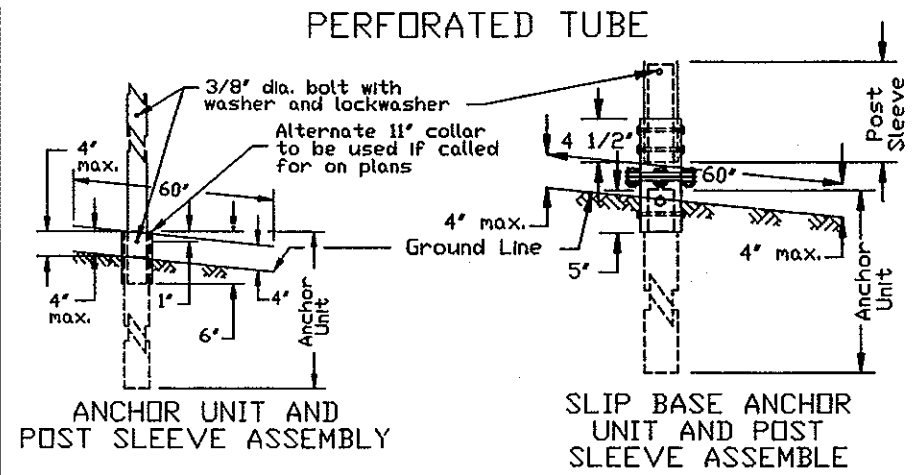
Fill: The material used for fill may be obtained from an area within the right of way as designated by the engineer. Upon completion of the work, the attenuation device and the fill shall be removed and the area restored to its original condition and reseeded. The fill shall be disposed of as directed 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		REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGE	NOTE	DESIGN ENGINEER	
11-20-89				APPROVED: <i>[Signature]</i> DESIGN ENGINEER
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		

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8



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.

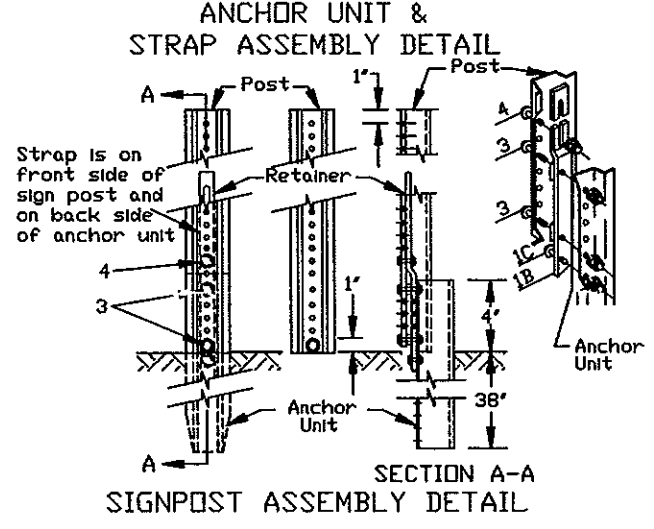
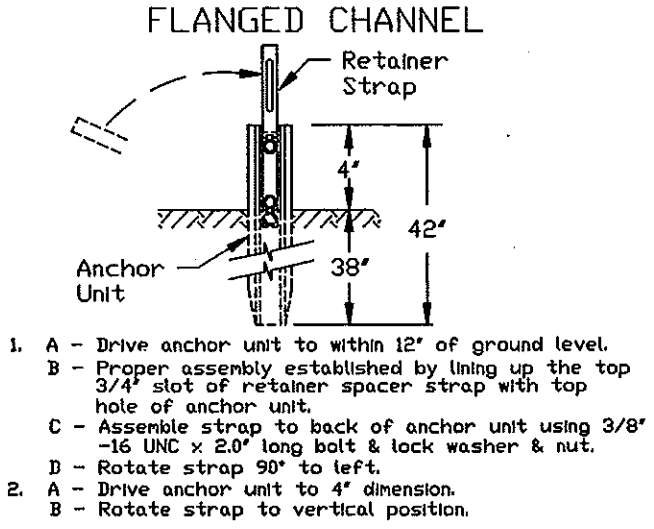
TELESCOPING PERFORATED TUBES-TYPE I							
TUBE SIZE IN.	WALL THICKNESS IN.	U.S. STANDARD GAUGE	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. 2	SECTION MODULUS IN. 3	
1 1/2 x 1 1/2	.105	12	1.702	.129	.380	.172	
2 x 2	.105	12	2.416	.372	.590	.372	
2 1/4 x 2 1/4	.105	12	2.773	.561	.695	.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	

SQUARE TELESCOPING STEEL POSTS-TYPE II							
POST SIZE	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 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	

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	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	12		2 1/4	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	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 1/4	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	12		2 1/4	12	NO	
1	2 1/2	10		3	3/16	YES	2 1/2	12		2 1/2	12	YES	1	2 1/2	12		2 1/4	12	YES	
1	2 1/4	12		2	2 1/2	12	YES	2 1/2	12		2 1/2	12	YES	1	2 1/4	12		2 1/2	12	YES
1	2 1/2	12		2 1/4	2 1/2	12	YES	2 1/4	12		2 1/4	12	YES	1	2 1/2	12		2 1/4	12	YES
2	2	12		2 1/4	12	NO	1 3/4	12		2	12	NO	2	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 1/4	12		2 1/2	12	NO	
2	2 3/16	10		2 1/2	12	YES	2 1/4	12		2 1/2	12	NO	2	2 3/16	10		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	12		2 1/4	12	NO	
2	2 1/2	10		3	3/16	YES	2 1/2	12		2 1/2	12	YES	2	2 1/2	10		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 1/4	12		2 1/2	12	YES
2	2 1/2	12		2 1/4	2 1/2	12	YES	2 1/4	12		2 1/4	12	YES	2	2 1/2	12		2 1/2	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	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	10		2 1/2	12	YES	
3 & 4	2 1/2	12		2 1/4	2 1/2	12	YES	2 1/4	12		2 1/4	12	YES	3 & 4	2 1/4	12		2 1/2	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	12		2 1/2	12	YES
3 & 4	2 1/2	10		2 3/16	3	3/16	YES	2 1/2	12		2 1/4	12	YES	3 & 4	2 1/2	10		2 1/2	12	YES

SLIP BASE ASSEMBLY DETAILS

NOTE: Slip base bolts shall be torqued as specified by the manufacturer.



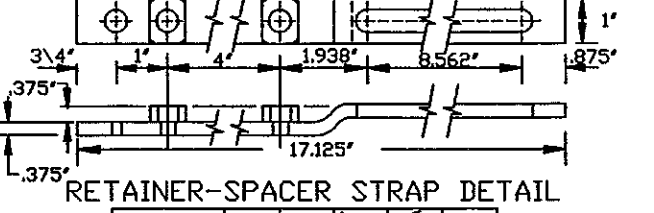
SECTION A-A SIGNPOST ASSEMBLY DETAIL

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)

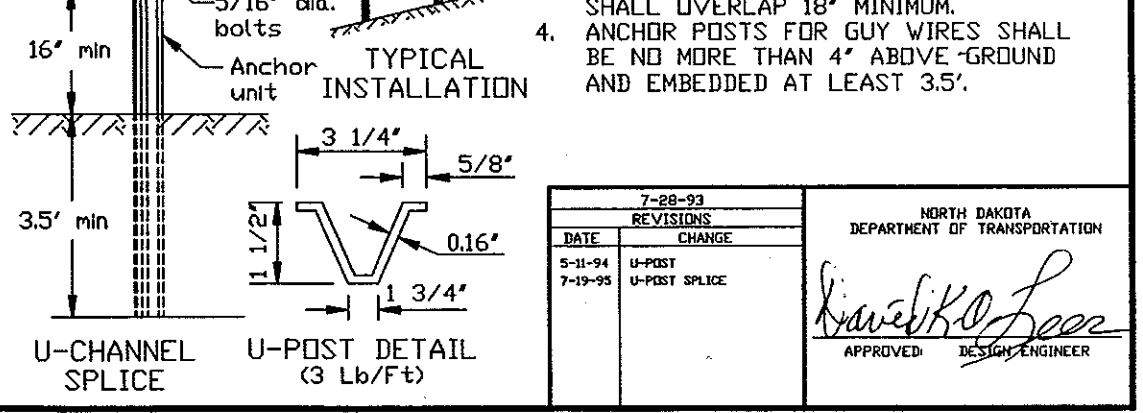
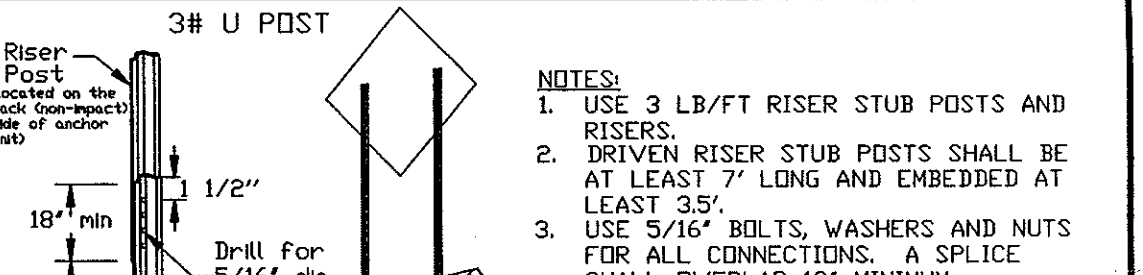
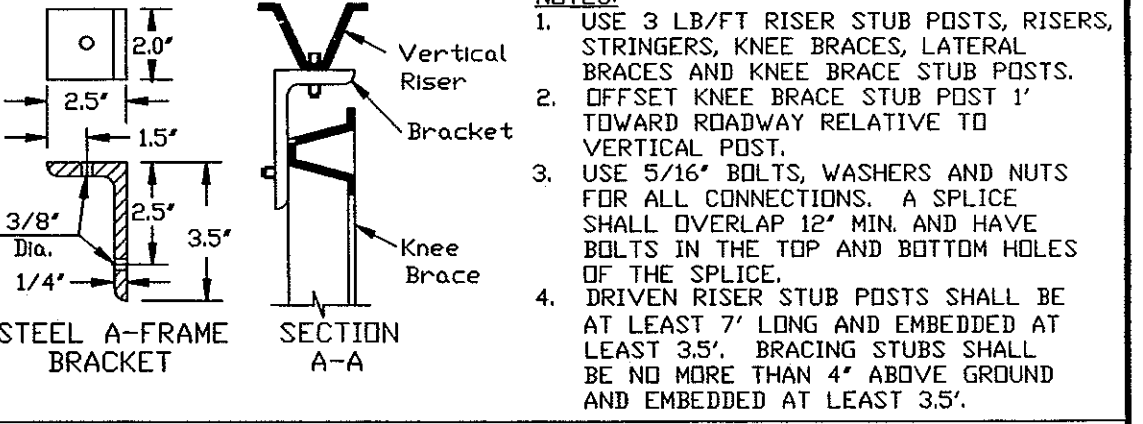
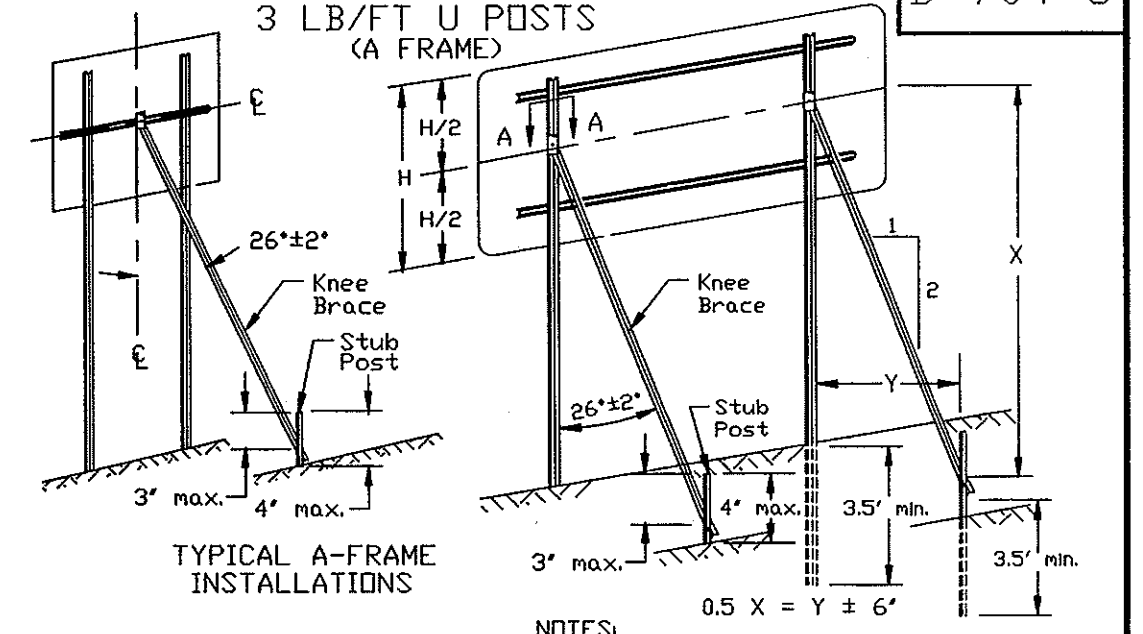
B - Alternately tighten two connector bolts.

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.



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



NOTES:

- USE 3 LB/FT RISER STUB POSTS, RISERS, STRINGERS, KNEE BRACES, LATERAL BRACES AND KNEE BRACE STUB POSTS.
- OFFSET KNEE BRACE STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST.
- 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.
- 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'.

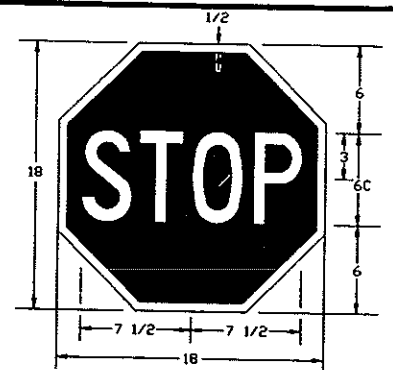
NOTES:

- USE 3 LB/FT RISER STUB POSTS AND RISERS.
- DRIVEN RISER STUB POSTS SHALL BE AT LEAST 7' LONG AND EMBEDDED AT LEAST 3.5'.
- USE 5/16" BOLTS, WASHERS AND NUTS FOR ALL CONNECTIONS. A SPLICE SHALL OVERLAP 18" MINIMUM.
- ANCHOR POSTS FOR GUY WIRES SHALL BE NO MORE THAN 4" ABOVE GROUND AND EMBEDDED AT LEAST 3.5'.

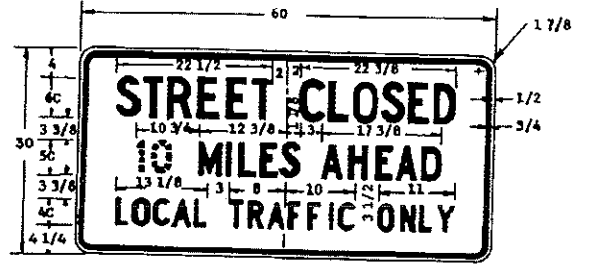
7-28-93 REVISIONS	
DATE	CHANGE
5-11-94	U-POST
7-19-95	U-POST SPLICE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

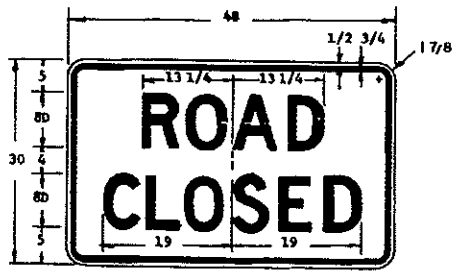
APPROVED: *Karevko Lee* DESIGN ENGINEER



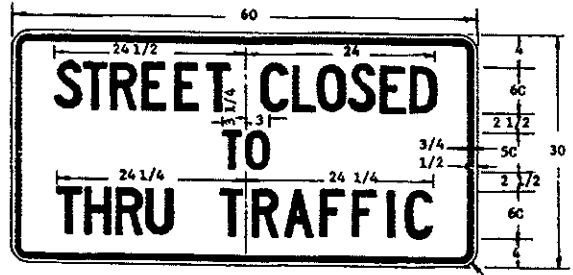
STOP-SLOW PADDLE
RED & WHITE
FLAGPERSON PADDLE



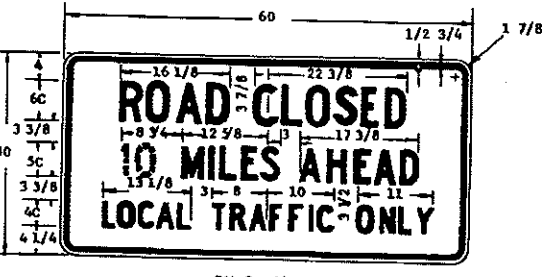
R11-3c-60
BLACK & WHITE



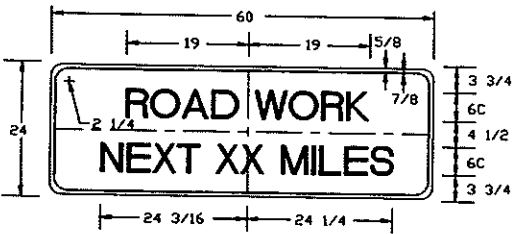
R11-2-48
BLACK & WHITE



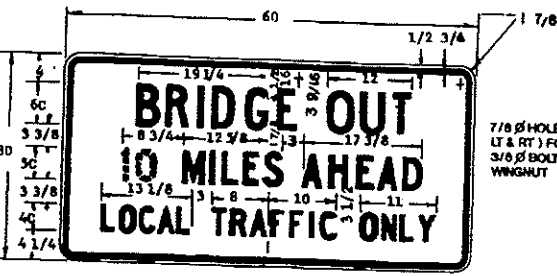
R11-4a-60
BLACK & WHITE



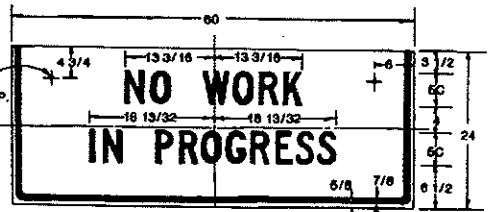
R11-3a-60
BLACK & WHITE



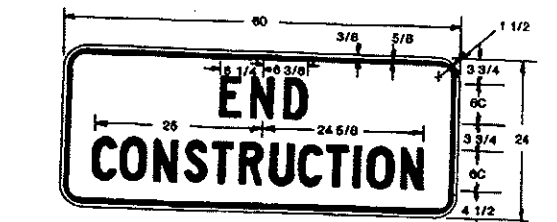
G20-1a-60
BLACK & ORANGE



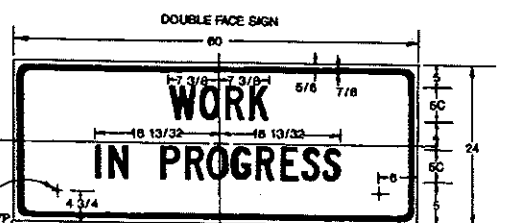
R11-3b-60
BLACK & WHITE



G20-1b-60
DOUBLE FACE SIGN
LEGEND: BLACK (NON-REFL)
BACKGROUND: ORANGE

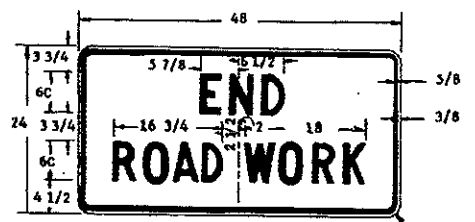


G20-2-60
BLACK & ORANGE

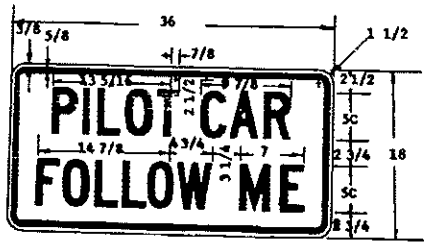


G20-1b-60
LEGEND: BLACK (NON-REFL)
BACKGROUND: ORANGE

CONSTRUCTION SIGN DETAILS



G20-2a-48
BLACK & ORANGE

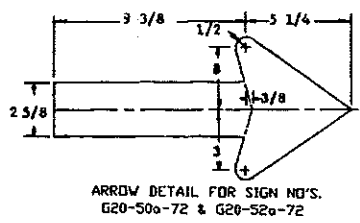


G20-4-36
BLACK & ORANGE

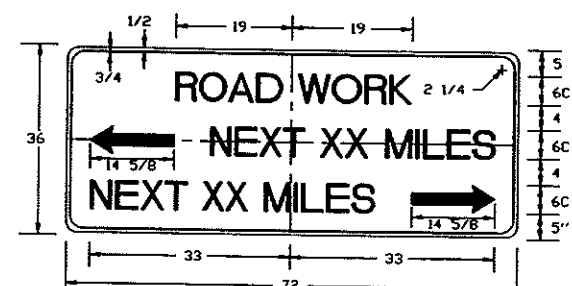
PILOT CAR SIGN SHALL BE MOUNTED ON REAR OF A VEHICLE USED FOR GUIDING CONTROLLED ONE-WAY TRAFFIC THROUGH A CONSTRUCTION AREA.



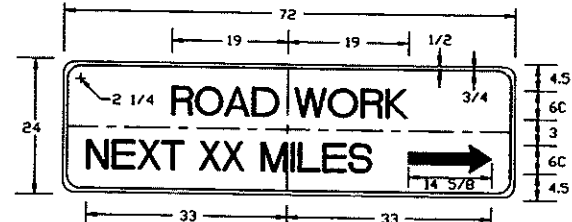
G20-8-48
BLACK & ORANGE



ARROW DETAIL FOR SIGN NOS.
G20-50a-72 & G20-52a-72

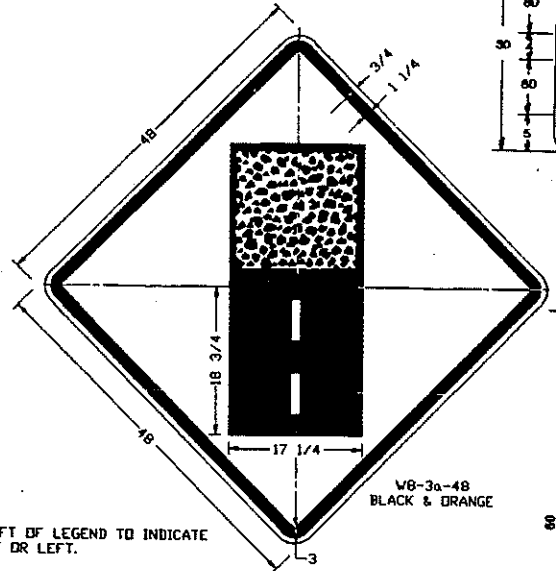


G20-50a-72
BLACK & ORANGE

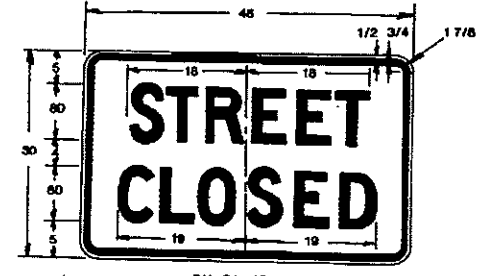


G20-52a-72
BLACK & ORANGE

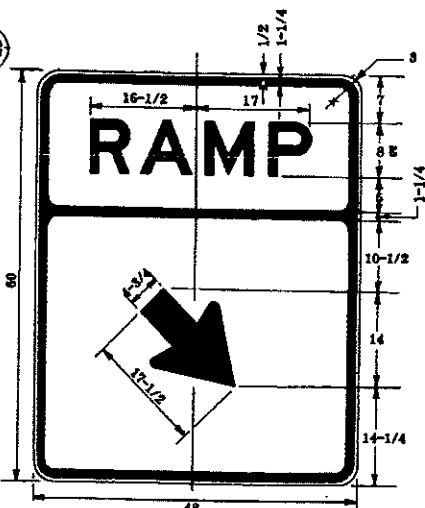
ARROW MAY BE RIGHT OR LEFT OF LEGEND TO INDICATE CONSTRUCTION TO THE RIGHT OR LEFT.



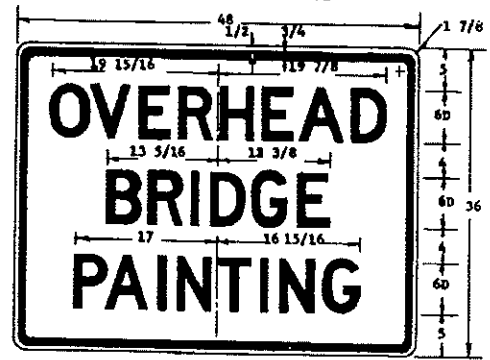
V6-3a-48
BLACK & ORANGE



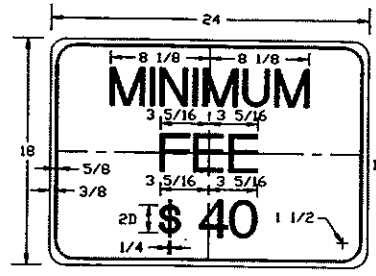
R11-2A-48
BLACK & WHITE



V13-4-48
BLACK & ORANGE



G20-54-48
BLACK & ORANGE

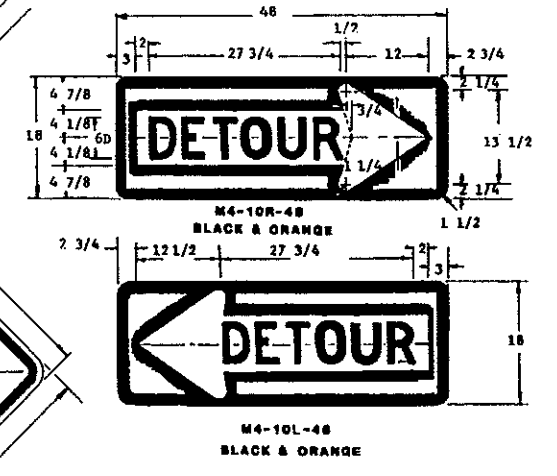
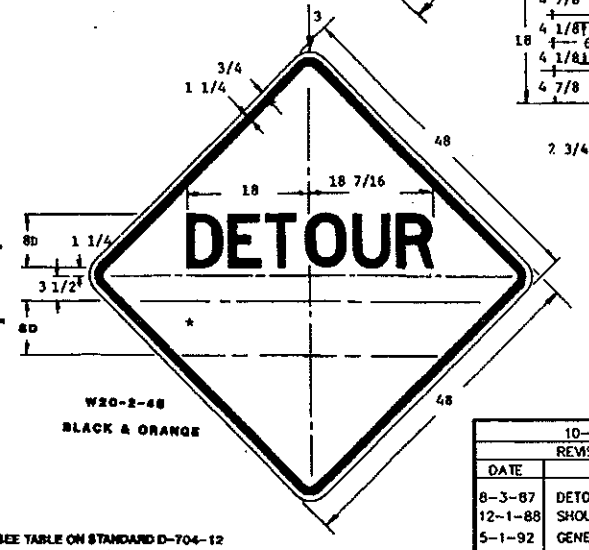
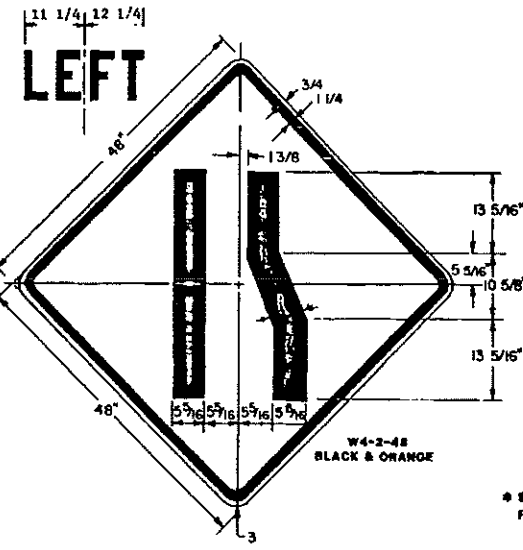
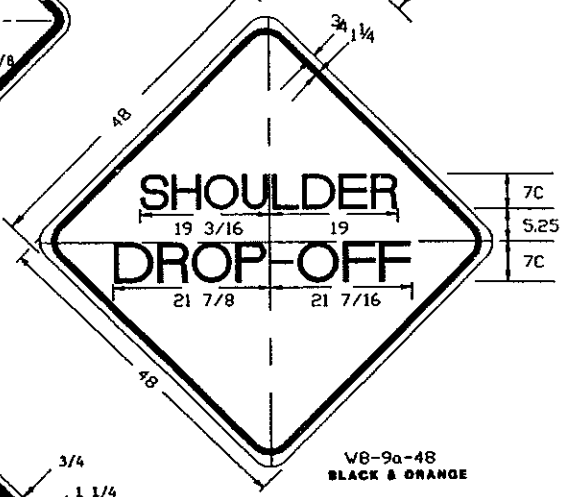
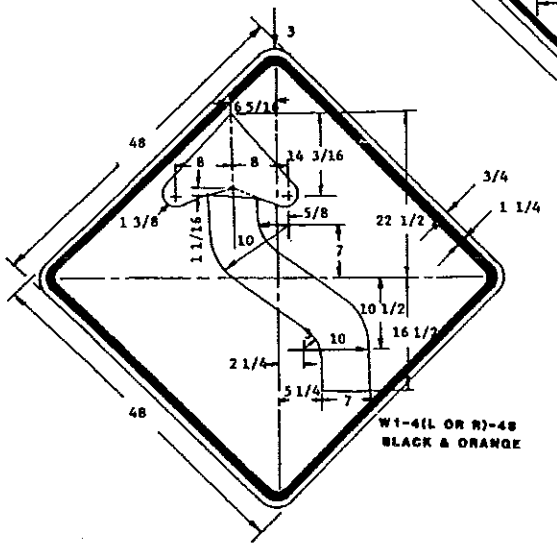
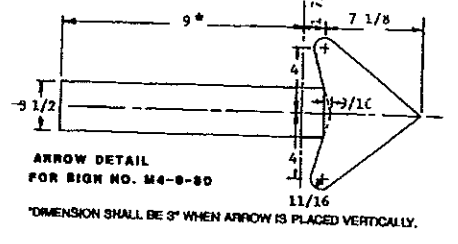
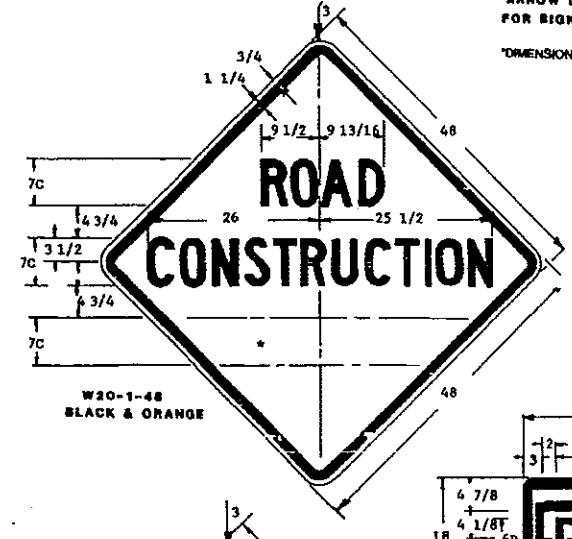
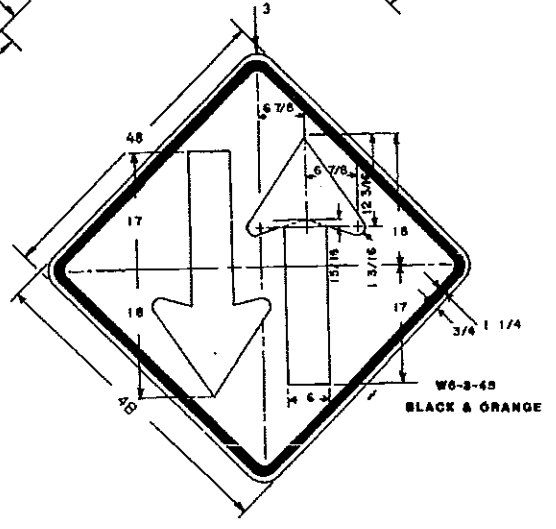
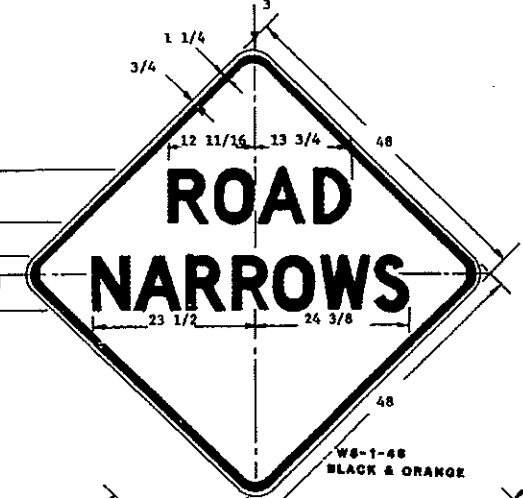
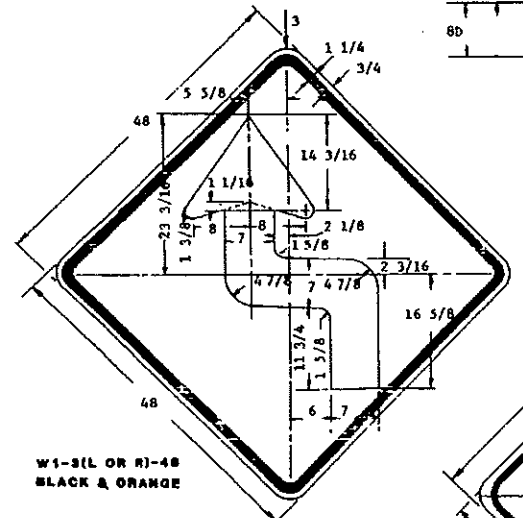
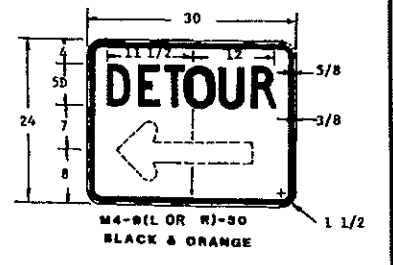
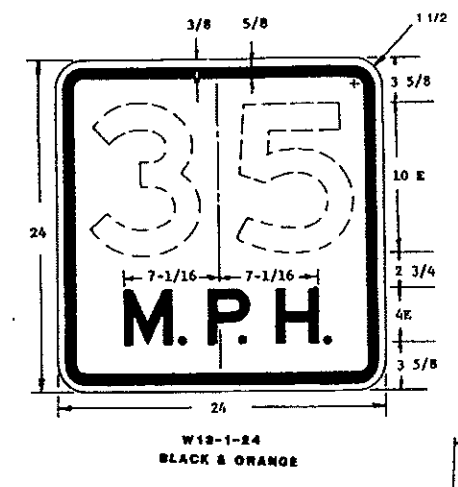
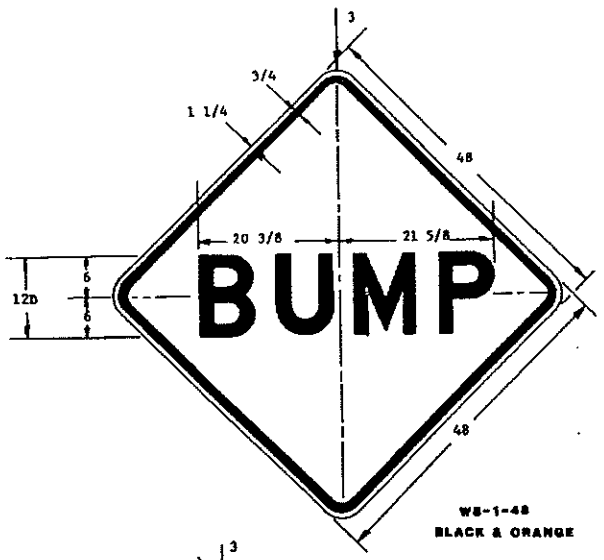
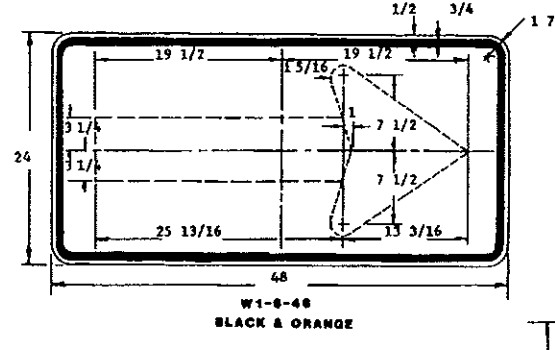
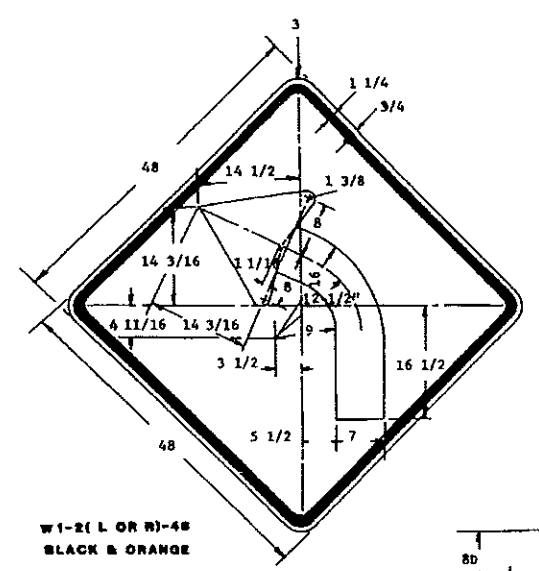


R2-1a-24
BLACK & WHITE

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: *Frank C. Lee*
DESIGN ENGINEER

CONSTRUCTION SIGN DETAILS



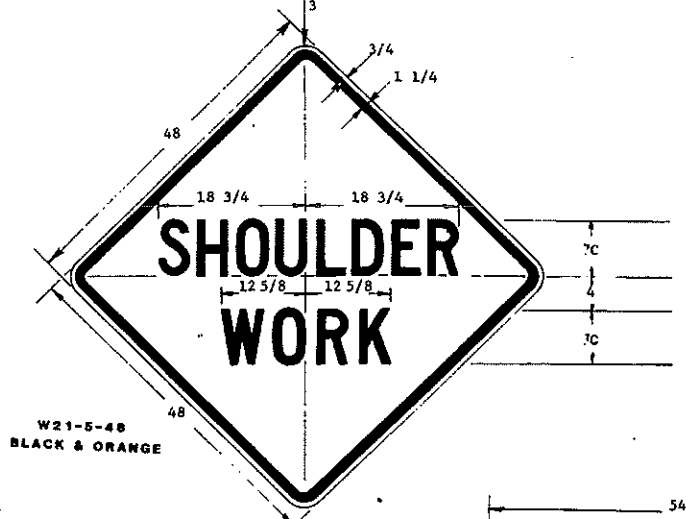
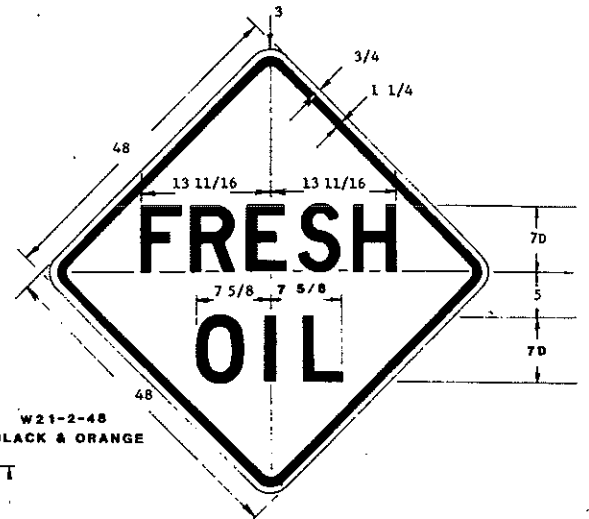
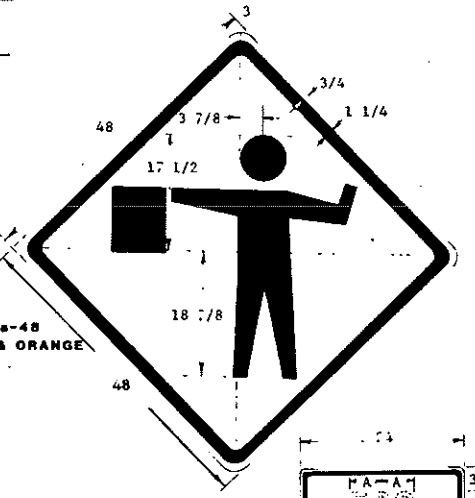
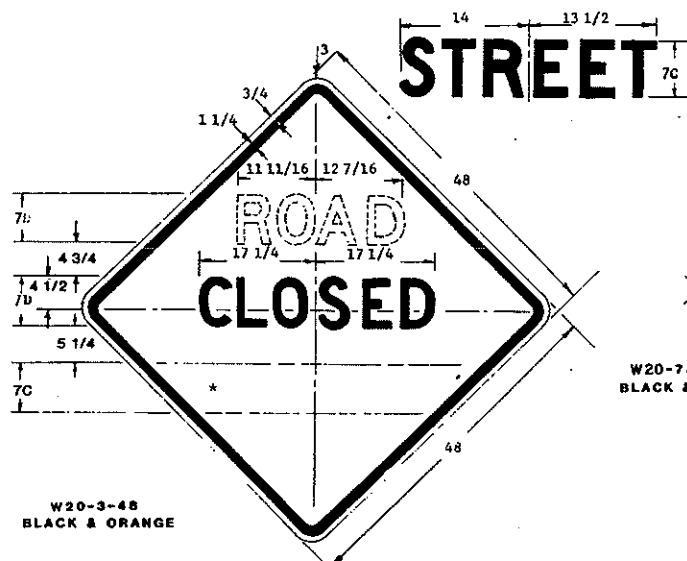
10-1-86	
REVISIONS	
DATE	CHANGE
8-3-87	DETOUR NO.
12-1-88	SHOULDER DROP OFF
5-1-92	GENERAL REVISIONS
2-3-95	W8-9a-48

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Lee*
DESIGN ENGINEER

* SEE TABLE ON STANDARD D-704-12 FOR MESSAGES AND DIMENSIONS.

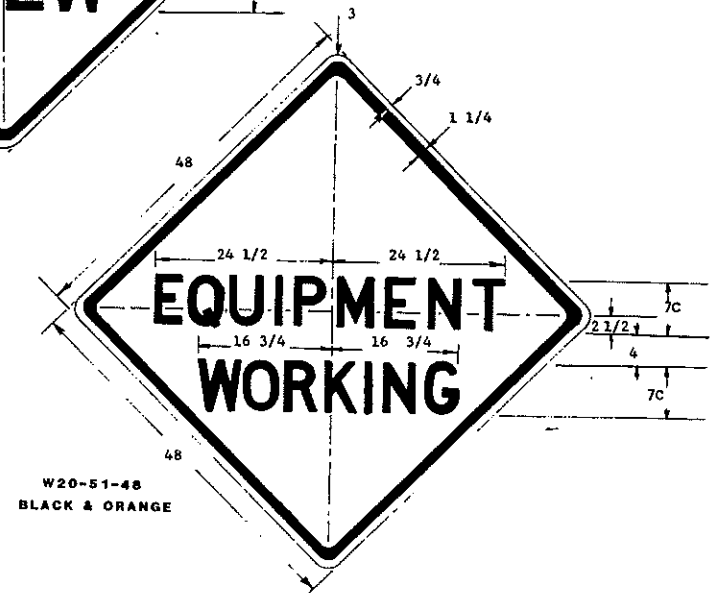
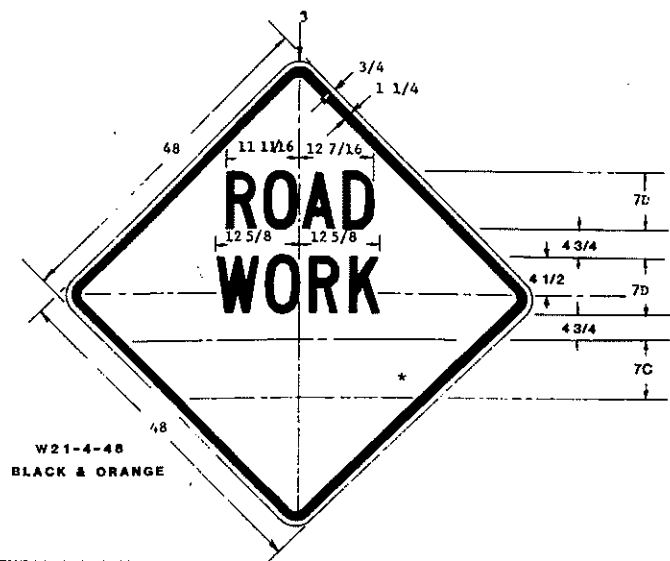
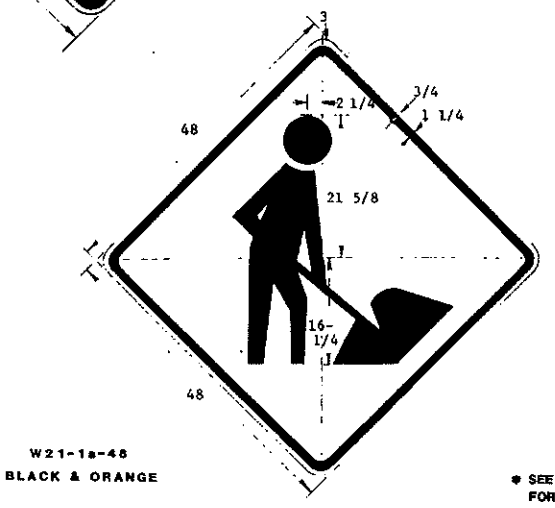
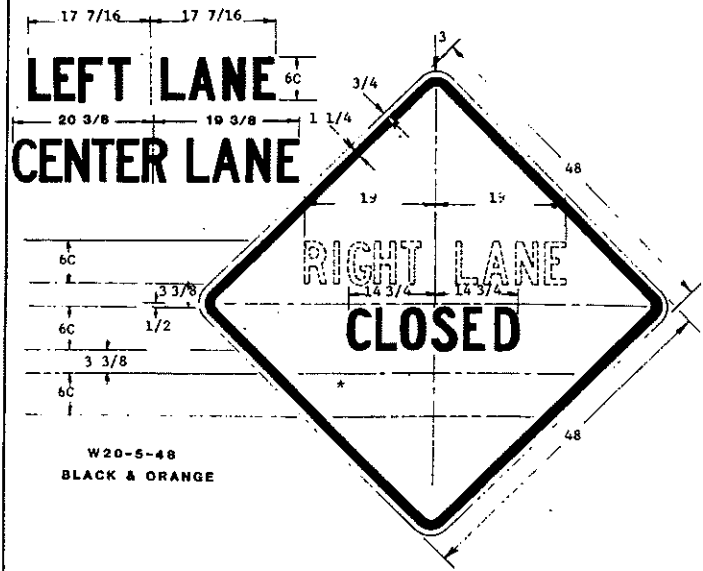
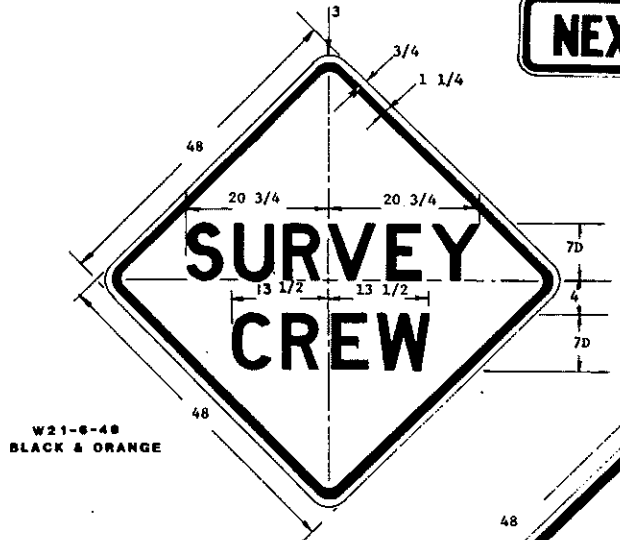
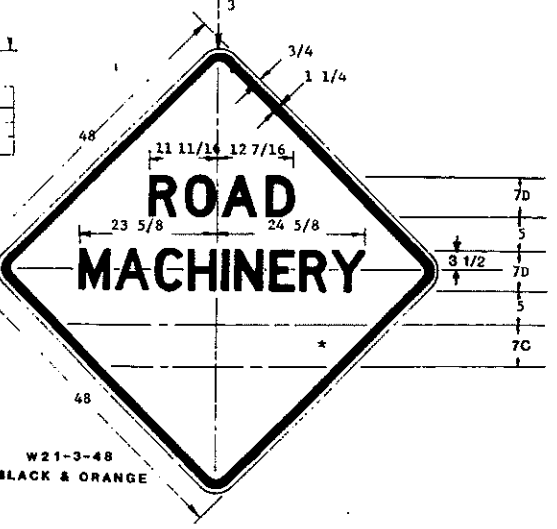
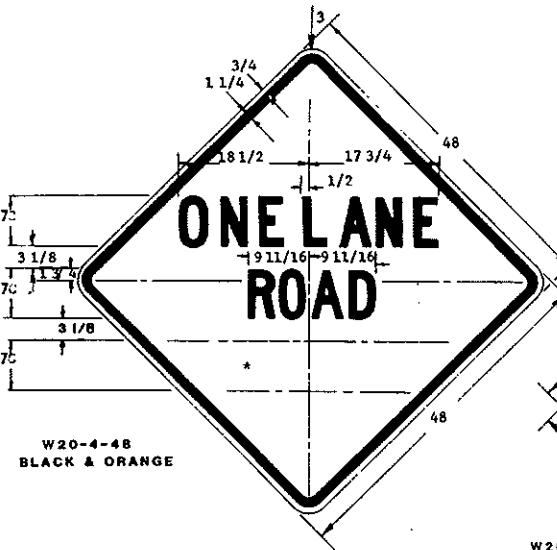
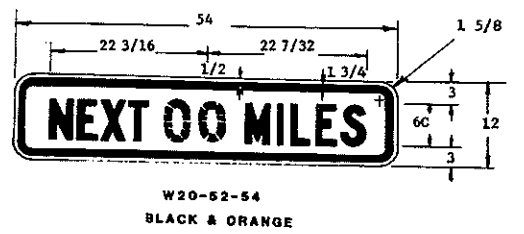
CONSTRUCTION SIGN DETAILS

D-704-11



SIGN DIMENSIONS (INCHES)	
30'	4 - 11/16
1000'	5 - 1/4
2500'	5 - 5/16
PL. USE WITH W20-7a-48 & W21-1a-48	

BLACK & ORANGE



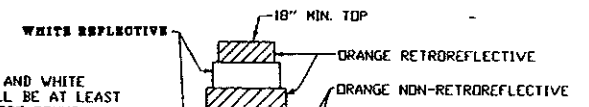
SEE TABLE ON STANDARD D-704-12 FOR MESSAGES AND DIMENSIONS.

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	
8-8-95	Chg 7D to 7C (Dwg W20-3, W21-3 & W21-4)	

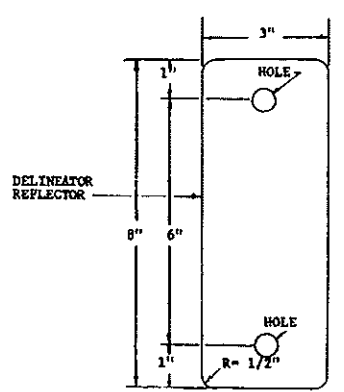
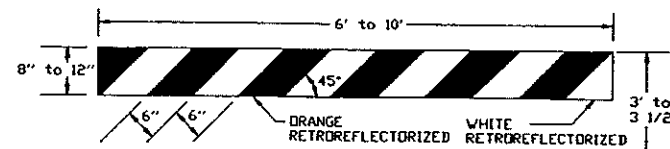
BARRICADE DETAILS

D-704-13

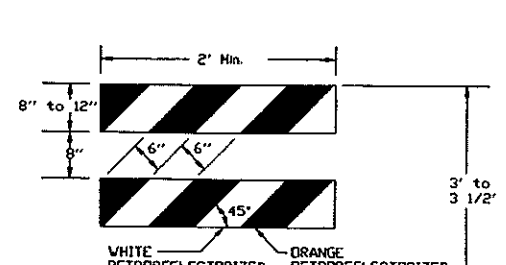
DELINEATOR DRUMS
 THE MARKINGS ON DRUMS SHALL BE ORANGE AND WHITE STRIPES 4 TO 6 INCHES WIDE. THERE SHALL BE AT LEAST TWO ORANGE AND TWO WHITE STRIPES. WHERE DRUMS HAVE RIBS OR INDENTATIONS, THERE SHALL BE NO RETRO-REFLECTORIZED SHEETING IN THIS AREA. THIS SPACE SHALL BE NO MORE THAN 2 INCHES WIDE. THE DRUM SURFACE SHALL BE PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE RETROREFLECTIVE SHEETING IS APPLIED.



DELINEATOR DRUM
36" MIN. HEIGHT



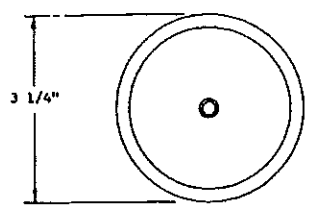
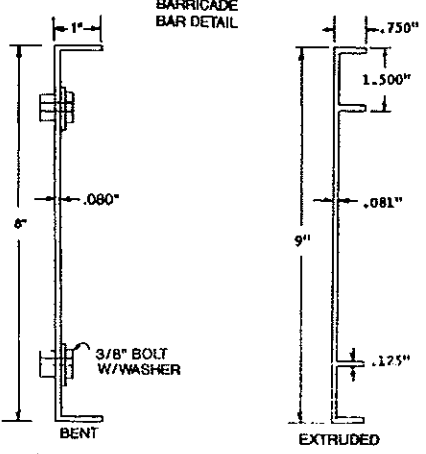
3" x 8" - 18 GAUGE GALVANIZED STEEL SHEETS OR .080" ALUMINUM PLATE WITH WHITE RETROREFLECTIVE SHEETING (TYPE 3A OR 3B) AS SPECIFIED IN SECTION 894 OF THE STANDARD SPECIFICATIONS.



TYPE I BARRICADE

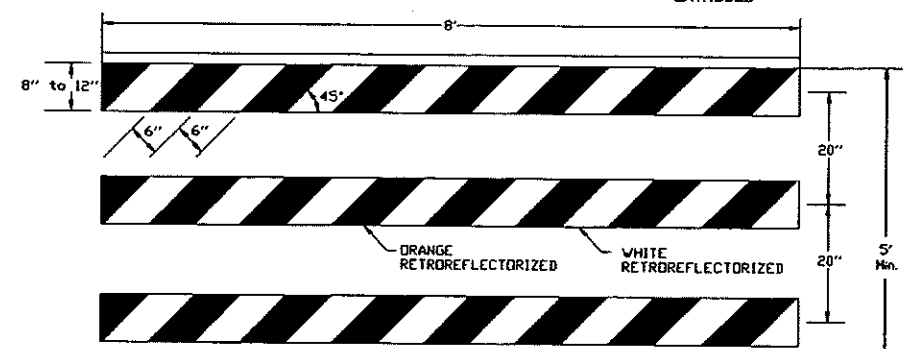
TYPE I BARRICADE

ALUMINUM BARRICADE BAR DETAIL



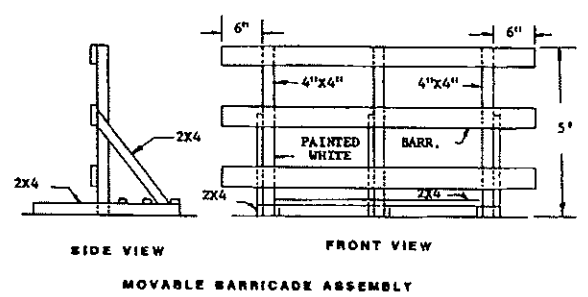
ACRYLIC PLASTIC REFLECTOR
 DELINEATOR REFLECTOR SHALL MEET THE REQUIREMENTS OF SECTION 894.

NOTE: VERTICAL PANELS USED ON THE EXPRESSWAYS OR OTHER HIGH SPEED ROADWAYS SHALL BE 12" BY 24".



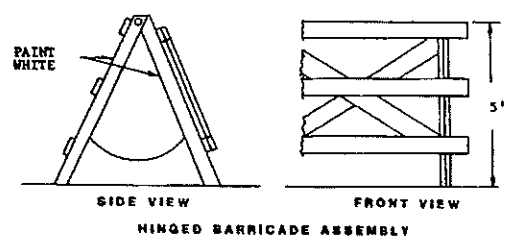
TYPE II BARRICADE

TYPE II BARRICADE

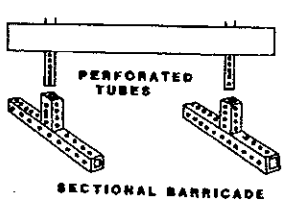


MOVABLE BARRICADE ASSEMBLY

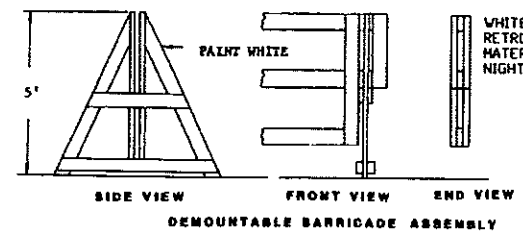
NOTE: EACH MOVABLE BARRICADE SHALL BE WEIGHTED DOWN BY A SUFFICIENT NUMBER OF SAND BAGS SO THAT IT WILL NOT BE BLOWN OVER BY THE WIND UNLESS THE MOVABLE SUPPORTING STRUCTURE IS CONSTRUCTED IN SUCH A MANNER THAT THE WIND CANNOT BLOW IT OVER. WEIGHT USED SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. 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.



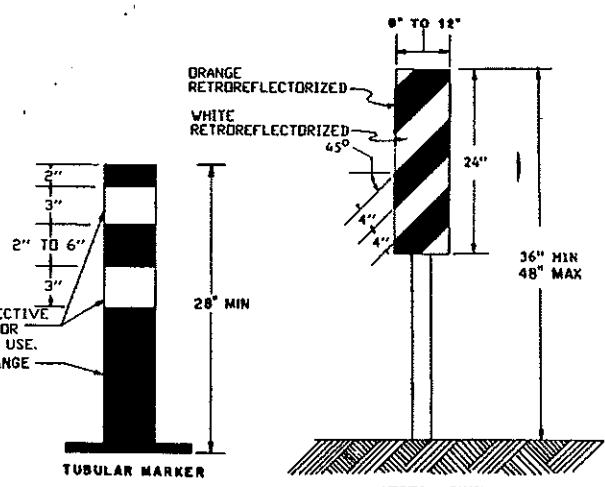
HINGED BARRICADE ASSEMBLY



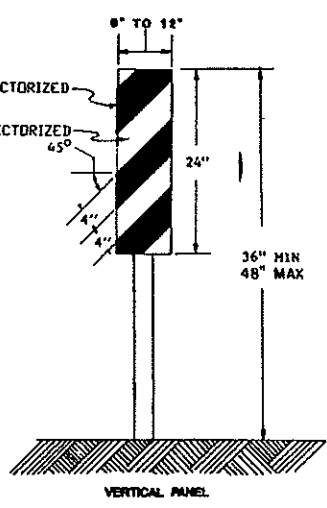
SECTIONAL BARRICADE



DEMOUNTABLE BARRICADE ASSEMBLY

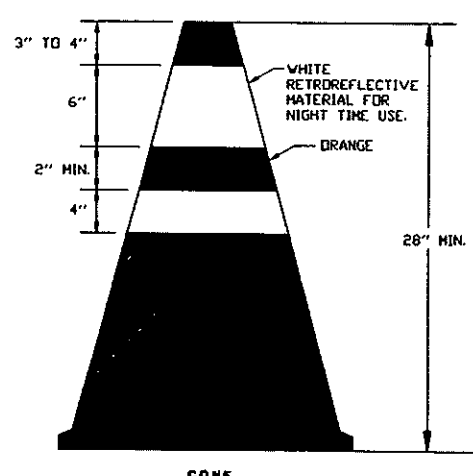


TUBULAR MARKER



VERTICAL PANEL

(RETROREFLECTIVE SHEETING SHALL BE PLACED ON BOTH SIDES)



CONE

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)

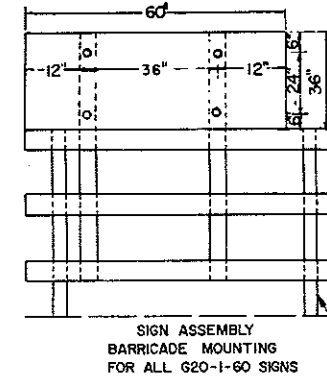
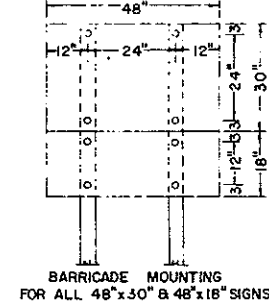
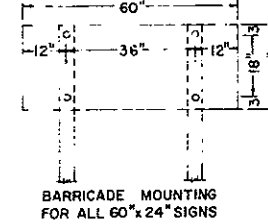
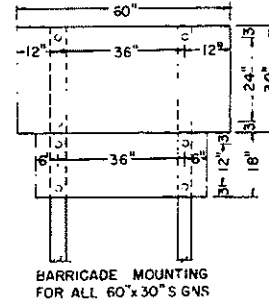
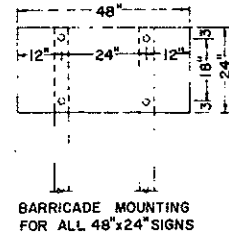
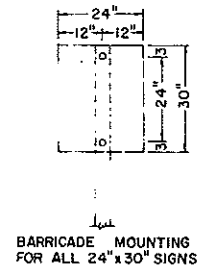
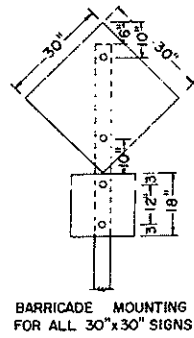
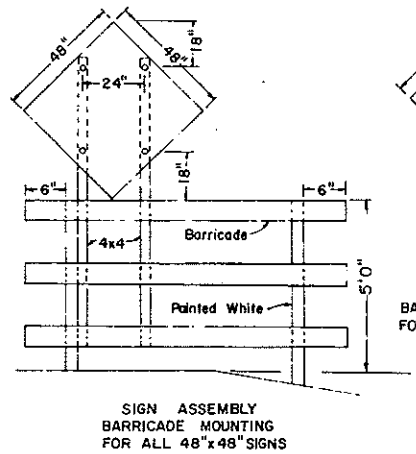
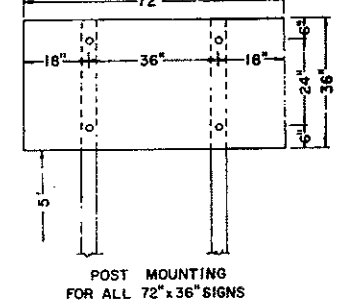
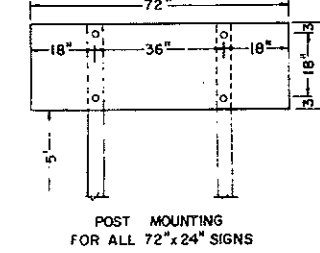
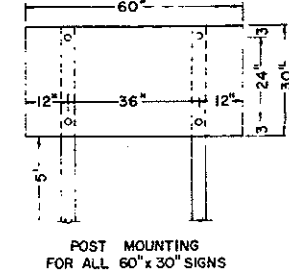
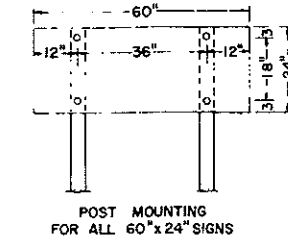
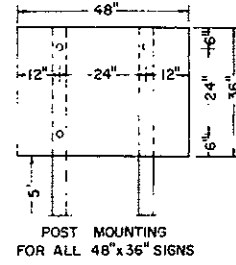
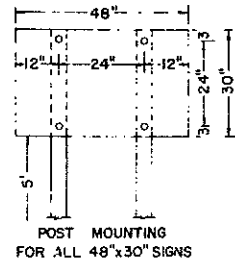
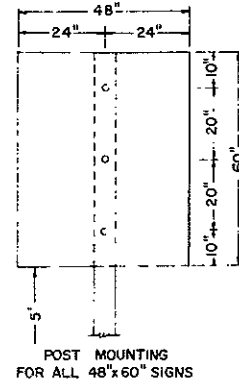
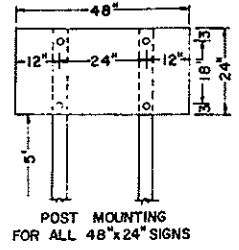
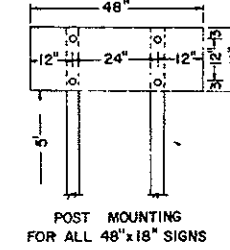
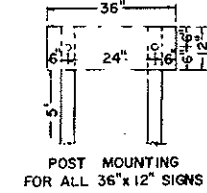
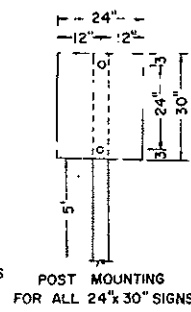
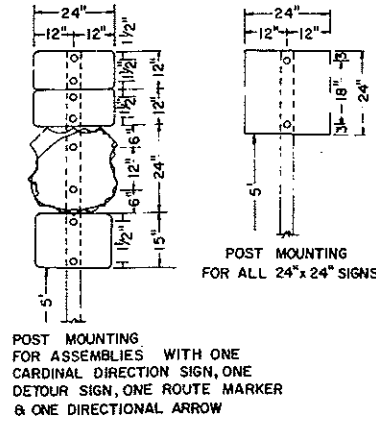
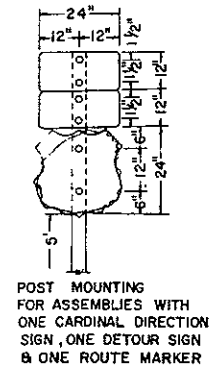
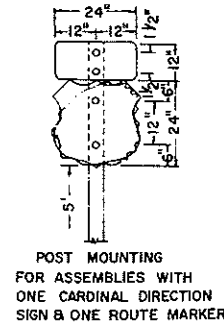
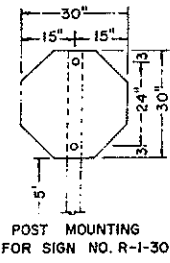
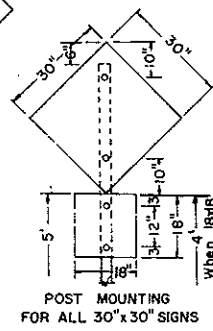
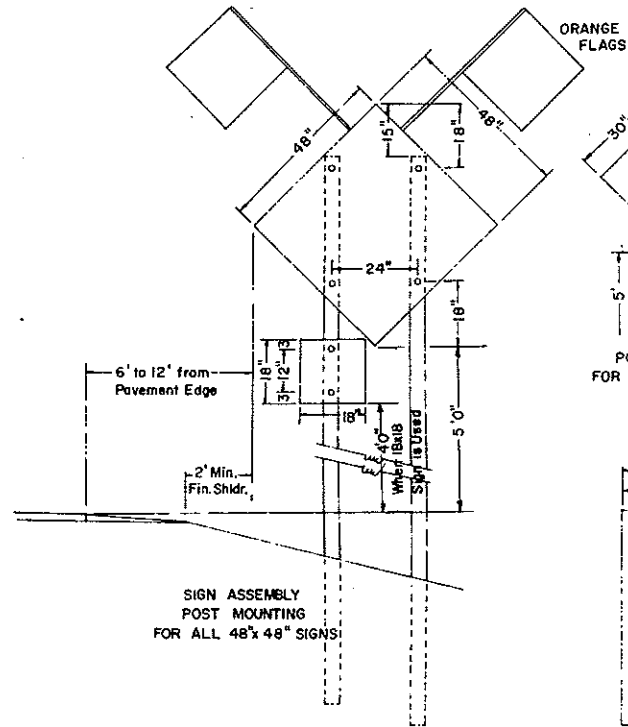
BARRICADE RAIL MATERIAL MAY BE 1" NOMINAL THICKNESS STANDARD LUMBER OR 3/4" PLYWOOD AND PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE RETROREFLECTIVE SHEETING IS APPLIED.

10-1-86		REVISIONS
DATE	CHANGE	
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	

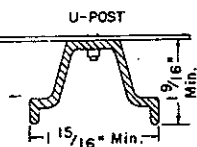
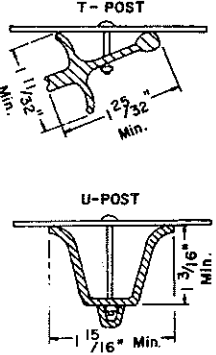
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *David K. O. [Signature]*
 DESIGN ENGINEER

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.

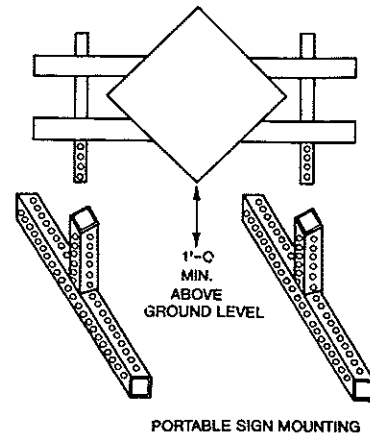
NOTES:
Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.
ADVANCE WARNING FLASHING OR SEQUENCING ARROW PANELS: The minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which 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 Stds. 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 5'0" and steel posts be imbedded 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.

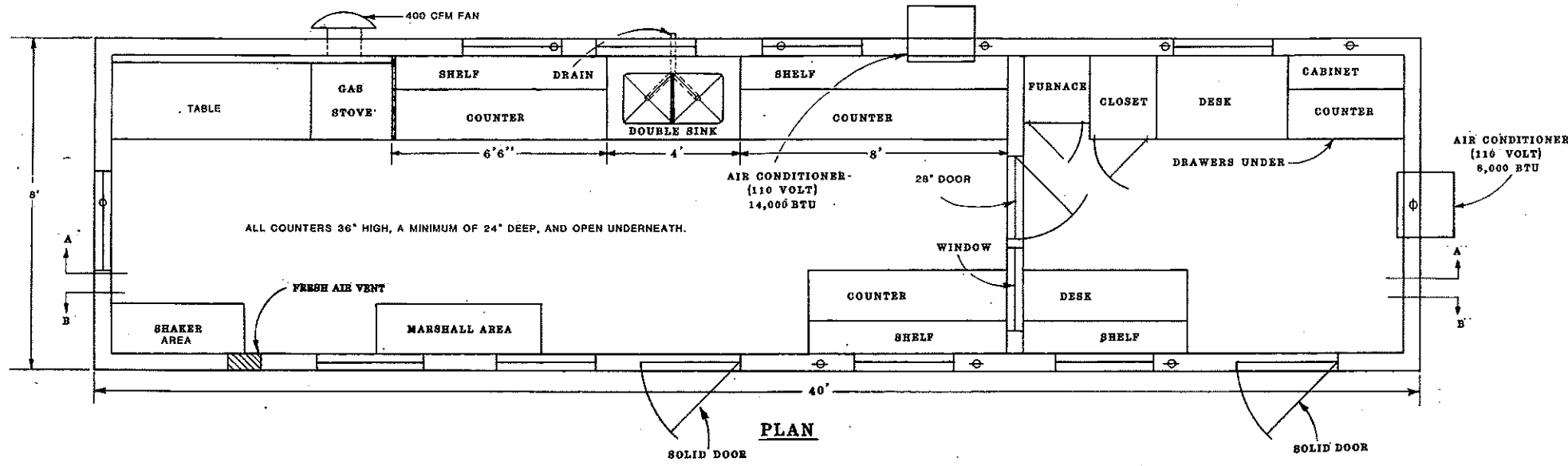


10-1-86 REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	CHANGE	
8-1-88	SIGN ASSEMBLY	APPROVED <i>David K. Loe</i> DESIGN ENGINEER
5-1-92	SIGN ASSEMBLY	
3-30-93	SIGN SUPPORTS NOTE	

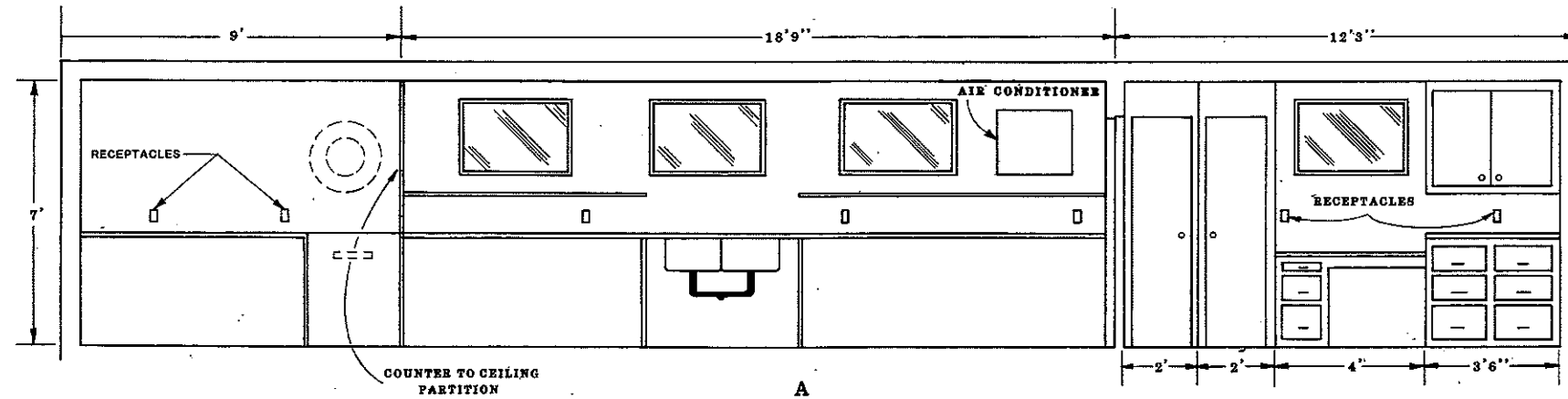
TYPE C FIELD LABORATORY

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

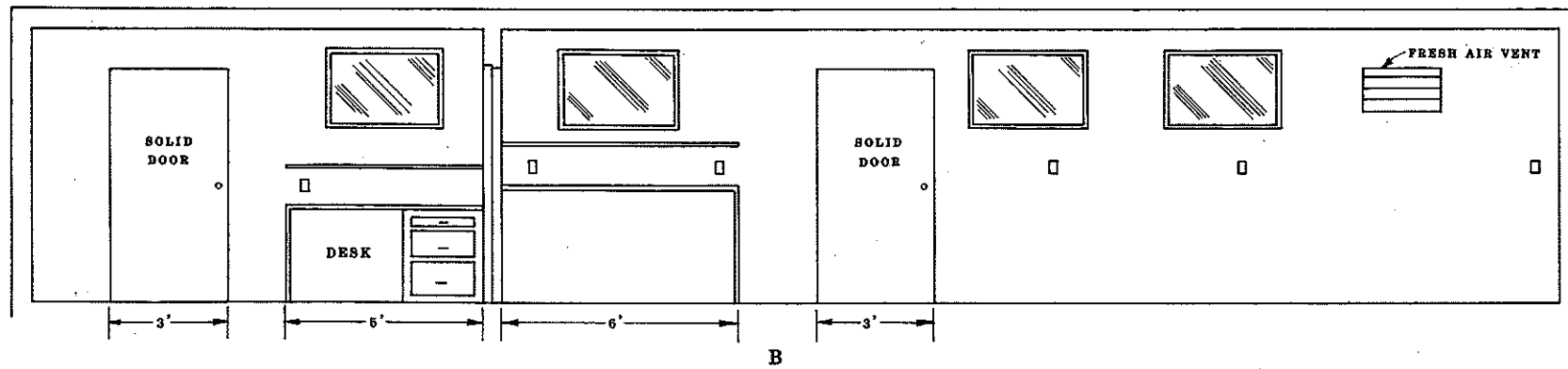
D-706-1



PLAN



A



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.

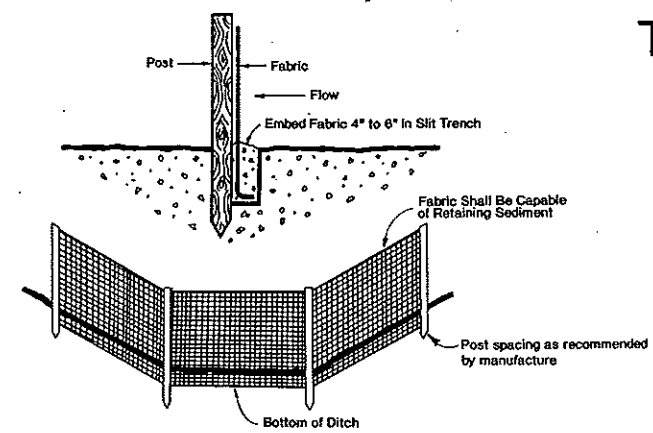
The lab shall be equipped with steel cable tie downs and ground anchors at each corner of the lab.

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.

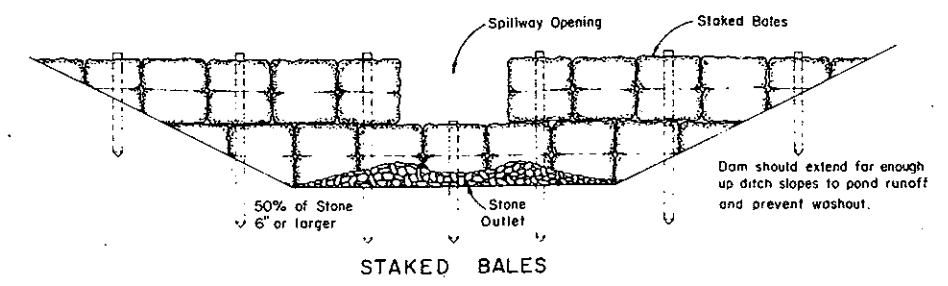
10-1-86	
REVISIONS	
DATE	CHANGE
5/5/88	Drawing and Notes

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
APPROVED: *David K. Lee*
Design Engineer

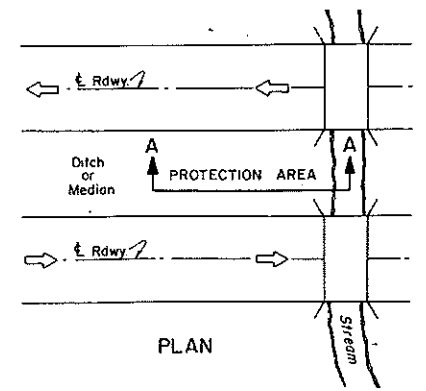
TEMPORARY EROSION AND SILTATION CONTROLS



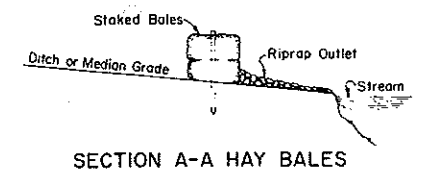
SEDIMENT CONTROL FENCING



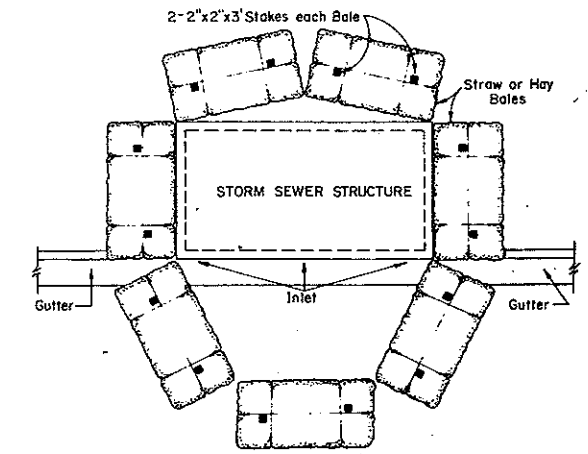
STAKED BALES



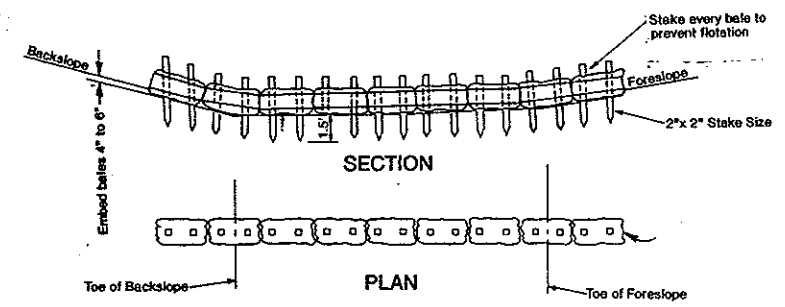
PLAN



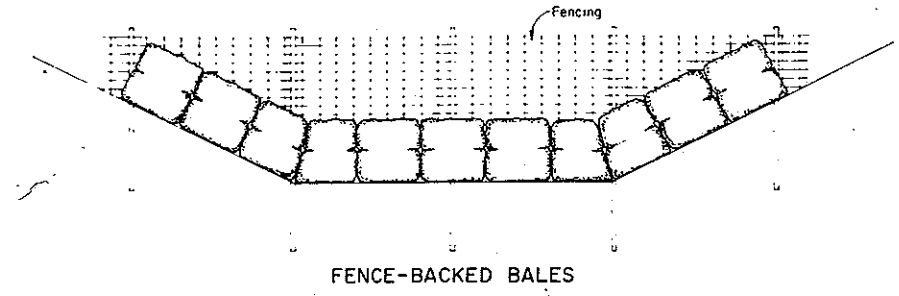
SECTION A-A HAY BALES



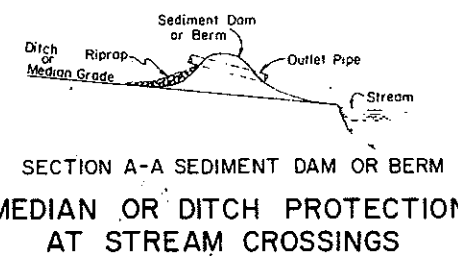
STORM SEWER INLET EROSION & SILTATION BARRIER



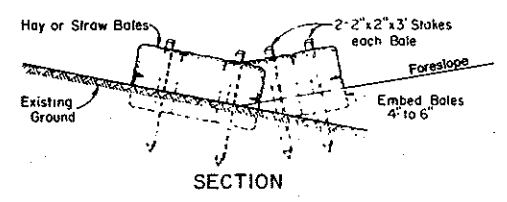
"TYPE A"



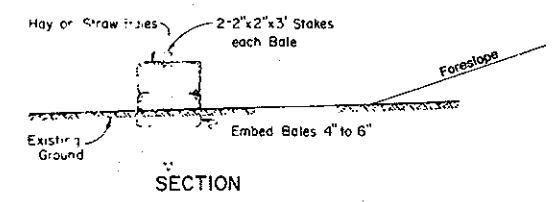
FENCE-BACKED BALES



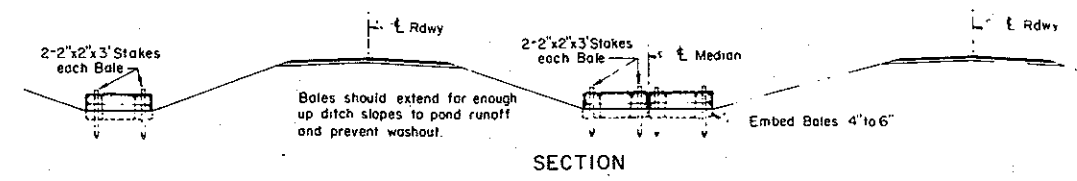
SECTION A-A SEDIMENT DAM OR BERM
MEDIAN OR DITCH PROTECTION AT STREAM CROSSINGS



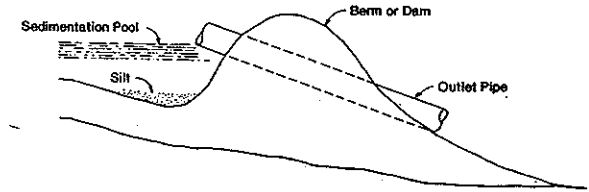
SECTION



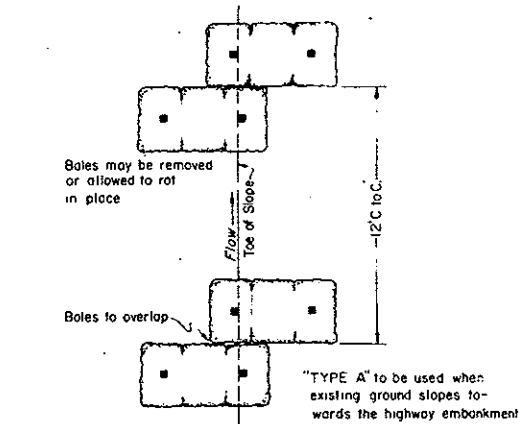
SECTION



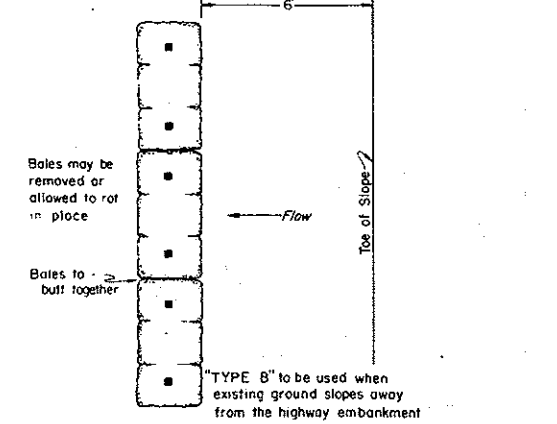
SECTION



SMALL SEDIMENT DAM OR BERM

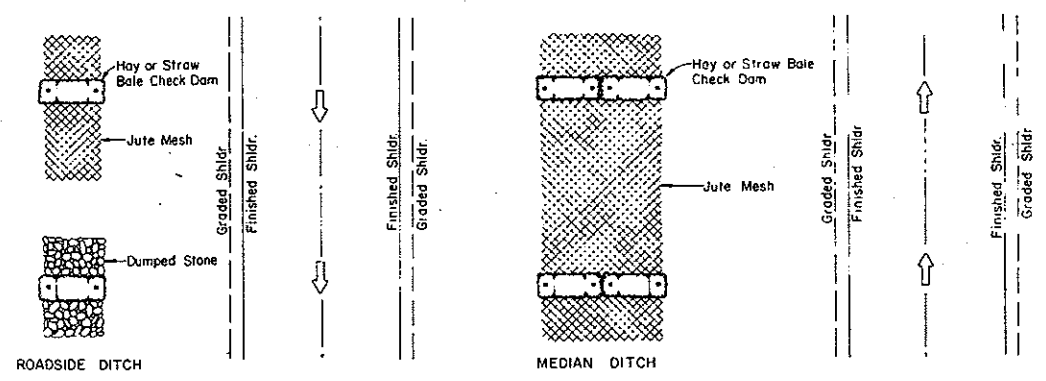


"TYPE B"



"TYPE C"

BALED HAY OR STRAW EROSION CHECKS



STONE, JUTE MESH, OR SOD DITCH & MEDIAN EROSION CONTROL

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.

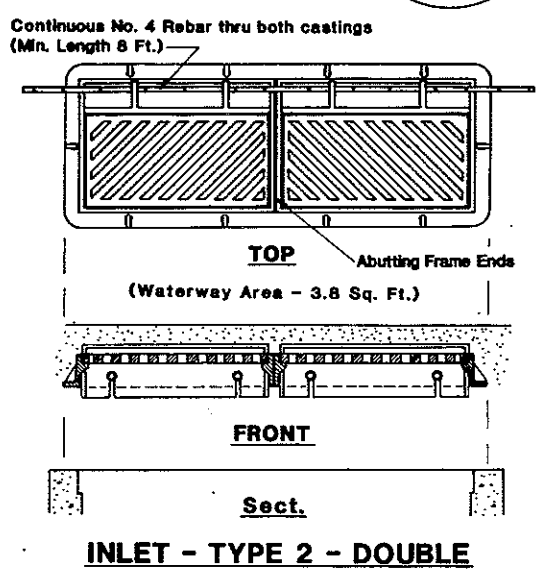
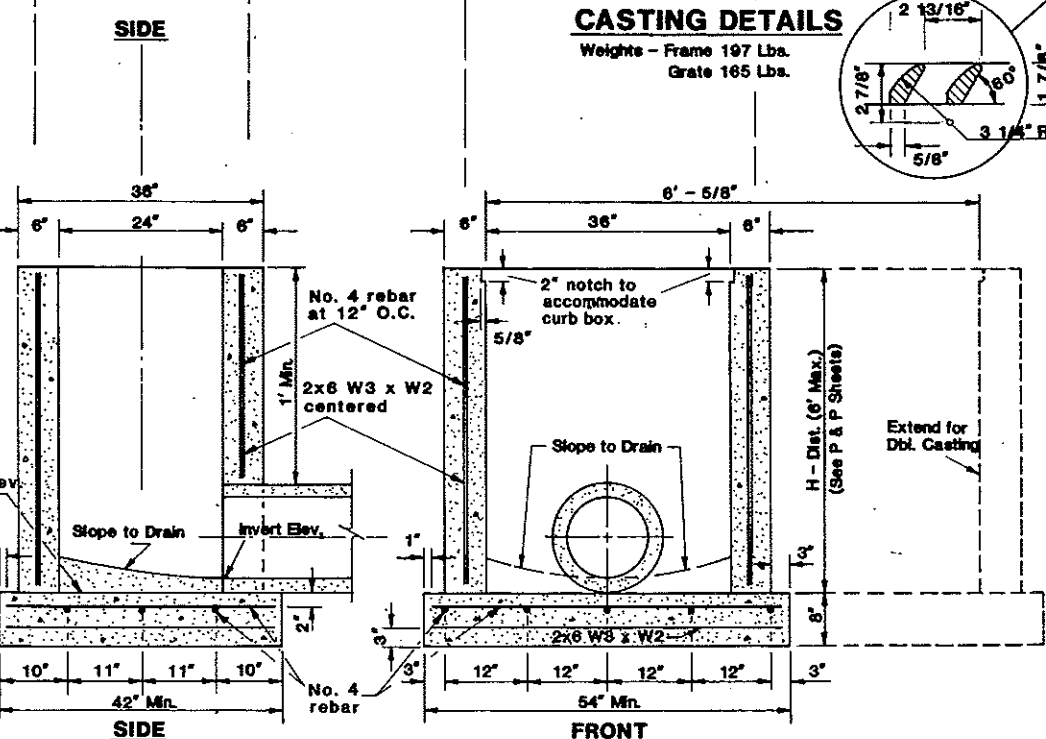
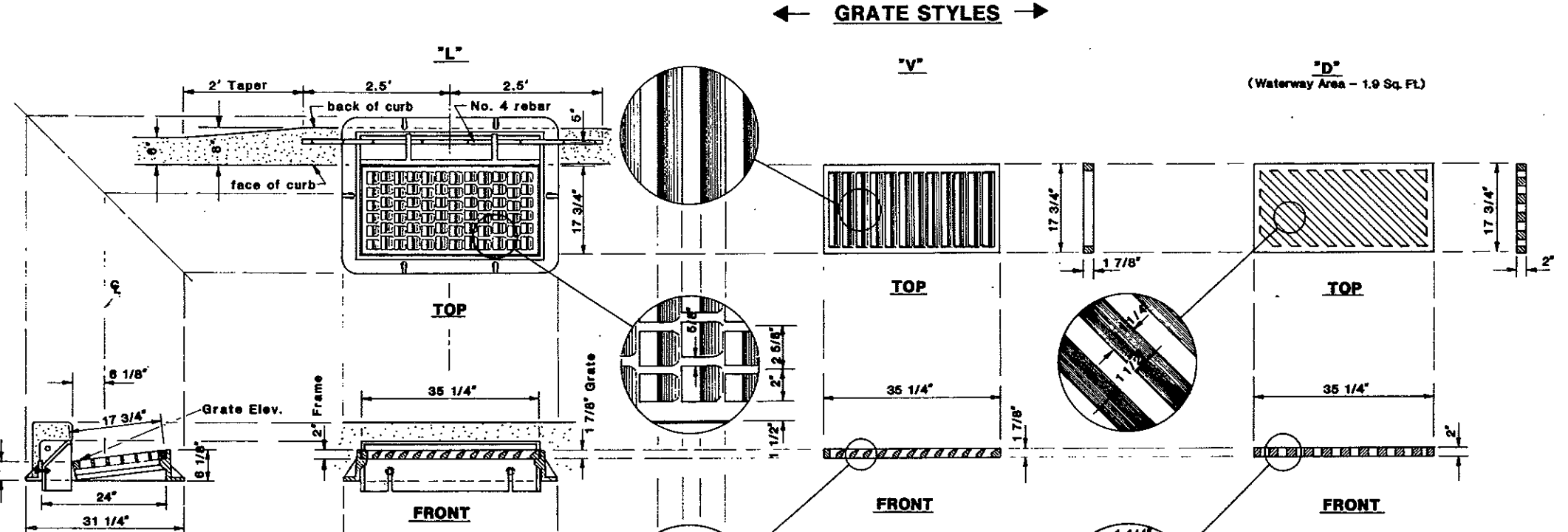
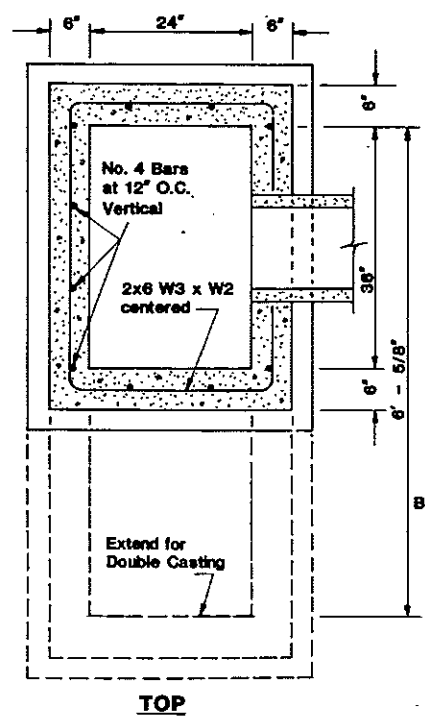
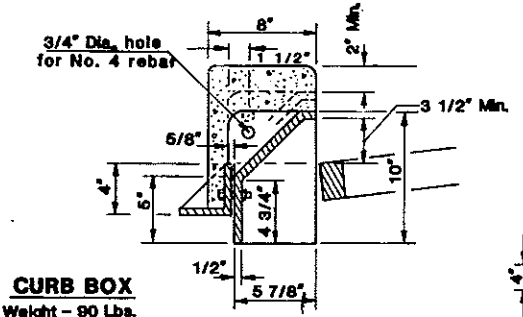
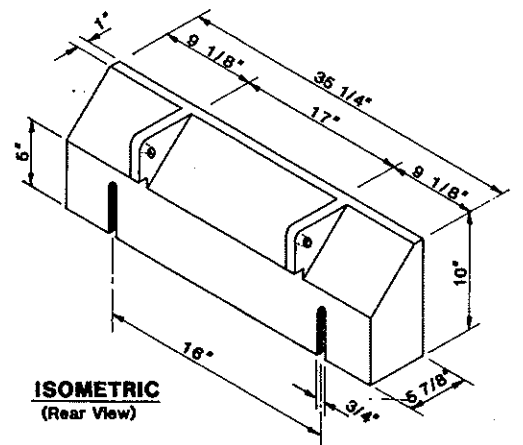
10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Loren</i> DESIGN ENGINEER
9-4-92	DITCH CHECK	
9-18-92	SEDIMENT CONT. FENCING	
1-31-95	GENERAL REVISIONS	

INLET - TYPE 2

Pay Items

Inlet - Type 1Ea.
Inlet - Type 2, DoubleEa.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		D-722-2

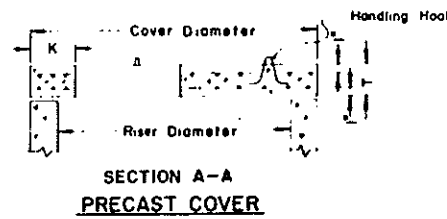
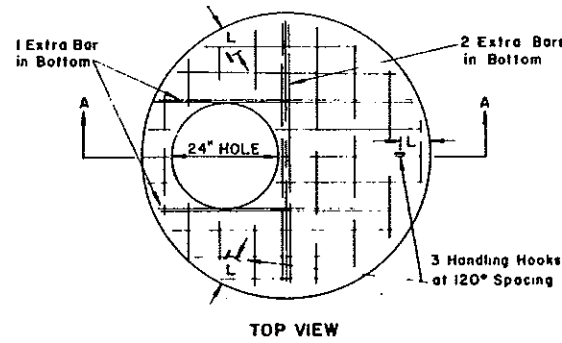
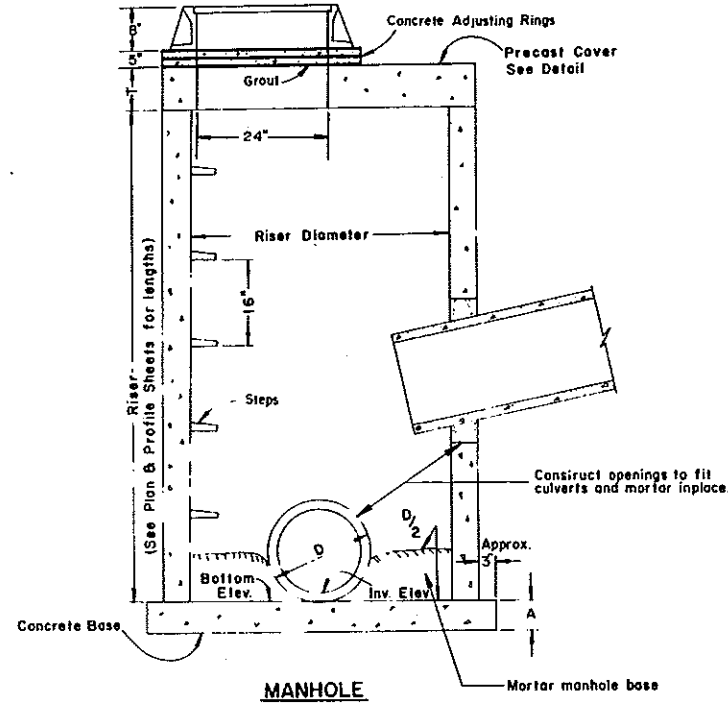


- Notes:**
- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans.
 - Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
 - The contractor 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	Revisions
11/90	Note 5 added.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
Approved: *David H. O. Lopez*
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 OF 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.

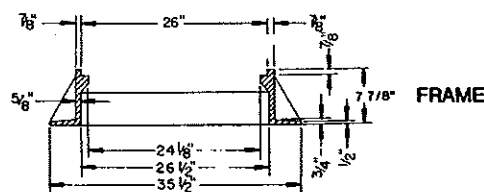
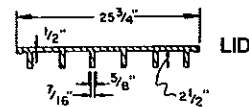
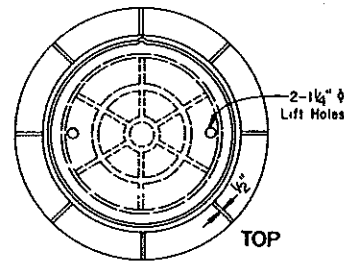
THE AGGREGATE SIZE SHALL BE APPROVED BY THE ENGINEER.
PRECAST BARRELS AND RISERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-109.

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:

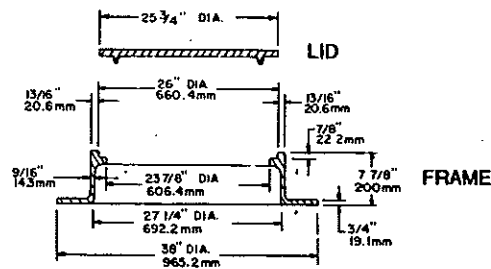
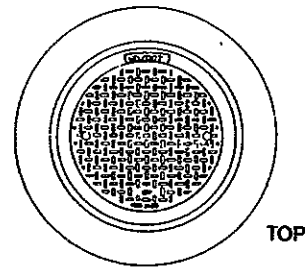
1. CAST IRON RING AND COVER OR BEEHIVE CASTING & COVER
2. PRECAST COVER
3. CONCRETE BASE
4. CONCRETE ADJUSTING RINGS

THE ITEM "MANHOLE RISER" SHALL INCLUDE THE FURNISHING & INSTALLING OF THE REQUIRED LENGTH OF RISER & CAST "LID" STEPS.

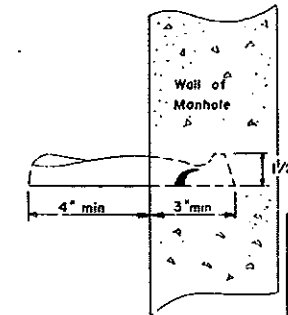
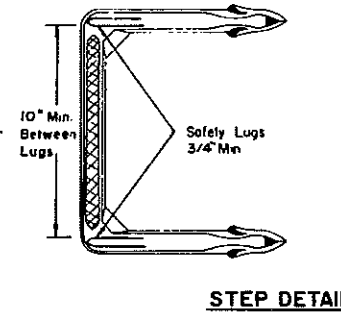
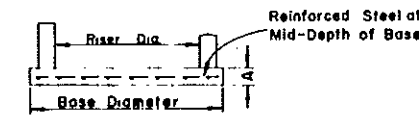
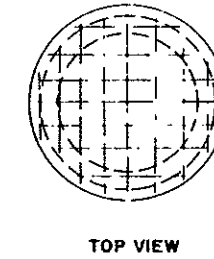
MORTAR TO BE INCLUDED IN THE PRICE BID FOR MANHOLES



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.)



MANHOLE STEP SHALL BE CORROSION RESISTANT AND SHALL HAVE A MINIMUM VERTICAL LOAD RESISTANCE OF 400 POUNDS AND A PULL-OUT RESISTANCE OF UP TO 1000 POUNDS. CONFIGURATION OF THE STEPS SHALL BE APPROVED BY THE ENGINEER.

THE CONTRACTOR MAY, IF HE SO ELECTS, CONSTRUCT MANHOLES OF SOLID CONCRETE BLOCK OR BRICK. THE MATERIALS SHALL BE APPROVED BY THE ENGINEER IN WRITING. THE TYPE OF CONSTRUCTION SHALL BE AS SPECIFIED IN SECTION 722 OF THE STANDARD SPECIFICATIONS.

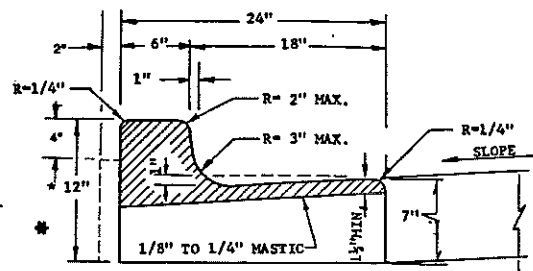
OTHER CASTINGS, SIMILAR IN DIMENSION AND OF EQUAL OR GREATER WEIGHT THAN THAT SHOWN MAY BE USED IF ACCEPTED BY THE ENGINEER IN WRITING.

METAL USED IN THE MANUFACTURE OF CASTINGS SHALL CONFORM TO AASHTO M-105, CLASS 35 B.

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
DATE	REVISIONS	
8-3-87	CHANGE	APPROVED: <i>David K. Lauer</i> DESIGN ENGINEER
8-10-83	NOTE MANHOLE FRAME & COVER	

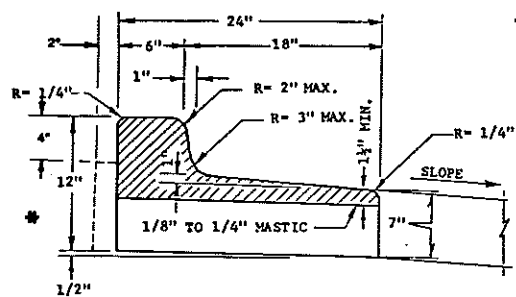
VALLEY GUTTER AND CURB & GUTTER

D-748-1

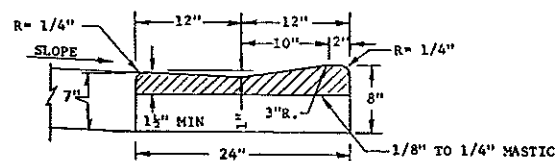


CURB & GUTTER TYPE I (SEC A)

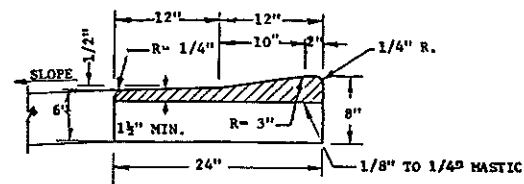
* 16" SEC. B
14" SEC. C



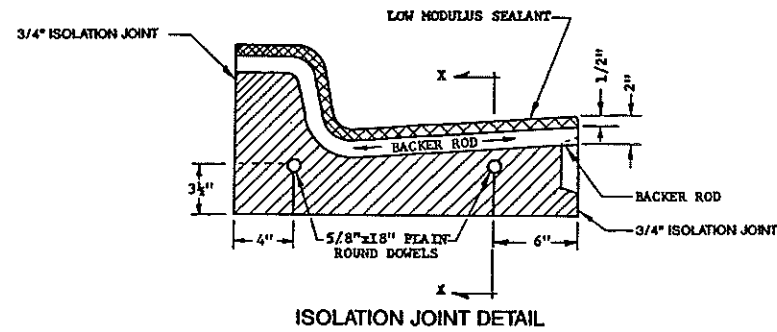
CURB & GUTTER TYPE I (SEC. D)



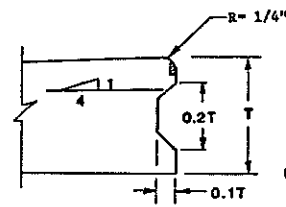
MOUNTABLE CURB & GUTTER TYPE I (SEC. A)



MOUNTABLE CURB & GUTTER TYPE I (SEC. B)

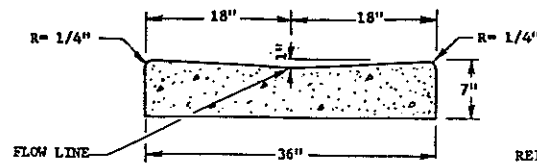


ISOLATION JOINT DETAIL

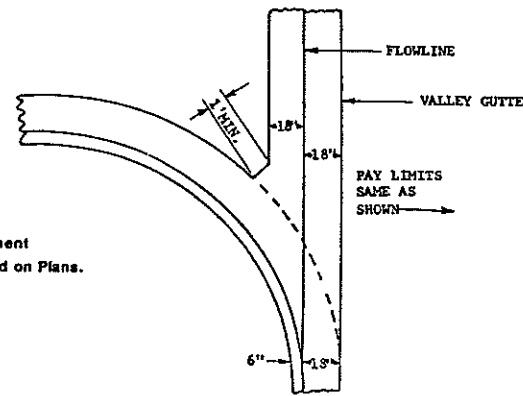


KEYWAY DETAIL FOR CURB & GUTTER (TO BE USED WITH P.C.C. PAVEMENT AND DRIVES.)

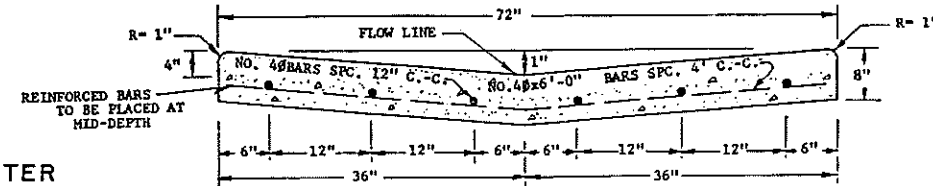
T=Thickness of Pavement Unless Otherwise Noted on Plans.



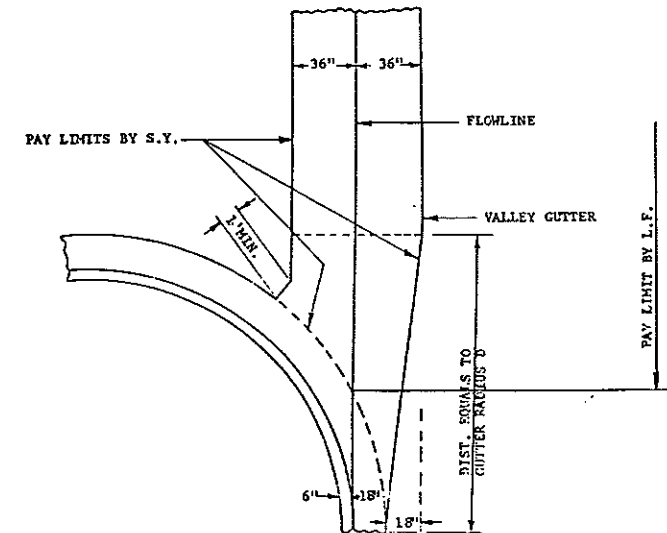
36" CONCRETE VALLEY GUTTER



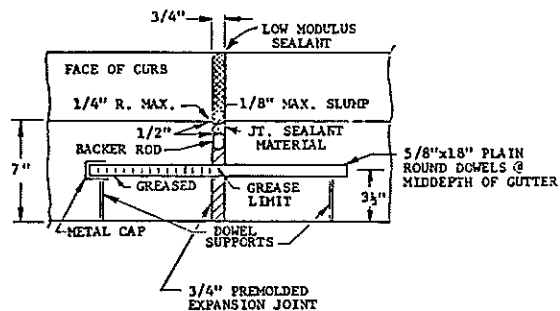
36" CONCRETE VALLEY GUTTER



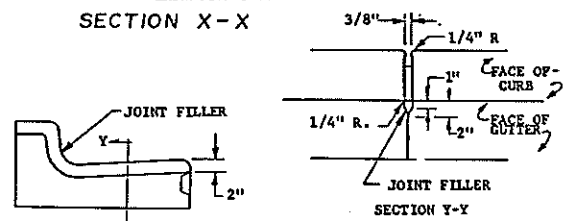
72" CONCRETE VALLEY GUTTER



72" CONCRETE VALLEY GUTTER

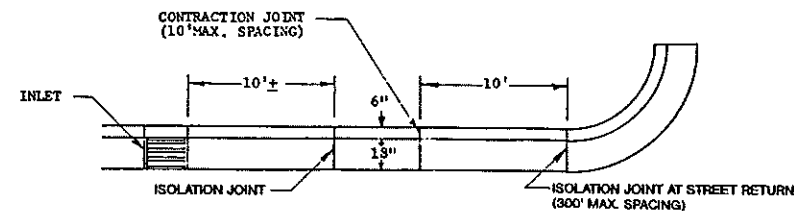


SECTION X-X



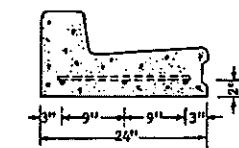
SECTION Y-Y

SCORED CONTRACTION JOINT DETAIL (10' MAX. SPACING)



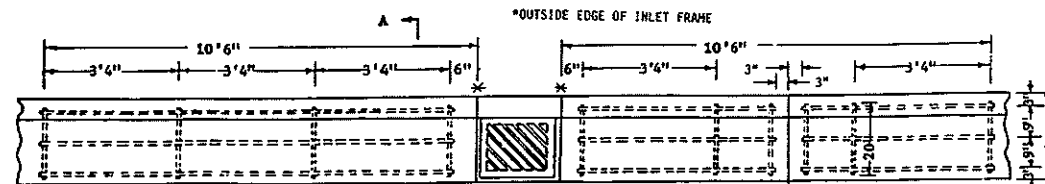
JOINT LOCATION DETAIL

NOT 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."

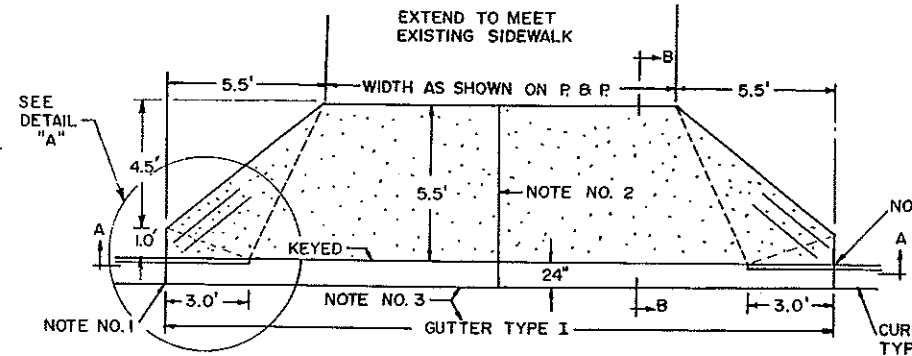


CURB & GUTTER REINFORCING AT INLETS (This includes Inlets Located on Radii)

- 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" PREMOULDED CONFORMING TO SECTION 828.02 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.

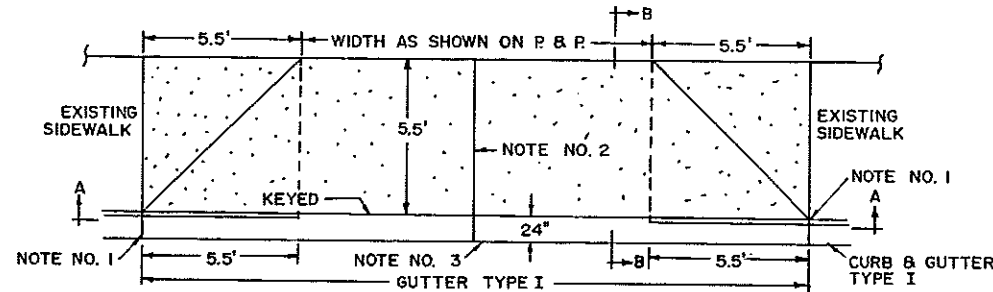
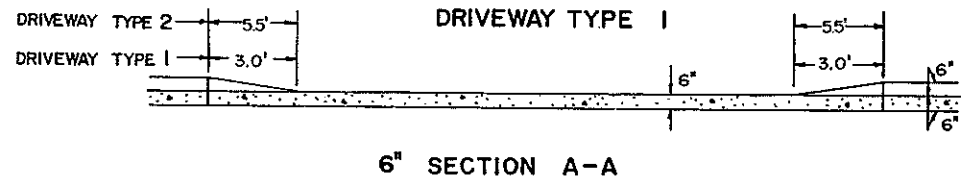
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
10-1-86	NOTE REMOVED	APPROVED: <i>Daniel R. Lee</i> DESIGN ENGINEER
3/1/88	Keyed Jt. Dimension	
5/19/88	C & G Reinf. at Inlets	
7/8/88	Reinf. RadII Inlets	
3-27-92	Add 2" ledge	
11-15-93	ISOLATION JOINT	

CONCRETE DRIVEWAY (URBAN)

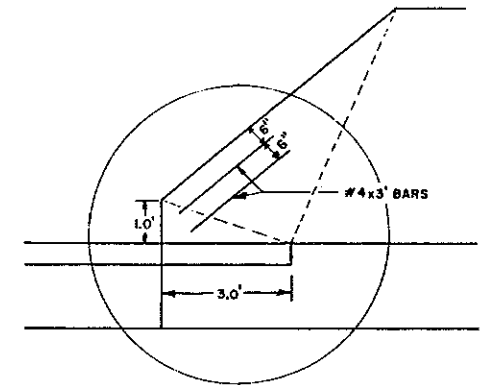


- NOTE NO. 1 ON BITUMINOUS PAVEMENTS PLACE A 3/4" ISOLATION JOINT FULL DEPTH AND THE SAME SHAPE AS THE CURB AND GUTTER. ON PCC PAVEMENTS THE CURB AND GUTTER JOINTS MATCH THOSE OF THE PAVEMENT.
- NOTE NO. 2 JOINT SPACING-THE DRIVEWAY JOINT SPACING SHALL MATCH THE CURB AND GUTTER OR PCC. PAVEMENT JOINT SPACING. (SEE STANDARD DRAWING D-748-1) THE JOINT MAY BE A KEYED CONSTRUCTION JOINT, A SAWED, 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.

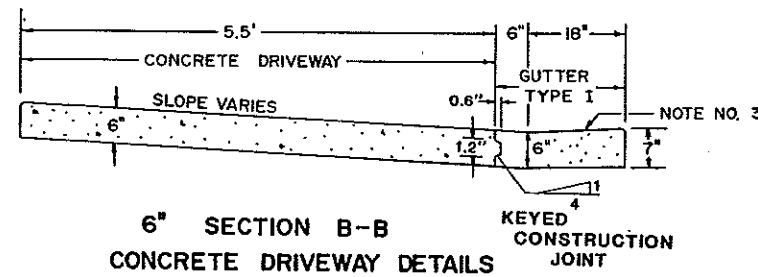
DRIVEWAY QUANTITIES (S.Y.)		
WIDTH	TYPE 1	TYPE 2
10'	10.1	12.8
12'	11.3	14.1
14'	12.5	15.3
16'	13.8	16.5
18'	15.0	17.7
20'	16.2	18.9
22'	17.4	20.2
24'	18.6	21.4
26'	19.9	22.6
28'	21.1	23.8
30'	22.3	25.1



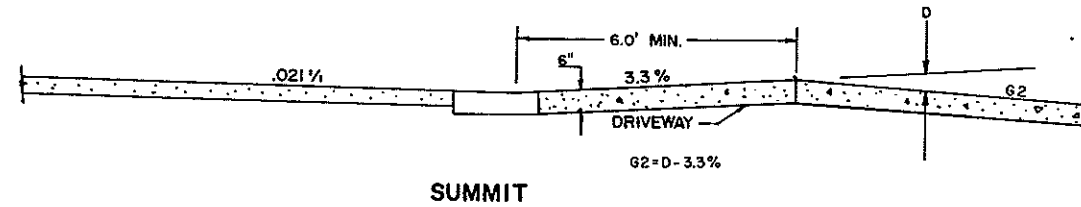
DRIVEWAY TYPE 2



DETAIL "A"



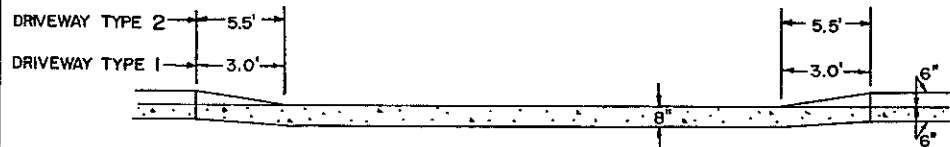
6" SECTION B-B
CONCRETE DRIVEWAY DETAILS



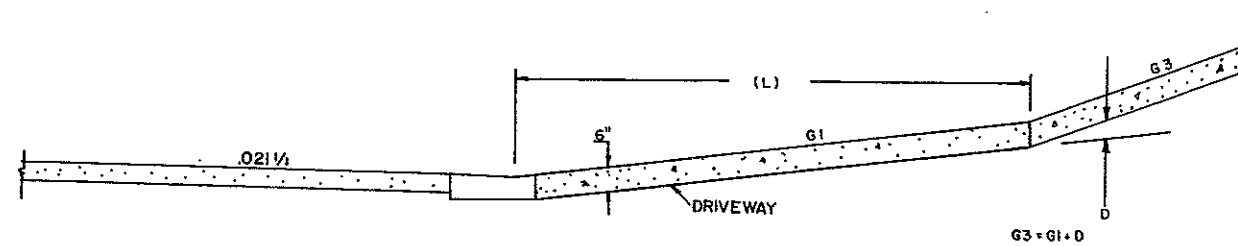
SUMMIT

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.

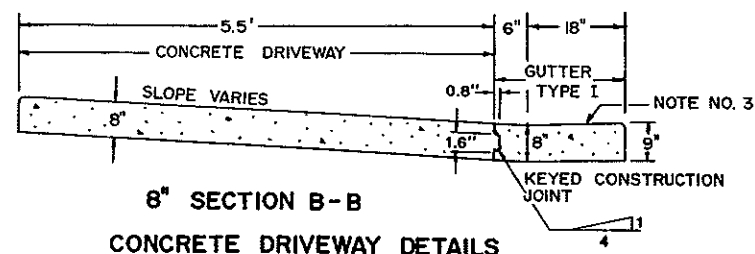
NOTE NO. 6 ALL COSTS FOR LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO CONSTRUCT AND SEAL JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR THE DRIVEWAY.



8" SECTION A-A



SAG



8" SECTION B-B
CONCRETE DRIVEWAY DETAILS

Driveway	Grade G1		Dimension (L) ft.		Grade Changes (D)	
	Desirable	Maximum	Desirable	Minimum	Desirable	Maximum
ADT	5%	12% or Controlled by Vehicle Clearance	12	6	+ 6%	15% or Controlled by Vehicle Clearance
(0-500)	5%	①	12	6	+ 6%	15% or Controlled by Vehicle Clearance
(500-1500)	3%	①	20	20	± 3%	± 6%
(>1500)	2%	5%	40	40	0%	± 3%

① 2% At Sidewalk Locations

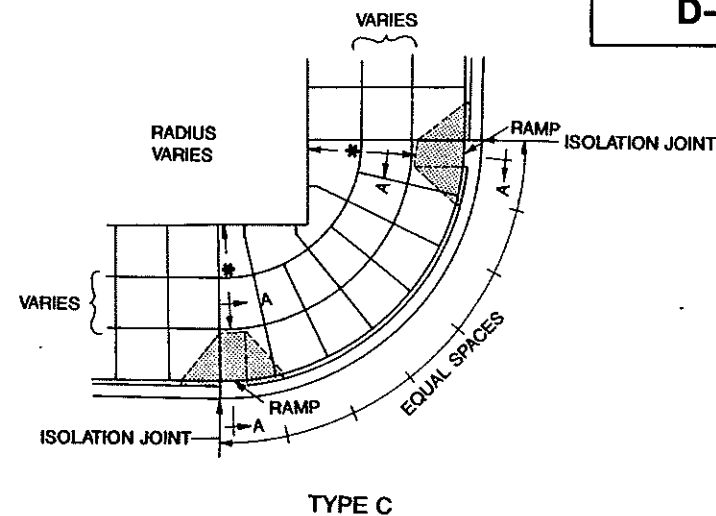
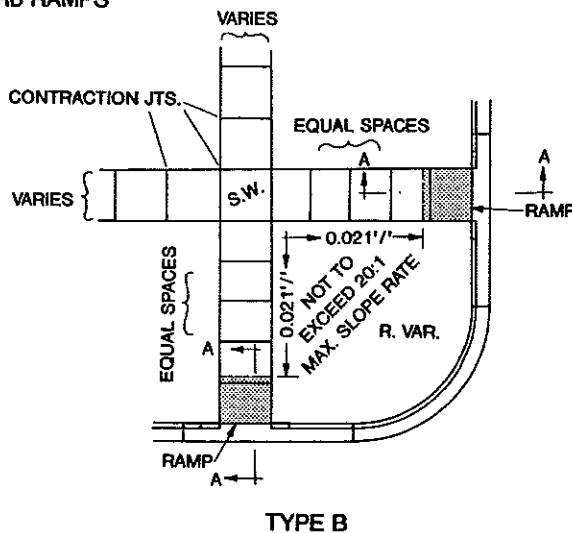
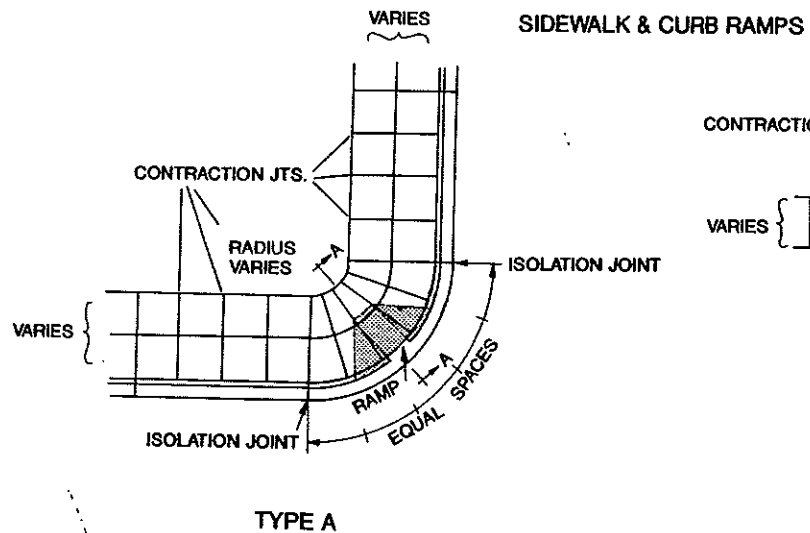
② 6% At Sidewalk Locations

10-1-88 REVISIONS	
DATE	CHANGE
3/1/88	Keyed Jt. Dimension
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

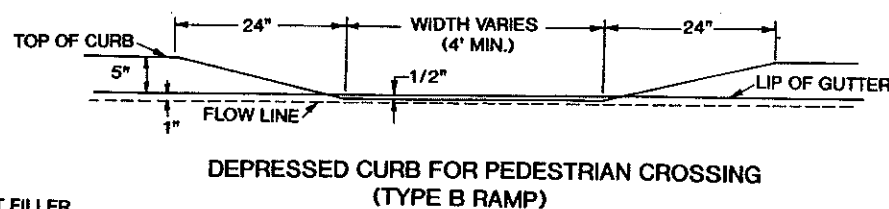
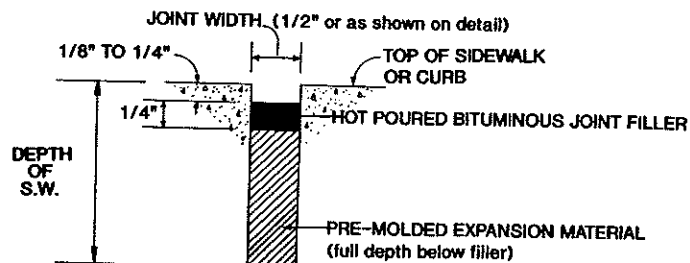
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Lee*
DESIGN ENGINEER

NOTES

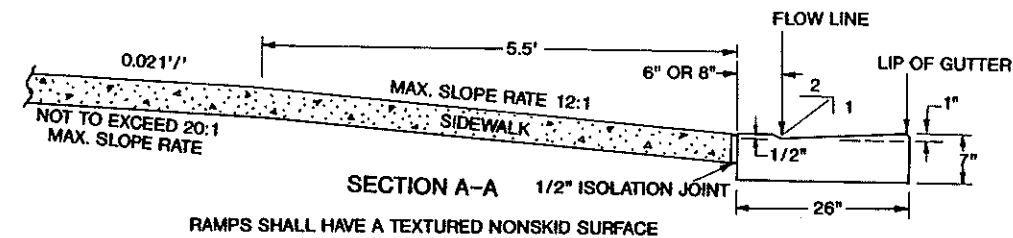
1. THE EXACT LOCATION & TYPE OF RAMP SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD AFTER CONSULTATION WITH THE CITY ENGINEER & CHANGES MADE ACCORDINGLY.
2. THE RAMP SHALL HAVE A SLIP RESISTANT SURFACE
3. METHOD OF PAYMENT: THE CURB RAMP WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE 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.



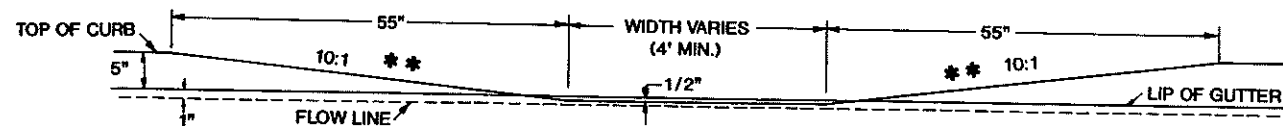
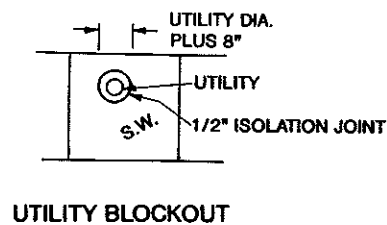
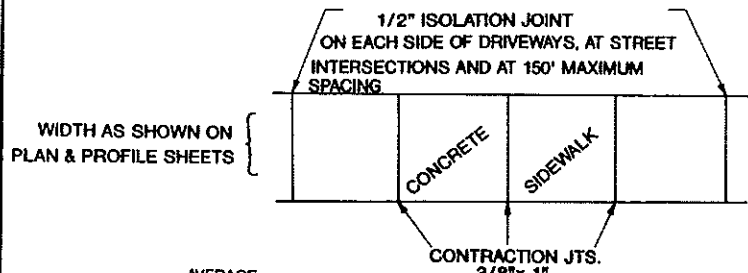
TYPE II CURB
AS SHOWN ON THE PLANS OR AT THE DIRECTION OF THE ENGINEER, A CURB SHALL BE CONSTRUCTED WHERE THE EXISTING SIDEWALK, ABUTTING A BUILDING OR ADJACENT PROPERTY, IS TO BE LOWERED. THE CURB WILL BE PAID FOR AT THE UNIT PRICE BID FOR CURB (TYPE-1) PER LINEAL FOOT.



TYPICAL ISOLATION JOINT SEAL (longitudinal and transverse)



RAMPS SHALL HAVE A TEXTURED NONSKID SURFACE



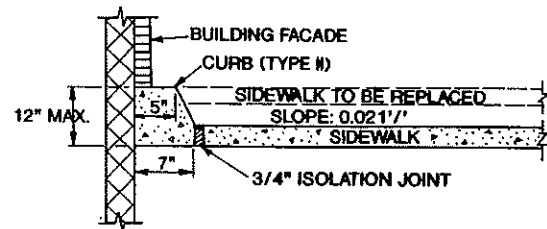
DEPRESSED CURB FOR PEDESTRIAN CROSSING (TYPE A & C RAMPS)

* IF LESS THAN 4' USE 12:1 SIDE SLOPE **

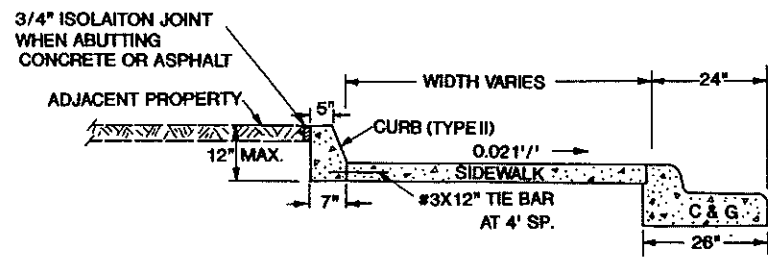
SIDEWALK WIDTH	AVERAGE CONTRACTION JOINT SPACING
4'-6"	5'
OVER 6'	6'

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

CONCRETE SIDEWALK DETAILS

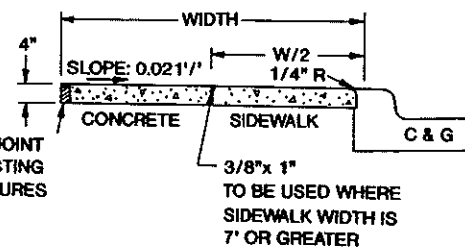


TYPE II CURB DETAIL



CURB DETAIL

3/4" ISOLATION JOINT WHEN ABUTTING EXISTING CONCRETE OR STRUCTURES



3-18-92		REVISIONS
DATE	CHANGE	
9-1-92	REMOVE DETECTABLE WARNING	
9-23-92	REVISED EXPANSION JOINT	
12-5-93	ISOLATION JOINT	
2-18-94	GENERAL REVISIONS	

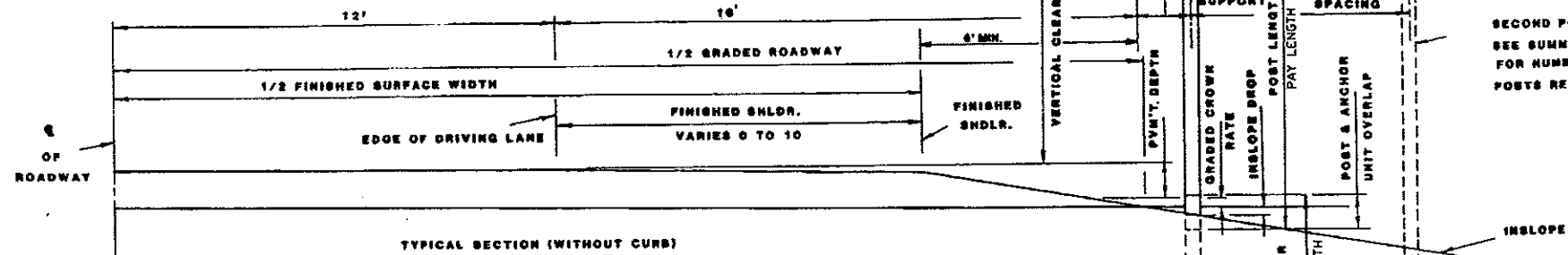
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *[Signature]*
DESIGN ENGINEER

ASSEMBLY DETAILS

MINIMUM HORIZONTAL CLEARANCE

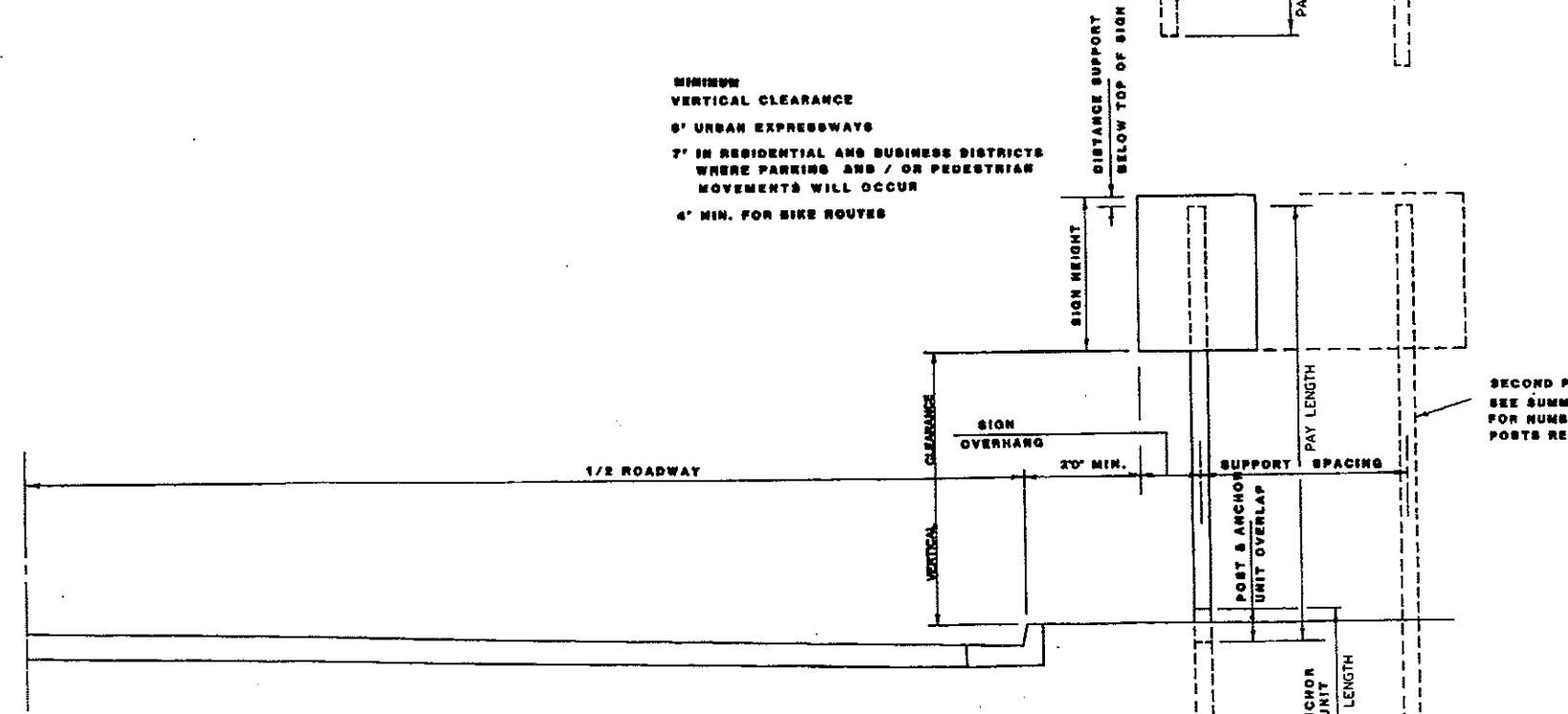
THE 16' CLEARANCE FROM THE EDGE OF THE DRIVING LANE TO THE EDGE OF THE SIGN SHALL BE FOR ALL ROADWAYS WITHOUT CURBS. ALL CURBED ROADWAYS SHALL HAVE 3' HORIZONTAL CLEARANCE FROM THE FACE OF THE CURB TO THE EDGE OF THE SIGN UNLESS NOTED OTHERWISE ON THE PLANS. ALL BIKE ROUTE SHALL HAVE A 3' MINIMUM HORIZONTAL CLEARANCE FROM THE EDGE OF THE BIKE ROUTE TO THE EDGE OF THE SIGN.

MINIMUM VERTICAL CLEARANCE
 5' RURAL ROADWAYS
 6' ON RURAL OR URBAN EXPRESSWAYS
 7' ON FREEWAYS



TYPICAL SECTION (WITHOUT CURB)

MINIMUM VERTICAL CLEARANCE
 6' 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)

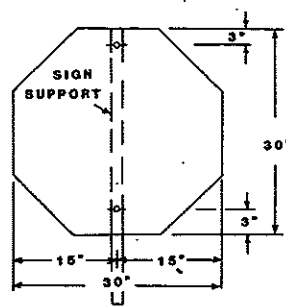
NOTE

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 16 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

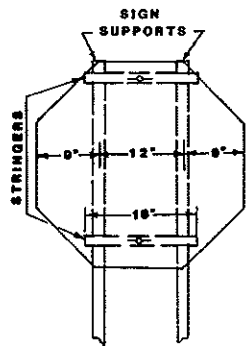
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *[Signature]*
 Design Engineer

**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**

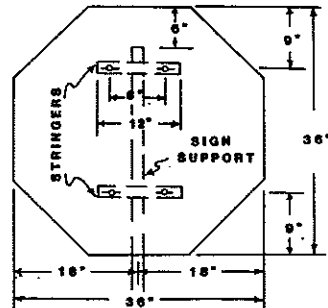


1 POST

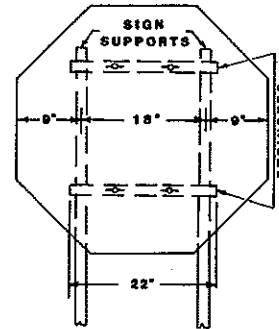
ASSEMBLY NO. 1



2 POSTS

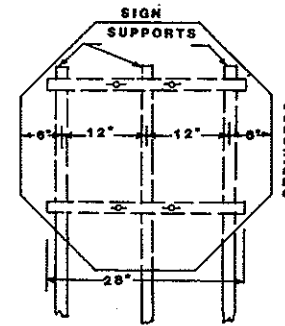


1 POST

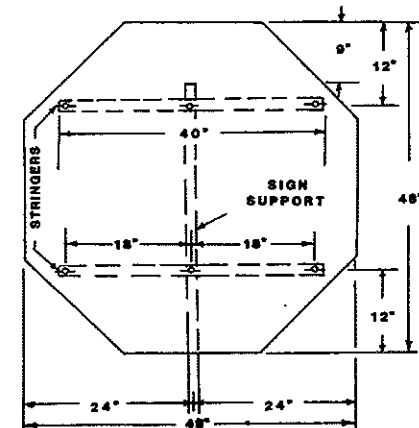


2 POSTS

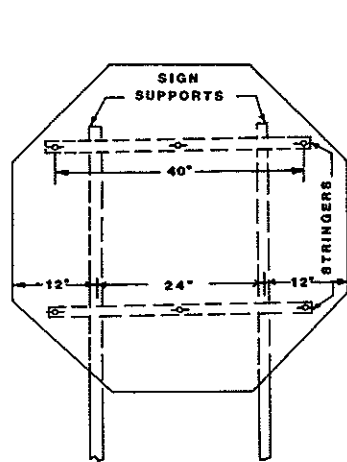
ASSEMBLY NO. 2



3 POSTS

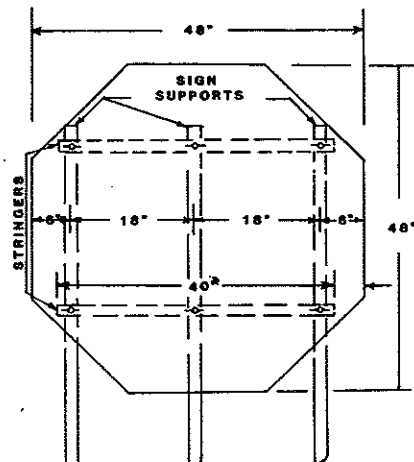


1 POST

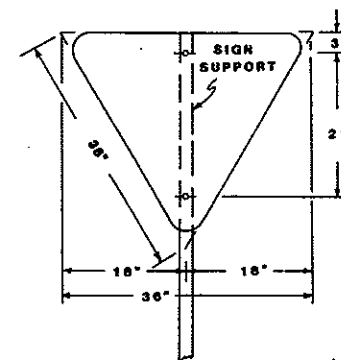


2 POSTS

ASSEMBLY NO. 3

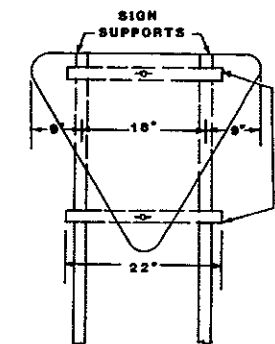


3 POSTS



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 1.120 per foot and of the length shown.

Square Tube, Perforated: All stringers shall be square tube, perforated 1/2" X 1/2" and of the length shown.

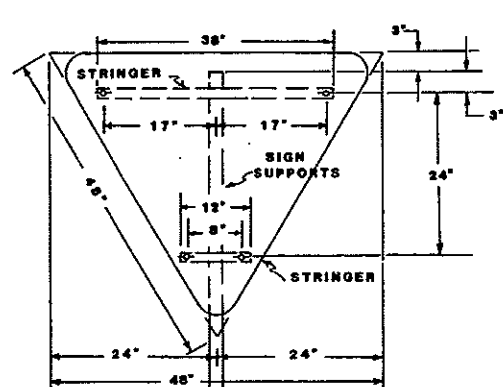
Holes:

Flange Channel: All holes shall be punched round for 3/8" diameter bolts.

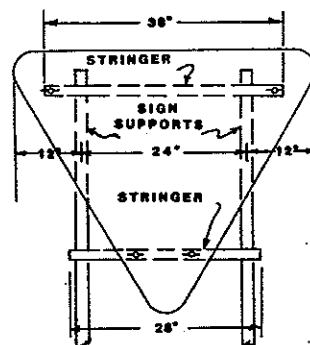
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:

See plans for sign numbers to be used at each location.
See Std. D-754-24 square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

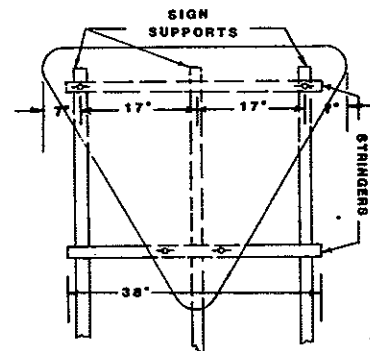


1 POST



2 POSTS

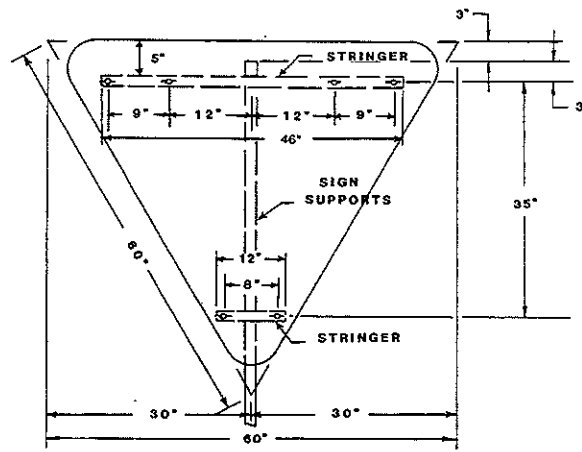
ASSEMBLY NO. 5



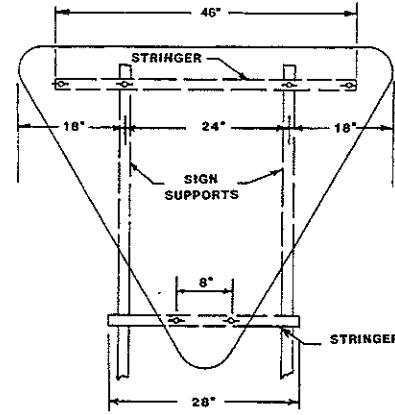
3 POSTS

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION APPROVED: <i>David H. [Signature]</i> DESIGN ENGINEER
DATE	REVISIONS	
5-1-92	GENERAL REVISIONS	

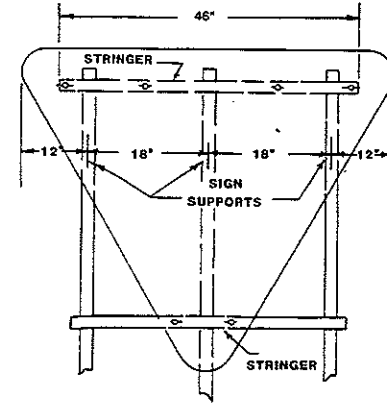
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



1 POST

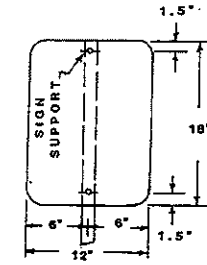


2 POSTS



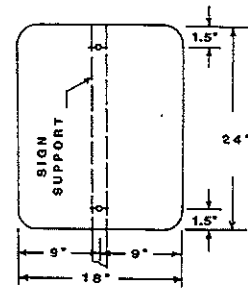
3 POSTS

ASSEMBLY NO. 6



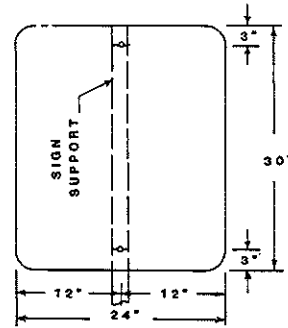
1 POST

ASSEMBLY NO. 7



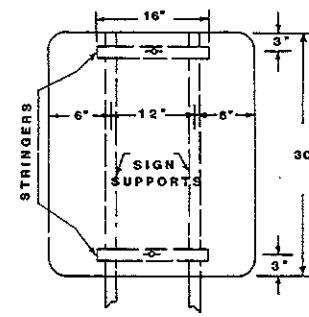
1 POST

ASSEMBLY NO. 8

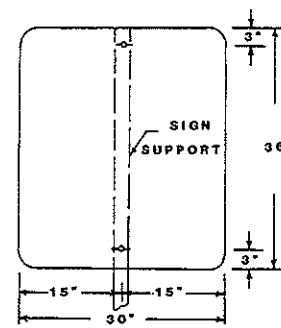


1 POST

ASSEMBLY NO. 9

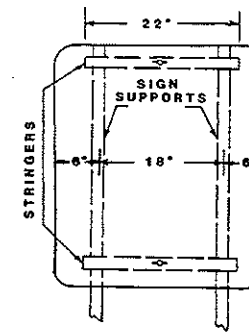


2 POSTS

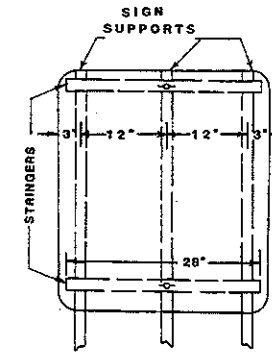


1 POST

ASSEMBLY NO. 10



2 POSTS



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"x1 1/2" and of the length shown.

Holes:

Flange Channel: All holes shall be punched round for 3/8" diameter bolts.

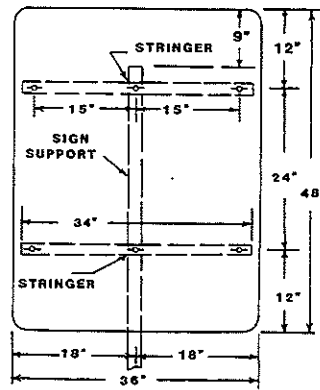
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:

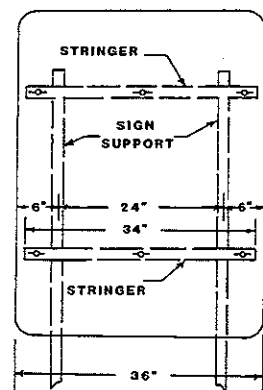
See plans for sign numbers to be used at each location.

See Std. D-754-24 square tube, perforated mounting details.

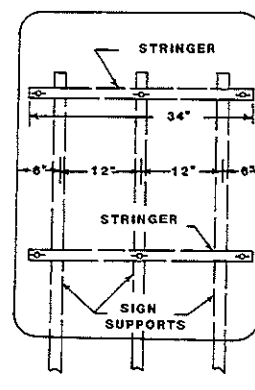
See Std. D-754-25 for flange channel mounting details.



1 POST



2 POSTS



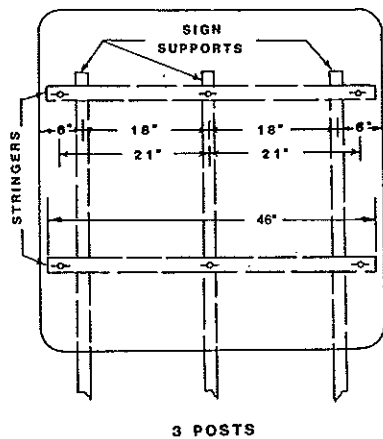
3 POSTS

ASSEMBLY NO. 11

10-1-86	
REVISIONS	
DATE	CHANGE
5-1-92	GENERAL REVISIONS
7-14-95	46" Stringer

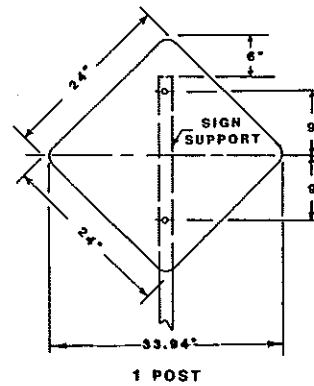
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David K.O. Kern*
DESIGN ENGINEER

**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



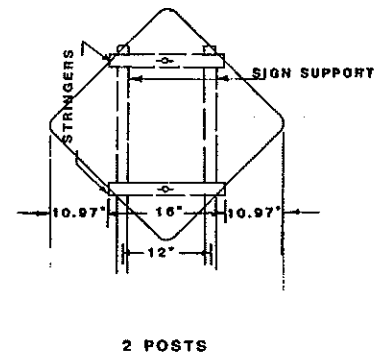
3 POSTS

ASSEMBLY NO. 17

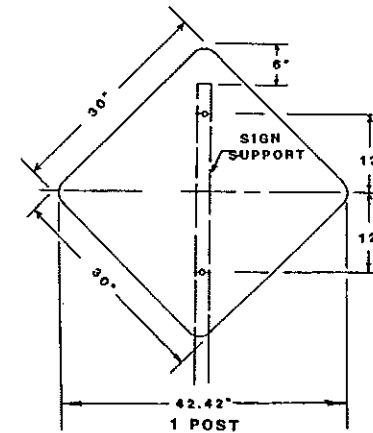


1 POST

ASSEMBLY NO. 18

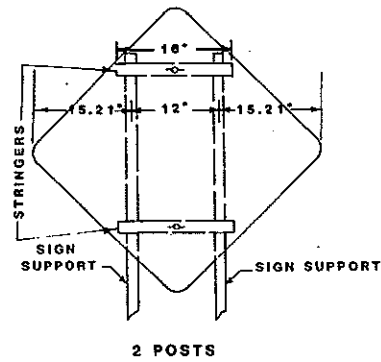


2 POSTS

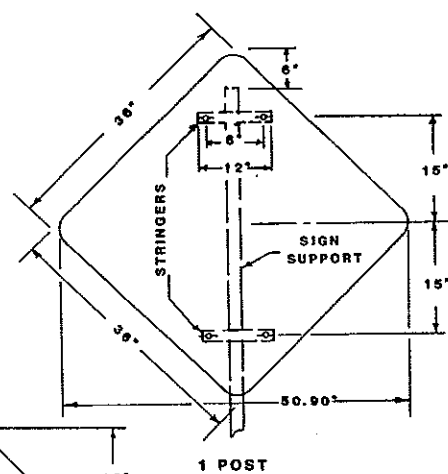


1 POST

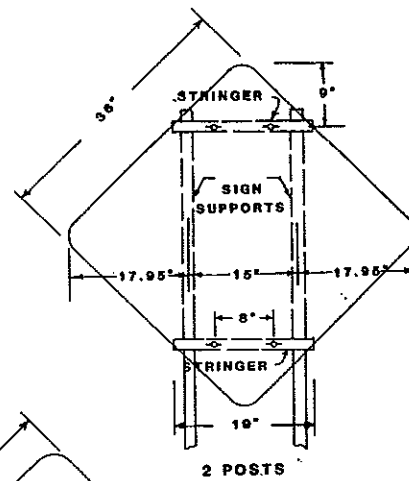
ASSEMBLY NO. 19



2 POSTS

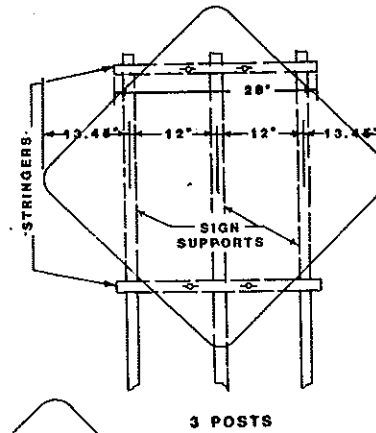


1 POST

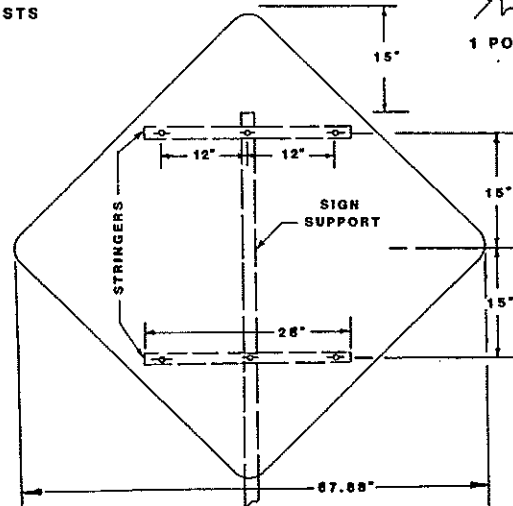


2 POSTS

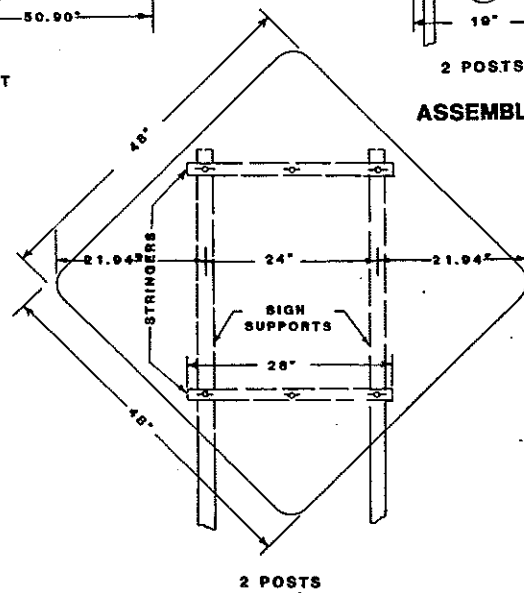
ASSEMBLY NO. 20



3 POSTS

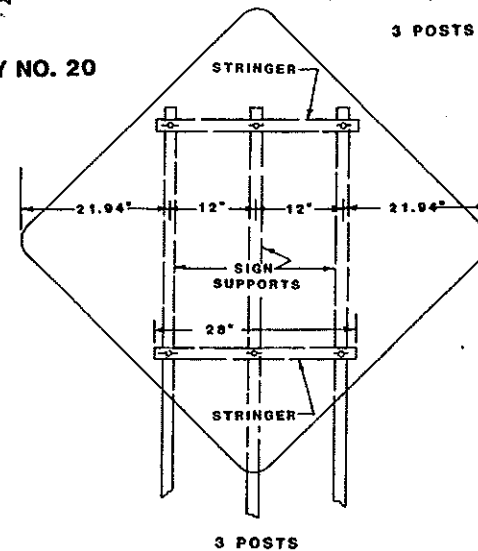


1 POST



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 1.125 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.

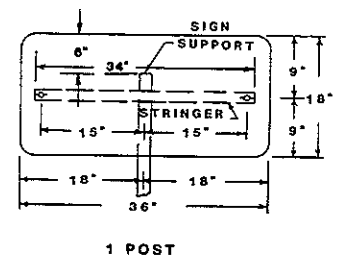
Note:
Flange Channel: All holes shall be punched round for 5/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

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-754-26 for flange channel mounting details.

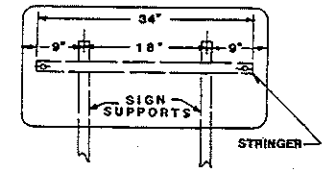
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
DATE	REVISIONS	
5-1-92	GENERAL REVISIONS	APPROVED: <i>David K. [Signature]</i> DESIGN ENGINEER
7-14-95	46" Stringer	

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING, AND GUIDE SIGNS

D-754-32

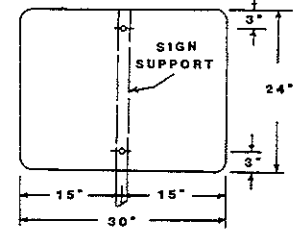


1 POST

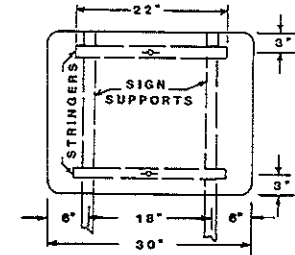


2 POSTS

ASSEMBLY NO. 31

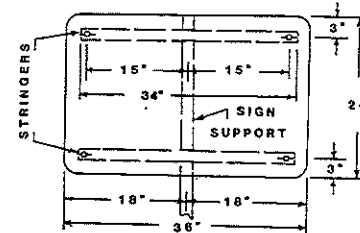


1 POST

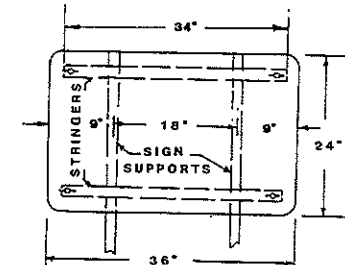


2 POSTS

ASSEMBLY NO. 32

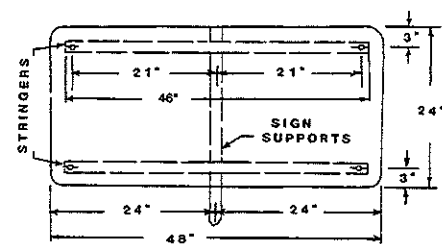


1 POST

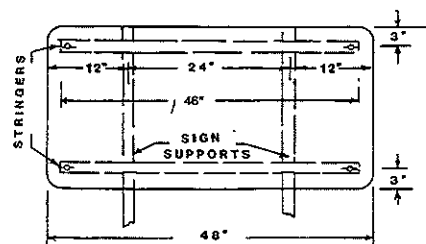


2 POSTS

ASSEMBLY NO. 33

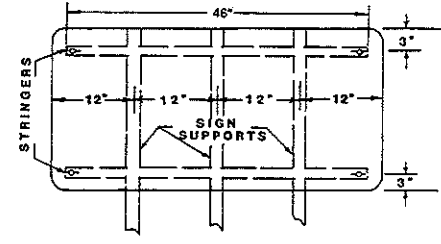


1 POST

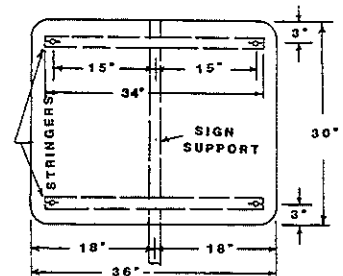


2 POSTS

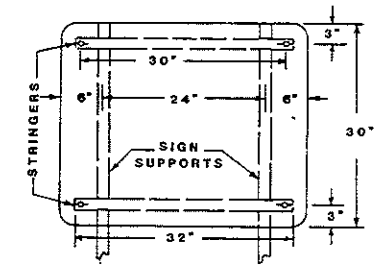
ASSEMBLY NO. 34



3 POSTS

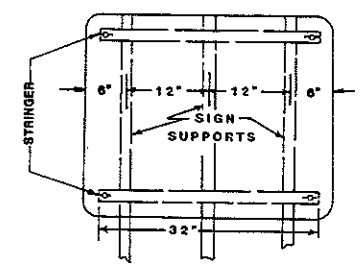


1 POST

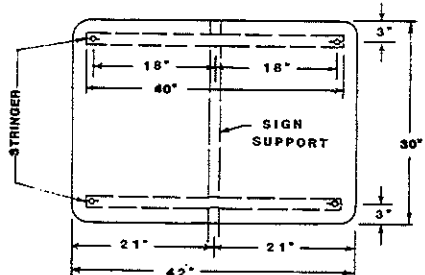


2 POSTS

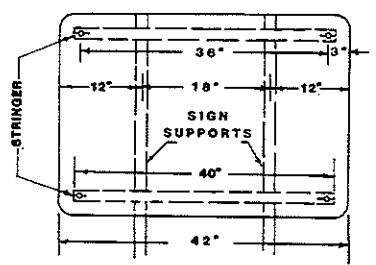
ASSEMBLY NO. 35



3 POSTS

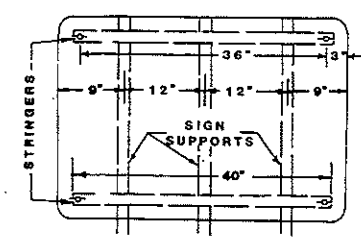


1 POST

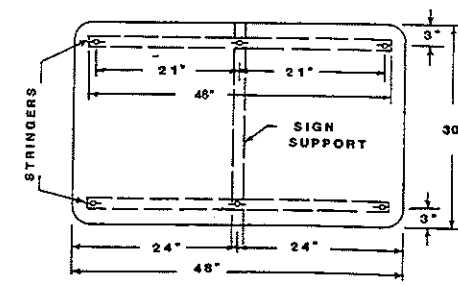


2 POSTS

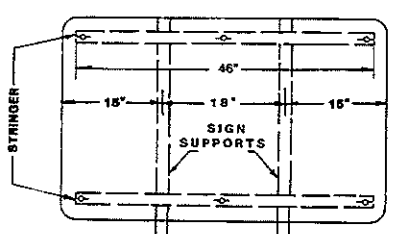
ASSEMBLY NO. 36



3 POSTS

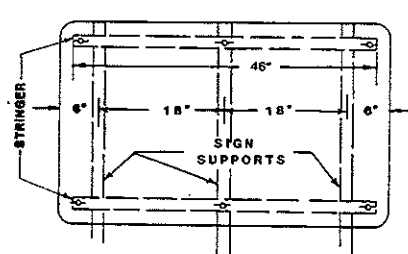


1 POST



2 POSTS

ASSEMBLY NO. 37



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.

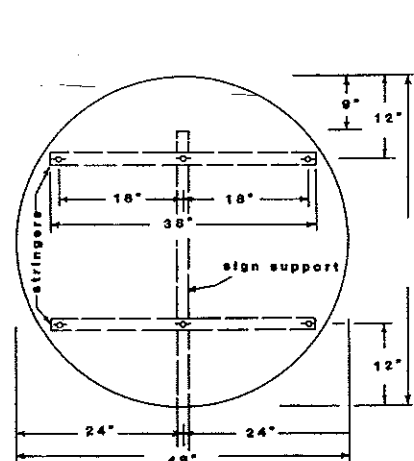
Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

General:
See plans for sign numbers to be used at each location.
See Std. D-754-24 for square tube, perforated mounting details.
See Std. D-754-25 for flange channel mounting details.

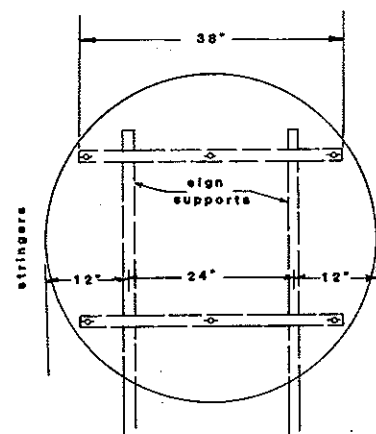
The single stringer and single post sign shall have stringers attached to the post using the special stringer angle shown std. D-754-24 for Perforated Tube post & stringers or using the stringer attachment plate shown on std. D-754-25 for Flange Channel post and stringers.

10-1-86		REVISIONS		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION APPROVED: <i>David K. Larson</i> DESIGN ENGINEER
DATE	CHANGE	DATE	CHANGE	
5-1-97	GENERAL REVISIONS			
7-14-95	46" Stringer			

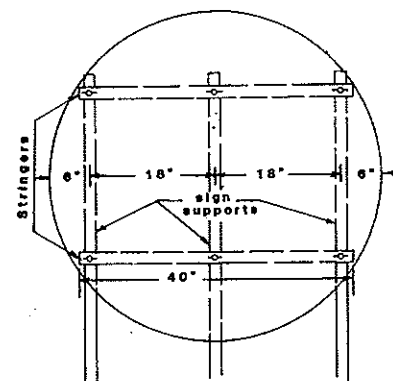
**SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
REGULATORY, WARNING, AND GUIDE SIGNS**



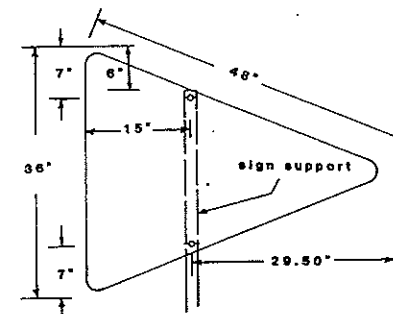
1 POST



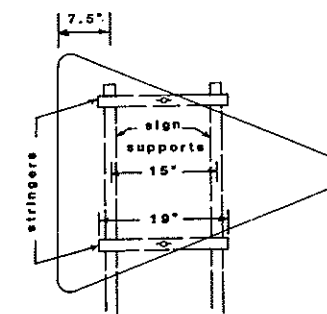
2 POSTS
ASSEMBLY NO. 64



3 POSTS

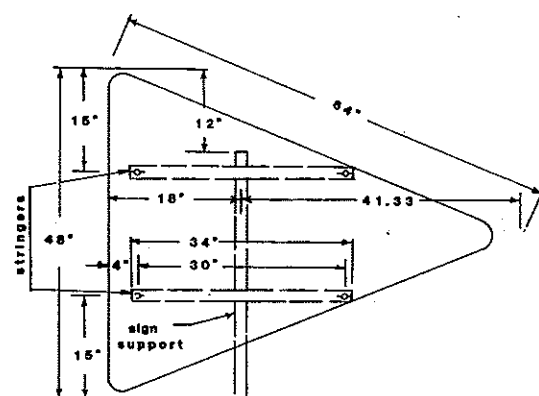


1 POST

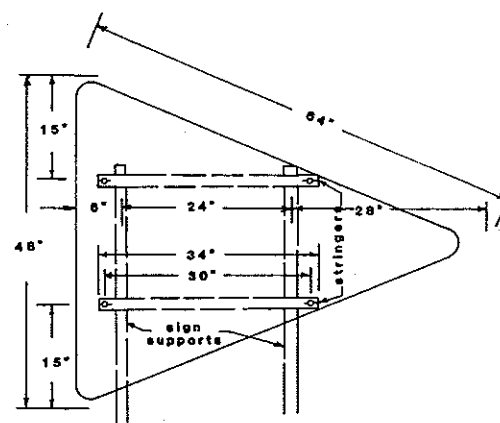


2 POSTS

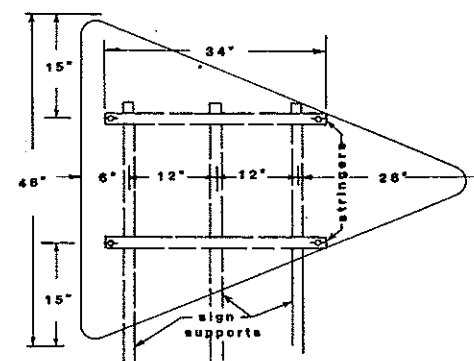
ASSEMBLY NO. 65



1 POST

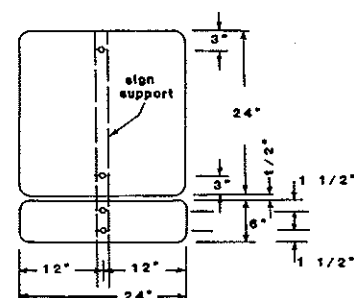


2 POSTS

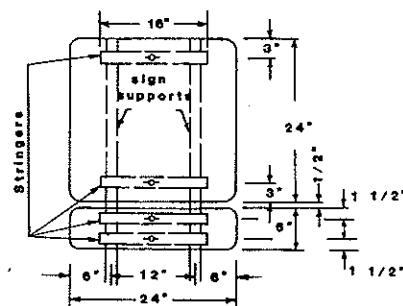


3 POSTS

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" X 1 1/2" and of the length shown.

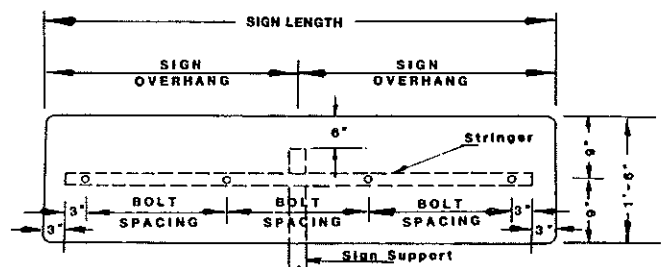
Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

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.

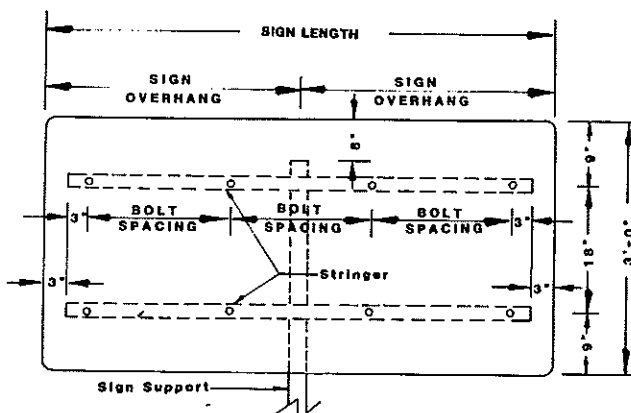
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K.O. Lee</i> DESIGN ENGINEER
5-1-82	GENERAL REVISIONS	

SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

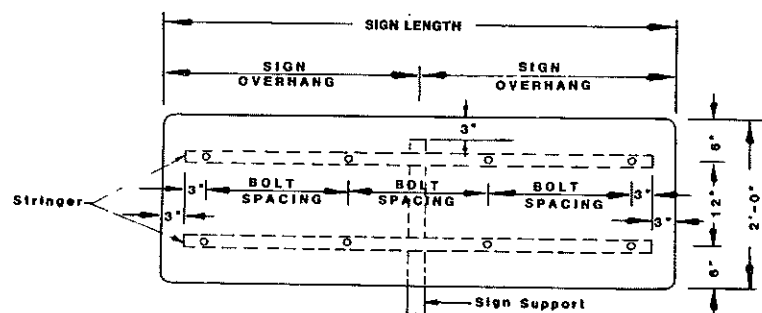
D-754-47



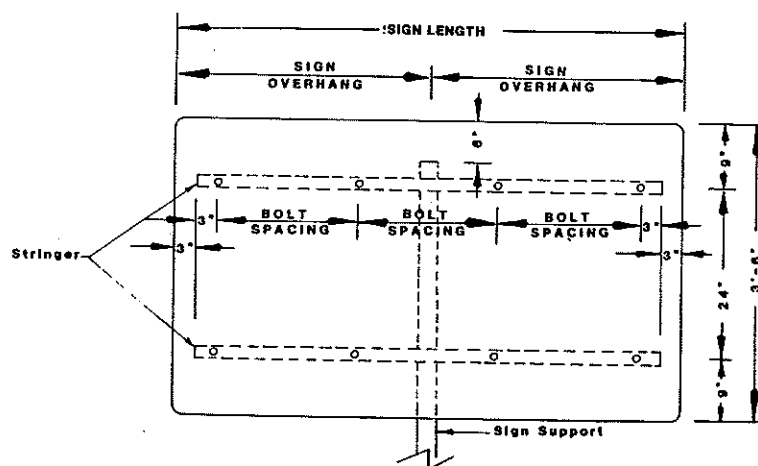
VARIES X 1'-6"



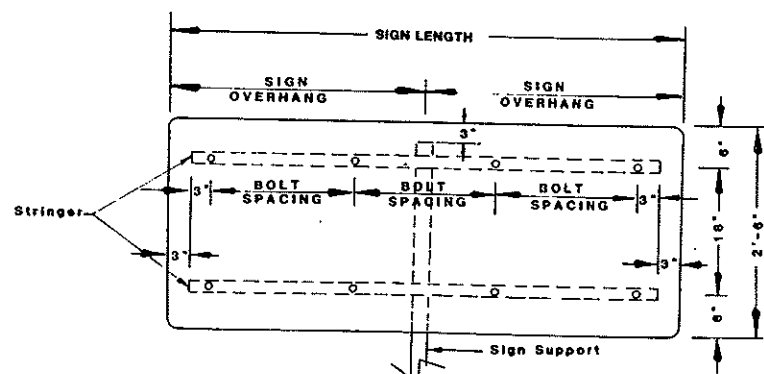
VARIES X 3'-0"



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" & 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" & 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" & 1-22"	4'-9"
10'-0"	93	119	152	185	218	251	284	317	350	2-21" & 1-22"	5'-0"
10'-6"	94	120	153	186	219	252	285	318	351	4-22" & 1-23"	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	2-22" & 4-21"	
14'-0"	101	127	160	193	226	259	292	325	358	2-23" & 5-22"	
14'-6"	102	128	161	194	227	260	293	326	359	0-23" & 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	0-22" & 2-21"	
16'-0"	105	131	164	197	230	263	296	329	362	4-23" & 4-22"	
16'-6"	106	132	165	198	231	264	297	330	363	0-23" & 2-24"	
17'-0"		133	166	199	232	265	298	331	364	24"	
17'-6"		134	167	200	233	266	299	332	365	24"	
18'-0"		135	168	201	234	267	300	333	366	0-23" & 3-22"	
18'-6"		136	169	202	235	268	301	334	367	0-23" & 3-24"	
19'-0"		137	170	203	236	269	302	335	368	24"	
19'-6"		138	171	204	237	270	303	336	369	4-22" & 2-23"	
20'-0"		139	172	205	238	271	304	337	370	0-23" & 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 thicknesses: All signs shall be 0.100 inch.

Stringers:

Flange Channel: All stringers shall be flange channel 1.12¢ per foot end of 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.

NOTE:

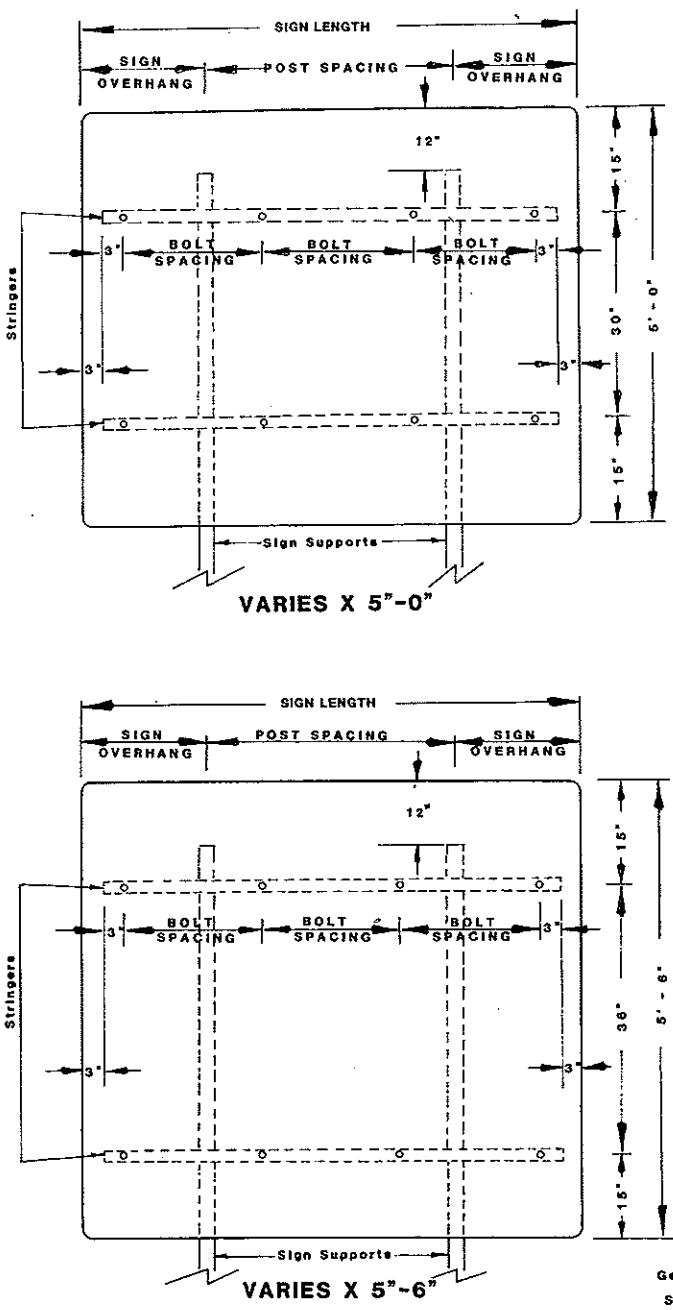
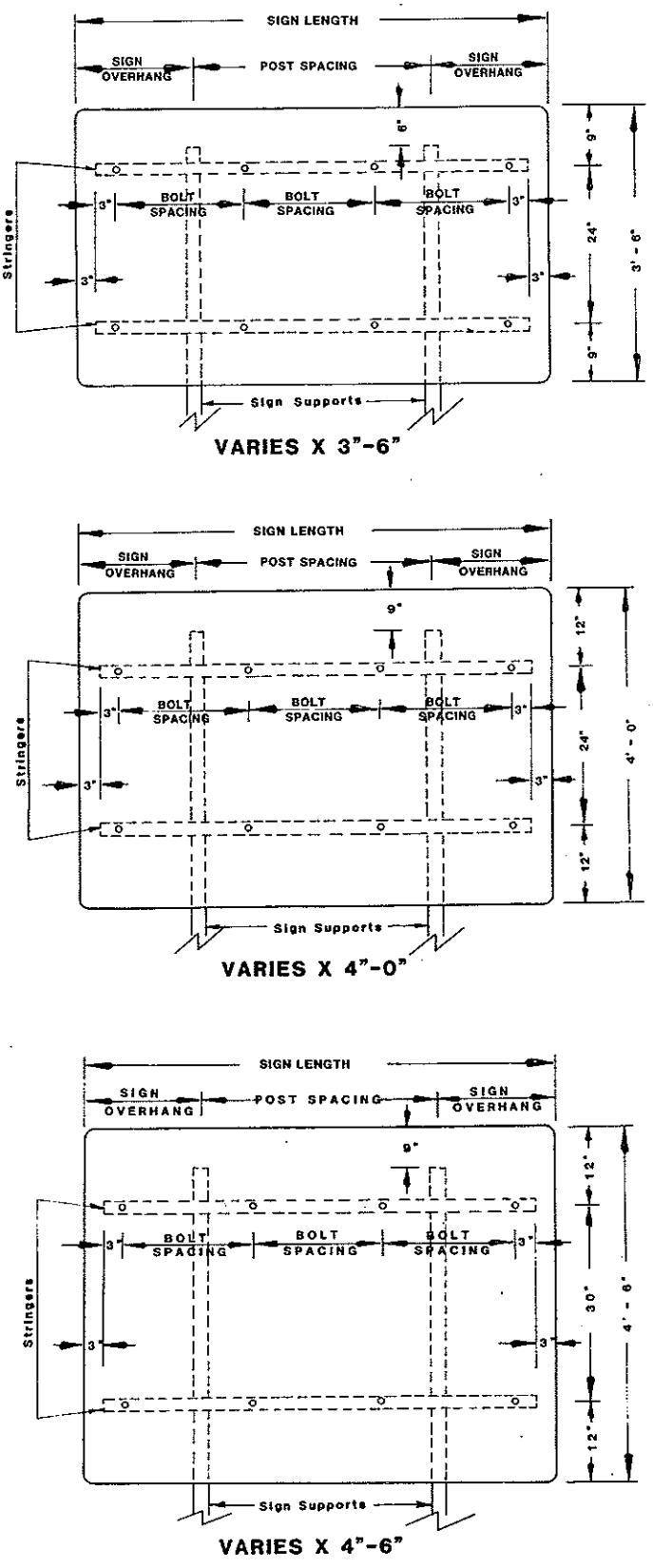
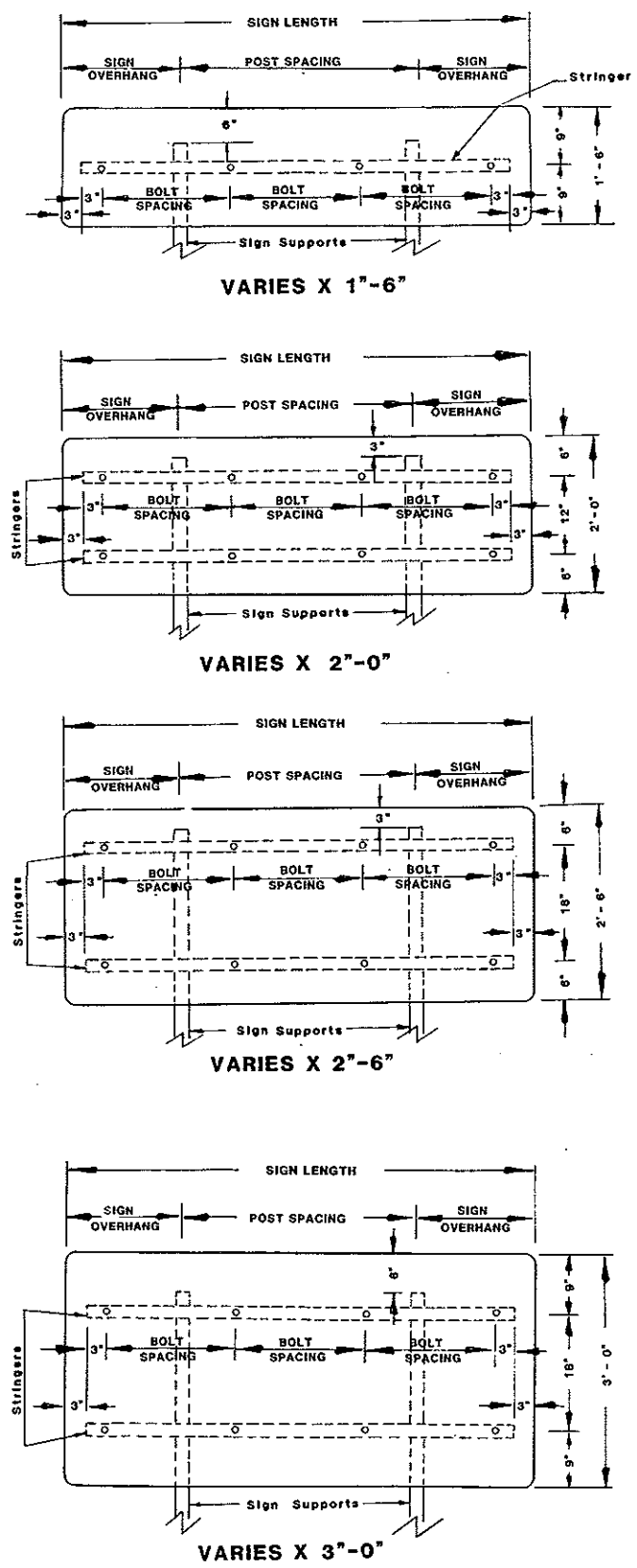
The single stringer and single post sign shall have stringers attached to the post using the special stringer angle shown std. D-754-24 for Perforated Tube post & stringers or using the stringer attachment plate shown on std. D-754-25 for Flange Channel post and stringers.

10-1-86 REVISIONS	
DATE	CHANGE
5-1-82	GENERAL REVISIONS
8-9-83	BOLT SPACING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

APPROVED: *David K. Olson*
DESIGN ENGINEER

SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS



* 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'-9"	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.

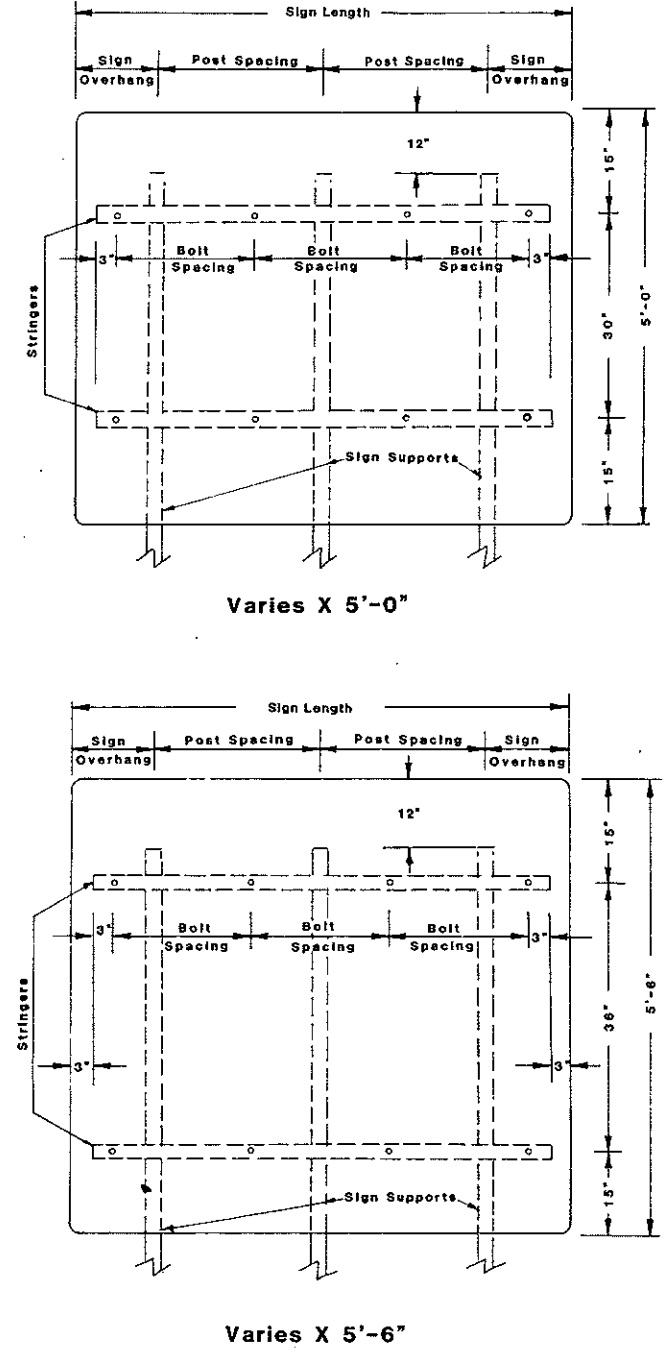
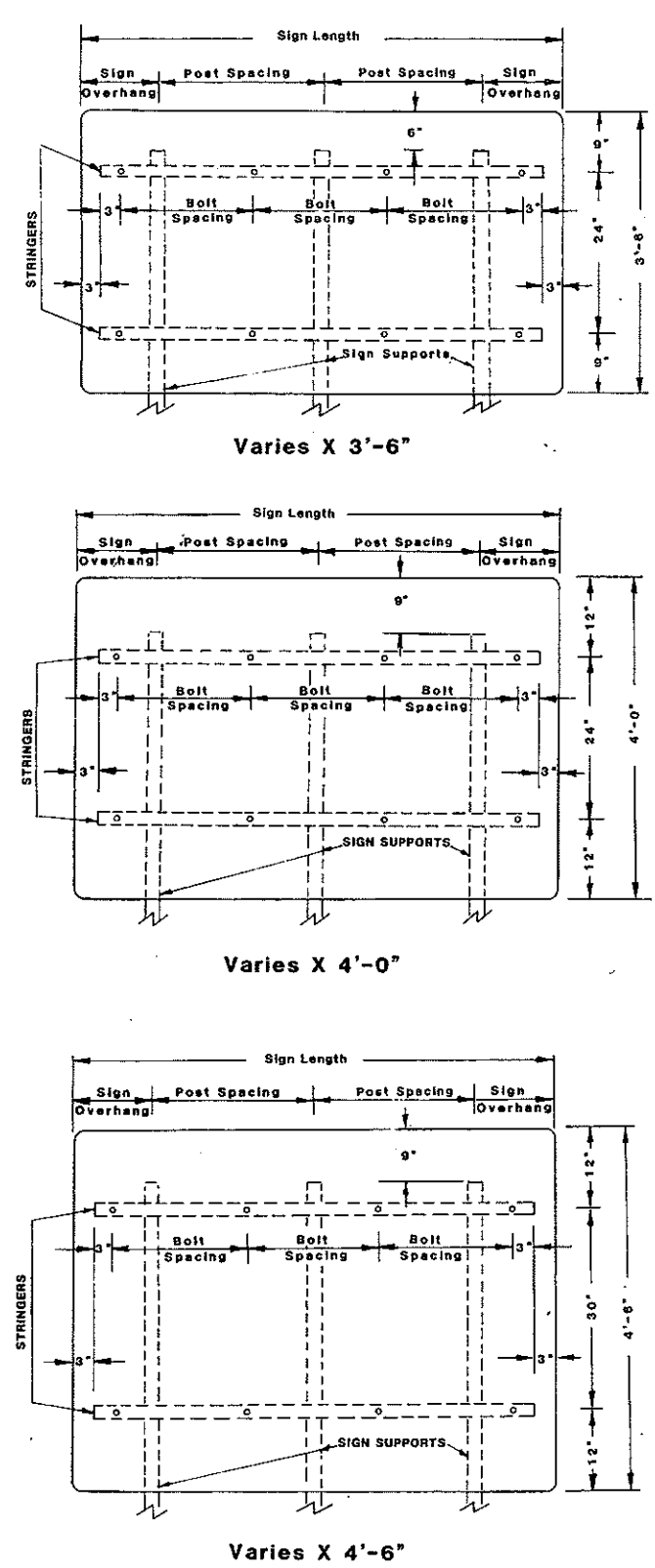
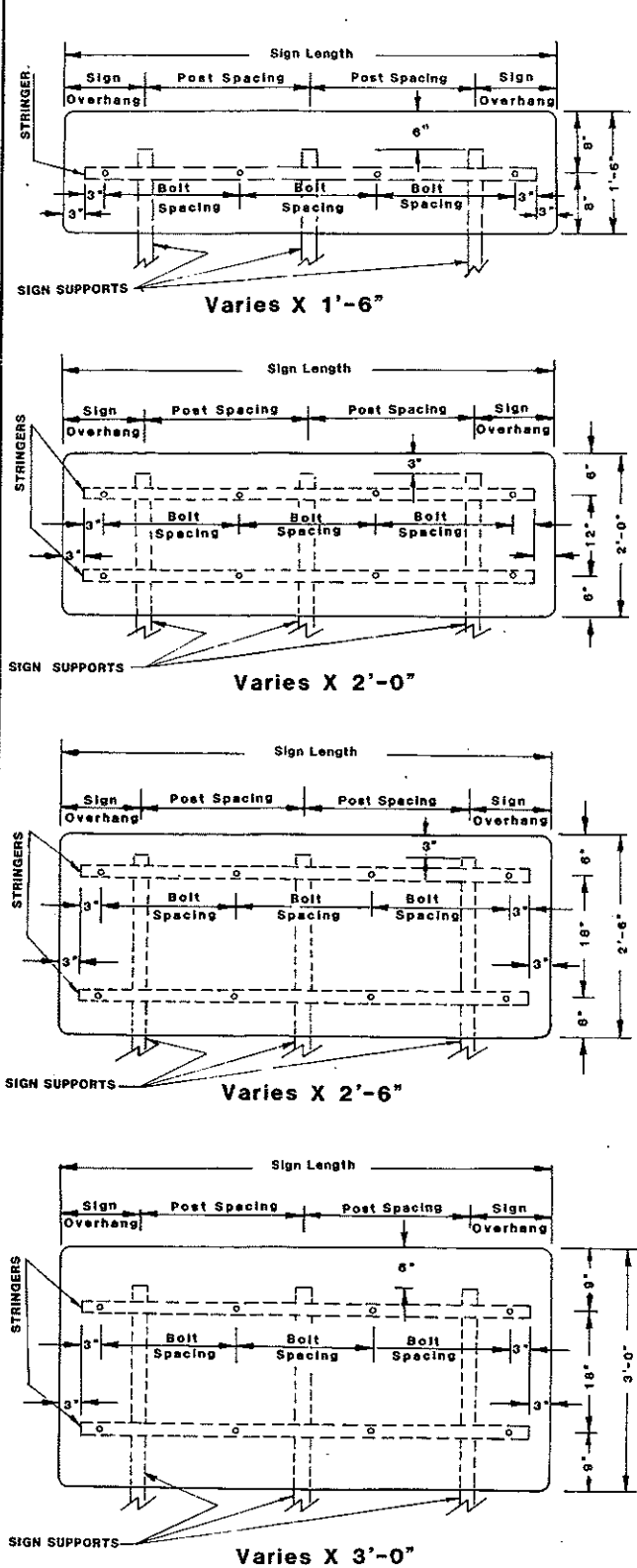
Holes:
Flange Channel: All holes shall be punched round for 3/8" diameter bolts.
Square Tube, Perforated: All holes shall be punched round for 3/8" diameter bolts.

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
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. [Signature]</i> DESIGN ENGINEER
1-1-82	GENERAL REVISIONS	

SIGN PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

D-754-49



# 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'-8"
19'-0"	3'-6"	6'-0"
19'-6"	4'-3"	5'-6"
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 1/2" 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

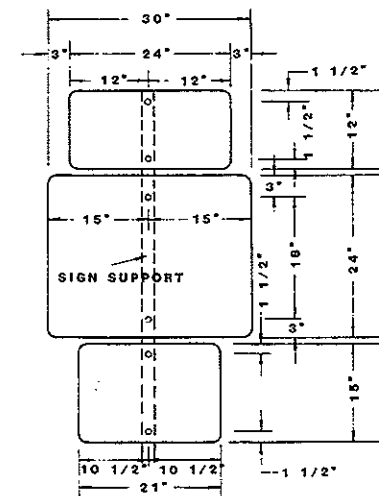
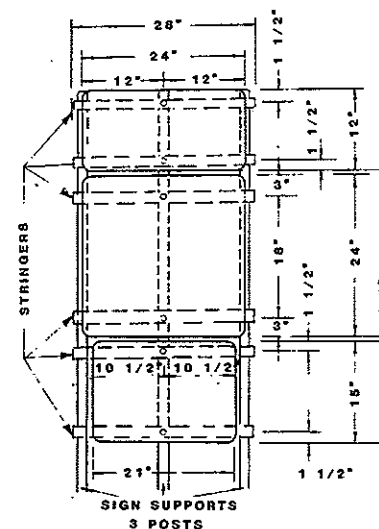
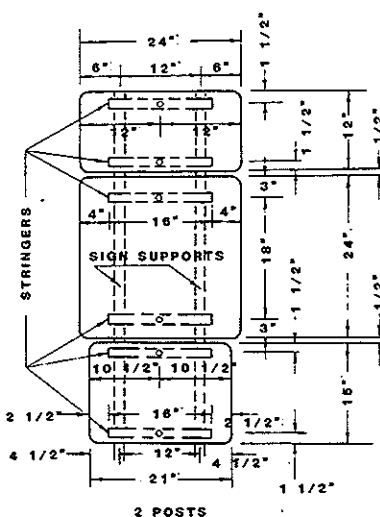
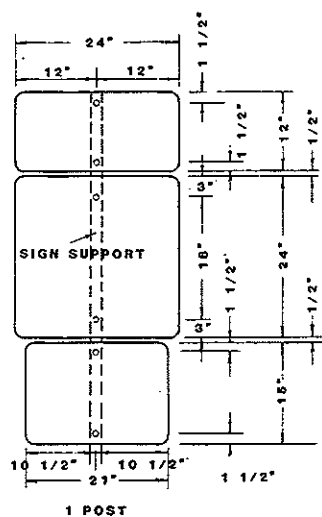
* See Standard Number D-754-47 for Assembly Numbers & Bolt spacings.

10-1-86	
DATE	REVISIONS
5-1-92	GENERAL REVISIONS

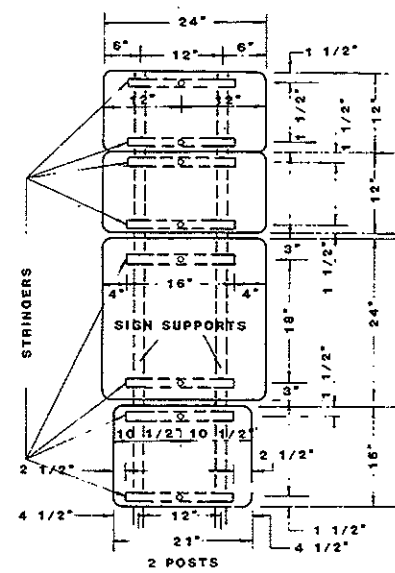
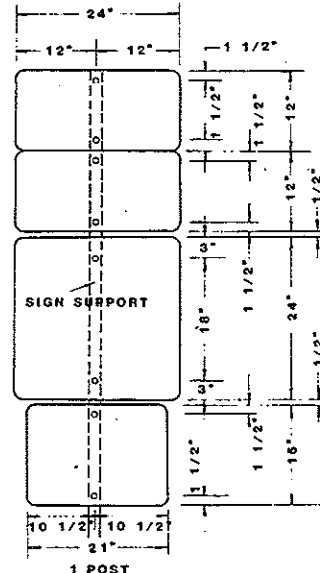
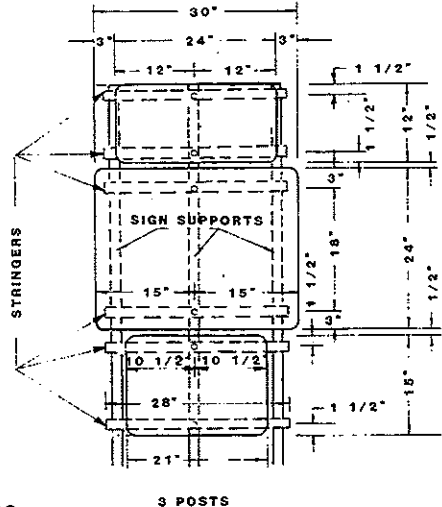
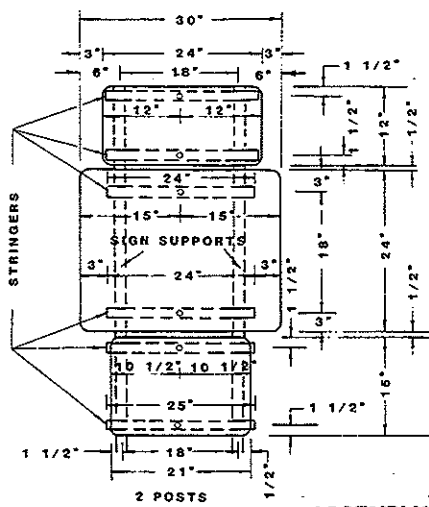
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
Approved: *[Signature]*
Design Engineer

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

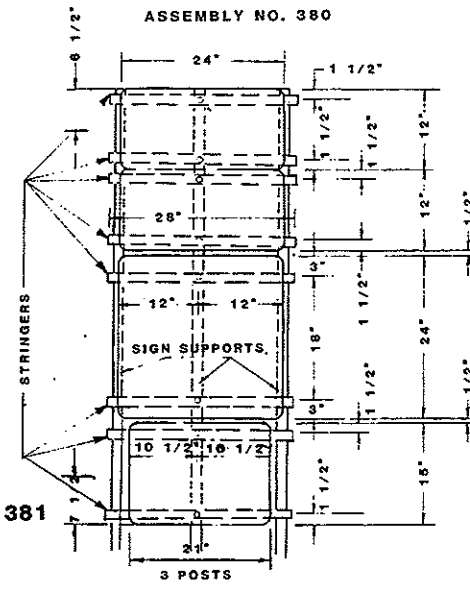
D-754-53



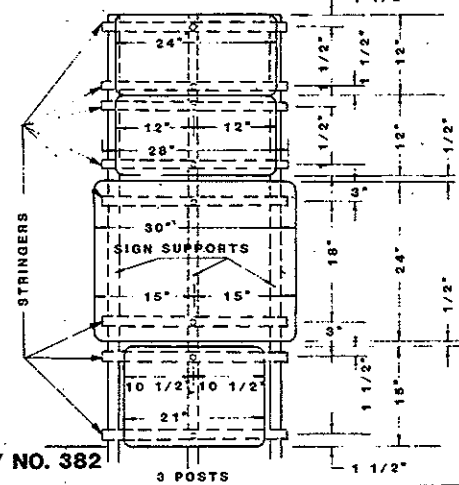
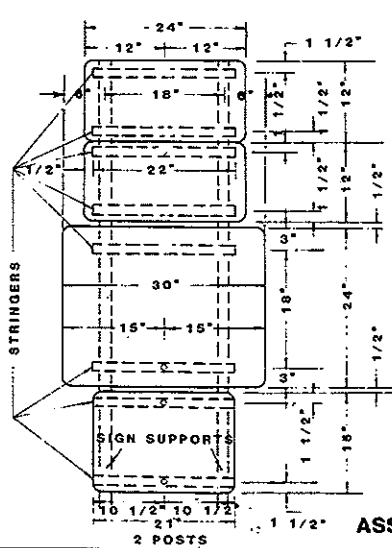
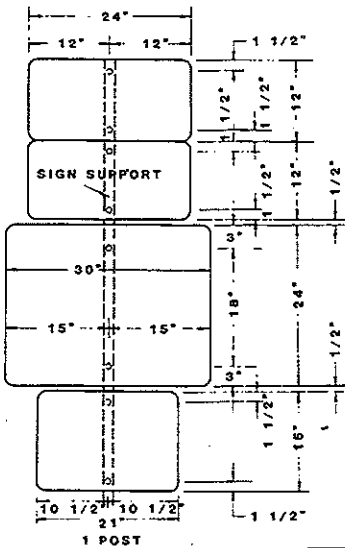
ASSEMBLY NO. 379



ASSEMBLY NO. 381



ASSEMBLY NO. 380



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
REVISIONS		
DATE	CHANGE	APPROVED: <i>David W. [Signature]</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	
7-18-95	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	319	-	-	-	-	-
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	265	372
90x6	144	186	186	198	244	260	347
96x6	135	180	186	186	225	250	326

Assemblies 443, 444							
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	23	307
60x6	119	155	180	195	195	210	221
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	317	-	-	-
48x6	190	215	245	277	342	-	-
54x6	184	191	218	248	304	422	-
60x6	184	184	195	222	273	37	-
66x6	171	184	184	202	247	345	-
72x6	155	176	184	184	226	316	-
78x6	141	161	184	184	208	221	-
84x6	128	148	171	184	192	263	-
90x6	117	135	158	181	184	251	-
96x6	106	124	146	168	184	234	-

Assemblies 443, 444							
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.

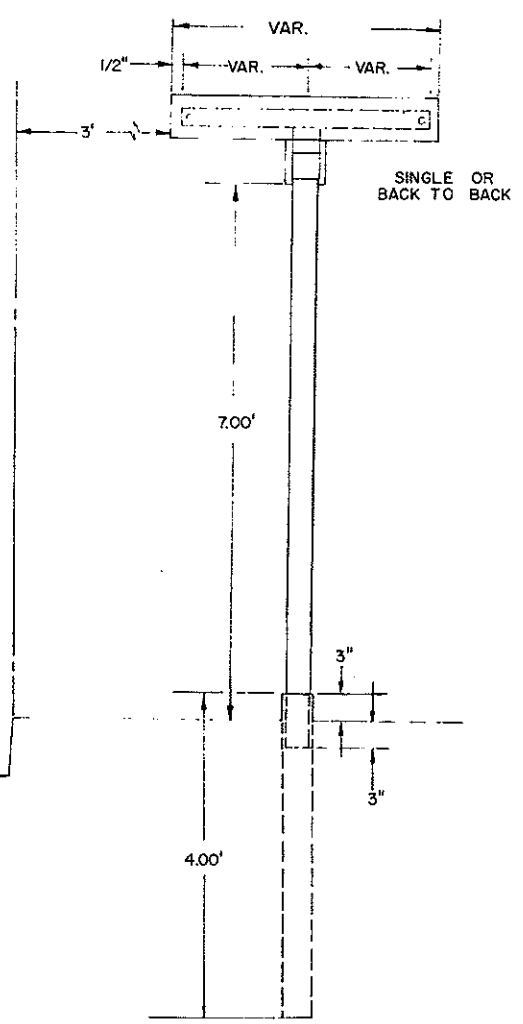
Size and Series: Street name signs 24", 30" or 36" standard length shall be fabricated using the following size and series capital letters:

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

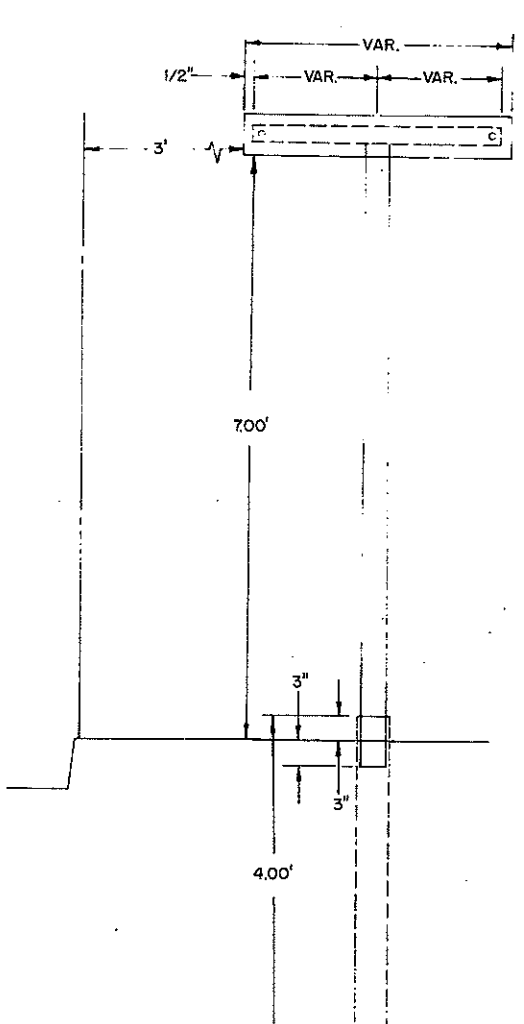
To provide maximum legibility, the widest letter shall be used whenever possible for each of the standard lengths specified. A minimum distance of 1/2" shall be allowed between legend and ends of the sign. The actual area shall be paid for at the contract unit price.

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.

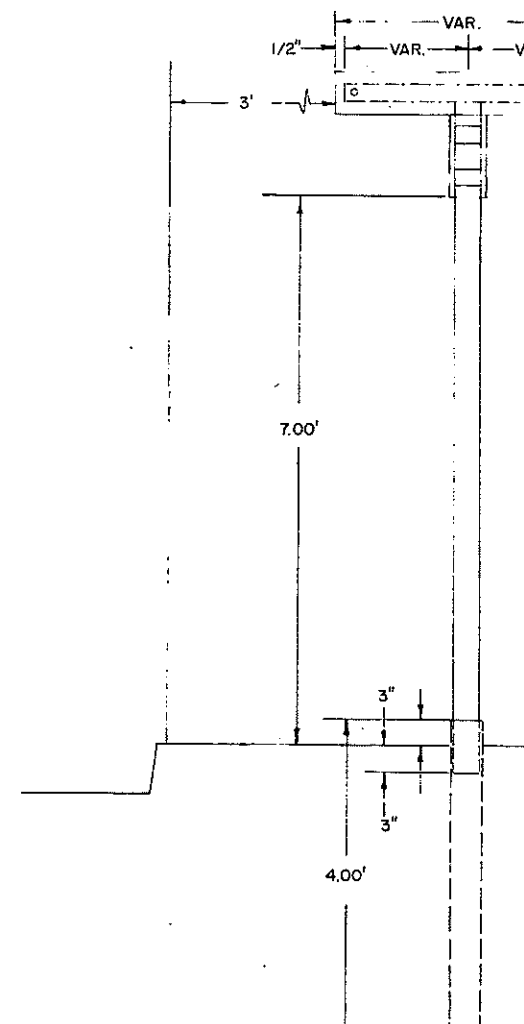
- Assembly: 438 Single sign
 439 Back to Back
 440 Single sign each direction
 441 Single sign one direction back to back other direction
 442 Back to Back both directions
 443 Back to Back single other direction
 Assembly: 444 Back to Back all directions



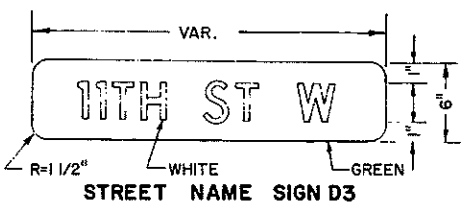
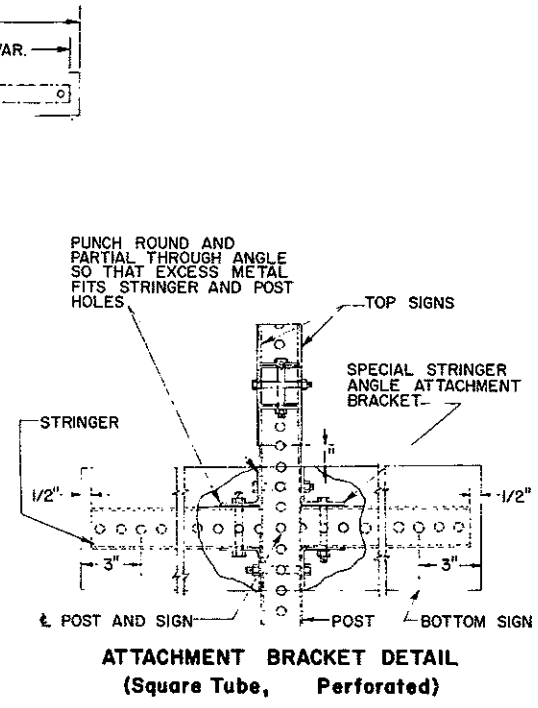
ASSEMBLIES 440,441,442



ASSEMBLIES 438,439



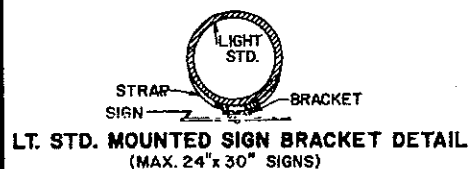
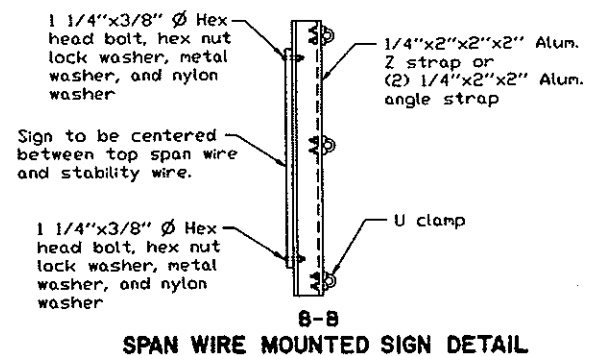
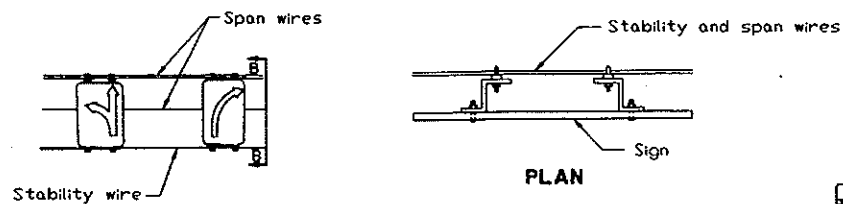
ASSEMBLIES 443,444



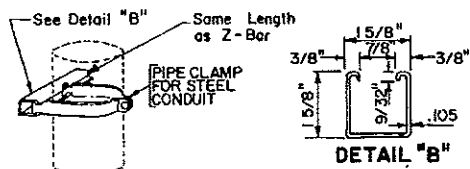
10-1-86	
REVISIONS	
DATE	CHANGE
5-1-82	GENERAL REVISIONS

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
 Approved: *[Signature]*
 Design Engineer

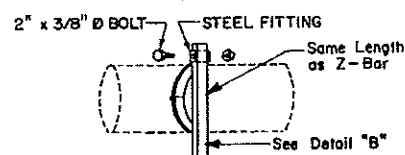
LIGHT STANDARD, SIGNAL STANDARD AND SPAN WIRE MOUNTED SIGN ASSEMBLY DETAIL



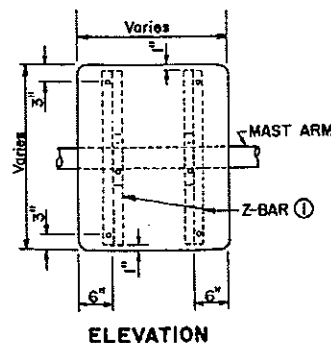
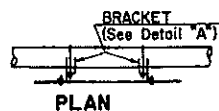
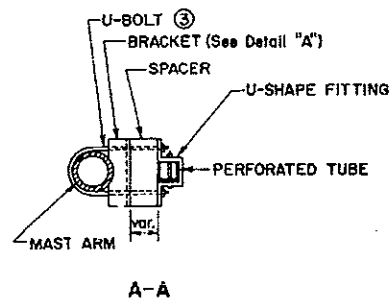
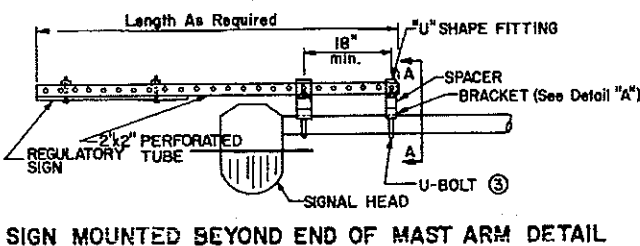
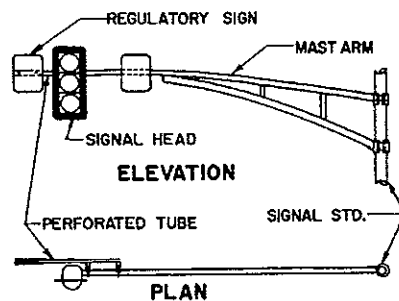
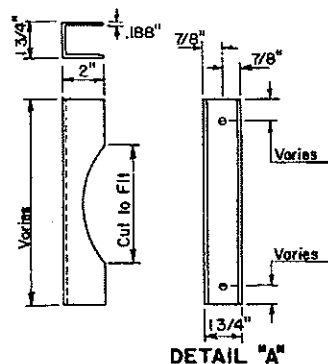
Bracket shall be of galv. steel consisting of strap & sign attachment bracket similar to the one shown in the detail. Cost of the bracket assembly to be included in the price bid for flat sheet signs. Punching shall be as shown on the Standard Drawings. The Engineer in the field shall determine the exact 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.



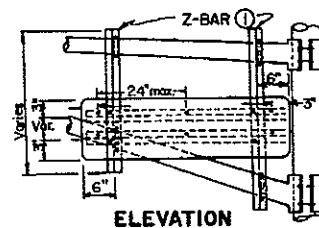
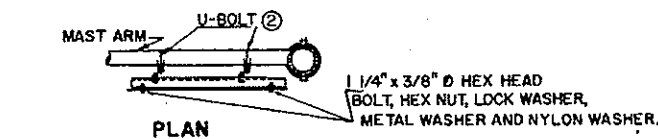
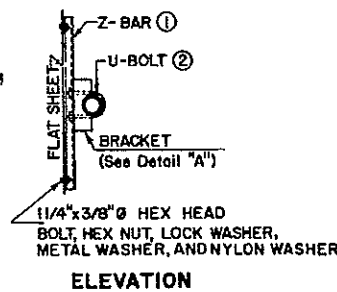
VERTICAL MOUNTING
Two (2) Clamps Required Per Sign



HORIZONTAL MOUNTING
Two (2) Clamps Required Per Sign
ALTERNATE CLAMP MOUNTING



MAST ARM MOUNTED REGULATORY SIGN DETAIL

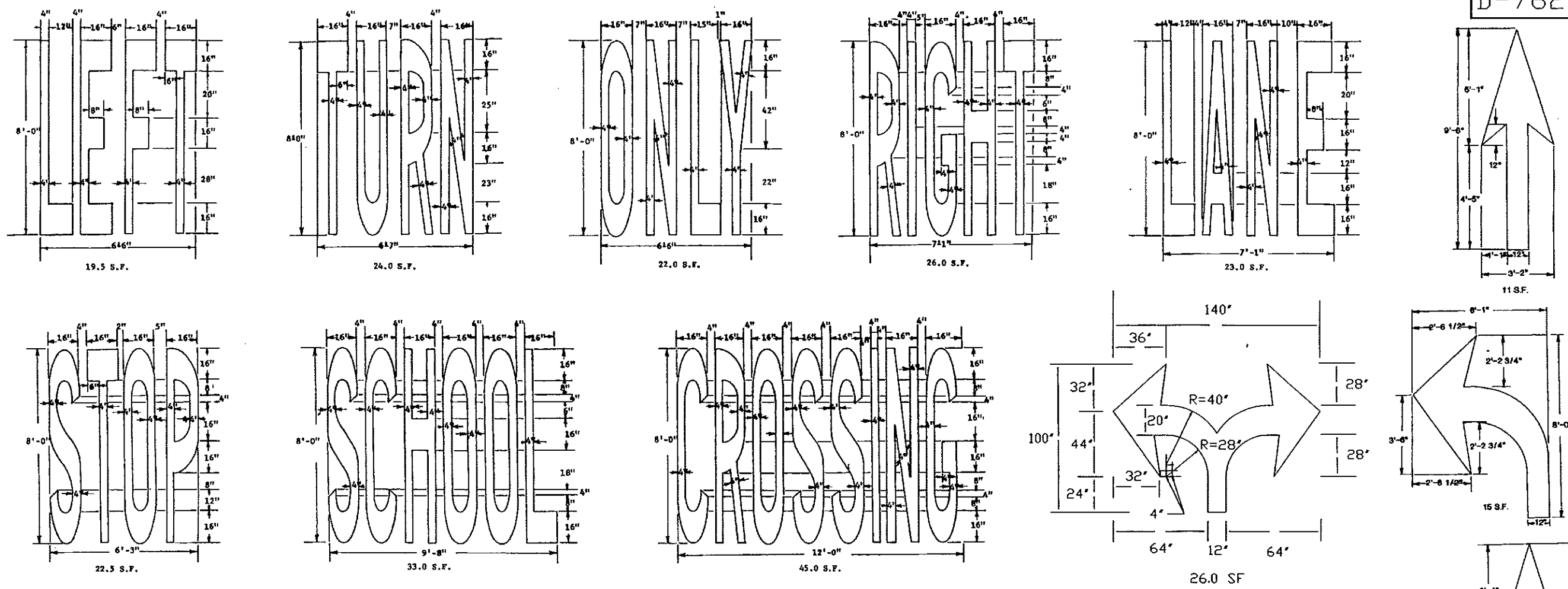


MAST ARM MOUNTED STREET NAME SIGN DETAIL

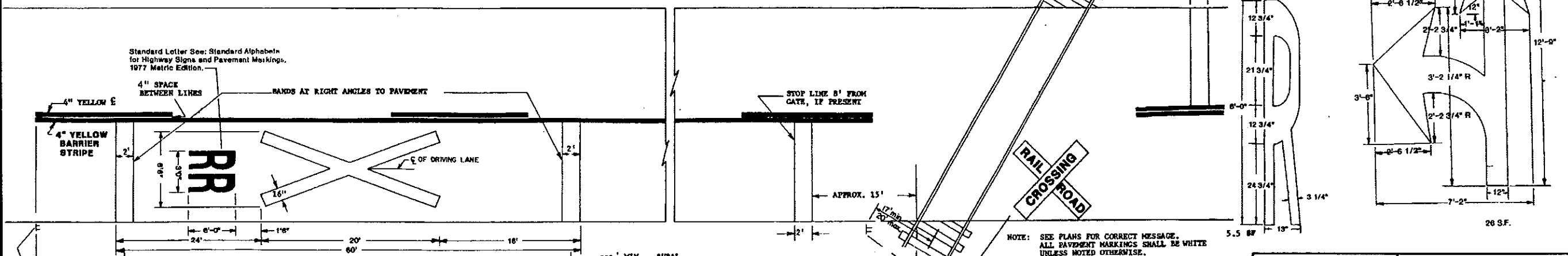
- ① Z-Bar - Use 1 3/4" x 3/16" Thick 1.08 Lbs./Ft Aluminum Alloy in lieu of Z-Bar, two angles bolted together, may be used or a channel. (1 3/4" x 1 3/4" x 3/16" angles) (1 3/4" x 2" x .188" Channels)
- ② 3/8" U-Bolt, Hex Nut, Lock Washer & Length depends on Dia. of Mast Arm
- ③ 3/8" U-Bolt, Hex Nut, Lock Washer & Length depends on Dia. of Mast Arm. Point Perforated Tube the same color and specification as Mast Arm.
2 x 2" Maximum support length 9.9 ft.
2 1/4" 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.

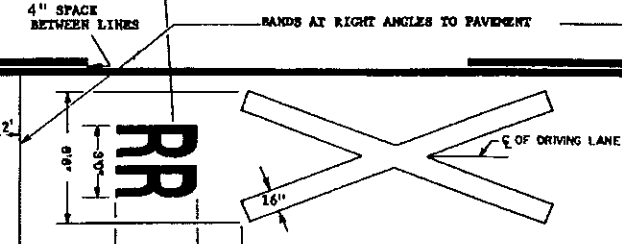
10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED <i>David K. Olson</i> DESIGN ENGINEER
5-1-92	GENERAL REVISIONS	
11-24-95	SPAN WIRE MOUNTING SIGN DETAIL	



PAVEMENT MARKING MESSAGE DETAILS

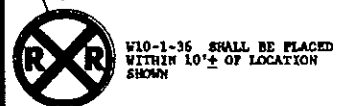


Standard Letter See: Standard Alphabet for Highway Signs and Pavement Markings, 1977 Metric Edition.



STOP LINE 8' FROM GATE, IF PRESENT

NOTE: SEE PLANS FOR CORRECT MESSAGE. ALL PAVEMENT MARKINGS SHALL BE WHITE UNLESS NOTED OTHERWISE.



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

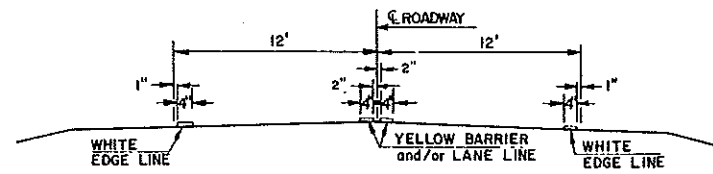
RAILROAD CROSS & 2 R'S 65.0 S.F.
3 BANDS 72.0 S.F.

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

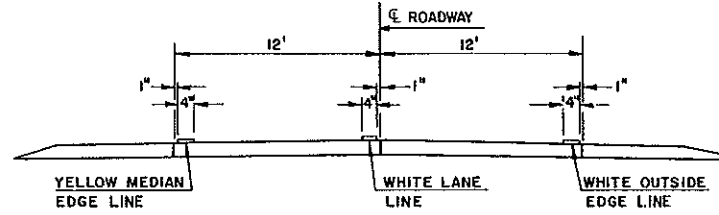
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Larson*
DESIGN ENGINEER

PAVEMENT MARKING

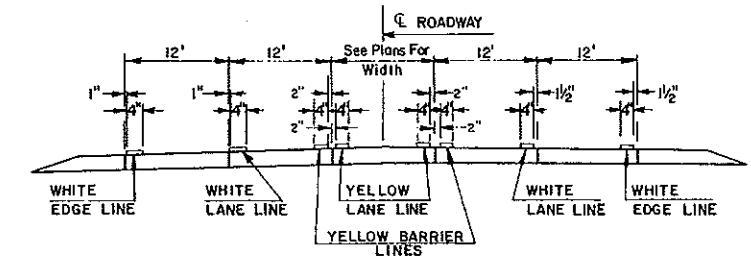
FHWA REGION	STATE	FED AID PROJ. NO.	SHEET NO.
8	N.D.		D-762-4



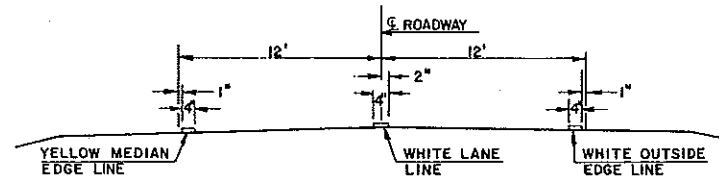
TWO LANE TWO WAY
RURAL ROADWAY



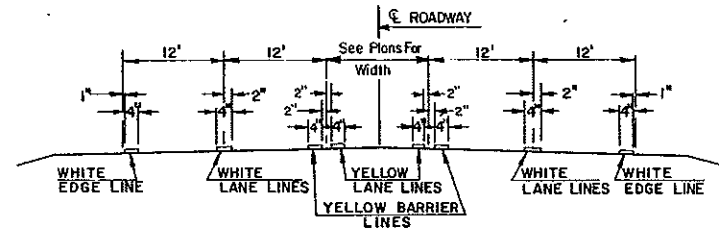
TWO LANE ROADWAY
INTERSTATE HIGHWAY
CONCRETE SECTION



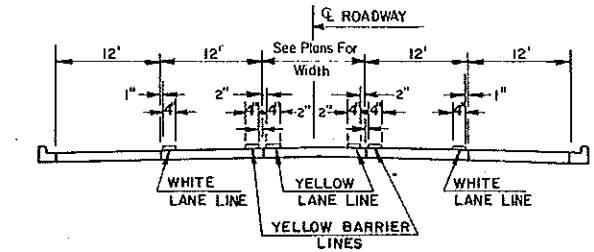
RURAL FIVE LANE ROADWAY
CONCRETE SECTION



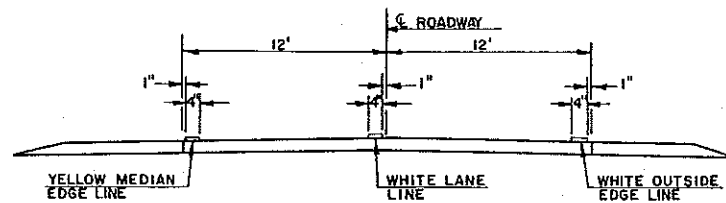
TWO LANE DIVIDED
RURAL ROADWAY
PRIMARY HIGHWAY
ASPHALT SECTION



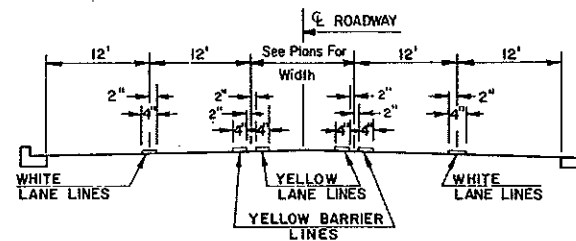
RURAL FIVE LANE ROADWAY
ASPHALT SECTION



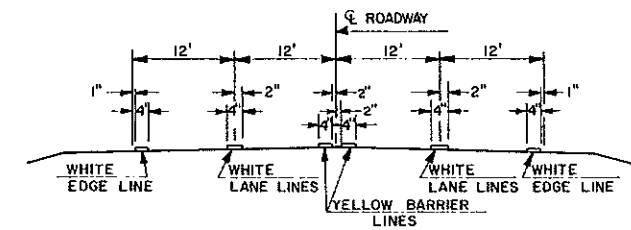
URBAN FIVE LANE SECTION
CONCRETE SECTION



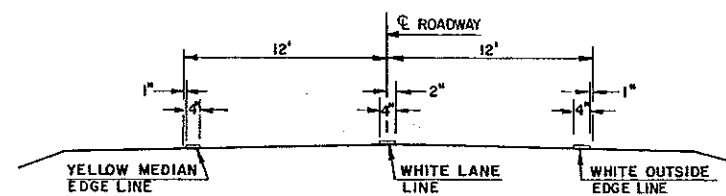
TWO LANE ROADWAY
PRIMARY HIGHWAY
CONCRETE SECTION



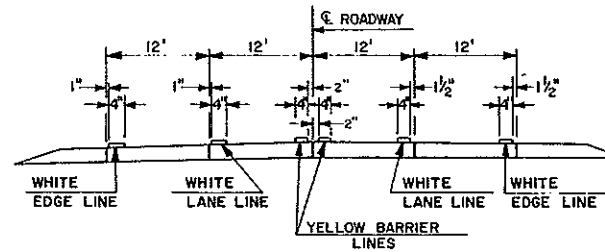
URBAN FIVE LANE SECTION
ASPHALT SECTION



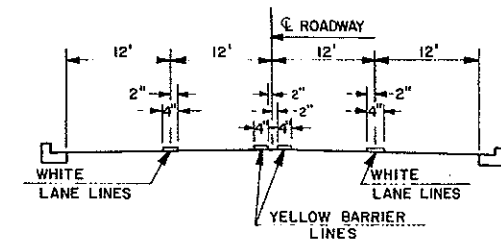
RURAL FOUR LANE ROADWAY
ASPHALT SECTION



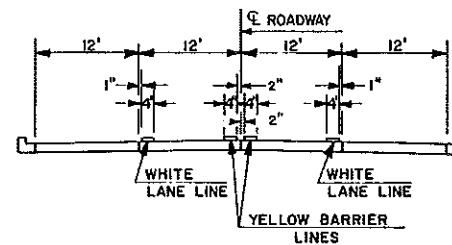
TWO LANE ROADWAY
INTERSTATE HIGHWAY
ASPHALT SECTION



RURAL FOUR LANE ROADWAY
CONCRETE SECTION



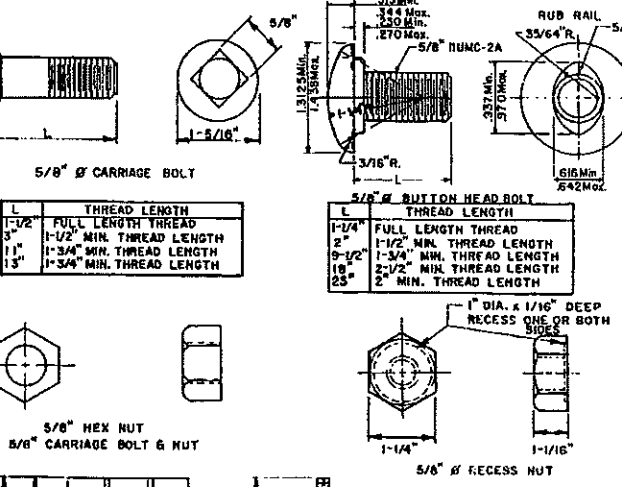
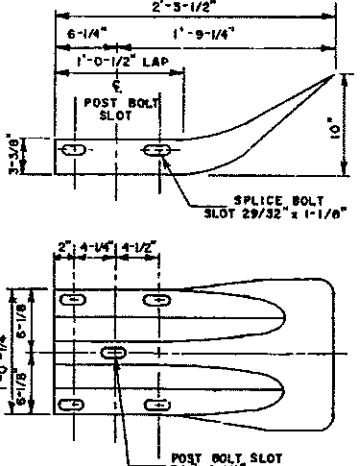
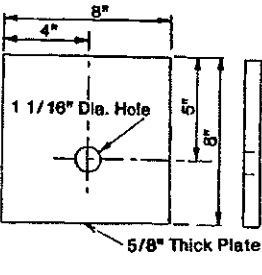
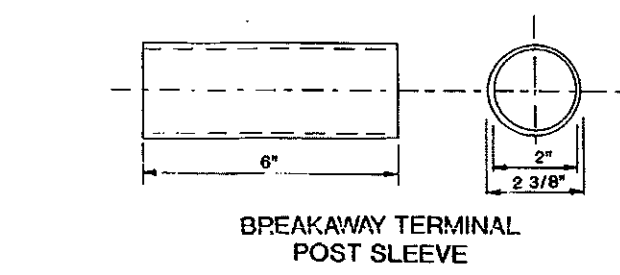
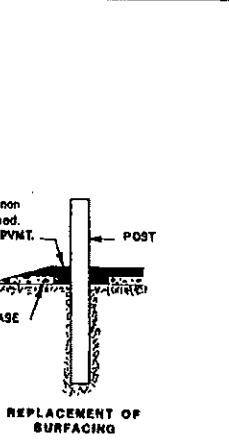
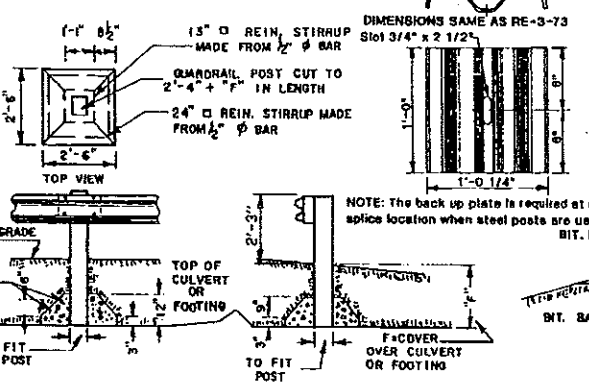
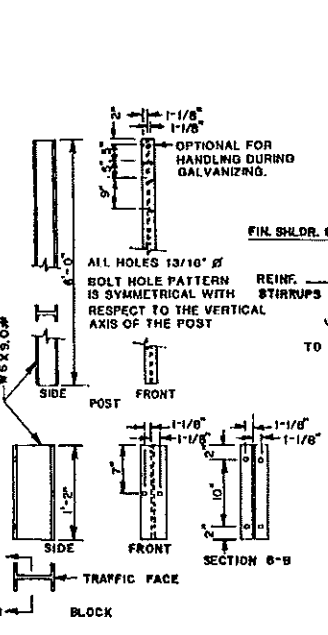
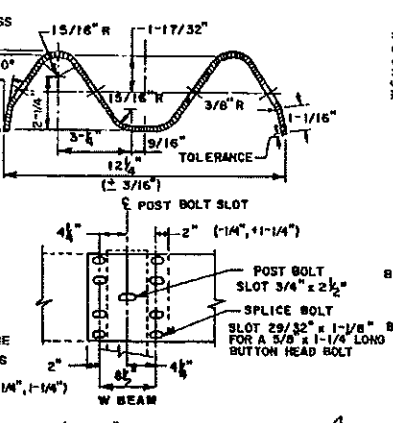
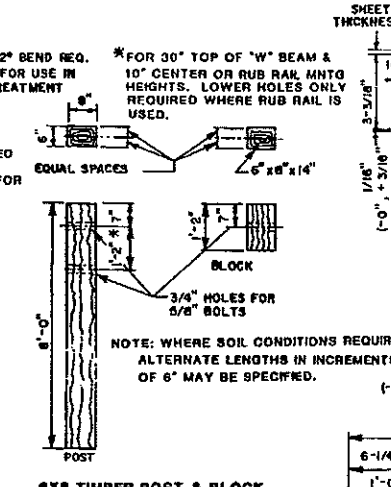
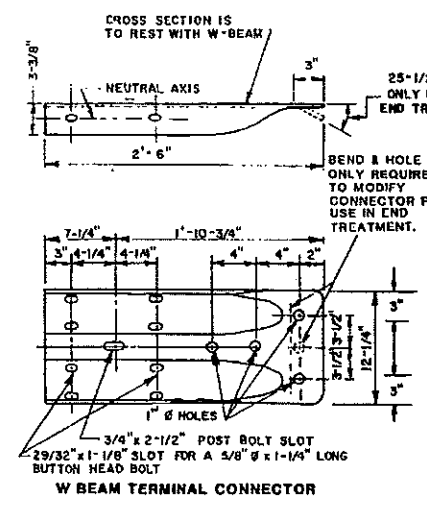
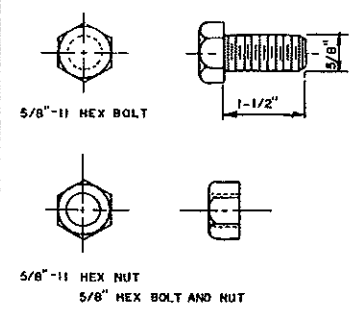
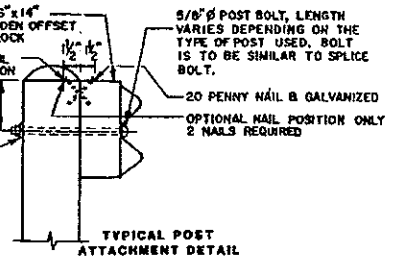
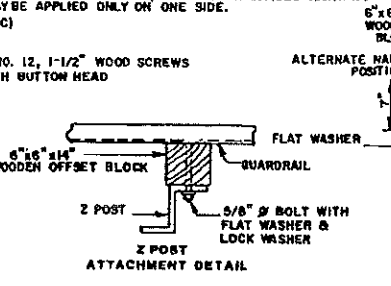
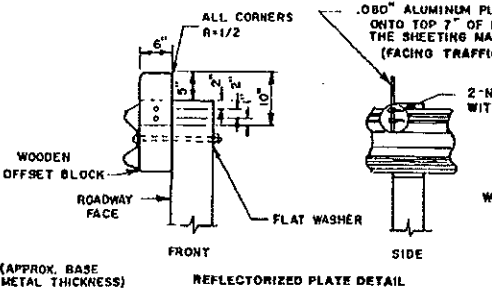
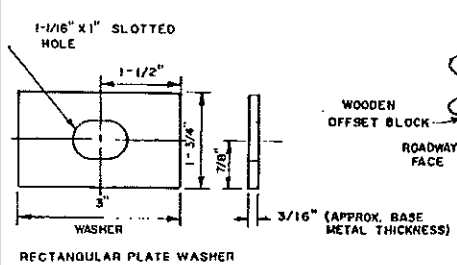
URBAN FOUR LANE SECTION
ASPHALT SECTION



URBAN FOUR LANE SECTION
CONCRETE SECTION

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. Olson</i> DESIGN ENGINEER
3-1-88 8-1-94	Edge Line GEN. REV.	

BEAM GUARDRAIL GENERAL DETAILS

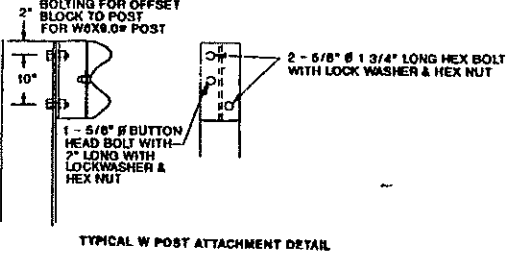
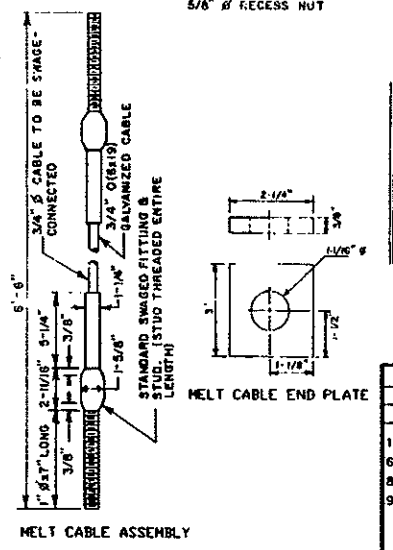
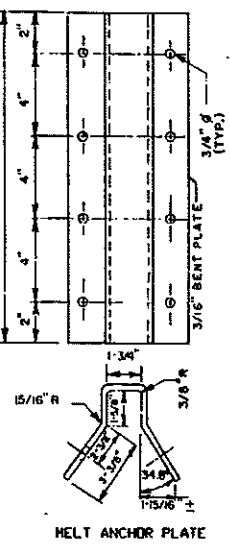
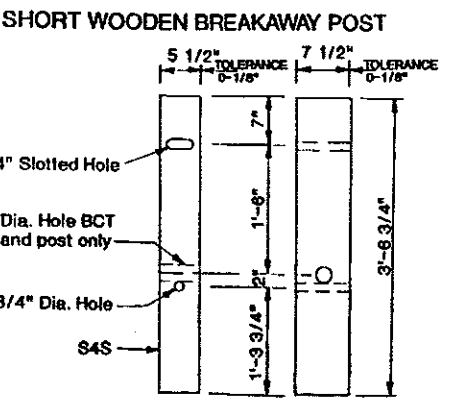
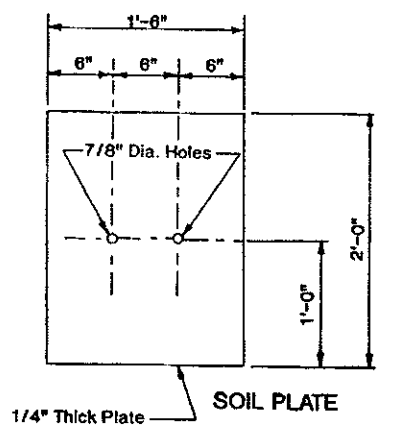
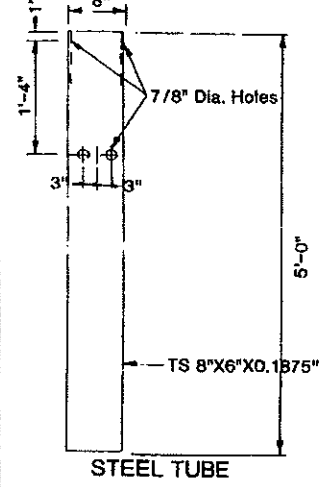


NOTE: REFLECTORIZED PLATES, REFLECTOR PLATES SHALL BEGIN AT FIRST POST AND SPACED AT 25' CENTERS ON GUARDRAIL LESS THAN 250' IN LENGTH AND AT 50' CENTERS FOR GUARDRAIL OVER 250' IN LENGTH. THE REFLECTOR SHALL BE THE SAME COLOR AS THE PAVEMENT MARKING ADJACENT TO THAT REFLECTOR UNLESS NOTED OTHERWISE ON THE PLANS. W-BEAM GUARDRAIL SECTIONS SHALL BE JOINED SO THE SPLICES ARE LAPPED TO FLOW IN THE DIRECTION OF THE TRAFFIC.

DETAIL OF CONCRETE PEDESTAL FOR POSTS: TO BE USED OVER CULVERTS OR FOOTINGS WHEN DIMENSION "F" IS LESS THAN 3'-8". WHEN Z OR ROUND POSTS ARE USED AND THE PEDESTAL REQUIRED THE POST HOLE IN THE PEDESTAL SHALL BE VARIED AS REQUIRED BY THE POST SHAPE.

MANNER OF REPLACING BIT, MATERIAL AT GUARDRAIL POST: ALL EXCESS EARTH FROM EXCAVATIONS FOR GUARD POSTS SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER. REPLACE BIT, MATERIAL WHERE GUARDRAIL IS INSTALLED AFTER MAT HAS BEEN LAID. COST OF EXCAVATION AND REPLACING OF BIT, MATERIAL TO BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

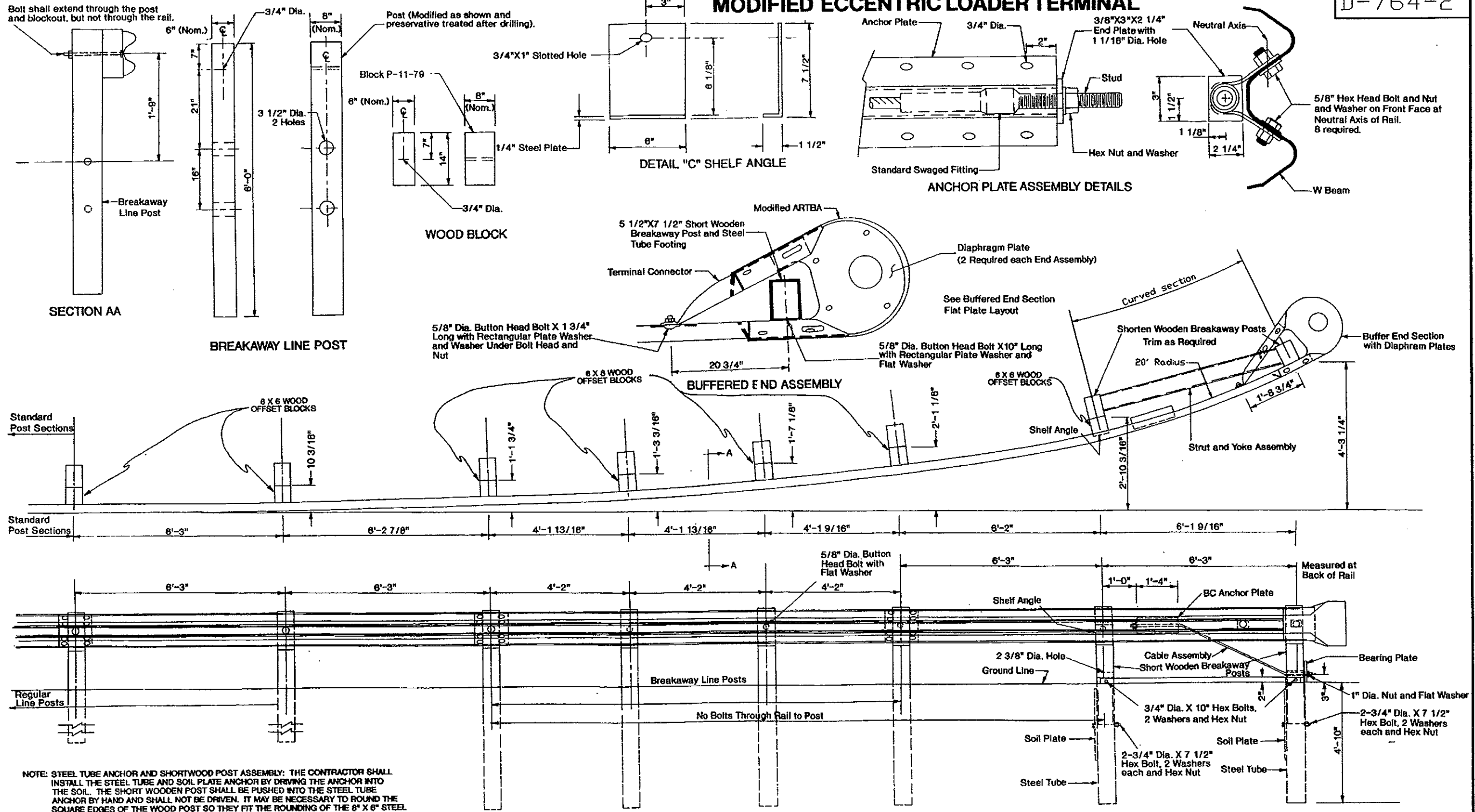
STEEL TUBE ANCHOR AND SHORTWOOD POST ASSEMBLY: THE CONTRACTOR SHALL INSTALL THE STEEL TUBE AND SOIL PLATE ANCHOR BY DRIVING THE ANCHOR INTO THE SOIL. THE SHORT WOODEN POST SHALL BE PUSHED INTO THE STEEL TUBE ANCHOR BY HAND AND SHALL NOT BE DRIVEN. IT MAY BE NECESSARY TO ROUND THE SQUARE EDGES OF THE WOOD POST SO THEY FIT THE ROUNDING OF THE 8"x6" STEEL TUBE. THE INSIDE OF THE STEEL TUBE ANCHOR SHALL BE GREASED BEFORE INSTALLATION OF THE WOODEN POST TO FACILITATE INSTALLATION AND REMOVAL.



10-1-85 REVISIONS	
DATE	CHANGE
11-15-93	ADDED NOTE
6-26-95	CHG BCT CABLE TO MELT
8-31-95	REMOVE NOTE
9-20-95	REVISE NOTE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *David K. Lee*
DESIGN ENGINEER

MODIFIED ECCENTRIC LOADER TERMINAL

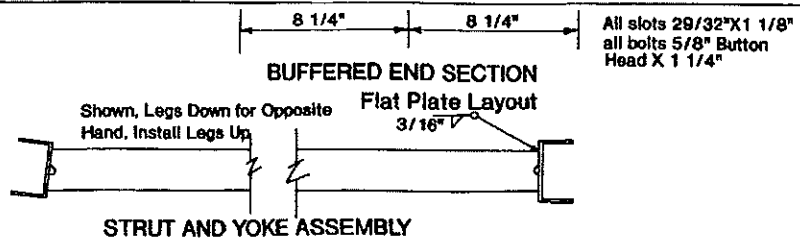
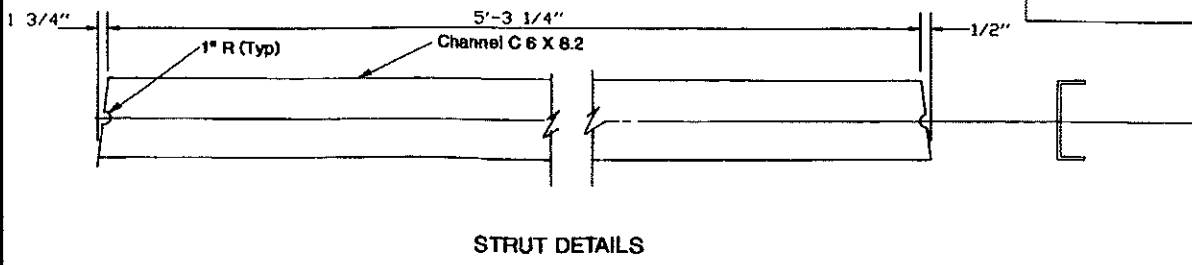
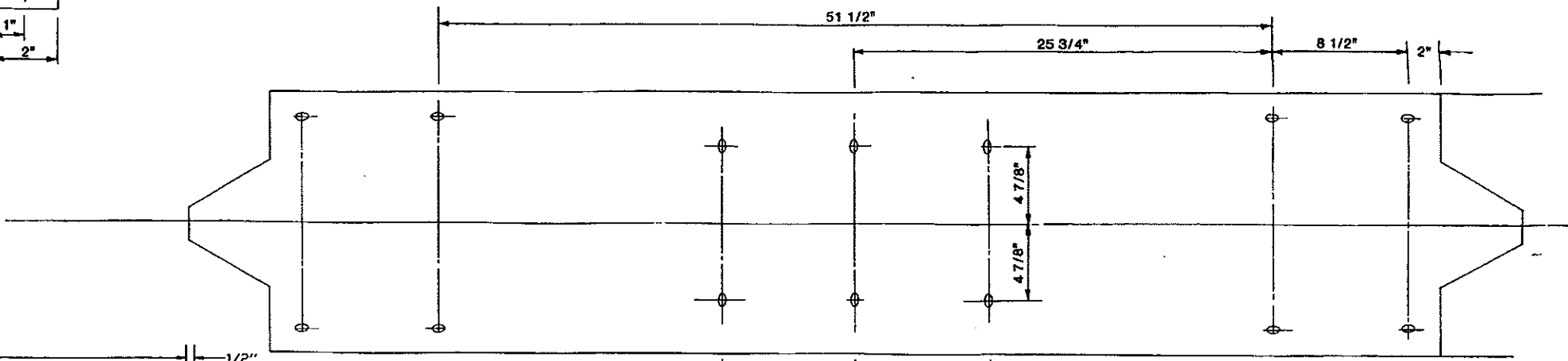
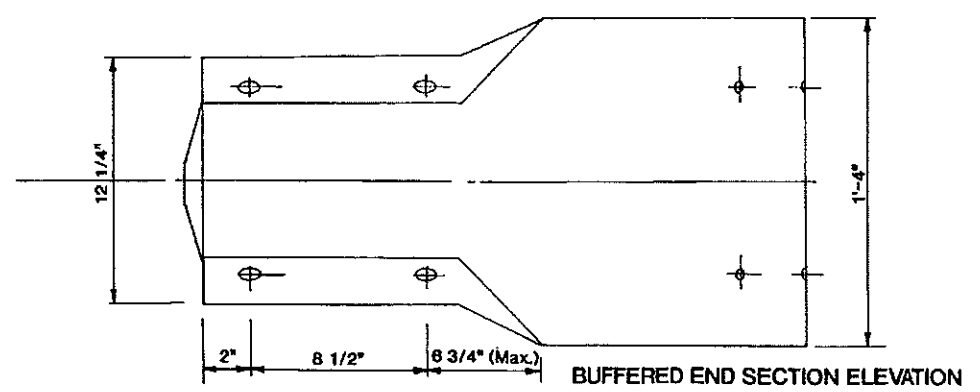
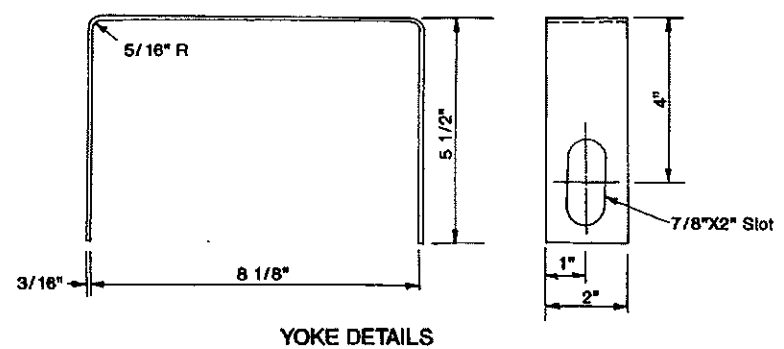
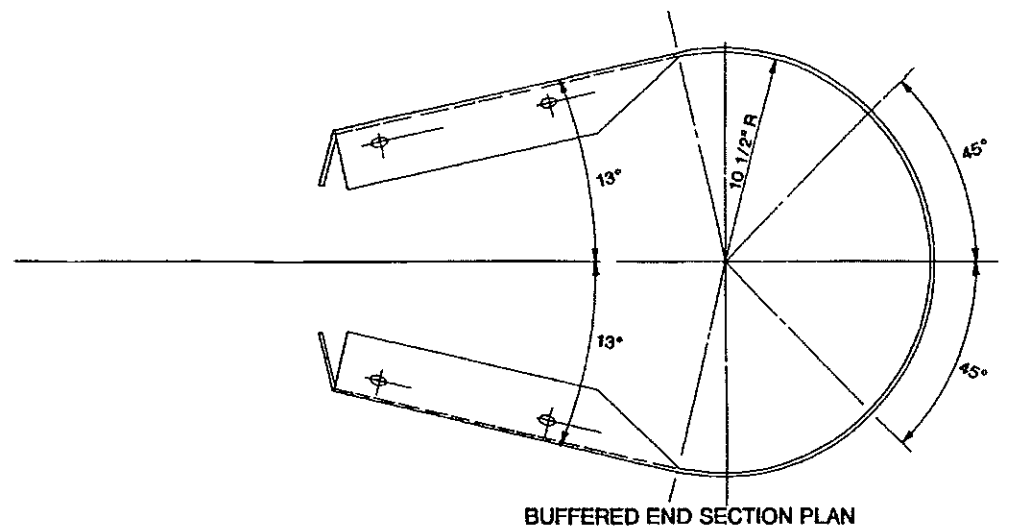
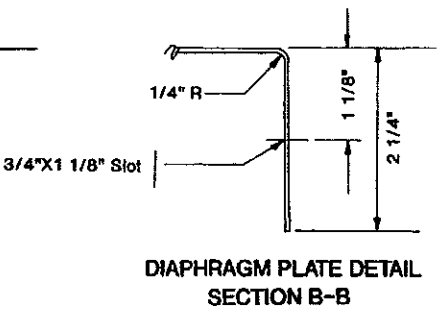
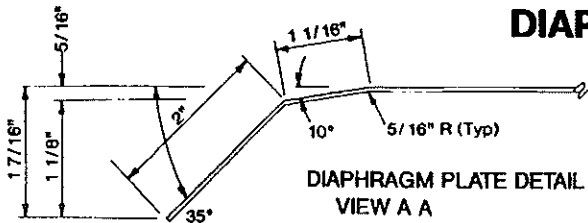
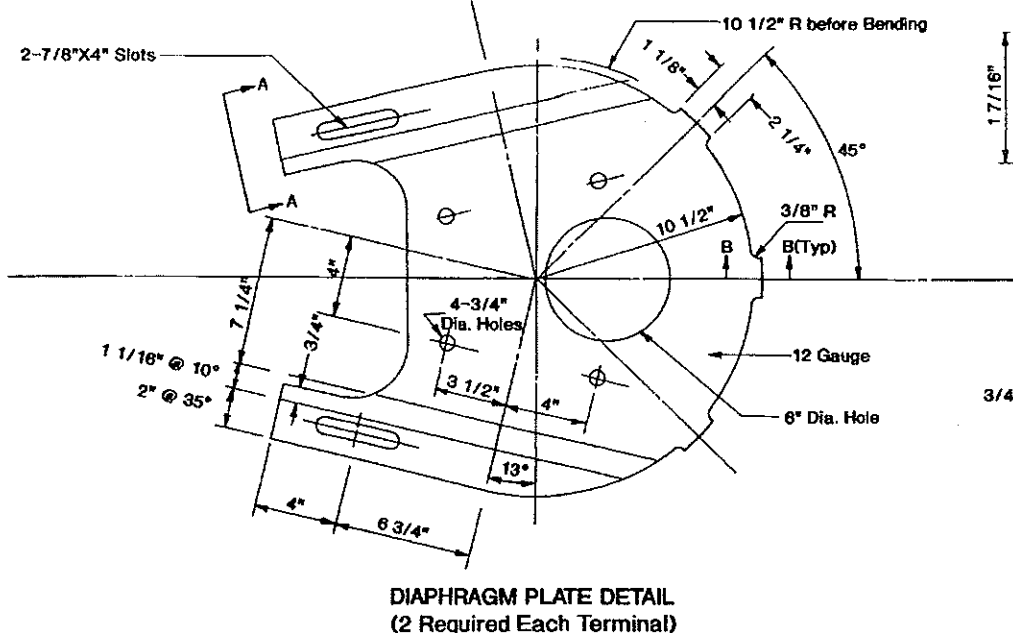


NOTE: STEEL TUBE ANCHOR AND SHORTWOOD POST ASSEMBLY: THE CONTRACTOR SHALL INSTALL THE STEEL TUBE AND SOIL PLATE ANCHOR BY DRIVING THE ANCHOR INTO THE SOIL. THE SHORT WOODEN POST SHALL BE PUSHED INTO THE STEEL TUBE ANCHOR BY HAND AND SHALL NOT BE DRIVEN. IT MAY BE NECESSARY TO ROUND THE SQUARE EDGES OF THE WOOD POST SO THEY FIT THE ROUNDING OF THE 8" X 8" STEEL TUBE. THE INSIDE OF THE STEEL TUBE ANCHOR SHALL BE GREASED BEFORE INSTALLATION OF THE WOODEN POST TO FACILITATE INSTALLATION AND REMOVAL.

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 *Daniel K. Lee*
DESIGN ENGINEER

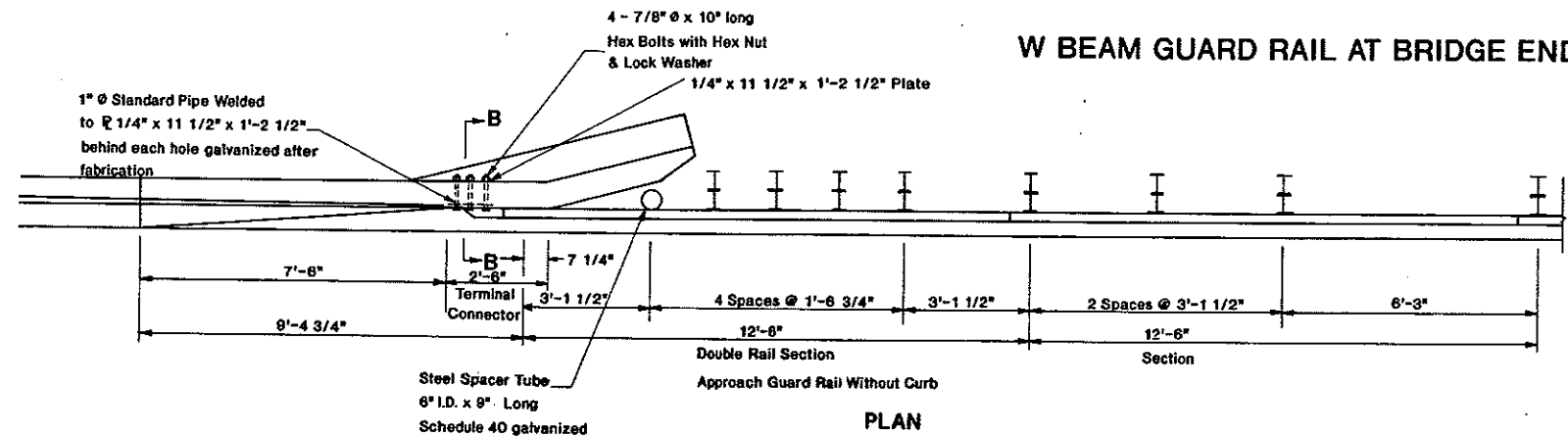
DIAPHRAGM BUFFERED & STRUT AND YOKE DETAILS



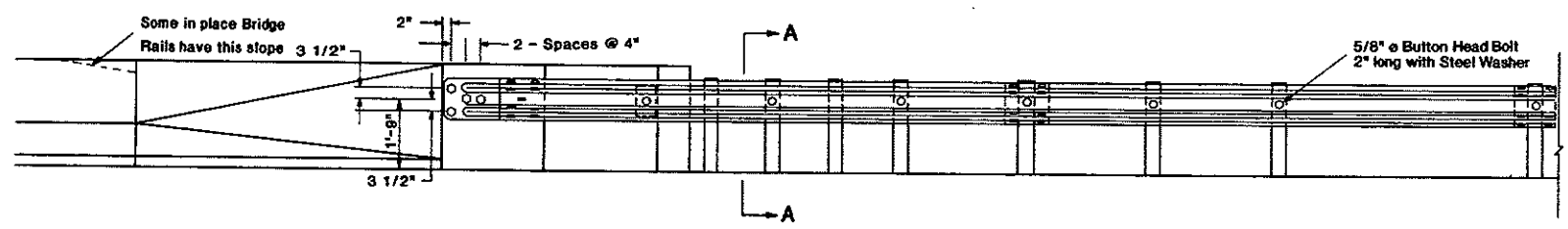
3-2-92	
REVISIONS	
DATE	CHANGE
12-1-95	STRUT DETAILS

NORTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
 APPROVED *David K. Olson*
 DESIGN ENGINEER

W BEAM GUARD RAIL AT BRIDGE ENDS

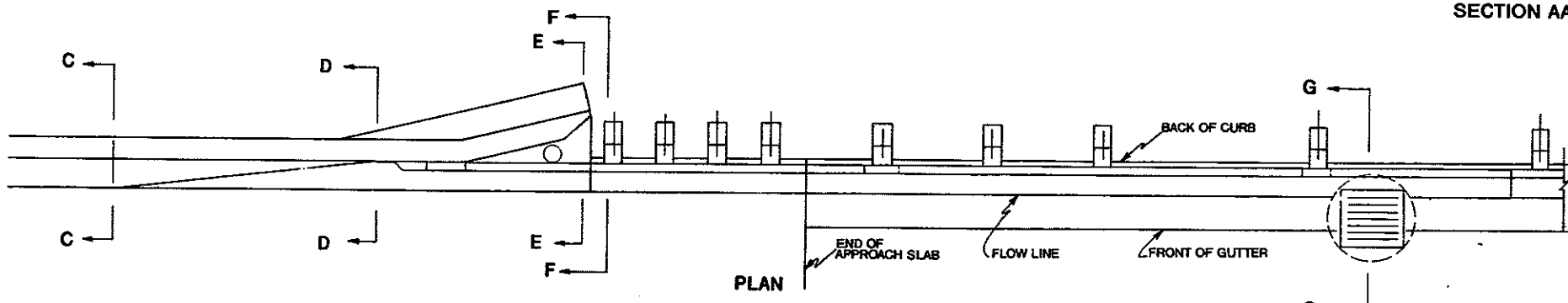


PLAN

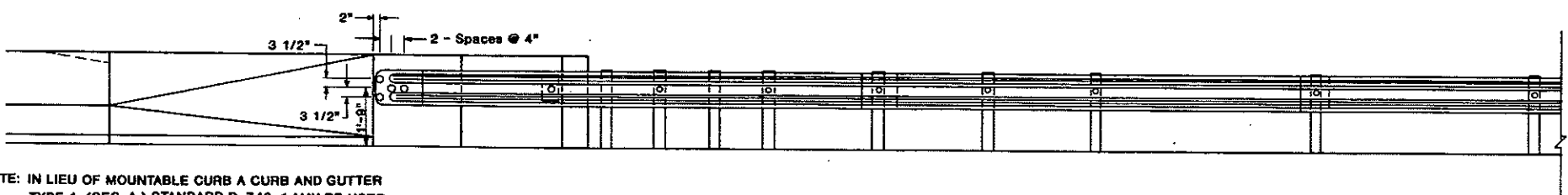


ELEVATION

ATTACHMENT DETAIL WITHOUT APPROACH DROP INLET



PLAN



ELEVATION

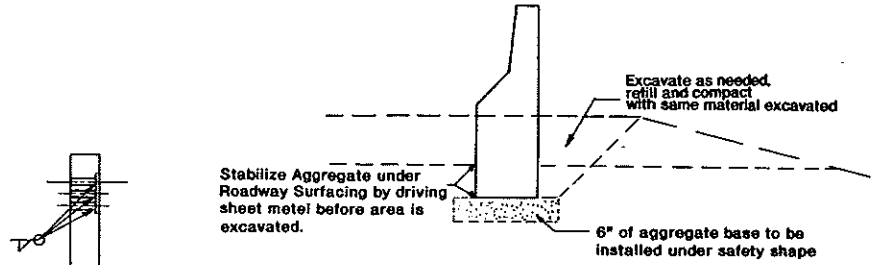
ATTACHMENT DETAIL WITH CURB AND GUTTER MOUNTABLE

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.

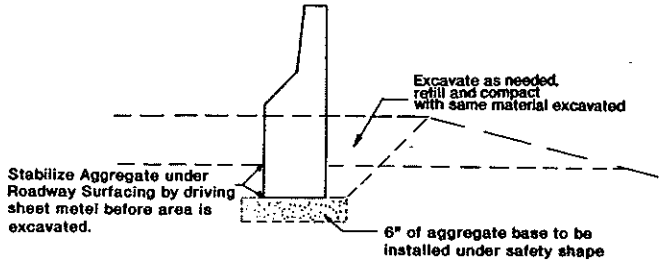
THE SAFETY SHAPE TRANSITION SHALL BE MEASURED BY THE NUMBER. THE COST OF EXCAVATION FORMING, AGGREGATE BASE, SHEET METAL, REINFORCING STEEL, EQUIPMENT AND LABOR SHALL BE INCLUDED IN THE PRICE BID FOR "CONCRETE AE3 FOR SAFETY SHAPE TRANSITION".

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

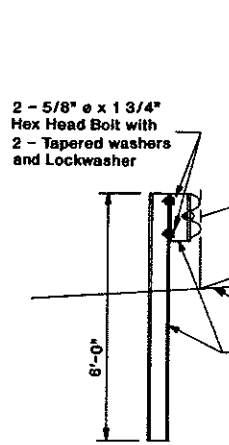
THE CONTRACTOR SHALL USE WOOD POSTS FOR THE W-BEAM GUARDRAIL AND FLARED END TREATMENT AND TRANSITION.



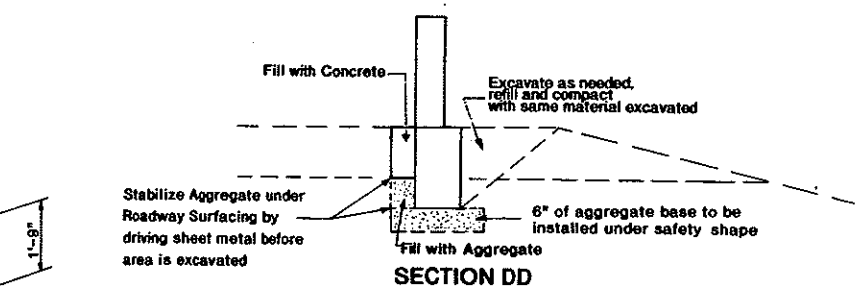
SECTION BB



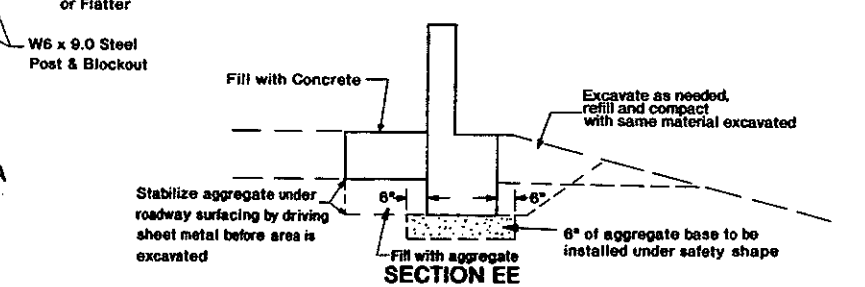
SECTION CC



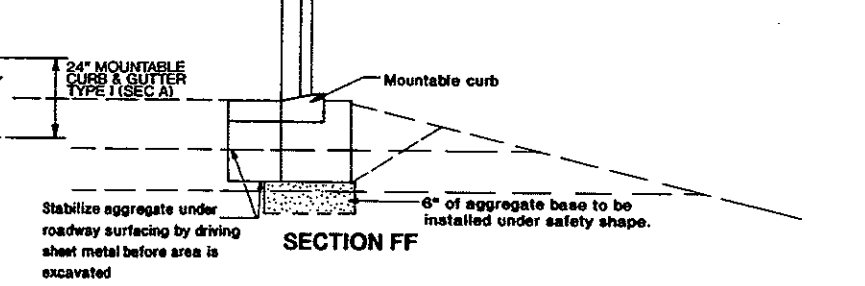
SECTION AA



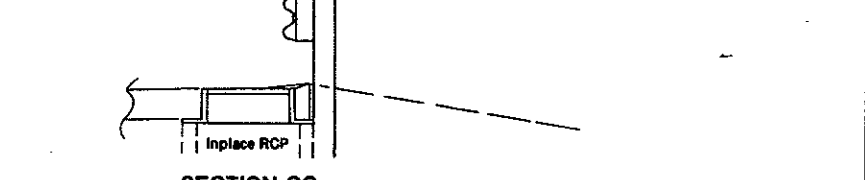
SECTION DD



SECTION EE



SECTION FF



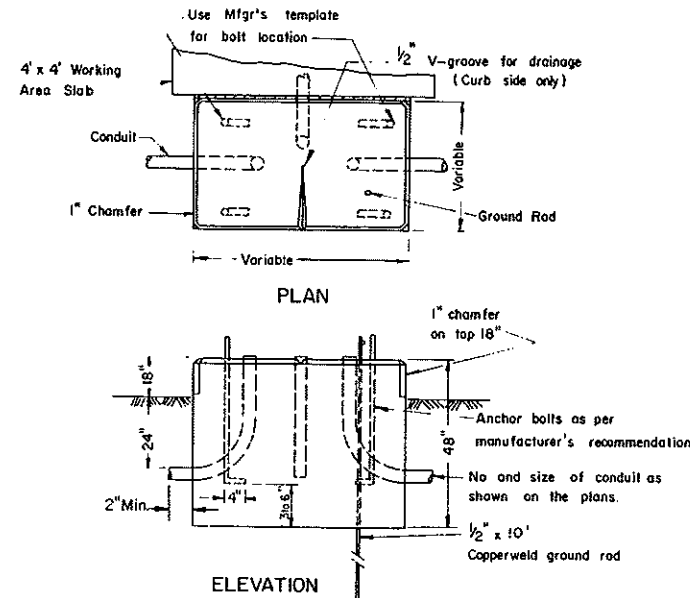
SECTION GG

4-28-89	
DATE	CHANGE
1-2-90	STANDARD NUMBER
6-1-90	NOTE ADDED
2-25-91	NOTE
3-10-91	GENERAL REVISIONS
6-10-91	GENERAL REVISIONS
10-20-93	NOTE ADDED
03-21-94	GENERAL REVISION

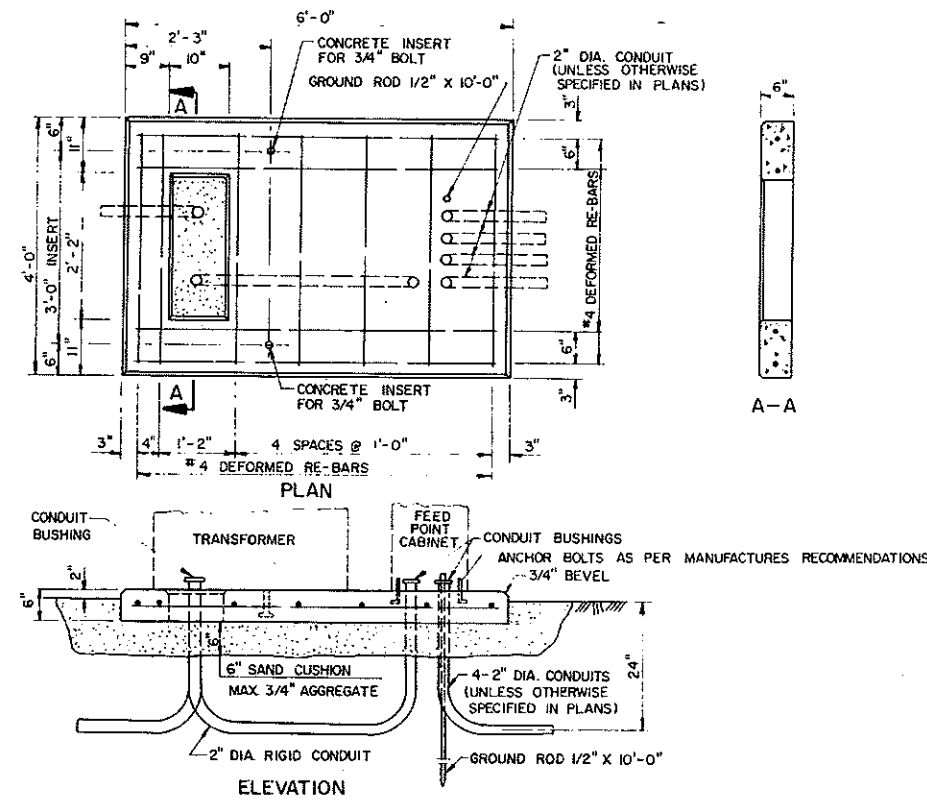
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
 APPROVED: *David K. Olson*
 DESIGN ENGINEER

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-#6	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'

CONCRETE FOUNDATIONS (TRAFFIC SIGNALS & HIGHWAY LIGHTING)



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:

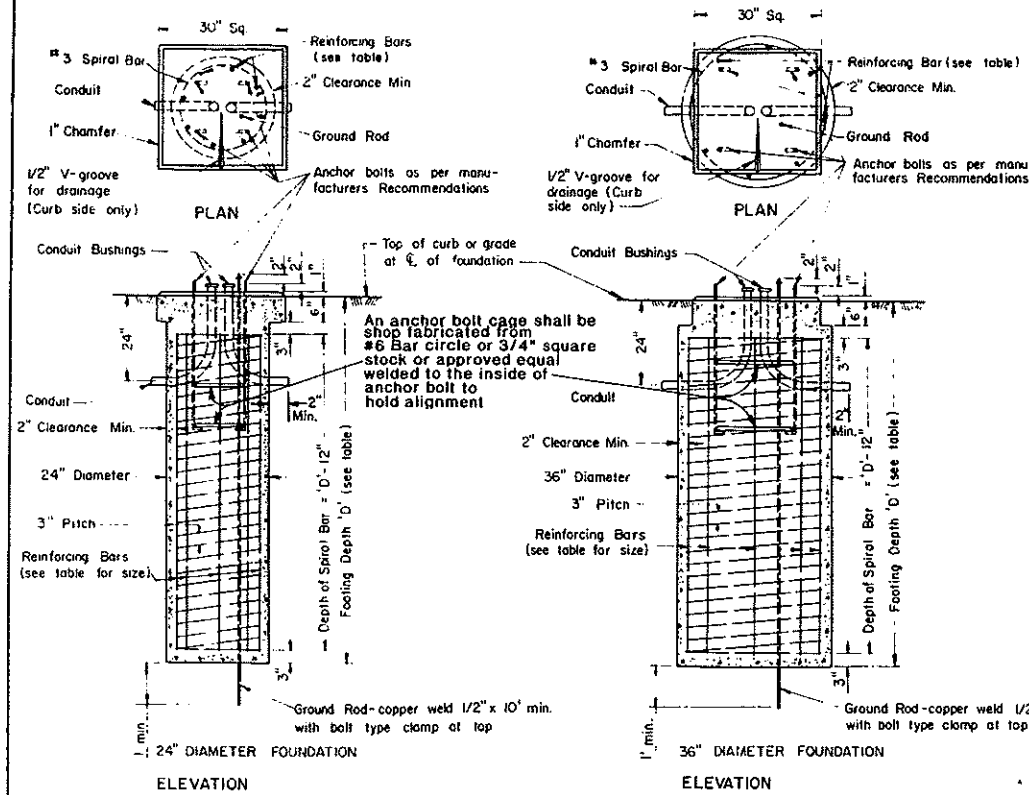
Foundation shall have a wood float finish.
All conduits shown shall be installed. Conduit that is not used at this time shall be plugged.

Feed Point Cabinet Foundation Pad Mounted:

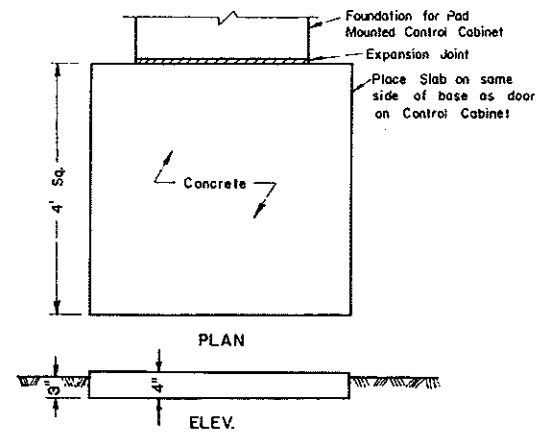
Foundation shall have wood float finish.
All conduits shown shall be installed. Conduit that is not used at this time shall be plugged.

10-1-86 REVISIONS	
DATE	CHANGES
5-5-92	14. Std. Mounting Ht.
6-16-94	Anchor Bolts & Leveling Nuts
10-10-94	Slab Revision
6-14-95	Footnote (D) Revision

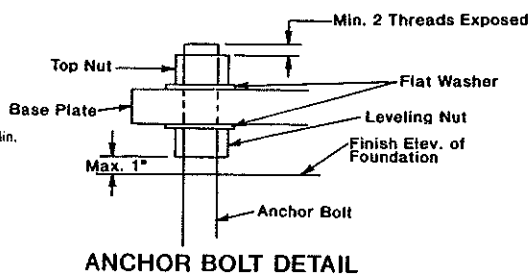
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED: *David R. F...*
DESIGN ENGINEER



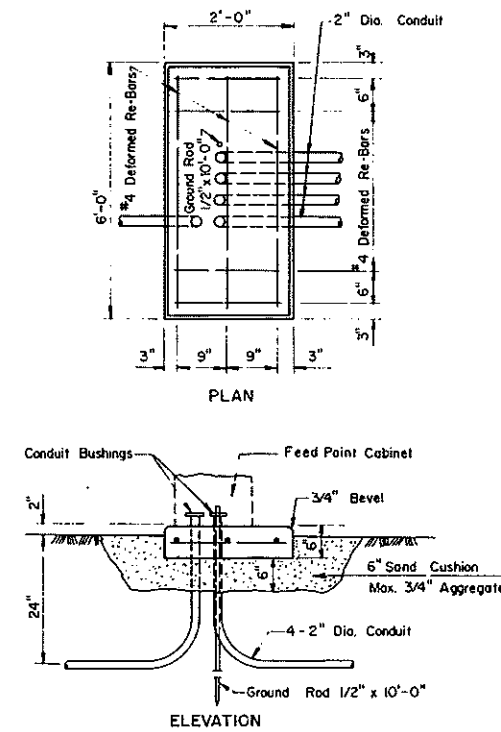
LIGHT & SIGNAL STANDARD FOUNDATION



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.

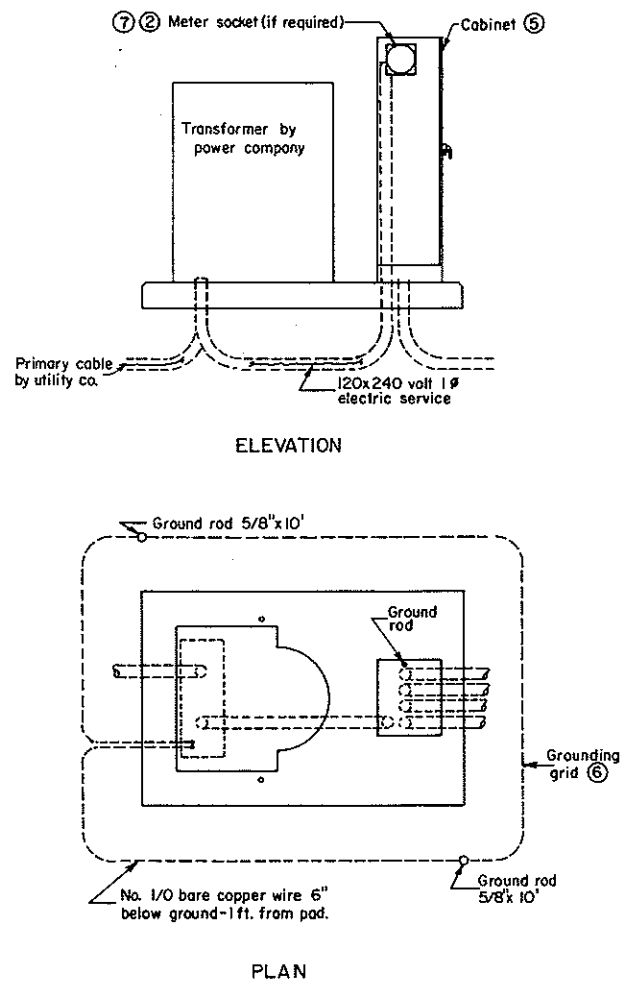


ANCHOR BOLT DETAIL

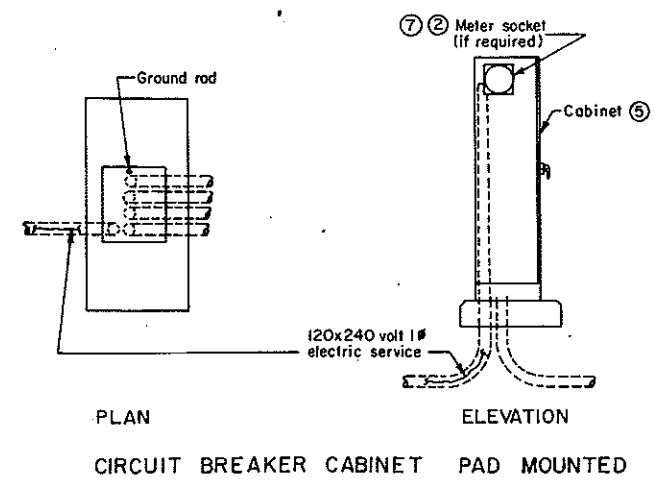


FEED POINT CABINET FOUNDATION PAD MOUNT
The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundations-Feed Point Pad-Type B

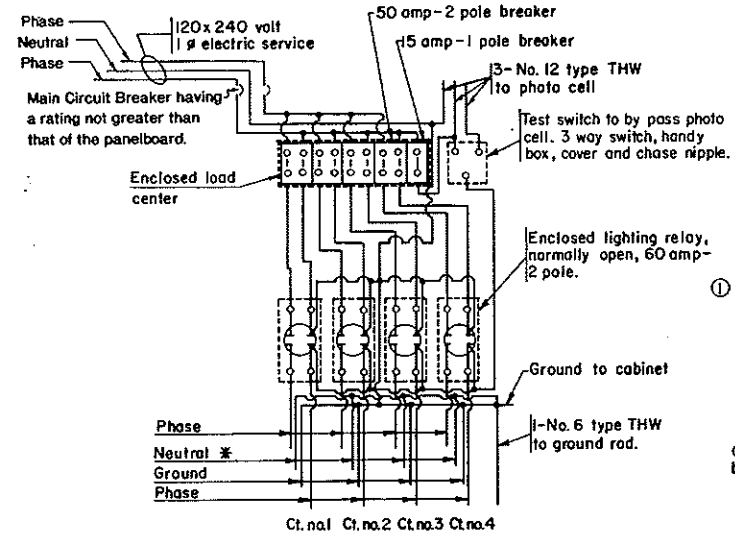
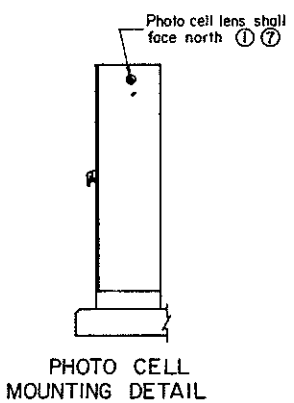
FEED POINTS (ROADWAY LIGHTING)



TRANSFORMER AND CIRCUIT BREAKER
CABINET PAD MOUNTED

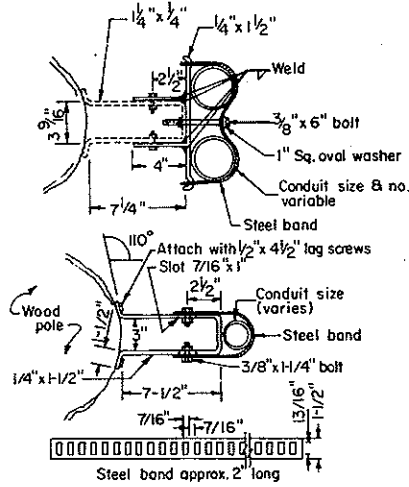
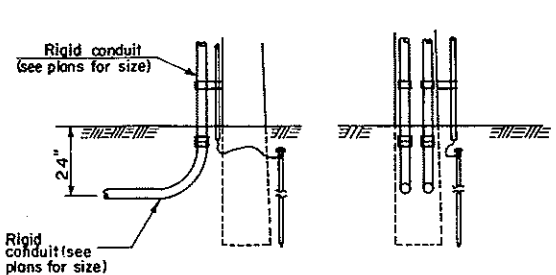


CIRCUIT BREAKER CABINET
PAD MOUNTED

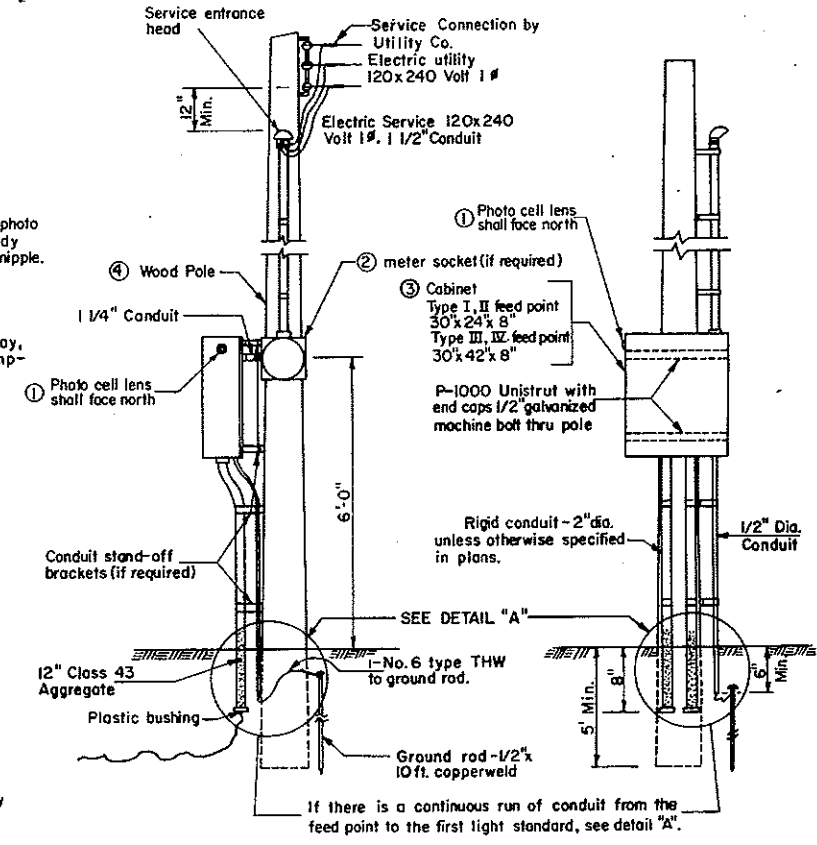


* Install when festoon circuit is required.

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 circuit, 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.



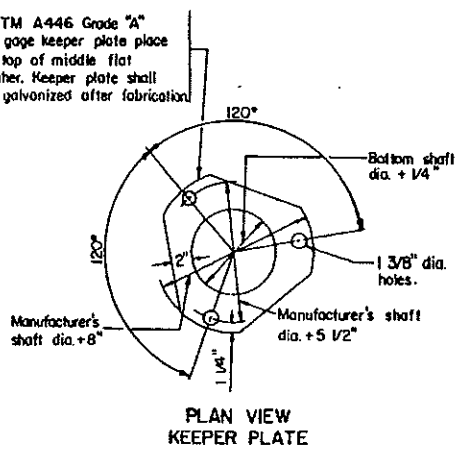
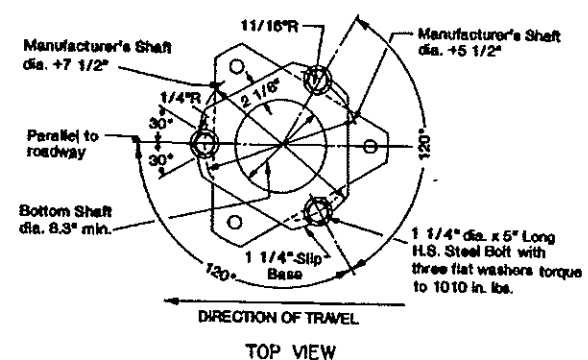
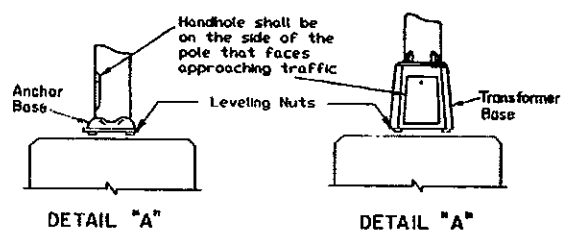
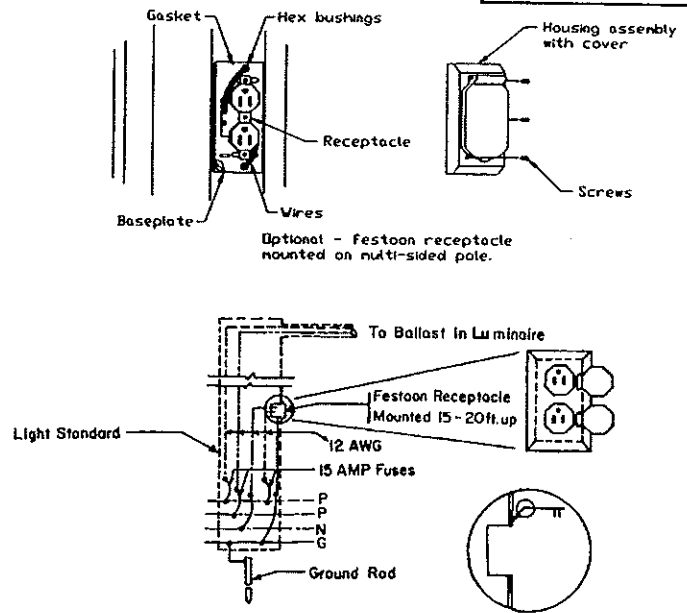
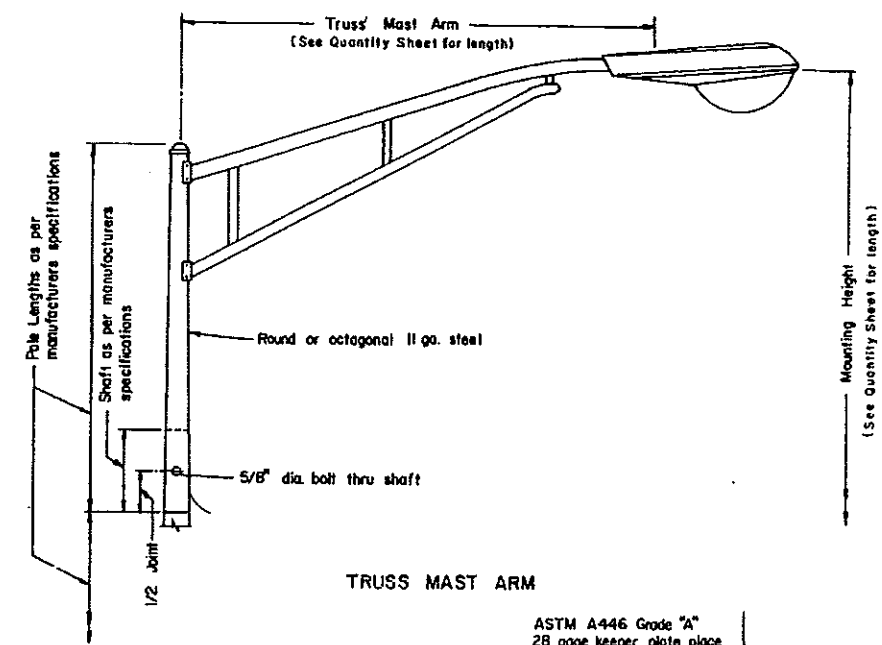
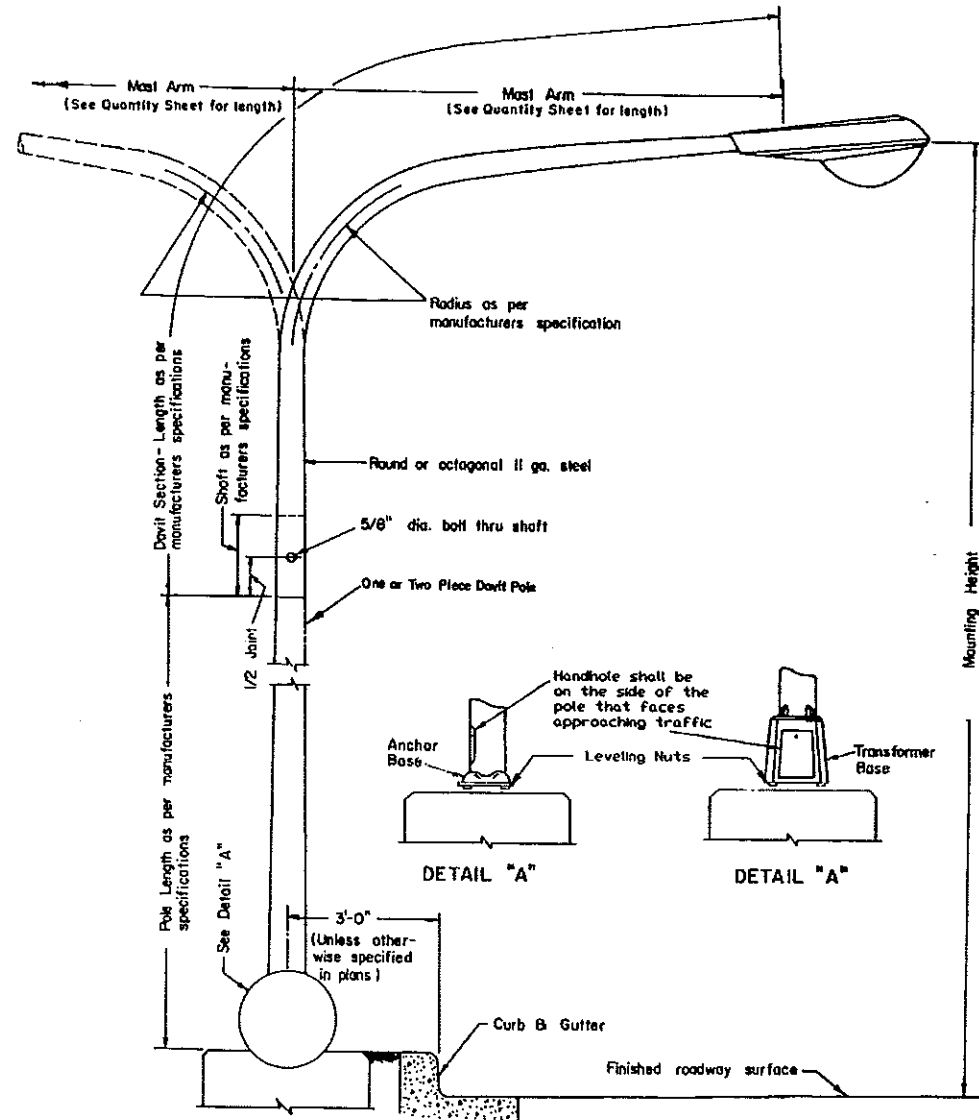
The conduit standoff brackets may be omitted if not required by the local utility company.



- 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 20 ft. 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.

10-1-86 REVISIONS		NORTH DAKOTA STATE HIGHWAY DEPARTMENT APPROVED: <i>David K. Lee</i> DESIGN ENGINEER
DATE	CHANGES	
1-28-91	Cabinet Note	
3-20-91	Conduit	
9-1-92	Feed Point	

LIGHT STANDARD DETAILS



POLE WIRING DIAGRAM **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.)

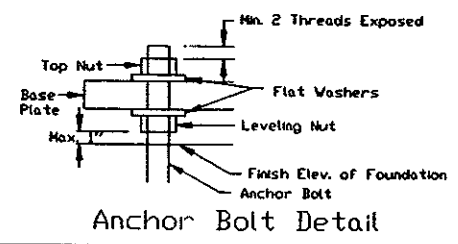
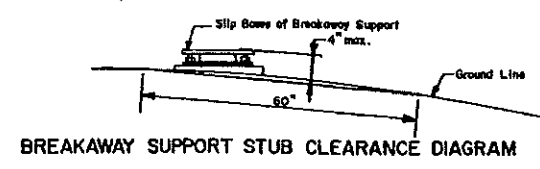
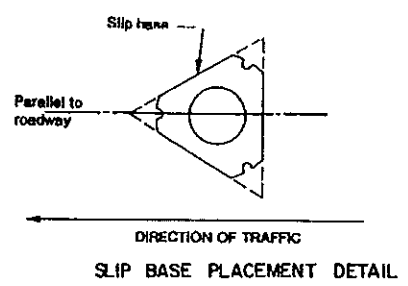
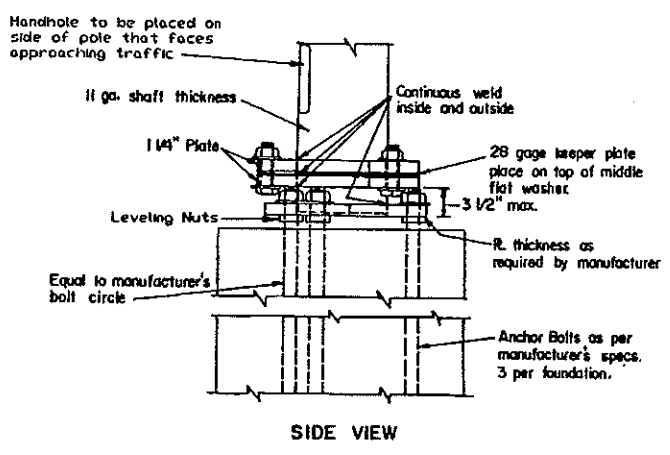
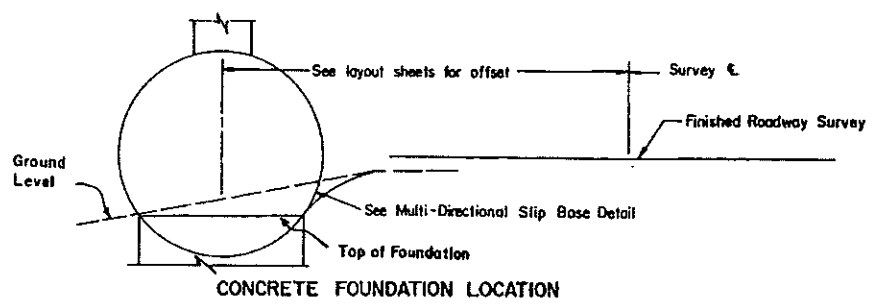
NOTES:
STEEL STANDARDS: Marred or Scratch areas shall be touched up after erection.

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" to 15" wrench to bed washers and to clean bolt threads, then loosen.
 2. Retighten bolts in a systematic order to prescribed torque.
 3. Loosen each bolt and retighten to prescribed torque in same order as initial retightening.
 4. Burr threads at junction with nut using center punch to prevent nut loosening.

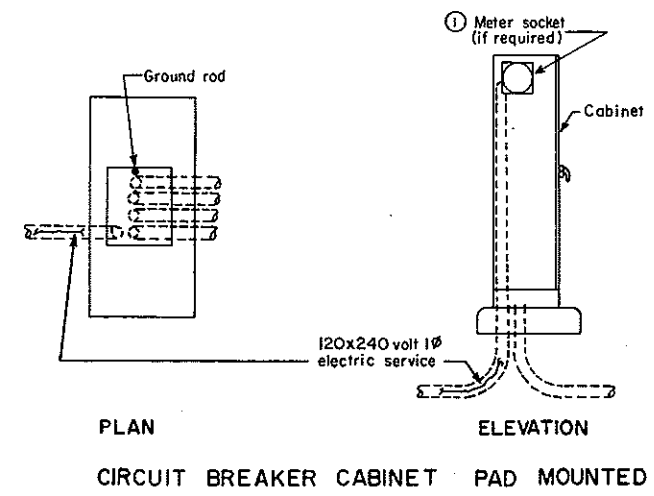


10-1-86 REVISIONS	
DATE	CHANGE
6-1-89	Breakaway Support
6-19-91	Breakaway Base
10-5-93	General Revisions
6-16-94	Leveling Nuts
11-07-94	Handhole Location
7-17-95	Festoon Mounting Detail

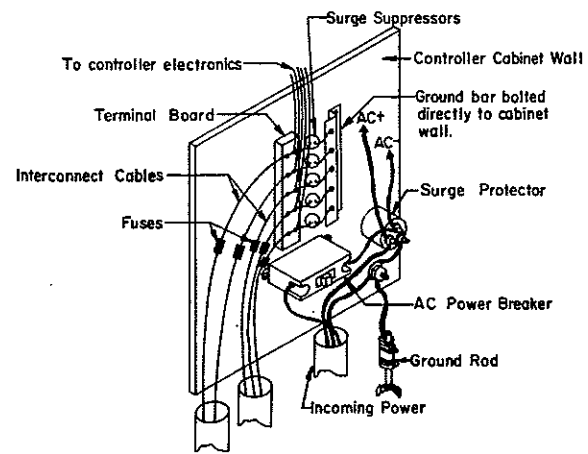
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

APPROVED: *David R. Lan*
 DESIGN ENGINEER

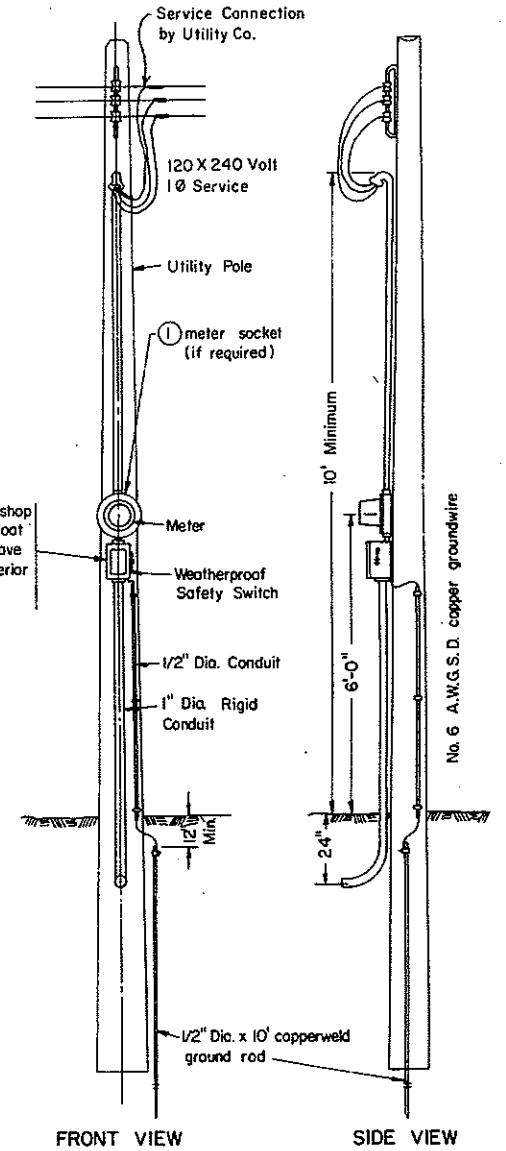
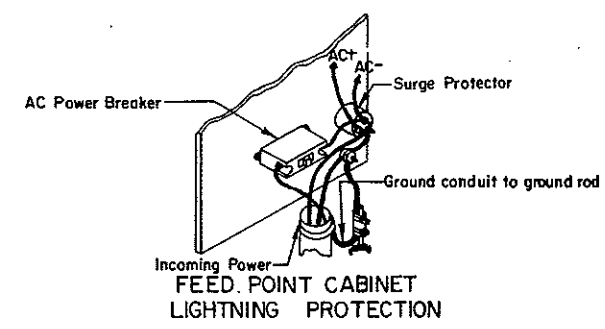
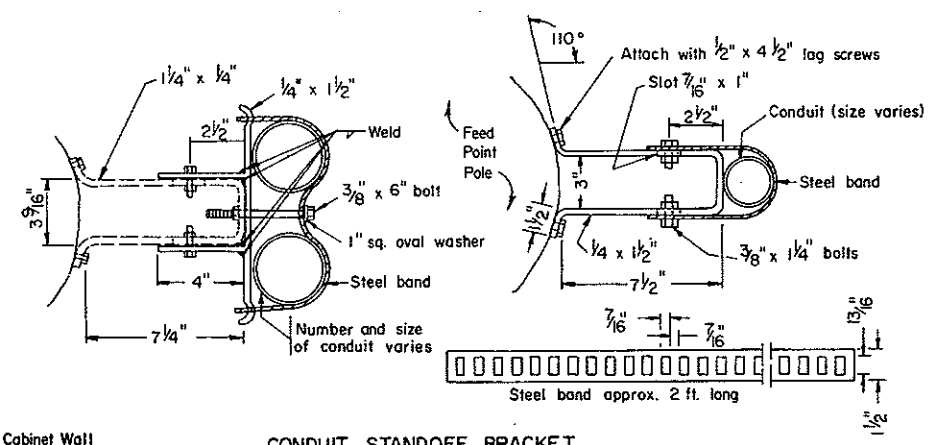
FEED POINT - TRAFFIC SIGNALS



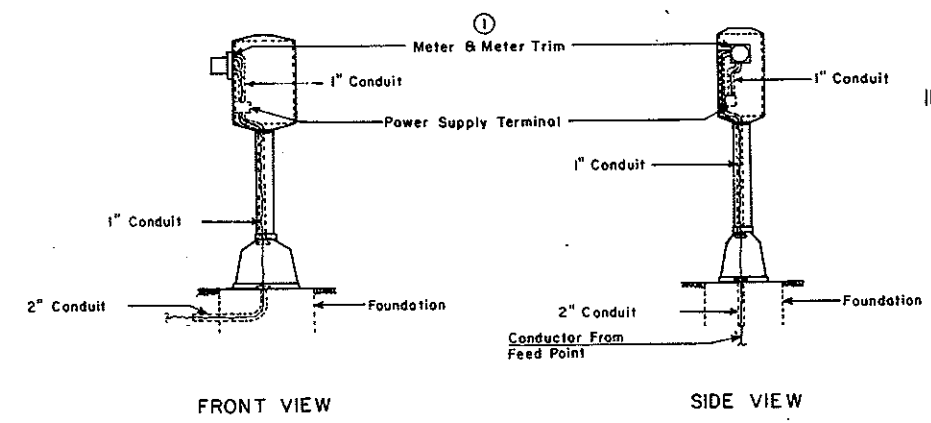
Cabinet shall be 56" high x 26" wide x 14" deep. Minimum 12 ga. steel with provisions for padlock. Cabinet shall be weatherproof. Cabinet shall have one shop coat of primer and two field coats of exterior dark green enamel.



CONTROLLER CABINET INTERCONNECT & POWER CABLE LIGHTNING PROTECTION



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.

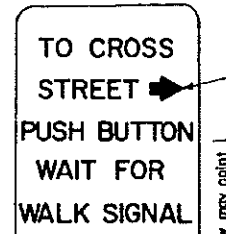
NOTE: Traffic signal controller shall be operated on 120 volts.

10-1-86		NORTH DAKOTA STATE HIGHWAY DEPARTMENT
REVISIONS		
DATE	CHANGES	APPROVED: <i>David R. Lee</i> DESIGN ENGINEER
1-28-91	Cabinet Note	

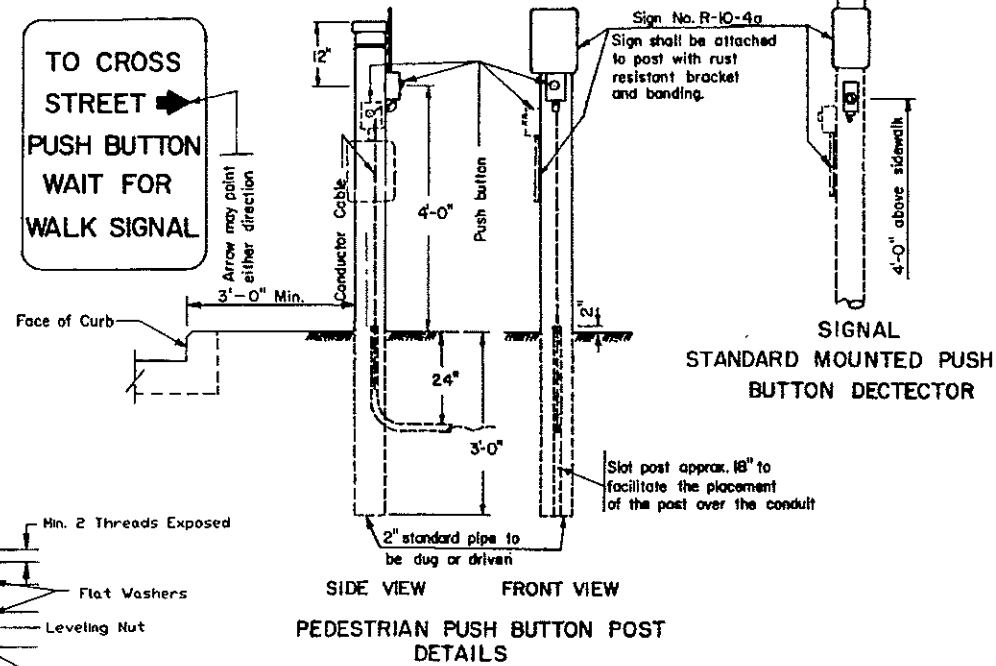
TRAFFIC SIGNAL STANDARDS

D-772-2

SIGN NO. R-10-4a
(0081 Aluminum)
See Standard Sign Layout Booklet
for dimensions and legend series.

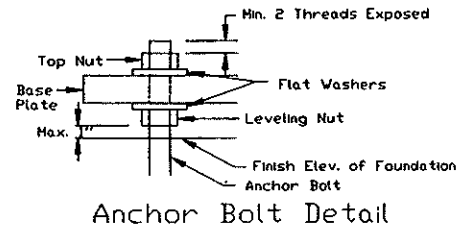


The positioning of sign & pushbutton & direction of arrow shall clearly indicate which crosswalk is actuated by the push button.

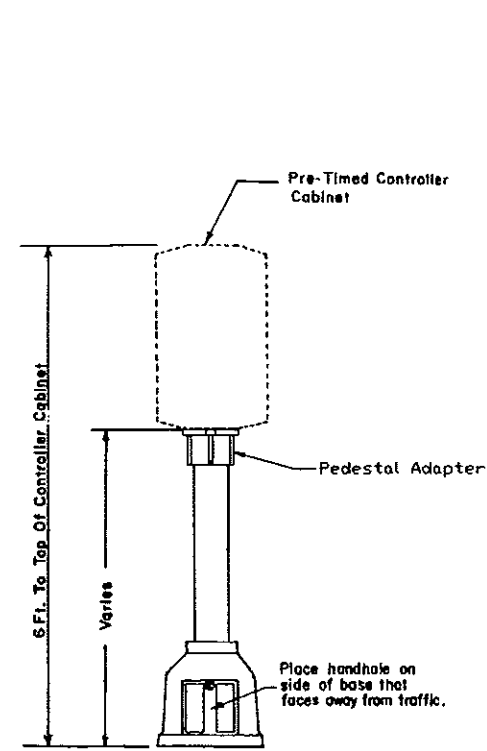


SIGNAL STANDARD MOUNTED PUSH BUTTON DETECTOR

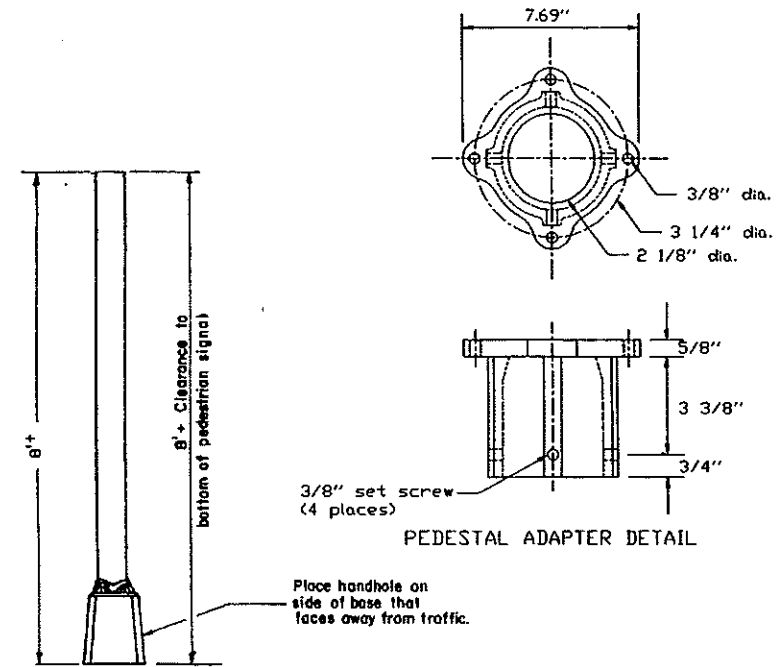
PEDESTRIAN PUSH BUTTON POST DETAILS



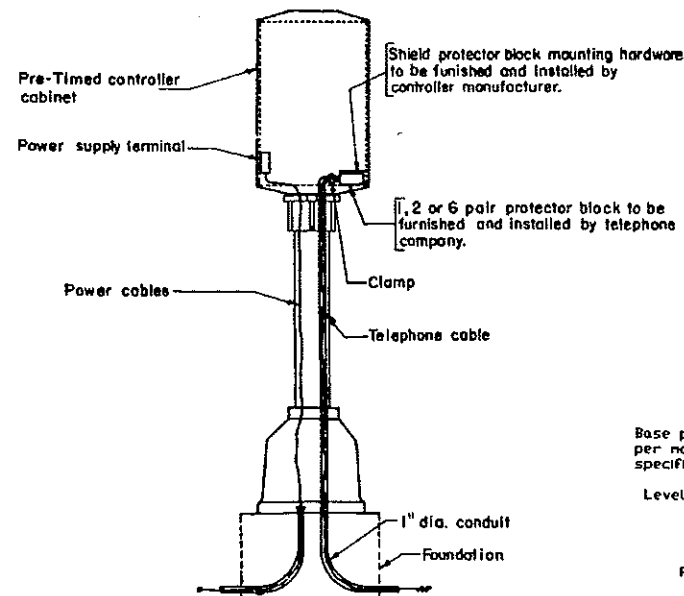
Anchor Bolt Detail



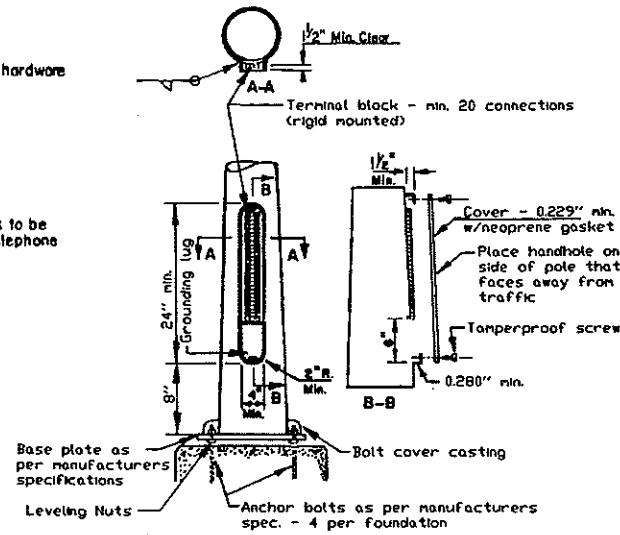
TYPE I



TYPE II

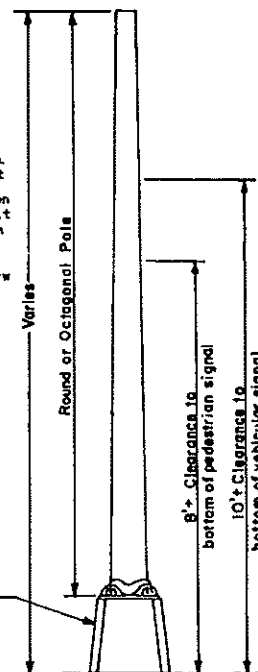


TELEPHONE INTERCONNECT SCHEMATICS DETAIL
(Control circuits not shown)

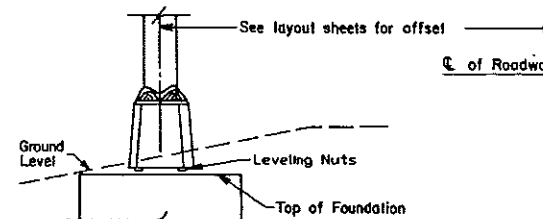
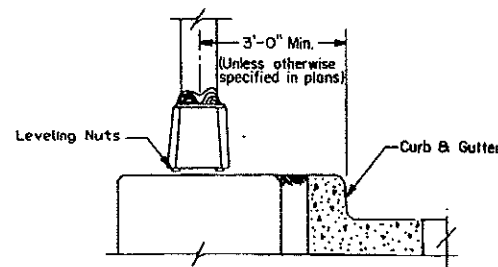


ALTERNATE SIGNAL STANDARD BASE
For Use Only With Type V, VI, & VII Signal Standards

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.

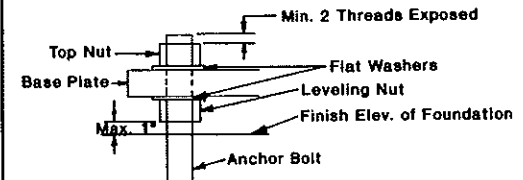
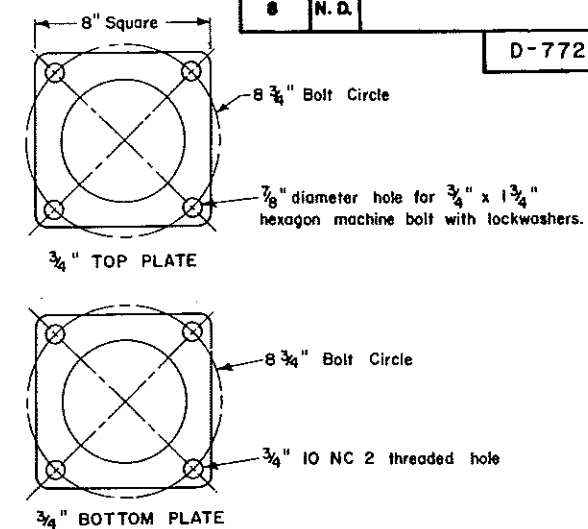
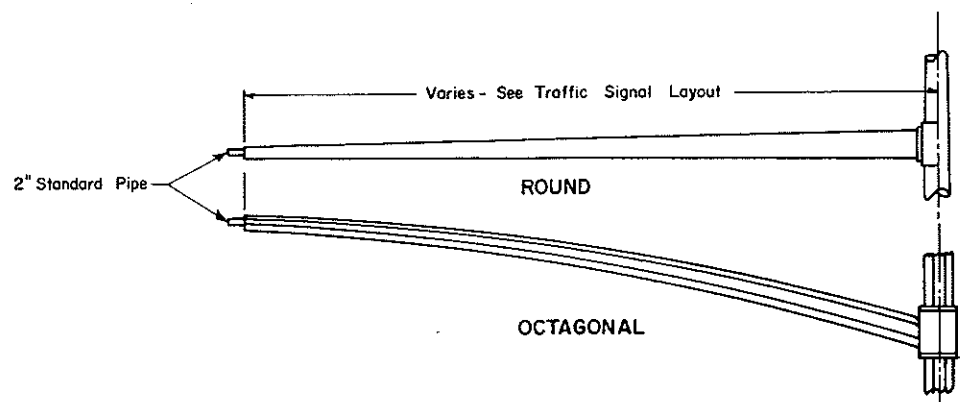
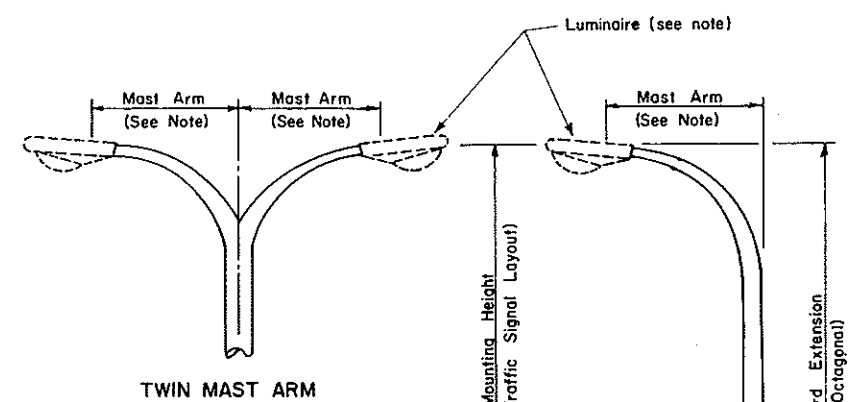
Paint: See note sheet for required color of paint.

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)



MONOTUBE TYPE MAST ARMS

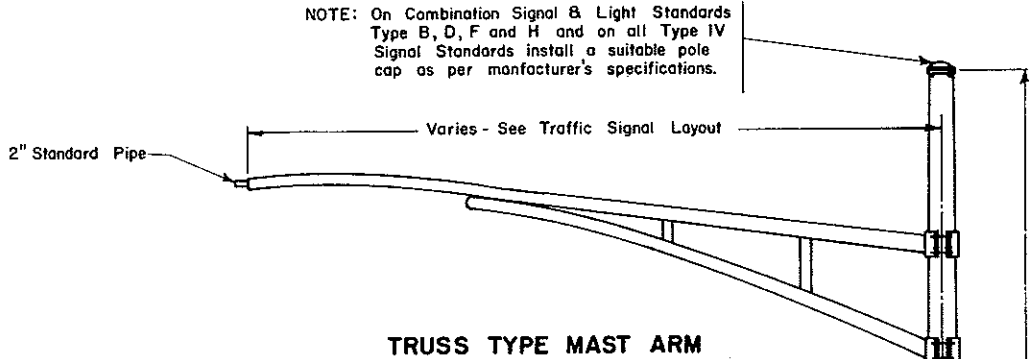
DETAIL "A"

NOTE: In lieu of the plate type connection a telescoping clamp type extension may be used.

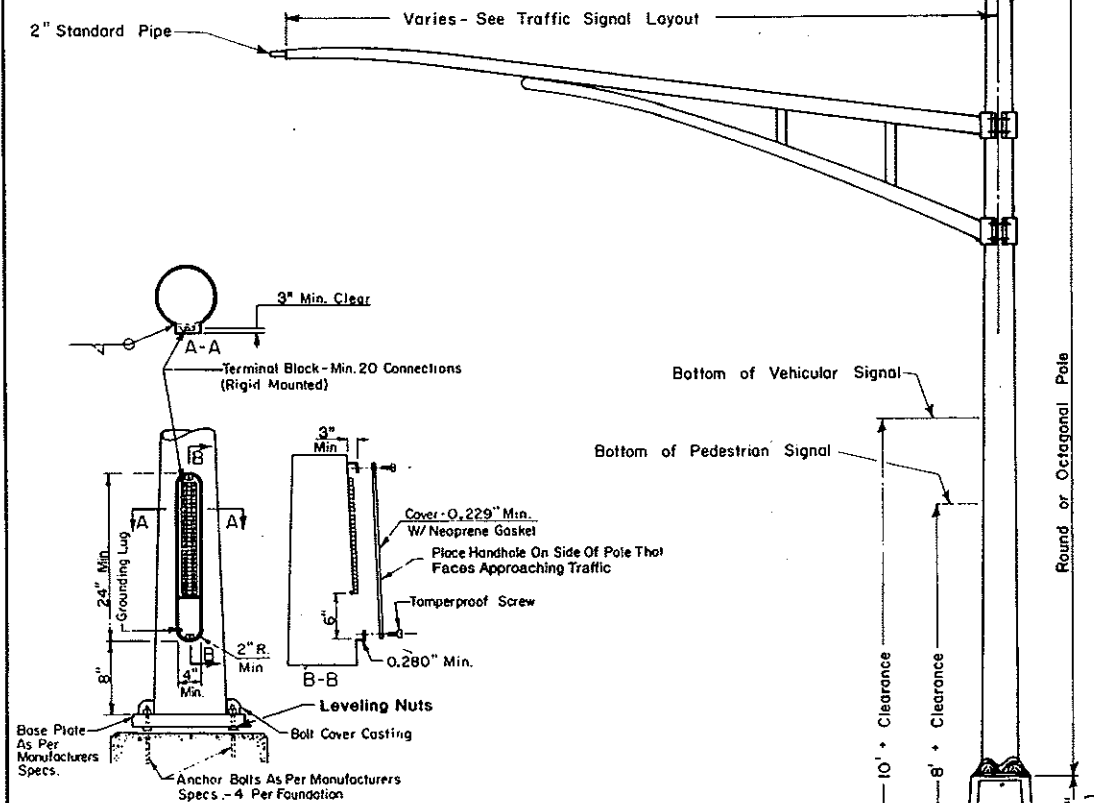
NOTES: COMBINATION SIGNAL AND LIGHT STANDARD:

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

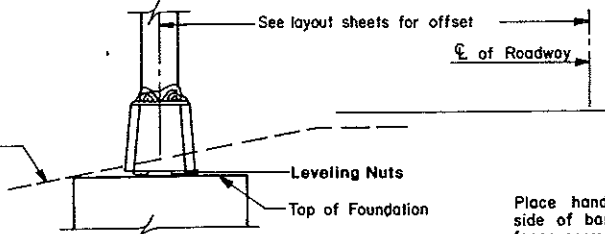
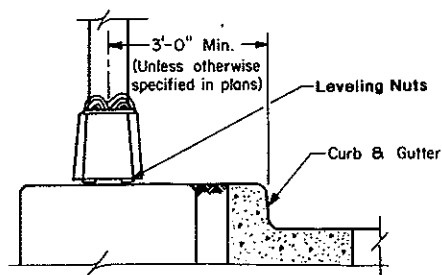
NOTE: On Combination Signal & Light Standards Type B, D, F and H and on all Type IV Signal Standards install a suitable pole cap as per manufacturer's specifications.



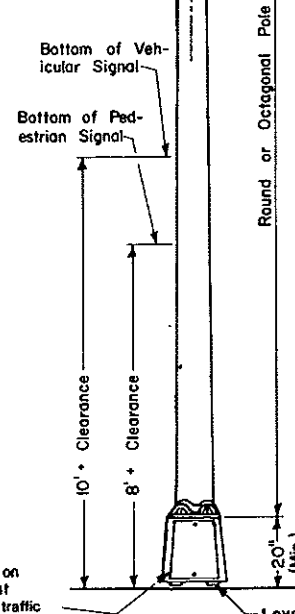
TRUSS TYPE MAST ARM



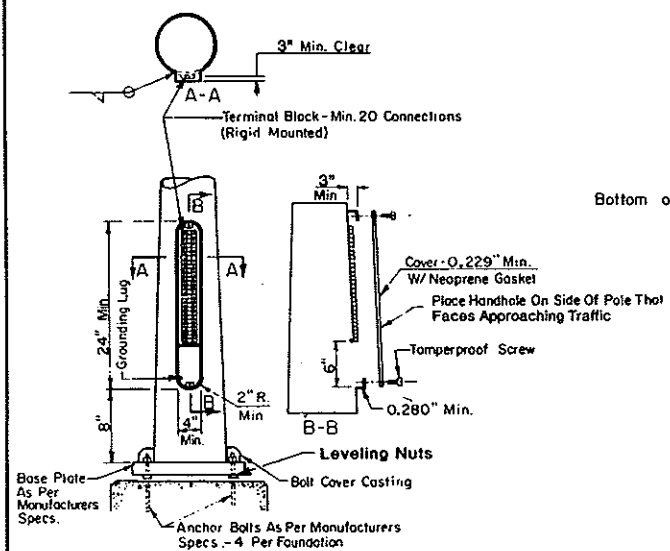
COMBINATION SIGNAL AND LIGHT STANDARD



SIGNAL STANDARD MIN. CLEARANCE DETAIL



TYPE IV SIGNAL STANDARD



ALTERNATE SIGNAL STANDARD BASE

For Use Only With Type IV & Combination Signal Standards

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.

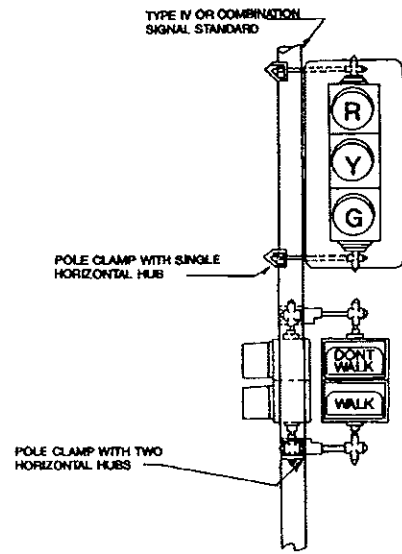
TRANSFORMER BASE: In lieu of the transformer base the contractor may use the alternate signal standard base.

10-1-86 REVISIONS		APPROVED: <i>David R. Larson</i> DESIGN ENGINEER
DATE	CHANGES	
12-1-88	Min. Clearance	
1-21-94	Add 50 ft.	
8-18-94	Leveling Nuts	
10-12-94	Handhole Location	

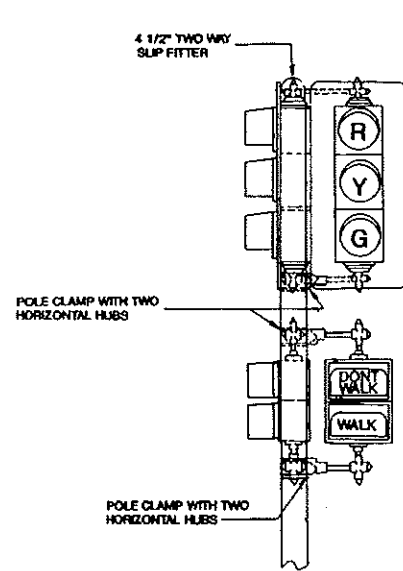
TRAFFIC SIGNAL HEAD MOUNTING



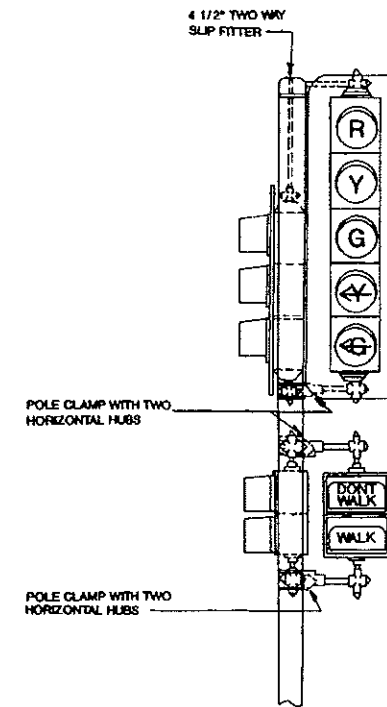
TYPE II
PEDESTAL MOUNTED
PEDESTRIAN



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:

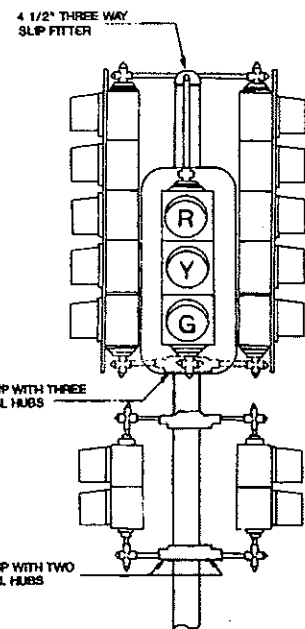
CLEARANCE: CLEARANCE FROM THE GROUND LINE OR SIDE-WALK TO THE BOTTOM OF POST OR PEDESTAL MOUNTED VEHICULAR SIGNAL HEADS SHALL BE 10 FT. MINIMUM. FROM PEDESTRIAN SIGNAL HEADS SHALL BE 8 FT. MINIMUM.

SIGNAL HEADS: SEE TRAFFIC SIGNAL LAYOUT FOR CORRECT MOUNTING POSITION, NUMBERS, SIZE AND ARRANGEMENT OF LENSES.

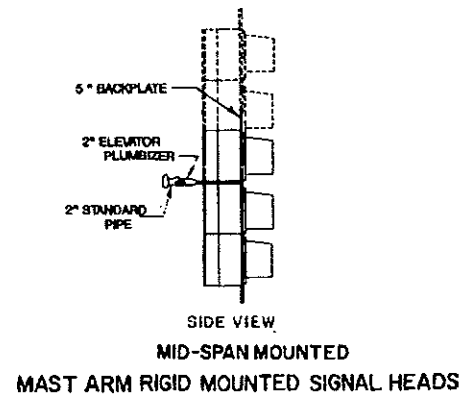
POLE CLAMPS: A POLE PLATE WITH SUITABLE BANDING MATERIAL AS APPROVED BY THE ENGINEER IN THE FIELD MAY BE SUBSTITUTED FOR THE POLE CLAMPS. WHERE TRAFFIC SIGNAL HEADS AND PEDESTRIAN SIGNAL HEADS ARE MOUNTED ONE ABOVE THE OTHER, ONE POLE CLAMP ASSEMBLY MAY BE USED.

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.

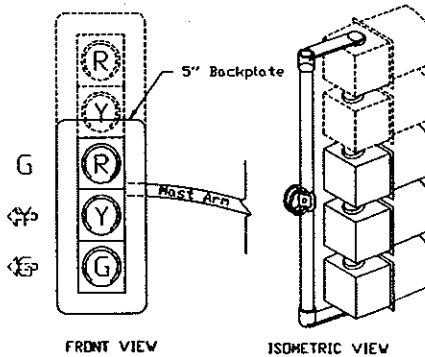
MOUNTING DETAILS: ALL SIGNAL HEADS SHOWN ARE VIEWED FROM DIRECTION OF TRAVEL.



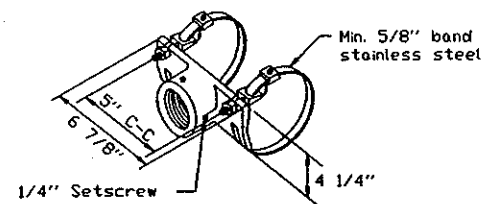
TYPE VII
POST MOUNTED - VEHICULAR
POST MOUNTED - PEDESTRIAN



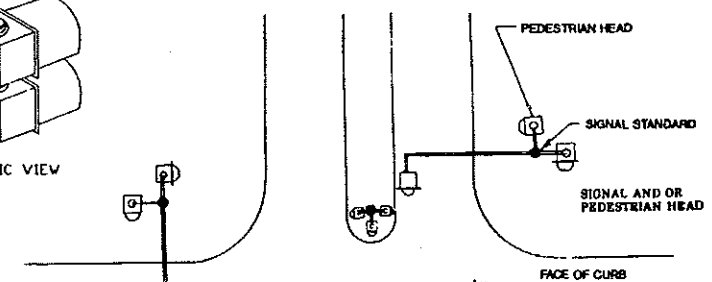
MID-SPAN MOUNTED
MAST ARM RIGID MOUNTED SIGNAL HEADS



END MOUNTED
MAST ARM RIGID MOUNTED SIGNAL HEADS



MAST ARM
SIGNAL HEAD BRACKET



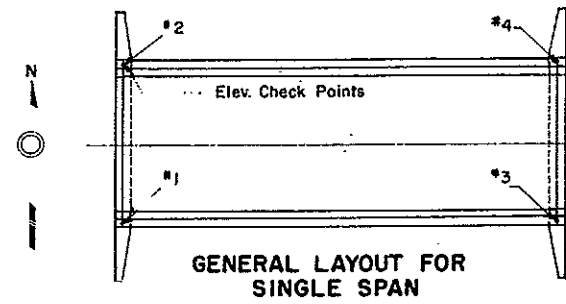
PLAN LAYOUT
(TYPICAL)
HEADS SHALL NOT PROTRUDE
OVER THE FACE OF THE CURB.

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 III
11-29-95	Mast Arm Mounting Bracket

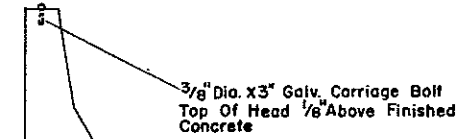
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
APPROVED *David K. Lee*
DESIGN ENGINEER

BRIDGE BENCH MARKS

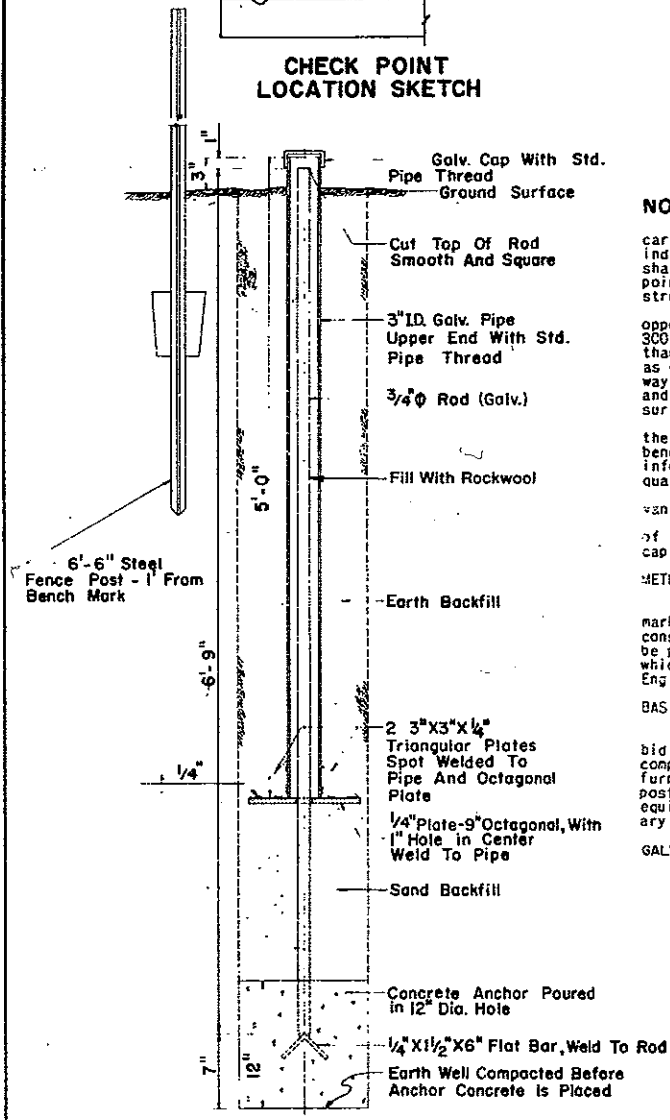
SDWA SECTION	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	D-900-1



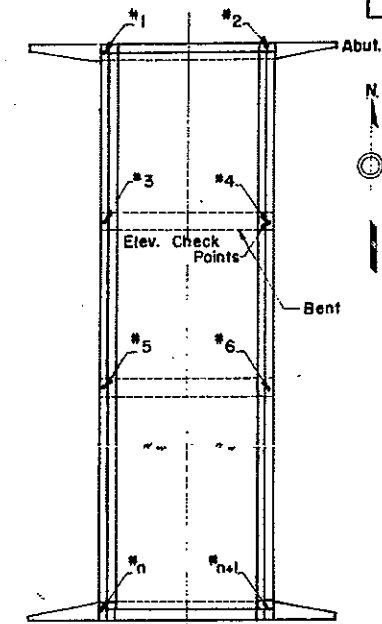
GENERAL LAYOUT FOR SINGLE SPAN



CHECK POINT LOCATION SKETCH



BENCH MARK DETAIL



GENERAL LAYOUT FOR MULTIPLE SPAN

NOTES:
 Elevation check points shall consist of 3/8" x 3" galvanized carriage bolts (or equal) set in the concrete curb at the points indicated on the General Layout Sketches. The top of bolt head shall project above the finished concrete 1/8". Elevation check points shall be placed on each curb over each unit of the substructure for each bridge at a structural location.
 Two bench marks as detailed hereon shall be set at diagonal opposite positions away from the structure location and at least 300 feet from the nearest point on the bridge or bridges (if more than one at a location). These bench marks shall be constructed as detailed on this sheet and located near the Highway Right-of-way lines. The steel fence post shall extend 4'-0" above ground and be painted with two coats of white paint suitable for steel surfaces.
 The Project Engineer shall run a set of levels determining the elevation of each check point on the structure and the two bench marks immediately after the completion of the bridge. This information shall be submitted to the Bridge Engineer with adequate information locating each check point and bench mark.
 Except for fence posts, all metal parts to be hot dip galvanized after punching, shearing, welding, and fabrication.
 Threads of cap and pipe are not to be galvanized. At time of installation these threads are to be coated with grease and cap screwed to snug fit.

METHOD OF MEASUREMENT:
 Each set of Bridge Bench Marks consisting of two bench marks and the required number of elevation check points shall be considered as one unit for bidding purposes and the quantity to be paid for shall be the number of sets of bridge bench marks which have been installed complete in place and accepted by the Engineer.

BASIS OF PAYMENT:
 Bridge Bench Marks shall be paid for at the contract price bid for each set of Bridge Bench Marks, which price shall be full compensation for all excavation, backfill and clean-up, and for furnishing, hauling and placing all elevation check points, fence posts, galvanized pipe, caps, rods, sand backfill, concrete, rock equipment, tools and incidentals, including galvanizing, necessary to complete this item.

GALVANIZING:
 After fabrication the complete assembly shall be Hot Dip Galvanized.

10-1-86		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
REVISIONS		
DATE	CHANGE	APPROVED: <i>David K. O. Lam</i> DESIGN ENGINEER
1-15-90	Rockwool	