87-4

This projects consits of the construction of railroad shoofly tracks and wood trestles on both the north and south sides of the existing railroad underpass. Some storm sewer installation, traffic control items, and miscellaneous work is included.

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JOB # 8

NORTH DAKOTA

STATE HIGHWAY DEPARTMENT

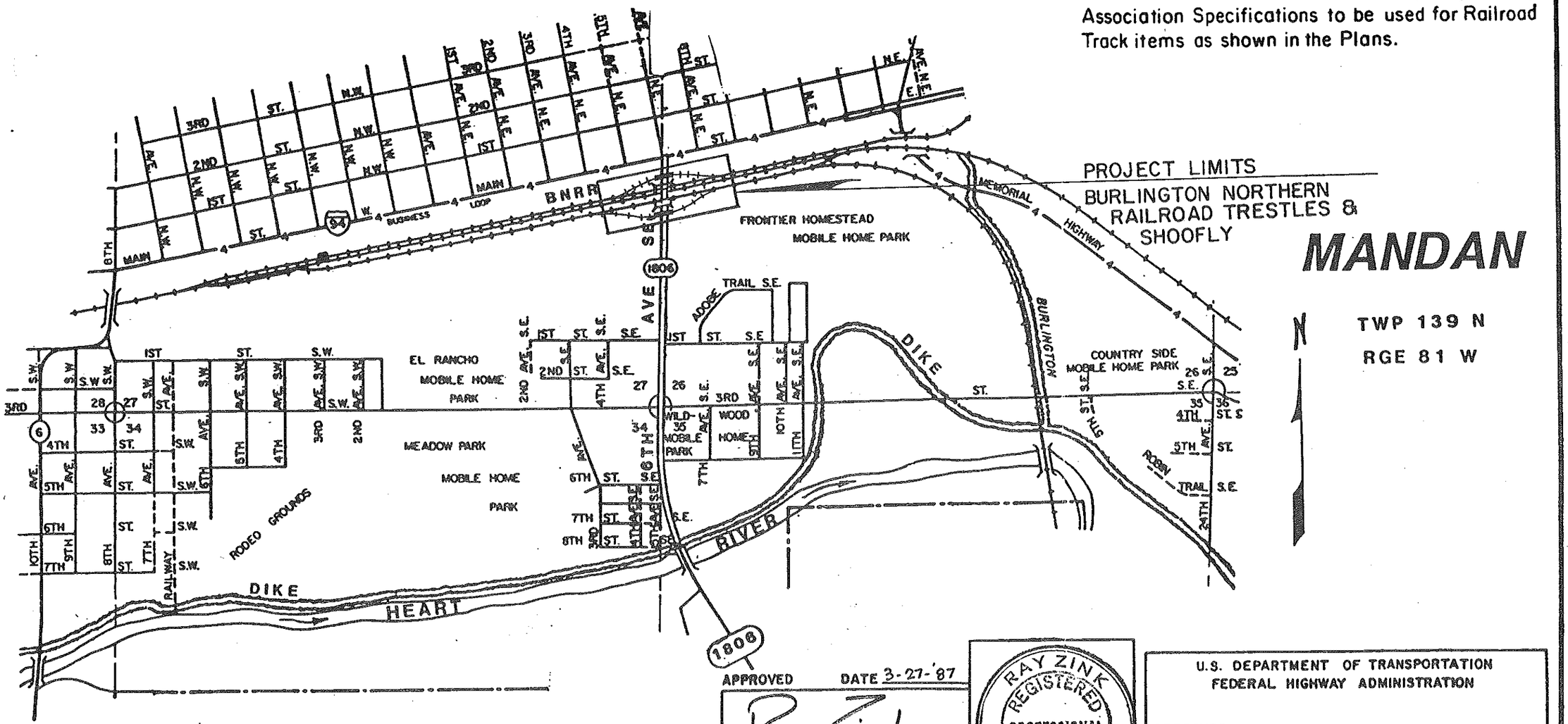
MORTON COUNTY

FG-1-806(015)069

RAILROAD TRESTLES & SHOOFLY

GOVERNING SPECIFICATIONS

Standard Specifications adopted by the North Dakota State Highway Department, November 1986. Standard Drawings currently in effect, and other Contract Provisions submitted herein. American Railway Engineering Association Specifications to be used for Railroad Track items as shown in the Plans.



APPROVED DATE 3-27-'87

Ray Zink

CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

RAY ZINK REGISTERED PROFESSIONAL P.E. 972 ENGINEER NORTH DAKOTA

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED 17

DIVISION ENGINEER DATE

SYMBOLS

- STATE & NATIONAL LINES
- COUNTY LINE
- TOWNSHIP & RANGE LINES
- SECTION LINE
- QUARTER SECTION LINE
- SECTION CORNER
- QUARTER SECTION CORNER
- OLD RIGHT OF WAY LINE
- NEW RIGHT OF WAY LINE
- GRADE LINE
- CENTERLINE OF CONSTRUCTION (300)
- RAILROAD RIGHT OF WAY LINE
- CITY OR VILLAGE CORPORATE LIMITS
- PROPERTY LINE
- EASEMENT LINE
- FENCES
- SNOW FENCE
- DRAINAGE
- WATERS EDGE
- MARSH OR SWAMP
- RIPRAP
- DRAINAGE DITCH
- APPROACH (302 + 00)
- TRAVELED WAY
- RAILROADS
- GUARD RAIL
- GUIDE POSTS
- DELINEATORS
- HEDGES AND TREES
- INTERCHANGE
- HIGHWAY GRADE SEPARATION–NO CONNECTION
- OTHER BRIDGE
- SERVICE ROAD
- TERMINATED CROSS-ROAD

- BUILDINGS
- TELEGRAPH LINES
- TELEPHONE LINES
- POWER LINES
- CULVERTS (in Place)
- CULVERTS (Install)
- CONCRETE BOX CULVERTS (Install)
- BRIDGES (Install)
- CONCRETE CURB
- CONCRETE CURB AND GUTTER
- CONCRETE WALK
- CATCH BASIN (Existing)
- CATCH BASIN (New)
- MANHOLE (Existing)
- MANHOLE (New)
- CURB INLET (Existing)
- CURB INLET (New)
- GROUND MOUNTED SIGNS
- OVERHEAD SIGNS
- HYDRANT
- LIGHT STANDARDS
- TRAFFIC SIGNALS (Plan & Profile Sheets)
- HIGH MAST LIGHTING ASSEMBLY
- GROUND / GRADE ELEVATION
- CENTERLINE
- SECTION LINE
- DEFLECTION ANGLE (Delta)
- SOD OR JUTE MESH
- POLES TO BE MOVED
- POLES TO BE LOWERED
- CONCRETE FOUNDATION
- CONDUIT
- 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
Ahd	Ahead
Alt	Alternate
Approx	Approximate or Approximately
Appr	Approach
Asph Cem or A C	Asphalt Cement
Asph. Conc.	Asphaltic Concrete
Bit	Bituminous or Bitumen
Bk	Back
B M	Bench Mark
Bldg.	Building
Br.	Bridge
C.A.E.S.	Corrugated Aluminum End Section
C.A P	Corrugated Aluminum Pipe
C B	Catch Basin
C & G	Curb and Gutter
Ch Blk	Channel Block
Ch. Ch	Channel Change
C. I	Curb Inlet
C.I P	Cast Iron Pipe
Cl	Class
C.S. E S	Corrugated Steel End Section
C.S.P.	Corrugated Steel Pipe
CMS	Cationic Medium Setting
Comp	Compression
Const	Construction
Conc	Concrete
Cont. Reinf Conc Pvm't	Continuously Reinforced Concrete Pavement
Contr	Contraction
Cro	Crown
CRS	Cationic Rapid Setting
Crse	Coarse
C S.	Curve to Spiral
C. to C.	Center to Center
C.Y	Cubic Yard
D	Degree of Curvature
D-Load	Dead Load
D.B.	Ditch Block
Def	Deformed
Del	Deliver
D G.	Ditch Grade
El. or Elev	Elevation
Ellipt.	Elliptical
Emb.	Embankment
Emul.	Emulsified
Engr.	Engineer
Eq.	Equation
E R	East Roadway
E S	End Section
Esmt	Easement
Exc.	Excavation
Exp.	Expansion
F. D	Field Drive
Found.	Foundation
F. P	Fence Post
Furn	Furnish
Ga	Gage or Gauge
Gr	Gravel
Grd	Graded
G V.	Gate Valve
Hel	Helical
Hyd	Hydrant
Ident.	Identification
Inchg	Interchange
I. M	Iron Monument
Inst	Install
Inter	Intersection
Ins	Insert
Jt	Joint
L	Length of Curve
Ls	Length of Spiral
Load	Loading
L. F.	Linear or Lineal Foot
Liq.	Liquid
Long	Longitudinal
L P	Light Pole
Lt	Left
"M"	One Thousand
Matl	Material
Max	Maximum
MC	Medium Curing
M H	Manhole
Min	Minimum
M L	Main Line
N R	North Roadway
Off Loc.	Office Location
O to O	Out to Out
P & P	Plan and Profile
P C	Point of Curvature
P C C	Point of Compound Curve
P C C Pvm't	Portland Cement Concrete Pavement
P D	Private Drive
Pen	Penetration
Perf	Perforated
P I	Point of Intersection
P O C	Point on Curve
P O T	Point on Tangent
P P	Power Pole
P R C	Point of Reverse Curvature
Pref	Preformed
P S D	Passing Sight Distance
P T	Point of Tangency
P V C	Polyvinyl Chloride Sewer Pipe
Quant	Quantity or Quantities
R	Radius
R or Rge	Range
RC	Rapid Curing
R C E S	Reinforced Concrete End Section
R C P	Reinforced Concrete Pipe
R C P S	Reinforced Concrete Pipe Sewer
Rd	Road
Rdbd	Roadbed
Rdwy	Roadway
Refl	Reflectorized
R R	Railroad
Rt	Right
R/W	Right of Way
Salv	Salvage
San	Sanitary
S C	Spiral to Curve
SC	Slow Curing
Sc	Spiral Deflection Angle
S D	Sight Distance
S E	Superelevation
Sec	Section
Sec Line Appr.	Section Line Approach
Sep	Separation
Serv	Service
Sgr Prep	Subgrade Preparation
Shldr.	Shoulder
SP	Special Provision
S.P P	Structural Plate Pipe
S PPA	Structural Plate Pipe Arch
S.R.	South Roadway
SS	Slow Setting or Supplement Specification
S S D	Stopping Sight Distance
S T.	Spiral to Tangent
Sta.	Station
Std.	Standard
Std. Specs.	Standard Specifications
Struct.	Structure
Surf	Surface or Surfacing
Surv	Survey
S W.	Sidewalk
S Y	Square Yard
T	Tangent Length (circular curve)
T or Twp.	Township
Tel	Telephone
Temp.	Temporary
T P	Telephone Pole
Tr	Traffic
Trans	Transverse or Transition
Trtd	Treated
Ts	Tangent Length (curve with spirals)
T S	Tangent to Spiral
U.S.C & G.S	United States Coast and Geodetic Survey
V C	Vertical Curve
V C P	Vitrified Clay Pipe
W M.	Water Main
W M V	Water Main Valve
W. R	West Roadway
Wrng.	Wearing
W. S V	Water Service Valve
X-Sec	Cross Section
Xc	Spiral Coordinate
Yc	Spiral Coordinate

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NOTES

100 010 GENERAL: The engineer will see to the removal of existing fences to the highway right of way line and to the relocation or adjustment of utility facilities as shown on the plans. All privately-owned light poles, guard posts, signs, etc., within the right of way limits shall be removed by the owners.

100 020 WORK SCHEDULE: In order to minimize interference with traffic operations, a detailed schedule shall be agreed to prior to beginning work, between the engineer, utility companies, and the contractor and subcontractors, if any.

100 030 UNDERGROUND UTILITIES: The contractor shall notify the local utility companies prior to the beginning of construction, so they may stake location and depth of all utilities in the project area. Subcutting or scarifying over utility lines may be eliminated if, in the opinion of the engineer, a hazardous situation exists. Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the contractor, upon request to the engineer.

100 P01 REMOVAL OF TRACKS: The existing railroad spur tracks located north and west of the existing underpass will be removed by the Burlington Northern Railroad as required to provide room for construction of the shoofly by the contractor.

100 P02 PAVEMENT REPAIR: The contractor will be required to repair the existing pavement that is damaged due to pile driving, storm sewer installation, or other construction activities. If the existing curb and gutter is destroyed or damaged during construction of the trestles, the contractor shall make repair (patching, temporary curbs, etc.) as required to maintain the present drainage patterns. Bituminous surfacing can be used for the patches, repairs, or for constructing temporary curbs if required. The cost of this repair work will not be paid for separately but shall be included in the price bid for other items.

100 P03 The contractor will be required to notify the following individual at least 48 hours prior to starting any work on this project:

W. R. Grimstad
Yellowstone Division Superintendent
2718 Montana Avenue
Billings, MT 59101
Telephone: (406)256-4221

100 P04 The temporary access easements between Main Street and the railroad as shown on the right of way and easement layout sheet have been provided for use by the contractor for equipment access to the north shoofly construction area. In the northeast quadrant, it will be necessary to drive over the existing curb and gutter and adjacent to the Mandan Supply building to get to the construction site. Adequate flagging will be provided at all times during the movement of equipment and machinery. The temporary easement in the southeast quadrant can be used by the contractor for equipment and machinery storage and parking area. Upon completion of the project, the area shall be cleaned up to the satisfaction of the engineer in the field.

100 P05 SOIL CONTAMINATION: During the soil survey, which was done in February 1986, some of the borings taken in an area west of the north trestle contained some hydrocarbon contaminated clay and sand. It is assumed this contamination is due to a gasoline spill or leak from the gasoline storage tanks in this area. This information is furnished to the contractor so that any appropriate action deemed necessary can be anticipated. Additional information concerning this contamination can be obtained by contacting the State Highway Department Materials and Research Division in Bismarck, North Dakota. The telephone number is (701)224-4382.

100 P06 AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATIONS: Inquiries pertaining to the A.R.E.A. Specifications can be directed to the Burlington Northern Division Engineer at Billings, Montana. The phone number is 406-256-4313.

100 133 The contractor will be required to conduct the construction activities in such a manner as to comply with the Air Pollution Control Regulations of the state of North Dakota. Water will be used to control dust on the construction site.

100 160 UTILITY POLES: Equipment shall work around utility poles within the construction area that are not to be disturbed.

107 100 RAILWAY PROTECTION INSURANCE: Insurance policies for Railway Protection Insurance and for Public Liability Insurance as required by Section 107.06 of the Standard Specifications and Supplemental Specification 107.07 shall be obtained by the Contractor at Stations 0+00 to 19+00 for protection of Burlington Northern Railroad.

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

NOTES

200 420 RAILROAD FLAGGING: The contractor will reimburse the Highway Department for the actual cost of railroad flagging. Railroad flagging is not a separate pay item, but shall be included in the price bid for "Excavation." Approximate rate is $17 per man hour. Haul operations across the Burlington Northern Railroad will require flagging. A minimum of three flagpersons will be required at each railroad crossing. Forty-eight hour advance notice will be required.

200 252 WASTE DISPOSAL: All excess excavation and old concrete sidewalks, driveways, curb and gutter, pavement, bituminous surfacing, etc., shall be disposed of off the highway right of way at a site selected by the contractor and approved by the Engineer. Disposal in wetland areas will not be approved. The cost of disposal (and obtaining of the disposal area) shall be included in the price bid for other items.

200 P01 WATER: The cost of water required for compaction, for the aggregate base course and for use as a dust palliative, has been included in the quantities and shall be paid for at the unit price bid for "Water."

200 P02 SOUTH SHOOFLY EXCAVATION: The south shoofly will be constructed over a low area that is used as a "holding pond" for the water discharged from the existing storm sewer lift station. The water table in this specific area can be very high depending on the weather and the amount of water pumping into the ponding area. It may be necessary to divert the discharge water into the new storm sewer and/or lower the ground water table in this area prior to the removal of the excavation and subcut. Cost of any pumping, special equipment, handling, etc., shall be included in the price bid for "Common Excavation - Type A."

200 P03 SUBCUT, SCARIFY, AND RECOMPACT: The area under the south shoofly shall be subcut to the elevation and dimension shown in the plans. The first two feet above the subcut shall be backfilled with Class 5 Aggregate Base as shown on the typical section. The excavation and subcut material can be used for filling the holding pond outside of the shoulder line. Some drying may be required. The remainder of the backfill material shall be obtained from borrow. The existing ground under the north shoofly roadway shall be scarified and recompacted for a depth of 12 inches as directed by the engineer. The subcut has been included in the quantities and shall be paid for at the unit price bid for "Common Excavation - Type A." The cost of scarifying and recompacting shall be included in the price bid for "Borrow."

200 360 COMPACTION AND DENSITY CONTROL: Compaction and density controls shall be in accordance with Section 203.02 F of the Standard Specifications T-180. This includes the Class 5 aggregate base.

618 P01 UNTREATED TIMBER: Payment for untreated timber will be based on plan quantity. Lumber pieces will not be measured individually for payment.

704 P01 MAINTAINING TRAFFIC: The contractor shall provide at least one lane for traffic at all times except possibly during the pile driving operations when it may be necessary to stop all traffic during construction within the two open spans. The roadway must be open to two-way traffic during the hours of 10:00 P.M. to 7:00 a.m.

704 P02 SIGNS: The signs listed below have been included in the quantities and shall be paid for at the unit price bid for "Traffic Control Signs."

Sign Description	Sign Number
Route Marker	M1-5-24
Vertical Clearance Symbol	W12-2-48
Road Narrows	W5-1-48

Upon completion of the project, the route markers shall be removed and the vertical clearance signs and the road narrows signs shall remain in place. All of these signs shall become the property of the State Highway Department.

706 010 FIELD LABORATORY: If deemed unnecessary by the engineer in the field, the item "Field Laboratory" shall be deleted.

714 040 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.

722 P01 MANHOLE: At Station 9+21± Lt., the new 48" manhole will be installed over the existing 15" storm sewer pipe. The cost of removing and replacing the existing storm sewer, the cutting, grouting, and all other work required to complete this installation shall be included in the price bid for "Manhole - 48 In."

NOTES

752 P01 SAFETY FENCE: A temporary safety fence shall be installed (and maintained) by the contractor at locations designated by the engineer as needed for pedestrian control. The safety fence shall be orange in color, 4 feet high, and constructed of high density polyethylene and shall be installed in accordance with manufacturer's recommendations. Tensor Corporation fence product No. UX 4050 or equal can be used. The quantity of fencing shown is advisory only and the actual amount needed shall be determined in the field as required for the construction sequencing.

The price bid for "Safety Fence" shall be full compensation for all labor, equipment, and materials necessary to complete the work as required.

920 P01 GEOTEXTILE REINFORCEMENT FABRIC: The geotextile fabric shall conform to the AREA Specifications for heavy fabric (typical weight 12 to 16 oz./s.y.). The fabric shall be measured by the actual surface area covered to the nearest square yard with no allowance for overlaps. The quantities measured as provided will be paid for at the contract unit price for "Geotextile Reinforcement Fabric" complete in place.

980 P01 RAILROAD BALLAST: Crushed stone complying with American Railway Engineering Association (AREA) Specification for No. 4 gradation with a nominal size square opening of 1½" to 3/4" shall be used as ballast.

980 P02 RAILROAD BALLAST: An additional 1300 tons of railroad ballast has been included in the quantities and shall be stockpiled for use by Burlington Northern Railroad. The ballast shall be stockpiled in the temporary easement area east of Highway 1806 and south of the railroad tracks. The exact location and dimension of the stockpile shall be determined by the engineer. This stockpiled material shall be measured and paid for at the unit price bid for "Railroad Ballast."

980 P03 RAILROAD TRACK: This item consists of furnishing and placing the ties, rails, and fastenings on the ballast at the locations shown on the plan and profile sheets and as specified herein. The construction and material for the track work and trestles shall comply with the applicable specifications and standards of the American Railway Engineering Association (A.R.E.A.) and/or the North Dakota State Highway Department.

RAIL: All rail shall be new or good relayer rail and shall be 115 pounds or greater. The rail shall be in standard 39 foot lengths and shall be smooth on the head, straight in line without bends, twists, waves, or kinks. Only one weight of rail shall be used throughout the project. Rail shall meet the approval of the North Dakota State Highway Department. The dimensions and elevations shown in the plans are based on the use of 115 pound rail. If a heavier rail is used, required adjustments in elevation shall be made accordingly.

TIE PLATES: The tie plates shall be new or good used plates and shall be of the proper size and punched to fit the base of the rail.

JOINT BARS: Joint bars shall be new or good secondhand material and shall be of the correct size and weight to fit the rail. All bars shall be free of defects and straight in the vertical and horizontal planes.

TRACK BOLTS, NUTS, AND SPRING WASHERS: Track bolts shall be heat treated carbon steel. Nuts shall be medium carbon steel. Bolts, nuts, and spring washers shall be of the size recommended to fit the joint bar and rail. Bolts, nuts, and spring washers shall be new material in conformance with A.R.E.A. specifications.

TRACK SPIKES: Track spikes shall be new, conforming to the requirements of A.R.E.A. specifications, size 5/8" x 6". Reinforced throat high carbon steel track spikes shall be used.

TIES: Ties shall be new and shall be of mixed hardwood species that are sawed or hewn on sides, top, and bottom. Hardwood ties shall have an approved type of anti-splitting device installed in each end before treatment. Ties shall be adzed and drilled for spikes prior to treatment. Treatment shall be in accordance with the applicable provisions of Fed. Spec. TT-W-571 for creosote or solutions containing creosote. The ties shall conform to the applicable requirements of the AREA manual, Size 7"x9"x8'-6".

All track construction shall be performed under the direction of qualified and competent supervisory personnel, including foremen and gang leaders, experienced in railroad construction. All track construction not covered specifically herein shall be in accordance with AREA specifications and recommended practices.

Roadbed surface, grade, and drainage shall be approved prior to any distribution of construction material. The contractor shall use equipment that will not form ruts or water pockets when distributing material over the finished roadbed. Depressions shall be filled and compacted prior to track laying.

Rail shall be loaded and unloaded with an approved derrick or crane and placed with the head up without dropping and with sufficient support under the base. Rail shall be handled carefully at all times to prevent kinking or nicking and shall not be unloaded from carts or trucks in motion. Rails unloaded and distributed for laying shall be placed parallel with the track on the edge of the roadbed opposite the locations in which they are to be placed in the tracks.

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NOTES

Rail shall be laid so that the joints on one rail shall not vary more than 36 inches in either direction from the center of the opposite rail. If it is necessary to field cut any rail, it shall be done with a power rail saw. The sawed rail ends shall be chambered and end hardened. New bolt holes required shall be drilled and chamfered using a template to insure accurate location of holes. The use of an acetylene torch will not be permitted in cutting rails or making holes in rails.

Rail shall be laid without bumping or striking with the ends square.

Rail joints shall be applied before the track is spiked. When preplaced ties are not used, the north rail on tangents and the outside rail on curves shall be spiked first. After the first rail is lined and spiked, the opposite rail shall be lined to accurate gauge using track gauges simultaneously placed at every fourth tie on tangents and at every third tie on curves. The gauge spikes shall be fully driven before the gauges are removed. The contractor shall bore 9/16" diameter holes for anchor spikes and place anchor spikes after the gauge spikes are driven. All rail laid on any given day shall be fully spiked and bolted and anchored at the end of the day's work.

Crossties shall be so handled as to avoid breaking or bruising. They shall not be thrown from cars or trucks onto rails, other track material, or rocks. Moving and placing ties with picks, spike mauls, sledges, or shovels is prohibited. Surfaces damaged, cut or drilled in the field shall be coated with an approved preservative.

Ties shall be placed with the adzed side up and at right angles to the centerline of track.

Timber crossties shall be placed on approximately 20-1/2" centers, with 23 ties per 39 feet of rail unless otherwise directed.

All track on timber ties shall be fully tie plated. Tie plates shall be installed by the contractor so that the rail will have full bearing on the plate and the plate will have full bearing on the tie. All bearing surfaces of ties, tie plates, and rail shall be cleaned before the rail and plates are laid. Tie plates shall be so placed that the shoulder is in contact with the base of rail for the entire length of shoulders, and shall be centered as nearly as appropriate over the prebored gauge spike holes. Plates shall be installed with cant in proper direction.

All rail shall be laid accurately to standard gauge at the time the rail is laid. The standard gauge of track shall be 4' - 8½" between points 5/8" below the top of rail on the two inside edges of the rail. On tangents and curves, the track shall be accurately laid and maintained to standard gauge of 4' - 8½". All track gauges used by the contractor will be checked by the railroad. If found to be more than 1/16" in variance from the master gauge, they shall immediately be removed from the job.

Joint bars shall be set in proper position and secured firmly in place by the full number of bolts and washers before track is fully spiked. Nuts shall be installed with the bevel end of the nut bearing against the lock washer. All bolts shall be tightened with approved bolt machines to within a range of 20,000 to 25,000 lbs. per bolt. Bolting shall start with the center bolts working toward the ends and all nuts shall be turned up tight with the bolt heads staggered inside and outside of the rail alternately. All joint bars and rail ends covered by the bars shall be cleaned of all foreign material. All joint bars, rail ends, bolts, nuts, and washers shall be well coated with corrosion resistant grease before installing.

Rail anchors shall be applied immediately after track is fully spiked, contractor shall box anchor each tie for each thirty-nine foot rail length at each end of each track and box anchor alternate ties for the remainder of the rail per detailed drawing, except no anchors shall be placed on ties at which joints occur in either rail. Anchors shall have full bearing against the tie.

Whenever the bearing of rail anchors against the tie is disturbed, the anchors shall be tightened or reset by an approved mechanical device, or they shall be taken off and reapplied in proper position by means of the rail anchor applicator, except that adjustments of less than one inch may be made by driving the anchors along the rail. In carrying out adjustments by driving along the rail, care shall be taken to avoid overdriving or damaging the anchors and to avoid skewing of the anchor on the rail.

NOTES

Rails shall be spiked to each timber crosstie using two gauge spikes and two anchor spikes in accordance with detailed drawing. Spikes shall be driven vertically and not inclined under the rail. Gauge spikes shall be driven close against the base of the rail. Care shall be taken to prevent injury to the rail by a blow from the spike maul. In no case shall the spikes be overdriven or straightened while being driven. Except when using preplated ties, the gauge shall always be used when spiking and no lifted until the spikes are fully driven.

Gauge at least every third tie on curves and every fourth tie on tangents. The rail shall be held to proper gauge by use of track lining bars while spikes are driven. The removal of spikes once driven shall be avoided whenever possible. When spikes are pulled, the holes shall be plugged with treated wood plugs, using care in driving when straight so as to avoid breaking before they are driven their full length.

Railroad ballast shall be paid for by the number of ton used in the accepted work. This payment will be full compensation for all labor, equipment, and materials necessary to complete the work in accordance with the plans and specifications. (See Note 980-P02).

Railroad track shall be paid for by the lineal foot of accepted track measured along the centerline between rails. The price bid for "Railroad Track" will be full compensation for all materials, labor, and equipment required to construct the track in accordance with the plans and specifications. All material necessary to install the railroad tracks including, but not limited to rails, joint bars, track bolts, nuts, spring washers, tie plates, spikes, and ties will be incidental and the cost of these items will be included in the price bid for "Railroad Track." The rails that are installed on the timber trestles have been included in the quantities and shall be paid for at the unit price bid for "Railroad Track."

Geotextile Reinforcement Fabric shall be measured and paid for in accordance with Note 920-P01.

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QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
103	0100	Contract Bond	L. Sum	1
107	0100	Railway Protection Insurance	L. Sum	1
203	0101	Common Excavation - Type A	C.Y.	1,478
203	0140	Borrow	C.Y.	3,370
216	0100	Water	M. Gal.	100
302	0120	Aggregate Base Course - Class 5	Ton	1,800
616	5890	Structural Steel	L. Sum	1
618	0115	Untreated Timber	M.B.M.	104
622	5400	Untreated Timber Piling	L.F.	13,410
622	5410	Untreated Timber Test Piling	L.F.	340
622	6760	Steel Sheet Piling	Sq. Ft.	3,600
702	0100	Mobilization	L. Sum	1
704	0100	Flagging	M. Hr.	300
704	1000	Traffic Control Signs	Unit	1,618
704	1030	Attenuation Device - Type A	Ea.	12
704	1052	Type III Barricade	Ea.	16
704	1065	Traffic Cones	Ea.	22
706	0100	Field Laboratory - Type A	Ea.	1
708	2187	Seeding, Type A, Class VI	Acre	1
714	0210	Pipe, Conc., Reinf., 15" - Cl. III - Sewer	L.F.	32
714	0212	Pipe, Conc., Reinf., 15" - Cl. IV - Sewer	L.F.	48
714	0315	Pipe, Conc., Reinf., 18" - Cl. III - Sewer	L.F.	66
714	0405	Pipe, Conc., Reinf., 21" - Cl. III - Sewer	L.F.	564
722	0100	Manhole - 48 In.	Ea.	5
722	1100	Manhole Riser - 48 In.	L.F.	47

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QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
722	2500	Manhole, Special	Ea.	1
752	0910	Safety Fence	L.F.	400
920	1210	Geotextile Reinforcement Fabric	S.Y.	4,300
930	9500	Hardware	Lbs.	7,000
980	0500	Railroad Ballast	Ton	3,100
980	0600	Railroad Track	L.F.	1,963

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BASIS OF ESTIMATE

Description

Aggregate Base Course - Cl. 5: 1.5 Ton/C.Y. plus 25%

Railroad Ballast: 1.5 Ton/C.Y.

Water: 10 Gal./C.Y. of estimated embankment quantity and 20 Gal./Ton of aggregate base course. An estimated amount of water has been included in the quantities and shall be used as a dust palliative.

Seeding: The entire area disturbed by construction of the shooflys, storm sewer, etc., shall be seeded. The exact limits for seeding shall be determined in the field.

MAXIMUM SIZE OF AGGREGATE

Description	Type of Aggregate	Max. Size
Aggregate Base Course, Cl. 5	Crushed	3/4"
Railroad Ballast (see A.R.E.A. Specifications)		

LIST OF STANDARD DRAWINGS

DESCRIPTION

D-722-5 Manhole Details

D-754-1 Construction Sign Details

D-754-2 Construction Sign Details

D-754-3 Construction Sign Details

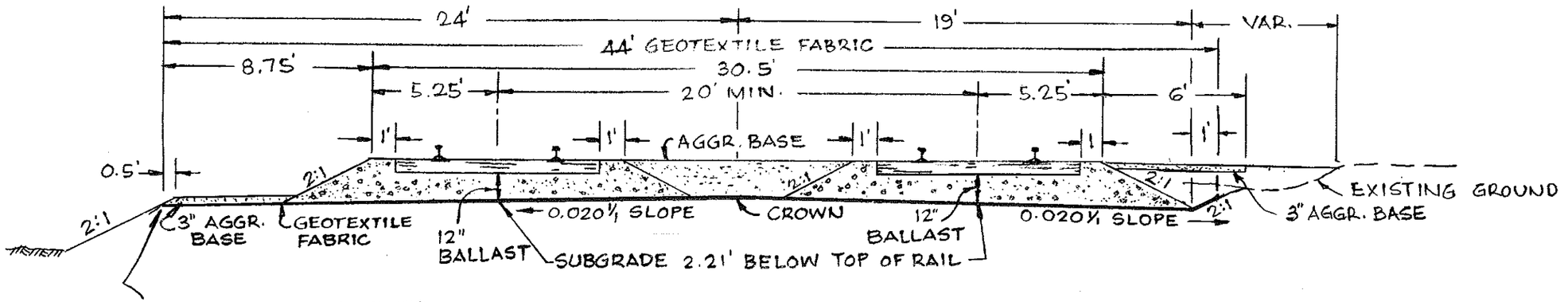
D-754-4 Construction Sign Details

D-754-5 Barricade Details

D-754-5A Construction Sign and Barricade Assembly Details

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	11

TYPICAL SECTIONS

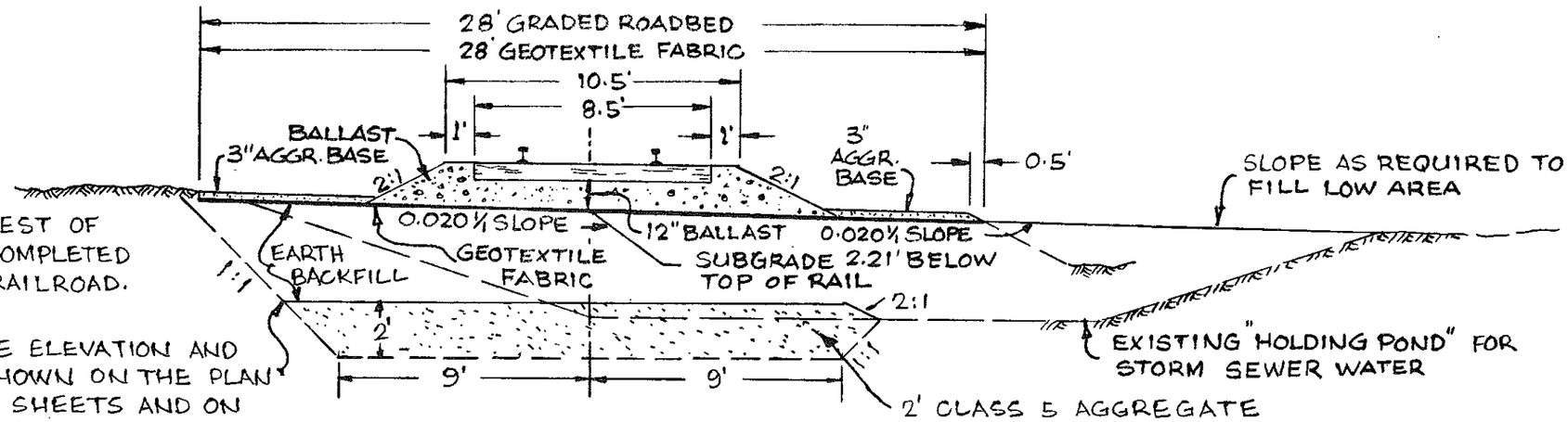


NOTE: WIDTH OF GRADED SHOULDER SHALL BE REDUCED BY 2' FROM STA 13+70± TO 14+15± TO ALLOW MORE CLEARANCE AT THE FARMERS UNION BUILDING.

NORTH SHOOFLY

STA. 6+56.87 TO 15+12.83 (MAIN LINE SHOOFLY)
STA. 7+65.12 TO 14+05.12 (TRACK Nº1 SHOOFLY)

NOTE: The subgrade elevation (2.21' below the top of rail) is based on the use of 115 pound rail. If heavier rail is used, adjustments shall be made accordingly.



ALL TRACK CONSTRUCTION WEST OF THE SOUTH TRESTLE TO BE COMPLETED BY BURLINGTON NORTHERN RAILROAD.

SUBCUT TO THE ELEVATION AND DIMENSION SHOWN ON THE PLAN AND PROFILE SHEETS AND ON THE CROSS SECTIONS.

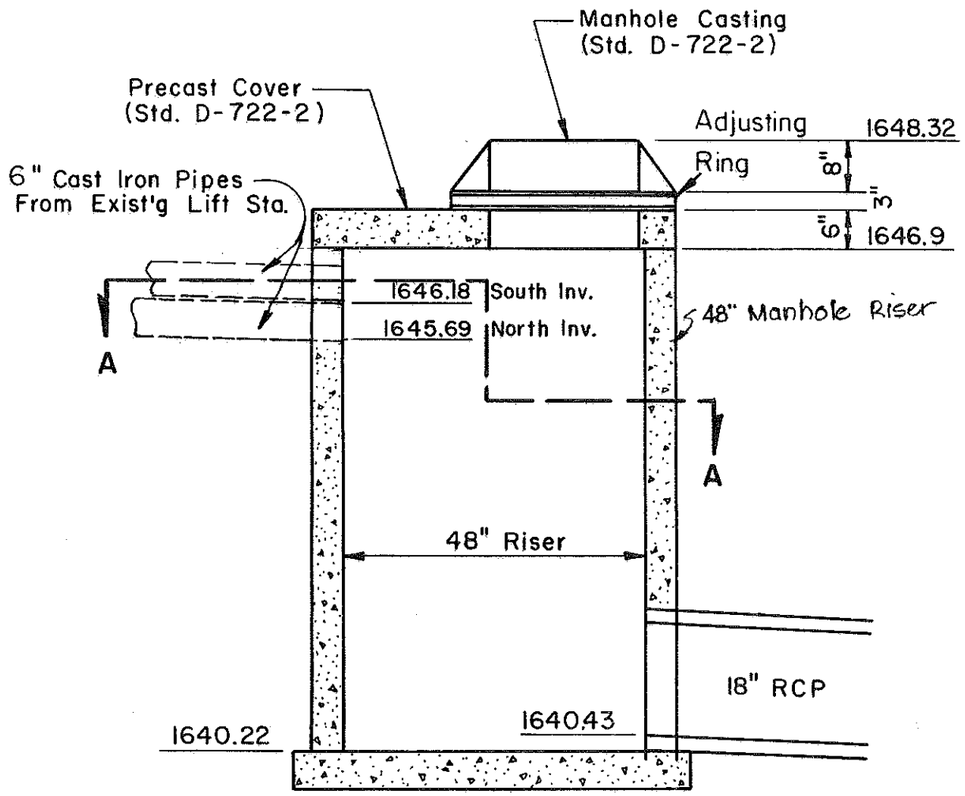
SOUTH SHOOFLY

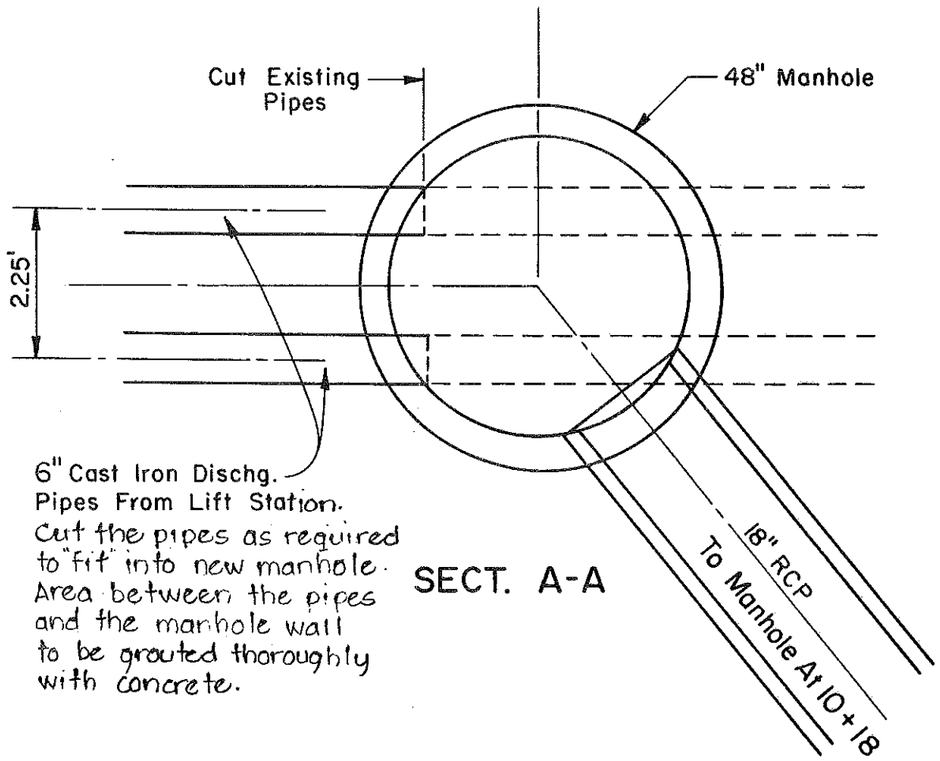
* STA. 9+52.6 (EAST END OF TRESTLE) TO STA. 13+11

* RAILS TO BE INSTALLED ON TRESTLE FROM STA. 8+43.3 TO 9+52.6

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	12

48" MANHOLE – 9+80 RT.





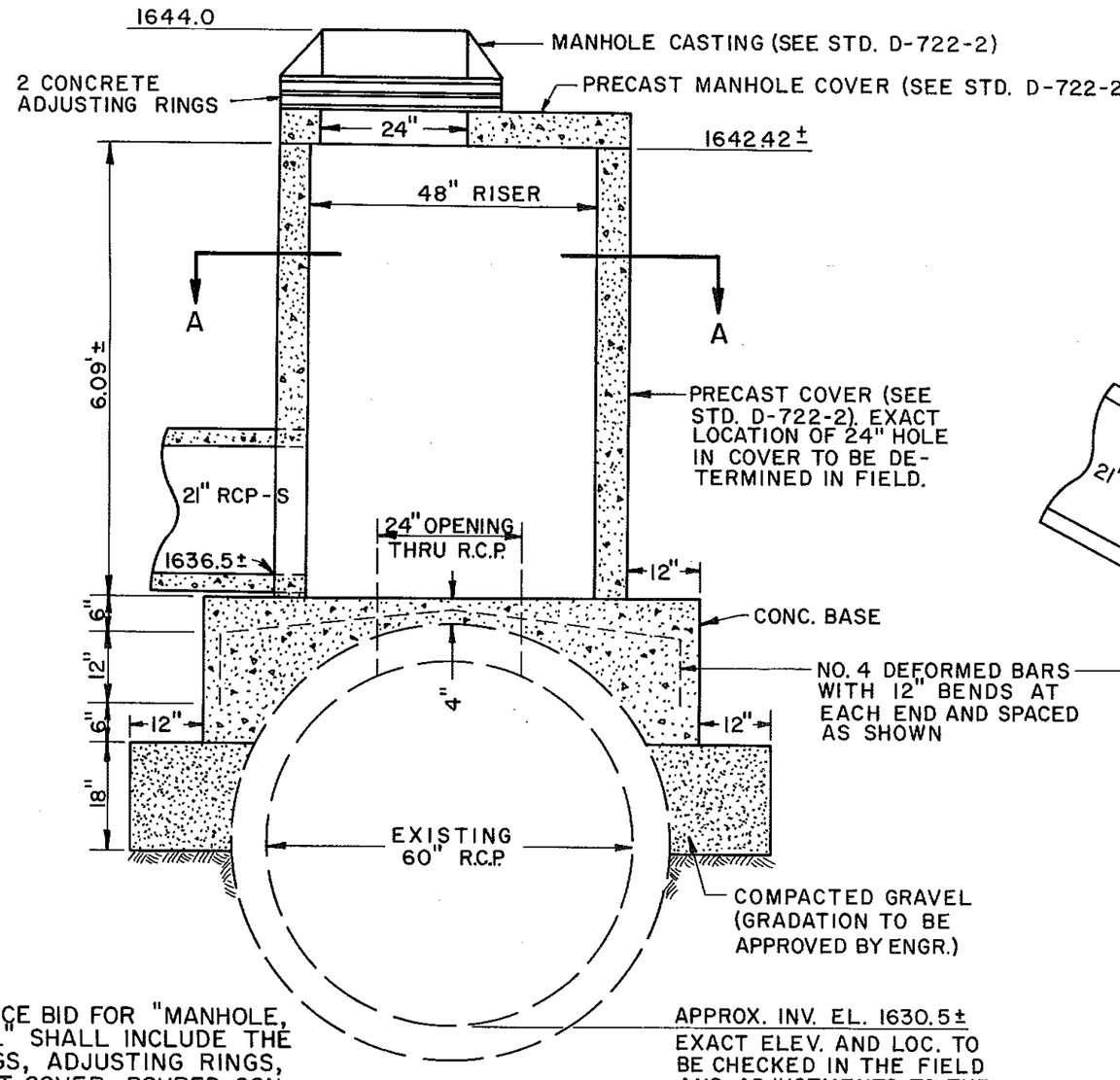
6" Cast Iron Dischg. Pipes From Lift Station. Cut the pipes as required to "fit" into new manhole. Area between the pipes and the manhole wall to be grouted thoroughly with concrete.

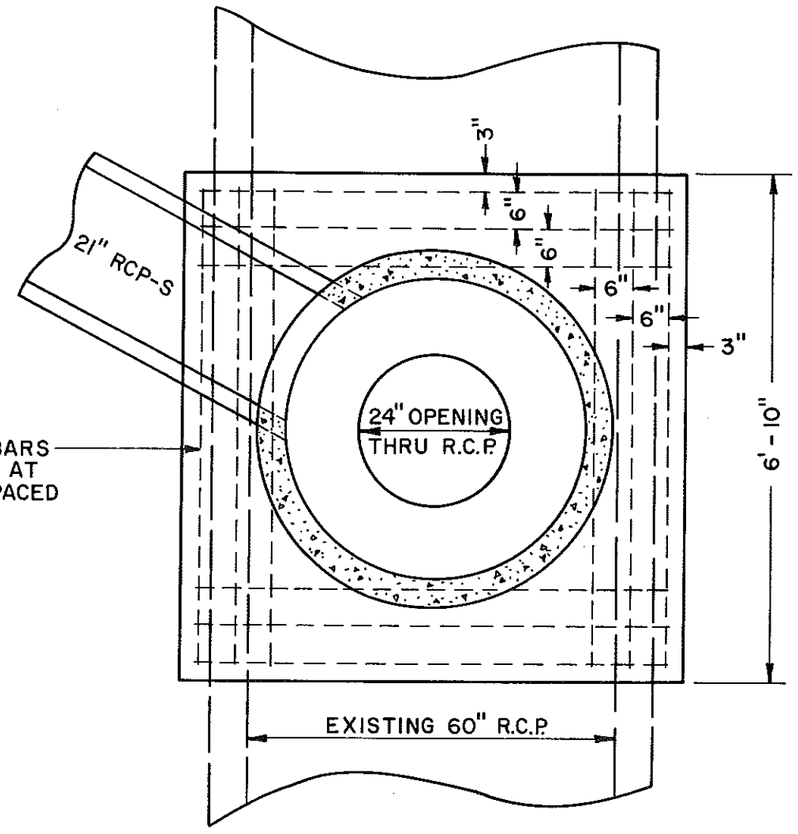
SECT. A-A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	13

SPECIAL MANHOLE

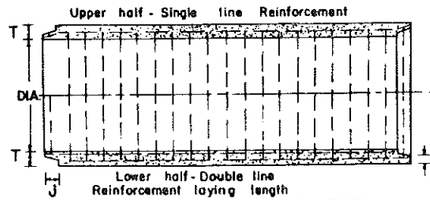
STA. 15+90± RT.

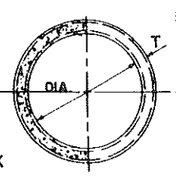


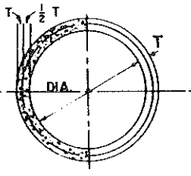


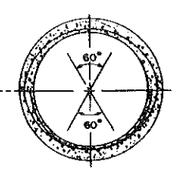
SECTION A-A

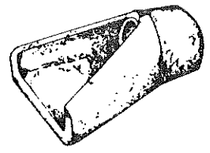
NOTE: THE PRICE BID FOR "MANHOLE, SPECIAL" SHALL INCLUDE THE CASTINGS, ADJUSTING RINGS, PRECAST COVER, POURED CONCRETE BASE AND THE GRAVEL. THE RISER HAS BEEN INCLUDED IN THE QUANTITIES AND SHALL BE PAID FOR AT THE PRICE BID FOR "MANHOLE RISER - 48 IN."

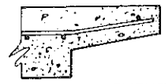


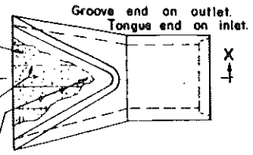


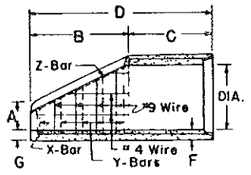












REGION			
8	N.D.	FG-1-806(015)069	14

D-714-1

REINFORCED CONCRETE PIPE CULVERT AND END SECTIONS

REINFORCED CONCRETE PIPE
TYPICAL LONGITUDINAL SECTION

END VIEW
Double line Reinforcement

END VIEW
Single line Reinforcement

END VIEW
Top half showing Elliptical Reinforcement.
Bottom half showing Elliptical & Inner Cage Reinforcement.

PERSPECTIVE

ARRANGEMENT FOR REINFORCEMENT
At end of 36" to 108" pipe.
At end of 12" to 33" pipe.

SEE STANDARD D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

END VIEW

PLAN

SECTION X-X

END SECTION
Equivalent to Class III Pipe

END SECTION										
TERMINAL DIMENSIONS								REINFORCING STEEL		
DIA.	A	B	C	D	E	F	G	X	Y	Z
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"	2"	2¼"x 2'	6-¼"x 2' @ 6" c.c.	2-¼"x 4'
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"	2¼"	2¼"x 2½'	6-¼"x 2½' @ 6" c.c.	2-⅜"x 4'
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"	2½"	2⅜"x 3'	6-¼"x 3' @ 6" c.c.	2-⅜"x 4'
21	0'-9"	3'-0"	3'-1½"	6'-1½"	3'-6"	2¾"	2¾"	2⅜"x 3½'	8 ¼"x 3½' @ 6" c.c.	2-⅜"x 5'
24	0'-9½"	3'-7½"	2' 6"	6'-1½"	4'-0"	3"	3"	2½"x 4'	8-⅜"x 4' @ 8" c.c.	2-⅜"x 6'
27	0'-10½	4'-1½"	2'-0"	6'-1½"	4'-6"	3¼"	3¼"	2½"x 5'	8-⅜"x 5' @ 9" c.c.	2-⅜"x 6'
30	1'-0"	4'-6"	3'-7¾"	8'-1¾"	5'-0"	3½"	3½"	2½"x 5'	12-⅜"x 5' @ 8" c.c.	2-½"x 6'
36	1'-3"	5'-3"	2'-10⅜"	8'-1¾"	6'-0"	4"	4"	2½"x 6'	18-⅜"x 6' @ 6" c.c.	2-½"x 8'
42	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	4½"	4½"	2½"x 7'	12-½"x 7' @ 9" c.c.	2-½"x 8'
48	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	5"	5"	2½"x 8'	16-½"x 8' @ 8" c.c.	2-½"x 8'
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"	5½"	2½"x 8'	16-½"x 8' @ 7" c.c.	2-½"x 8'
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	6"	5"	2½"x 9'	16-½"x 9' @ 6" c.c.	2-½"x 9
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	6½"	5½"	2½"x 9'	22-½"x 9' @ 6" c.c.	2-½"x 9
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	7"	6"	2½"x 10'	24-½"x 10' @ 6" c.c.	2-½"x 9
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	7½"	6½"	2½"x 10'	28-½"x 10' @ 6" c.c.	2-½"x 10'
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	8"	6½"	4½"x 10'	28-½"x 10' @ 6" c.c.	4-½"x 10'
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	8½"	6½"	4½"x 11'	28-½"x 11' @ 6" c.c.	4-½"x 10'

Permissable Fill Heights
RCP-Sewer-Trench Conditions
Other than Class I

PIPE SIZE	Class II	Class III	Class IV	Class V
	FT	FT	FT	FT.
" thru 54"	3-9	1-3 9-13	13-23	23+
" thru 108"	1-9	9-13	13-23	23+

REINFORCED CONCRETE PIPE

Dia. of Pipe in inches	Cross-Sectional Water Area	Weight per lin. foot of pipe Std Wall	Joint Groove End J Min./Max.	Joint Tongue End K Min.	CLASS I					CLASS II					
D-LOAD TO PRODUCE A 0.01 INCH CRACK					800					1000					
D-LOAD TO PRODUCE ULTIMATE LOAD					1200					1500					
						4000 P.S.I.					4000 P.S.I.				
					Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Height of Fill Trench Conditions	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Height of Fill Normal Backfill	Height of Fill Imperfect Trench
						Inner cage	Outer cage				Inner cage	Outer cage			
Dia	Sq.ft.	Lbs.	In.	In.	In.	Sq.in	Sq.in	Sq.in	Ft.	In.	Sq.in.	Sq.in.	Sq.in.	Ft.	Ft.
12	0.79	92	1⅝-2⅜	¾											
15	1.23	127	1¾-2¾	⅞		TO	BE USED		FOR						
18	1.77	166	1⅞-2⅞	1		R.C.P.	SEWER		ONLY						
21	2.40	214	1⅞-3⅛	1⅛											
24	3.14	265	2¾-3¾	1⅛											
27	3.98	322	2¾-4	1¼	☆Special conditions only					3¼	.13		.11	3-11	11-18
30	4.91	384	3¼-4¼	1¼						3½	.14		.12	3-11	11-18
33	5.94	452	3¼-4¼	1½						3¾	.15		.13	3-11	11-18
36	7.07	524	3¼-4¼	1½						4	.12	.09	.13	3-11	11-18
42	9.62	685	3⅜-4¾	1¾						4½	.15	.12	.17	3-11	11-18
48	12.57	867	3⅝-4¾	1⅞						5	.18	.14	.20	3-11	11-18
54	15.90	1070	4⅛-5¼	2					☆	5½	.22	.16	.24	3-11	11-18
60	19.63	1296	4½-5½	2¼	6	.21	.16	.23	6-9	6	.25	.19	.28	3-11	11-18
66	23.76	1542	5-6	2⅝	6½	.25	.19	.28	6-9	6½	.31	.23	.34	3-11	11-18
72	28.27	1810	5⅝-6¾	2⅞	7	.29	.22	.32	6-9	7	.35	.26	.39	3-11	11-18
78	33.18	2098	6¼-7¼	2⅞	7½	32	.24	.36	6-9	7½	.40	.30	.44	3-11	11-18
84	38.48	2410	5⅝-7¾	3⅜	8	.37	.28	.41	6-9	8	.46	.34	.51	3-11	11-18
90	44.18	2793	6¾-8¼	3⅛	8½	.41	.31	.46	6-9	8½	.51	.38	.57	3-11	11-18
96	50.27	3092	7-8¼	3½	9	.46	.35	.51	6-9	9	.57	.43	.63	3-11	11-18
					5000 P.S.I.					5000 P.S.I.					
102	56.75	3466	7-8¼	3½	9½	.54	.41	.13 .41	6-9	9½	.68	.51	.17 .51	3-11	11-18
108	63.62	3864	7¼-8½	3¾	10	.61	.46	.15 .46	6-9	10	.76	.57	.19 .57	3-11	11-18

Dia	CLASS III										CLASS IV								CLASS IV ALTERNATE								
D-LOAD TO PRODUCE A 0.01 INCH CRACK	1350										2000																
D-LOAD TO PRODUCE ULTIMATE LOAD	2000										3000																
		4000 P.S.I.				4000 P.S.I.						4000 P.S.I.				4000 P.S.I.				5000 P.S.I.							
	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Height of Fill Normal Backfill	Height of Fill Imperfect Trench	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Minimum Wall Thickness	Inner cage	Ellip. cage	Outer cage	Shear Steel			Height of Fill Normal Backfill	Height of Fill Imperfect Trench
		Inner cage	Outer cage			Inner cage	Outer cage					Inner cage	Outer cage			Inner cage	Outer cage			Ai	Ae	Ao	N	S	Ar		
Dia	In.	Sq.in	Sq.in	Sq.in.	In.	Sq.in.	Sq.in.	Sq.in.	Ft.	Ft.	In.	Sq.in.	Sq.in.	Sq.in.	In	Sq.in.	Sq.in.	Sq.in.	In.	Sq.in	Sq.in.	Sq.in	No	In.	Sq.in.	Ft.	Ft.
12	2	.07							1-16	16-31	2	07														16-24	24-43
15	2¼	.07							1-16	16-31	2¼	.10														16-24	24-43
18	2½	07		07					1-16	16-31	2½	14		.11												16-24	24-43
21	2¾	.07		.07					1-16	16-31	2¾	20		17												16-24	24-43
24	3	.07		07	3¾	.07			1-16	16-31	3	27		23	3¾	07	.07	.08								16-24	24-43
27	3¼	.16		.14	4	.08			1-3 11-16	16-31	3¼	31		25	4	.08	.07	.09								16-24	24-43
30	3½	.18		.15	4¼	.10			1-3 11-16	16-31	3½	35		28	4¼	09	.07	10								16-24	24-43
33	3¾	.20	.11	.17	4½	.12			1-3 11-16	16-31	3¾	27	.20	.30	4½	11	.08	.12								16-24	24-43
36	4	.17	.13	.19	4¾	.08	.07	.09	1-3 11-16	16-31	4	30	22	33	4¾	14	10	15								16-24	24-43
42	4½	.21	.16	23	5¼	.12	.09	.13	1-3 11-16	16-31	4½	35	26	39	5¼	20	15	22								16-24	24-43
48	5	.24	.18	.27	5¾	.16	.12	.18	1-3 11-16	16-31	5	42	32	47	5¾	26	20	29								16-24	24-43
54	5½	.29	.22	.32	6¼	.21	.16	.23	1-3 11-16	16-31	5½	50	.37	.55	6¼	.34	.26	38								16-24	24-43
												5000 P.S.I.															
60	6	.34	.26	.38	6¾	.25	.19	.28	1-3 11-16	16-31	6	.59	.45	66	6¾	.41	.31	46	6	.54	.27	.41	7	6	.22	16-24	24-43
66	6½	.41	.31	.46	7¼	.31	.23	.34	1-3 11-16	16-31	6½	.69	.52	77	7¼	.51	.39	57	6½	.60	.30	.45	8	6	.22	16-24	24-43
																5000 P.S.I.											
72	7	.49	.37	.54	7¾	.36	.27	.40	1-3 11-16	16-31	7	79	60	88	7¾	.61	.46	68	7	.64	.32	.48	8	6	.23	16-24	24-43
78	7½	.57	.43	.63	8¼	.42	.32	47	1-3 11-16	16-31					8¼	.71	.53	79	7½	.70	.35	.53	9	6	.25	16-24	24-43
84	8	.64	.48	.71	8¾	.50	.38	.56	1-3 11-16	16-31					8¾	.85	.63	.94	8	.76	.38	.57	10	6	.28	16-24	24-43
		5000 P.S.I.																									
90	8½	.69	.52	.77	9¼	.59	.45	66	1-3 11-16	16-31									8½	.82	.43	.62	11	6	.31	16-24	24-43
96	9	.76	.57	84	9¾	.70	.53	.17 .53	1-3 11-16	16-31									9	.88	.46	.66	11	6	.34	16-24	24-43
102	9½	.90	.68	.22 .68	10¼	.83	.62	.21 .62	1-3 11-16	16-31									9½	.94	.52	.71	12	6	.37	16-24	24-43
108	10	1.08	.81	.27 .81	10¾	.99	.74	.25 .74	1-3 11-16	16-31									10	1.02	.57	.76	12	6	.40	16-24	24-43

Dia	CLASS V								CLASS V ALTERNATE								
D-LOAD TO PRODUCE A 0.01 INCH CRACK	3000																
D-LOAD TO PRODUCE ULTIMATE LOAD	3750																
		6000 P.S.I.				6000 P.S.I.				5000 P.S.I.							
	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Minimum Wall Thickness	Circular rein. in circular pipe		Ellip. rein. in Cir. pipe & Cir. rein. in Ellip. pipe	Minimum Wall Thickness	Inner cage	Ellip. cage	Outer cage	Shear Steel			Height of Fill Normal Backfill	Height of Fill Imperfect Trench
		Inner cage	Outer cage			Inner cage	Outer cage			Ai	Ae	Ao	N	S	Ar		
Dia	In.	Sq.in	Sq.in	Sq.in.	In.	Sq.in	Sq.in	Sq.in.	In.	Sq.in	Sq.in.	Sq.in.	No.	In.	Sq.in	Ft.	Ft.
12	2	.10														24-35	35-69
15	2¼	.14														24-35	35-69
18	2½	.18		16												24-35	35-69
21	2¾	24		.21												24-35	35-69
24	3	.30		.24	3¾	.12	09	.13								24-35	35-69
27	3¼	.38	28	.42	4	.14	11	16								24-35	35-69
30	3½	.41	31	.46	4¼	18	14	.20								24-35	35-69
33	3¾	.46	35	.51	4½	.23	17	25								24-35	35-69
36	4	50	38	.56	4¾	.27	20	30								24-35	35-69
42	4½	60	45	67	5¼	36	27	40								24-35	35-69
48	5	.73	55	81	5¾	.47	.35	.52	5	.66	.33	.50	8	4	.22	24-35	35-69
54					6¼	.58	.43	.64	5½	.74	.37	.56	9	4	.22	24-35	35-69
60					6¾	.70	53	78	6	.82	41	.62	7	6	.22	24-35	35-69
66					7¼	84	.63	93	6½	.88	44	.66	8	6	22	24-35	35-69
72					7¾	.99	.74	110	7	.96	48	.72	8	6	23	24-35	35-69
78									7½	1.04	52	.78	9	6	25	24-35	35-69
84									8	1.12	56	.84	10	6	28	24-35	35-69
90									8½	1.20	65	.90	11	6	31	24-35	35-69
96									9	1.32		.99	11	8	34	24-35	35-69
102									9½	1.42		1.07	12	8	.37	24-35	35-69
108																	

NOTES: All reinforcement shall be electrically welded cold drawn steel wire fabric.

Circular reinforcement shall lap in accordance to A.A.S.H.O. M170.

All circular, longitudinal and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms

Laying length of pipe- 12" to 66" (incl.) = Not less than 4 feet.
66" to 108" (incl) = Not less than 6 feet

Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drains or sanitary sewers.

CLASS IV & CLASS V ALTERNATE

LONGITUDINAL SECTION

Ai, Ae, Ao = Minimum circumferential reinforcement required in square inches per lineal foot of pipe.

Ar = Minimum radial reinforcement required in square inches per square foot of pipe.

N= Minimum number of rows of radial reinforcing at top and bottom of pipe.

S= Maximum circumferential spacing of rows of radial reinforcing.

10-1-86	
REVISIONS	
DATE	CHANGE
11-5-86	Note Added

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
APPROVED: ______
DESIGN ENGINEER

STATE	FED. AID PROJ. NO.	SHEET NO.
N.D.	FG-1-806(015)	

3RD AVE. NE | 4TH AVE. NE | 5TH AVE. NE | 6TH AVE. NE | 8TH AVE. NE | 9TH AVE. NE | 10TH AVE. NE | 11TH AVE. NE

MAIN

NO. 1 | NO. 2 | NO. 3 | NO. 4

25' ESM'T.

TEMP CONSTRUCTION EASEMENT

P.I. 10188.14
OFF. LCC. 46 Rt. of & 80 Tracks

P.T. 12107.95 OFF LCC.

P.C. 13109.39 OFF LCC.

21" R.C.P.

24" San.

Exist. 11.11' x 60" Storm Sewer

INTERLOCKING SHEET PILING PZ 27, MZ 27 OR EQUAL, WITH DEAD MAN ANCHOR AS SHOWN (SEE SHEET 24 FOR DETAILS) PILING SHALL BE MINIMUM OF 30 FEET IN LENGTH AND DRIVEN FLUSH TO SURFACE.

SCALE: 1 INCH = 100 FEET
PHOTO DATE: 4-9-85

CURVE DATA FOR ALL CURVES, NORTH SHOOFLY
OFFICE LOCATION
Δ = 7°48'
D = 3°
T = 130.22'
L = 260.0'
R = 1910.08'

CURVE DATA FOR ALL CURVES, SOUTH SHOOFLY
OFFICE LOCATION
Δ = 7°30'
D = 3°
T = 125.19'
L = 250.0'
R = 1910.08'

LIMITS OF SHOOFLY TRACK CONSTRUCTION ON NORTH DAKOTA STATE HIGHWAY DEPARTMENT CONTRACT

MAIN LINE: BEG. @ P.T. 6+56.87 - 17.4' N. OF MAIN LINE ℄
END @ P.C. 15+12.89 - 17.4' N. OF MAIN LINE ℄

TRACK No. 1: BEG. @ P.C. 7+65.12 - 12.2' N. OF MAIN LINE ℄
END @ P.T. 14+05.12 - 12.2' N. OF MAIN LINE ℄

TRACK NO. 3 BEG. @ 8+43.3 - WEST END OF TRESTLE
END @ P.C. 13+09.39 - 16.1' SOUTH OF TR. ℄ NO. 3

36' INTERLOCKING SHEET PILING

37'-0" | 70'-0"

℄ EXISTING RDWY. | ℄ NEW RDWY.

℄ MAINLINE

20'-0"

32' ± FACE TO FACE OF EXISTING ABUT. WALL

16'-6"

33'-6" | 33'-6"

10°51'23"

INSIDE FACE NEW ABUT.

℄ TRACK 1

℄ TRACK 2

EXISTING WALLS

℄ TRACK 3

EXISTING RETAINING WALL

PLAN

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

LAYOUT

6TH AVE. S.E. UNDERPASS
MANDAN, N. DAK.

1806-070.039

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N. D.	FG-1-806(115)	16

BENCH MARKS

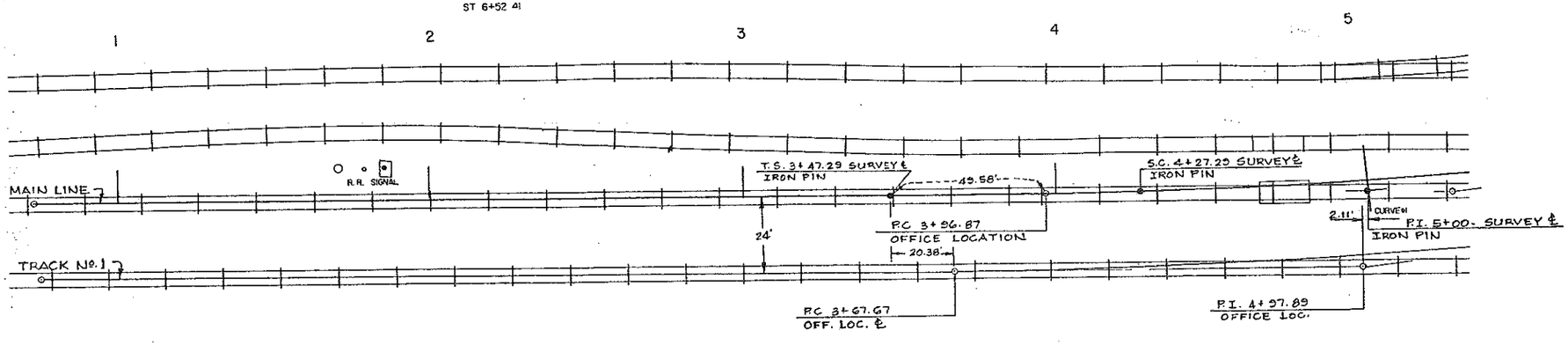
NO	DESCRIPTION	LOCATION	ELEV.

NOTE: ALL TRACK CONSTRUCTION ON THIS SHEET BY BURLINGTON NORTHERN RAILROAD.

SCALE

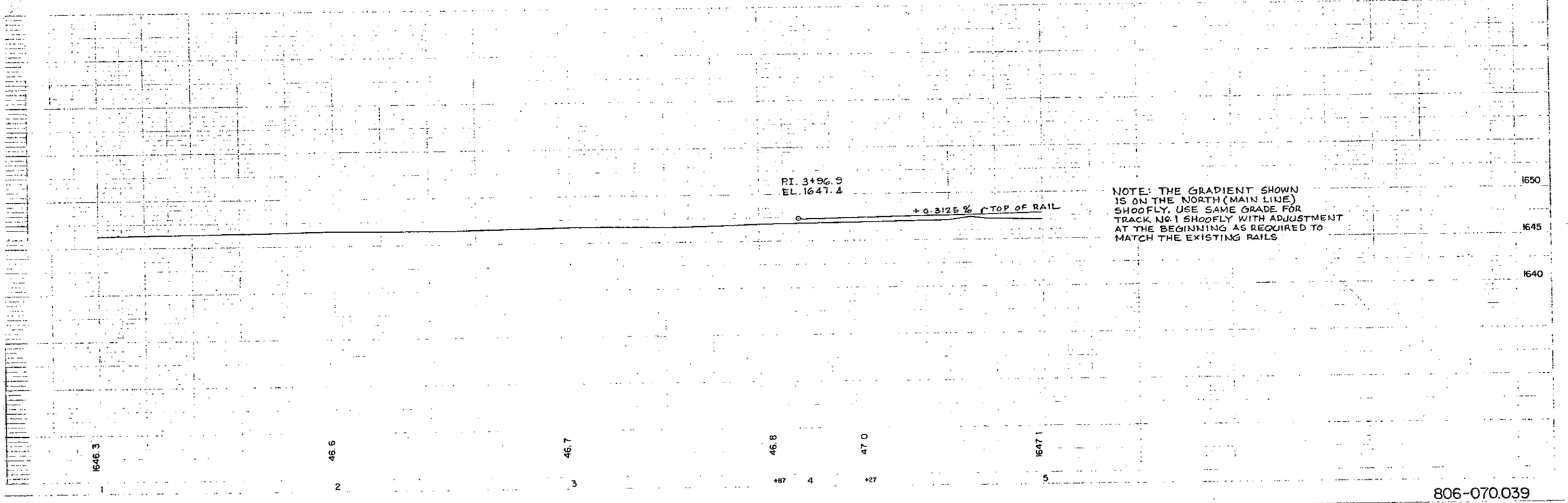
CHORD DEFINITION
CURVE #1
Δ= 6° 45' 12" LT
D= 3° 00' 00" 12 X 80'SP)
R= 1910.08
SC= 1° 12' 00"
YC= 79.99
XC= 0.56
TS= 152.71
L= 145.12
TS 3+47.29
SC 4+27.29
PI 5+00.00
CS 5+72.41
ST 6+52.41

SEC 27
T-139 N
R-81 W



OFFICE LOCATION CURVE DATA
Δ = 7° 48'
D = 3°
T = 130.22'
L = 260.0'
R = 1910.08'

NORTH SHOOFLY



NOTE: THE GRADIENT SHOWN IS ON THE NORTH (MAIN LINE) SHOOFLY. USE SAME GRADE FOR TRACK No. 1 SHOOFLY WITH ADJUSTMENT AT THE BEGINNING AS REQUIRED TO MATCH THE EXISTING RAILS

806-070.039

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO
8	N. D.	FG-1-806(15)	17

BENCH MARKS

NO	DESCRIPTION	LOCATION	ELEV

SURVEY ℄
CHORD DEFINITION
CURVE#2
Δ= 6° 45' 13" RT
D= 3° 00' 00" (2X 80' SPI)
R= 1910.08
SC= 1° 12' 00"
YC= 79.99
XC= 0.56
TS= 152.71
L= 145.12
TS 7+29.66
SC 8+09.66
PI 8+82.36
CS 9+54.78
ST 10+34.76

SEC 27
T-139 N
R-81 W

TANKS

GAS STORAGE TANKS

LP TANK

DOCK

PLATFORM

RAILROAD TRACK
6+57 TO 9+00 (MAIN LINE) - 243 L.F.
7+65 TO 9+00 (TRACK Nº 1) - 135 L.F.

℄ TEMP. ESMT.

P.I. 8+95.07
OFF. LOC.

P.I. 8+82.36 - SURVEY ℄
IRON PIN

CURVE#2

SURVEY ℄
T.S. 7+29.66
IRON PIN

OFF. LOC.

SURVEY ℄
C.S. 9+54.78
IRON PIN

SURVEY ℄
S.C. 8+09.66
IRON PIN

12.10'

20'

OFFICE LOC. ℄

30'

℄ 200 PR. N.W. BELL TEL.

P.I. 5+00 - SURVEY ℄
IRON PIN

SURVEY ℄
C.S. 8+72.41
IRON PIN

SURVEY ℄
C.T. 6+52.41
IRON PIN

P.T. 6+56.67
OFF. LOC.

P.C. 7+64.85
OFF. LOC.

27.09'

SEG. TRACK CONSTRUCTION

P.C. 7+65.12
OFF. LOC.

℄ MAIN LINE

CURVE#1

2.11'

P.I. 5+27.09
OFF. LOC.

P.T. 6+27.67
OFFICE LOC.

24'

℄ TRACK Nº 1

P.I. 4+97.89
OFF. LOC.

NOTE: TRACK CONSTRUCTION FROM STA. 3+96.87 TO 6+57 (MAIN LINE SHOOFLY) AND FROM STA. 3+67.67 TO 7+65 (TRACK Nº 1 SHOOFLY) TO BE COMPLETED BY BURLINGTON NORTHERN R.R.

BEG TRACK CONSTRUCTION
7+65

OFFICE LOCATION CURVE DATA
Δ= 7° 48'
D= 3°
T= 130.22'
L= 260.0'
R= 1910.08'

NORTH SHOOFLY

20" WATER MAIN APPROX. LOC.

TEMP. ESMT.

TRACK CONSTRUCTION TO WEST BY B.N.R.R.

P.T. 6+57
BEG. TRACK CONSTRUCTION
MAIN LINE SHOOFLY

TRACK CONSTRUCTION TO WEST BY B.N.R.R.

P.C. 7+65
BEG. TRACK CONSTRUCTION
TRACK Nº 1 SHOOFLY

+0.3125%

TOP OF RAIL

SUBGRADE (2.21' BELOW TOP OF RAIL)

SURVEY ℄ PROFILE

1650
1645
1640

1647 1 | 46 5 | 46 6 | 46 3 | 47 0 | 46 4 | 1645.0

5 +75 6 +12 7 +69 8 +09 9

806-070.039

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO
8	N. D.	FG-1-806(15)	18

BENCH MARKS

	NO.	DESCRIPTION	LOCATION	ELEV
*	BM 1	PAINT SPOT N.E. COR. CONTROLLER	4+47 - 48' RT.	1646.21
*	BM 2	PAINT SPOT ON N.W. COR. UNDERPASS TUN'L.	6+11 - 25' RT.	1634.45

* STATIONING ON 6TH. AVE. S.E.

RAILROAD TRACK
9+00 TO 14+05 (MAIN LINE) - 505 L.F.
9+00 TO 14+05 (TRACK NO 1) - 505 L.F.

OFFICE LOCATION CURVE DATA
Δ = 7° 48'
D = 2°
T = 130.22'
L = 200.0'
R = 1910.08'

NORTH SHOOFLY

806-070.039

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N. D.	FG-1-806(13)	19

SEC 26
T-139 N
R-81 W

CHORD DEFINITION
CURVE#4
Δ= 6° 45' 13" LT
D= 3° 00' 00" (2X 60'SP)
R= 1910.08
SC= 1° 12' 00"
YC= 79.99
XC= 0.56
TS= 152.71
L= 145.12
TS 14+97.13
SC 15+77.13
PI 16+49.83
CS 17+22.25
ST 18+02.25

BENCH MARKS

NO	DESCRIPTION	LOCATION	ELEV.

RAILROAD TRACKS
14+05 TO 15+13 (MAIN LINE) 108 L.F.

14 15 16 17 18 19

TEMPORARY EASEMENT
RAILROAD LEASE LINE
TRACK CONSTRUCTION AHEAD BY B.N. RAILROAD
TEMP. ESMT.
24" SAN. SEWER
60" RCP SEWER
200 PR. N.W. BELL TEL.
RAILROAD LEASE LINE
50'
P.T. 14+04.85 OFF. LOC.
SURVEY ℄ S.T. 14+13.88 IRON PIN
OFFICE LOC. ℄
P.C. 15+12.83 OFFICE LOC.
SURVEY ℄ S.C. 15+57.13 NO MONUMENT
SURVEY ℄ T.S. 14+97.18 IRON PIN
SURVEY ℄
P.T. 14+05.12 OFF. LOC.
OFFICE LOC. ℄
SURVEY ℄ P.I. 16+49.83 IRON PIN
7.87
C.S. 17+22.24 SURV. ℄ IRON PIN
30.36'
SURVEY ℄ S.T. 18+02.24 IRON PIN
MAIN LINE
TRACK CONSTRUCTION AHEAD BY B.N. RAILROAD
P.C. 15+42.57 OFFICE LOC.
P.I. 16+43.05 OFFICE LOC.
CURVE#4
21.33'
P.T. 17+72.88 OFF. LOC.
P.T. 18+02.57 OFF. LOC.
1.16'
24'
TRACK Nº 1
P.I. 16+72.79 OFF. LOC.
TEMP. ESMT.

NOTE:
TRACK CONSTRUCTION FROM STA. 14+05.12 TO 18+02.57 (TRACK Nº.1 SHOOFLY) AND FROM STA. 15+12.83 TO 17+72.83 (MAIN LINE SHOOFLY) WILL BE COMPLETED BY BURLINGTON NORTHER RAILROAD.

OFFICE LOCATION CURVE DATA
Δ= 7°48
D= 3°
T= 130.22'
L= 260.0'
R= 1910.08'

NORTH SHOOFLY

END TRACK CONSTRUCTION TRACK Nº.1 SHOOFLY STA. 14+05

END TRACK CONSTRUCTION MAIN LINE SHOOFLY STA. 15+12.83

P.I. 17+72.8
EL. 1651.7

+0.3125% TOP OF RAILS
PROFILE ON SURVEY ℄

SUBGRADE

1655
1650
1645

NOTE: THE GRADIENT SHOWN IS ON THE NORTH (MAIN LINE) SHOOFLY. USE SAME GRADE FOR TRACK Nº.1 SHOOFLY WITH ADJUSTMENT AT END AS REQUIRED TO MATCH THE EXISTING RAILS.

1645.8 49.8 50.4 50.8 51.0 51.0 1651.5

14 +19 +99 15 +37 16 17 +62 18+02 19

806-070.039

FHWA REGION	STATE	FED AID PROJ. NO	SHEET NO.
8	N. D.	FG-1-806(15)	20

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV
1	PAINT SPOT ON N.E. CORNER OF CONTROLLER	4+47 (ON 1806) 48' RT.	1646.21
2	PAINT SPOT ON NW COR. UNDERPASS TUNNEL	6+11 (ON 1806) 25' RT.	1634.45

TRACK NO. 2

TRACK NO 3

TEMP. ESMT.

SURVEY ℄ P.I. 8+44.18 IRON PIN

CURVE #5

PC 7+99.43 - SURVEY ℄ IRON PIN

BEG TRESTLE 8+43.3

SEC 27 T-139 N R-81 W

℄ 6+81.3

RG. 9+57.95 OFFICE LOCATION (46' SO. OF ℄ SO. TRACKS)

9+CC.07 (SHOOFLY) 7+16.94 (1806) (SURVEY ℄)

END TRESTLE 9+52.64

SURVEY ℄

OFF. LOC. ℄

SURVEY ℄ T.S. 8+42.76 IRON PIN (35' SO. OF ℄ SO. TRACKS)

EXISTING DBL. 6"x 18" CAST IRON DISCHARGE PIPES

LIFT STATION

15" RCP-S7

18" RCP-S7

1-900 2-600 PR.

1-900 PR.

8" V.C.P. underdrain

SURVEY ℄ STA. 8+88.76 CONCRETE NAIL

8" V.C.P. underdrain 8+27.87 (SHOOFLY) 7+28.14 (1806)

℄ 1806 (10TH AVE.)

R/W

100'

120'

B.N. RAILROAD 12 PR. FUEL CONTROL CABLE

CHORD DEFINITION
CURVE #5
Δ-6°42' 0" RT
D-7°30' 0"
R-764.49'
T-44.75'
L-89.33'

PC 7+99.43
PI 8+44.18
PT 8+88.76

NOTE: ALL TRACK CONSTRUCTION WEST OF THE TRESTLE (STA. 8+43.3) WILL BE COMPLETED BY BURLINGTON NORTHERN RAILROAD

3" DIESEL FUEL LINE

RAILROAD TRACK
6+43 TO 10+00 - 157 L.F.

MANHOLE - 48"
9+15 - 18' RT. - 1 EA.
9+21 - 16'± LT. - 1 EA.
9+80 - 16.5'± RT. - 1 EA.

MANHOLE RISER
9+15 - 18' RT. - 48"x 12.1 L.F.
9+21 - 16'± LT. - 48"x 10.8 L.F.
9+80 - 16.5'± RT. - 48"x 6.7 L.F.

PIPE, CONC. REINF. SEWER
9+21 LT. TO 9+15 RT. - 15"x 32 L.F. CL. III
9+15 RT. TO LIFT STA. 15"x 48 L.F. CL. IV
9+80 RT. TO 10+18 RT. 18"x 66 L.F. CL. III

SEE RIGHT OF WAY AND EASEMENT LAYOUT SHEET FOR TEMPORARY EASEMENTS IN THIS AREA.

SOUTH SHOOFLY

P.I. 8+00 EL. 1649.5

BEG. TRESTLE 8+43.3

END TRESTLE 9+52.64

SUBCUT 9+55 EL. 1647.6

+0.263% TOP OF RAIL

TRACK CONSTRUCTION BY B.N.R.R.

DBL. 6" IRON PIPE

SUBGRADE

Subcut 10+00 EL. 1645.0

-5.78%

18" RCP-S

48" MANHOLE 10+18 RT. (SEE NEXT SHEET)

SURVEY ℄

OFF. LOC. ℄

48" MANHOLE (SEE DETAIL SHEET) 9+80 RT.
TOP 1648.32
BASE 1640.22
INV. 1640.43
OUT. 1639.93
RISER 6.68'
(TO BE INSTALLED OVER EXISTING 6" IRON PIPE)

9+21± LT.

9+15 RT

EXISTING LIFT STATION

21.19

15" RCP-S

48" MANHOLE 9+21± LT.
TOP 1634.50
BASE 1622.09
INV. 1622.28
OUT 1622.0
RISER 10.82
(MANHOLE TO BE INSTALLED OVER EXISTING 15" RCP)

48" MANHOLE 9+15 RT
TOP 1635.5
BASE 1621.81
INV. 1622.0
OUT. 1621.79
RISER 12.10'

32.4 REMOVE EXISTING 15" RCP. SEWER. INSTALL NEW SEWER PIPE IN SAME HOLE & GROUT THOROUGHLY.

1645 1640 1635 1630 1625 1620

5 6 7 8 9 10

806-070 039

RWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	FG-1-806(15)	21

BENCH MARKS

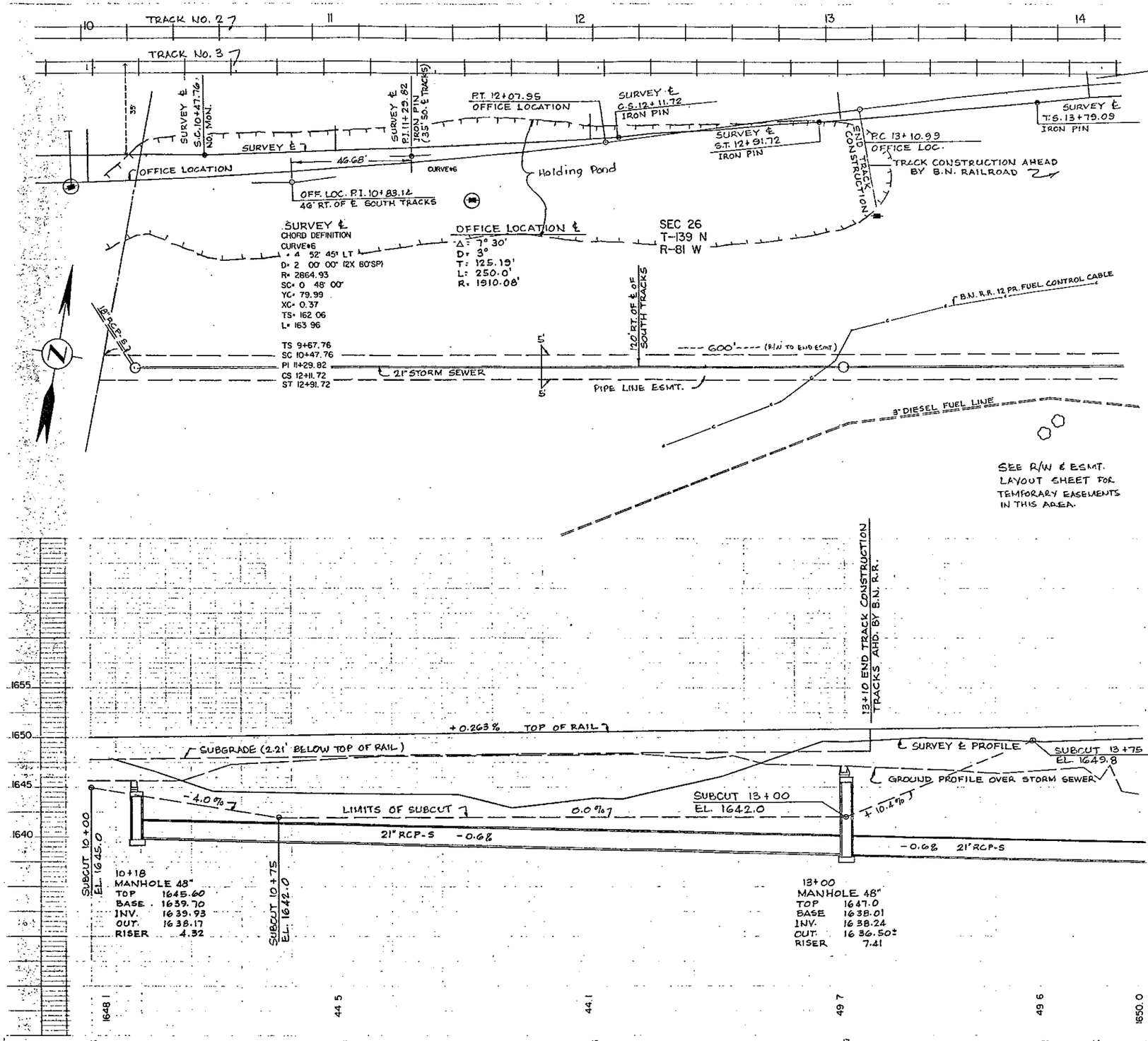
NO	DESCRIPTION	LOCATION	ELEV

RAILROAD TRACKS
10+00 TO 13+10 - 310 L.F.

MANHOLE - 48"
10+18 RT. - 1 EA.
13+00 RT. - 1 EA.

PIPE, CONC, REINF. SEWER
10+18 TO 13+00 - 21" x 278 L.F. CL. III
13+00 TO 14+20 - 21" x 118 L.F. CL. III

MANHOLE RISER
10+18 RT. - 48" x 4.3 L.F.
13+00 RT. - 48" x 7.4 L.F.



806-070.039

FHWA REGION	STATE	FED. AID PROJ NO.	SHEET NO.
8	N. D.	FG-1-806(15)	22

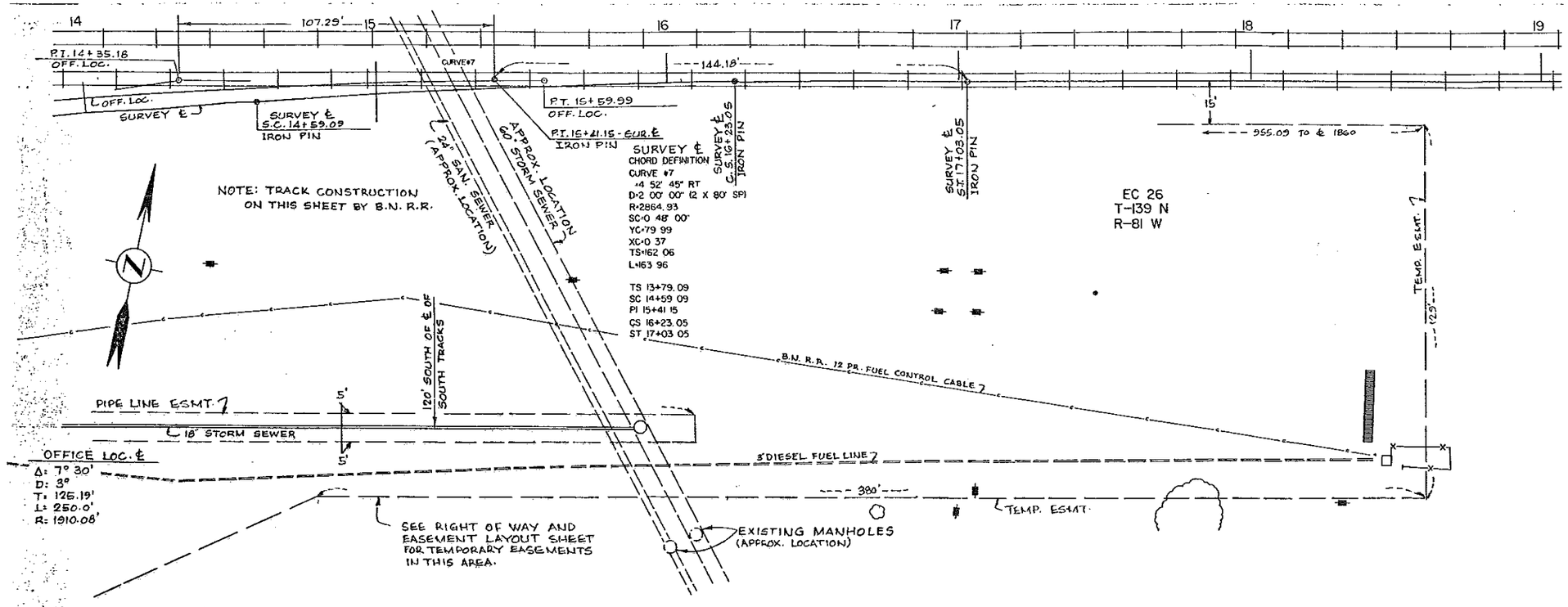
BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.

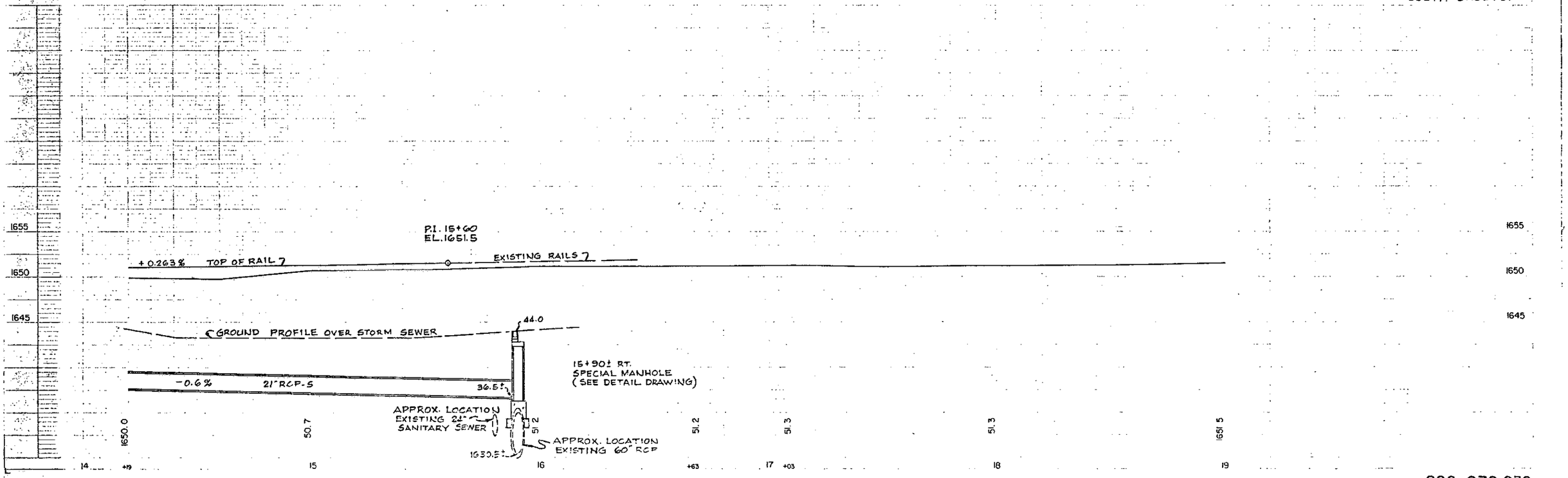
MANHOLE, SPECIAL
15+90 ± RT. - 1 EA.

MANHOLE RISER
15+90 ± RT. - 48"x 6.1 L.F.

PIPE CONCRETE, REINF. SEWER
14+20 TO 15+90 RT. - 21"x 168 L.F.



SOUTH SHOOFLY

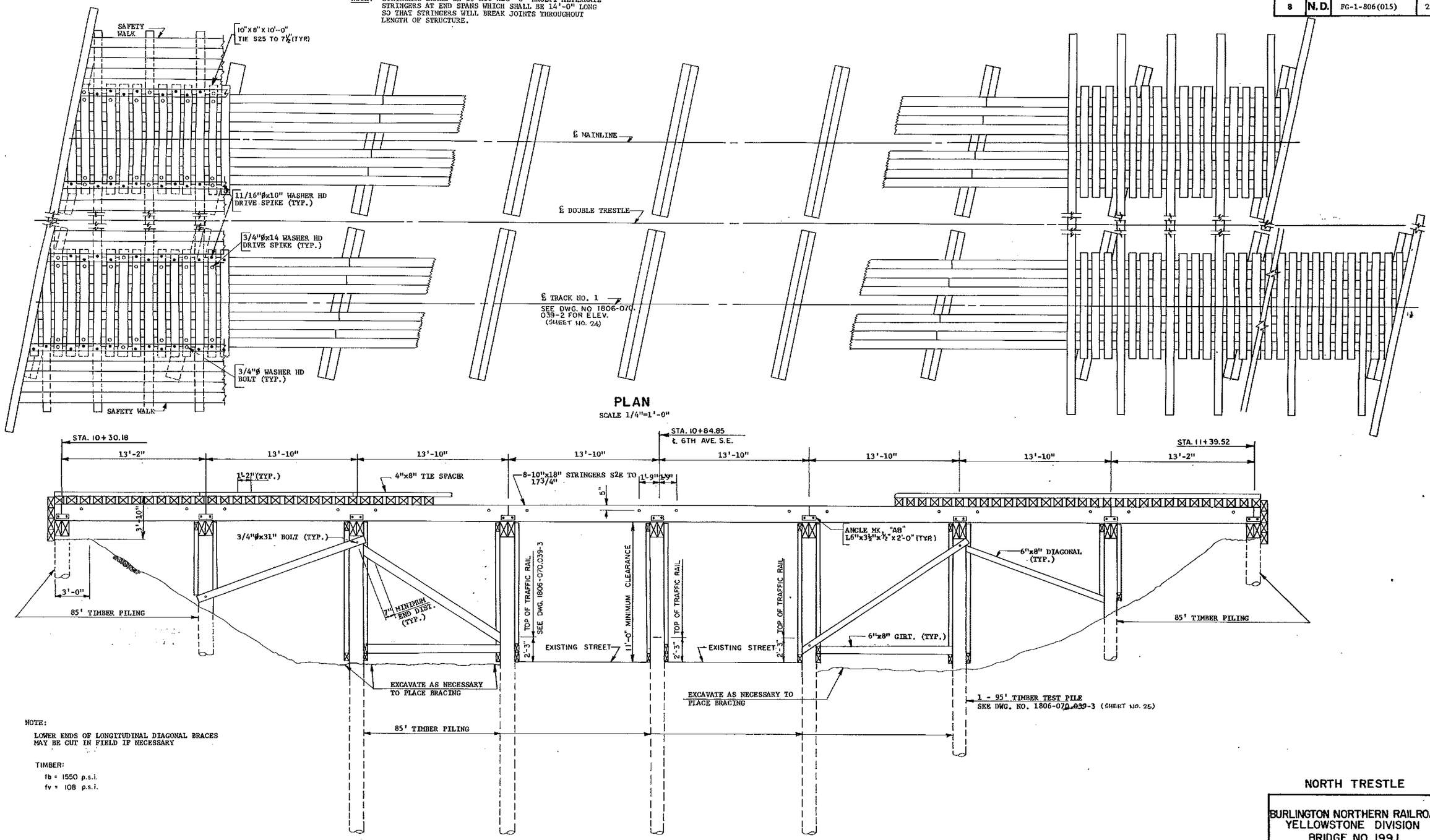


806-070.039

MATHISON 814 9-77 61627A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	23

NOTE: STRINGERS SHALL BE 10"x18"x28'-0" EXCEPT ALTERNATE STRINGERS AT END SPANS WHICH SHALL BE 14'-0" LONG SO THAT STRINGERS WILL BREAK JOINTS THROUGHOUT LENGTH OF STRUCTURE.



PLAN
SCALE 1/4"=1'-0"

ELEVATION MAINLINE ONLY
(FOR ELEVATION OF TRACK NO. 1 SEE DWG NO. 1806-070.039-2) (SHEET NO. 24)

NOTE:

LOWER ENDS OF LONGITUDINAL DIAGONAL BRACES MAY BE CUT IN FIELD IF NECESSARY

TIMBER:

fb = 1550 p.s.i.
fv = 108 p.s.i.

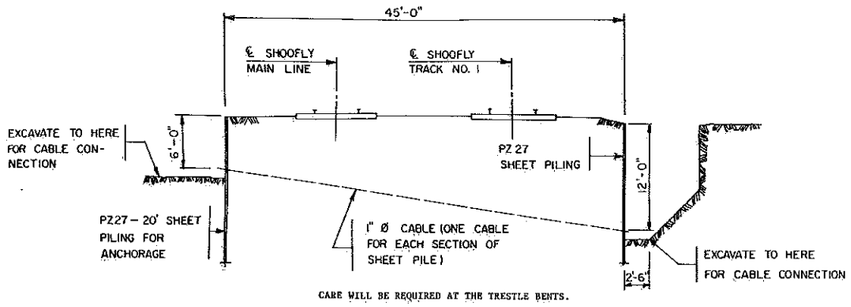
NORTH TRESTLE

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

6TH AVE. S.E. UNDERPASS
MANDAN, N. DAK.

1806-070.039-1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	24



CARE WILL BE REQUIRED AT THE TRESTLE BENTS.

TYPICAL SECTION

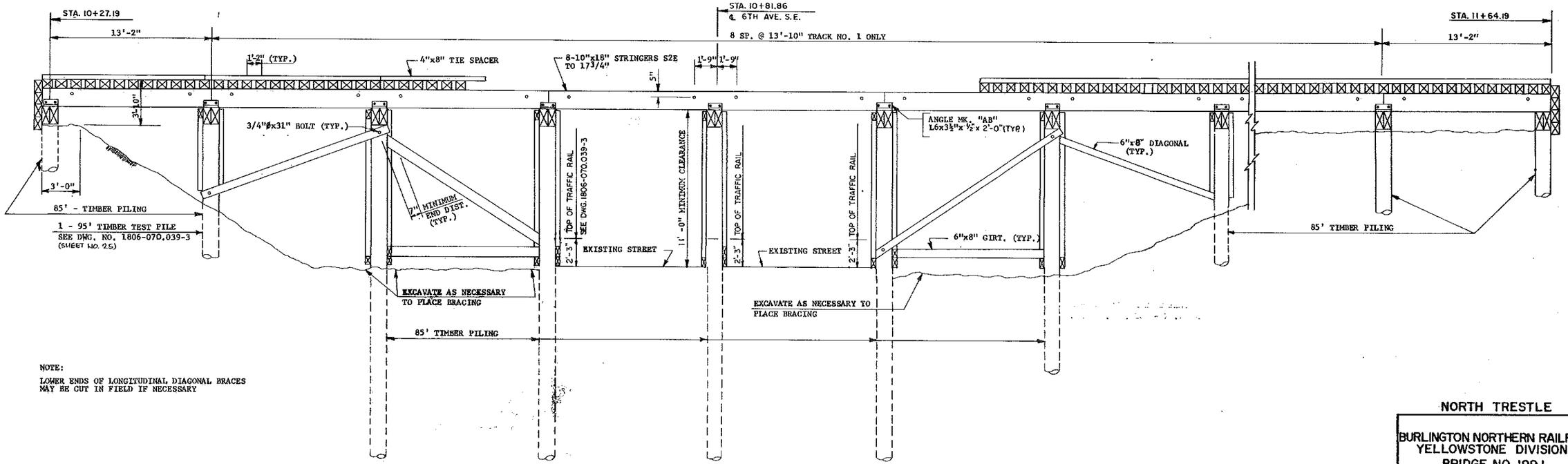
SHOWING SHEET PILING ARRANGEMENT & ANCHORAGE

NOTE:
STEEL SHEET PILING: THIS WORK SHALL CONSIST OF THE MATERIALS AND LABOR NEEDED FOR CONSTRUCTION OF STEEL SHEET PILINGS NECESSARY TO ALLOW THE EXCAVATION FOR FOUNDATIONS.

THE COST OF THE CABLES AND HARDWARE USED FOR ANCHORAGE, AND EXCAVATION NEEDED FOR WORKING SPACE SHALL BE INCIDENTAL TO THE PRICE BID FOR SHEET PILING.

DRAWINGS ON THIS PAGE DO NOT SHOW THE CABLE CONNECTIONS AND OTHER DETAILS PERTAINING TO SHEET PILING. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF DRAWINGS WITH ALL CONNECTIONS SHOWN, OR HE MAY SUBMIT HIS OWN DESIGN AND DETAILS IF DIFFERENT FROM WHAT IS SHOWN ON THIS SHEET FOR APPROVAL BY THE BRIDGE ENGINEER. THESE DRAWINGS SHALL BE SUBMITTED AS SOON AS POSSIBLE AFTER CONTRACT IS AWARDED TO PROVIDE AMPLE TIME FOR ANY REVISIONS AND CHANGES THAT MAY BE REQUIRED BY THE SNRR COMPANY.

NO SPLICING OF THE SHEET PILES IS ALLOWED.



NOTE:
LOWER ENDS OF LONGITUDINAL DIAGONAL BRACES MAY BE CUT IN FIELD IF NECESSARY

ELEVATION TRACK NO.1 ONLY

SCALE 1/4" = 1'-0"

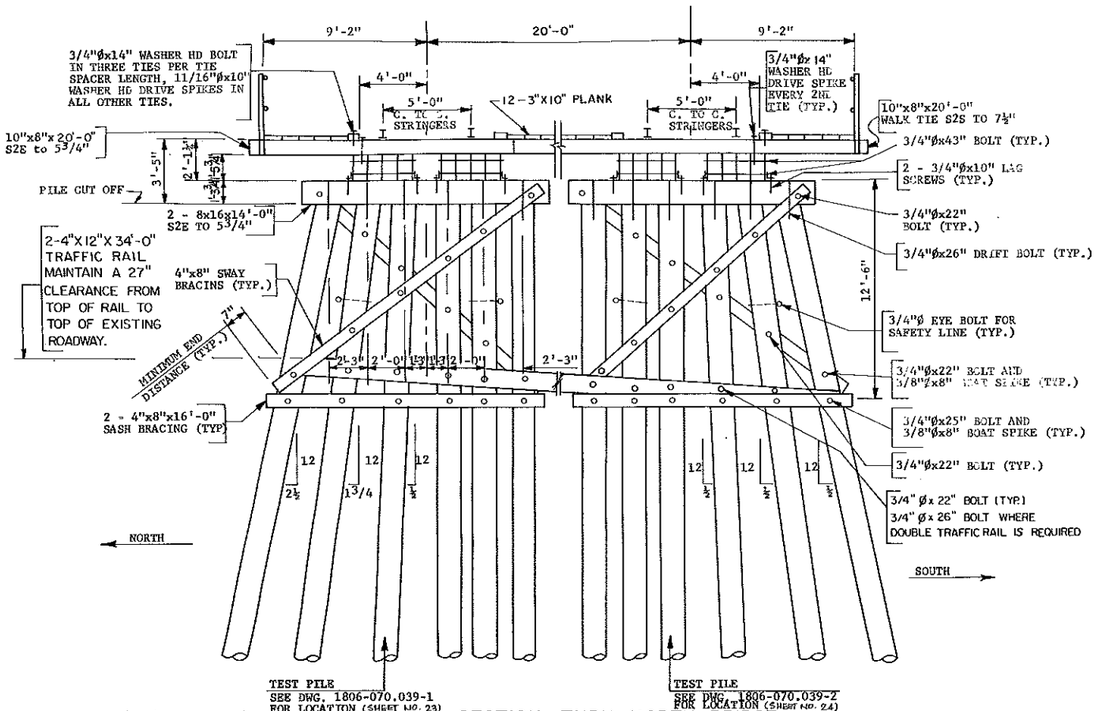
NORTH TRESTLE

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

6TH AVE. S.E. UNDERPASS
MANDAN, N. DAK.

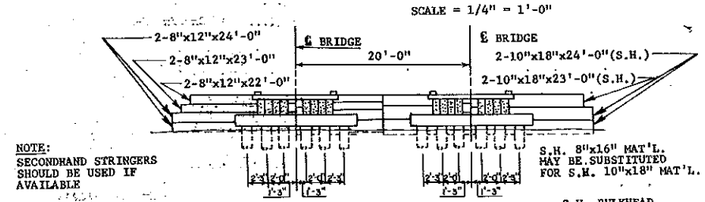
1806-070.039-2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	25



SECTION THRU NORTH BRIDGE

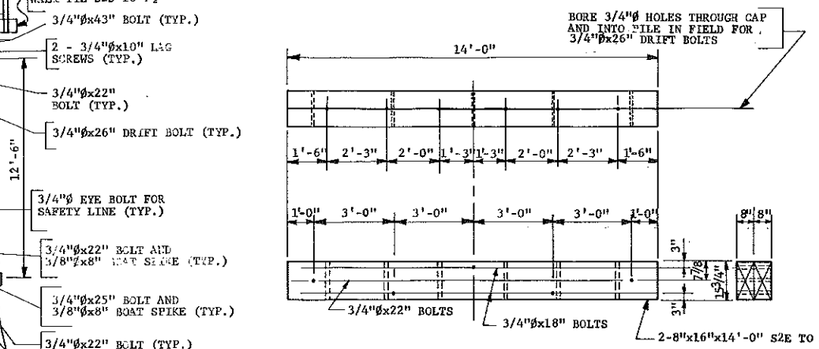
SCALE = 1/4" = 1'-0"



NOTE: SECONDHAND STRINGERS SHOULD BE USED IF AVAILABLE

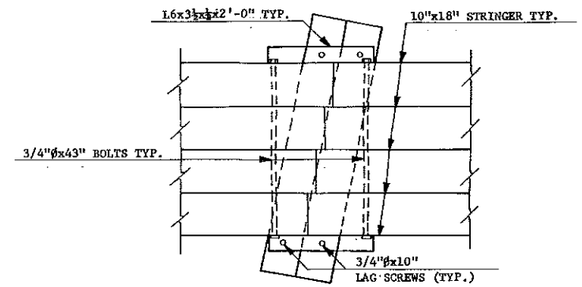
END BENT

SCALE: 1/8"=1'-0"



TIMBER CAP DETAILS

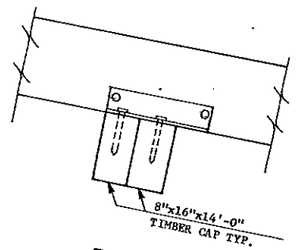
SCALE: 3/8"=1'-0"



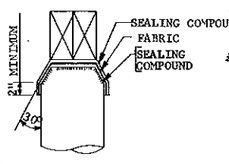
PLAN

SHOWING STRINGER CONNECTION

SCALE 3/4"=1'-0"

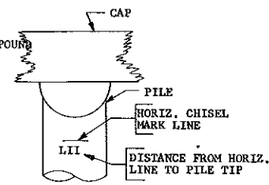


ELEVATION



NOTES: SEALING COMPOUND SHALL BE SELF-HEALING BRIDGE CEMENT. FABRIC SHALL BE 5 OUNCES OR MORE WITH 25 TO 36 THREADS PER INCH.

PILE HEAD FIELD PROTECTION



DETAIL "A"

NOTES:

ALL TIMBER AND PILING SHALL BE UNTREATED.

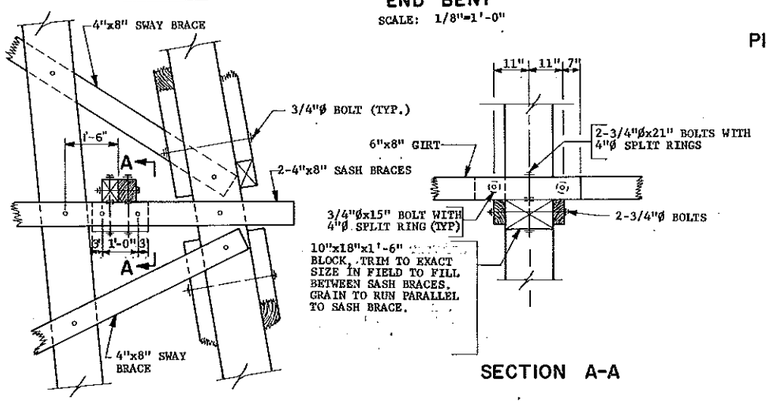
FRAMING: UNTREATED PILES MUST NOT BE CUT FOR FASTENING OF BRACING. IF NECESSARY, FILLER BLOCKS SHALL BE USED TO FILL SPACES BETWEEN PILES AND BRACING.
--TOPS OF PILES SHALL BE CUT AND PROTECTED AS SHOWN.
--SWAY BRACING SHALL BE FASTENED TO CAPS WITH 3/4"ø BOLTS.
--USE 6" WIDE FILLER BETWEEN CAP AND SWAY BRACE IF PILES ARE OVER 16" DIAMETER.
--ALL BRACING SHALL BE FASTENED TO PILES WITH 3/4"ø BOLTS. WHEN BRIDGE IS LOCATED ON A HORIZONTAL CURVE OF 7° OR MORE, SPIKE GRIDS SHALL BE USED WITH BOLTS ON ALL BRACING CONNECTIONS.
--BORE GROOVES FOR SPLIT RINGS WITH SPLIT RING CUTTER HEAD M-14. DO NOT CUT OUT MATERIAL INSIDE OF GROOVES.
--ALL BOLTS THROUGH TIMBER SHALL HAVE A 5/16"x3 O.D. CUT WASHER OR EQUIVALENT UNDER BOTH NUT AND HEAD.
--USE APPROVED LOCK NUTS ON ALL BOLTS.
--HOLES FOR 3/4"ø BOLTS SHALL BE 13/16"ø - HOLES FOR 3/4"ø DRIFT BOLTS SHALL BE 3/4"ø.
--HOLES FOR DRIVE SPIKES SHALL BE 1/8" LESS THAN DIAMETER OF SPIKE.

PILING: ALL TIMBER PILING SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 25 TON PER PILE. PILE DRIVING RECORDS SHALL BE RECORDED FOR EACH PILE WITH A COPY FURNISHED TO THE BRIDGE ENGINEERING. EACH PILE SHALL BE CHISEL MARKED WITH A HORIZONTAL LINE AND ROMAN NUMERALS TO RECORD THE DISTANCE FROM THAT LINE TO THE PILE TIP (SEE DETAIL "A").

DECK: TIES SHALL BE PLACED AT ABOUT 14" CENTERS.
--TIES SHALL BE BORED IN THE FIELD
--TIE SPACERS SHALL BE CUT TO PROPER LENGTH AND BOLT HOLES BORED IN FIELD

PILING: Piling shall be driven with a steam, air or diesel hammer with a rated energy and ram weight not less than 12,935 foot-pound-tons, as computed by the formula W(E-3938)+.65?E, where W is the weight of the ram in tons and E is the rated hammer energy. In no case shall the ram weight be less than 2700 pounds.

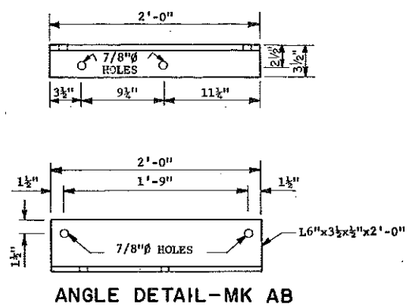
Boring indicate contaminated materials. Contractor to use all precautions necessary to maintain safe conditions.



PARTIAL ELEVATION

SCALE: 1/2"=1'-0"

SECTION A-A



ANGLE DETAIL-MK AB

SCALE 1½"=1'-0"

NORTH TRESTLE

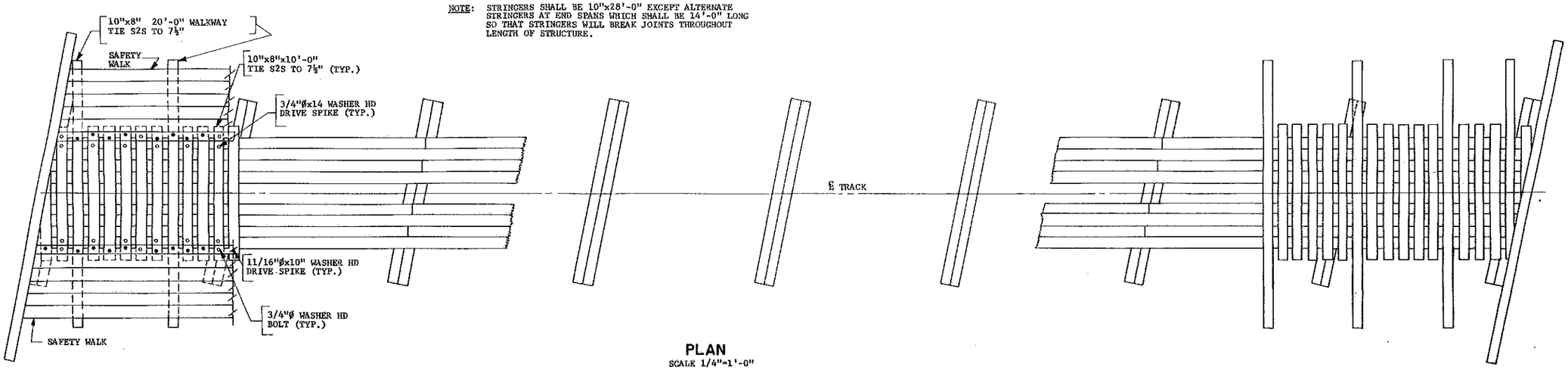
BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

6TH AVE. S.E. UNDERPASS
MANDAN, N. DAK.

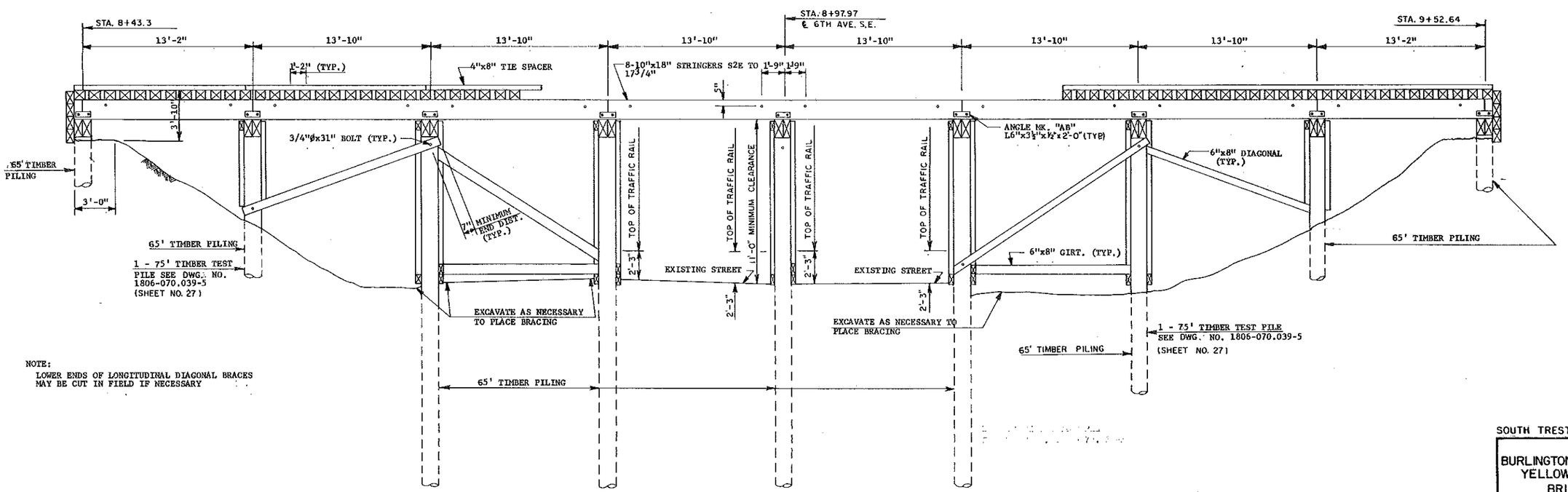
1806-070.039-3

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	26

NOTE: STRINGERS SHALL BE 10"x28'-0" EXCEPT ALTERNATE STRINGERS AT END SPANS WHICH SHALL BE 14'-0" LONG SO THAT STRINGERS WILL BREAK JOINTS THROUGHOUT LENGTH OF STRUCTURE.



PLAN
SCALE 1/4"=1'-0"



ELEVATION
SCALE 1/4"=1'-0"

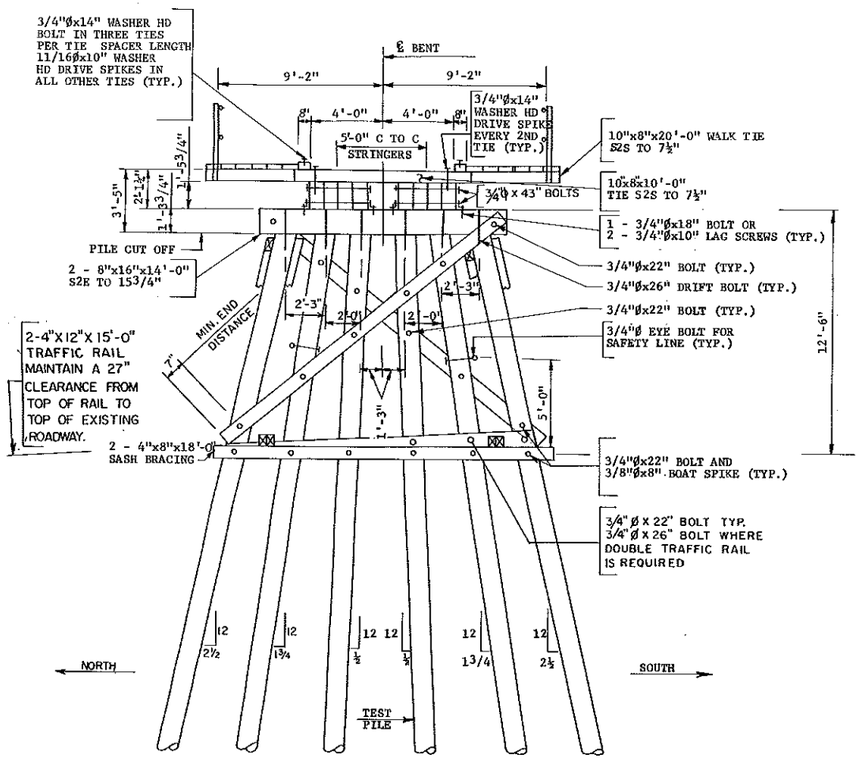
SOUTH TRESTLE

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

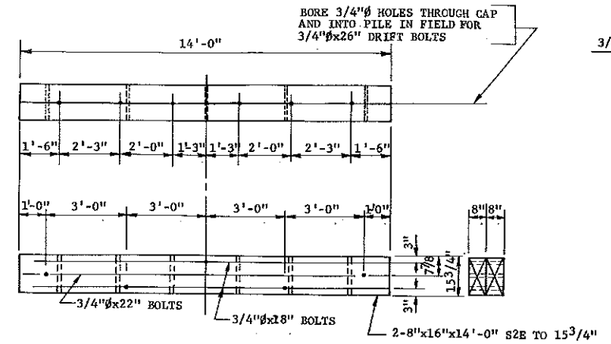
6TH AVE. S.E. UNDERPASS
MANDAN, N. DAK.

1806-070.039-4

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	27

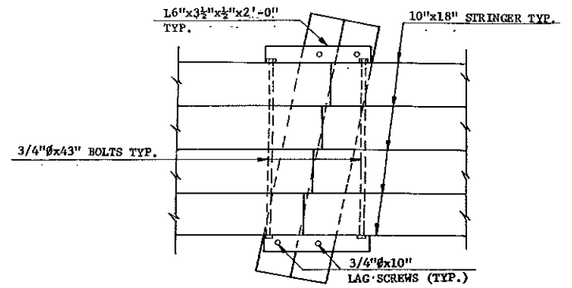


SECTION THRU SOUTH BRIDGE



TIMBER CAP DETAILS

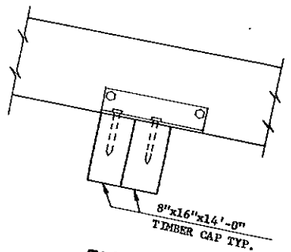
SCALE: 3/8"=1'-0"



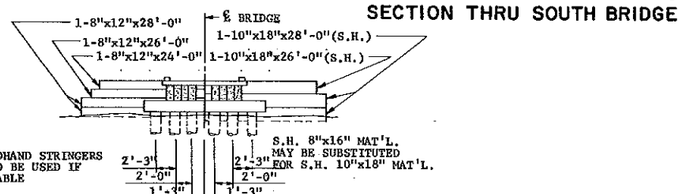
PLAN

SHOWING STRINGER CONNECTION

SCALE 3/4"=1'-0"



ELEVATION

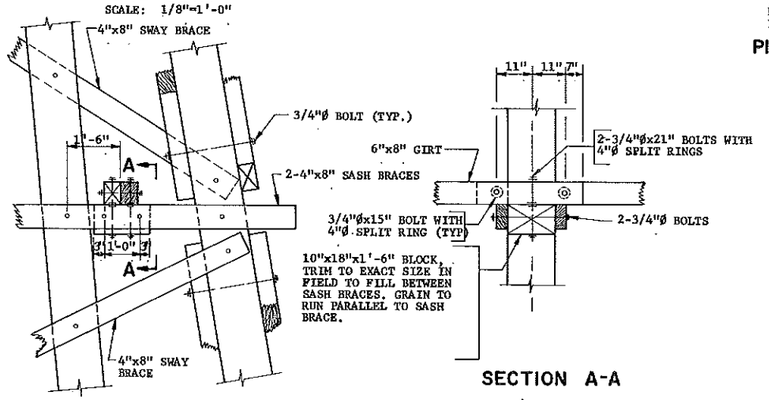


NOTE: SECONDHAND STRINGERS SHOULD BE USED IF AVAILABLE

NEW BULKHEAD — S.H. BULKHEAD

END BENT

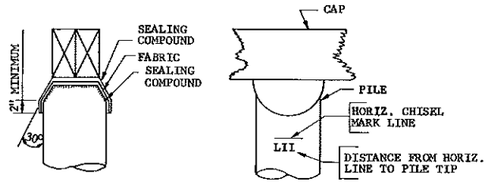
SCALE: 1/8"=1'-0"



PARTIAL ELEVATION

SCALE: 1/2"=1'-0"

SECTION A-A



NOTES:

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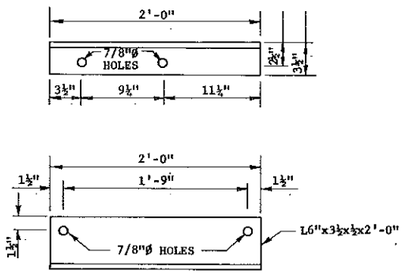
PILE HEAD FIELD PROTECTION

DETAIL "A"



ANGLE DETAIL - MK AB

SCALE 1½"=1'-0"

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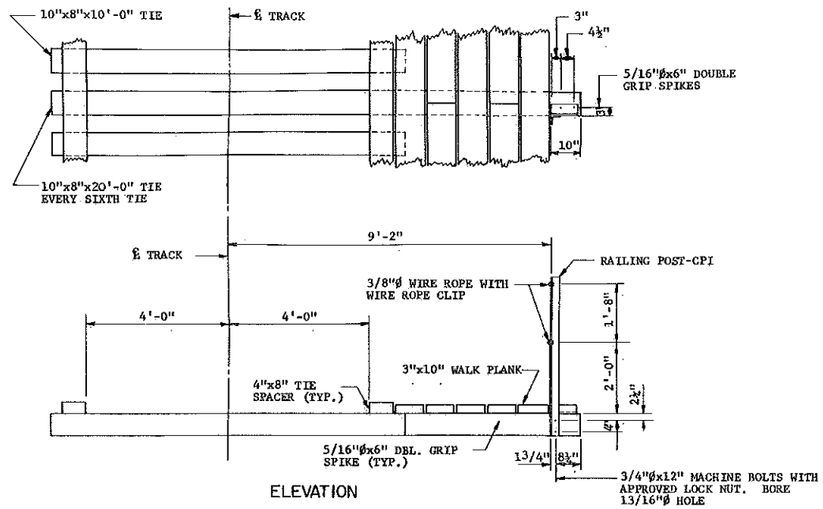
SOUTH TRESTLE

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1

6TH. AVE. S.E. UNDERPASS
MANDAN, N. DAK.

1806-070.039-5

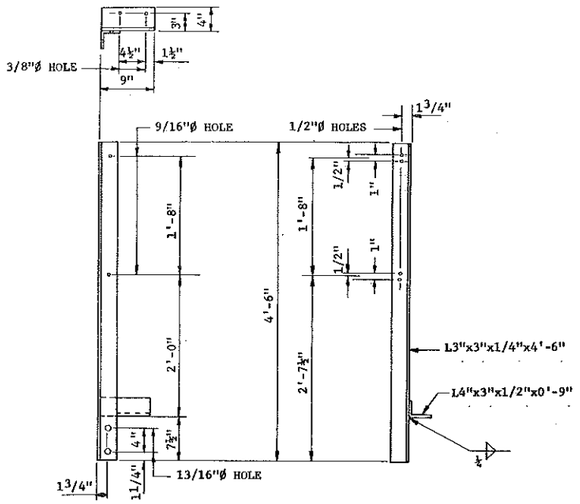
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	26



ELEVATION

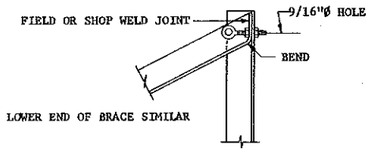
DETAIL OF WALK WITH WIRE ROPE RAILINGS FOR TIMBER TRESTLE SPANS

SCALE: 1/2" = 1'-0"



DETAIL OF RAILING POSTS

POST CP1 - AS SHOWN
POST CP2 - OPPOSITE HAND
SCALE: 1" - 1'-0"



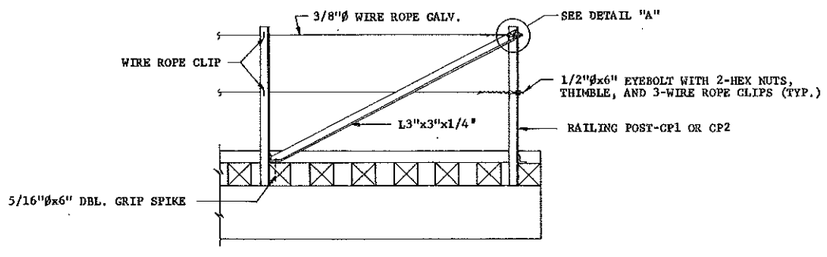
NOTE: LOWER END OF BRACE SIMILAR

NOTES

CANT HOOKS, PEAVIES, PIKES, OR HOOKS SHALL NOT BE USED TO HANDLE TIMBER.
WIRE ROPE: 3/8" Ø - 7 WIRE STRAND, COMMON GRADE, TYPE 1, GALV. ASTM A475.

WIRE ROPE CLIPS: ASTM A338.
PAINT: POSTS SHALL BE GIVEN ONE SHOP COAT OF PRIMER.
APPLY TWO COATS OF BRIDGE PAINT TO POSTS AND BRACES AFTER ERECTION.
HOLES FOR 5/16" Ø x 6" DBL. GRIP SPIKES SHALL BE 3/16" Ø.
WALKS AND RAILINGS SHALL BE PLACED AS DIRECTED.
RAIL POSTS SHALL BE SPACED AT 7 FEET (ON WALK TIES).
HARDWARE: ASTM A153.

STRUCTURAL STEEL - M183= 6,000 POUNDS
INCLUDES POSTS, END BRACINGS, ANGLES AND 6x3 1/2 x 1/2 ANGLES ON STRINGERS
(SEE SHEETS 25 AND 27.



RAILING POST BRACE AT BRIDGE ENDS

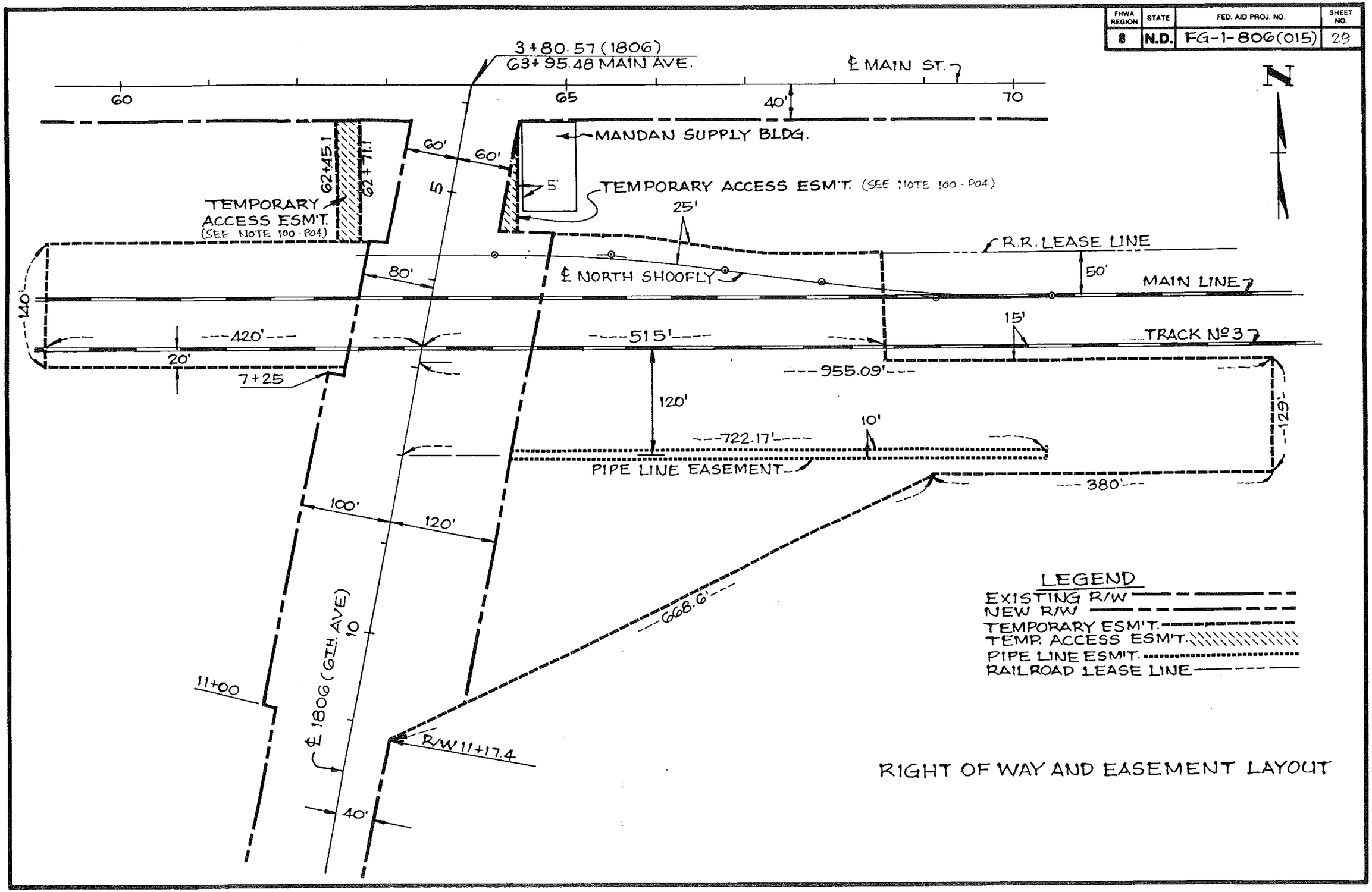
SCALE: 1/2" = 1'-0"

RAILING DETAILS

BURLINGTON NORTHERN RAILROAD
YELLOWSTONE DIVISION
BRIDGE NO. 199.1
6TH. AVE. S.E. UNDERPASS
MANDAN, N. DAK.

1806-070.039-6

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	29



RIGHT OF WAY AND EASEMENT LAYOUT

3/13/87 PROJECT NO. FG-1-806(015)069

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB-TOTAL
R1-1-30	30"x 30"	STOP		17	0
R1-1-48	48"x 48"	STOP		34	0
R1-2-48	48"x48"& 36"x 30"	YIELD & TO ONCOMING TRAFFIC		45	0
R2-1-48	48"x 60"	SPEED LIMIT		40	0
R2-5c-48	48"x 60"	SPEED ZONE AHEAD		40	0
R4-1-48	48"x 60"	DO NOT PASS		40	0
R4-7-48	48"x 60"	KEEP RIGHT SYMBOL		40	0
R4-8-48	48"x 60"	KEEP LEFT SYMBOL		40	0
R10-6-48	48"x 72"	STOP HERE ON RED		44	0
R11-2-48	48"x 30"	ROAD CLOSED		26	0
R11-3a-60	60"x 30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		30	0
R11-3b-60	60"x 30"	BRIDGE OUT __ MILES AHEAD LOCAL TRAFFIC ONLY		30	0
R11-2a-48	48"x 30"	STREET CLOSED	2	26	52
R11-3c-48	60"x 30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY	2	30	60
R11-4a-60	60"x 30"	STREET CLOSED TO THRU TRAFFIC		30	0
G20-1-60	60"x 36"	ROAD CONSTRUCTION NEXT __ MILES		34	0
G20-2-60	60"x 24"	END CONSTRUCTION	2	28	56
G20-2a-48	48"x 24"	END ROAD WORK		24	0
G20-4-36	36"x 18"	PILOT CAR FOLLOW ME		10	0
G20-50-72	72"x 36"	ROAD CONSTRUCTION NEXT __ MILES RT & LT ARROWS		38	0
G20-52-72	72"x 24"	ROAD CONSTRUCTION NEXT __ MILES RT or LT ARROW	2	30	60
G20-54-48	48"x 36"	OVERHEAD BRIDGE PAINTING		30	0
G20-8-48	48"x 36"	TEMPORARY SURFACE NEXT __ MILES		30	0
M1-5-24	24"x 24"	ROUTE MARKER	25	14	350
M3-1-24	24"x 12"	NORTH (MOUNTED ON ROUTE MARKER POST)	7	6	42
M3-3-24	24"x 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)	18	6	108
M4-8-24	24"x 12"	DETOUR (MOUNTED ON ROUTE MARKER POST)	25	6	150
M4-8a-24	24"x 18"	END DETOUR	2	8	16
M5-1-21	21"x 15"	ARROW AHD AND RT or LT(MOUNTED ON RTE MKR POST)	3	6	18
M6-1-21	21"x 15"	ARROW RT or LT (MOUNTED ON ROUTE MARKER POST)	8	6	48
M6-2-21	21"x 15"	ARROW RT UP DIAGONAL(MOUNTED ON RTE MKR POST)	1	6	6
M6-3-21	21"x 15"	ARROW AHD (MOUNTED ON ROUTE MARKER POST)	13	6	78
M4-10-48	48"x 18"	DETOUR ARROW RIGHT or LEFT		22	0
W1-1-48	48"x 48"	RIGHT or LEFT SHARP CURVE ARROW		34	0
W1-2-48	48"x 48"	RIGHT or LEFT CURVE ARROW		34	0
W1-3-48	48"x 48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		34	0
W1-4-48	48"x 48"	RIGHT or LEFT REVERSE CURVE ARROW		34	0
W1-6-48	48"x 24"	LARGE ARROW		26	0
W3-1a-48	48"x 48"	STOP AHEAD SYMBOL		34	0
W3-2a-48	48"x 48"	YIELD AHEAD SYMBOL		34	0
W3-3-48	48"x 48"	SIGNAL AHEAD SYMBOL		34	0
W4-2-48	48"x 48"	LANE TRANSITION SYMBOL		34	0
W5-1-48	48"x 48"	ROAD NARROWS	2	34	68
W6-3-48	48"x 48"	TWO WAY TRAFFIC SYMBOL		34	0
W8-1-48	48"x 48"	BUMP		34	0
W8-3a-48	48"x 48"	PAVEMENT ENDS SYMBOL		40	0
W8-3a-24	24"x 18"	PAVEMENT END PLAQUE			
W8-9-48	48"x 48"	LOW SHOULDER		34	0
W8-51-48	48"x 48"	UNEVEN PAVEMENT		34	0
W8-53-48	48"x 48"	TRUCKS ENTERING HIGHWAY		34	0
W8-54-48	48"x 48"	TRUCKS ENTERING AHEAD OR __ FT.		34	0
W8-55-48	48"x 48"	TRUCKS CROSSING AHEAD or __ FT.		34	0
W12-2-48	48"x 48"	VERTICAL CLEARANCE SYMBOL	2	34	68
W13-1-24	24"x 24"	MPH ADVISORY SPEED PLATE		10	0
W13-4-48	48"x 60"	RAMP ARROW		40	0
W20-1-48	48"x 48"	ROAD CONSTRUCTION - AHEAD, 1/2 MILE, or FT.	2	34	68
W20-1a-48	48"x 48"	MEN WORKING SYMBOL		34	0
W20-2-48	48"x 48"	DETOUR FT.	4	34	136
W20-3-48	48"x 48"	ROAD or STREET CLOSED AHEAD or __ FT.		34	0
W20-4-48	48"x 48"	ONE LANE ROAD AHEAD or FT.	1	34	34
W20-5-48	48"x 48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		34	0
W20-7a-48	48"x 48"	FLAGGING SYMBOL	4	34	136
W20-7k-24	24"x 18"	FEET	4	8	32
W20-8-48	48"x 48"	STREET CLOSED		34	0
W20-50-48	48"x 48"	BE PREPARED TO STOP		34	0
W20-51-48	48"x 48"	EQUIPMENT WORKING		34	0
W20-52-54	54"x 12"	NEXT MILES		10	0
W21-2-48	48"x 48"	FRESH OIL		34	0
W21-5-48	48"x 48"	SHOULDER WORK		34	0
W21-50-48	48"x 48"	BRIDGE PAINTING AHEAD or __ FT.		34	0
W21-51-48	48"x 48"	MATERIAL ON ROADWAY		34	0
W22-7-48	48"x 48"	SINGLE LANE AHEAD or __ FT.		34	0
W22-8-48	48"x 48"	FRESH OIL LOOSE ROCK		34	0
R1-1a-18 W22-14-18	18"X 18"	STOP and SLOW PADDLE Back to Back	4	8	32
		TOTAL UNITS			1618

TYPE III 8' LONG	BARRICADES	EACH		16
TYPE II 2' MIN.	BARRICADES	EACH		
TYPE I 6'to 10'	BARRICADES	EACH		
18"x 36" MIN.	DELINEATOR DRUMS	EACH		
28" MIN.	TRAFFIC CONES	EACH		22
	SEQUENCING ARROW PANEL TYPE C	EACH		
	ATTENUATION DEVICES TYPE A	EACH		12

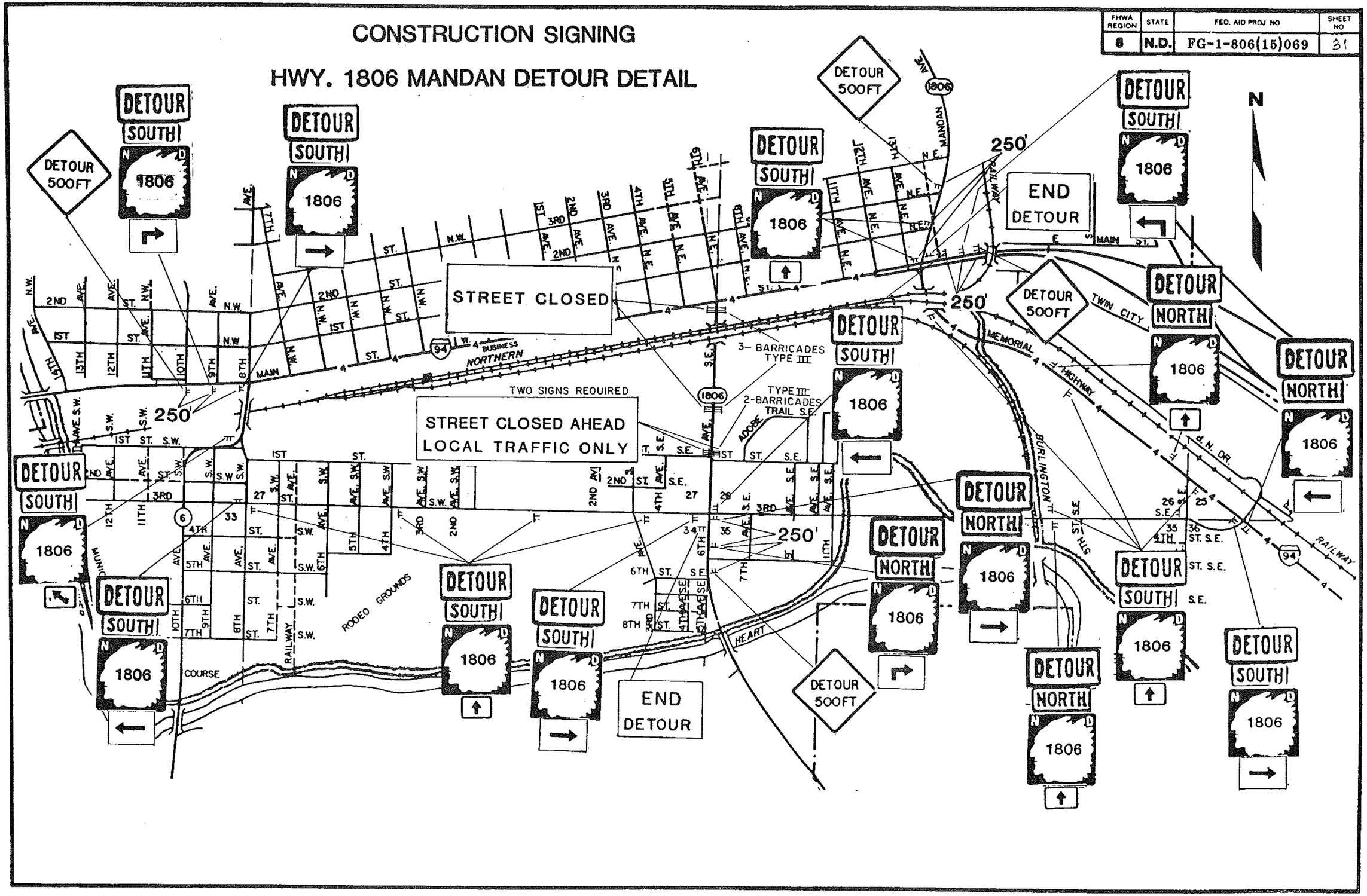
TRAFFIC CONTROL
CONSTRUCTION
DEVICES LIST
ND 1806
BNRR TRESTLE
MANDAN, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	30

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO
8	N.D.	FG-1-806(15)069	31

CONSTRUCTION SIGNING

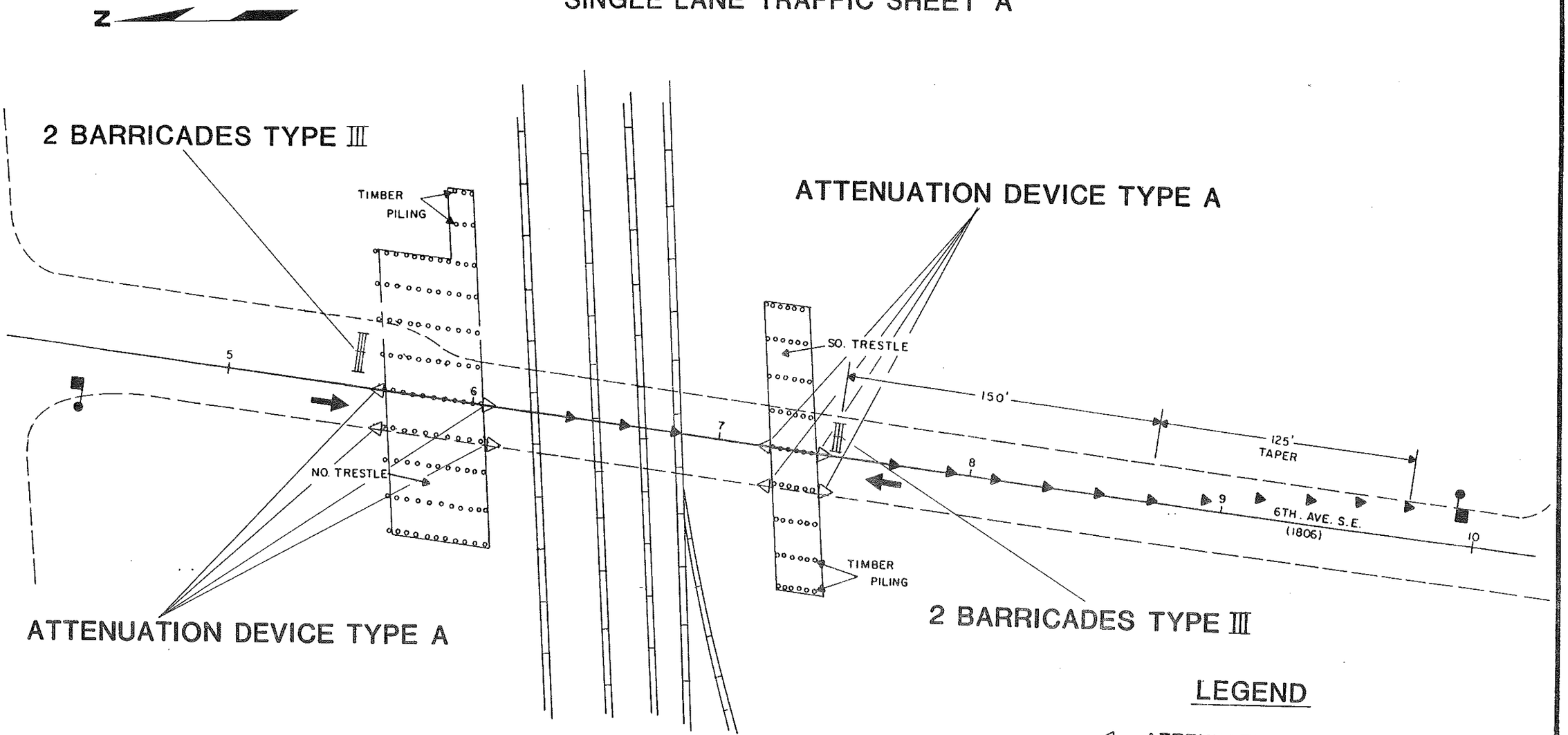
HWY. 1806 MANDAN DETOUR DETAIL



FHWA REGION	STATE	FED AID PROJ NO	SHEET NO.
8	N.D.	FG-1-806(15)069	32

CONSTRUCTION SIGNING HWY.1806 MANDAN

SINGLE LANE TRAFFIC SHEET A



LEGEND

- ATTENUATION DEVICES
- CHANNELIZING DEVICES
- III TYPE III BARRICADE
- FLAGGER

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)069	33

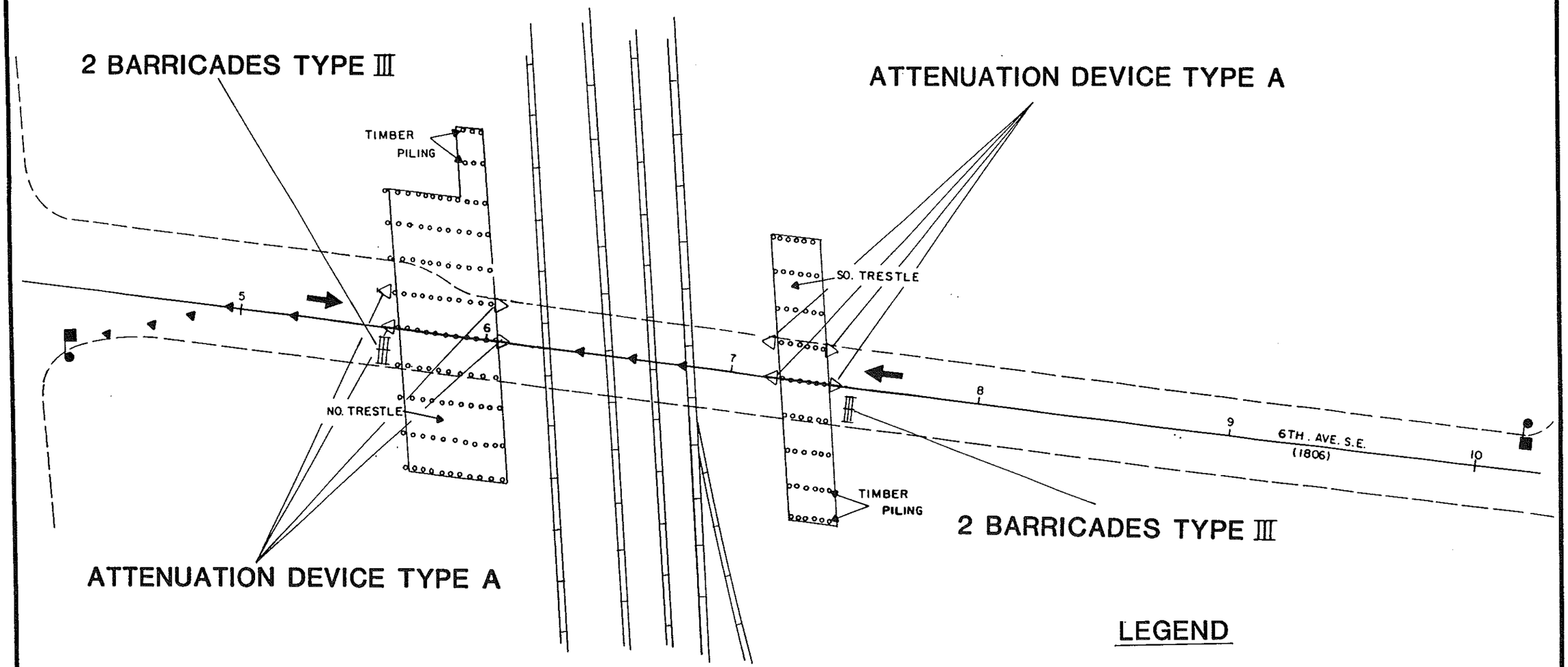
CONSTRUCTION SIGNING HWY. 1806 MANDAN

SINGLE LANE TRAFFIC SHEET B

N

2 BARRICADES TYPE III

ATTENUATION DEVICE TYPE A



ATTENUATION DEVICE TYPE A

2 BARRICADES TYPE III

LEGEND

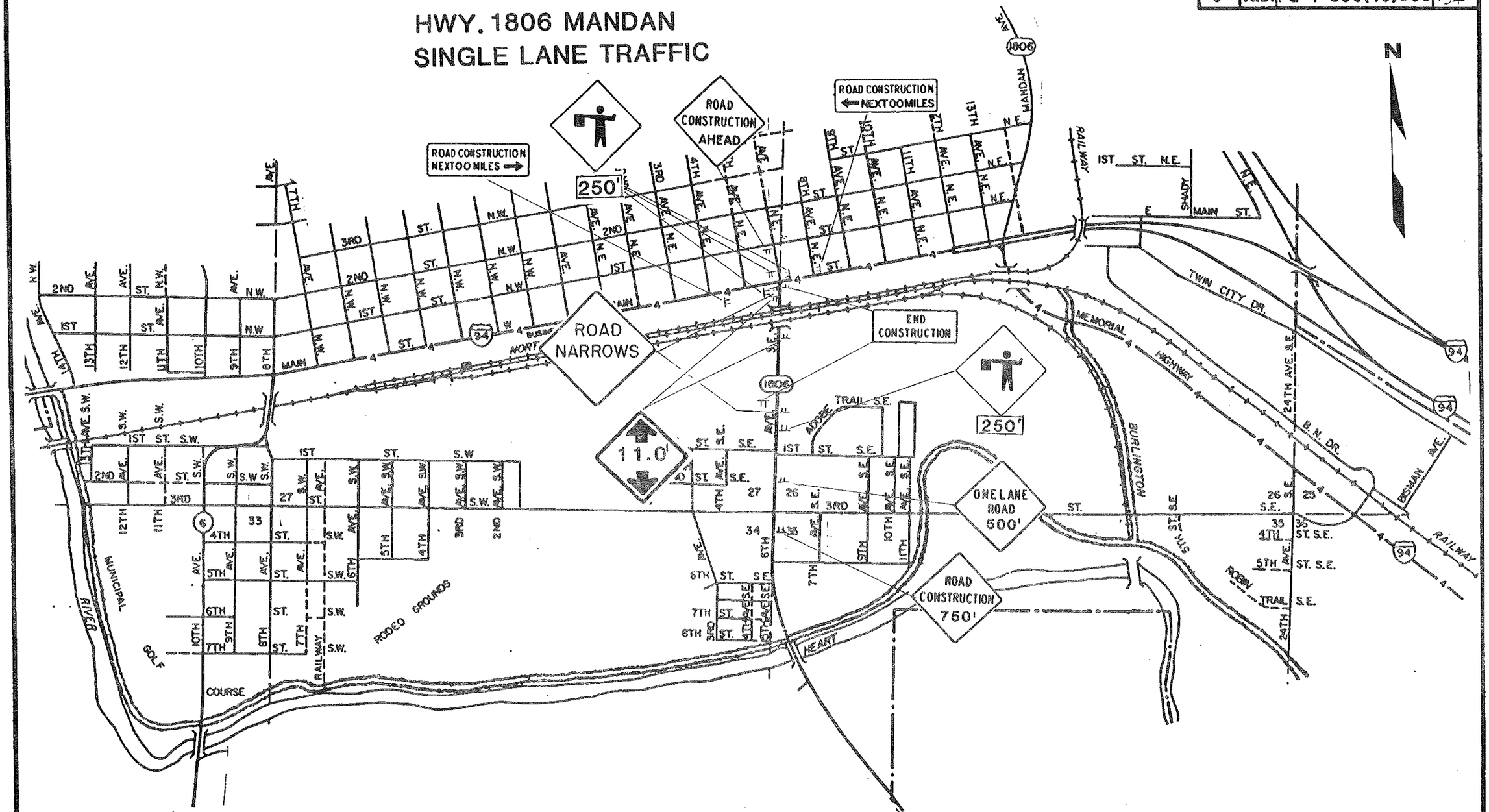
- ◁ ATTENUATION DEVICES
- ▲ CHANNELIZING DEVICES
- III TYPE III BARRICADE
- FLAGGER

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)069	34

CONSTRUCTION SIGNING

HWY. 1806 MANDAN

SINGLE LANE TRAFFIC



NOTE: TO BE USED WITH SHEETS A AND B

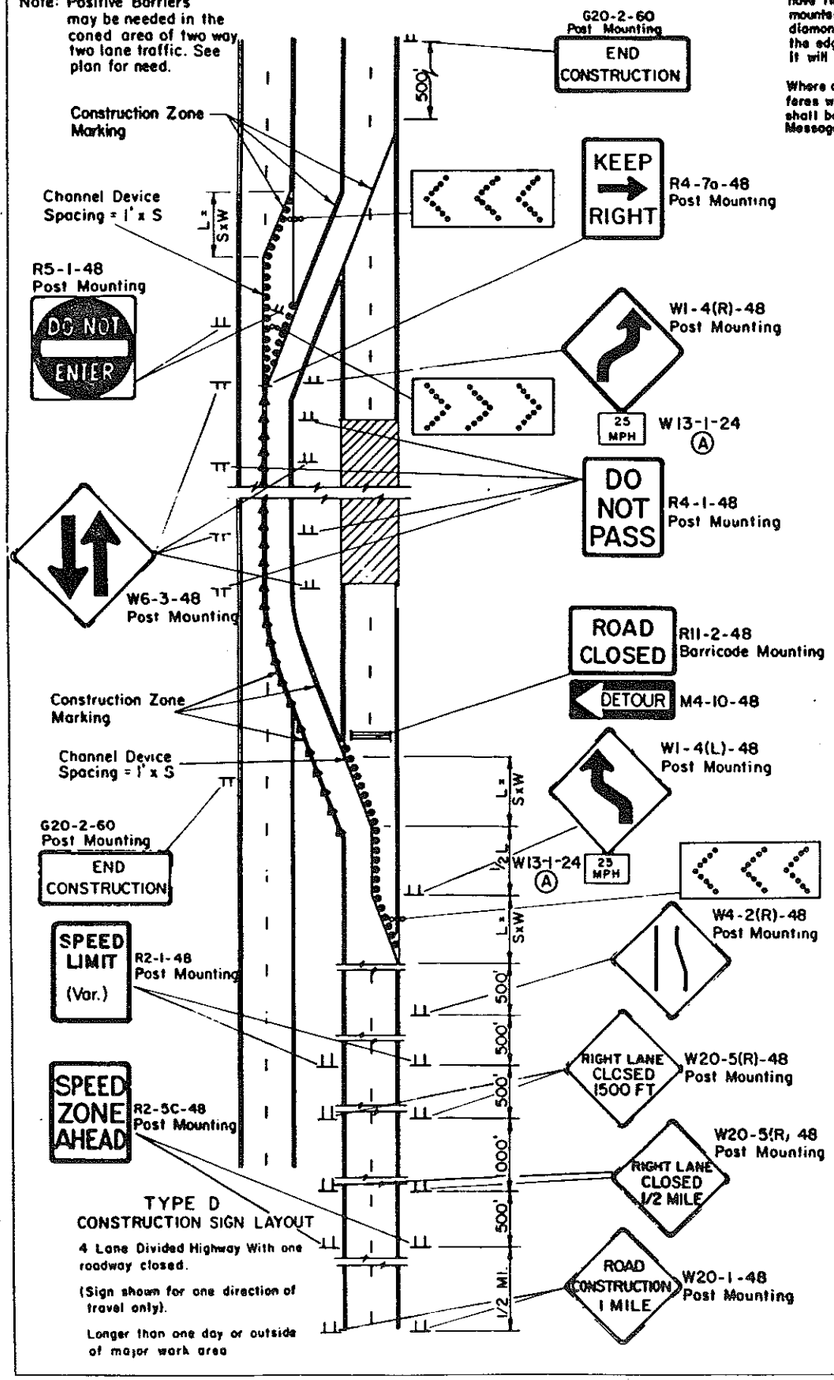
FHWA REGION	STATE	FED AID PROJ NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	35

D-754-7

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

Ⓐ Where necessary safe speed to be determined by the Engineer.

Note: Positive Barriers may be needed in the coned area of two way two lane traffic. See plan for need.



TYPE D
CONSTRUCTION SIGN LAYOUT

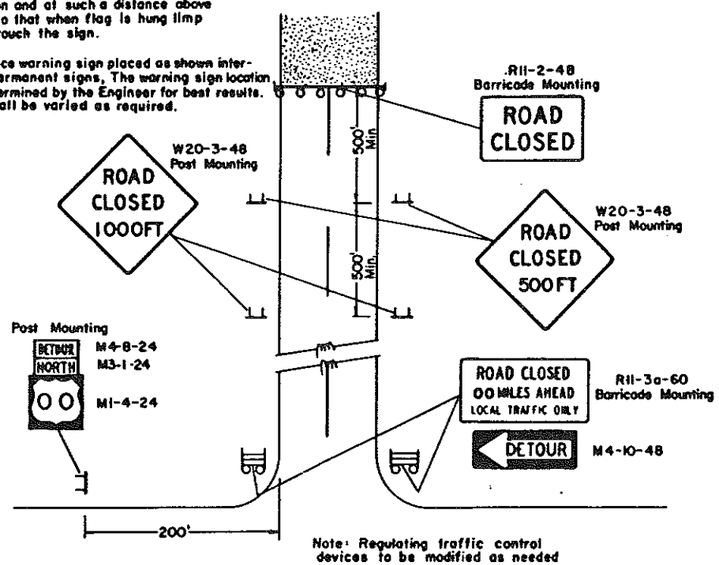
4 Lane Divided Highway With one roadway closed.

(Sign shown for one direction of travel only).

Longer than one day or outside of major work area

NOTE:
FLAGS: All warning signs shall have two orange warning flags 24" square mounted perpendicular to the edges of the diamond sign and at such a distance above the edges so that when flag is hung limp it will not touch the sign.

Where advance warning sign placed as shown interferes with permanent signs, The warning sign location shall be determined by the Engineer for best results. Messages shall be varied as required.



Note: Regulating traffic control devices to be modified as needed for the duration of the detour.

** Where necessary safe speed to be determined at the site by the Engineer

Sequencing Arrow Panels shall be Type A, B or C dependent on traffic volumes and speeds as follows:

Type A Sequencing Arrow Panels shall be used on roadways with slow moving traffic speeds and low volume (25 mph and 750 ADT. or less).

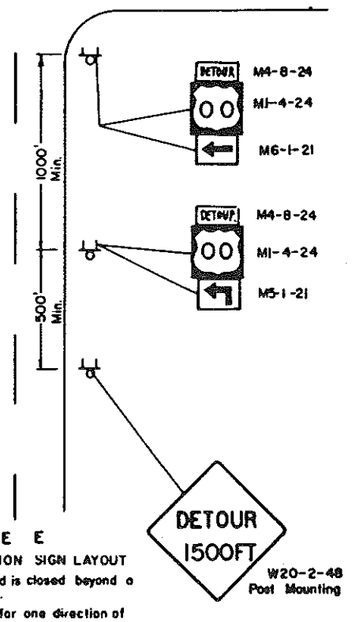
Type B Sequencing Arrow Panels shall be used on roadways with moderate traffic speeds and moderate traffic volumes (40 mph and less and 5000 ADT. or less).

Type C Sequencing Arrow Panels shall be used on roadways with high traffic speeds and high traffic volumes (More than 40 mph and over 5000 ADT).

Note:
L = Minimum Length of Taper
S = Numerical value of Speed limit or 85 percentile speed
W = Width of offset

L = S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater.
L = WS²/60 for urban, residential, and other streets with speeds of 40 mph or less

KEY
- Type I Barricades
- Type II Barricades
- Type III Barricades
- Cones
- Lighting Device
- Flagman
- Delineator Drums
- Signs
- Type A Delineator
- Sequencing Arrow Panel



TYPE E
CONSTRUCTION SIGN LAYOUT

Where a road is closed beyond a detour point.

(Sign shown for one direction of travel only)

Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.

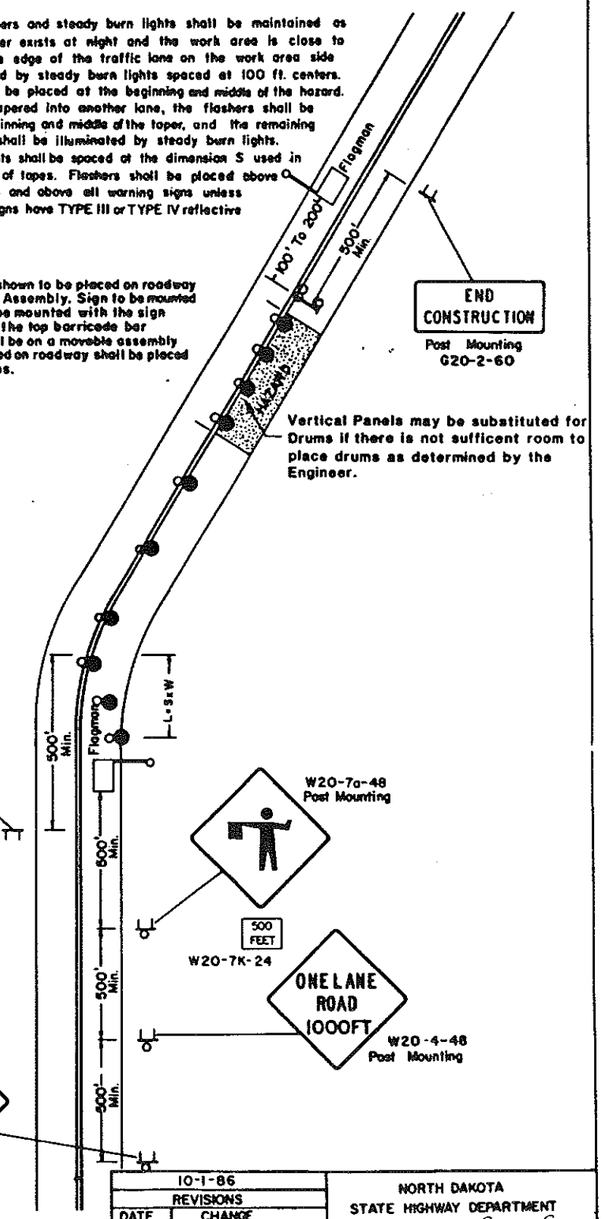
Longer than one day or outside of major work area

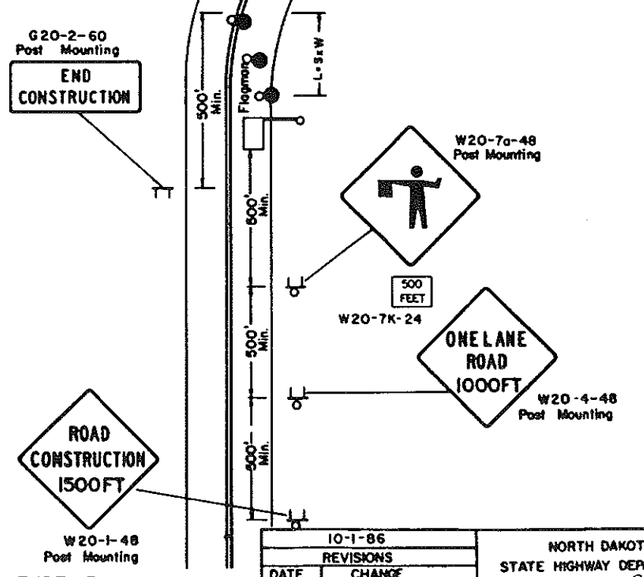
Delineator drums, Barricades or Cones used for tapering traffic shall be spaced at the demention "S".

"S" = Numerical value of speed limit or 85 percentile speed

Lighting - The flashers and steady burn lights shall be maintained as shown. If the danger exists at night and the work area is close to the traffic lane, the edge of the traffic lane on the work area side shall be illuminated by steady burn lights spaced at 100 ft. centers. The flashers shall be placed at the beginning and middle of the hazard. Where traffic is tapered into another lane, the flashers shall be placed at the beginning and middle of the taper, and the remaining tapering devices shall be illuminated by steady burn lights. The steady burn lights shall be spaced at the dimension S used in calculating length of tapes. Flashers shall be placed above the barricade bars and above all warning signs unless barricades and signs have TYPE III or TYPE IV reflective sheeted faces.

Mounting - Barricade shown to be placed on roadway shall be on a movable Assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar intermediate Sign shall be on a movable assembly Sign show to be placed on roadway shall be placed on movable assemblies.





TYPE F
CONSTRUCTION SIGN LAYOUT

2 Lane Highway with one lane closed. Barricading is at a point where it is visible to approaching traffic

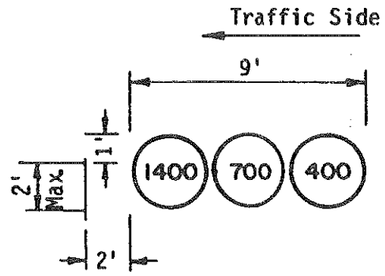
Warning sign sequence in opposite direction — same as one shown.

REVISIONS	
DATE	CHANGE
10-2-86	Revised Type D & F

10-1-86

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
APPROVED David K.D. Leer
DESIGN ENGINEER

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	36



ATTENUATION DEVICE DETAILS

(Barrel Weights)

Note: Numbers indicated in barrels are required weights of sand fill.

Filling of Modules:

Each unit is composed of a cylinder 36 inches in diameter, a core, a disc to distribute the weight of the core, a flexible seal to keep the sand from leaking down and a lid (figure 2).

To erect-follow this procedure:

1. Place module in proper location as indicated on the plan.
2. Place proper care (see color codes and sand depth chart) in module.
3. Place plastic disc on top of core.
4. Place seal snuggly on top of disc with turned up edges overlapping of slits.
5. Fill sand to required depth (see color code for core and sand depth chart).
6. Place lid on top and press down to achieve tight fit.

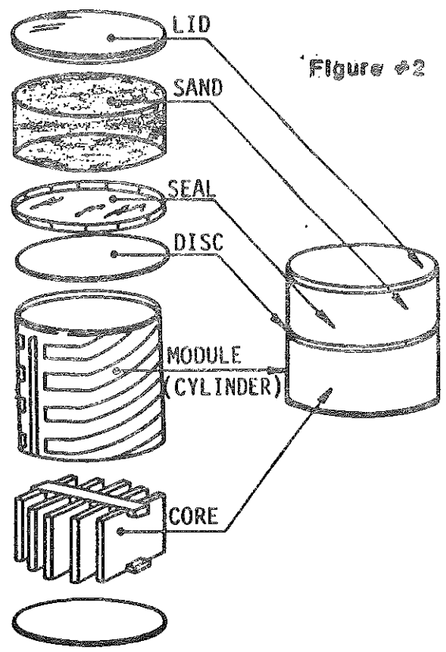


Figure #2

MODULE CONSTRUCTION DETAIL

MATERIALS:

The cylinders shall be approximately 36 inches in height and diameter. They shall be molded by a foamed center process from a tough, high density, polyethlene (or equal material which is durable, weatherproof, and esthetic) thickness approximately 5/16", weigh approximately 36 pounds. The module shall be of such design material and construction as to shatter under impact.

The lid shall be formed for high density polyethlene (or equal), .125 gauge and of such diameter so as to form a "press" fit on the modules, weight approximately five pounds.

The seal shall consist of 40 inch circular sheet of ionomer resin (or equal) slotted so as to form a dish to contain the sand placed inside the modules.

Discs shall be formed as the lids without the lip that fits around the top of the cylinder. They shall be of such diameter to provide a snug fit within the cylinder.

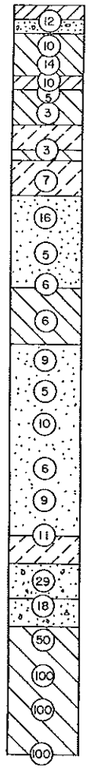
Spacer arrangement of cores shall be supplied in three heights: 11½ inches, 16½ inches, and 20½ inches, in accordance with the plans and fabricated from polystyrene (or equal) in accordance with the drawing. Density 1.5 PCF.

The contractor shall provide three barrel layouts as shown on the plans. In order to have sufficient numbers of replacement barrels for maintenance purposes, the contractor shall provide and have on hand throughout the duration of the contract three extra barrels for each type of layout in use at that time. Three extra barrels shall be 400, 700, and 1400 pounds. The extra barrels are to be used for maintenance purposes and shall be replaced in the extra barrel stock as damaged barrels are replaced in the construction zone.

Cost of attenuation device shall be paid for at the price bid for each location. The barrels damaged over or above the initial installation and the extra barrels shall be paid for as extra work.

Upon completion of the project, attenuation devices shall be left in place on the approach ends of the piers. Those attenuation devices and the maintenance stockpile shall become the property of the State Highway Department.

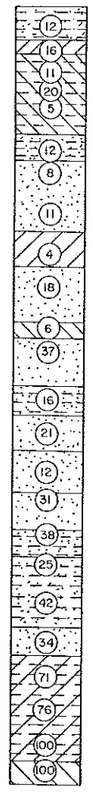
ATTENUATION DEVICE DETAILS AND NOTES



1644.1		
1642.1		FILL, MOSTLY CLAY, DARK BROWN, FROZEN
1640.1		FILL, MOSTLY CINDERS WITH A LITTLE SAND & GRAVEL, BLACK, FROZEN TO 3'
	(A-7-6)	CLAY, BROWN, RATHER STIFF
1634.1		
1632.1	(A-7-6)	CLAY, GRAYISH BROWN, RATHER STIFF
	(A-7-6)	CLAY, GRAY, MEDIUM TO SOFT, GASOLINE ODOR FROM 12'-18'
H_2O LEVEL @ 1627.1		
1623.6	(A-4)	SANDY LOAM, GRAY
1622.1	(A-7-6)	CLAY, BROWNISH GRAY, SOFT
	(A-4)	SANDY LOAM, GRAY, WET, LOOSE
1617.1		
	(A-2-4)	SAND, FINE TO MEDIUM GRAINED, GRAY, MEDIUM DENSE TO LOOSE, A FEW LAYERS OF FAT CLAY
1604.1		
	(A-7-6)	CLAY, GRAY, MEDIUM, A FEW LAYERS OF WATERBEARING SAND.
1596.1		
	(A-2-6)	SAND, GRAY, MEDIUM DENSE AND LOOSE, LAYERS OF SILT AND CLAY.
1569.1		
1565.1	(A-4)	SANDY LOAM, GRAY, WET, MEDIUM DENSE
1560.1	(A-2-4)	SAND WITH A LITTLE GRAVEL, FINE TO MEDIUM GRAINED, GRAYISH BROWN, WATERBEARING, DENSE
1556.1	(A-3)	SAND WITH A LITTLE GRAVEL, MEDIUM TO COARSE GRAINED, GRAYISH BROWN, WATERBEARING, DENSE
1538.1	(A-7-6)	SHALE, GRAY, VERY STIFF, (TEXTURAL CLASSIFICATION: CLAY

BORING NO. 1A

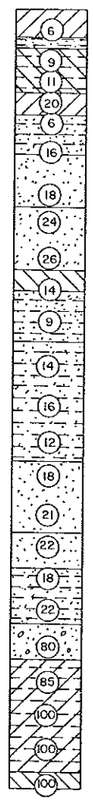
NORTHWEST EXISTING BRIDGE



1643.8		
		FILL, MOSTLY SILTY SAND, A LITTLE GRAVEL AND CINDERS, BLACK
1638.8		
1636.8		MEDIUM FAT CLAY, GRAYISH BROWN, RATHER STIFF (CH-CL) (MAY BE FILL)
		SILTY CLAY, BROWN, WITH A FEW LENSES OF DARK GRAY ABOVE 10', STIFF TO MEDIUM, A FEW LENSES OF FAT CLAY AND SILT (CL) (MAY BE FILL)
H_2O LEVEL @ 1626.8		
1625.8		
		SILTY SAND, FINE GRAINED, BROWNISH GRAY, WATERBEARING, MEDIUM DENSE (SM)
1621.8		
		SAND, FINE GRAINED, BROWN, WATERBEARING, LOOSE TO MEDIUM DENSE (SP-SM)
1611.8		
		FAT CLAY, GRAY, SOFT, A FEW LENSES OF SILT (CH)
1606.8		
		SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)
1598.8		
1596.8		FAT CLAY, GRAY, MEDIUM, A FEW LENSES OF WATERBEARING SAND (CH)
		SAND, FINE GRAINED, A TRACE OF GRAVEL, GRAY, WATERBEARING, VERY DENSE (SP-SM)
1589.8		
1585.8		SILTY SAND, FINE TO MEDIUM GRAINED, A TRACE OF GRAVEL, GRAY, WATERBEARING, DENSE, LENSES OF FAT CLAY (SM)
		SAND, FINE TO MEDIUM GRAINED, A TRACE OF GRAVEL, GRAYISH BROWN, WATERBEARING, DENSE, A FEW LENSES OF SILTY CLAY (SP-SM)
1580.8		
		SAND, FINE GRAINED, GRAY, WATERBEARING, MEDIUM DENSE, A FEW LENSES OF SILT (SP-SM)
1574.8		
		SAND, MEDIUM TO FINE GRAINED, GRAY, WATERBEARING, VERY DENSE (SP-SM)
1569.8		
1565.8		SILTY SAND, FINE GRAINED, GRAY, WATERBEARING, VERY DENSE (SM-SP)
1555.8		SILTY SAND, FINE TO MEDIUM GRAINED, A LITTLE GRAVEL, GRAY TO GRAYISH BROWN, WET, DENSE TO VERY DENSE (SM)
1551.8		SAND, MEDIUM GRAINED, A TRACE OF GRAVEL, BROWN, WATERBEARING, VERY DENSE (SP)
1536.8		SHALE, GRAY, A LAYER OF LIGNITE ABOVE 96' (TEXTURAL CLASSIFICATION; SILTY CLAY, VERY STIFF (CL))
1533.3		SHALE, BLACK, (TEXTURAL CLASSIFICATION; FAT CLAY, VERY STIFF (CH-OH)

BORING NO. 1

SOUTHWEST EXISTING BRIDGE



1644.2		
		FILL, MIXTURE OF LEAN CLAY AND SILTY CLAY, A LITTLE GRAVEL AND CINDERS, BLACK AND BROWN, FROZEN TO 3'
1640.2		
1638.7		FILL, MOSTLY SILTY SAND, BROWN
		SILTY CLAY, BROWN AND A LITTLE GRAY MOTTLED, MEDIUM TO RATHER STIFF (MAY BE FILL)
1632.2		
1629.2		MEDIUM FAT CLAY, BROWN AND GRAYISH BROWN, STIFF (CH-CL) (MAY BE FILL)
H_2O LEVEL @ 1627.2		
1623.7		SANDY SILT, BROWN, MOIST TO WET, LOOSE TO MEDIUM DENSE (ML)
		SAND, FINE GRAINED, BROWN, WATERBEARING, DENSE, A FEW LENSES OF SILTY CLAY (SP-SM)
1616.2		
		SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)
1607.2		
1604.2		MEDIUM FAT CLAY, GRAY, RATHER STIFF, A FEW LAYERS OF WATERBEARING SAND (CH)
1597.2		SILTY SAND, FINE GRAINED, GRAY, WATERBEARING, MEDIUM DENSE, LENSES OF FAT CLAY (SM)
		SILTY SAND, FINE GRAINED, GRAY, WATERBEARING, MEDIUM DENSE TO DENSE TO MEDIUM DENSE (SM-SP)
1580.2		
		SAND, FINE TO MEDIUM GRAINED, A TRACE OF GRAVEL, GRAY, WATERBEARING, DENSE, A FEW LENSES OF SILTY CLAY (SP-SM)
1570.2		
1565.2		SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)
1557.2		SILTY SAND, MEDIUM GRAINED, A LITTLE GRAVEL, BROWN, WET, DENSE, A FEW LENSES OF CLAYEY SAND AND WATERBEARING SAND (SM)
1552.2		SANDY GRAVEL, BROWNISH GRAY, WATERBEARING, VERY DENSE (GP-GM)
		SHALE, GRAY, (TEXTURAL CLASSIFICATION; SILTY CLAY, VERY STIFF, A FEW LENSES OF SILT (CL)
1536.2		
1533.9		SHALE, BLACK, (TEXTURAL CLASSIFICATION; FAT CLAY, VERY STIFF (CH-OH)

BORING NO. 2

SOUTHEAST EXISTING BRIDGE

1640 1630 1620 1610 1600 1590 1580 1570 1560 1550 1540 1530

CLASSIFICATION:

GP - POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
SP - POORLY GRADED SANDS AND GRAVELLY SANDS, LITTLE OR NO FINES.
SM - SILTY SANDS, SAND-SILT MIXTURES
ML - INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS.
CL - INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.
CH - INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
OH - ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY.

NOTES: ENCIRCLED NUMBERS INDICATE THE NUMBER OF BLOWS DELIVERED BY A 140 LB. HAMMER FROM A HEIGHT OF 30" TO DRIVE A CORE TUBE 1'-0".

THE BORING LOG DATA SHOWN IS FOR DESIGN PURPOSES ONLY. THE STATE ASSUMES NO RESPONSIBILITY IF SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION DIFFER FROM THOSE SHOWN.

SYMBOLS:

P - MAXIMUM LOAD (LBS. SQ. FT.)
Ø - ANGLE OF INTERNAL FRICTION (DEGREES)
C - COHESION (LBS. SQ. FT.)
M - MOISTURE (PERCENT)
W - DRY WEIGHT (LBS./CU. FT.)
* - TRIAXIAL

N.D. 1806
MANDAN

BORING LOG

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	38

37	(5)(015)	N.D. FG-1-806(015)	9
SW 33-148-96	ON FOM DIV 1024	23 MI S	MOHALL MINOT

North Shoofly Soils Profile

P.I. 3+96.9
EL 1647.4

+0.2125 % TOP OF RAIL

P.I. 17+72.8
EL 1651.7

SUBGRADE 12.21 BELOW TOP OF RAIL)

Brn Clay
A7-6 (32)
Field Moisture 29%
pH 7.56

Brn Clay
A7-6 (37)
Field Moisture 31%
pH 7.62

(H2O level 14.2')

NORTH SHOOFLY

South Shoofly Soils Profile

P.I. 8+00
EL. 1649.5 (TOP OF RAIL)

+0.2625 % TOP OF RAIL

Ground profile 10' Lt of ℄ survey

SUBGRADE (2.21' BELOW TOP OF RAIL)

℄ Survey

P.I. 15+60
EL. 1651.5 (TOP OF RAIL)

BIK Cl Lm
A7-5(7)
Field Moisture 26%
pH 7.29

BEG TRESTLE 9+48.3

END TRESTLE 9+52.64

Subcut Limits

Ground profile 16' Rt of ℄ survey

Lt Brn Clay
A7-6 (33)
Field Moisture 30%
pH 7.61

Lt Brn Sandy Loam
A2-4 (0)
Field Moisture 16%
pH 8.01

(H2O level 11.5')

Brn Clay
A7-6 (24)
Field Moisture 28%
pH 7.55

STA 12+00 RT 98'

STA 12+00 RT 25'

STA 15+00 RT 25'

SOUTH SHOOFLY