FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO
8	N.D.	F-FG-1-806(015)069	2

TABLE OF CONTENTS

SHEET NO.	DESCRIPTION
1	Title Sheet
2	Table of Contents
3-8	General Notes
9-17	Quantities
18	Basis of Estimate
19	List of Standards
20-23	Typical Sections
24	Right of Way and Easement Layout
25	Curb and Gutter Details
26	Concrete Driveway Details
27	Sidewalk and Curb Ramp Details
28-29	Concrete Pavement Joint Details
30-32	Lift Station Details
33-34	Poured Manhole Details
35	Sewer Bedding and Backfill Details
36	Perforated Pipe Details
37	Underdrain Cleanout Detail
38	Polystyrene Insulation Board
39	Manhole Blockout Detail
40	Chain Link Gate Detail
41	Flood Water Storage Area Detail
42-56	Plan and Profile Sheets
57-59	Pavement Layout Details
60-61	Pit Plats
62-66	Construction Signing and Marking
67	Construction Sequence Layout
68	Standard D-754-5 Barricade Details
69-73	Flood Wall Notes, Layouts, and Details
74-117	Structural Notes and Details (See Sheet No. 74 for Index of Drawings)
118-121	Notes for Traffic Signals and Lighting
122-124	Interim Traffic Signals
125	Interim Traffic Signal Quantities
126-132	Traffic Signal Layouts and Details
133	Conduit and Conductor Quantities
134	Controller Phasing
135	Controller Settings
136-137	Signal Head and Mast Arm Sign Location
138	Summary of Quantities for Signals
139	Pedestrian Heads on Light Standard Details
140	Preformed Loop Detector Details
141	Utility Service Pole Detail
142-143	Feed Point Details
144-145	Lighting System Schematics
146-168	Lighting Layout and Quantities
169-172	Sign Summary Sheets
173-187	Signing and Pavement Marking Details
188	Soil Survey Sheet
189-217	Cross Section Sheets

GENERAL 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.

100 014 Cross sections for this project are available for inspection at the Design Division, North Dakota State Highway Department, 600 East Boulevard Avenue, Bismarck, North Dakota 58505-0178 and also at the North Dakota State Highway Department District Office in Bismarck, North Dakota.

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.

100 133 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.

100 145 CONTRACTOR-OPTIONED PITS: Prior to surface disturbance or removal of aggregate from a contractor-optioned pit, the contractor shall provide the North Dakota State Highway Department with a description of the location of the pit. The North Dakota State Highway Department will submit this information to the State Historic Preservation Officer for review to see if any significant cultural resources would be affected. The contractor shall submit this information to the North Dakota State Highway Department at least seven days prior to stripping the surface or removing any aggregate from the pit. Apart from extension of time, no payment or claim for any damages shall be made to the contractor as compensation for damage for any delays or hindrances from any cause whatsoever in the progress of the work because of this required review.

100 060 DETOURS: The contractor shall maintain the streets used as detours (streets to be designated by the engineer) 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 State Highway Department and erected and maintained by the contractor as an incidental item.

100 P03 REQUIRED CONSTRUCTION SEQUENCE: The Main Street portion of this project and the roadway from 3rd Street, S.E. to the end of the project shall have a minimum of two lanes open to the full and unobstructed use of traffic between June 27, 1988, and July 6, 1988. All-weather surfacing will be required. No work on the roadways will be permitted during this period without permission of the Highway Department Engineer.

100 P01 WEEKLY PLANNING/REPORTING MEETING:

A. Purpose of Weekly Meeting.

1. Coordination of efforts between subcontractors, utilities, local authorities, and others.

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

1. The contractor will be required to provide a written schedule of the next week's work and a tentative schedule of the following week.
2. The contractor will be responsible for sending a knowledgeable representative to conduct a weekly Reporting/Planning meeting.
3. Reporting/Planning meeting will include discussion of problems encountered during the current week; information of interest to local authorities, subcontractors, utilities, and next week's prospective schedule.
4. The contractor will organize the weekly meeting contacting interested agencies. These agencies include but are not limited to the following:

a. State Highway Department.
b. City Engineer's representative.
c. Police department.
d. Fire department.
e. Ambulance service.
f. Telephone Co.
g. MDU.
h. Cable TV.
i. Subcontractors.
j. Burlington Northern Railroad.

GENERAL NOTES

100 P02 UNDERGROUND FUEL TANKS: There are two underground gasoline tanks located at approximately Sta. 12+15± - 100' Lt. The owner has until June 1, 1988, to remove and relocate these tanks outside the right of way. The Contractor shall delay any construction in this immediate area until the removal has been completed.

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 Station(s) 4+10 to 13+50 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.

200 045 Any costs for the disposal of excess excavation from the trenches of storm drains, water lines, water mains, sanitary sewers, and related items shall be included in the price bid for the respective pay item.

200 060 PAVEMENT REMOVAL: All concrete and concrete pavements paid for as removal shall be deducted from the excavation quantity. This includes both the Common Excavation and the Unclassified Excavation.

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.

200 420 RAILROAD FLAGGING: The contractor shall coordinate the need for railroad flagging with the Burlington Northern Railroad. The railroad requires a 48-hour advance notice when flagging is needed. Payment for this flagging will be made directly to the railroad by the North Dakota State Highway Department. There will be no charge to the Contractor.

200 P01 REMOVAL OF CONCRETE PAVEMENT: The removal of the existing integral curbs in the vicinity of the railroad underpass has been included in the quantities and shall be paid for at the contract unit price per square yard for "Removal of Concrete Pavement."

200 P02 REMOVAL OF CONCRETE: This item includes the removal of the existing concrete sidewalk, driveways, parking lots (where required), old concrete floor slabs and foundations, and all other concrete items other than the curb and gutter and concrete pavement.

In the area south of Main Street between Sta. 64+50 and 66+50, the contractor shall remove the two old concrete floor slabs and the concrete parking lot. Also to be removed and properly disposed of, is a 1,000 ± gallon underground fuel tank. The resulting hole shall be backfilled with excess excavation. The cost of removing and disposing of the fuel tank shall be included in the price bid for "Removal of Concrete."

200 P03 REMOVAL OF LIFT STATION: The existing lift station located at approximately Sta.7+32 - 68'± Lt. of survey centerline, shall be removed and/or obliterated and backfilled in accordance with Section 202 of the Standard Specifications. All equipment and materials removed from the lift station (including pumps, pipes, etc.) shall become the property of the contractor. The existing storm sewer pipes that are not removed with the normal excavation shall be thoroughly plugged at both ends and abandoned in place.

200 P05 REMOVAL OF BITUMINOUS SURFACING: The removal of the existing bituminous surfacing necessary to construct this project has been included in the quantities and shall be paid for at the unit price bid for "Common Excavation - Type A."

200 P06 REMOVAL OF INLETS AND MANHOLES: At locations shown in the plans for "Removal of Inlets" or "Removal of Manholes," the work shall be performed in the following manner. The contractor shall carefully remove the castings and deliver them to the city shop at 6th Avenue, S.W. The concrete barrel or box shall then be removed or obliterated to a minimum of one foot below the aggregate base. If the sewer pipes are no longer required for drainage, they shall be removed or thoroughly plugged at the ends. The resulting holes shall be filled with Class 5 aggregate base.

200 P07 REMOVAL OF CULVERTS - ALL TYPES AND SIZES: The existing 60" concrete storm sewer shall be removed on Main Street from Sta. 62+30 to 65+70 Rt. Disposal of this pipe shall be in a location obtained by the contractor and approved by the engineer. The resulting trench shall be backfilled to the subgrade with a good quality soil obtained from other cut sections. The removal of the underdrains and storm sewer pipe in the underpass area is not a pay item. The cost of this removal and disposal shall be included in the price bid for other items.

200 P08 SUBCUT SCARIFY AND RECOMPACT: The roadway on this project shall be subcut to a distance of one foot outside the curb and gutter and to the depth shown on the plan and profile and cross section sheets. The subcut section shall be brought back to the proposed grade line with Class 5 aggregate base. The contractor shall have the option of crushing the concrete removed on this project and using this material for a portion of the backfill in lieu of the aggregate base. The crushed concrete (if used) shall have the same gradation as the Class 5 aggregate except that the fractured faces requirement shall not apply. If the contractor elects to use crushed concrete, this material shall be measured and paid for at the unit price bid for "Aggregate Base Course - Class 5." The subcut has been included in the quantities and shall be paid for at the unit price bid for "Common Excavation - Type A."

200 P09 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."

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	5

GENERAL NOTES

200 P10 DISPOSAL OF EXCESS EXCAVATION AND CONCRETE: If the existing concrete (pavement, sidewalk, curb and gutter, driveways, etc.) is not crushed and used in the subgrade (see note 200-P08), this material and the excess excavation shall be disposed of at a site obtained by the contractor and approved by the engineer. Disposal in a wetland area will not be permitted. The area in the vicinity of the underpass may contain some hydrocarbon contaminated soil. If, in the opinion of the engineer and/or the State Health Department, the contamination is severe, this material will have to be disposed of at the city of Mandan landfill located southwest of the city. There will be no charge to the contractor for use of the landfill. The cost of all of the disposal and obtaining of the disposal area, shall be included in the price bid for "Common Excavation - Type A," "Removal of Concrete," and "Removal of Concrete Pavement."

200 P11 UNCLASSIFIED EXCAVATION: The excavation required for the seal slab from Sta. 5+55.75 to 9+05 will be measured and paid for as "Unclassified Excavation." The volume to be paid for will be that volume bounded by vertical planes located 1½ feet outside of and parallel to the walls (see note 200-060).

320 P01 COMPACTION OF AGGREGATE BASE: The Class 5 Aggregate Base Course (and the crushed concrete, if used) shall be compacted to 85% of the maximum dry density as determined by AASHTO T-180.

320 P02 AGGREGATE BASE COURSE: The gradation for the Class 5 Aggregate Base to be installed from Sta. 4+90.35 to 6+27 and from 8+20.2 to 9+84.15 shall be revised as follows:

Sieve Size	Max. % Passing
No. 4	49
No. 200	4

400 050 AUTOMATIC BATCHING EQUIPMENT: The automatic batching equipment as specified in AASHTO M-156 will not be required on this project.

400 P01 HOT BITUMINOUS PAVEMENT: The 7" hot bituminous pavement shall be laid in 3 lifts with the top lift having a depth of approximately 2".

400 P02 HOT BITUMINOUS PAVEMENT: Approximately 60 tons of hot bituminous pavement and 4 tons of 85-100 asphalt cement have been provided in the quantities and shall be used at street returns and where concrete construction abuts existing asphalt such as parking lots, etc., at the property line. The street return patches shall be 6 inches thick and the property line patches shall be a minimum of 4 inches thick. The widths and lengths of the patches shall be determined in the field.

550 050 The requirements for the transverse metal tine finish of Section 550.04-J-6 (Final Surface Finish) of the Standard Specifications shall be deleted.

550 P01 HIGH EARLY STRENGTH CONCRETE: The 2200 S.Y. of high early strength concrete that has been included in the quantities shall be used for constructing street approaches and to complete gaps left in the concrete pavement for traffic control. The exact locations, use, and quantity of high early strength concrete shall be determined by the engineer in the field.

550 P02 MANHOLE BLOCKOUTS: All manholes located in the new 8 inch concrete pavement shall be blocked out as shown on the manhole blockout detail sheet. The blockouts will not be paid for separately but shall be included in the price bid for "8 Inch Nonreinforced Concrete Pavement - Class AE."

704 P01 MAINTAINING ACCESS: The contractor will be responsible for providing access to all residential dwelling and business establishments adjacent to this project. Final details on location of access points and construction procedures shall be worked out with the engineer in the field prior to start of the project.

Two hundred tons of cold bituminous pavement has been provided and shall be used for providing an all-weather surface for maintaining access to adjacent establishments. The depth of the pavement shall be approximately 3 inches for these temporary access drives. The exact locations and quantities shall be determined in the field. The gradation of the aggregate and the type and grade of bitumen to be used shall be approved b the engineer. The unit price bid for "Cold Bituminous Pavement" will be full compensation for all labor, equipment, and materials (including bitumen) necessary to complete the work as specified. Subsequent removal of this material (where required) will not be paid for separately but shall be included in the price bid for "Cold Bituminous Pavement."

704 P02 MAINTAINING PEDESTRIAN TRAFFIC: The contractor will be required to maintain pedestrian traffic during construction of this project. Special care and procedures will be required to ensure the safety of the individuals in the underpass area. This will require the use of specially constructed and totally enclosed walkways and/or utilizing flagpersons as "guides" to safely direct the pedestrians through the construction zone. The methods used to ensure the safe passage of the pedestrians shall be approved by the engineer. The pedestrian walkway shall be lighted with an average illuminance intensity of 0.3 foot candles and a 6:1 uniformity. This lighting shall be maintained by the contractor. The cost of this work (with the exception of the flagperson) will not be paid for but shall be included in the price bid for other items.

704 TRAFFIC CONTROL:
P03

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 conversant with the contents and intentions contained within the MUTCD and the NDSHD Specifications.

c. Have previous experience working with maintenance and protection of traffic.

d. Be competent to supervise personnel with lessor training 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.

704 The following traffic control devices are in place and shall be
P04 removed:

Sta. 12+30 Lt. on 1806 - 48"x48" steel posts
Sta. 10+00 Lt. on 1806 - 48"x48" wood pole
Sta. 7+30 Lt. on 1806 - 36"x36" trestle mounted
Sta. 8+60 Rt. on 1806 - 36"x36" trestle mounted
Sta. 5+00 Rt. on 1806 - 48"x48" 20' wood pole and span wire cable
Sta. 32+00 Lt. on 1806 - 48"x60" steel posts
Sta. 4+80 Rt. on 1806 - 48"x48" steel posts
Sta. 66+30 Lt. on Main St. - 48"x60" steel posts
Sta. 62+90 Rt. on Main St. - 48"x60" steel posts
Attenuation Devices - 6 6 set of 3

The contractor shall remove these traffic control devices at such time when the underpass is closed permanently. The cost of removing these devices shall be considered incidental to the cost of traffic control signs. The devices shall become the property of the state and shall be stockpiled on the right of way at a location designated by the engineer.

708 SEEDING: The following seed mixture will be used on this project
020 where seeding is called for:

Grass Species	Variety	Pounds Pure Live Seed Per Acre
Class V		
Crested Wheatgrass	Fairway	10
Brome Grass		8
Slender Wheatgrass	Revenue or Primar	2
		20

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

714 DRAINAGE: If the existing drainage facilities become inoperable
040 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 INLETS: The inlet castings for inlets, No. 25 and No. 28 (Sta.
P01 7+23.5 Rt. and Lt.), shall be as shown on Standard D-722-2 for Inlet, Type II - Double. Grates with diagonal slot openings (Neenah No. R-3067 or equal) shall be used in lieu of the vane grates shown in the standard. The castings shall be installed on the openings formed in the seal slab (see structural drawings for details). These grates shall be paid for at the unit price bid for "Inlet, Double Casting."

The curb castings to be installed on Main Street at Sta. 59+93 Lt. and 60+43 Lt. shall be as shown on Standard D-722-1. The price bid for "Inlet, Curb Casting" shall be payment in full for removing the existing casting and the installation and adjustment to grade of the new casting.

722 STORM DRAINS: At locations shown on the plans, new sewer is to
P02 be installed into existing manhole and new inlets or manhole will be installed over existing sewers. The cost of cutting into the inlets or manholes, removing and replacing sewer lines, grouting, and other work required to complete these installations shall be included in the price bid for other items.

GENERAL NOTES

724 P01 WATER SERVICE LINE: The following material shall be used for the installation of the one-inch copper water service line on Main Street at Sta. 65+52.

Copper Water Pipe: The one-inch copper water pipe shall conform to A.S.T.M. B88, Type K.

Corporation Stop with Bend: The corporation stop with bend shall be Mueller No.H-15020.

Curb Stop. Curb stop shall be Mueller No. H-15164 for copper water pipe or equal.

Curb Box: Curb box shall be Mueller No. H-10304 (two-inch diameter) for one-inch copper water pipe or equal. The length of the curb box extended shall be eight (8) feet.

There is an existing water service line located at approximately Sta. 64+78. The contractor will be required to shut off the water supply for this line utilizing the corporation stop at the existing water main. The contractor will also be responsible for tapping the existing water main as required for the installation of the new service line. This tap shall be done in accordance with the city of Mandan specifications. The cost of closing the existing corporation stop and for tapping the water main shall be included in the unit price bid for "Water Service Line - One-Inch Copper." Questions pertaining to the city of Mandan specifications should be directed to the City Engineer. The address is 205 2nd Avenue, N.W. 58554. The telephone number is (701)667-3225.

In order to maintain the required depth, the new water service line will have to be installed under the new 60-inch storm sewer line and possibly under the existing 24-inch sanitary sewer depending on the depth of this existing sewer line.

724 P02 PIPE, DUCTILE IRON: The ductile iron cast iron pipe shall be manufactured in accordance with the American National Standards Institute (A.N.S.I.) Specification A21.51. The 12-inch, 15-inch, and 18-inch pipe shall be Class 50. The 30-inch pipe shall be Class 52. The pipe shall be coated and lined in accordance with A.N.S.I. A21.4. Pipe joints shall be the mechanical or slip-on type gasket joint. The ductile iron pipe shall be installed with a polyethylene encasement conforming to A.N.S.I. A21.5, using Method A for installation.

744 P02 INSULATION BOARD: The polystyrene insulation board shall be installed in a minimum of two layers for a total thickness of 3 inches. See the typical sections, plan and profile sheets, and the seal slab details for locations and dimensions of insulation board to be installed under the concrete and behind the retaining walls.

750 P01 CONCRETE DRIVEWAYS - HIGH EARLY STRENGTH: 330 S.Y. has been added to the quantities for concrete driveways on the FG portion of the project and shall be used for paving the portion of the parking lot east of Ski's Liquor (7" depth) at Station 63+00 Lt. and ahead and other locations where the new driveway or sidewalk abuts existing concrete. The exact locations shall be determined by the engineer in the field.

750 P02 CURB RAMPS: The location for the curb ramps shown on the plan and profile sheets is advisory only. The exact location and type of ramp shall be determined by the engineer in the field after consultation with the Mandan City Engineer and changes made accordingly.

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. US 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.

754 030 IN-PLACE SIGNS: The district shall inspect the in-place signs and supports for condition to determine if there are any additional signs or supports that can be reset or changed to new sign and supports. The district shall inform the contractor of any changes prior to the time the contractor orders materials.

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.

754 P01 SIGN PLACEMENT: The permanent signs shall be placed at the back of the sidewalks or near the right of way so the sidewalks are kept as clear for pedestrian traffic as possible.

GENERAL NOTES

930 DEWATERING: The contractor will be responsible for all the
P01 details in connection with dewatering the site to allow the construction of the seal slab, manholes, storm sewer, etc., in a dry condition. The water shall be a minimum of two feet below the bottom of the 4" base slab.

The Materials and Research Division of the North Dakota State Highway Department has gathered some information pertaining to the existing subsurface conditions. The information they have may be obtained from them or examined in their offices at 300 Airport Road, Bismarck, North Dakota 58502. The telephone number is 701-224-2535.

The lump sum contract price bid for "Dewatering" shall include full compensation for any and all costs, including but not limited to the costs for design of the dewatering system and the costs for furnishing all equipment, tools, labor, materials, and incidentals to satisfactorily dewater the work site. Partial payments for "Dewatering" will be based on the following:

(% of Seal Slab Class YE-1 concrete installed) multiplied by (lump sum bid for Dewatering) = Total payment to date.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO
8	N.D.	F-FG-1-806(015)069	9

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG PORTION	F PORTION	TOTAL
103	0100	Contract Bond	L. Sum	1		1
107	0100	Railway Protection Insurance	L. Sum	1		1
201	0370	Removal of Trees - 10 Inches	Ea.		11	11
201	0380	Removal of Trees - 18 Inches	Ea.		6	6
201	0386	Removal of Trees - 24 Inches	Ea.		2	2
201	0390	Removal of Trees - 30 Inches	Ea.		23	23
202	0105	Removal of Structure	L. Sum	1		1
202	0112	Removal of Concrete	Sq. Yd.	4,019	1,133	5,152
202	0114	Removal of Concrete Pavement	Sq. Yd.	8,573		8,573
202	0130	Removal of Curb and Gutter	L. Ft.	1,989	1,047	3,036
202	0170	Removal of Culverts - All Types and Sizes	L. Ft.	340		340
202	0210	Removal of Manholes	Ea.	3		3
202	0230	Removal of Inlets	Ea.	12	2	14
202	0277	Removal of Lift Station	L. Sum	1		1
203	0100	Unclassified Excavation	Cu. Yd.	23,860		23,860
203	0101	Common Excavation - Type A	Cu. Yd.	23,701	13,804	37,505
210	0100	Class I Excavation	Cu. Yd.	430		430
210	0110	Class 2 Excavation	Cu. Yd.	20		20
210	0200	Select Backfill	Cu. Yd.	900		900
210	0201	Foundation Preparation	Ea.	1		1
216	0100	Water	M. Gal.	320	260	580
302	0120	Aggregate Base Course Cl. 5	Ton	12,564	9,480	22,044
401	0152	SS-1h or CSS-1h Emulsified Asphalt	Gal.	180	110	290
402	0110	Cold Bituminous Pavement	Ton	100	100	200
406	0170	Hot Bituminous Pavement - Cl. 25	Ton	654	373	1,027
406	0310	85-100 Asphalt Cement	Ton	43	24	67

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	10

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG PORTION	F PORTION	TOTAL
550	0112	8 In. Non-reinforced Concrete Pavement - Cl. AE	Sq. Yd.	9,242	9,311	18,553
550	0174	8 In. Non-reinforced Concrete Pavement - High Early Strength	Sq. Yd.	1,000	1,200	2,200
550	0230	Doweled Expansion Joint Assembly	L. Ft.	480	288	768
550	0240	Doweled Contraction Joint Assembly	L. Ft.	1,330	864	2,194
550	0420	Standard Anchorage Unit - J Bolts	Ea.	34		34
550	0809	Preformed Compression Joint Seal 9/16 In.	L. Ft.	7,483	6,987	14,470
550	0958	Longitudinal Joint Silicone Seal	L. Ft.	1,224	1,860	3,084
550	0959	Contraction Joint Silicone Seal	L. Ft.	432		432
550	0961	Expansion Joint Silicone Seal	L. Ft.	480	288	768
602	0130	Class AAE-3 Concrete	Cu. Yd.	32		32
602	1120	Superstructure Concrete	Cu. Yd.	147		147
602	1123	Seal Slab Class YE-1 Concrete	Cu. Yd.	3,026		3,026
602	1124	Seal Slab Class AE-3 Concrete	Cu. Yd.	1,724		1,724
602	1129	Class AE-3 Modified Concrete	Cu. Yd.	1,898		1,898
602	1130	Class AE-3 Concrete	Cu. Yd.	571		571
604	9915	Prestressed I-Beam - 54 In.	L. Ft.	1,792		1,792
612	0115	Reinforcing Steel - Grade 60	Lb.	296,392		296,392
612	0116	Reinforcing Steel - Grade 60 (Epoxy Coated)	Lb.	2,403		2,403
612	0125	Seal Slab Reinforcing Steel - Grade 60	Lbs.	58,521		58,521
612	0130	Seal Slab Reinforcing Steel - Grade 60 (Epoxy Coated)	Lb.	21,534		21,534
616	0362	Structural Steel M183	Lb.	4,520		4,520
622	0016	Steel H-Pile Tips 14x73	Ea.	204		204

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	11

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG PORTION	F PORTION	TOTAL
622	0060	Steel Piling HP 14x73	L. Ft.	17,176		17,176
622	1900	Steel Test Piling HP 14x73	L. Ft.	180		180
624	0123	Pedestrian Railing	L. Ft.	1,206		1,206
626	0100	Cofferdam	Ea.	2		2
702	0100	Mobilization	L. Sum	1		1
704	0100	Flagging	M. Hr.	1,000	300	1,300
704	0105	Obliteration of Pavement Marking	L. Ft.	1,040		1,040
704	1000	Traffic Control Signs	Unit	2,828		2,828
704	1051	Type II Barricade	Ea.	64		64
704	1052	Type III Barricade	Ea.	25		25
704	1060	Delineator Drums	Ea.	165		165
704	1067	Tubular Markers	Ea.	45		45
704	1086	Sequencing Arrow Panel - Type B	Ea.	4		4
706	0300	Field Laboratory - Type C	Ea.	1		1
708	2280	Seeding - Type B Class V	Acre		1	1
708	4000	Sodding	Sq. Yd.	8,313	4,302	12,615
714	0115	Pipe, Concrete Reinforced 12 In. - Cl. III - Storm Sewer	L. Ft.	312	32	344
714	0210	Pipe, Concrete Reinforced 15 In. - Cl. III - Storm Drain	L. Ft.	213	198	411
714	0405	Pipe, Concrete Reinforced 21 In. - Cl. III - Storm Drain	L. Ft.		841	841
714	1002	Pipe, Concrete Reinforced 42 In. - Cl. II - Storm Drain	L. Ft.		70	70
714	1312	Pipe, Concrete Reinforced 60 In. - Cl. III - Storm Drain	L. Ft.	233		233

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

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG PORTION	F PORTION	TOTAL
714	2182	Pipe, Concrete Reinforced Arch 88In.x54In. Cl. III - Storm Drain	L. Ft.	94		94
714	3005	End Section, Concrete Reinforced 15 In.	Ea.		1	1
714	3040	End Section, Concrete Reinforced 42 In.	Ea.		2	2
714	9730	Underdrain, Pipe PVC Perforated - 6 In.	L. Ft.	1,626		1,626
714	9771	Underdrain, Pipe PVC Non-perforated - 6 In.	L. Ft.	42		42
722	0100	Manhole - 48 In.	Ea.	1	1	2
722	0110	Manhole - 60 In.	Ea.		3	3
722	0130	Manhole - 84 In.	Ea.		1	1
722	0200	Manhole - 108 In.	Ea.	2		2
722	1100	Manhole Riser - 48 In.	L. Ft.	4	8	12
722	1110	Manhole Riser - 60 In.	L. Ft.		18	18
722	1130	Manhole Riser - 84 In.	L. Ft.		8	8
722	1200	Manhole Riser - 108 In.	L. Ft.	15		15
722	2000	Manhole Poured	Ea.	2		2
722	2020	Manhole, Poured, Type A	Ea.	2		2
722	2030	Manhole, Poured, Type B	Ea.	1		1
722	4100	Inlet	Ea.	2	4	6
722	4110	Inlet, Double	Ea.		4	4
722	4500	Inlet, Vaned Grates - Type I	Ea.	7		7
722	4520	Inlet, Vaned Grates - Type II	Ea.	1	1	2
722	4700	Inlet, Curb Casting	Ea.	2		2
722	4750	Inlet, Double Casting	Ea.	2		2
722	6200	Adjust Manhole	Ea.	6	9	15
722	6240	Adjust Utility Appurtenance	Ea.	15	6	21

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

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG-PORTION	F-PORTION	FG-PORTION 100% CITY	GRAND TOTAL
724	0420	Hydrant, Relocate	Ea.	2			2
724	0610	Water Service Line - 1 In. Copper	L. Ft.	64			64
724	1144	Pipe, Ductile Iron - 12 In.	L. Ft.	65			65
724	1150	Pipe, Ductile Iron - 16 In.	L. Ft.	198			198
724	1155	Pipe, Ductile Iron - 18 In.	L. Ft.	70			70
724	1160	Pipe, Ductile Iron - 30 In.	L. Ft.	93			93
740	0122	Three Ply Fabric Waterproofing	Sq. Yd.	50			50
740	0140	Butyl Rubber Membrane Waterproofing	Sq. Ft.	7,507			7,507
740	0160	Waterproofing Membrane	Sq. Yd.	3,743			3,743
740	0162	Waterstops - 6 In.	L. Ft.	825			825
740	0163	Waterstops - 9 In.	L. Ft.	140			140
744	0100	Polystyrene Insulation Board	Bd. Ft.	78,576	4,404		82,980
748	0140	Curb and Gutter, Type I	L. Ft.	4,248	4,214		8,462
748	0500	Curb, Header - Type I	L. Ft.	269			269
750	0100	Sidewalk, Concrete	Sq. Yd.	2,309	2,061		4,370
750	1010	Driveway, Concrete - High Early Strength	Sq. Yd.	693	363		1,056
752	0600	Fence, Chain Link	L. Ft.	108			108
752	0910	Safety Fence	L. Ft.	1,000			1,000
752	3100	Corner Assembly, Chain Link	Ea.	4			4
754	0116	Flat Sheet for Signs - Type 2 Reflective Sheeting	Sq. Ft.	77	92		169
754	0117	Flat Sheet for Signs - Type 3A or 3B Reflective Sheeting	Sq. Ft.	14	37		51
754	0209	Steel Galvanized Posts - Square Tube Perforated	Lb.	1,562	1,446		3,008
754	0592	Reset Sign Panel	Ea.	35	13		48

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO
8	N.D.	F-FG-1-806(015)069	14

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG-PORTION	F-PORTION	FG-PORTION 100% CITY	GRAND TOTAL
754	0593	Reset Sign Support	Ea.	10	7		17
762	0102	Pavement Marking Painted Line	L. Ft.	3,400	4,400		7,800
762	0103	Pavement Marking - Painted Message	Sq. Ft.		74		74
762	0128	Plastic Pavement Marking Film Message	Sq. Ft.	296			296
762	0129	Plastic Pavement Marking Film Line	Sq. Ft.	2,902			2,902
762	0131	Temporary Stripe - Solid Line, Type R	L. Ft.	5,075			5,075
762	0132	Temporary Stripe - Solid Line, Type NR	L. Ft.	2,550			2,550
770	0020	Concrete Foundation - Highway Lighting	Ea.	11	13		24
770	0100	Pull Box	Ea.	1			1
770	0210	Cable Trench - Type I	L. Ft.	847	2,596		3,443
770	0330	2 In. Diameter Rigid Conduit	L. Ft.	2,630	2,692		5,322
770	0503	Underground Conductor No. 2 - Type RHW	L. Ft.	1,374			1,374
770	0504	Underground Conductor No. 4 - Type RHW	L. Ft.	5,282	626	1,792	7,700
770	0505	Underground Conductor No. 6 - Type RHW	L. Ft.	2,568	11,030		13,598
770	0604	Underground Conductor No. 4 - Type THW	L. Ft.		313		313
770	0605	Underground Conductor No. 6 - Type THW	L. Ft.	4,163	5,515		9,678
770	1076	Light Standard 6 Ft. M.A. - 40 Ft. M.H.	Ea.	3	10		13
770	1176	Light Standard 10 Ft. M.A. - 40 Ft. M.H.	Ea.	1			1
770	1215	Light Standard 12 Ft. M.A. - 29 Ft. Pole	Ea.	1			1
770	1226	Light Standard 12 Ft. M.A. - 40 Ft. M.H.	Ea.	1	1		2
770	1376	Light Standard 6 Ft. M.A. - 40 Ft. M.H. - Festoon	Ea.	4			4
770	1526	Light Standard 12 Ft. M.A. - 40 Ft. M.H. - Festoon	Ea.	1			1
770	4140	H.P. Sodium Vapor Luminaire - 250 Watt	Ea.	4	11		15

FHWA REGION	STATE	FED. AID PROJ NO.	SHEET NO
8	N.D.	F-FG-1-806(015)069	15

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG-PORTION	F-PORTION	FG-PORTION 100% CITY	GRAND TOTAL
770	4170	H.P. Sodium Vapor Luminaire - 400 Watt	Ea.	10			10
770	4310	Underpass Light Unit - Ceiling Mounted 100 Watt	Ea.	4			4
770	4380	H.P. Sodium Vapor - Wall Mounted Luminaire - 150 Watt	Ea.	2			2
770	4523	Revise Highway Lighting Feed Point	Ea.		1		1
770	4540	Relocate Light Standard	Ea.		2		2
770	4560	Remove Light Standard	Ea.	10			10
770	4570	Remove Street Light Luminaire	Ea.	2			2
770	4575	Remove Light Standard Extension	Ea.	1			1
772	0020	Concrete Foundation - Traffic Signals	Ea.	5			5
772	0055	Concrete Foundation - Feed Point - Type B	Ea.	1			1
772	0100	Pull Box	Ea.	9			9
772	0200	1 In. Diameter Rigid Conduit	L. Ft.	644			644
772	0240	2 In. Diameter Rigid Conduit	L. Ft.	351			351
772	0260	2.5 In. Diameter Rigid Conduit	L. Ft.	50			50
772	0270	3 In. Diameter Rigid Conduit	L. Ft.	112			112
772	0280	3.5 In. Diameter Rigid Conduit	L. Ft.	248			248
772	0300	Underground Conductor No. 6 - Type RHW	L. Ft.	425			425
772	0310	Underground Conductor No. 6 - Type THW	L. Ft.	34			34
772	0325	Detector Loop - Polyethylene Conduit Pre-wired	L. Ft.	118			118
772	0330	Loop Lead-in Conductor	L. Ft.	2,569			2,569
772	0350	Preformed Loop Detector	Ea.	22			22
772	0400	No. 12 AWG 2 Conductor Cable	L. Ft.	1,809			1,809
772	0401	No. 12 AWG 3 Conductor Cable	L. Ft.	144			144

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	16

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG-PORTION	F-PORTION	FG-PORTION 100% CITY	GRAND TOTAL
772	0403	No. 12 AWG 5 Conductor Cable	L. Ft.	408			408
772	0405	No. 12 AWG 7 Conductor Cable	L. Ft.	640			640
772	0408	No. 12 AWG 10 Conductor Cable	L. Ft.	883			883
772	0490	Saw Slot	L. Ft.	34			34
772	0551	Feed Point - Combo. Lighting and Signal Pad Mount	Ea.	1			1
772	0812	Combo 11 Ft. M.A. Signal and Light Standard - Type C	Ea.	1			1
772	1012	Combo 31 Ft. M.A. Signal and Light Standard - Type C	Ea.	1			1
772	1812	1-Way 3 Sec. Head W/12 In. Lenses - Mast Arm Mounted	Ea.	1			1
772	1850	1-Way 3 Sec. Prog Head W/12 In. Lenses - Post Mounted	Ea.	1			1
772	1852	1-Way 3 Sec. Prog Head W/12 In. Lenses - Mast Arm Mounted	Ea.	1			1
772	2000	1-Way, 2 Sec. Hd. Pedestrian Signal - Post Mounted	Ea.	4			4
772	2200	Pedestrian Push Button Post	Ea.	1			1
772	2505	Volume Density Controller W/Ped. Timing	Ea.	1			1
772	2800	Interim Traffic Signals	Ea.	1			1
772	3020	Relocate Post Mounted Vehicular Head	Ea.	4			4
772	3021	Relocate Mast Arm Signal Head	Ea.	4			4
772	3030	Relocate Programmed Signal Head	Ea.	1			1
772	3040	Relocate Post Mounted Pedestrian Head	Ea.	8			8
772	3051	Relocate Signal Standard	Ea.	2			2
772	3100	Remove Combination Signal and Light Standards	Ea.	2			2

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	17

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	FG-PORTION	F-PORTION	FG-PORTION 100% CITY	GRAND TOTAL
772	3120	Remove Traffic Signal Controller	Ea.	1			1
772	3160	Remove Concrete Pull Box	Ea.	7			7
920	0100	Pumping Equipment	L. Sum	1			1
920	0200	Pump House	L. Sum	1			1
930	0200	Dewatering	L. Sum	1			1
930	0400	Flood Wall	L. Sum	1			1
930	8600	Elastomeric Bearing Pad	Sq. Ft.	92			92
930	9535	Deck Drainage System	L. Sum	1			1
930	9930	Anti-Graffiti Coating	Sq. Ft.	7,975			7,975
950	0100	Trainee	M. Hr.	3,000	1,000		4,000

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	18

BASIS OF ESTIMATE (SURFACING)

Description	Unit	Quantity/S.Y./In.
Hot Bituminous Pavement - Cl. 25 @ 2.0 Ton/C.Y.	Ton	0.05556
85-100 Asphalt Cement @ 6.5% of Hot Bituminous Pavement	Ton	0.03611
Aggregate Base Course - Cl. 5 @ 1.5 Ton/C.Y. + 25%	Ton	0.05208
Water for Aggregate Base @ 20 Gal./Ton of Aggr. Base	M. Gal.	0.00104
SS-1h or CSS-1h Emulsified Asph. for Tack Coat @ 0.05 Gal./S.Y.	Gal.	0.05/S.Y.

BASIS OF ESTIMATE (GRADING)

WATER: 10 Gals./C.Y. 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.

TOPSOIL: Topsoil (where presently existing) shall be removed and replaced for a minimum depth of 4 inches. Removal of topsoil has been included in the quantities and shall be paid for at the unit price bid for "Common Excavation - Type A."

SODDING: The entire area behind the curb and gutter or sidewalk (except surfaced areas) shall be sodded. The exact limits shall be determined in the field.

SEEDING: The entire area disturbed by the excavation for the flood water storage at Station 19+65 Lt. and back. See detail sheet for location.

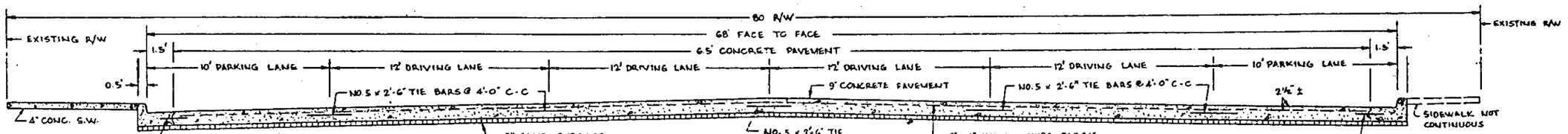
FHWA REGION	STATE	FED. AID PROJ NO.	SHEET NO.
8	N.D.	F-1-806(015)069 FG-1-806(015)069	12

LIST OF STANDARD DRAWINGS

REVISION DATE	STANDARD NO.	
	D-622-1	Pile Splice Details
	D-706-1	Type C Field Laboratory
7-17-87	D-714-1	Reinforced Concrete Pipe Culverts and End Sections
11-1-86	D-714-2	Reinforced Concrete Pipe Arch Culverts and End Sections
	D-722-1	Inlet Details
8-3-87	D-722-2	Inlet Details
8-3-87	D-722-5	Manhole Details
	D-724-1	Water Works
12-11-86	D-752-2	Chain Link Fence
	D-754-1	Construction Sign Details
8-3-87	D-754-2	Construction Sign Details
	D-754-3	Construction Sign Details
	D-754-4	Construction Sign Details
**10-1-87	D-754-5A	Barricade Details
	**	Include as plan sheet in all plans.
8-3-87	D-754-10	Construction Sign and Barricade Location Details
	D-754-23	Assembly Details
8-3-87	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, Warning, and Guide Signs
	D-754-28	Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs
	D-754-29	Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs
	D-754-39	Sign Punching, Stringer, and Support Location Details for Regulatory, Warning, and Guide Signs
	D-754-49	Sign Punching, Stringer, and Support Location Details for Variable Length Signs
	D-754-51	Sign Punching, Stringer, and Support Location Details
	D-754-76	Street Name Sign Assembly Details
	D-754-80	Light Standard, Signal Standard, and Span Wire Mounted Sign Assembly Detail
	D-762-1	Pavement Marking Message Details
	D-762-3	Striping for Flared Intersections
	D-762-4	Pavement Marking
	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
8-3-87	D-772-5	Loop Detector Details
8-3-87	D-772-6	Interim Traffic Signals

FHWA REGION	STATE	FED AID PROJ NO.	SHEET NO
8	N.D.	F-FG-1-806(015)069	20

EXISTING TYPICAL SECTIONS

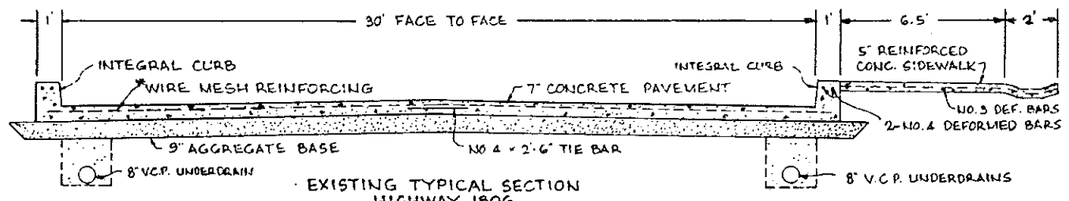


NOTE: THE EXISTING TRANSVERSE JOINTS ARE DOWELED WITH 1¼" x 18" SMOOTH DOWELS SPACED 1'-0" C-C.

EXISTING TYPICAL SECTION
MAIN STREET
59 + 00 TO 67 + 50

NOTE. SEE PLAN & PROFILE SHEETS FOR TRANSITION IN WIDTH FROM APPROX. STA. 82+00 TO STA. 86+26.

SEE TYPICAL SECTION ON PLAN & PROFILE SHEET (@ STA. 84) FOR REMOVAL & REPLACEMENT OF THE EXISTING MEDIAN FROM STA. 83+32± TO 87+36±.



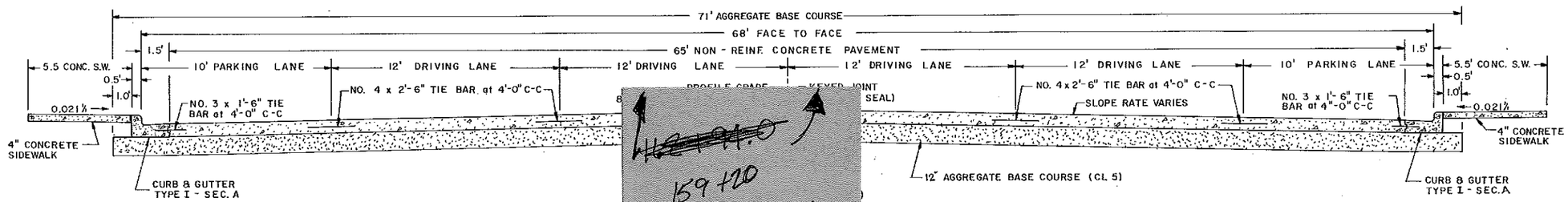
* ADDITIONAL NO.5 REINF. BARS IN PAVEMENT THROUGH THE UNDERPASS.

EXISTING TYPICAL SECTION
HIGHWAY 1806
MAIN STREET TO STA. 11 + 19.4

NOTE: BITUMINOUS SURFACING WITH GRAVEL BASE IN PLACE FROM STA. 11 + 18.4 TO THE END OF THE PROJECT. (SEE NOTE 200 - P05)

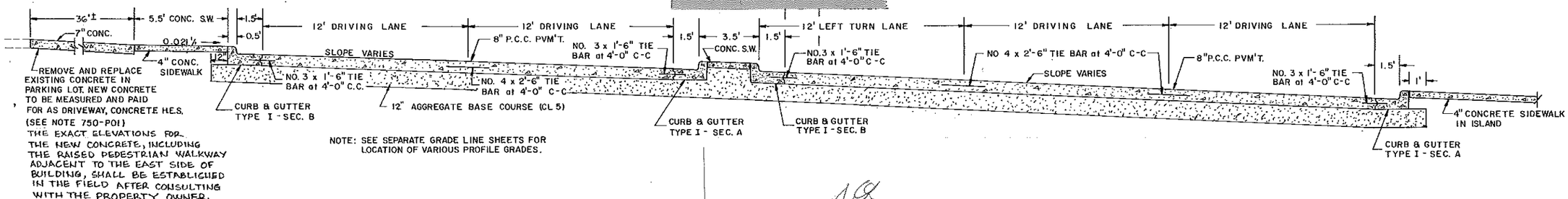
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	21

TYPICAL SECTIONS



159+20

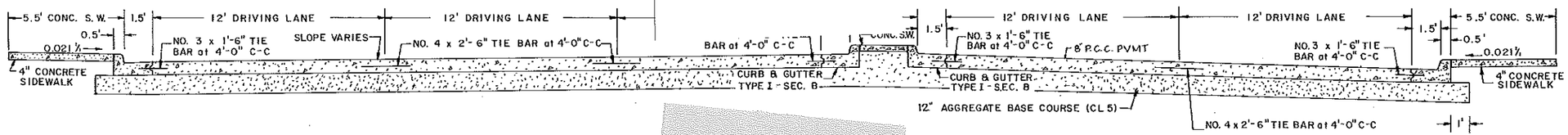
162+94



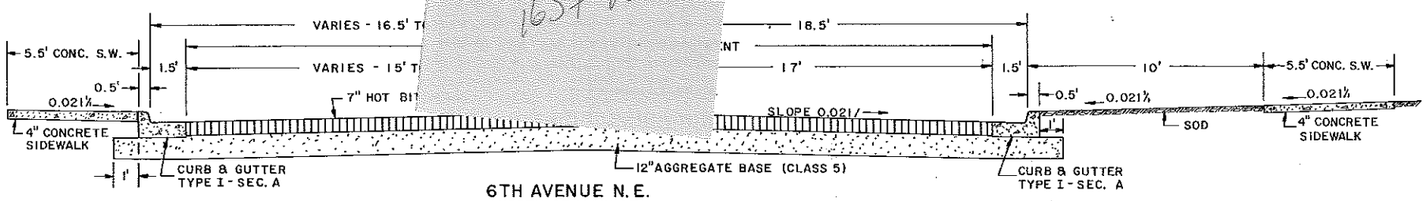
NOTE: SEE SEPARATE GRADE LINE SHEETS FOR LOCATION OF VARIOUS PROFILE GRADES.

THE EXACT ELEVATIONS FOR THE NEW CONCRETE, INCLUDING THE RAISED PEDESTRIAN WALKWAY ADJACENT TO THE EAST SIDE OF BUILDING, SHALL BE ESTABLISHED IN THE FIELD AFTER CONSULTING WITH THE PROPERTY OWNER. IF POOR SOIL CONDITIONS ARE ENCOUNTERED, THE SUBGRADE SHALL BE SUBCUT AND CLASS 5 AGGREGATE BASE INSTALLED UNDER THE CONCRETE.

163+48



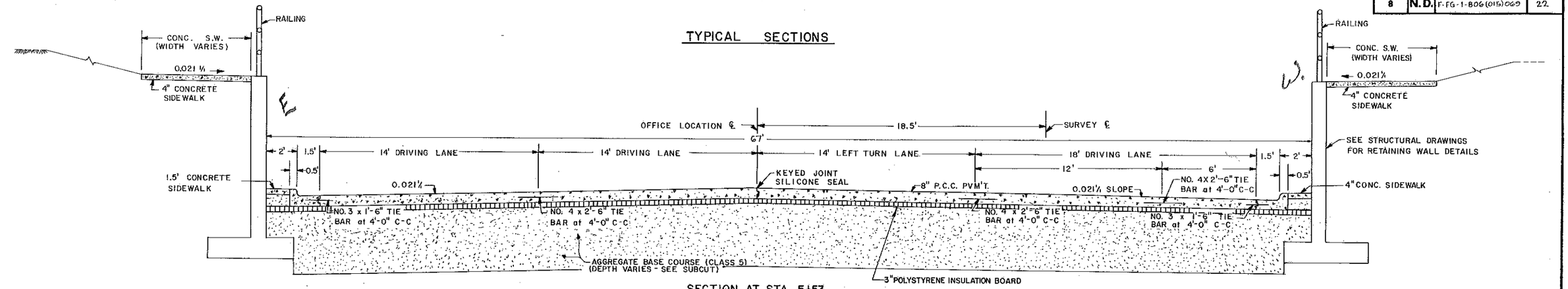
165+70



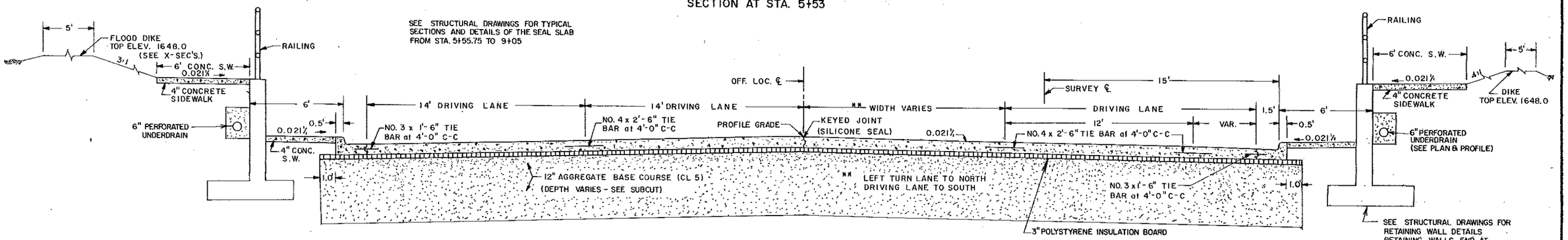
6TH AVENUE N.E.
(NORTH OF MAIN ST.)
STA. 1+92± TO 3+29.1

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	22

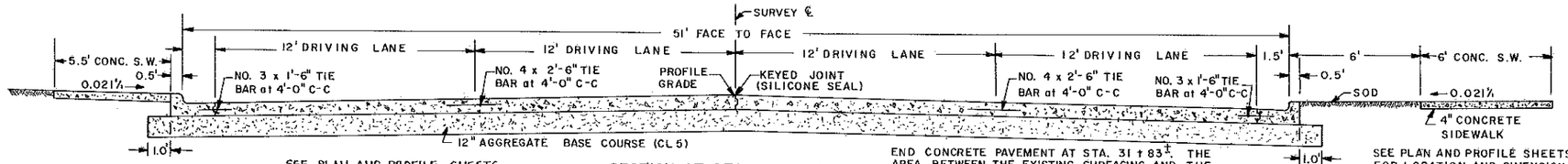
TYPICAL SECTIONS



SECTION AT STA. 5+53



SECTION AT STA. 9+08



SEE PLAN AND PROFILE SHEETS FOR SPECIAL SUBCUT FROM STA. 16+00 TO 20+15.

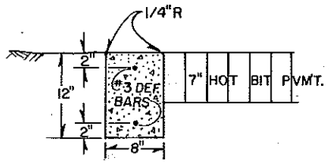
SECTION AT STA. 14+38 AHD.

END CONCRETE PAVEMENT AT STA. 31+83 ±. THE AREA BETWEEN THE EXISTING SURFACING AND THE NEW CURB AND GUTTER FROM STA. 31+83 RT. AND AHEAD SHALL BE SURFACED WITH 8" OF HOT BITUMINOUS PAVEMENT. EXCAVATE BETWEEN THE EXISTING SURFACING AND THE NEW CURB AND GUTTER AS REQUIRED FOR PLACEMENT OF THE HOT BITUMINOUS PAVEMENT.

SEE PLAN AND PROFILE SHEETS FOR LOCATION AND DIMENSION OF THE SIDEWALK.

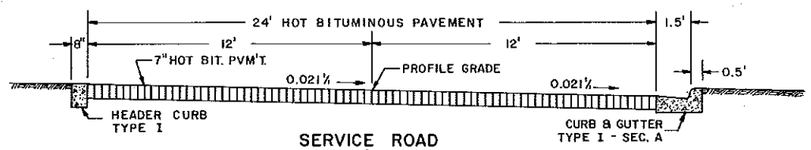
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	23

TYPICAL SECTIONS



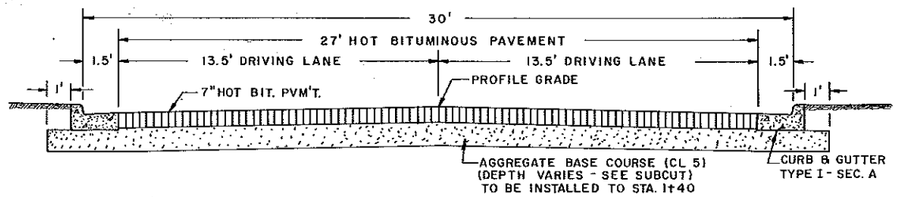
HEADER CURB, TYPE-I

NOTE: REINFORCING STEEL, NOT A PAY ITEM BUT, SHALL BE INCLUDED IN PRICE BID FOR "HEADER CURB, TYPE-I."



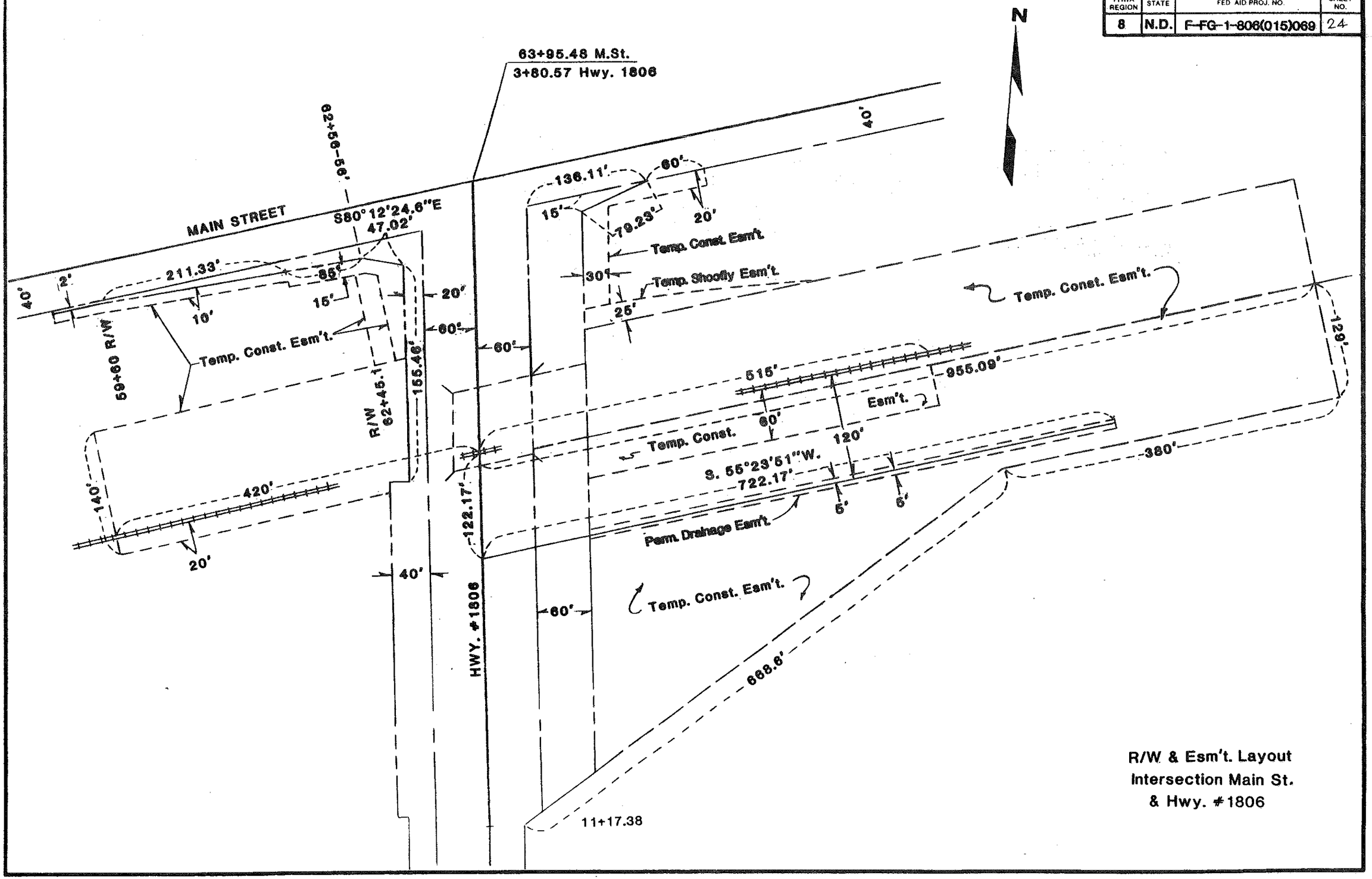
SERVICE ROAD
10+28.9 - 106.6' LT. (MAINLINE STA.) =
0+00 TO STA. 2+51.02

NOTE: FRONTIER STREET TO BE SURFACED WITH 7" OF HOT BITUMINOUS PAVEMENT FROM 56.2' LT. TO 129.7' LT.



1ST STREET S.E.
0+51.43 TO 2+60.11

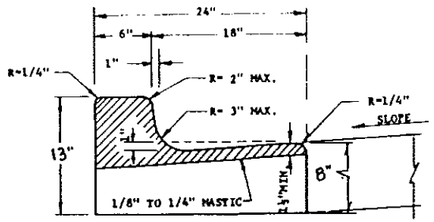
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	24



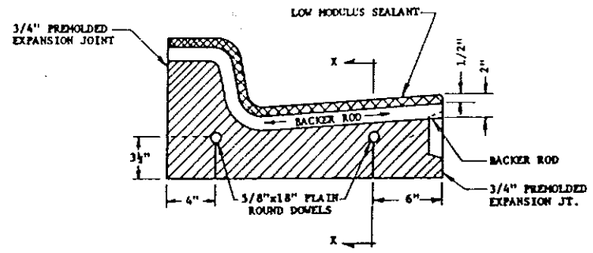
R/W & Esm't. Layout
Intersection Main St.
& Hwy. #1806

CURB & GUTTER

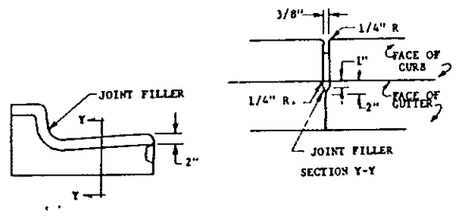
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	25



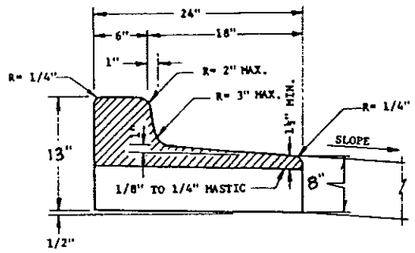
CURB & GUTTER TYPE I (SEC. A)



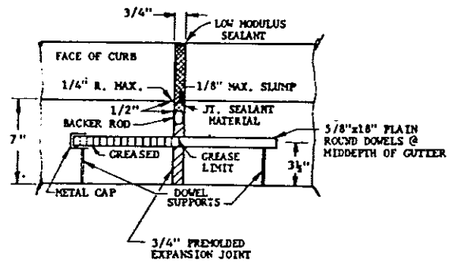
EXPANSION JOINT DETAIL



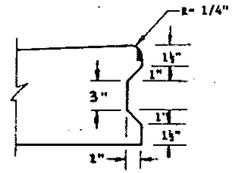
SCORED CONTRACTION JOINT DETAIL



CURB & GUTTER TYPE I (SEC. B)



SECTION X-X

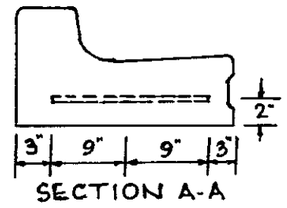


KEYWAY DETAIL FOR CURB & GUTTER
(TO BE USED WITH P.C.C. PAVEMENT AND DRIVES.)

NOTE: EXPANSION JOINTS TO BE PLACED AT SAME LOCATION AS EXPANSION JOINTS IN THE P.C.C. PAVEMENT. (SEE PAVEMENT LAYOUT DETAILS)

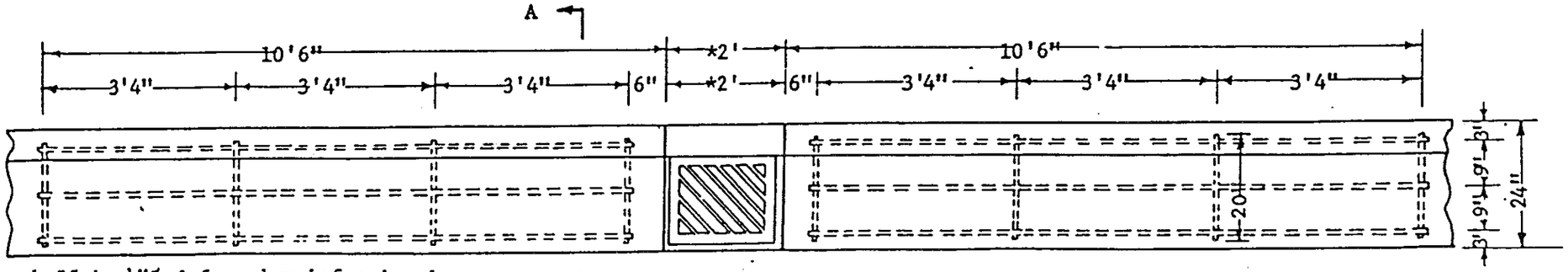
NOTES:

1. CURB AND GUTTER TYPE I (SEC. A) TO BE USED UNLESS OTHERWISE SPECIFIED.
2. CONTRACTION JOINTS: USE 1/8"-1/4" ASPHALTIC MASTIC BOARD EMBEDDED 1½" INTO THE GUTTER AND THROUGH THE CURB, OR SCORE THE CURB AND GUTTER 2" AS SHOWN IN THE DETAIL.
3. EXPANSION JOINTS - EXPANSION JOINT MATERIAL SHALL BE 3/4" PREMOLDED CONFORMING TO SECTION 816.02 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.
4. 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.
5. JOINT SEALING - ALL CONTRACTION AND EXPANSION JOINTS SHALL BE SEALED AS SHOWN IN THE DETAILS, OR AS APPROVED BY THE ENGINEER. THE JOINT SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE WITH THE FOLLOWING MINIMUM PROPERTIES:
   TENSILE STRENGTH AT BREAK (ASTM D-412) 125 psi
   MOVEMENT CAPABILITY ±50% EXPANSION/CONTRACTION
   TT-S-00230C
   THE SEALANT SHALL BE TOOLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
6. THE COST FOR ALL LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO CONSTRUCT CONTRACTION, & EXPANSION JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR CURB AND GUTTER.



SECTION A-A

*4' for Double Inlets



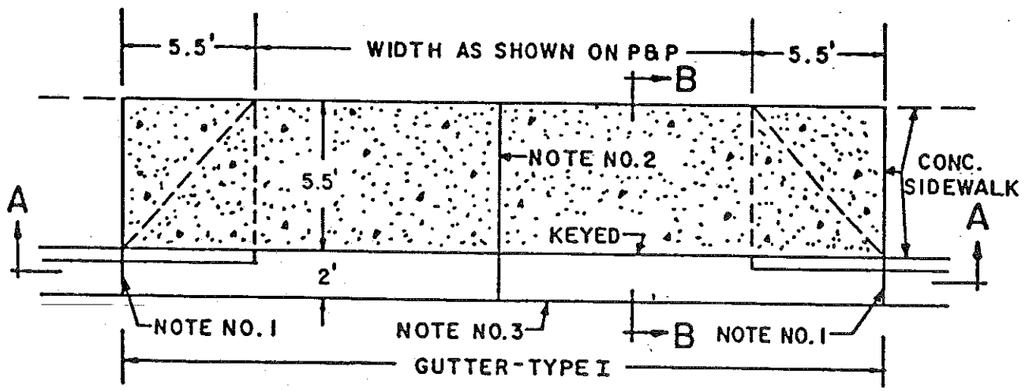
NOTE: All bars shall be ½"Ø deformed reinforcing bars. Splices will not be permitted. Reinforcing bars at inlet locations will not be paid for separately, but shall be included in the price bid for "Curb and Gutter - Type I".

A

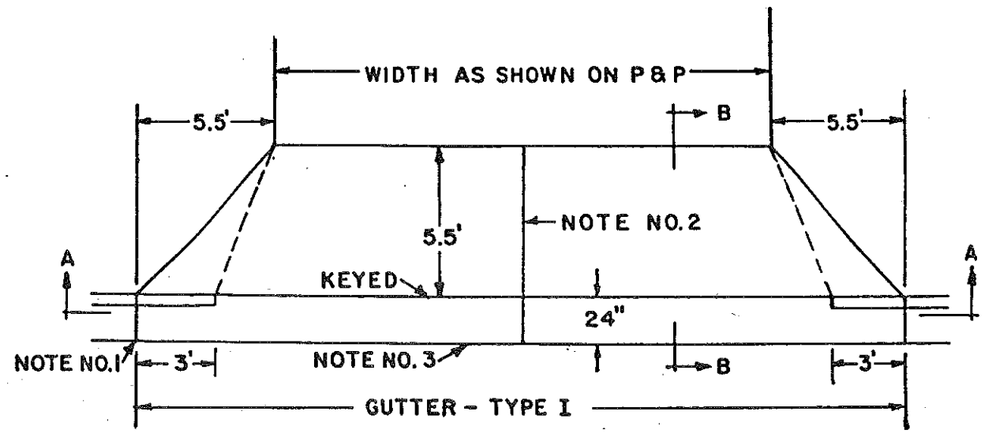
CURB & GUTTER REINFORCING AT INLETS

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N.D.	F-FG-1-806(015)069	26

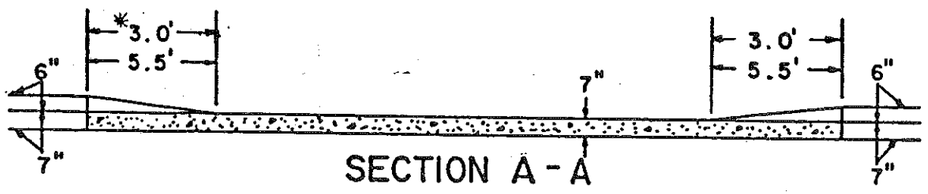
CONCRETE DRIVEWAYS



DRIVEWAY-TYPE II

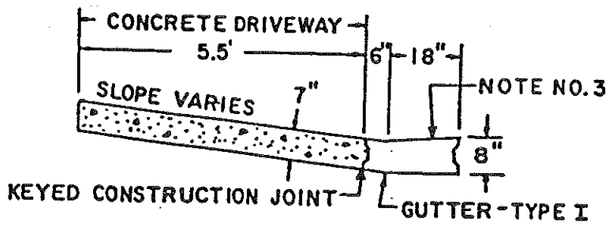


DRIVEWAY-TYPE I

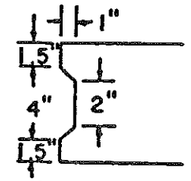


SECTION A-A

* 3.0' FOR TYPE I DRIVEWAY
5.5' FOR TYPE II DRIVEWAY



SECTION B-B



KEYWAY DETAIL

NOTE NO.1 3/4" PREMOLDED EXPANSION JOINT FULL DEPTH AND SAME SHAPE AS CURB AND GUTTER.

NOTE NO.2 CENTER JOINT SHALL BE USED ON ALL DRIVEWAYS 16' IN WIDTH OR GREATER. JOINTS SHALL BE A KEYED CONSTRUCTION JOINT OR A CONTRACTION JOINT SCORED 1/3 THE DEPTH OF THE CONCRETE. JOINT SHALL BE SEALED IN A MANNER AND WITH A MATERIAL APPROVED BY THE ENGINEER.

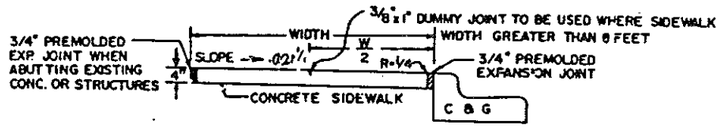
NOTE NO.3 GUTTER-TYPE I SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "CURB AND GUTTER-TYPE I."

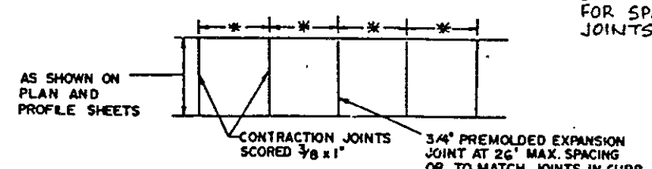
NOTE NO.4 THE CONCRETE DRIVEWAYS SHALL BE CONSTRUCTED WITH HIGH EARLY STRENGTH CONCRETE.

DIVISION	STATE	PROJECT	SHEET NO.
8	N.D.		27

F-FG-1-806(015)069

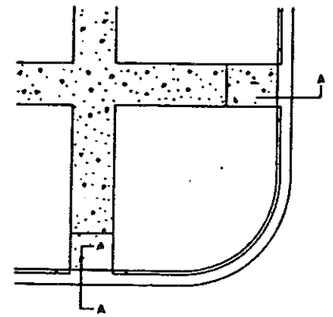
SIDEWALKS AND CURB RAMPS



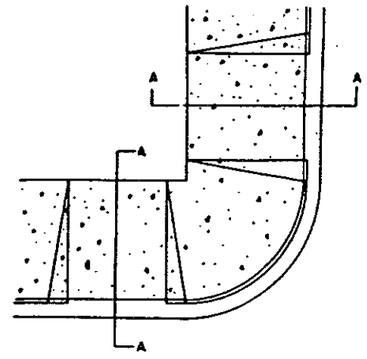


* SEE PAVEMENT LAYOUT DETAILS FOR SPACING OF CONTRACTION JOINTS

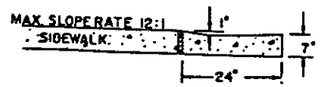
CONCRETE SIDEWALK DETAILS



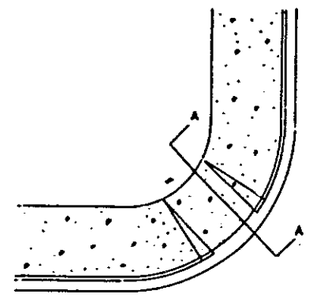
TYPE B



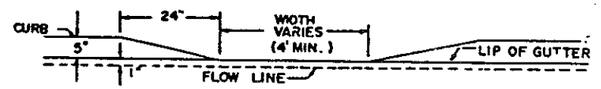
TYPE C



SEC. A-A



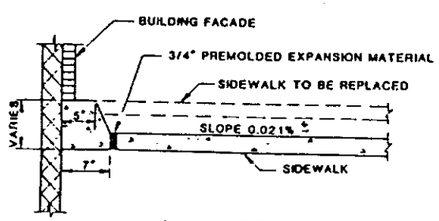
TYPE A



DEPRESSED CURB FOR PEDESTRIAN CROSSING

NOTES:

1. METHOD OF PAYMENT THE CURB RAMP WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE QUANTITIES AND PAID FOR AT THE UNIT PRICE BID FOR CONCRETE SIDEWALK AND CURB AND GUTTER.
2. THE TYPE OF CURB RAMP TO BE USED AT EACH INTERSECTION WILL BE INDICATED ON THE PLANS.
3. THE LOCATION AND TYPE OF RAMPS MAY BE CHANGED BY THE ENGINEER IN THE FIELD TO CONFORM TO EXISTING CONDITIONS.
4. AS SHOWN ON THE PLANS OR AT THE DIRECTION OF THE ENGINEER A CURB SHALL BE CONSTRUCTED WHERE THE EXISTING SIDEWALK ABUTTING A BUILDING IS TO BE LOWERED. THE CURB SHALL BE CONSTRUCTED AS SHOWN IN THE CURB DETAIL.
5. THE CURB (IF USED) SHALL BE MEASURED AND PAID FOR AT THE UNIT PRICE BID FOR "CURB, HEADER - TYPE I".

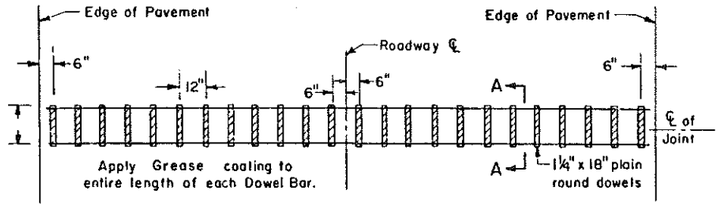


CURB DETAIL

(See Note 4 & 5)

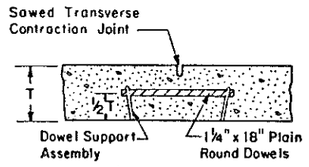
JOINT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	28

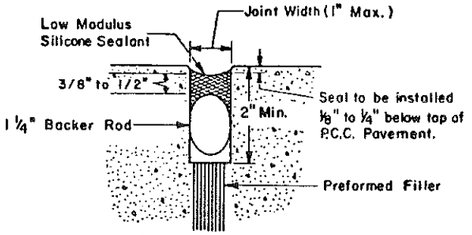


PLAN

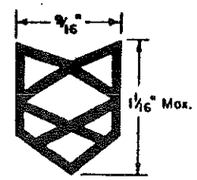
CONTRACTION JOINT DOWEL BAR ASSEMBLY



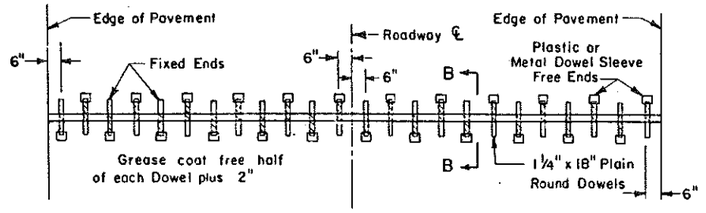
SECTION A-A



INSTALLATION
(EXPANSION JOINT SILICONE SEAL)

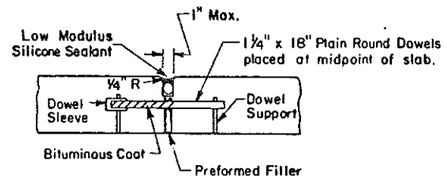


PREFORMED COMPRESSION JOINT SEAL FOR TRANSVERSE CONTRACTION JOINTS

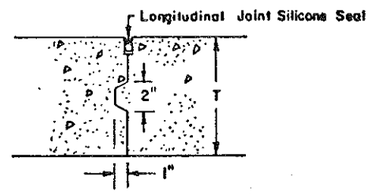


PLAN

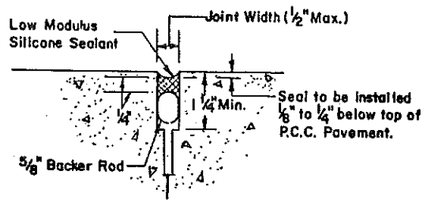
EXPANSION JOINT DOWEL BAR ASSEMBLY



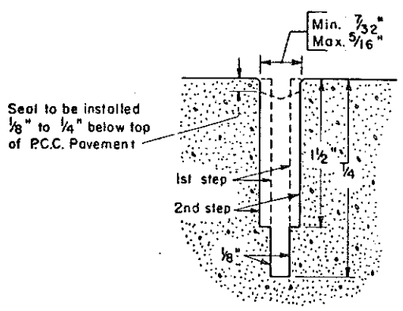
SECTION B-B



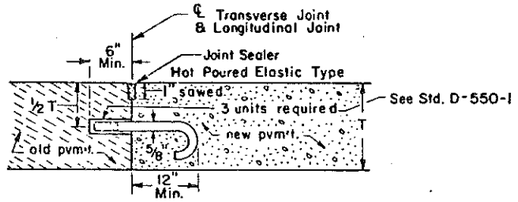
LONGITUDINAL KEYED JOINT



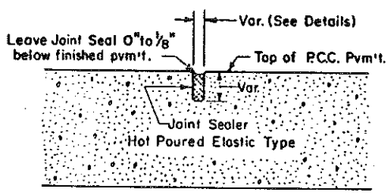
LONGITUDINAL JOINT SILICONE SEAL



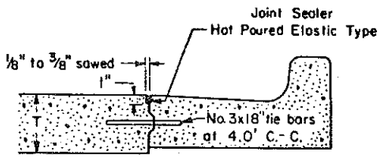
SAWED TRANSVERSE JOINT



J-BOLT INSTALLATION
(MAX. SPACING OF 4.0' C.-C. WHERE NEW CONCRETE ABUTS EXISTING CONC.)

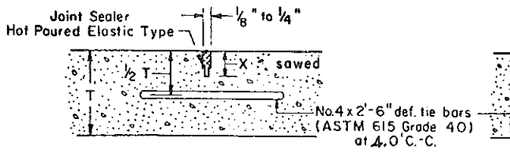


JOINT SEALER DETAIL
(APPLIES TO ALL SAWED JOINTS EXCEPT AS SHOWN)

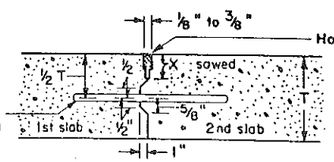


JOINT SEALER AT ALL CURB & GUTTER SECTIONS

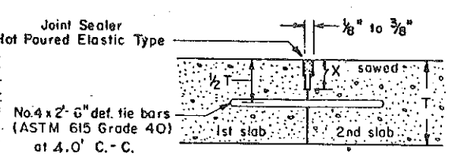
$X = T/3 + \frac{1}{4}"$



SAWED LONGITUDINAL JOINT

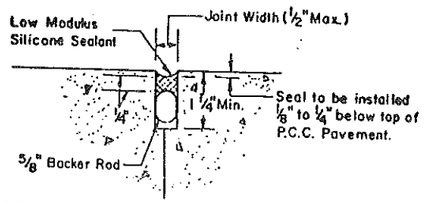


LONGITUDINAL CONSTRUCTION JOINT
(KEYED TIED JOINT)



LONGITUDINAL CONSTRUCTION JOINT
(TIED BUTT JOINT)

NOTE: The Joint Sealer on Longitudinal Joints shall have a Minimum Depth of 1 Inch.



CONTRACTION JOINT SILICONE SEAL
For Transverse Contraction Joints From Sta. 5+55.75 to 9+05 (see Pvm't. Layout Details.)

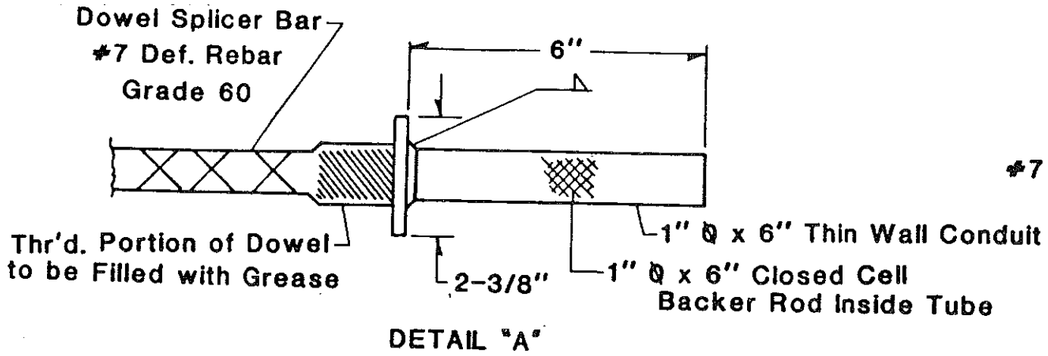
NOTE
The contractor shall apply a coat of curing material or other approved bond breaker to all longitudinal construction joints immediately before pouring adjacent concrete

NOTE:
Preformed inserts used to form grooves for transverse joints will not be allowed.

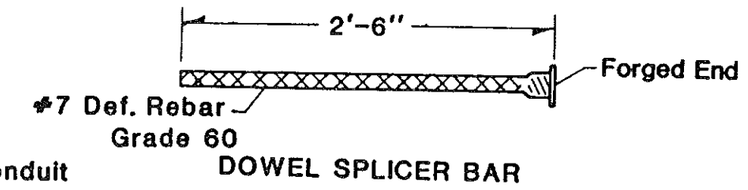
Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer.

The hot poured elastic type joint filler shall meet the requirements of section 826.02 A.2 of the standard specifications.

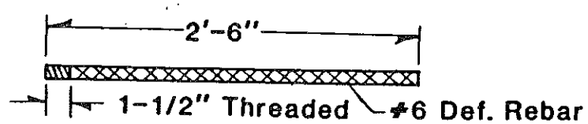
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	29



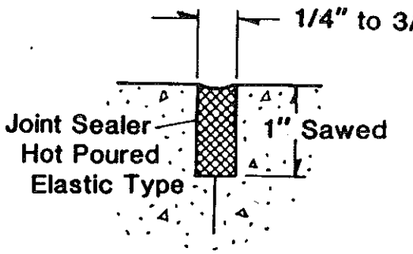
DETAIL "A"



DOWEL SPLICER BAR

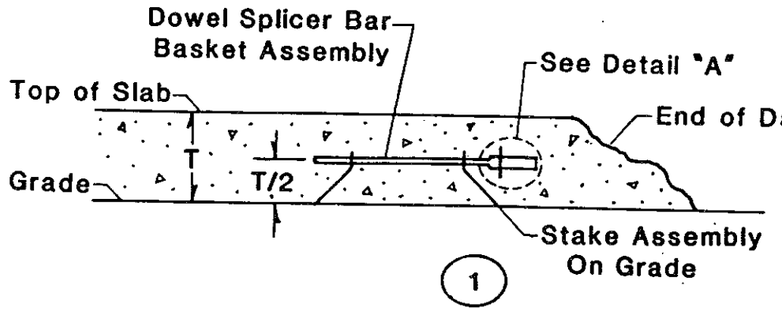


DOWEL IN



DETAIL "B"

Note: Construction Joints to be Sawed to a Depth of 1" & a Width of 1/4" to 3/8" & Sealed.



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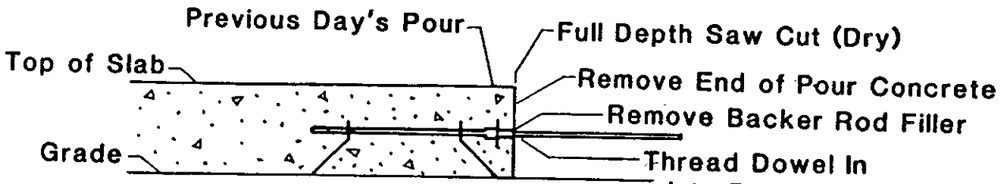

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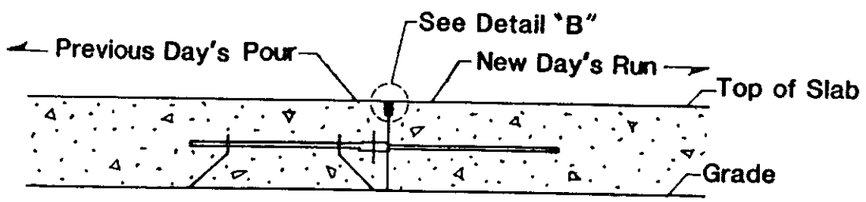
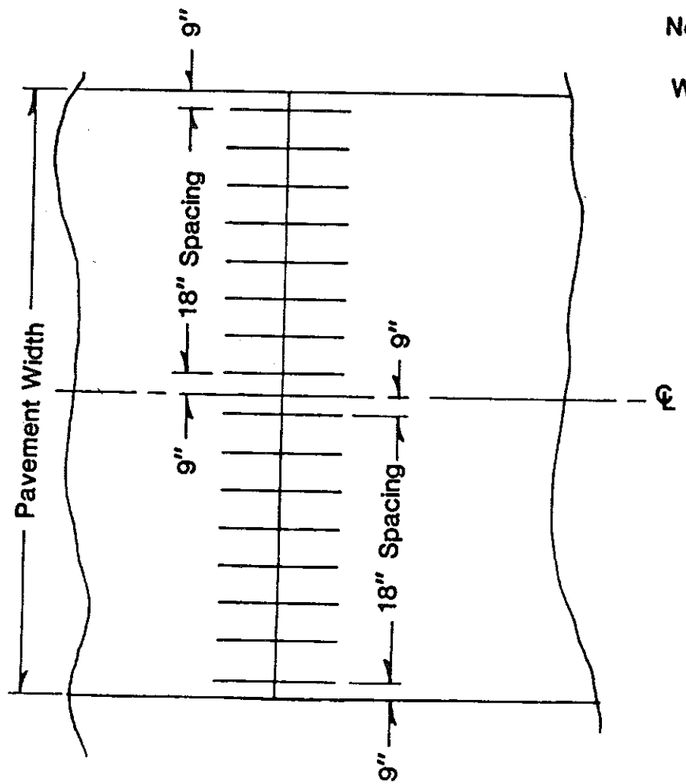


3



PLAN VIEW

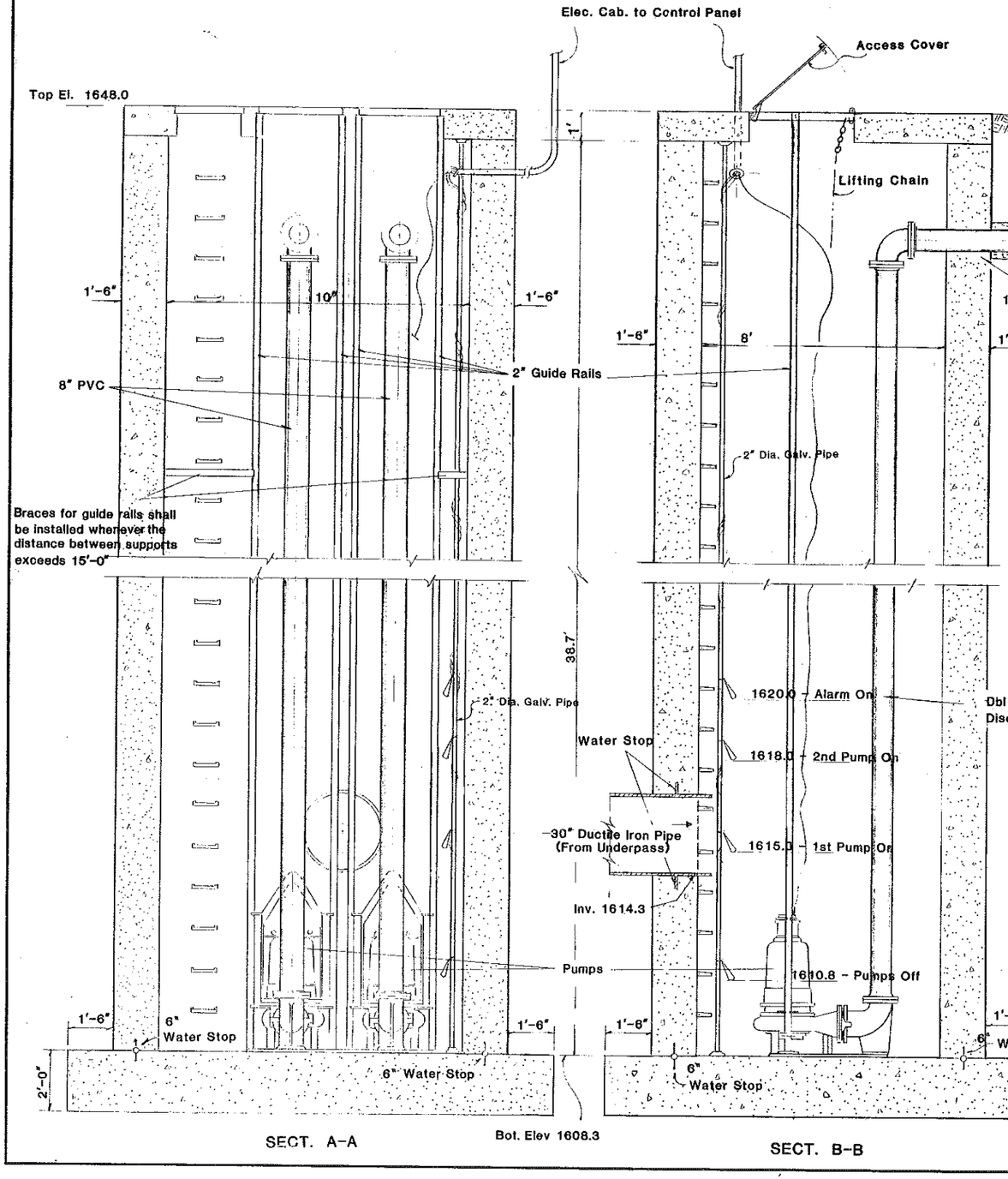
TRANSVERSE
CONSTRUCTION JOINT

STORM WATER LIFT STATION

(See Special Provision for Specifications on Pumping Equipment & Materials)

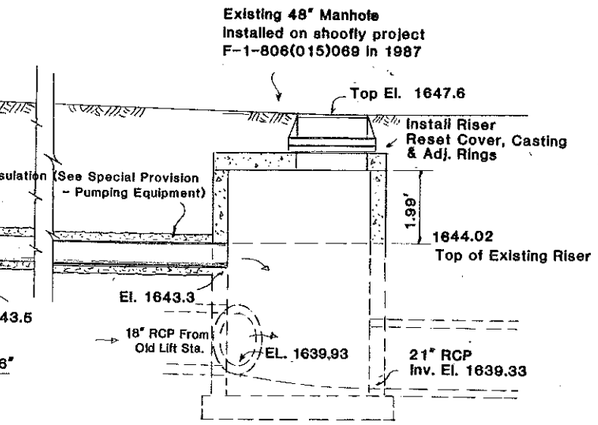
NOTE: The approximate location of the access covers are shown . The exact dimensions shall be provided by the pump supplier.

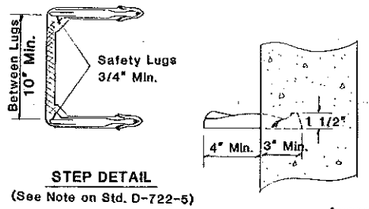
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	30



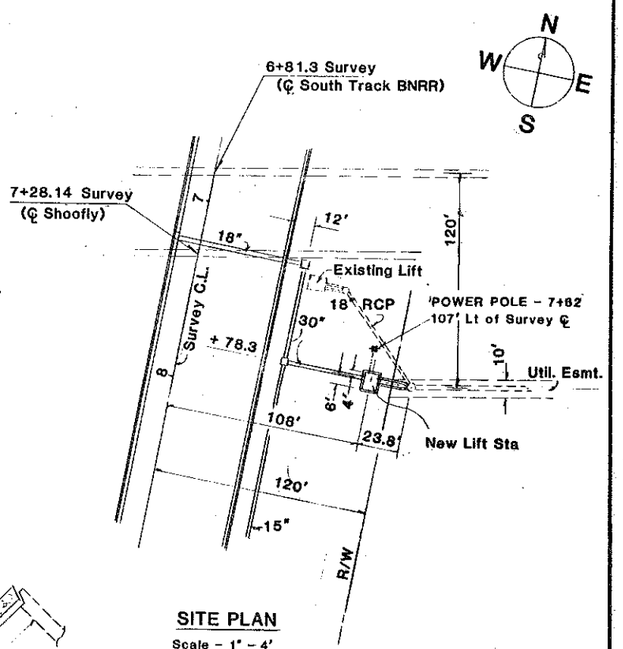
SECT. A-A

SECT. B-B

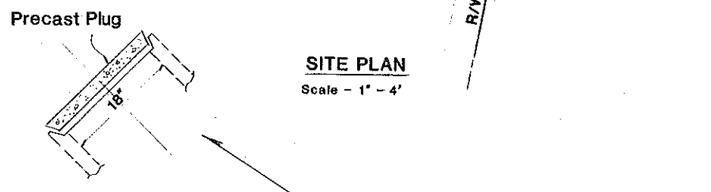


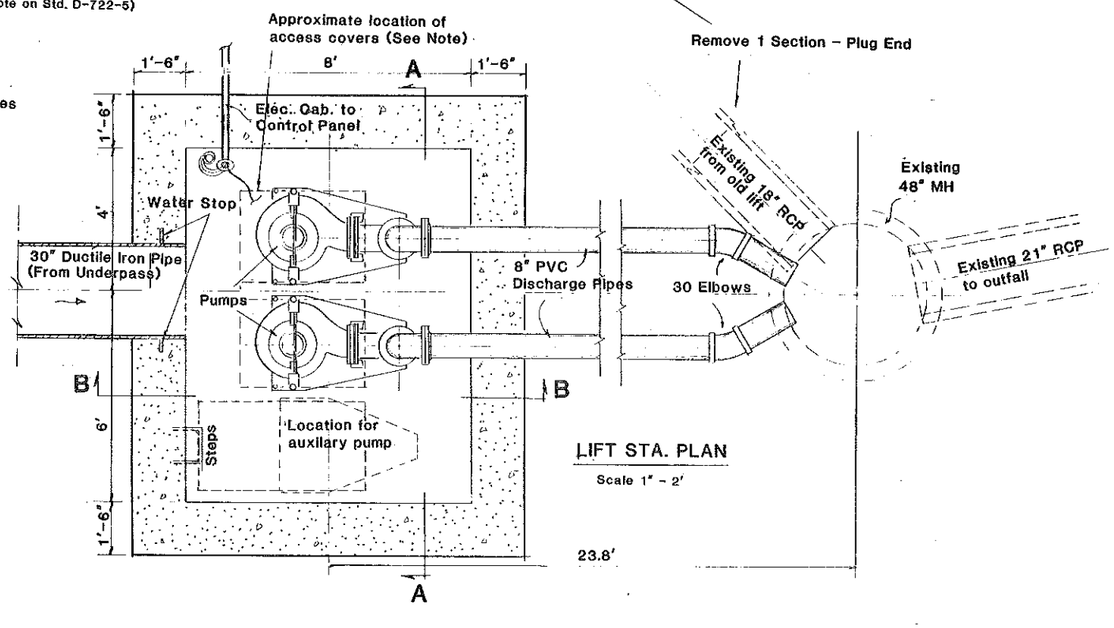


STEP DETAIL
(See Note on Std. D-722-5)



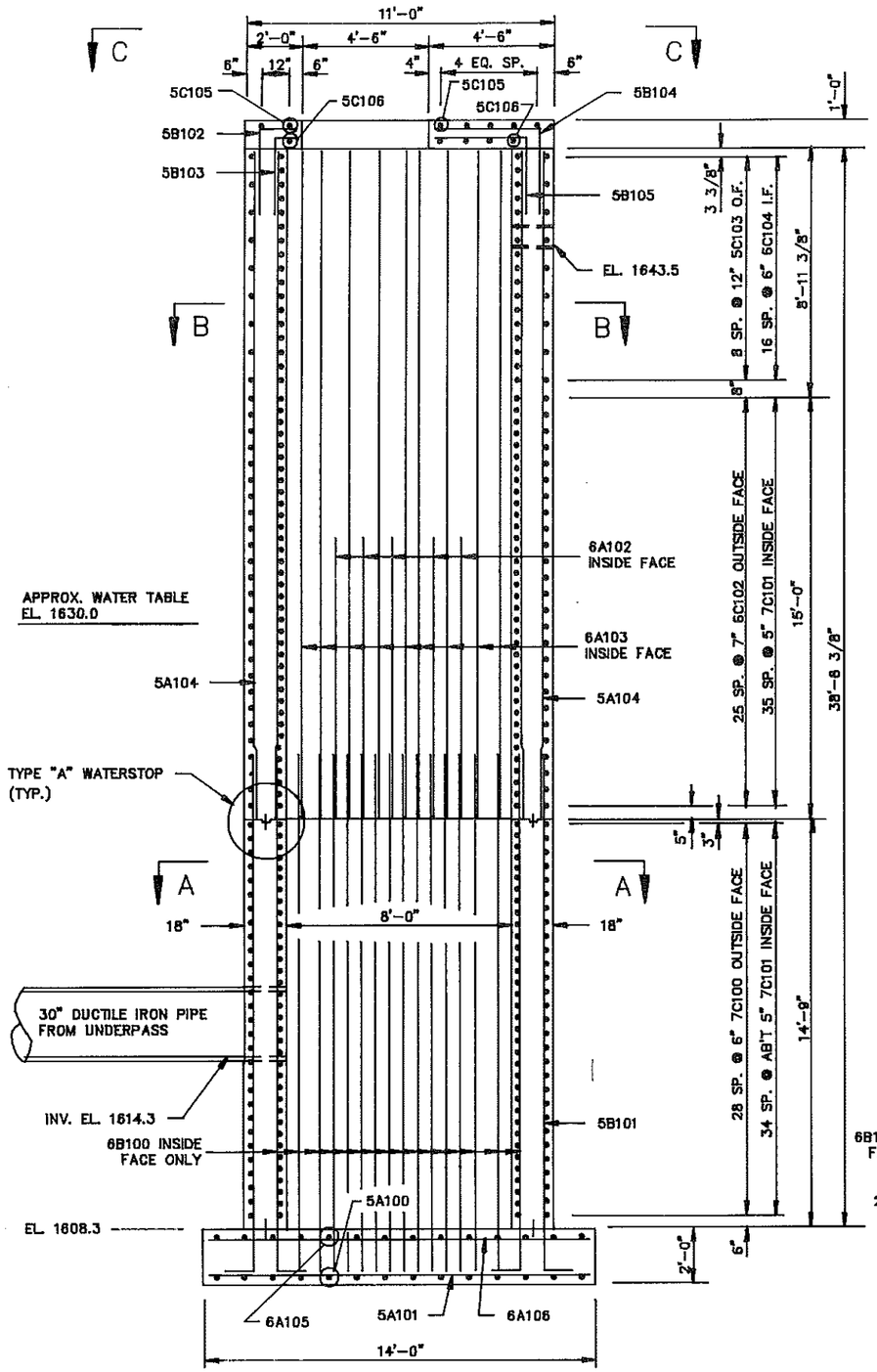
SITE PLAN
Scale - 1" - 4'

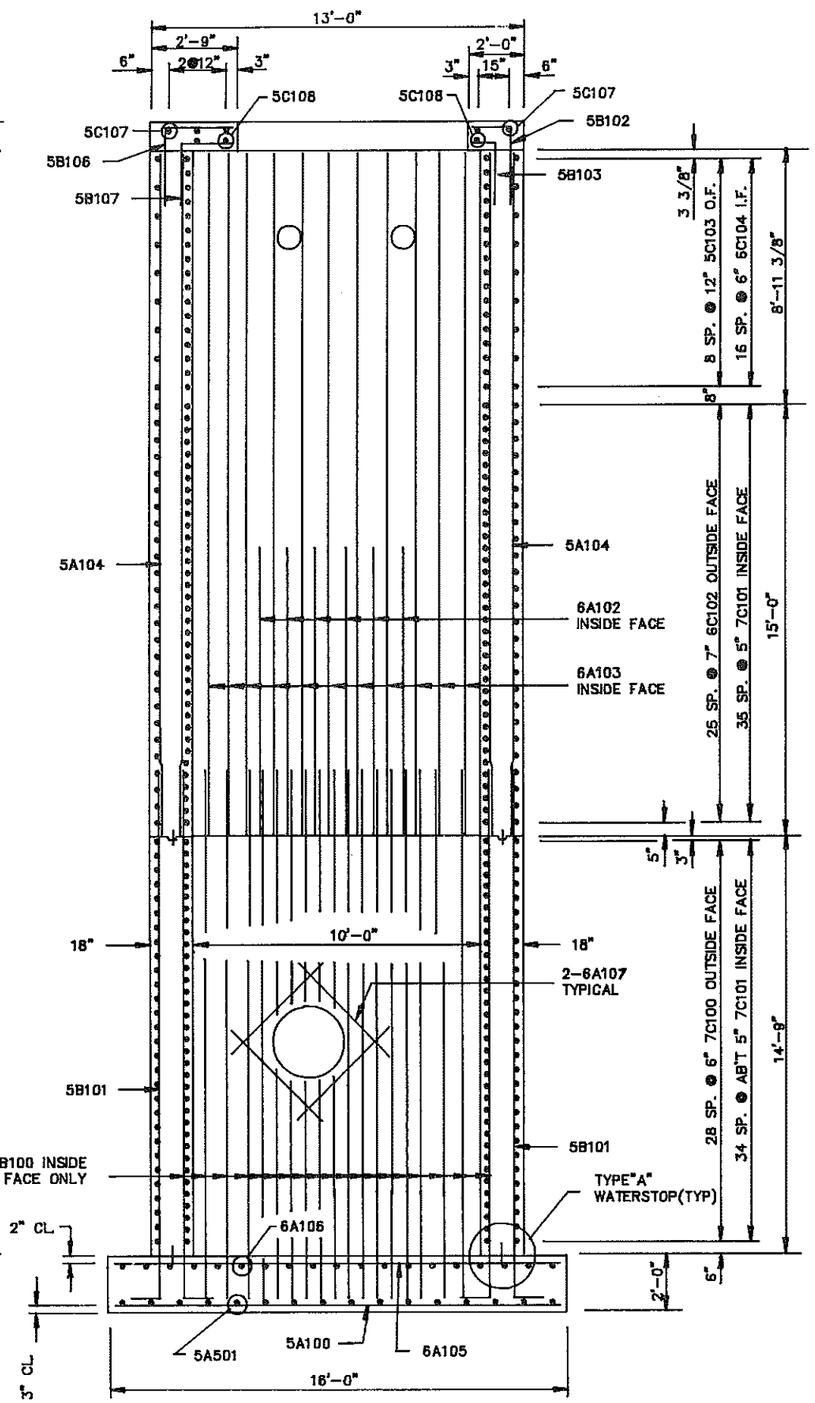




LIFT STA. PLAN
Scale 1" - 2'

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	31





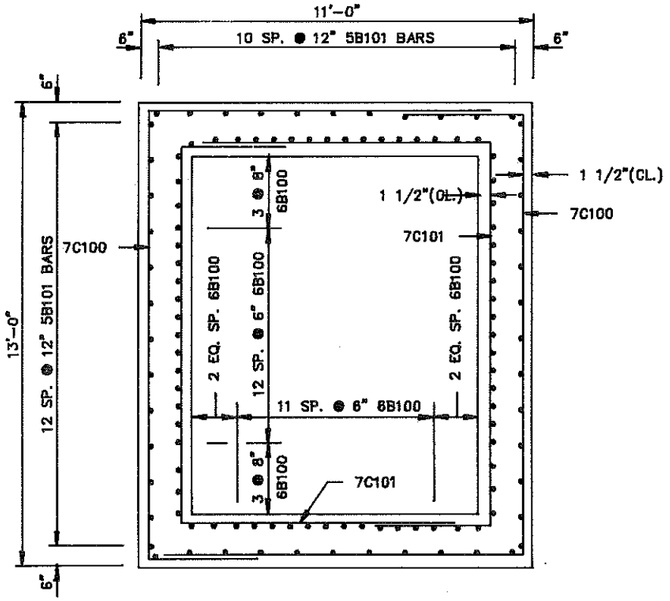
NOTE:

1. CUT AND BEND REINFORCING STEEL AS REQUIRED FOR PLACEMENT OF 30" DUCTILE IRON PIPE AND DOUBLE 8" PVC PIPES.
2. THE BOTTOM SIDE OF THE FOOTING AND THE EXTERIOR FACES OF THE WALLS AND FOOTING BELOW ELEVATION 1631.0 SHALL BE COVERED WITH MEMBRANE WATERPROOFING.
3. SEE STORM WATER LIFT STATION DETAILS FOR OTHER DETAILS OF PUMP HOUSE.
4. SEE SPECIAL PROVISIONS FOR FURTHER SPECIFICATIONS ON TYPE "A" WATERSTOP AND WATERPROOFING MEMBRANE.
5. COFFERDAMS SHALL BE REQUIRED FOR THE CONSTRUCTION OF THE PUMP HOUSE. THE STEEL SHEET PILING SHALL ENCLOSE AN AREA WITH A LENGTH OF 20 FEET AND A WIDTH OF 20 FEET. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COFFERDAMS AS NOTED IN SECTION 626 OF THE SPECIFICATIONS WHICH SHALL INCLUDE THE DESIGN, CONSTRUCTION, DEWATERING, MAINTAINING, AND REMOVAL. EXCAVATION WITHIN THE COFFERDAM SHALL BE INCLUDED IN THE BID ITEM "PUMP HOUSE".
6. THE ESTIMATED MATERIAL QUANTITIES SHOWN ON DRWG. NO. LIFTSTA 2 ARE FOR INFORMATIONAL PURPOSES ONLY. ALL EQUIPMENT, LABOR, AND MATERIALS INCLUDING COFFERDAM, CONCRETE, REINFORCING BARS, WATERSTOP, AND WATERPROOFING MEMBRANE REQUIRED TO BUILD THE PUMP HOUSE SHALL BE INCIDENTAL TO THE PAY ITEM, "PUMP HOUSE."

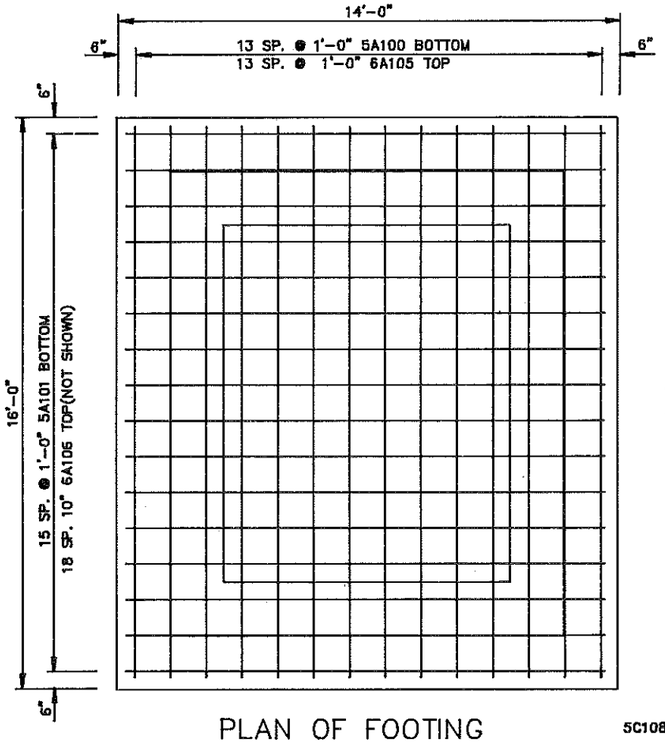
MANDAN UNDERPASS

PUMP HOUSE DETAILS

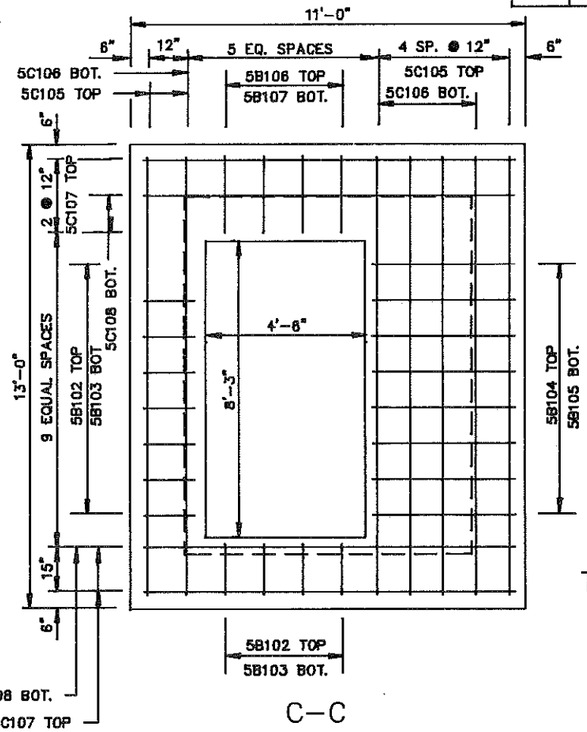
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	32



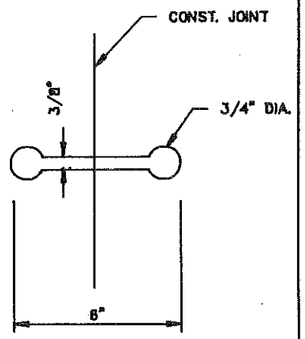
A–A



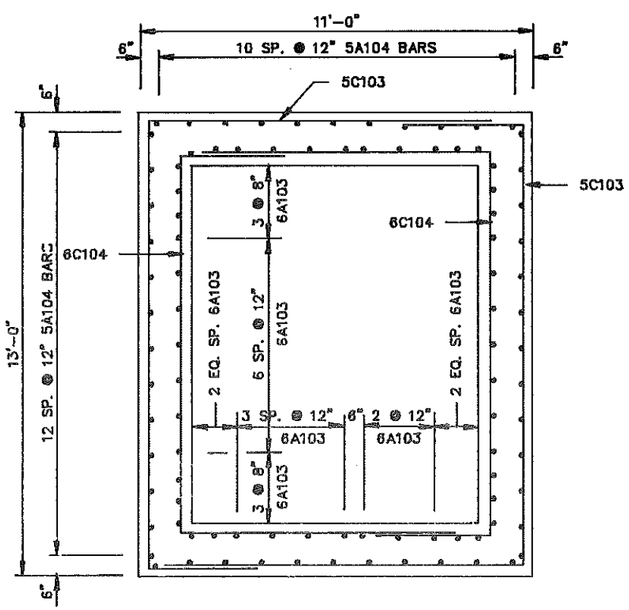
PLAN OF FOOTING



C–C



TYPE "A" WATERSTOP

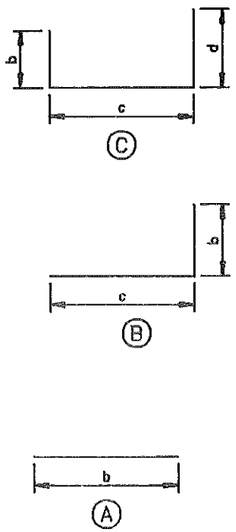


B–B

BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS								
					a	b	c	d	e	f	g	h	k
PUMP HOUSE	5	A100	14	15'-8"		15'-8"							
	5	A101	16	13'-8"		13'-8"							
	6	A102	22	9'-0"		9'-0"							
	6	A103	48	23'-9"		23'-9"							
	5	A104	48	23'-9"		23'-9"							
	6	A105	14	15'-8"		15'-8"							
	6	A106	19	13'-8"		13'-8"							
	6	A107	8	6'-0"		6'-0"							
	6	B100	70	20'-9"		2'-0"	18'-9"						
	5	B101	46	20'-9"		2'-0"	18'-9"						
	5	B102	12	4'-1"		3'-0"	1'-1"						
	5	B103	12	3'-6"		3'-0"	6"						
	5	B104	8	6'-9"		3'-0"	3'-9"						
	5	B105	8	6'-3"		3'-0"	3'-3"						
	5	B106	4	5'-0"		3'-0"	2'-0"						
	5	B107	4	4'-3"		3'-0"	1'-3"						
	7	C100	58	25'-6"		3'-0"	12'-6"	10'-0"					
	7	C101	142	21'-6"		3'-0"	10'-6"	8'-0"					
	6	C102	52	25'-6"		3'-0"	12'-6"	10'-0"					
	5	C103	18	25'-6"		3'-0"	12'-6"	10'-0"					
	6	C104	34	21'-6"		3'-0"	10'-6"	8'-0"					
	5	C105	7	18'-6"		3'-0"	12'-6"	3'-0"					
	5	C106	5	16'-6"		3'-0"	10'-6"	3'-0"					
	5	C107	5	16'-6"		3'-0"	10'-6"	3'-0"					
	5	C108	3	14'-6"		3'-0"	8'-6"	3'-0"					



BENT BAR DETAILS

NOTES

1. FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.
2. ALL DIMENSIONS ARE OUT TO OUT OF BARS.
3. NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF THE DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.

QUANTITIES	INFORMATION ONLY
REINFORCING STEEL	21,084 LBS.
CLASS AE-3 CONCRETE	110.5 C.Y.
TYPE "A" WATERSTOP	84.0 L. FT.
WATERPROOFING MEMBRANE	169.0 S.Y.
PUMP HOUSE COFFERDAM	1 EA.

MANDAN UNDERPASS

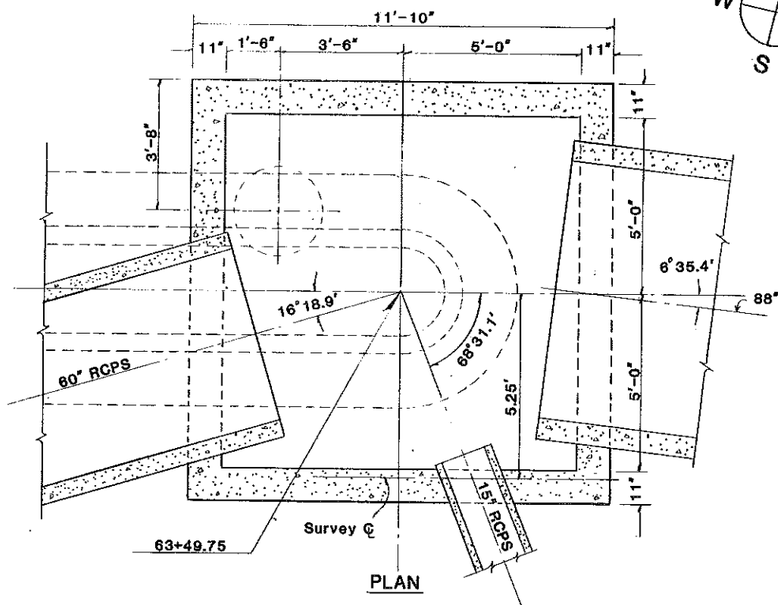
PUMP HOUSE DETAILS

MAYHISON STM. 8-77 656774

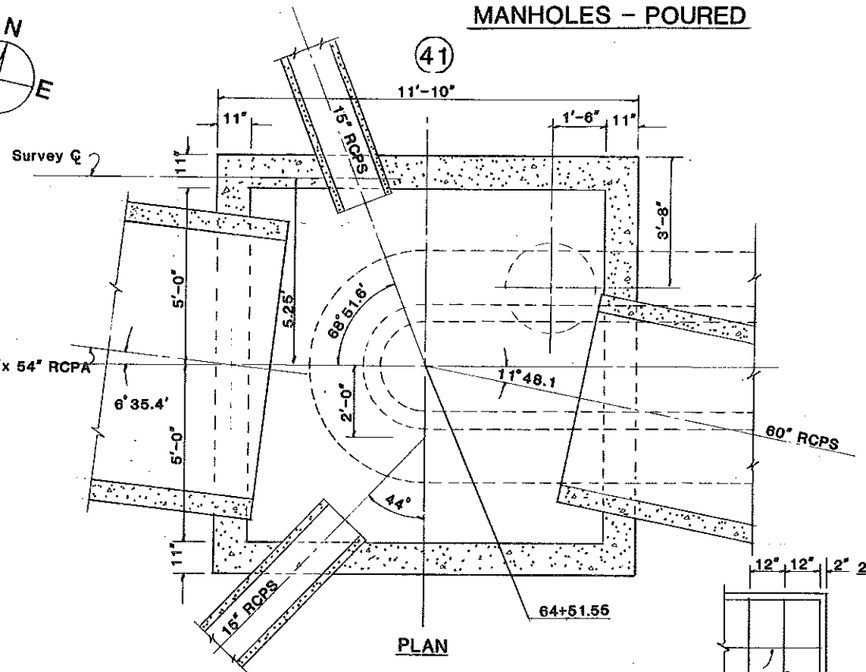
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-FG-1-806(015)069	33

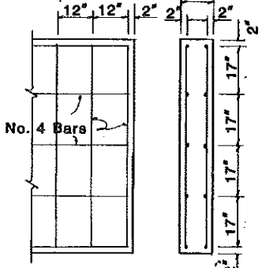
MANHOLES – POURED

(35)

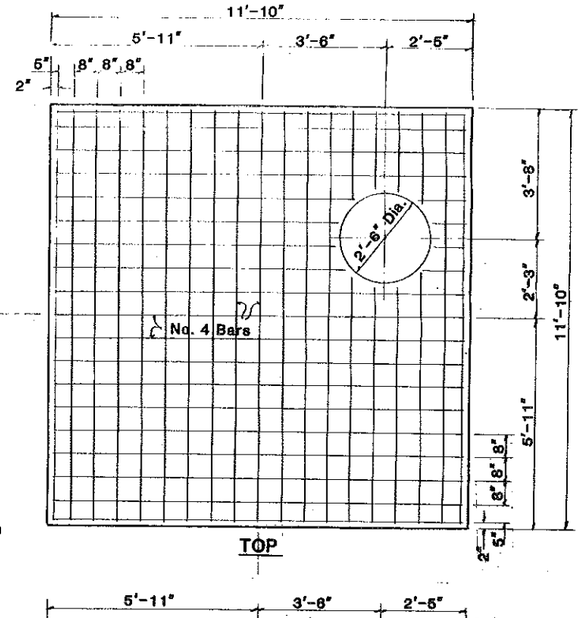


(41)

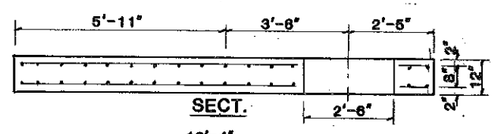




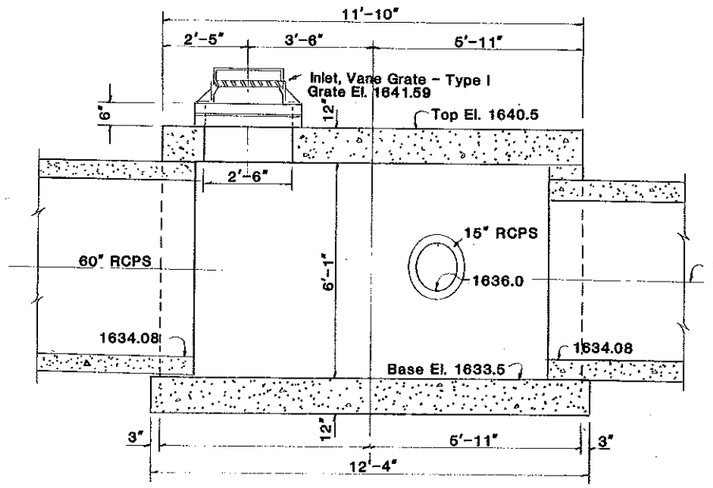
TYP. RISER SECT.



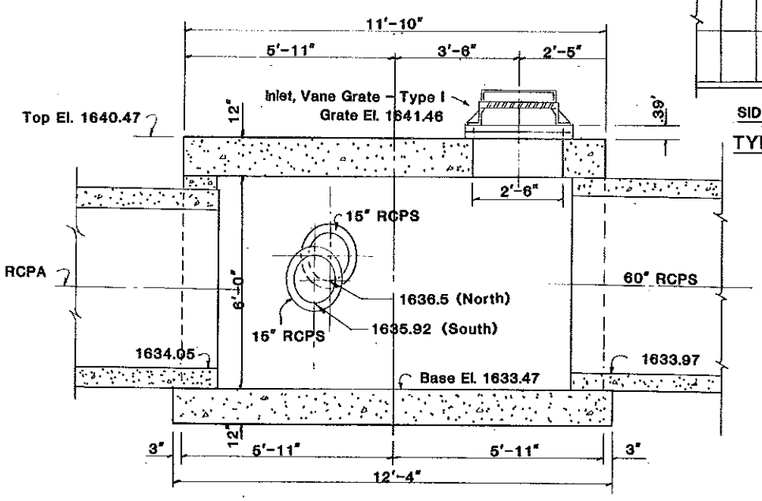
TOP



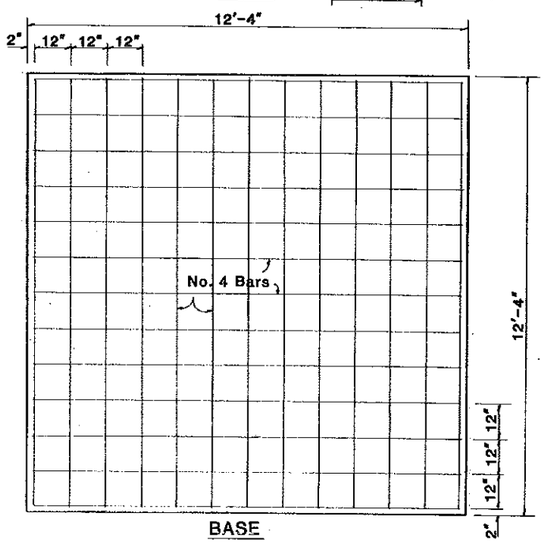
SECT.



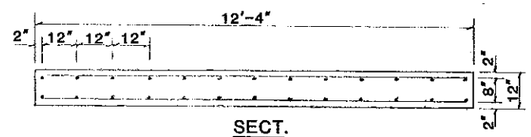
SECT.



SECT.



BASE



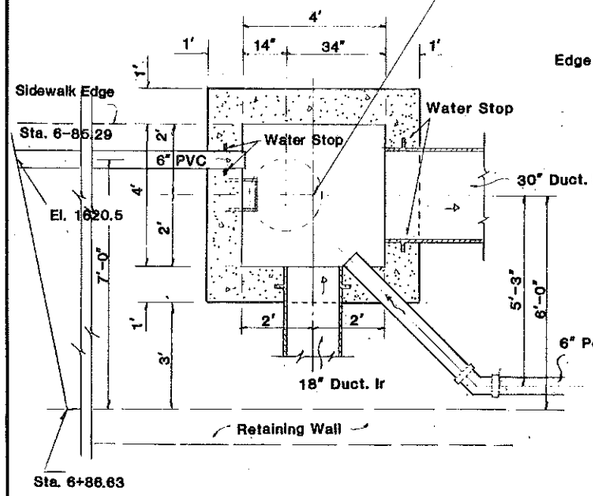
SECT.

Note: All equipment, labor and materials including concrete, reinforcing bars and inlet castings required to build the manholes shall be included in the pay item 'Manhole – Poured'.

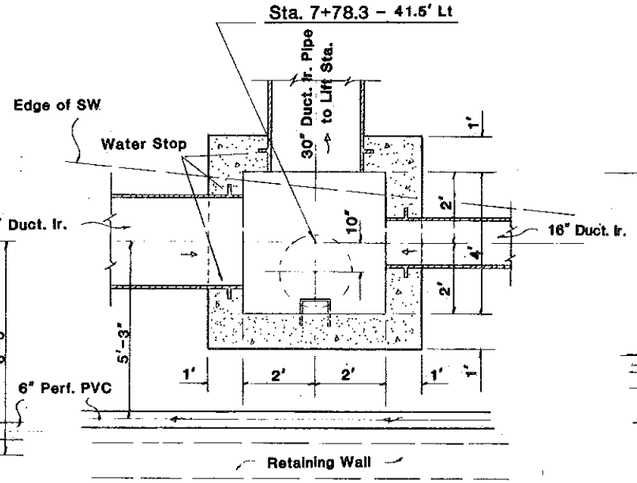
FED. ROAD DIST. NO.	STATE	PROJ. NO.	
5	N.D.	F-FG-1-806(015)063	34

MANHOLE DETAILS

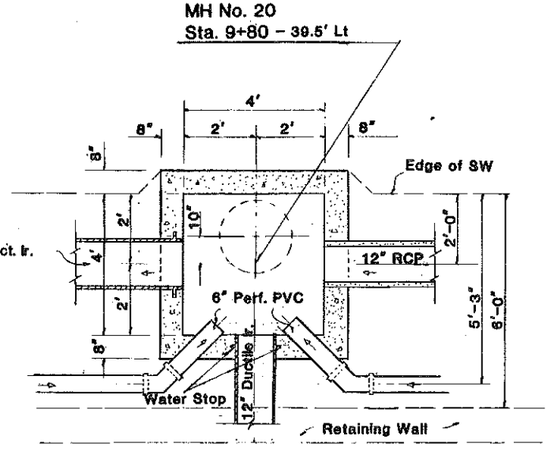
MH No. 23
Sta. 7+23.5 – 41.5' Lt



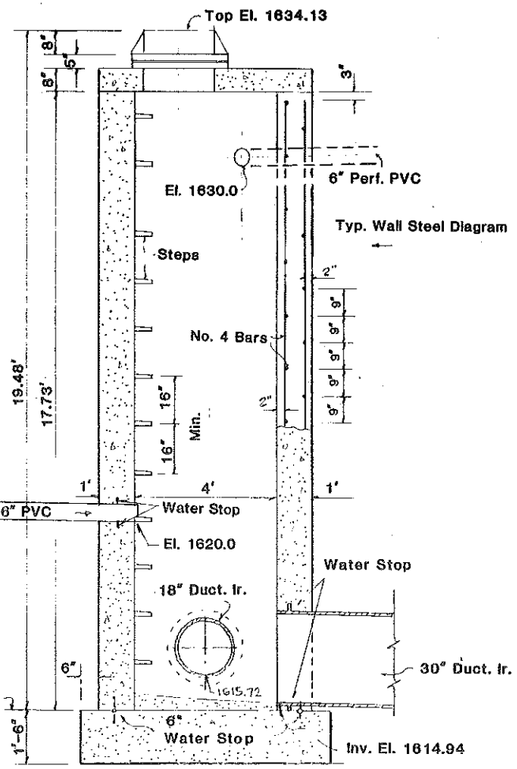
MH No. 31
Sta. 7+78.3 – 41.5' Lt

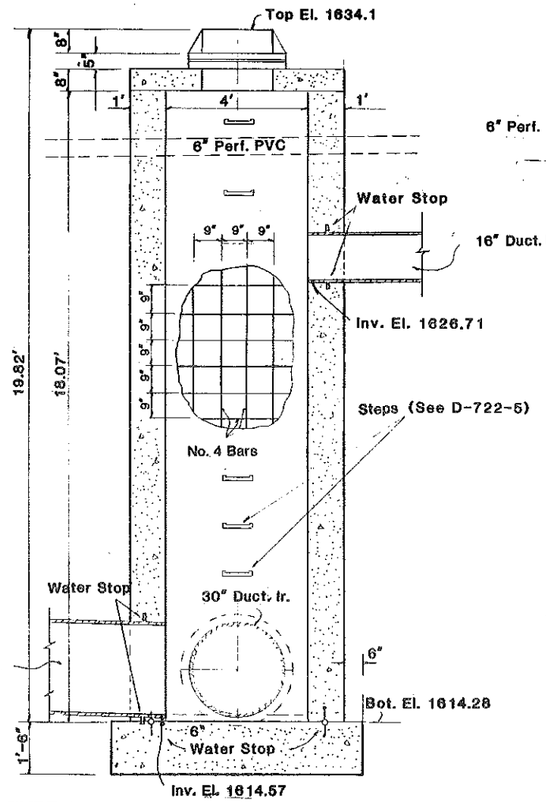


MH No. 20
Sta. 9+80 – 39.5' Lt

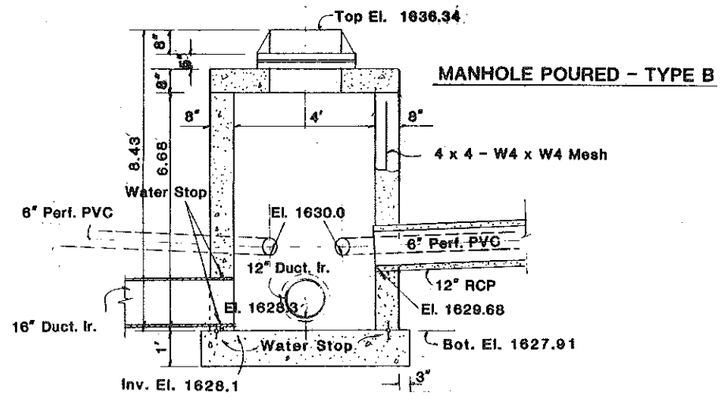


1. The bottom side of the footing and the exterior faces of the walls and footing below elevation 1631 shall be covered with membrane waterproofing.
2. See special provisions for further specifications on Type "A" Waterstop and Waterproofing Membrane.
3. All equipment, labor and materials including concrete, reinforcing bars, waterstop, and waterproofing membrane required to build the manholes shall be included in the pay items "Manhole Poured – Type A" and "Manhole Poured – Type B".

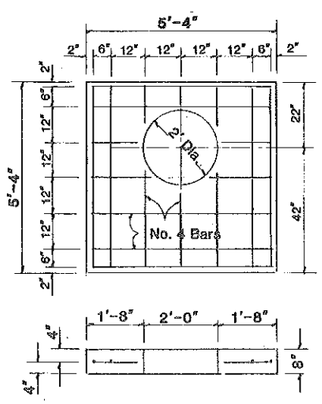




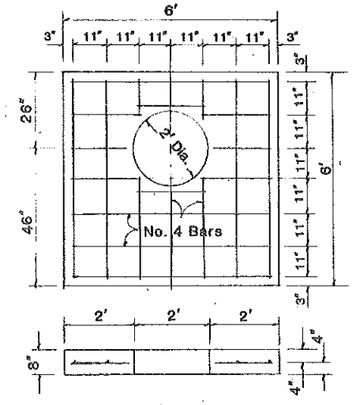
MANHOLE POURED – TYPE A



MANHOLE POURED – TYPE B

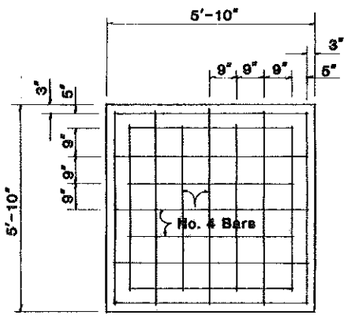


MH No. 20



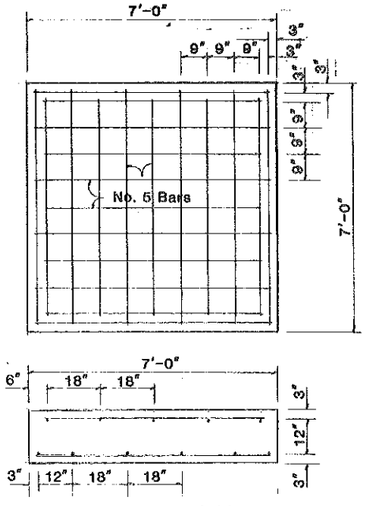
MH No. 23 & 31

COVERS



MH No. 20

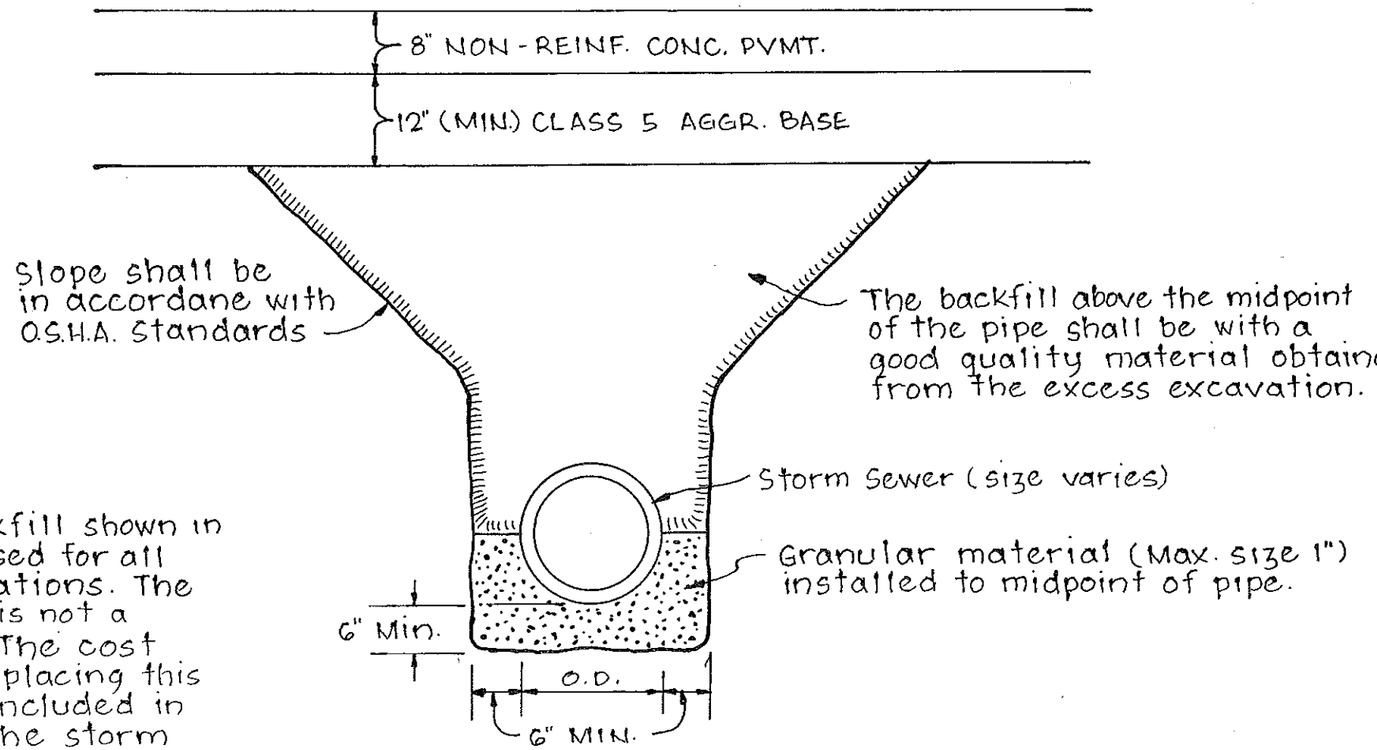
BASE



MH No. 23 & 31

BASE

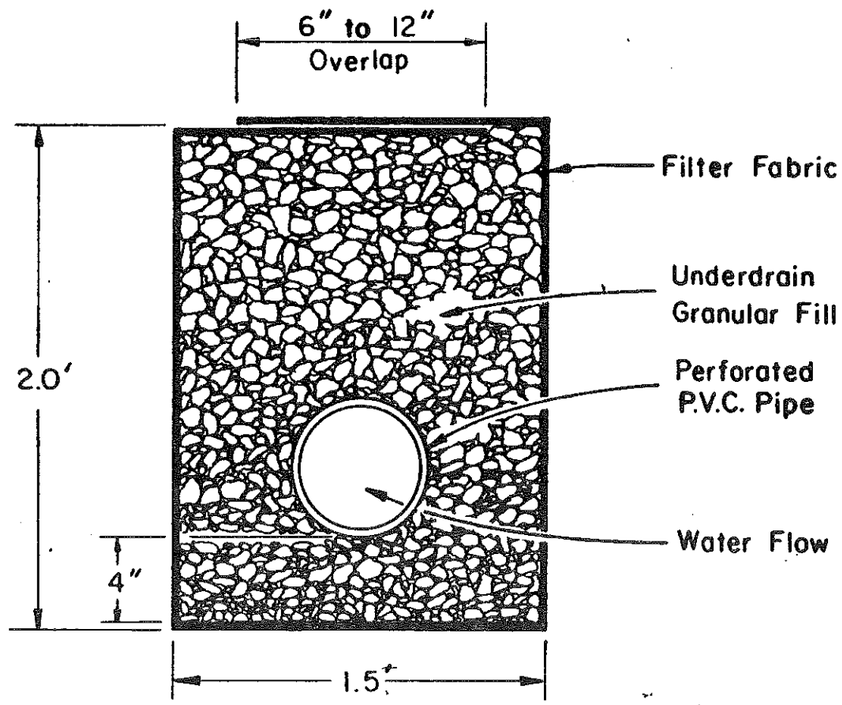
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	35



The bedding and backfill shown in the detail shall be used for all storm sewer installations. The granular material is not a separate pay item. The cost of furnishing and placing this material shall be included in the price bid for the storm sewer pipe.

BEDDING AND BACKFILL DETAIL

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



All PVC pipe used shall be encased as shown:

Filter fabric shall meet the requirements of the special provision on

Geotextile Filter Fabric

The cost of the underdrain granular fill, filter fabric and all labor and equipment necessary to construct the underdrain as shown shall be included in the price bid for 6 inch perforated PVC pipe for underdrains.

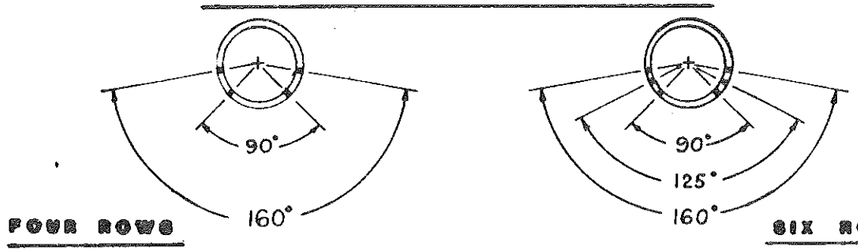
1. TYPE OF PIPE
   The pipe shall be polyvinyl chloride sewer pipe with solvent cemented joints as specified in ASTM Spec. No. 3034.

2. Perforations shall be circular and 1/4" ± 1/16" in diameter. They should be arranged in rows parallel to the axis of the pipe and shall be spaced approximately 3" center to center along the rows. The spigot end of the pipe shall be unperforated for a length equal to the depth of the socket. The placement and total number of the rows shall be as shown below with an allowable tolerance of $+10^{o}$. The spigot and bell end shall be unperforated for a length equal to the depth of the spigot.

3. The nominal laying length of the pipe shall be 12.5 feet. Shorter or longer laying lengths shall be provided if required.

4. See structural sheet for underdrain detail behind retaining wall.

PERFORATED P.V.C. SEWER PIPE

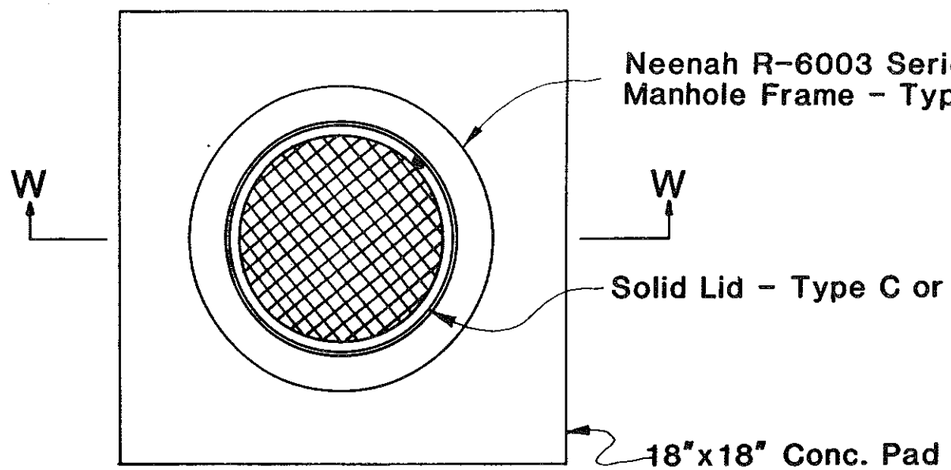


PIPE SIZE	ROWS OF PERFORATIONS	No. of PERFORATIONS / ROW *
4	4	48
6	4	48
8	4	47
9	4	47
10	5	47
12	6	47

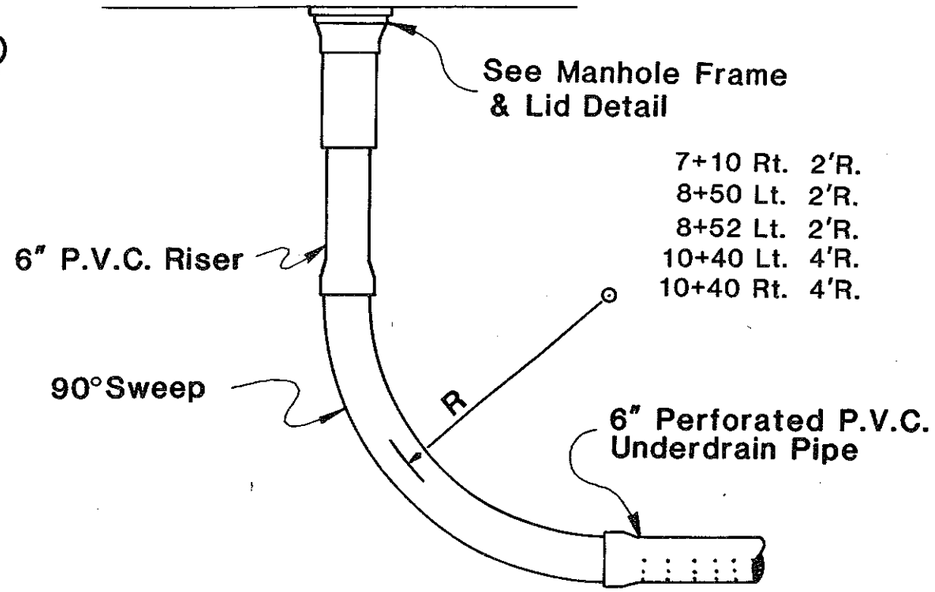
*For 12.5 Foot Pipe Laying Lengths

PERFORATED PIPE

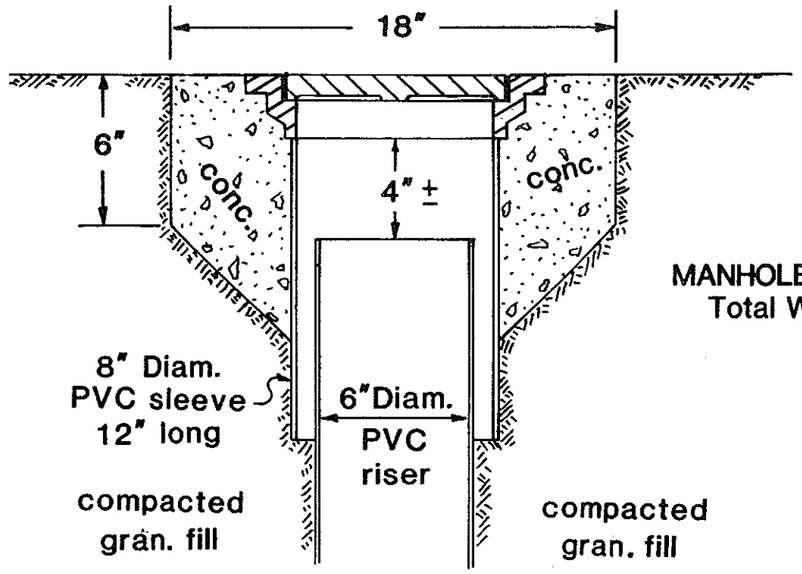
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806 (015)069	37



MANHOLE FRAME & LID DETAIL



TYPICAL UNDERDRAIN
CLEAN-OUT RISER DETAIL



MANHOLE FRAME & LID
Total Weight 35 lbs.

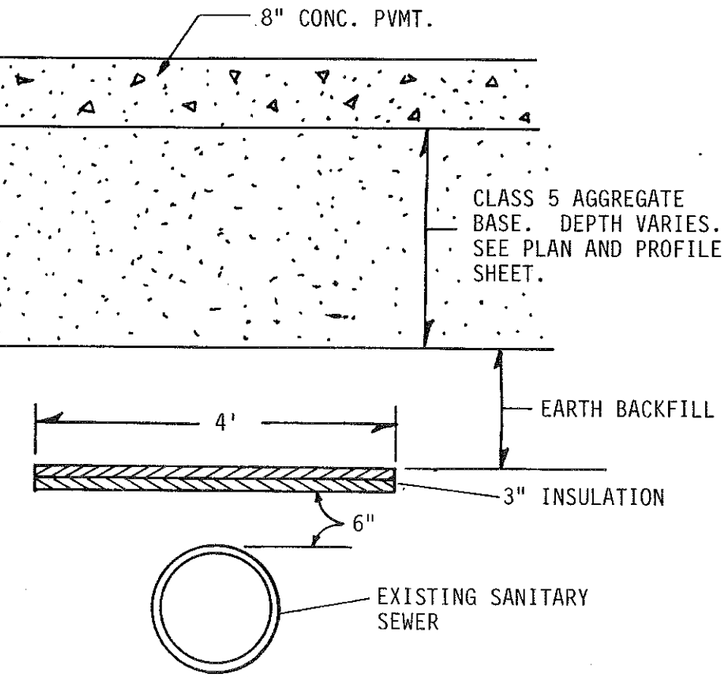
SECTION W-W
MANHOLE FRAME & LID ELEVATION

NOTE: 6" P.V.C. Radius Sweep & 6" P.V.C. Riser to be paid for as 6" Nonperf. P.V.C. Underdrain Pipe.

DETAIL
UNDERDRAIN CLEAN-OUT

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		38

F-FG-1-806(015)069



Sta. 16+00 to 19+41-16' Rt.
Sta. 19+39-18' Rt. to 44' Rt.

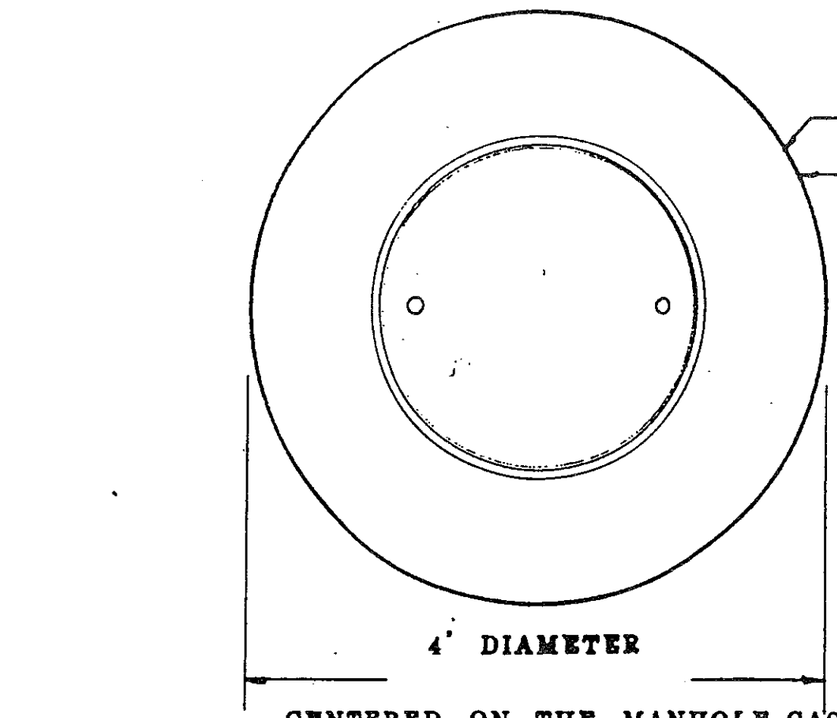
See plan & profile sheets, typical sections, and structural detail sheets for insulation board locations under the seal slab and the concrete pavement.

POLYSTYRENE INSULATION BOARD

FHWA RIBBON	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		39

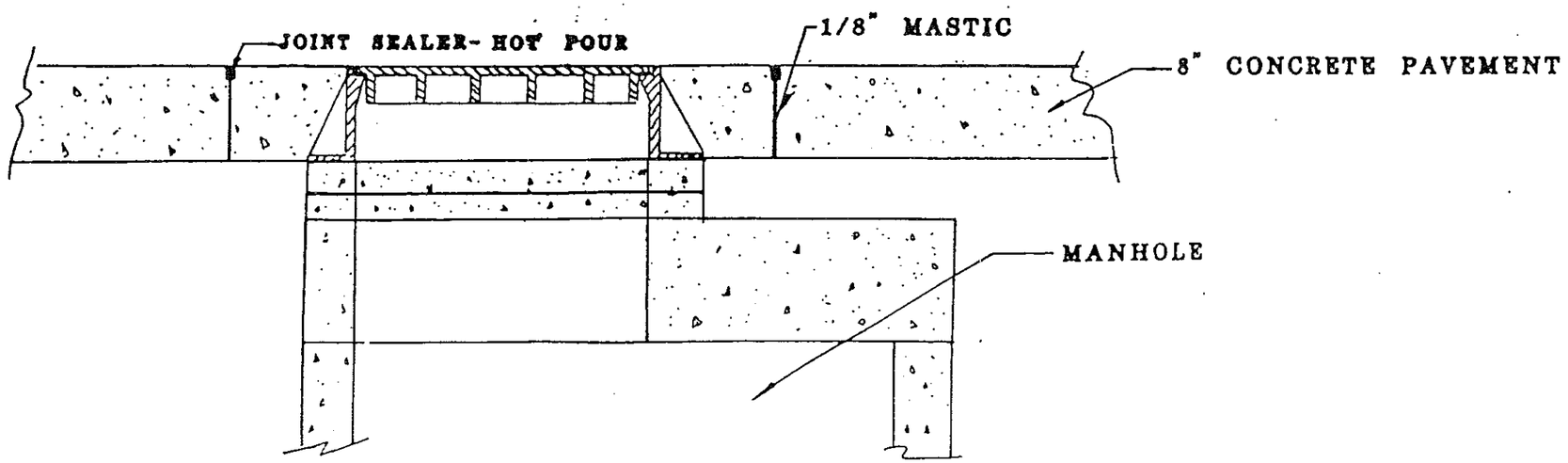
F-FG-1-806(015)069

MANHOLE BLOCKOUT DETAIL SHEET



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

CENTERED ON THE MANHOLE CASTING

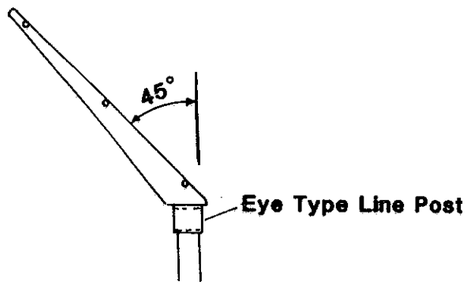


NOTE:

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."

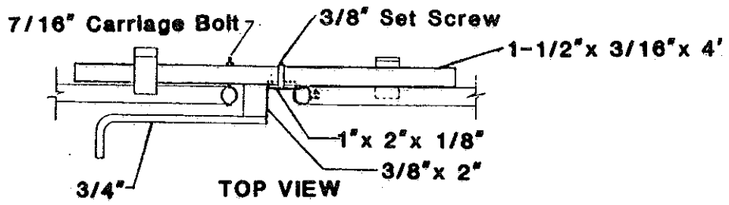
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		40

F-FG-1-806(015)069

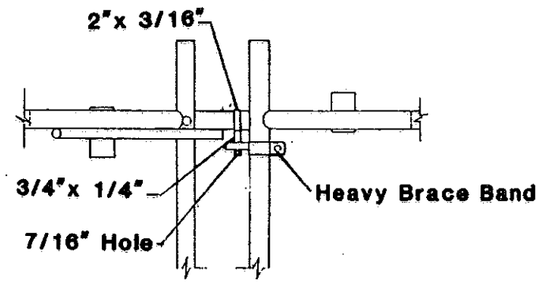


Heavy Duty Barb Arm With Stay
Line Post Top Detail

LOCKING DEVICE

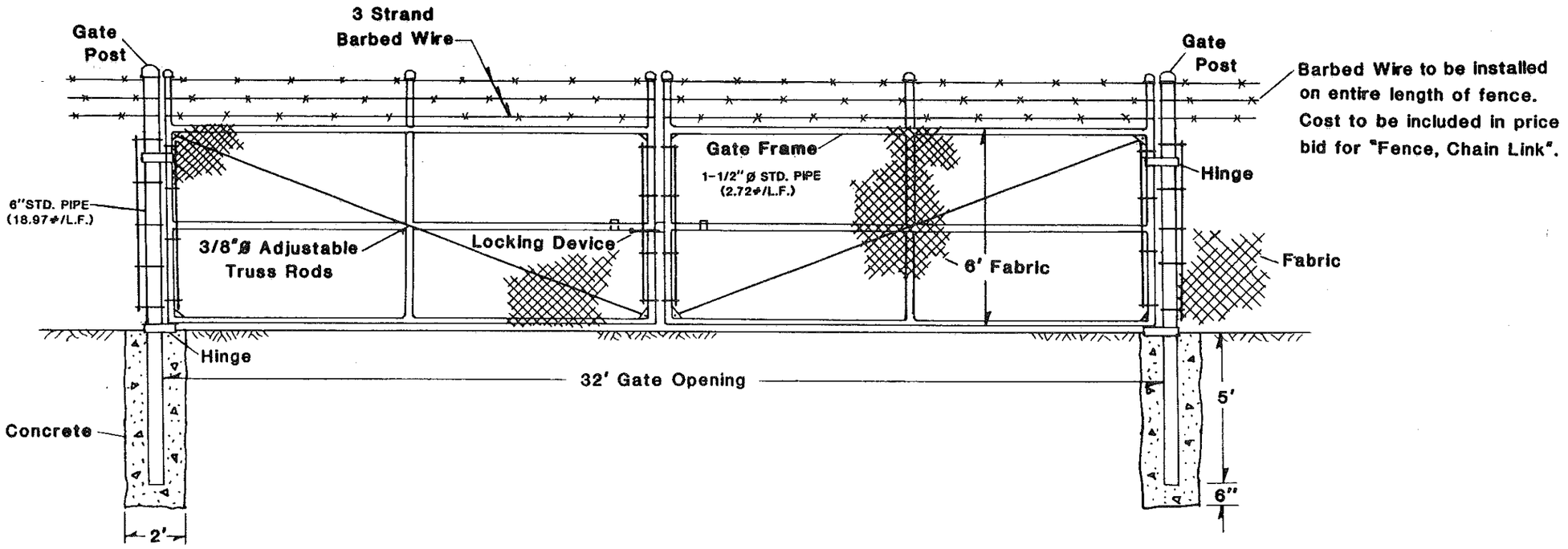


TOP VIEW



FRONT VIEW

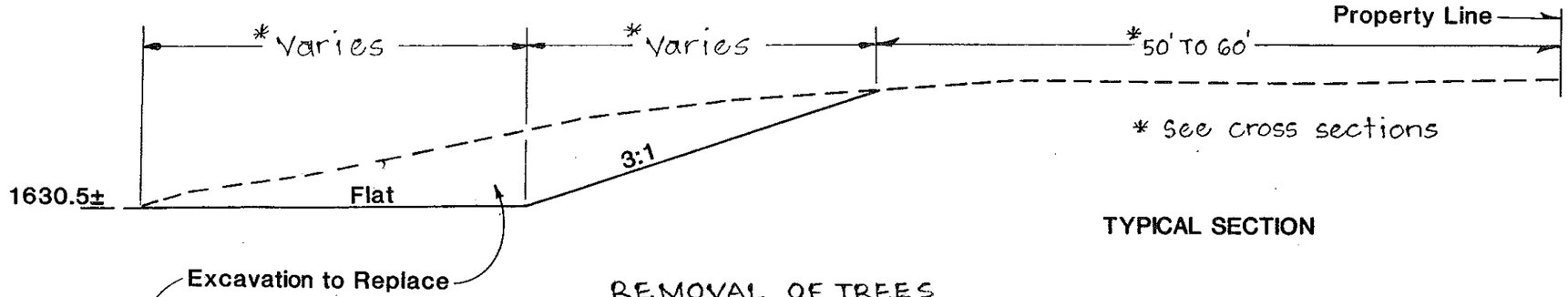
Note: The Double Swing Gate (Including Locking Device) shall not be Paid for separately, but has been included in the Quantities & shall be paid for at the unit price bid for "Fence Chain Link". See Standard D-752-2 for additional details for Chain Link Fence.



DOUBLE SWING GATE

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		41

F-FG-1-806(015)069

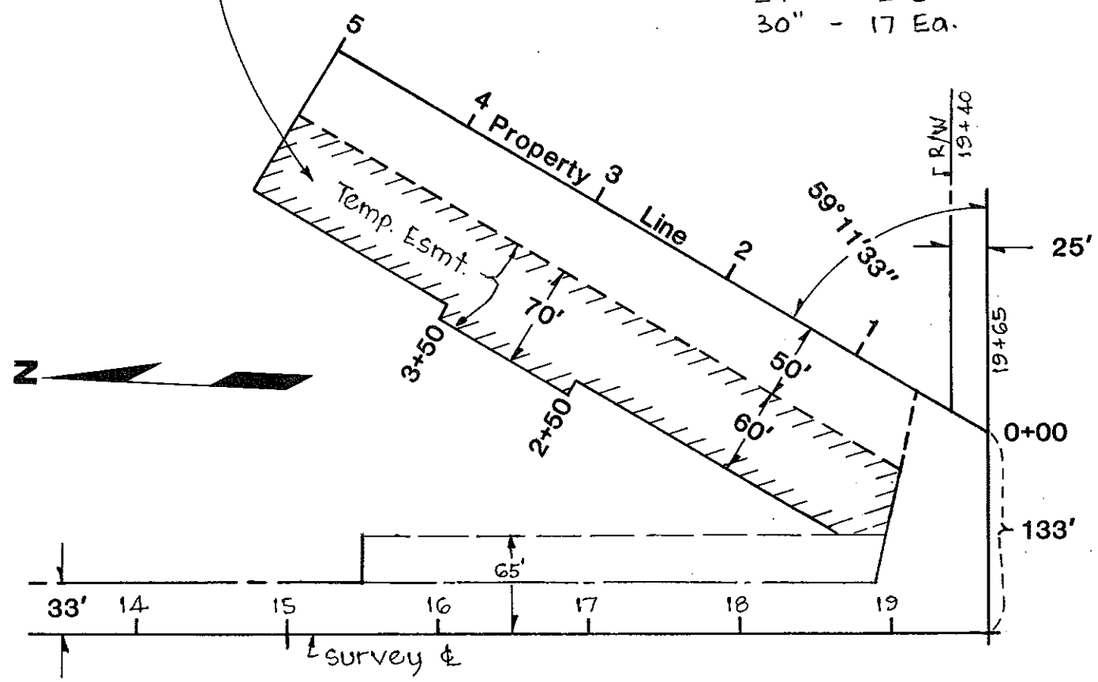


TYPICAL SECTION

REMOVAL OF TREES

10" - 11 Ea.
18" - 3 Ea.
24" - 2 Ea.
30" - 17 Ea.

The Excavation from this Area (1750 C.Y.) Shall be Wasted, See Note 200-P10.

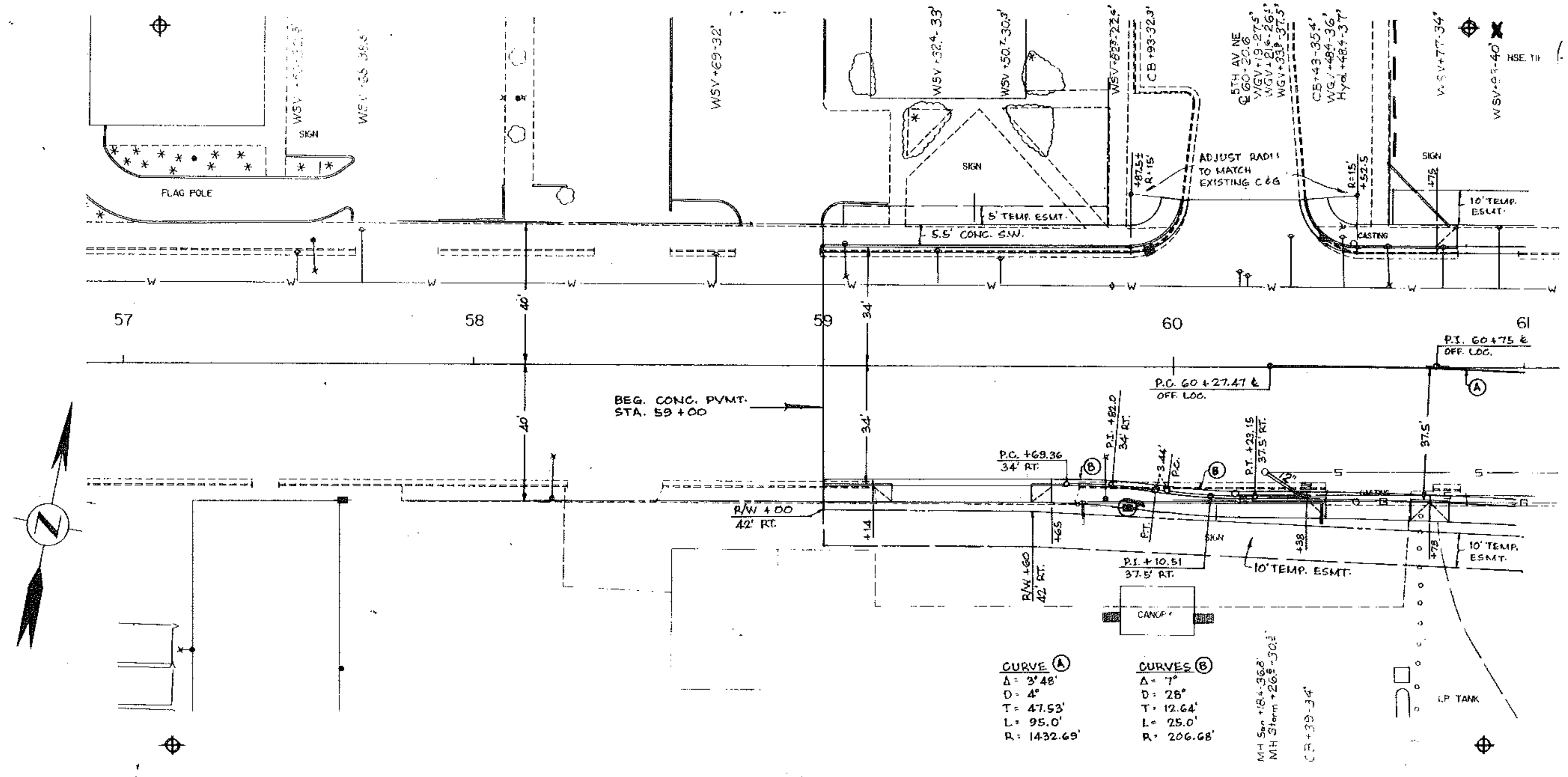


PLAN VIEW

NOTE: The number of trees shown to be removed from the excavation area is advisory only. The actual number (and size) shall be determined in the field. The trees located near the existing channel bottom shall be left in place and be "worked around" if deemed feasible by the Engineer. The cost of removing and disposing of the existing brush and approximately 35 stumps from the excavation area shall be incidental to other items.

FLOOD WATER STORAGE

8	FP-I-806(015)069	42



REMOVAL OF CONC. PVM'T.

59+00 to 61+00 1551 S.Y.

REMOVAL OF CONCRETE

59+00 to 61+00 Lt.	118.7 S.Y.
59+00 to 61+00 Rt.	229.0 S.Y.

CURB & GUTTER, TYPE-I

59+00 to 61+00 Lt.	179.5 L.F.
59+00 to 61+00 Rt.	200 L.F.

ADJUST MANHOLE

60+18.4 Rt.	36.8'	1 Ea.
60+26.6 Rt.	30.3'	1 Ea.

RELOCATE HYDRANT

60+48.4 Lt. 37.1' 1 Ea.

REMOVAL OF CURB & GUTTER

57+00 to 61+00 Lt.	179.2 L.F.
57+00 to 61+00 Rt.	200.0 L.F.

DRIVEWAY, CONCRETE-H.E.S.

59+39.5 Rt. (40')	31.2 S.Y.
60+55.5 Rt. (24')	21.4 S.Y.
60+96.5 Rt. (36')	28.7 S.Y.
60+92.5 Lt. (24')	21.4 S.Y.

INLET

60+36 Rt. 1 Ea.

INLET, CURB CASTING

59+93 Lt. 32.3' 1 Ea.
60+43 Lt. 35' 1 Ea.

PIPE, CONC. REINF. CL.-III, STORM DRAIN

60+27 Rt. 31' to 60+32 Rt. 37' 12" x 10 L.F.

ADJUST UTILITY APPURT.

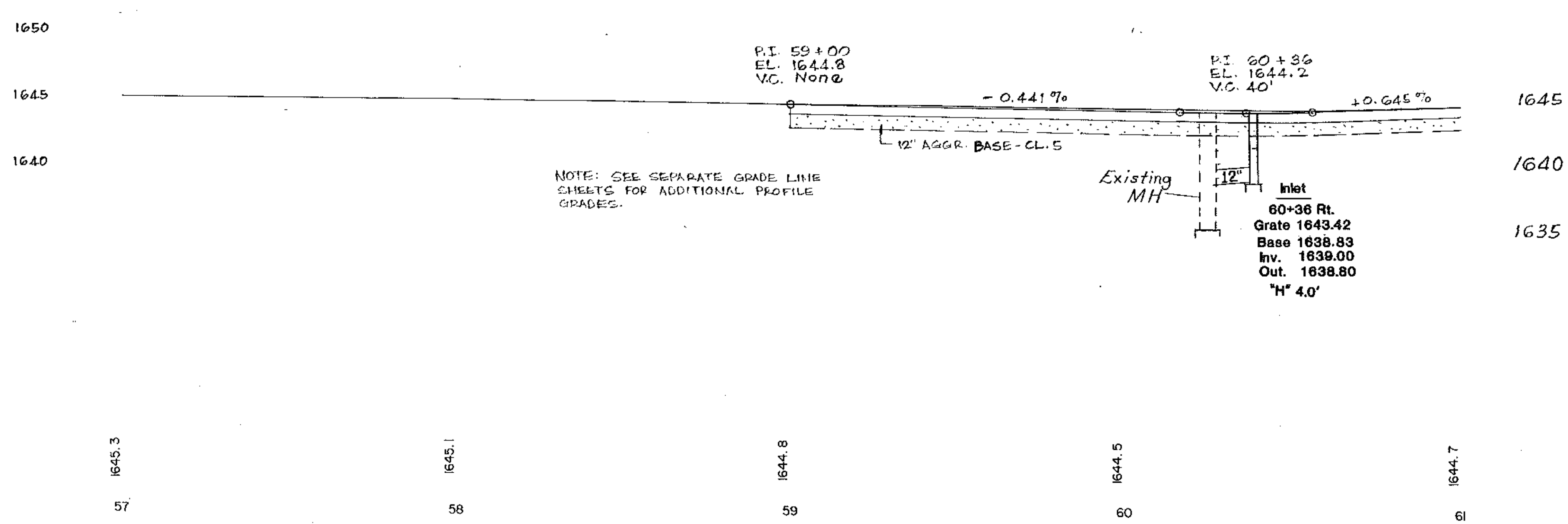
59+32.4 Lt.	33' (W.S.V.)	1 Ea.
59+50.7 Lt.	30.3' (W.S.V.)	1 Ea.
59+82 Lt.	26.6' (W.G.V.)	1 Ea.
60+19 Lt.	27.5' (W.G.V.)	1 Ea.
60+21.6 Lt.	26.1' (W.G.V.)	1 Ea.
60+33.9 Lt.	37.5' (W.G.V.)	1 Ea.
60+48.4 Lt.	35.9' (W.G.V.)	1 Ea.
60+77 Lt.	34' (W.S.V.)	1 Ea.
60+93 Lt.	40.3' (W.S.V.)	1 Ea.

SIDEWALK, CONCRETE

59+00 to 61+00 Rt. 63.1 S.Y.
59+00 to 61+00 Lt. 87.3 S.Y.

REMOVAL OF INLET

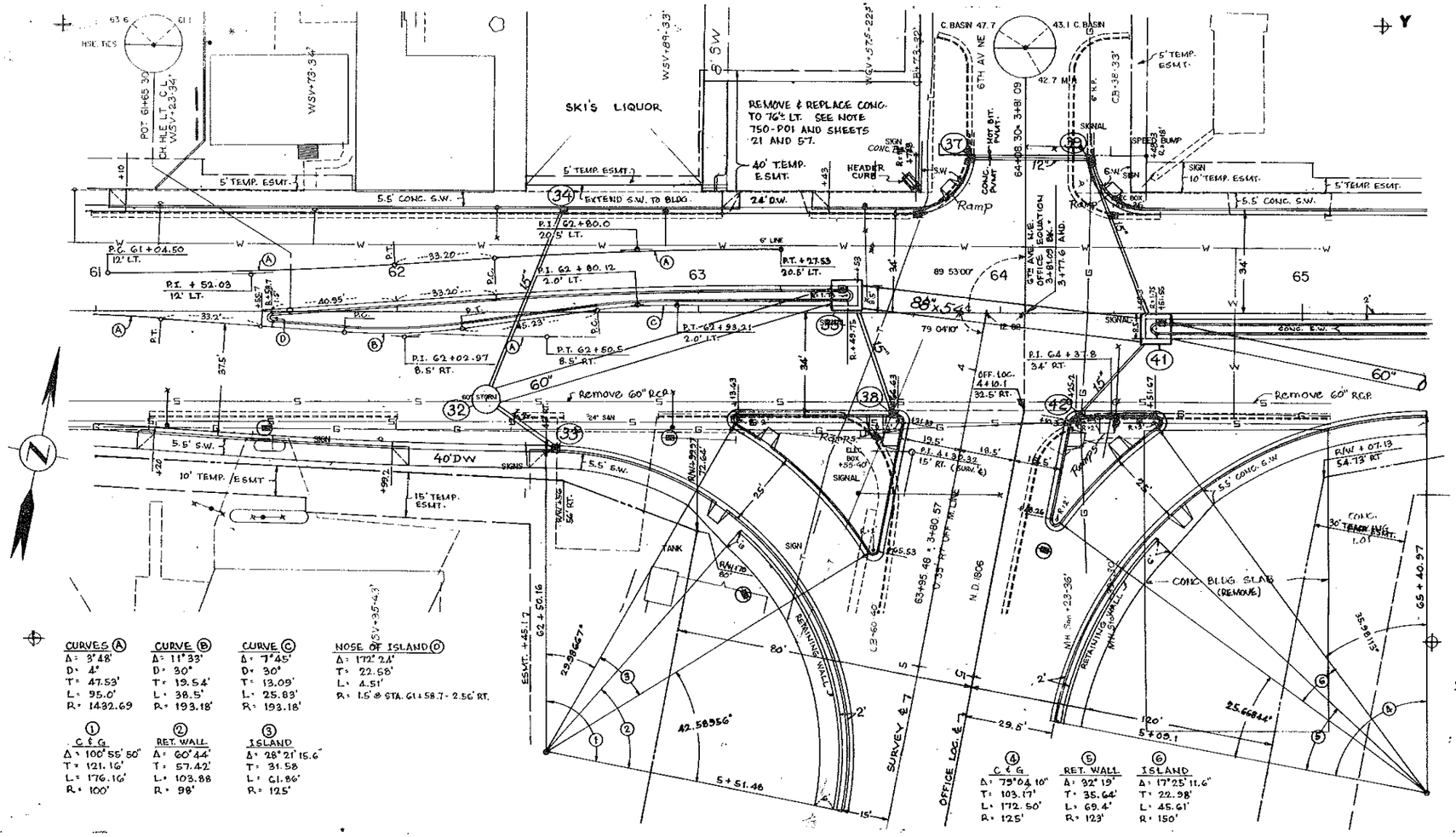
60+39 Rt. 34' 1 Ea.



NOTE: SEE SEPARATE GRADE LINE SHEETS FOR ADDITIONAL PROFILE GRADES.

MAIN STREET

FED.RD. DIVISION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG 1-806-3(10)69	43



CURVES Ⓐ	CURVE Ⓑ	CURVE Ⓒ	NOSE OF ISLAND Ⓓ
Δ = 3°48'	Δ = 11°33'	Δ = 7°45'	Δ = 172° 24'
D = 4°	D = 30°	D = 30°	T = 22.58'
T = 47.53'	T = 19.54'	T = 13.09'	L = 4.51'
L = 95.0'	L = 38.5'	L = 25.83'	R = 1.5' @ STA. 61+58.7 - 2.56' RT.
R = 1432.69	R = 193.18'	R = 193.18'	

① C & G	② RET. WALL	③ ISLAND
Δ = 100° 55' 50"	Δ = 60° 44'	Δ = 28° 21' 15.6"
T = 121.16'	T = 57.42'	T = 31.58
L = 176.16'	L = 103.88	L = 61.86'
R = 100'	R = 98'	R = 125'

④ C & G	⑤ RET. WALL	⑥ ISLAND
Δ = 75° 04' 10"	Δ = 32° 19'	Δ = 17° 25' 11.6"
T = 103.17'	T = 35.64'	T = 22.98'
L = 172.50'	L = 69.4'	L = 45.61'
R = 125'	R = 123'	R = 150'

MANHOLE 108 IN.
#32 1 Ea.

MANHOLE RISER 108 IN.
#32 7.09 LF.

MANHOLE POURED
#35 1 Ea. (See Detail Drawing)
#41 1 Ea.

PIPE, CONC.REINF. CL.-III STORM DRAIN
#32 to #33 15" x 24 LF.
#32 to #34 15" x 64 LF.
#35 to #38 15" x 36 LF.
#37 to #39 12"x 38 L.F.
#39 to #41 15"x 56 L.F.
#41 to #42 15" x 33 LF.

INLET
#34 1 Ea.

INLET, TYPE-II
#33 1 Ea.

INLET, TYPE-I
#37 1 Ea.
#38 1 Ea.
#39 1 Ea.
#42 1 Ea.

ADJUST MANHOLE
64+23.0 Rt. 36.3' 1 Ea.

REMOVAL OF CONCRETE
PIPE CONC. REINF.CL. III, ST. DR. 61+00 to 65+00 Lt. 544.5 S.Y.
61+00 to 65+00 Rt. 865.0 S.Y.
#32 to #35 60" x 118 LF.
#35 to #41 88" x 54" x 94 LF.
#41 to 65+00 60" x 44 LF.

REMOVAL OF CONC. PVM'T.
61+00 to 65+00 2862.5 S.Y.

REMOVAL OF CURB & GUTTER
61+00 to, 65+00 Lt. 406.3 L.F.
61+00 to 65+00 Rt. 371.6 L.F.

ADJUST UTILITY APPURT.
61+22.6 Lt. 33.6' (W.S.V.) 1 Ea.
61+73.0 Lt. 33.7' (W.S.V.) 1 Ea.
61+95.0 Rt. 42.9' (W.S.V.) 1 Ea.
62+89.3 Lt. 33.0' (W.S.V.) 1 Ea.
63+57.5 Lt. 22.5' (W.S.V.) 1 Ea.

CURB & GUTTER- TYPE I
61+00 to 65+00 Lt. 380.1 L.F.
W. Median Island 61+56 to 63+53. 372.9 L.F.
E. Median Island 64+48.3 to 65+00 192.4 L.F.
S.W. Island 172.5 L.F.
S.E. Island 118.3 L.F.
61+00 to 65+00 Rt. 467.2 L.F.

REMOVAL OF MANHOLE
64+39 Rt. 29.7' 1 Ea.

DRIVEWAYS, CONCRETE, H.E.S.
62+24.7 Rt. 31.2 S.Y.
63+26.5 Lt. 21.4 S.Y.
See Note 750-P01

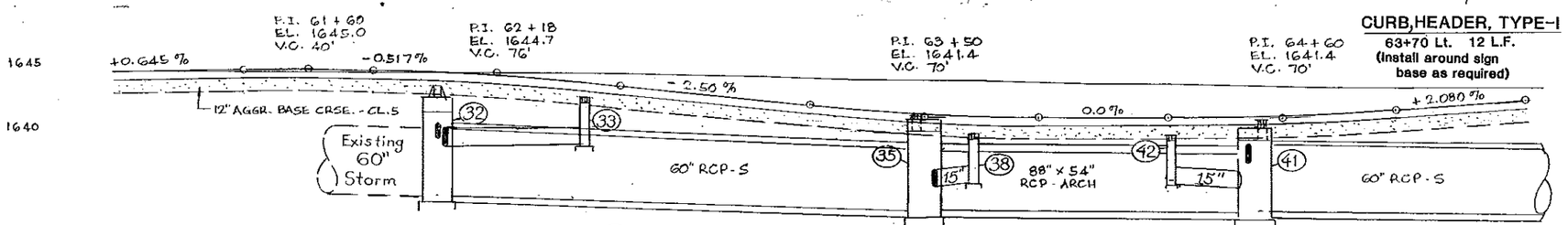
SIDEWALK CONCRETE
61+00 to 65+00 Lt. 187.3 S.Y.
61+00 to 65+00 Rt. 293.4 S.Y.
Median Island West 83.9 S.Y.
South West Island 137.8 S.Y.
Median Island East 19.4 S.Y.
South East Island 76.0 S.Y.

REMOVAL OF CULVERTS
62+30 to 65+00 Rt. (60") 270 L.F.

REMOVAL OF INLETS
63+73 Lt. 32' 1 Ea.
63+60 Rt. 40' 1 Ea.
64+38 Lt. 33' 1 Ea.

RELOCATE HYDRANT
64+26 Lt. 1 Ea.

CURB,HEADER, TYPE-I
63+70 Lt. 12 L.F.
(Install around sign base as required)



Inlet #	#33	#34
Type	T-II V.G.	Inlet
Sta.	62+53 Rt. 45.5'	62+55 Lt. 33.5'
Grate	1642.65	1643.80
Base	1638.82	1639.87
Inv.	1639.01	1640.06
Out.	1638.80	1639.66
"H"	3.50'	3.34'

Inlet #	#37	#38
Type	T-I, V.G.	T-I, V.G.
Sta.	63+90.3 Lt. 51'	63+65 Rt. 33.5'
Grate	1643.00	1640.11
Base	1637.71	1636.02
Inv.	1637.88	1636.21
Out.	1637.53	1636.00
"H"	4.70'	3.5'

Inlet #	#36	#42
Type	T-I, V.G.	T-I, V.G.
Sta.	64+29.8 Lt. 51'	64+26.2 Rt. 33.5'
Grate	1642.93	1640.02
Base	1637.34	1635.93
Inv.	1637.53	1636.12
Out.	1636.50	1635.92
"H"	5.00'	3.50'

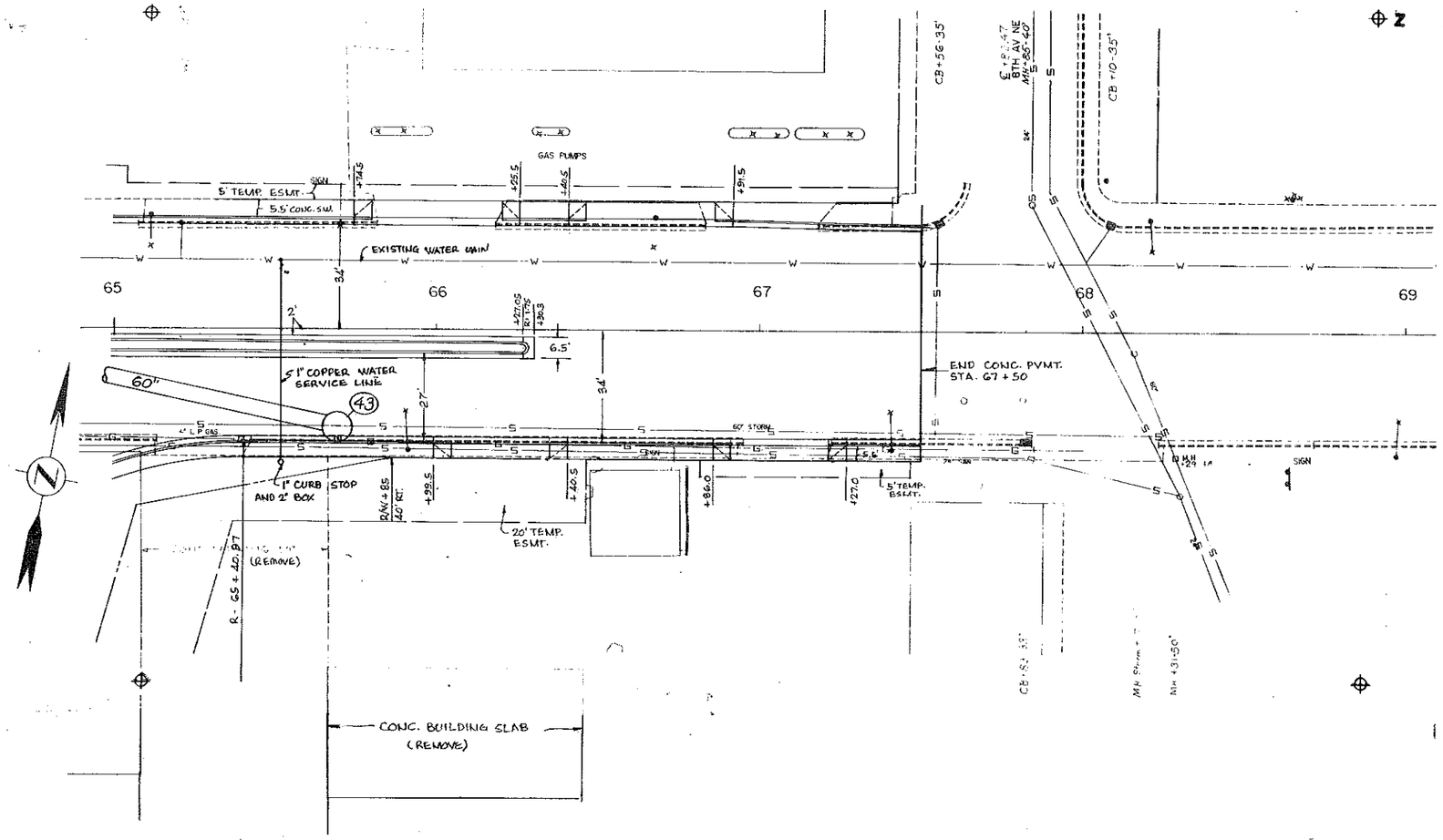
Manhole # #32
Type 108 In.
Sta. 62+30 Rt. 29.8'
Top 1643.81
Base 1634.64
Inv. 1635.14
Out. 1634.08
Riser 7.09'

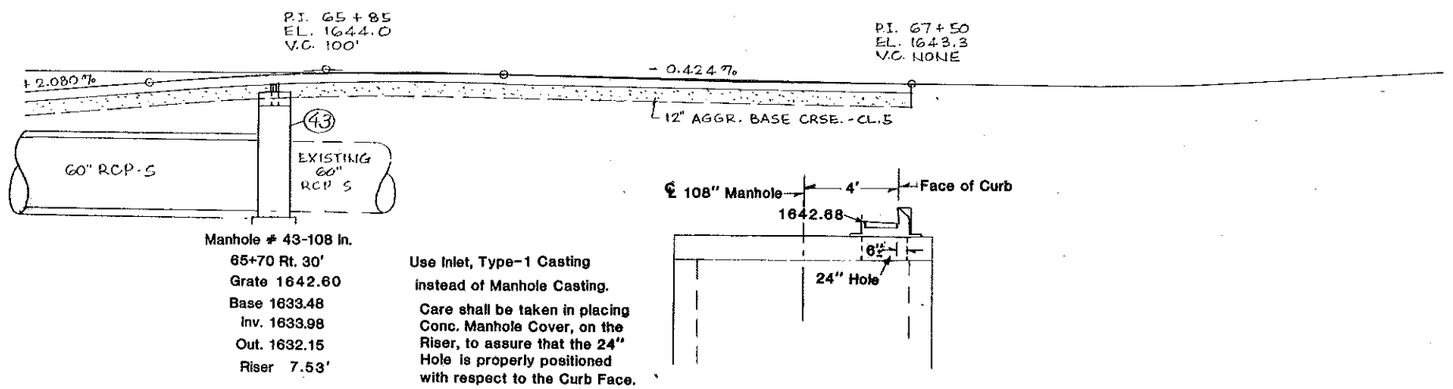
1640
1635
1630

V.G. Vaned Grate

MAIN STREET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-896(018)106,S	44





Manhole # 43-108 In.
65+70 Rt. 30'
Grate 1642.60
Base 1633.48
Inv. 1633.98
Out. 1632.15
Riser 7.53'

Use Inlet, Type-1 Casting instead of Manhole Casting.

Care shall be taken in placing Conc. Manhole Cover, on the Riser, to assure that the 24" Hole is properly positioned with respect to the Curb Face.

MANHOLE 108 IN.
#43 1 Ea.

MANHOLE RISER 108 IN.
#43 7.53 L.F.

PIPE, CONC. REINF. CL. III STORM DRAIN
65+00 to #43 60" x 71 L.F.

REMOVAL OF CURB & GUTTER
65+00 to 67+50 Lt. 250 L.F.
65+00 to 67+50 Rt. 250 L.F.

REMOVAL OF CONC. PVM'T.
65+00 to 67+50 1777.8 S.Y.

CURB & GUTTER - TYPE I
65+00 to 67+50 Lt. 250 L.F.
65+00 to 66+27 Med. 259.6 L.F.
65+00 to 67+50 Rt. 250.7 L.F.

DRIVEWAY CONCRETE H.E.S.

66+00.5 Lt.	40'	31.2 S.Y.
66+20 Rt.	30'	25.1 S.Y.
66+66 Lt.	40'	31.2 S.Y.
67+08.5 Rt.	30'	25.1 S.Y.

WATER SERVICE LINE-1 IN. COPPER
65+52 Rt. & Lt. 64 L.F.

ADJUST UTILITY APPURT.
65+21.3 32.9'Lt. 1 Ea.

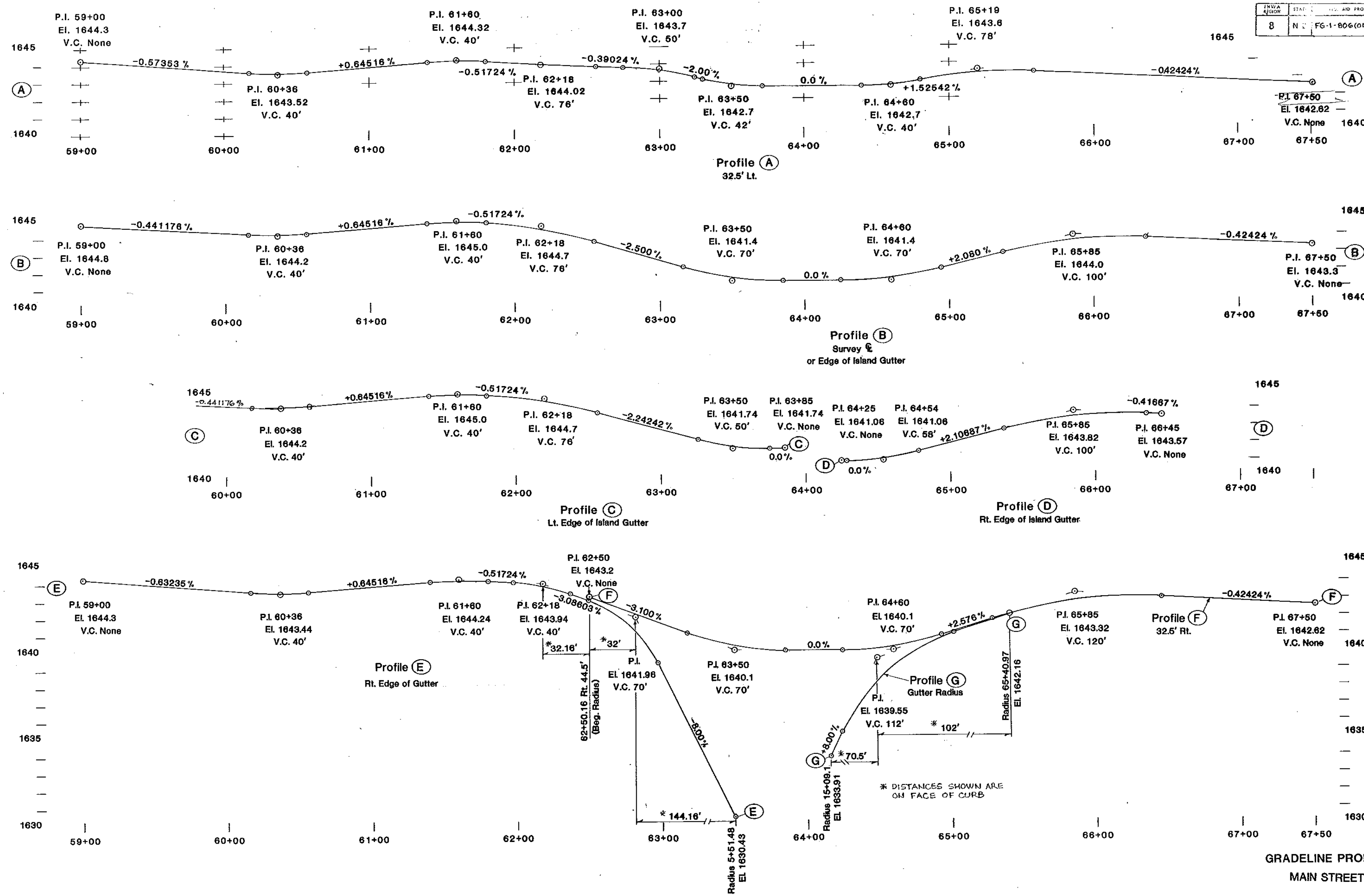
REMOVAL OF CONCRETE
65+00 to 67+50 Lt. 194.4 S.Y.
65+00 to 67+50 Rt. 1347.0 S.Y.

SIDEWALK CONCRETE
65+00 to 67+50 Lt. 98.4 S.Y.
65+00 to 66+27 Med. 35.6 S.Y.
65+00 to 67+50 Rt. 102.5 S.Y.

REMOVAL OF CULVERTS
65+00 to 65+70 Rt. 70 L.F.

MAIN STREET

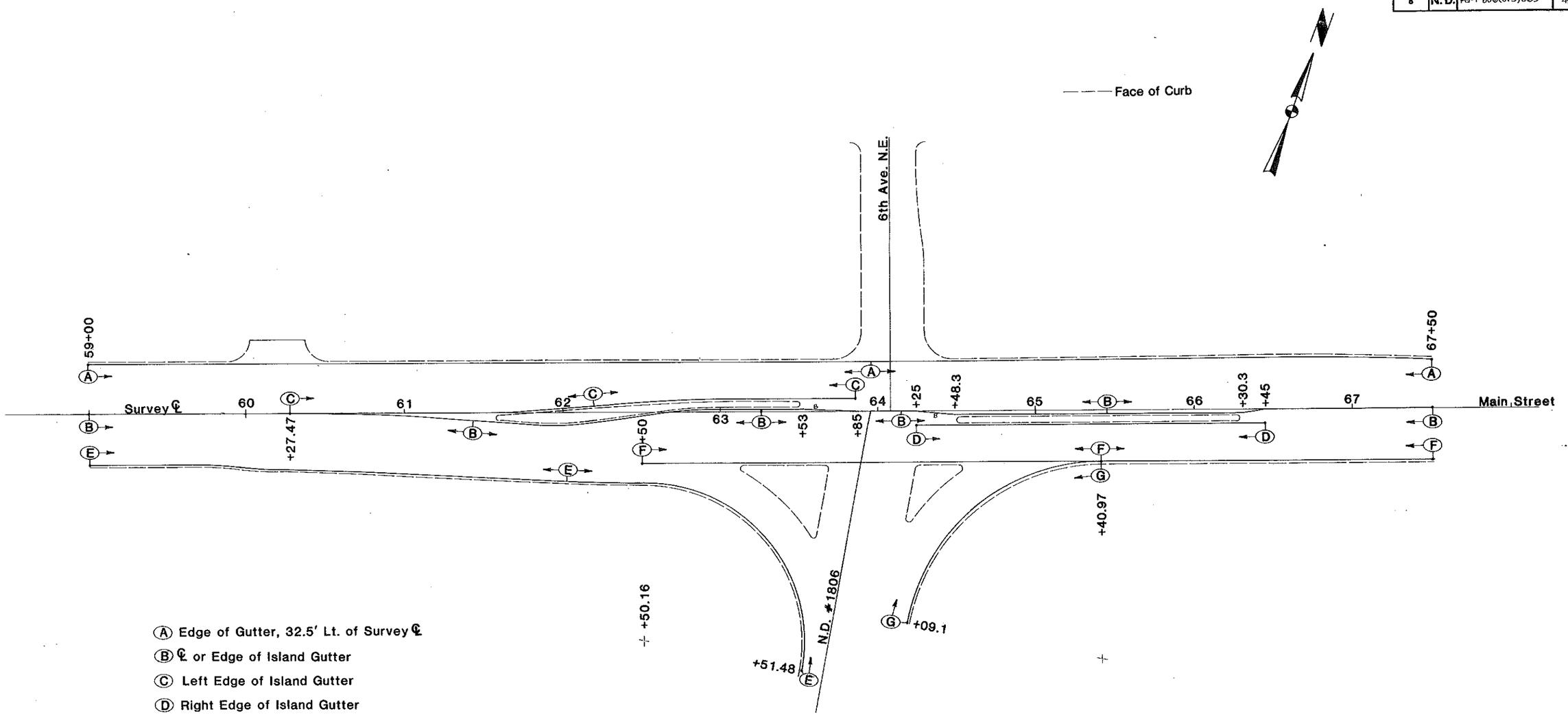
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N [illegible]	FG-1-806(015)069	45



GRADELINE PROFILE

MAIN STREET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	46



Ⓐ Edge of Gutter, 32.5′ Lt. of Survey ℄

Ⓑ ℄ or Edge of Island Gutter

Ⓒ Left Edge of Island Gutter

Ⓓ Right Edge of Island Gutter

Ⓔ Edge of Gutter

Ⓕ 32.5′ Rt. Edge of Gutter

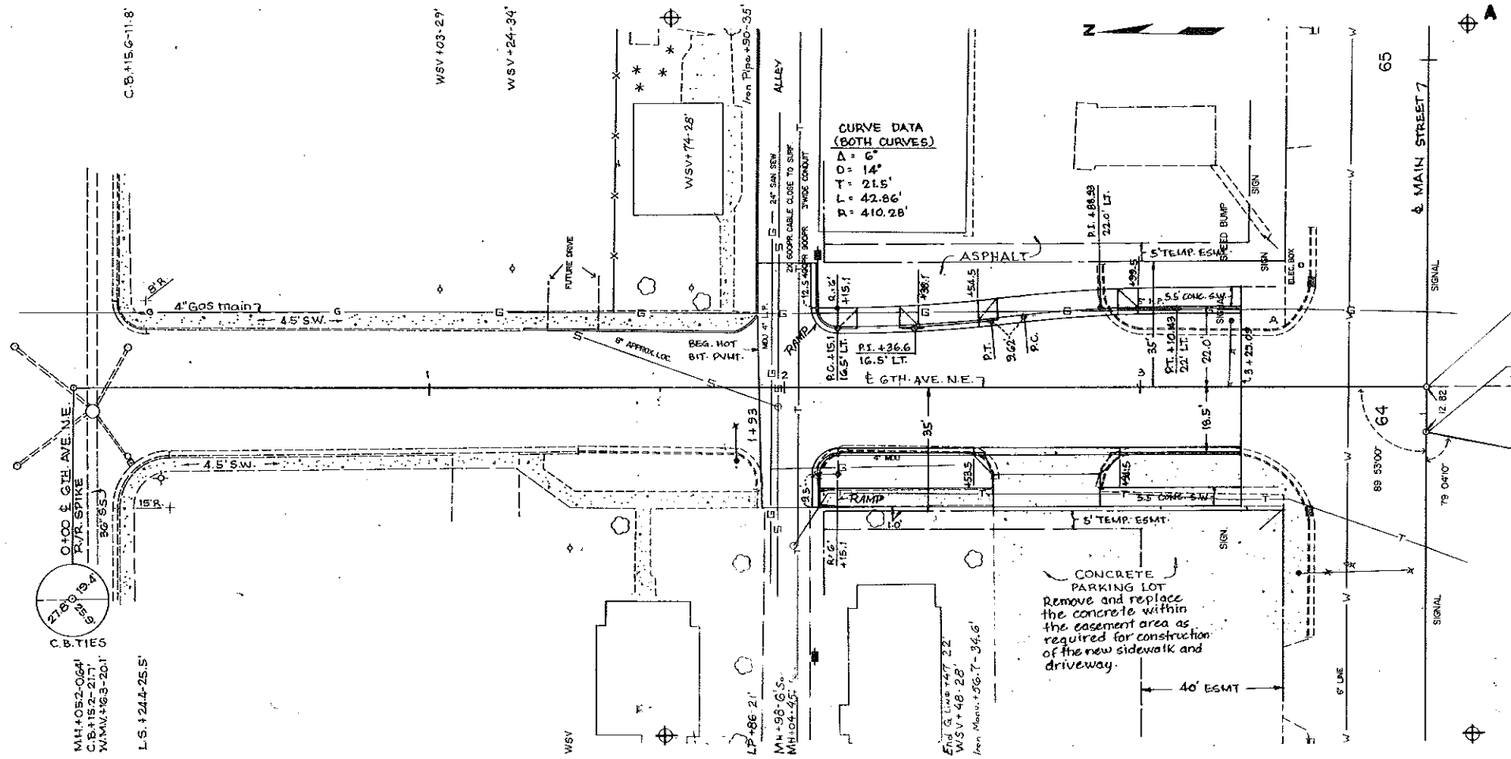
Ⓖ Edge of Gutter

GRADELINE LOCATION

MAIN STREET

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	FG-1-BRG(015)069	47

6TH AVE. N.E.



REMOVE CONCRETE
2+09 to 3+29.1 Rt. 190 S.Y.

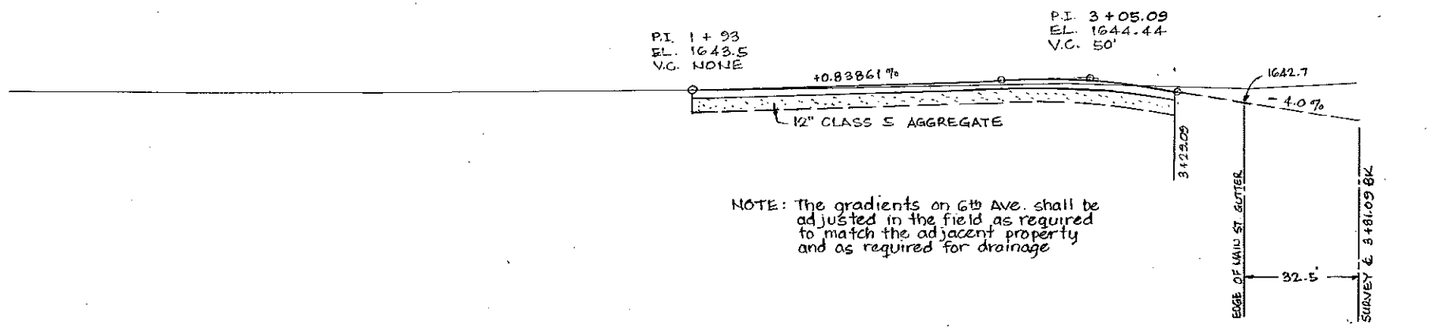
REMOVE CURB & GUTTER
2+89 to 3+29.1 Lt. 52 L.F.
2+09 to 3+29.1 Rt. 103 L.F.

CURB & GUTTER, TYPE-1
2+09.1 to 3+29.1 Lt. 135.9 L.F.
2+09.1 to 3+29.1 Rt. 132.9 L.F.

SIDEWALK, CONCRETE
2+09.6 to 3+29.1 Lt. 30.8 S.Y.
2+09.6 To 3+29.1 Rt. 54.7 S.Y.

DRIVEWAY, CONCRETE H.E.S.
2+26.6 Lt. (12') 14.1 S.Y.
2+77 Lt. (34') 27.5 S.Y.
2+74 Rt. (30') 53.4 S.Y.

ADJUST MANHOLE
1+98 Rt. 6' 1 Ea.



NOTE: The gradients on 6th Ave. shall be adjusted in the field as required to match the adjacent property and as required for drainage

BENCH MARK			
NO.	DESCRIPTION	LOCATION	ELEV.
10	TOP OF HYDRANT	64+27-44' LT.	1647.27

6TH. AVE. N.E. MANDAN

D	N.D	FG-1-BOG(015)069	48

CURB & GUTTER, TYPE-1
5+09.1 to 5+55.75 Lt. 46.6 L.F.
5+51.5 to 5+55.75 Rt. 4.3 L.F.

SIDEWALK, CONCRETE
5+09.1 to 8+00 Lt. 185.2 S.Y.
5+51.5 to 8+00 Rt. 145.9 S.Y.

REMOVE CURB & GUTTER
4+00 to 8+00 177 L.F.

REMOVE CONCRETE
4+00 to 8+00 165.1 S.Y.

REMOVE MANHOLE
6+55 Rt. 3' 1 Ea.
7+28 Lt. 85' 1 Ea.

REMOVE INLET
6+55 Lt. & Rt. 2 Ea.
6+07 Lt. & Rt. 2 Ea.
6+14 Rt. 1 Ea.
7+05 Lt. & Rt. 3 Ea.

REMOVE LIFT STATION
7+32 Lt. 68' 1 Ea.

REMOVE CONCRETE PAVEMENT
4+00 to 8+00 1315.6 S.Y.

INLET, DOUBLE CASTING
#28 1 Ea.
#25 1 Ea.

MANHOLE POURED TYPE "A"
#23 1 Ea. (See Detail Drawing)
#31 1 Ea.

UNDERDRAIN PIPE P.V.C. PERF. 6 IN
#23 to 8+00 Lt. 82 L.F.
7+10 to 8+00 Rt. 88 L.F.

See Manhole Details for #23, #31 & #20

PIPE, DUCTILE IRON 18 IN.
#28 to #25 60 L.F.
#25 to #23 10 L.F.

PIPE, DUCTILE IRON 30 IN.
#23 to #31 51 L.F.
#31 to #30 42 L.F.

PIPE, DUCTILE IRON 16 IN.
#31 To 8+00 20 L.F.

UNDERDRAIN PIPE, NON-PERF. 6 IN.
7+10 Rt. 4 L.F.

POLYSTYRENE INSULATION BOARD
* 4+90.35 to 6+27 29,700 Bd. Ft.
** 5+55.75 to 8+30 10,890 Bd. Ft.
* Under Roadway
** Behind Retaining Walls

Inlet #	#28	#25
Casting Type	Type II, Double	Type II, Double
Station	7+23.5 Rt.	7+23.5 Lt.
Grade	1620.97	1621.05
Bottom	1616.68	1615.98
Inv.	1616.72	1616.02
Out.	1616.02	1615.72

BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
1	Paint Spot N.E. Cor. Controller	4+47 - 48' Rt.	1646.21
2	Paint Spot on Sidewalk, N.W. Cor. Underpass	6+11 - 25' Rt.	1634.45

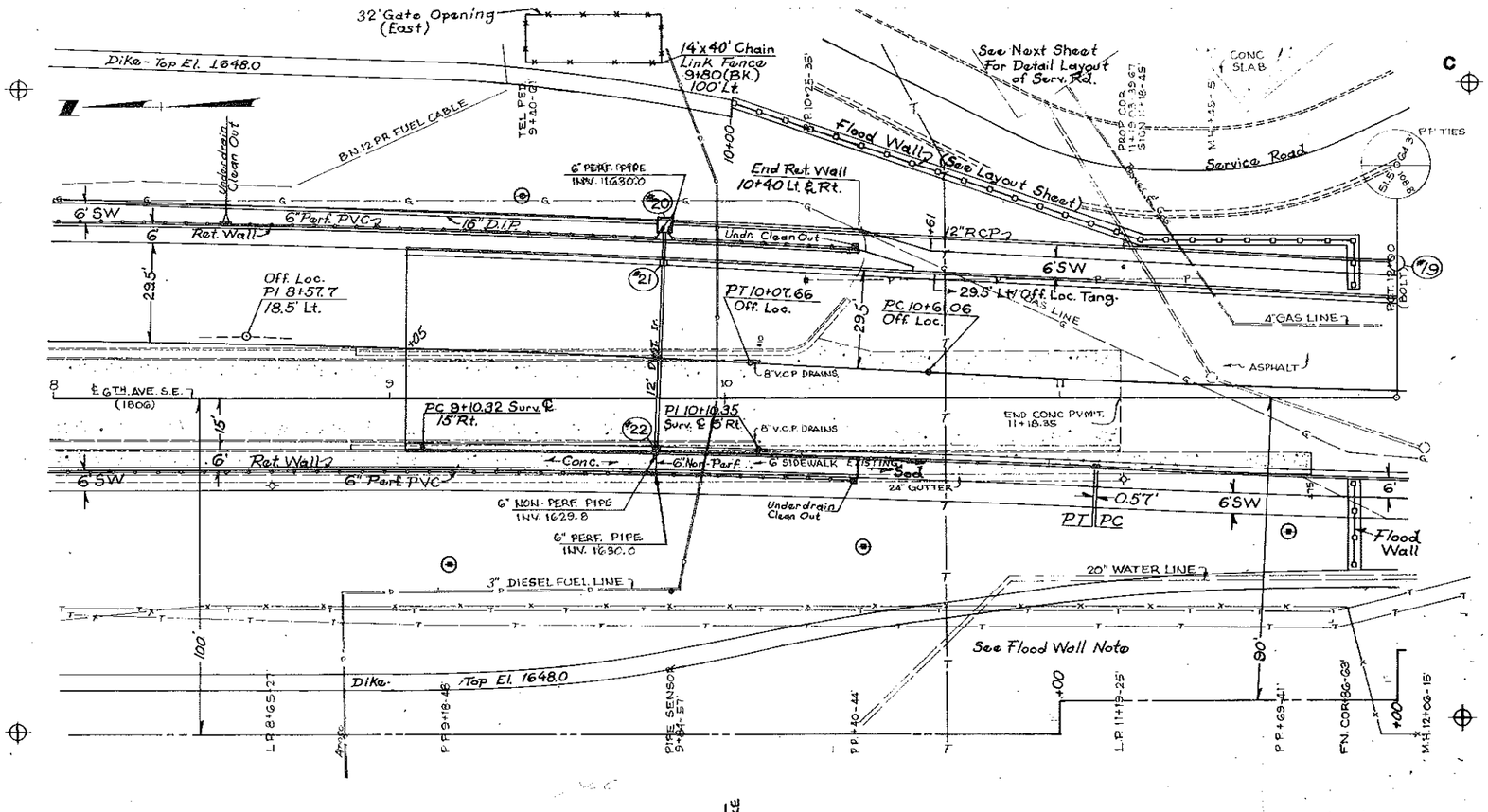
1806 MANDAN

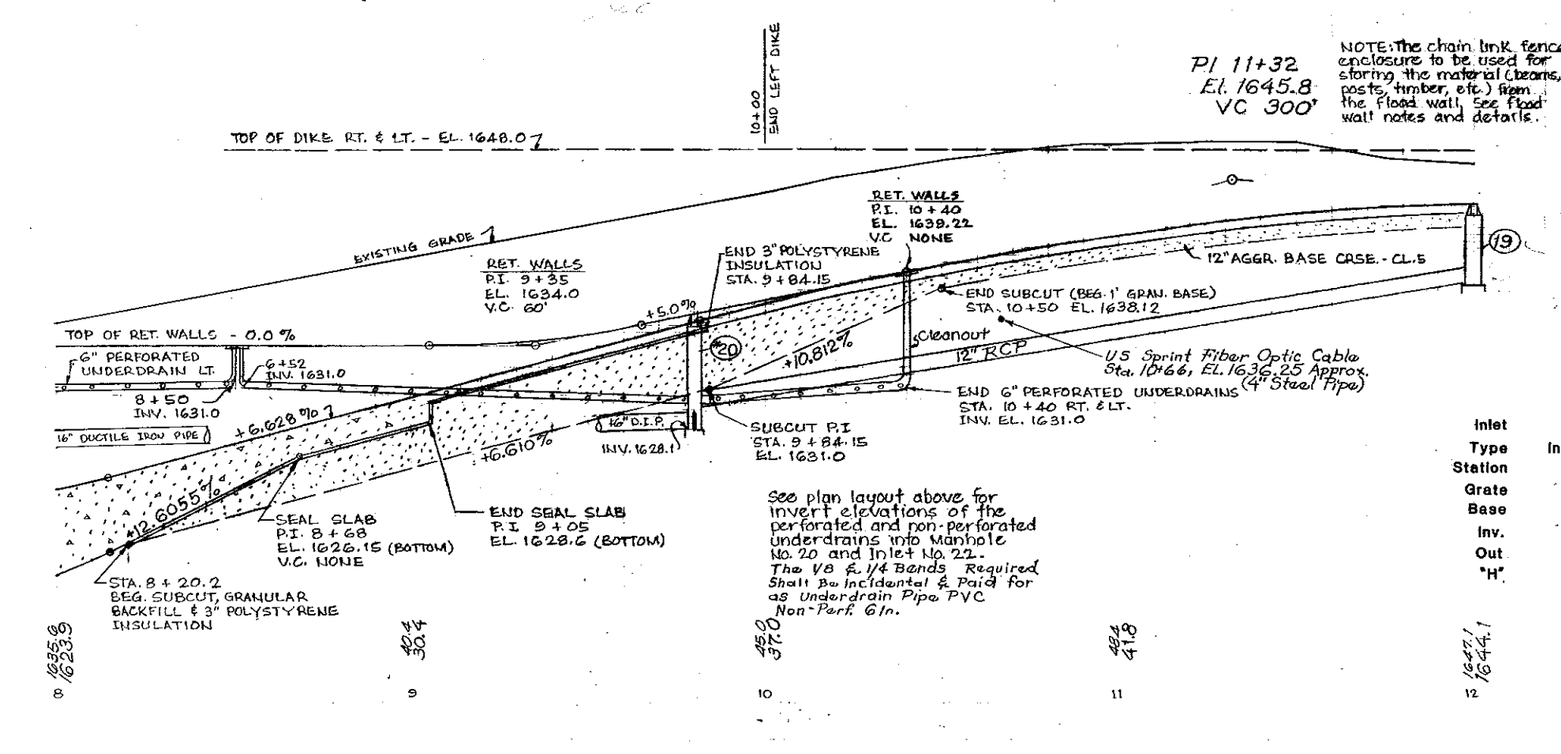
FED'L REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	49

Curve Data

Off. Loc.℄
Both Curves
Δ: 3°
D: 1°
T: 150.04'
L: 300.0'
R: 5729.65'

Right C & G
Both Curves
Δ: 3°
D: 1°30'
T: 100.03'
L: 200.0'
R: 3819.83'





ADJUST MANHOLE
11+45 Lt. 5' 1 Ea.

REMOVE CONCRETE PAVEMENT
8+00 to 12+00 1066.4 S.Y.

REMOVE CONCRETE
8+00 to 12+00 320.8 S.Y.

CURB & GUTTER, TYPE-1
9+05 to 12+00 Lt. 295 L.F.
9+05 to 12+00 Rt. 295 L.F.

SIDEWALK, CONCRETE
8+00 to 12+00 Lt. 267.2 S.Y.
8+00 to 12+00 Rt. 266.7 S.Y.

DUCTILE IRON PIPE 12 IN
#22 to #21 55 L.F. #20 to #21 10 L.F.

DUCTILE IRON PIPE 16 IN
8+00 to #20 178 L.F.

MANHOLE 48 IN
#19 1 Ea.

MANHOLE RISER 48 IN
#19 4.19 L.F.

PIPE CONC. REINF. CL.-III, SEWER 12 IN
#20 to #19 217 L.F.

UNDERDRAIN PIPE, P.V.C. PERF. 6 IN.
8+00 to 10+40 Lt. 238 L.F.
8+00 to 10+40 Rt. 238 L.F.

UNDERDRAIN PIPE P.V.C. NON-PERF. 6 IN.
8+50 Lt. 5 L.F. 10+40 Lt. 11 L.F.
8+52 Lt. 5 L.F. 10+40 Rt. 11 L.F.
9+80 Rt. 6 L.F.

FLOOD WALL (SEE DETAIL SHEET)
10+00 Lt. 88.5' to 11+86.5 Rt. 52.4' 1 L.S.

CHAIN LINK FENCE (See Detail Sheet)
9+80 to 9+80 Lt. 108 L.F.

CORNER ASSEMBLY CHAIN LINK
9+40 & 9+80 Lt. 4 Ea.

INLET VANED GRATE, TYPE-I
#22 1 Ea. #21 1 Ea.

48"Manhole #19

12+00 Lt.	38'
Top	1644.00
Base	1638.22
Inv.	1638.39
Out.	1629.66
Riser	4.19'

POLYSTYRENE INSULATION BOARD
* 8+20.2 to 9+84.15 34,220 Bd. Ft.
** 8+30 to 9+05 3,766 Bd. Ft.

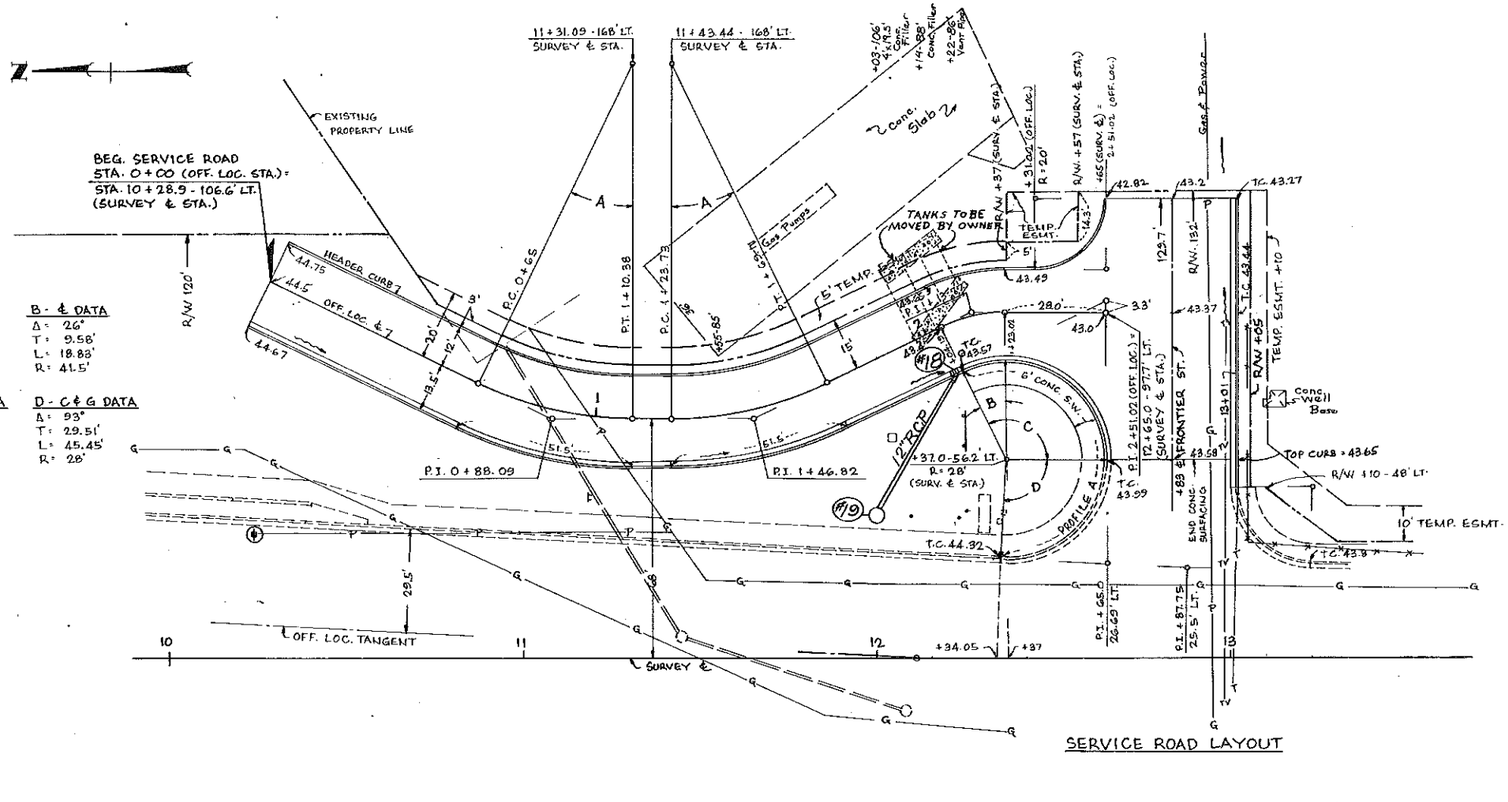
MANHOLE POURED TYPE "B"
#20 1 Ea.
(SEE DETAIL SHEET)

Inlet	#22	#21
Type	Inlet, Vaned Grate, Type I	Inlet, Vaned Grate, Type I
Station	9+80 Rt.	9+80 Lt.
Grate	1635.10	1635.06
Base	1629.33	1628.33
Inv.	1629.5	1628.5
Out	1628.5	1628.3
"H"	5.18'	6.14'

* Under Roadway
** Behind Retaining Walls

1806 MANDAN

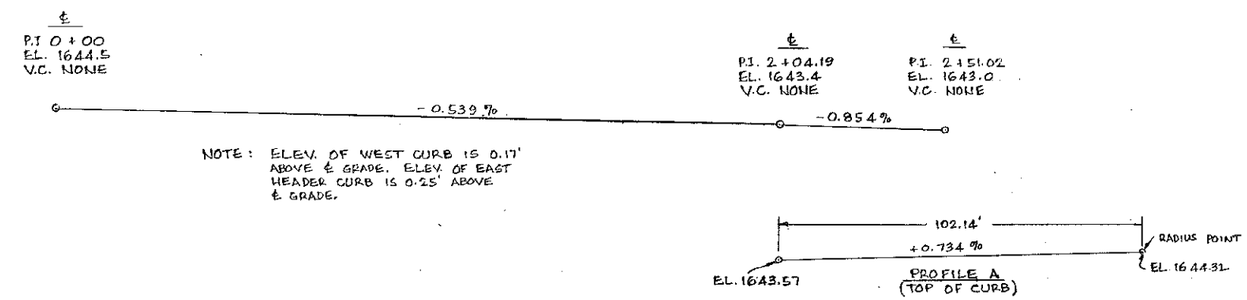
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N D	FG-T-806 (015)069	50



SERVICE ROAD LAYOUT

A - ℄ DATA	B - ℄ DATA
Δ = 26°	Δ = 26°
T = 23.09'	T = 9.58'
L = 45.38'	L = 18.88'
R = 100'	R = 41.5'

C - C&G DATA	D - C&G DATA
Δ = 116°	Δ = 93°
T = 44.81'	T = 29.51'
L = 56.69'	L = 45.45'
R = 28'	R = 28'



NOTE: ELEV. OF WEST CURB IS 0.17' ABOVE ℄ GRADE. ELEV. OF EAST HEADER CURB IS 0.25' ABOVE ℄ GRADE.

CURB & GUTTER, TYPE-1

0+00 to 2+51 Rt. Off. Loc. 273.1 L.F.
13+01 Lt. 84.5 L.F.

CURB, HEADER TYPE-1

0+00 to 2+51 Lt. Off. Loc. 256.9 L.F.

SIDEWALK CONCRETE

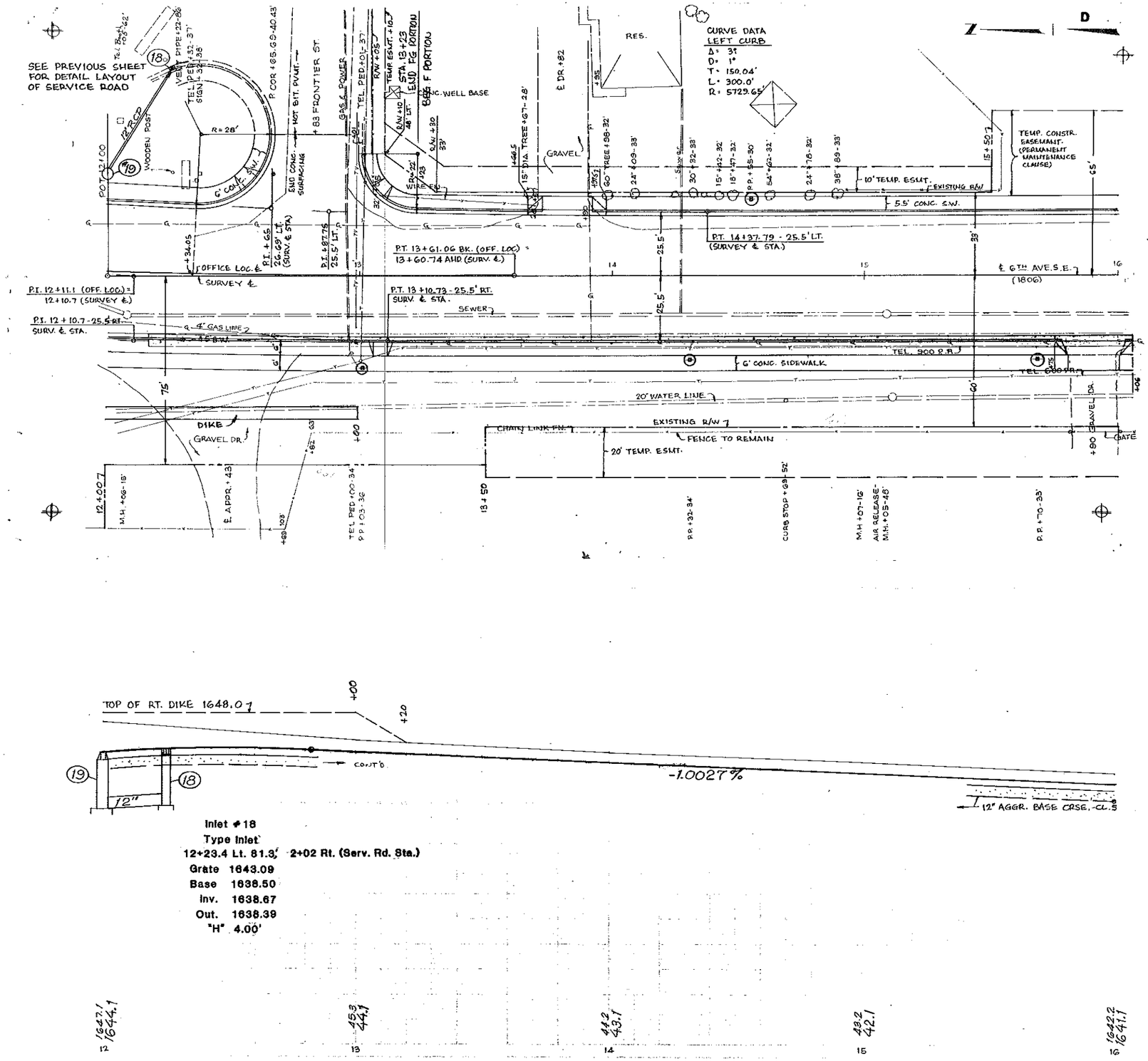
2+04.2 Rt. & Ahd. 33.4 S.Y.

INLET-TYPE I

#18 1 Ea.
(2+02 Rt Serv. Rd.)

1806 Mandan
Frontier Service Road

TRNSP. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-1-806(015)069	51



Inlet #18
Type Inlet
12+23.4 Lt. 81.3' 2+02 Rt. (Serv. Rd. Sta.)
Grate 1643.09
Base 1638.50
Inv. 1638.67
Out. 1638.39
"H" 4.00'

1642.1 / 1644.1 — 12
45.3 / 44.1 — 13
44.2 / 43.1 — 14
43.2 / 42.1 — 15
1642.2 / 1641.1 — 16

ADJUST MANHOLE
12+06 Rt. 15' 1 Ea.
15+07 Rt. 16' 1 Ea.

CURB & GUTTER, TYPE-1
12+00 to 12+65 Lt. 79.5 L.F.
13+01 to 16+00 Lt. 311.8 L.F.
12+00 to 16+06 Rt. 406 L.F.

SIDEWALK, CONCRETE
12+00 to 16+00 Lt. 236.8 S.Y.
12+00 to 16+06 Rt. 257.3 S.Y.

DRIVEWAY, CONCRETE (H.E.S.)
13+82 Lt. (20') 18.9 S.Y.
15+90 Rt. (20') 28.9 S.Y.

PIPE, CONC. REINF. CL-III, STORM DRAIN
#18 to #19 12" x 47 L.F.

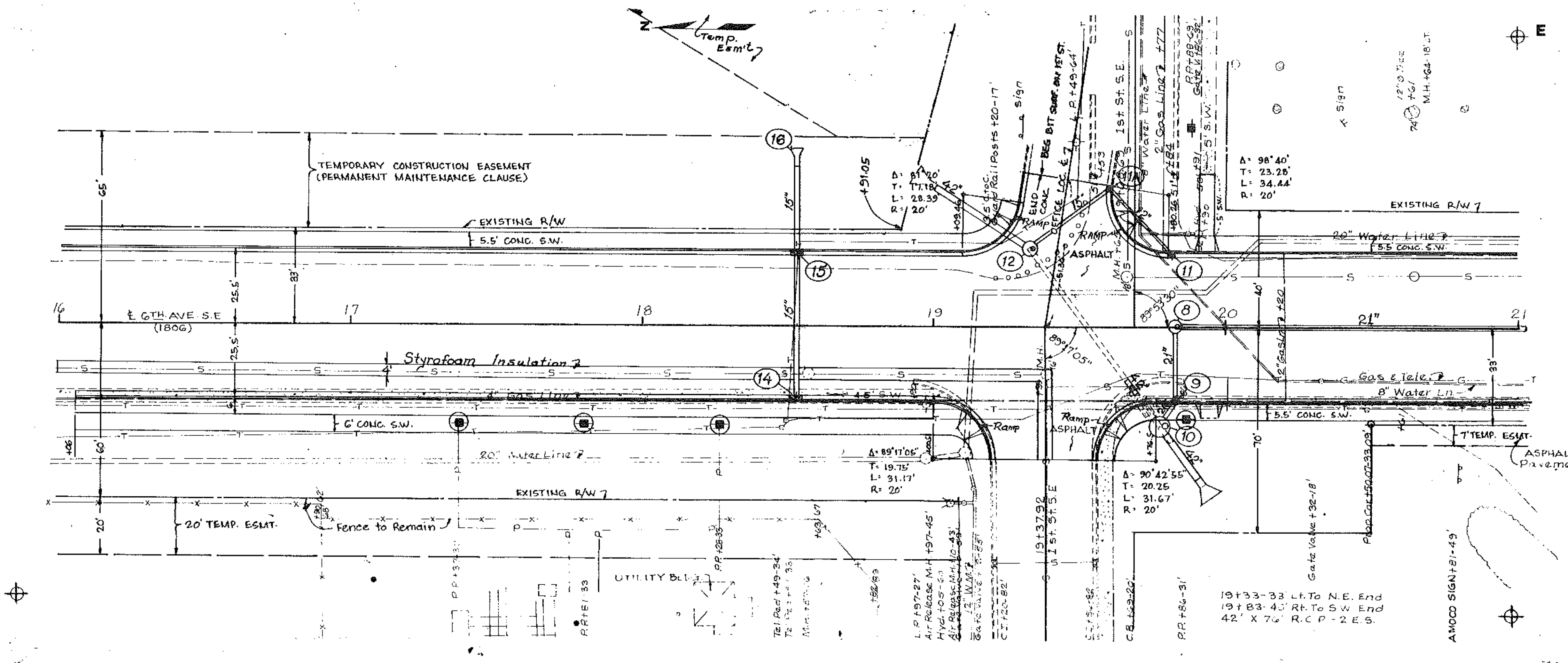
REMOVAL OF TREES
13+67 Lt. 28' (18"Ø) 1 Ea.
13+98 Lt. 32' (30"Ø) 1 Ea.
14+09 Lt. 33' (30"Ø) 1 Ea.
14+32 Lt. 33'(30"Ø) 1 Ea.
14+42 Lt. 32' (18"Ø) 1 Ea.
14+47 Lt. 32' (18"Ø) 1 Ea.
14+62 Lt. 32' (30"Ø) 1 Ea.
14+78 Lt. 32' (30"Ø) 1 Ea.
14+89 Lt. 33' (30"Ø) 1 Ea.

REMOVAL OF CONCRETE
12+15 to 16+00 Rt. 192 S.Y.

BENCH MARKS			
No.	Description	Location	Elev.
3	Point Spot S.W. cor. Tele. Booth	12+88-45' Lt.	1645.10

1806 MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-I-806 (015)069	52



REMOVE CONCRETE
16+00 to 21+00 230.5 S.Y.

REMOVE CURB & GUTTER
18+90 to 19+86 Rt. 85.5. L.F.

ADJUST MANHOLE
18+57 Rt. 16' 1 Ea.
19+39 Rt. 16' 1 Ea.
19+65 Lt. 18' 1 Ea.
20+64 Lt. 18' 1 Ea.

CURB & GUTTER, TYPE-1
16+00 to 21+00 Lt. 502 L.F.
16+00 to 21+00 Rt. 486.8 L.F.

SIDEWALK, CONCRETE
16+00 to 21+00 Lt. 306.1 S.Y.
16+00 to 21+00 Rt. 314.5 S.Y.

ADJUST UTILITY APPURTENANCE
20+32 Rt. 18' (G.V.) 1 Ea.

INLET, TYPE II
#9 1 Ea.

INLET
#11 1 Ea.
#11A 1 Ea.

INLET, DOUBLE
#14 1 Ea.
#15 1 Ea.

MANHOLE 60 IN.
#12 1 Ea.

MANHOLE 48 IN.
#8 1 Ea.

MANHOLE RISER 60 IN.
#12 6.8 L.F.

MANHOLE RISER 48 IN.
#8 7.57 L.F.

MANHOLE 84 IN.
#10 1 Ea.

REMOVAL OF INLET
19+69 Rt. 1 Ea.

MANHOLE RISER 84 IN.
#10 7.87 L.F.

PIPE, CONC. REINF. CL.-III, STORM DRAIN
#14 to #15 15" x 48 L.F.
#15 to #16 15" x 29 L.F.
21+00 to #8 21" x 116 L.F.
#8 to #9 21" x 23 L.F.
#9 to #10 21" x 8 L.F.
#11A to #12 15" x 33 L.F.
#11 to #11A 12" x 32 L.F.

PIPE, CONC. REINF. CL-II, STORM DRAIN
19+00 Lt. to #12 42" x 42 L.F.
#10 to 19+91 Rt. 42" x 22 L.F.
✳ 19+69 Rt. 42" x 6 L.F.

✳ To be installed if required after inlet is removed.

END SECTION, CONC. REINF. 15 IN.
#16 1 Ea.

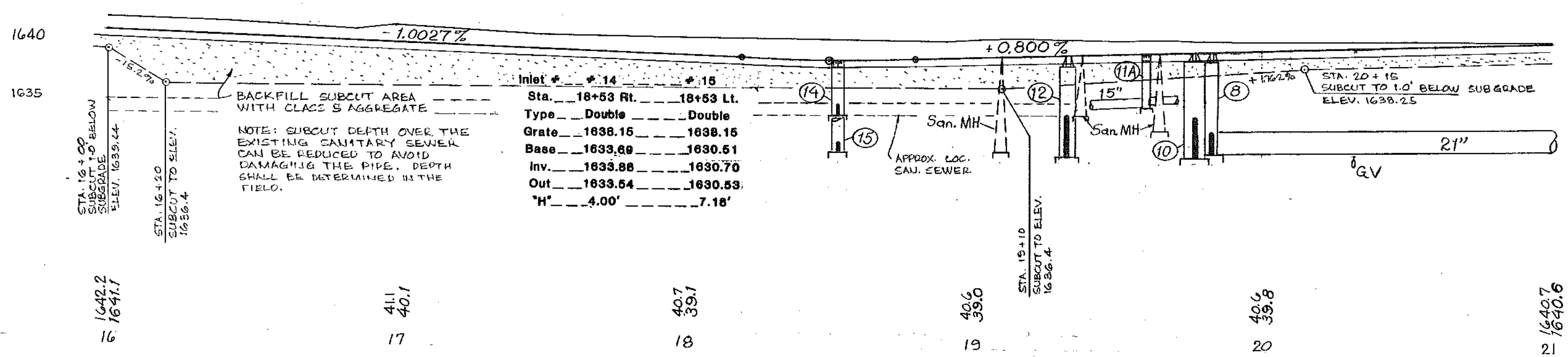
END SECTION, CONC. REINF. 42 IN.
19+00 Lt. 1 Ea.
19+91 Rt 1 Ea.

POLYSTRENE INSULATION BOARD
16+00 to 19+41 Rt 16'± 4092 Bd. Ft.
19+39 Rt. 18' to 44' Rt. 312 Bd. Ft.

MH #	#8-48"	#10-84"	#12-60"
Sta.	19+83 ℄	19+77 Rt. 34'	19+33 Lt. 26'
Top	1639.66	1639.65	1638.72
Base	1630.50	1630.02	1630.16
Inv.	1630.73	1630.39	1630.53
Out.	1630.53	1630.39	1630.53
Riser	7.57'	7.67'	6.80'

Inlet #	# 9	# 11	# 11A
Sta.	19+83 Rt.	19+81.3 Lt.	19+60 Lt. 48.7'
Type	T-II, V.G.	Inlet	Inlet
Grate	1638.98	1639.07	1639.00
Base	1630.30	1634.98	1634.67
Inv.	1630.53	1635.15	1634.76
Out.	1630.39	1634.95	1634.56
"H"	8.19'	3.50'	3.84'

PI 18+50
El. 1638.6
VC 60'



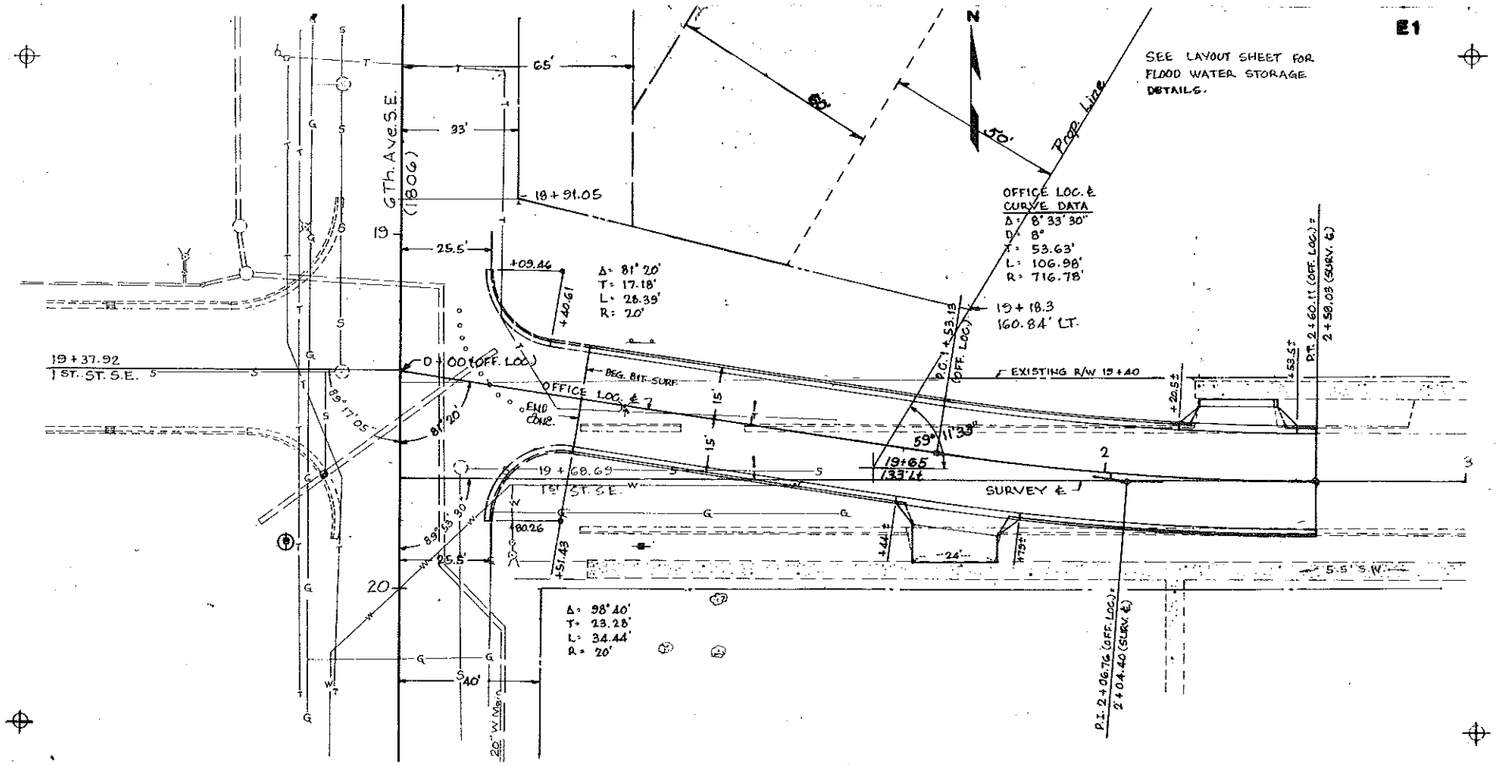
Inlet #	# 14	# 15
Sta.	18+53 Rt.	18+53 Lt.
Type	Double	Double
Grate	1638.15	1638.15
Base	1633.69	1630.51
Inv.	1633.88	1630.70
Out	1633.54	1630.53
"H"	4.00'	7.18'

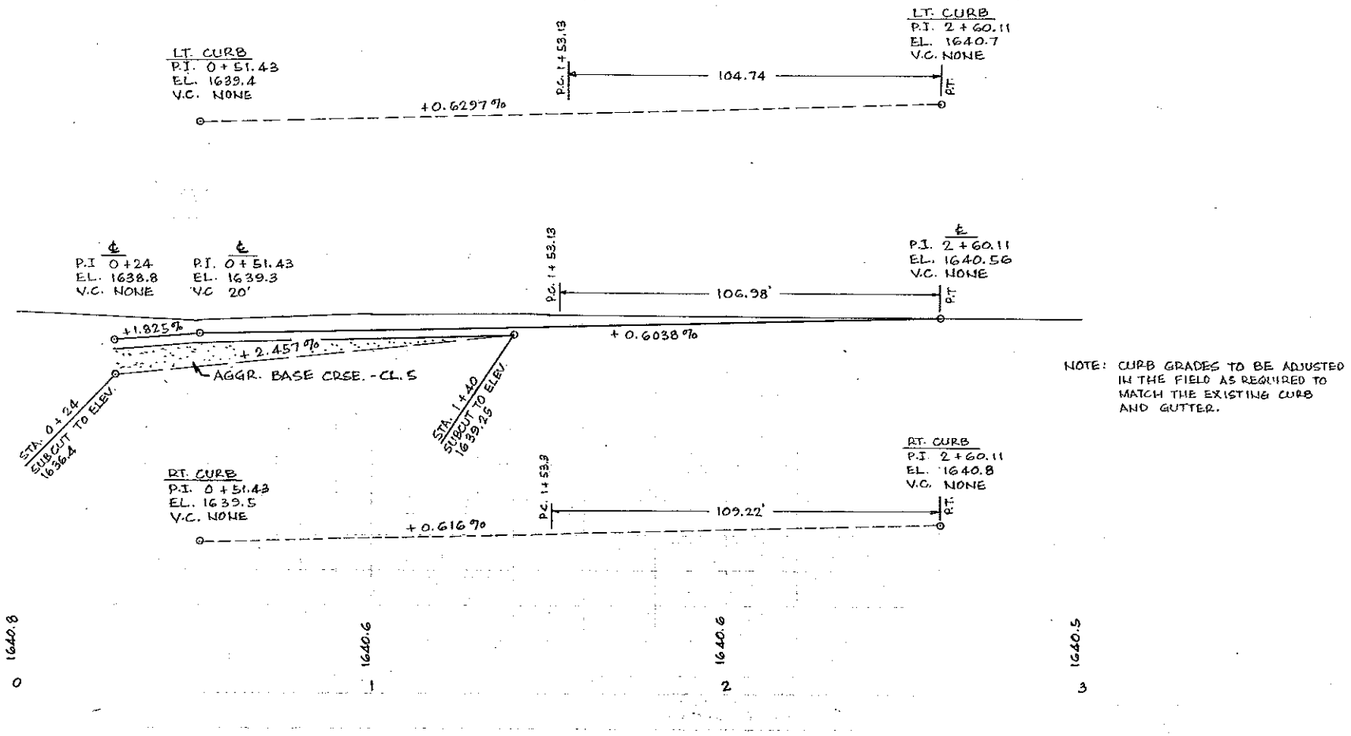
1645
1640
1635

BENCH MARK			
NO.	DESCRIPTION	LOCATION	ELEV.
4	Top of Hydr.	19+90 - 32' Lt.	1642.86

1806 MANDAN

PROJECT NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
B	N.D.	F-1-806(15)069	53





NOTE: CURB GRADES TO BE ADJUSTED IN THE FIELD AS REQUIRED TO MATCH THE EXISTING CURB AND GUTTER.

REMOVE CONCRETE

0+00 to 2+58 41.2 S.Y.

REMOVE CURB & GUTTER

0+50 to 2+58 Surv. 398 L.F.

CURB & GUTTER, TYPE-I

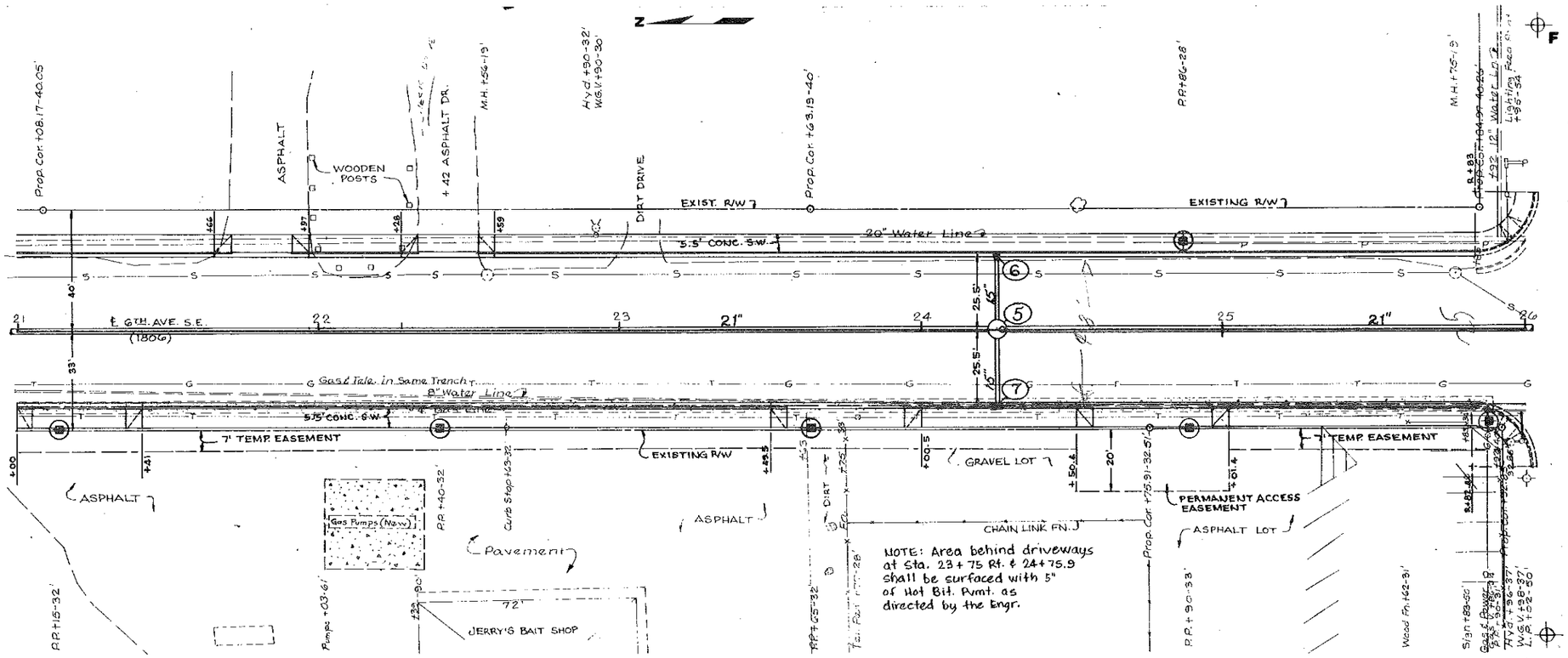
0+40.6 to 2+60 Lt. 208 L.F.
0+51.4 to 2+60 Rt. 210.9 L.F.

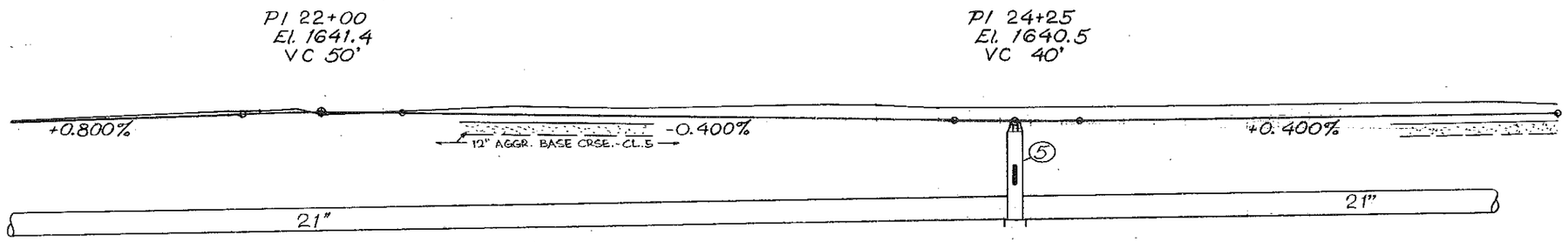
DRIVEWAY, CONCRETE H.E.S.

1+81.5 Rt. (24') 42 S.Y.
2+37 Lt. (22') 21.7 S.Y.

1ST ST. S.E. MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	54





MH #5-60"	
24+25 ℄	
Top	1640.54
Base	1632.25
Inv.	1632.46
Out.	1630.79
Riser	8.53'

Inlet #	#6	#7
Type	Inlet	Double
Sta.	24+25 Lt.	24+25 Rt.
Grate	1639.96	1639.96
Base	1635.37	1635.50
Inv.	1635.56	1635.69
Out.	1635.36	1635.49
"H"	4.00'	4.00'

1640.7 / 1640.6 — 21
41.2 / 41.3 — 22
41.6 / 41.0 — 23
41.6 / 40.6 — 24
41.8 / 40.8 — 25
1641.9 / 1641.2 — 26

REMOVE CONCRETE
21+00 to 26+00 245 S.Y.

REMOVE CURB & GUTTER
25+85 to 26+00 Lt. 20 L.F

ADJUST MANHOLE
22+56 Lt. 19' 1 Ea.
25+76 Lt. 19' 1 Ea.

CURB & GUTTER, TYPE-1
21+00 to 25+83 Lt. 483 L.F.
21+00 to 25+82.4 Rt. 482.4 L.F.

SIDEWALK, CONCRETE
21+00 to 25+83 Lt. 257.3 S.Y.
21+41 to 25+82.4 Rt. 207.4 S.Y.

DRIVEWAY, CONCRETE H.E.S.
21+20.5 Rt. (30') 25.1 S.Y.
21+81.5 Lt. (20') 16.9 S.Y.
22+43.5 Lt. (20') 16.9 S.Y.
23+75 Rt. (40') 31.2 S.Y.
24+75.9 Rt. (40') 31.2 S.Y.

ADJUST UTILITY APPURTENANCE
25+98 Rt. 37' (W.G.V.) 1 Ea.
22+80 Lt. 30' (W.G.V.) 1 Ea.

MANHOLE 60 IN.
#5 1 Ea.

MANHOLE RISER 60 IN.
#5 8.53 L.F.

INLET #6 1 Ea.

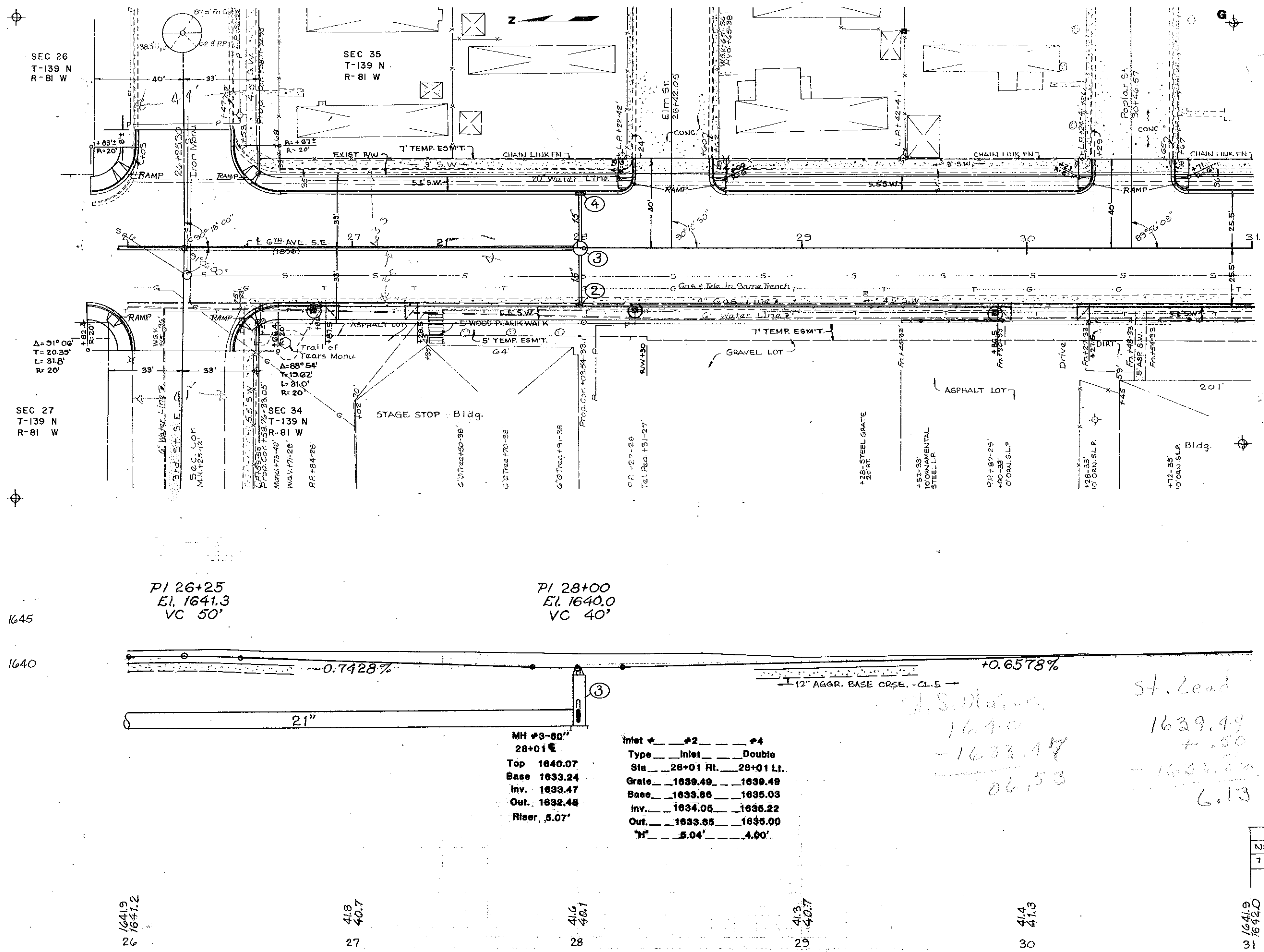
INLET, DOUBLE #7 1 Ea.

PIPE, CONC. REINF., CL-III, STORM DRAIN
21+00 to #5 21" x 328 L.F.
#5 to 26+00 21" x 178 L.F.
#5 to #6 18" x 22 L.F.
#5 to #7 18" x 22 L.F.

BENCH MARKS			
No.	DESCRIPTION	LOCATION	ELEV.
5	Top of Hydrant	22+90-32' Lt.	1643.14
6	Top of Hydrant	25+96-37' Rt.	1644.80

1806 MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-1-806(015)069	55



MH #3-60"
28+01 ℄
Top 1640.07
Base 1633.24
Inv. 1633.47
Out. 1632.48
Riser 5.07'

Inlet #	#2	#4
Type	Inlet	Double
Sta	28+01 Rt.	28+01 Lt.
Grate	1639.49	1639.49
Base	1633.66	1635.03
Inv.	1634.05	1635.22
Out.	1633.65	1635.00
"H"	5.04'	4.00'

REMOVE CONCRETE
26+00 to 31+00 361.2 S.Y.

ADJUST MANHOLE
26+25 Rt. 12' 1 Ea.

REMOVE INLET
29+28 Rt. 1 Ea.

CURB & GUTTER, TYPE-1
25+83 to 31+00 Lt. 487.4 L.F.
25+82.4 to 31+00 Rt. 498.4 L.F.

SIDEWALK, CONCRETE
25+83 to 31+00 Lt. 272.8 S.Y.
25+82.4 to 31+00 Rt. 250.4 S.Y.

DRIVEWAY, CONCRETE H.E.S.
27+08 Rt. (30') 25.1 S.Y.
30+07 Rt. (30') 25.1 S.Y.

ADJUST UTILITY APPURTENANCE
26+15 Rt. 36' (W.G.V.) 1 Ea.
26+71 Rt. 28' (W.G.V.) 1 Ea.
28+65 Lt. 38' (W.G.V.) 1 Ea.

REMOVAL OF CURB & GUTTER
26+00 to 31+00 429.7 L.F.

INLET
#2 1 Ea.

INLET, DOUBLE
#4 1 Ea.

MANHOLE 60 IN.
#3 1 Ea.

MANHOLE RISER 60 IN.
#3 5.07 L.F.

PIPE, CONC. REINF. CL-III, STORM DRAIN
26+00 to #3 21" x 198 L.F.
#2 to #3 15" x 22 L.F.
#3 to #4 15" x 22 L.F.

BENCH MARK			
NO.	DESCRIPTION	LOCATION	ELEV
7	Top of Hydrant	28+65-38'Lt.	1642.97

1806 MANDAN

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	56

REMOVE CONCRETE
31+00 to 33+25 116.4 S.Y.

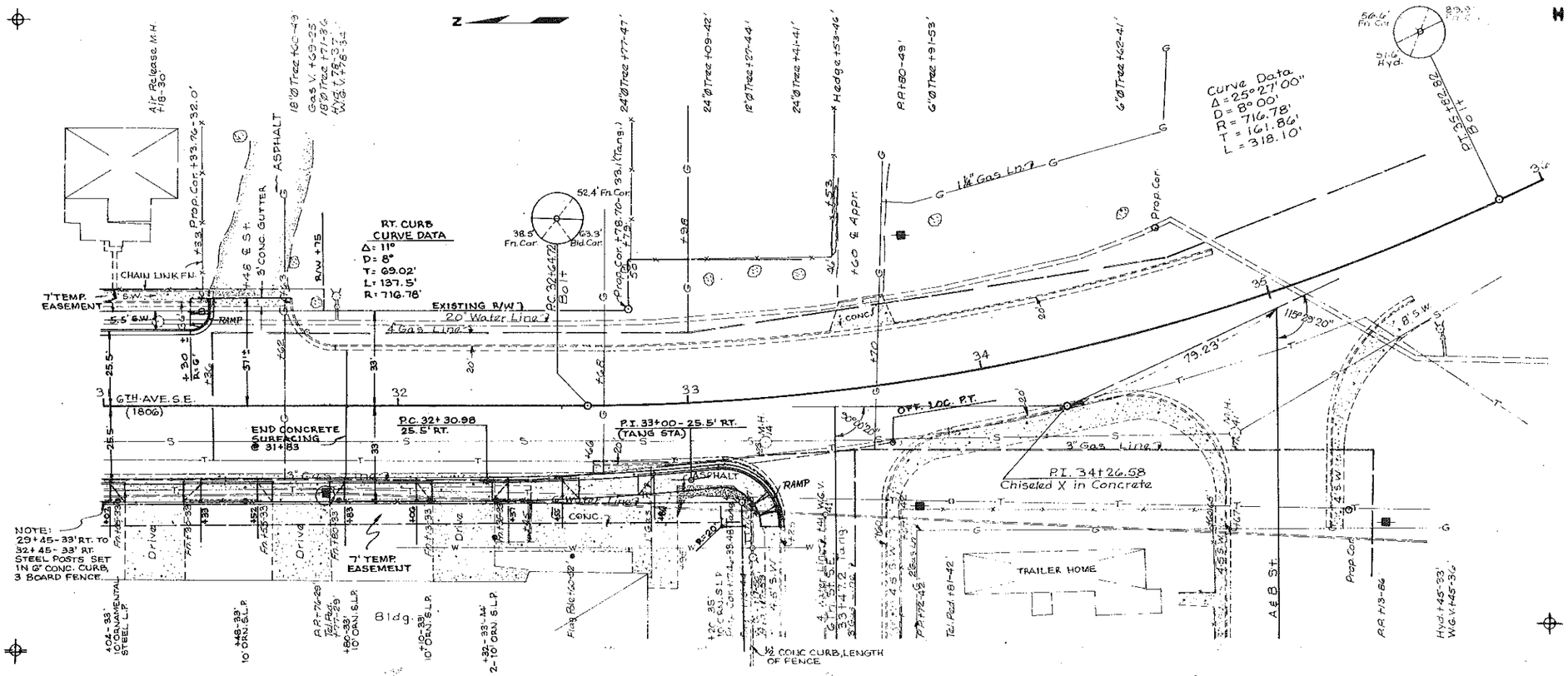
REMOVE CURB & GUTTER
31+00 to 33+25 114 L.F.

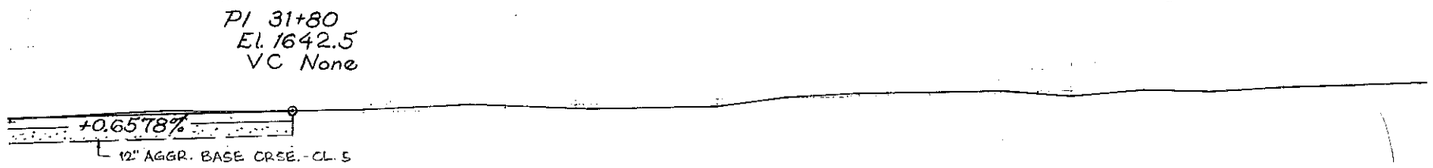
CURB & GUTTER, TYPE-1
31+00 to 31+36 Lt. 44.9 L.F.
31+00 to 33+25 Rt. 252 L.F.

SIDEWALK CONCRETE
31+00 to 31+35.5 Lt. 24.3 S.Y.
31+00 to 33+24.5 Rt. 84.5 S.Y.

DRIVEWAY, CONCRETE H.E.S.
31+17.5 Rt. (20') 18.9 S.Y.
31+67.5 Rt. (20') 18.9 S.Y.
32+21.5 Rt. (20') 18.9 S.Y.
32+70.5 Rt. (20') 18.9 S.Y.

ADJUST MANHOLE
31+18 Lt. 30" 1 Ea.





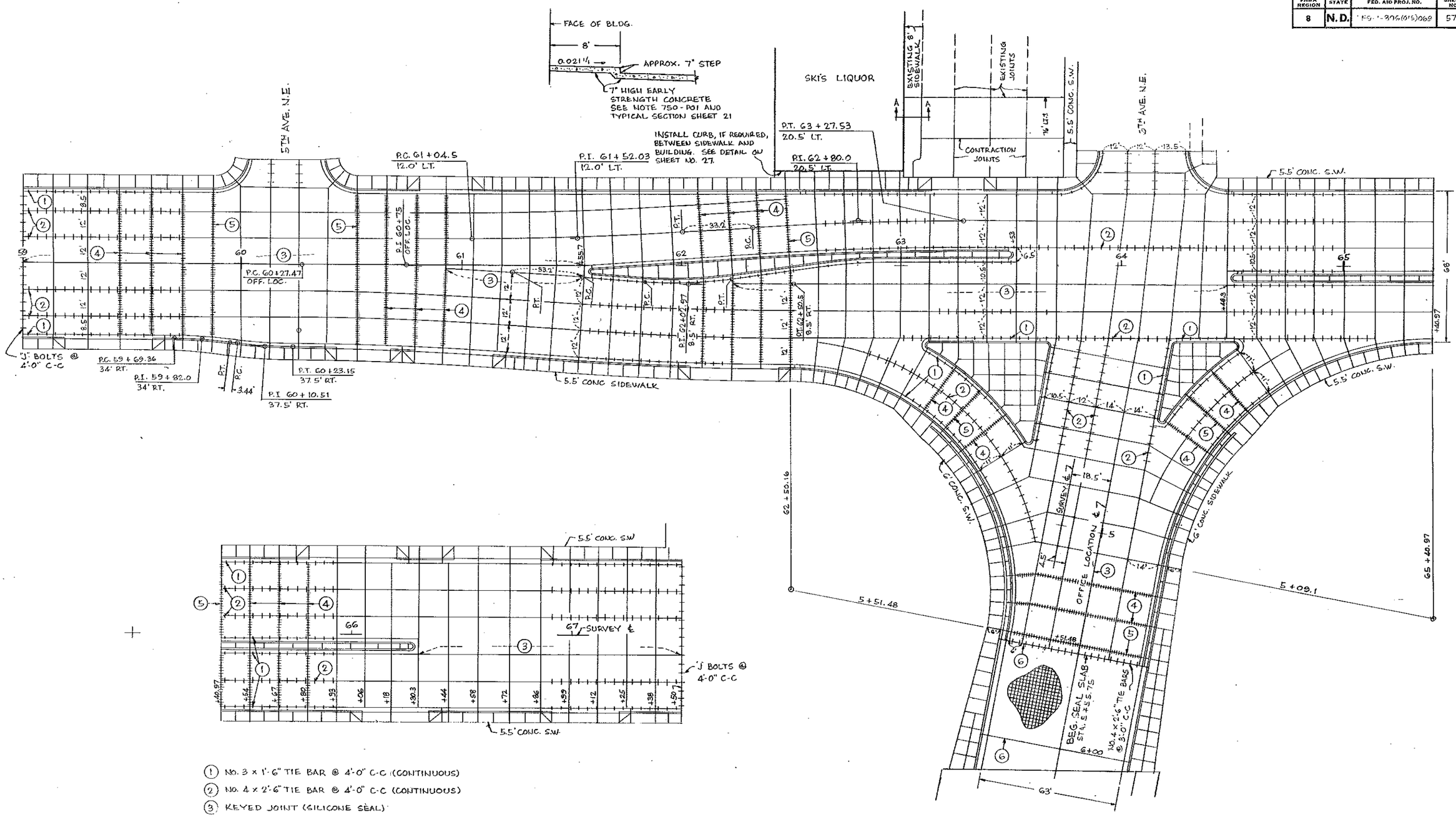
NOTE:
Curb grades ahead of Sta 31+80 shall be established in the field as required to match the existing roadway and existing drives and concrete surfaced areas. Excavate between the existing roadway surfacing and the new curb and gutter as required for placement of 8" Hot Bituminous Pavement. The existing concrete behind the new driveways shall be removed and replaced as required.

BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
8	TOP OF HYDRANT	31+78-37' LT.	1644.13
9	TOP OF HYDRANT	35+45-33' RT.	1648.25

1641.9
1642.0
42.6
42.8
43.6
1644.7
31
32
33
34
35
36

1806 MANDAN

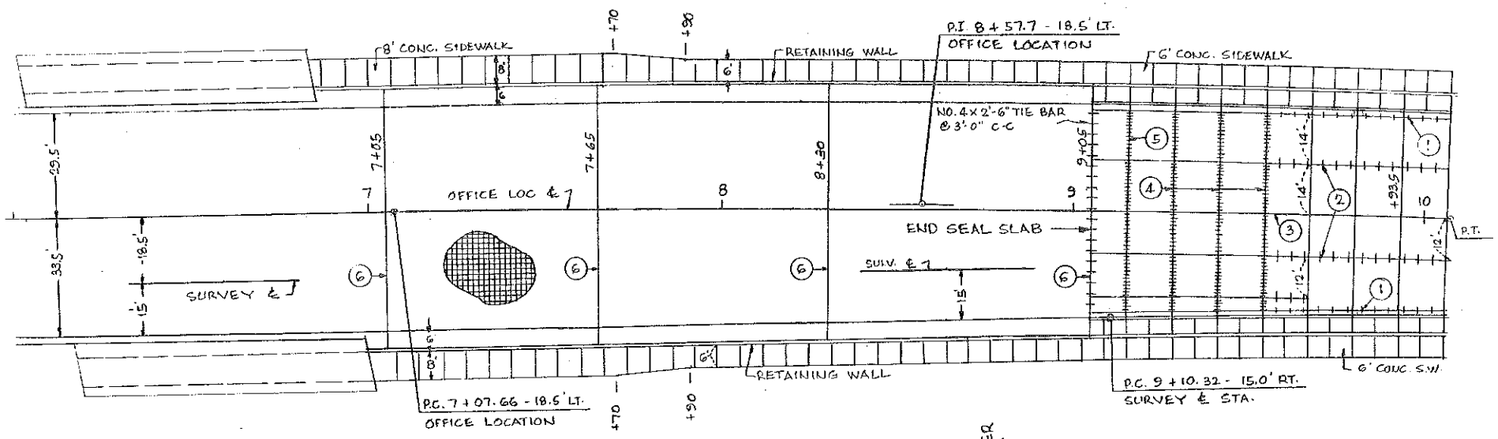
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-396(015)069	57

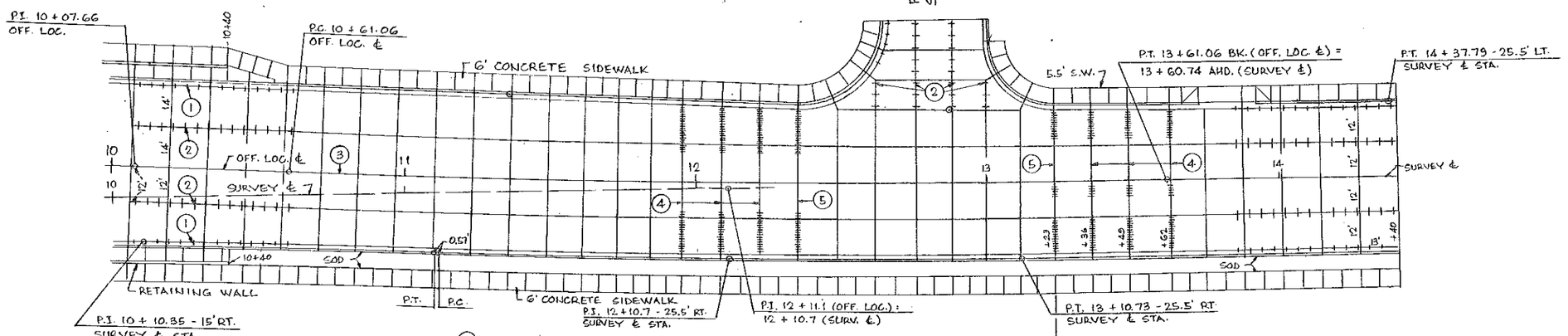


(1) No. 3 x 1'-6" TIE BAR @ 4'-0" C-C (CONTINUOUS)
(2) No. 4 x 2'-6" TIE BAR @ 4'-0" C-C (CONTINUOUS)
(3) KEYED JOINT (SILICONE SEAL)
(4) DOWELED CONTRACTION JOINT
(5) DOWELED EXPANSION JOINT
(6) CONTRACTION JOINT SILICONE SEAL

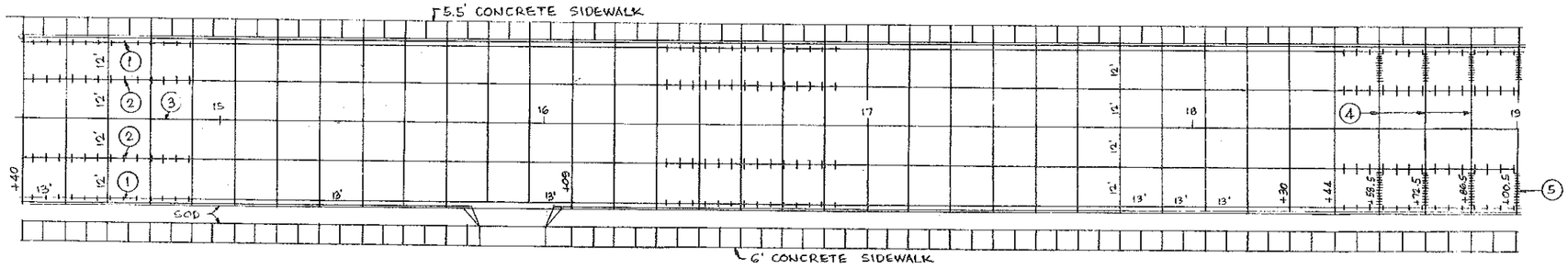
PAVEMENT LAYOUT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)065	58



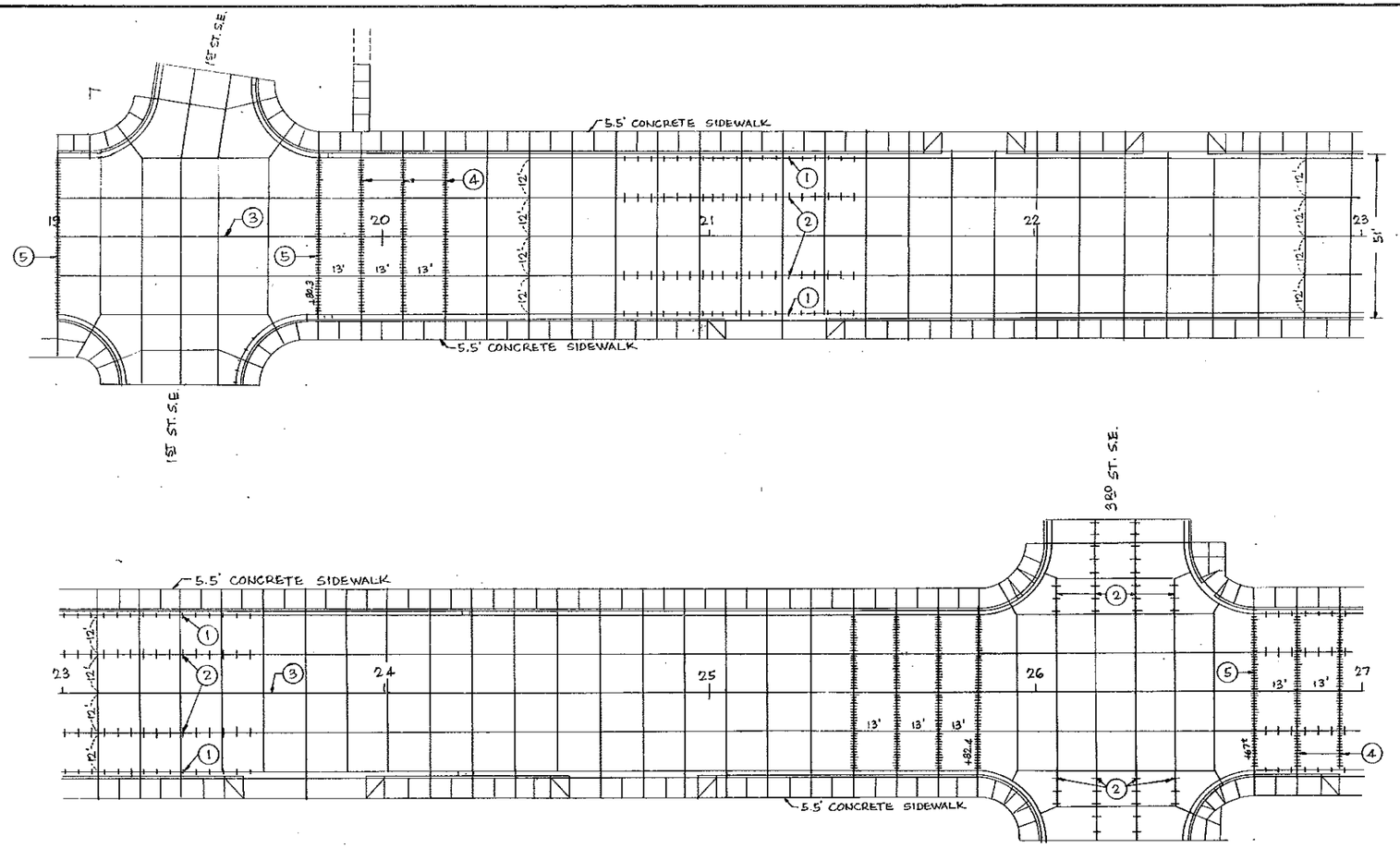


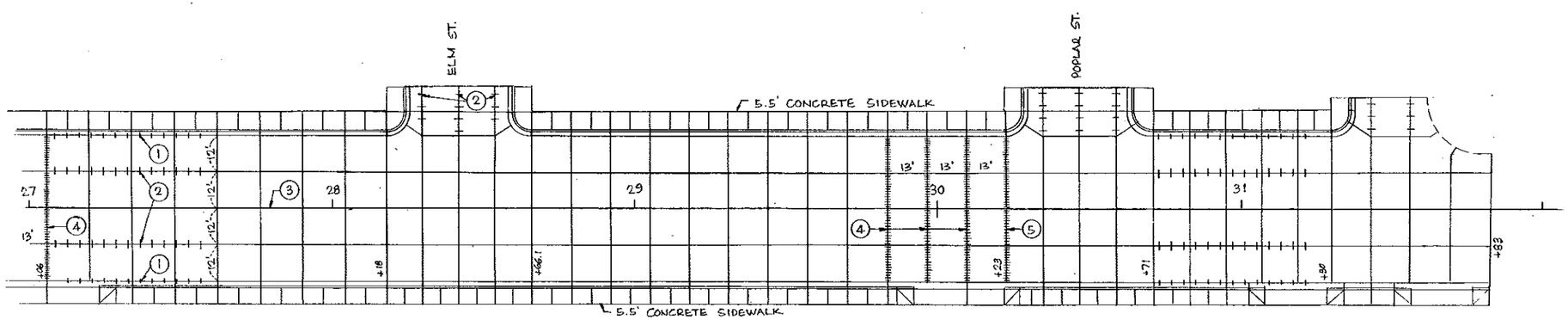
(1) NO. 3 x 1'-6" TIE BARS @ 4'-0" C-C (CONTINUOUS)
(2) NO. 4 x 2'-6" TIE BARS @ 4'-0" C-C (CONTINUOUS)
(3) KEYED JOINT (SILICONE SEAL)
(4) DOWELED CONTRACTION JOINT
(5) DOWELED EXPANSION JOINT
(6) CONTRACTION JOINT SILCONE SEAL



PAVEMENT LAYOUT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	59





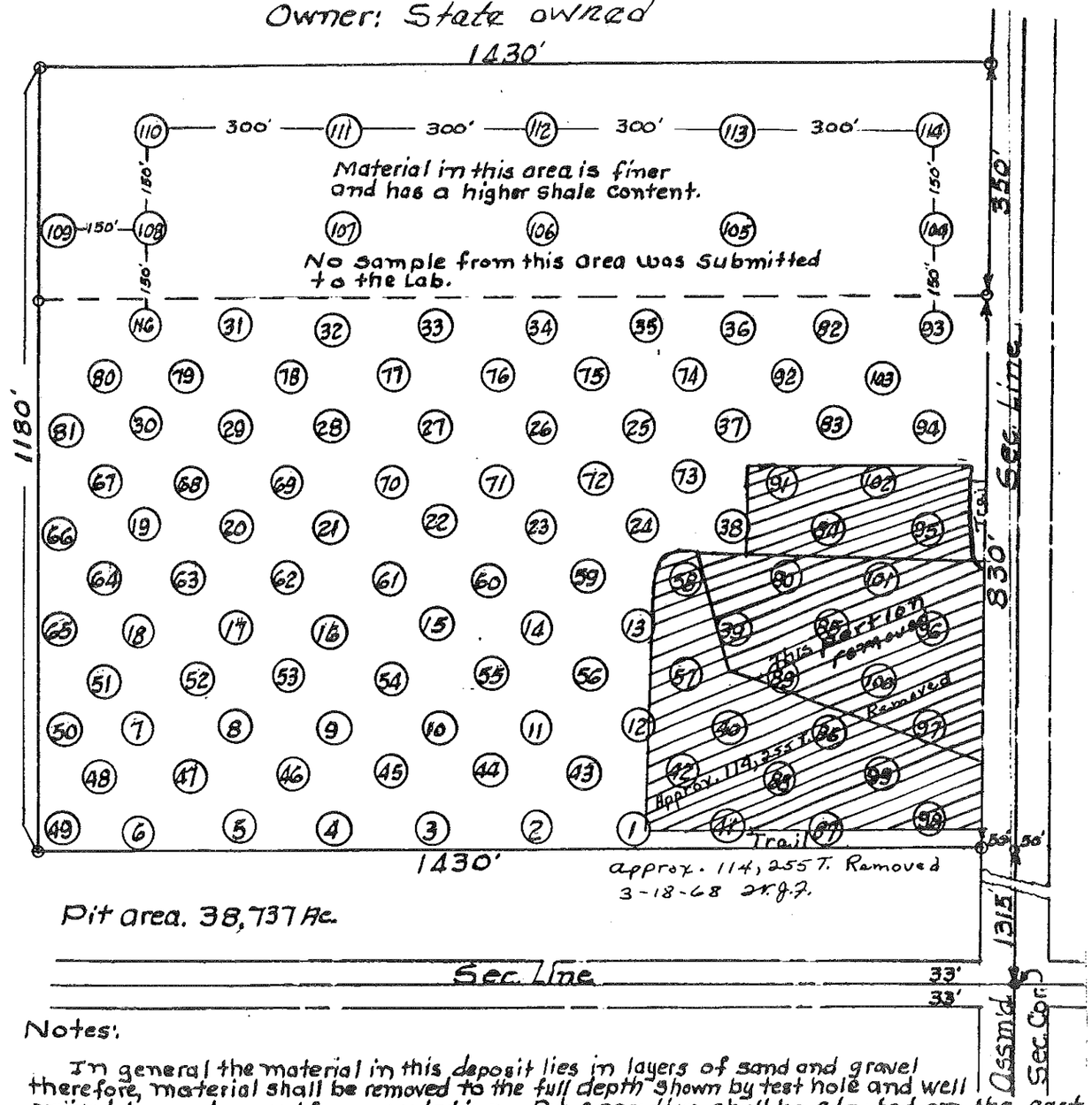
(1) NO. 3 × 1'-6" TIE BARS @ 4'-0" C-C (CONTINUOUS)
(2) NO. 4 × 2'-6" TIE BARS @ 4'-0" C-C (CONTINUOUS)
(3) KEYED JOINT (SILICONE SEAL)
(4) DOWELED CONTRACTION JOINT
(5) DOWELED EXPANSION JOINT

PAVEMENT LAYOUT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		60

F-FG-1-806
(015)069

SE¼ Sec. 28, T.140, R.77
Owner: State owned



PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
1	1.5	9.0	6	10	15	32	Rock
2	1.5	10.5	7	10	15	32	Fine Sandy clay
3	1.5	10.0	6	8	14	34	Clay.
4	2.0	2.5Gr 1.0S. clay 6.0Gr	5	7	10	26	"
5	2.0	8.0Gr 3.0 Sand	3	5	7	23	"
6	2.0	8.0Gr 3.0 Sand	4	7	11	26	Fine Sandy Clay
7	3.0	11.0	4	6	10	25	Fine Sand
8	3.0	2.0 Sand 10.0 Gr	5	7	10	24	"
9	1.5	11.0 Gr 2.5 S.	6	10	13	32	Sand
10	2.5	3.0 S 7.0 Gr	0	5	7	22	Sandy clay.
11	2.5	8.5	5	7	12	31	"
12	2.0	10.5	5	7	14	30	"
13	2.0	10.0	4	6	12	28	Fine Sandy clay
14	1.5	2.5 Gr 1.5 S 7.0 Gr	4	10	14	31	"
15	2.5	2.5 S 8.5 Gr 1.5 S.	6	10	13	30	Sand
16	4.0	8.0 Gr 2.5 S	6	10	12	30	Gravel
17	2.0	2.0 S 4.0 Gr 1.5 S 3.0 Gr 1.5 S	5	7	12	30	Fine Sand
18	3.0	10.0 Gr 2.0 S	5	10	15	33	Sand + Shale
19	2.0	1.5 S 8.0 Gr 2.5 S	5	10	14	28	Sand
20	2.0	6.0 Gr 2.0 S 3.0 Gr 1.5 S	4	6	10	25	"
21	3.0	2.0 S 10.0 Gr	3	6	11	27	Gravel
22	3.5	10.5	5	8	15	32	"
23	1.5	13.5	6	8	14	30	"
24	2.0	11.0	7	12	15	33	"
25	3.5	2.5 S 9.0 Gr	6	10	13	32	Gravel
26	1.5	13.5	5	7	12	30	"
27	1.5	12.5 Gr 1.0 S.	7	10	15	32	Sand
28	2.5	11.5	5	8	14	31	Sand + Shale
29	2.0	2.0 Gr 1.5 S 2.5 Gr 3.0 S. clay 1.5 Gr	0	5	10	27	Fine Sand
30	1.5	4.5 Gr 3.0 P.S. 6.0 Gr	5	10	15	32	Gravel
31	3.5	2.5 S 2.0 Gr 1.0 S 5.0 Gr	0	5	8	23	Sand + Shale

TEST HOLE PLAT

Notes:

In general the material in this deposit lies in layers of sand and gravel therefore, material shall be removed to the full depth shown by test hole and well mixed to produce uniform gradation. Pit operation shall be started on the east end and worked in a westerly direction. Pit operation shall be conducted in a manner not to strip more area than what is needed at any one time.

It is agreed that after the sand and gravel has been removed the top soil or stripping shall be replaced in open pit and smoothed, leaving the pit sides as flat as possible

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		61

F-FG-1-806(015)069

PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
32	3.0	2.0 S 8.5 Gr	2	4	10	25	"
33	1.5	4.5 S 6.5 Gr.	3	5	8	25	Fine Sand.
34	2.5	2.5 S. 11.8 Gr	2	4	8	22	Fine sandy clay
		6.0 Gr					
35	2.0	2.5 S 9.5 Gr	5	8	15	32	Fine Sand
36	2.0	2.0 S 10.0 Gr	6	10	14	30	Gravel
37	2.0	2.0 S. 8.0 Gr	5	8	12	30	Sand
38	2.0	4.0 S 8.0 Gr	7	10	16	35	Fine sand
39	1.5	2.0 S 9.8 Gr	5	8	13	34	Fine Sand
40	2.0	9.0 Gr 11.5 S	4	6	12	30	Gravel
41	1.0	1.5 Gr 3.0 S	5	8	12	31	Sand clay
		6.0 Gr					
42	1.5	10.5	6	10	14	30	"
43	1.5	11.5	6	10	15	33	"
44	2.0	10.0	5	8	12	30	"
45	2.0	11.5	5	8	12	30	"
46	1.5	5.0 F.Gr 8.0 Gr	4	6	10	25	Clay
47	4.0	2.5 S 3.0 S 6.5 Gr	5	7	11	26	Sandy clay
48	1.5	2.0 S 5.5 Gr	6	10	15	32	"
		3.0 S					
49	1.5	6.0 S 2.5 Gr	0	2	5	16	Sand
50	1.5	3.5 S 5.0 F.Gr 8.5 S	0	0	5	20	"
51	2.0	7.5	5	10	15	32	sandy shale
52	6.5	7.0	7	11	16	35	Fine Sand
53	2.5	2.0 S 5.5 Gr	4	7	10	31	Sandy clay
54	2.0	4.0 Gr 1.5 S	4	8	12	30	Fine sand
55	1.5	5.0 Gr 11.5 Gr 3.0 S	2	5	10	30	Clay
56	2.0	3.0 S 10.0 Gr	4	6	12	28	Gravel
57	1.5	13.0	6	10	16	35	Clay
58	1.5	11.5	7	11	17	36	Sand
59	2.0	12.0	6	12	17	36	"
60	2.5	2.5 S 10.0 Gr	5	8	12	30	Clay
61	4.0	11.0	5	10	15	33	Sand
62	2.5	12.0	5	8	12	32	"
63	2.0	4.0 Gr 2.0 S 5.5 Gr	5	10	16	33	Fine Sand
64	2.0	10.5	6	8	12	32	"
65	2.0	2.0 S 8.0 Gr	6	8	15	34	Sand
66	1.5	2.0 S 4.0 F.Gr	2	2	7	26	"
		7.0 Gr 2.0 S					
67	2.0	10.0 Gr 1.5 S	6	10	16	32	Fine Sandy clay

PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
68	4.0	5.0 S 1.0 Gr	4	7	10	25	Clay
		2.0 S. clay 2.0 Gr					
69	2.0	2.0 S 4.0 Gr 2.5 S clay	2	2	6	26	Fine Sand
		4.0 Gr					
70	1.5	2.0 S 10.5 Gr	5	8	12	28	"
71	2.5	12.0	5	8	13	34	Sand & Shale
72	2.0	2.0 S 11.0 Gr	7	12	16	35	Gravel
73	2.5	2.5 S 10.0 Gr	7	12	17	35	"
74	3.0	12.0	6	10	16	34	Fine sand.
75	5.0	2.0 S 8.0 Gr	4	8	15	33	Gravel
76	2.0	11.0	5	7	12	32	Fine sand.
77	2.0	2.0 S 8.5 Gr	0	4	7	27	Sand & shale
78	1.0	4.0 F.Gr 2.0 S 4.5 Gr	0	4	6	20	"
79	No Good						
80	3.0	3.0 F.Gr 2.0 F.S 4.0 Gr	3	7	12	28	Gravel
81	5.5	2.5 Gr 1.5 S clay	4	7	11	27	Sand & Shale
		8.0 Gr 2.0 S					
82	1.5	9.0	6	10	16	35	Clay
83	1.5	1.5 S 12.0 Gr	7	11	16	34	Sand & Shale
84	2.5	3.5 S 9.0 Gr	6	10	15	33	Gravel
85	1.5	3.0 S 8.0 Gr	5	7	14	30	Fine Sand
86	2.0	2.0 S 8.0 Gr	5	10	16	32	Sand & Shale
87	1.0	2.5 Gr 2.0 clay 4.0 Gr	5	7	11	30	Clay
		10.5					
88	2.0	3.5 Gr 1.0 clay 3.5 Gr	4	6	8	20	Fine sandy clay
89	3.0	2.0 S 10.8 Gr	4	8	12	30	Gravel
90	2.0	11.0	5	10	16	36	Fine Sand
91	2.0	3.0 S 11.0 Gr	7	11	15	32	Sand
92	2.0	3.0 S 9.0 Gr	7	12	17	35	Sandy clay
93	6.0	9.0	6	10	15	33	Gravel
94	1.5	13.5	7	10	15	34	Fine Sand
95	1.5	12.5	6	10	15	36	Fine sandy clay
96	2.0	2.0 S 9.0 Gr	5	10	13	32	Sand
97	0.5	13.5	5	8	13	30	Fine Sand
98	1.0	3.0 Gr 3.0 S 8.5 Gr	2	4	8	22	Clay
99	0.5	2.0 S	6	8	12	32	"
100	1.5	13.0	5	8	12	30	Sand
101	3.0	2.0 S 9.5 Gr	7	11	16	35	Fine Sand
102	1.5	12.5	6	12	16	36	Sandy clay
103	3.0	12.0	5	8	12	34	Gravel

PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
Totals	225.5	1148.0	483	820	1287	3067	
104	2.5	2.0 S 6.5 Gr	2	5	10	24	Sandy clay
105	2.0	4.0 S 3.5 Gr	2	5	8	25	Fine sand
106	3.0	3.0 S 4.0 Gr	0	3	6	24	"
107	1.0	2.0 S 8.0 Gr	0	4	7	22	Sand & Shale
108	2.0	1.5 Gr 1.8 S 7.0 Gr	0	4	6	21	Fine sand
109	2.5	3.5 S 7.8 Gr	2	2	6	22	"
		1.5 S 5.0 Gr					
110	2.5	3.0 S 2.0 Gr	0	0	3	15	"
111	2.0	3.0 S 4.0 Gr	2	4	7	22	"
112	2.0	3.5 S 3.5 Gr	2	5	8	25	"
113	2.5	1.8 S 2.0 Gr	0	0	3	16	Clay
		2.0 S 8.0 Gr					
114	1.5	2.5 S 2.5 Gr	0	2	4	15	"
Totals	23.5	87.0	10	34	68	231	

PIT AVERAGE

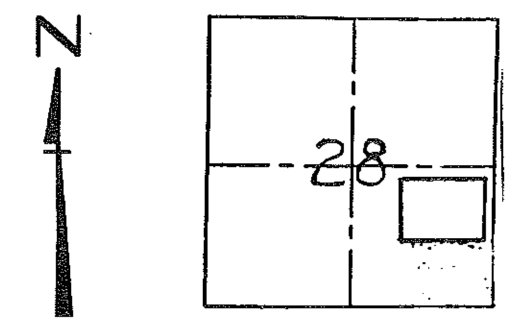
	Test holes 1 to 103	Test holes 104-114	
Depth of Strip	~~2.2~~ 2.3	2.1	ft.
% Strip to Material	~~19.6~~ 20.72	26.5	%
Depth of Material	~~11.2~~ 11.1	7.9	ft.
% Retained on 1½"	~~4.1~~ 4.5	0.9	%
% Retained on 1"	~~8.0~~ 7.7	3.0	%
% Retained on ¾"	~~12.5~~ 12.2	6.1	%
% Retained on ¼"	~~30.0~~ 29.3	20.9	%
Quantity of	~~480,000~~ 365,745	80,000	Cu. Yds.
Quantity of	548,618	120,000	Tons.

Burleigh COUNTY

PIT PROSPECTED BY Heinle — DATE 10/57

INSPECTED & APPROVED

LOCATION OF PIT IN SECTION



Sec. 28
Twp. 140 N.
Rge. 77 W.

TEST HOLE PLAT

1/8/88 PROJECT NO. F-1-806(015)069

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB-TOTAL
R1-1-30	30"x 30"	STOP	4	17	68
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
R2-3c-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
R8-3-24	24"x 30"	NO PARKING	28	15	420
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		30	0
R11-4a-60	60"x 30"	STREET CLOSED TO THRU TRAFFIC	4	30	120
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	2	38	76
G20-52-72	72"x 24"	ROAD CONSTRUCTION NEXT __ MILES RT or LT ARROW	3	30	90
G20-54-48	48"x 36"	OVERHEAD BRIDGE PAINTING		30	0
G20-8-48	48"x 36"	TEMPORARY SURFACE NEXT __ MILES		30	0
M1-4-24	24"x 24"	ROUTE MARKER (POST AND INSTALLATION ONLY)	31	8	248
M3-1-24	24"x 12"	NORTH (MOUNTED ON ROUTE MARKER POST)	8	6	48
M3-2-24	24"x 12"	EAST (MOUNTED ON ROUTE MARKER POST)		6	0
M3-3-24	24"x 12"	SOUTH (MOUNTED ON ROUTE MARKER POST)	23	6	138
M3-4-24	24"x 12"	WEST (MOUNTED ON ROUTE MARKER POST)		6	0
M4-8-24	24"x 12"	DETOUR (MOUNTED ON ROUTE MARKER POST)	31	6	186
M4-8A-24	24"x 18"	END DETOUR	2	13	26
M4-10-48	48"x 18"	DETOUR ARROW RIGHT or LEFT		22	0
M5-1-21	21"x 15"	ARROW AHD AND RT or LT(MTD ON ROUTE MKR POST)	6	6	36
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 DIAGONAL RT or LT	1	6	6
M6-3-21	21"x 15"	ARROW AHD	15	6	90
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	1	34	34
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	4	34	136
W5-1-48	48"x 48"	ROAD NARROWS		34	0
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.	2	34	68
W8-55-48	48"x 48"	TRUCKS CROSSING AHEAD or __ FT.	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.	7	34	238
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.		34	0
W20-5-48	48"x 48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.	8	34	272
W20-7a-48	48"x 48"	FLAGGING SYMBOL	2	34	68
W20-7k-24	24"x 18"	__ FEET	2	8	16
W20-8-48	48"x 48"	STREET CLOSED		34	0
W20-50-48	48"x 48"	BE PREPARED TO STOP	2	34	68
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	18"X 18"	STOP and SLOW PADDLE Back to Back	2	8	16
W22-14-18		TOTAL UNITS		SPEC&CODE 704-1000	2828

TYPE III	8' LONG	BARRICADES	EACH	704-1052	25
TYPE II	2' MIN.	BARRICADES	EACH	704-1051	64
TYPE I	6'to 10'	BARRICADES	EACH	704-1050	
18"x 36"	MIN.	DELINEATOR DRUMS	EACH	704-1060	165
28" MIN.		TUBULAR MARKERS	EACH	704-1067	45
8" to 12"	x 24"	VERTICAL PANELS	EACH	704-1080	
	3"x 8"	DELINEATOR	EACH	704-1070	
		SEQUENCING ARROW PANEL TYPE B	EACH	704-1086	4
		TEMPORARY STRIPE - SOLID LINE - TYPE R	LF	762-131	5075
		TEMPORARY STRIPE - SOLID LINE - TYPE NR	LF	762-132	2550
		OBLITERATION OF PAVEMENT MARKING	LF	704-0105	1040

TRAFFIC CONTROL
CONSTRUCTION AREA
DEVICES LIST

6th Avenue SE
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	62

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		63

F-1-806(015)069

DETOUR SOUTH 1806 → or ← (1)

DETOUR SOUTH 1806 → (2)

DETOUR SOUTH 1806 ← (3)

DETOUR SOUTH 1806 ↑ (4)

DETOUR SOUTH 1806 ↖ (5)

RIGHT LANE CLOSED 500 FT. or LEFT LANE CLOSED 500 FT. (6)

ROAD CONSTRUCTION AHEAD (7)

DETOUR 500 FT. (8)

DETOUR NORTH 1806 ↑ (9)

DETOUR NORTH 1806 ← or → (10)

DETOUR NORTH 1806 ↱ (11)

STREET CLOSED TO THRU TRAFFIC Type-III Barr. (12)

ROAD CONSTRUCTION ← NEXT 00 MILES NEXT 00 MILES → (13)

RIGHT LANE CLOSED 1000 FT. or LEFT LANE CLOSED 1000 FT. (14)

DETOUR NORTH 1806 ↰ (15)

END DETOUR (16)

STREET CLOSED Type-III Barr. (17)

or (18)

Directional Arrows Shall Point to Appropriate Route

HWY. 1806 DETOUR

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		64

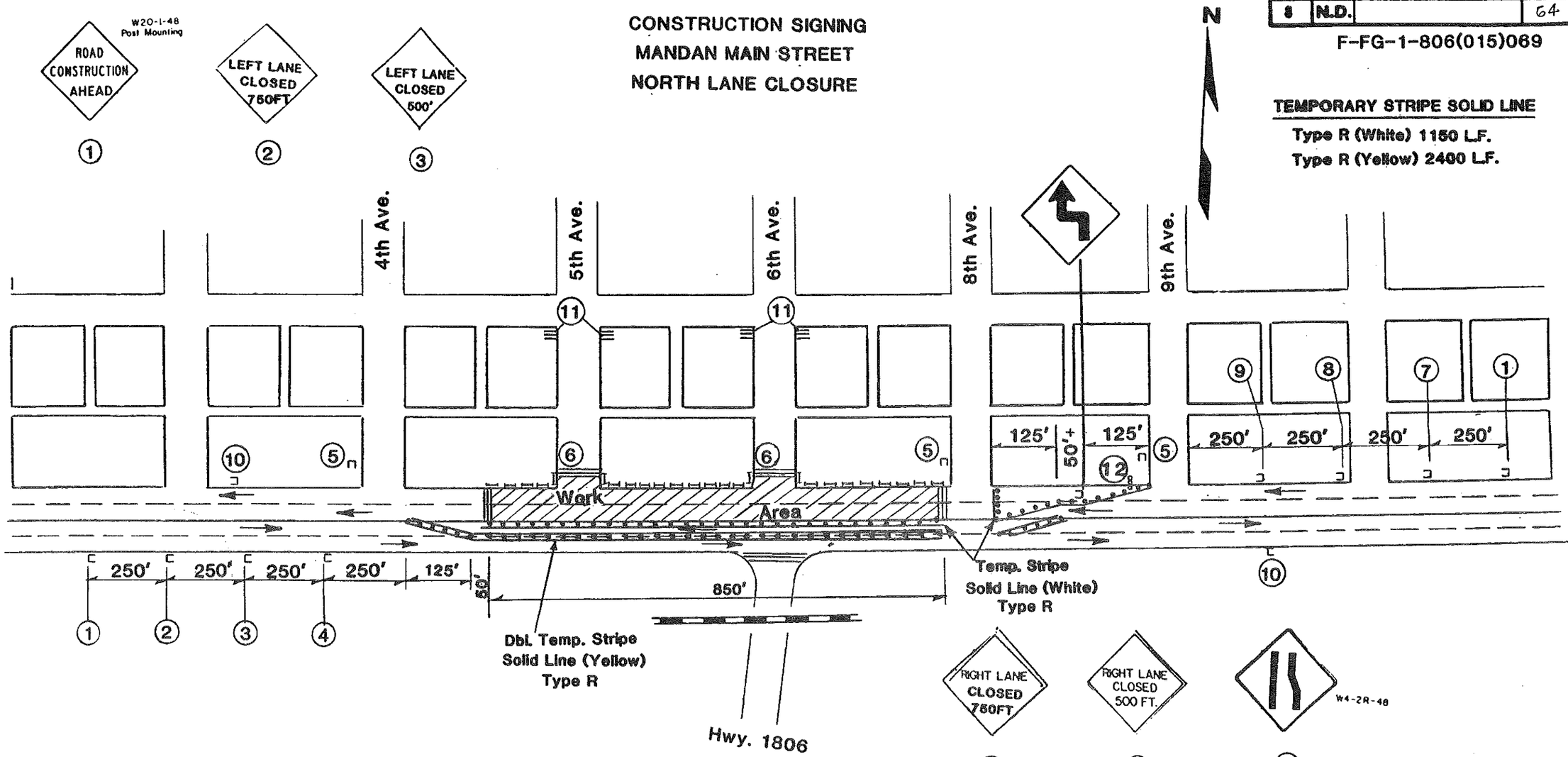
F-FG-1-806(015)069

CONSTRUCTION SIGNING
MANDAN MAIN STREET
NORTH LANE CLOSURE

TEMPORARY STRIPE SOLID LINE

Type R (White) 1150 L.F.

Type R (Yellow) 2400 L.F.



W20-1-48 Post Mounting

ROAD CONSTRUCTION AHEAD

①

LEFT LANE CLOSED 750FT

②

LEFT LANE CLOSED 500'

③

W4-2L-48 Post Mounting

④

ROAD CONSTRUCTION
NEXT 00 MILES
NEXT 0 0 MILES

G20-50-72 Post Mounting

⑤

STREET CLOSED

R11-2a-48 Barricade Mounting

⑥

RIGHT LANE CLOSED 750FT

⑦

RIGHT LANE CLOSED 500 FT.

⑧

W4-2R-48

⑨

G20-2-60 Post Mounting

END CONSTRUCTION

⑩

R11-4a-60 Barricade Mounting

STREET CLOSED TO THRU TRAFFIC

⑪

SEQUENCING ARROW PANEL TYPE-B

⑫

⊢ SAFETY FENCE

⊨ TYPE III BARR.

• TUBULAR MARKERS

• DELINEATOR DRUMS

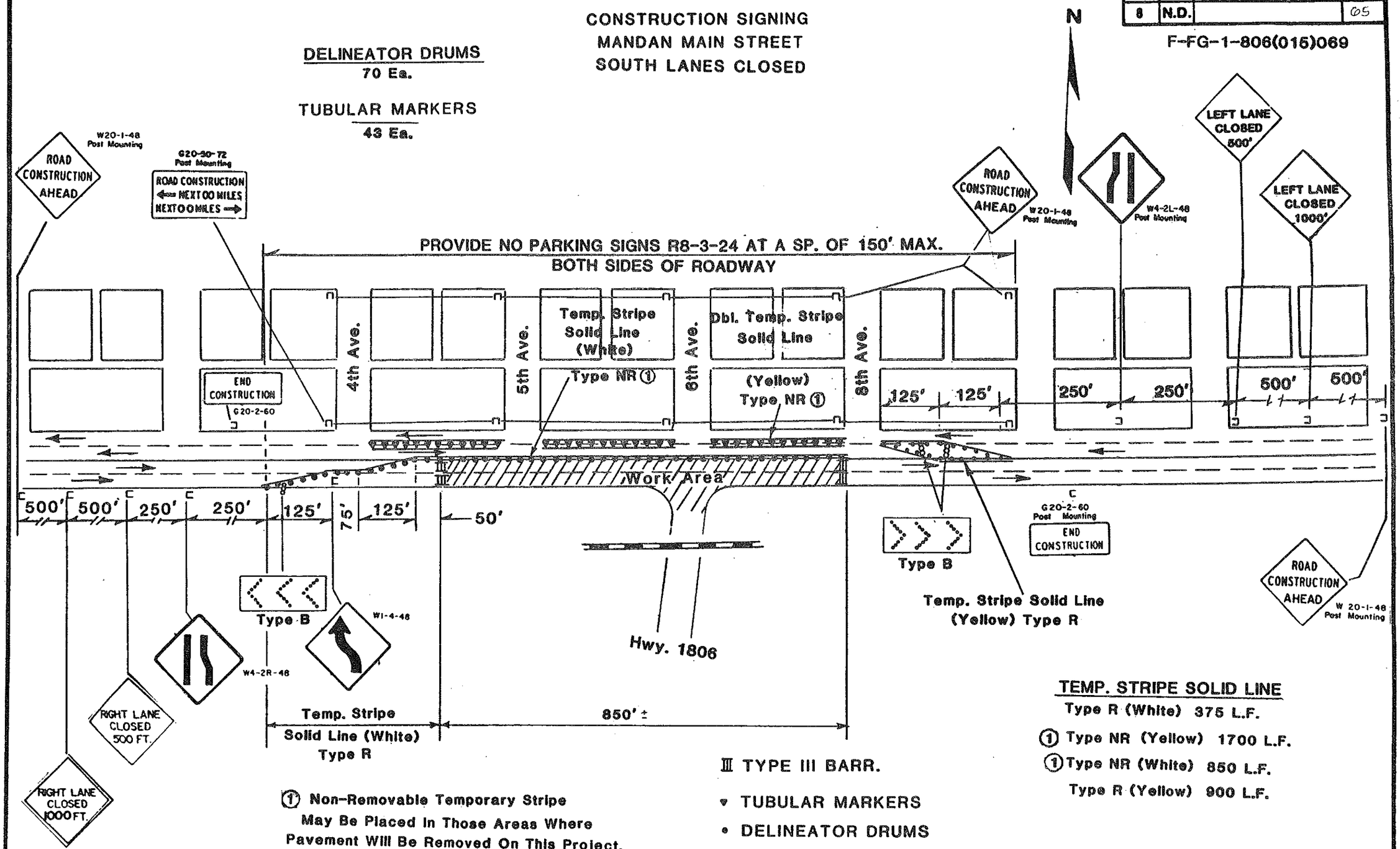
FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N.D.		05

F-FG-1-806(015)069

CONSTRUCTION SIGNING
MANDAN MAIN STREET
SOUTH LANES CLOSED

DELINEATOR DRUMS
70 Ea.

TUBULAR MARKERS
43 Ea.



① Non-Removable Temporary Stripe May Be Placed In Those Areas Where Pavement Will Be Removed On This Project.

Ⅲ TYPE III BARR.

▾ TUBULAR MARKERS

• DELINEATOR DRUMS

TEMP. STRIPE SOLID LINE

Type R (White) 375 L.F.

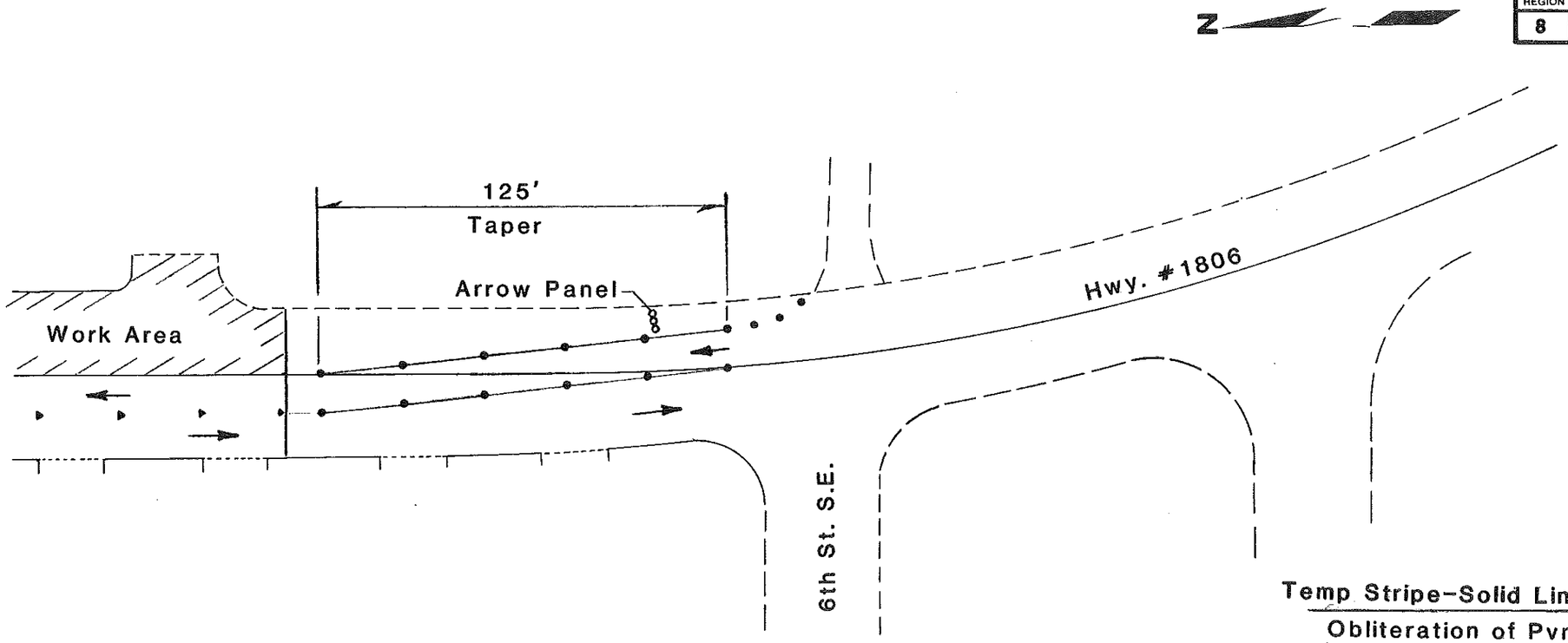
① Type NR (Yellow) 1700 L.F.

① Type NR (White) 850 L.F.

Type R (Yellow) 900 L.F.

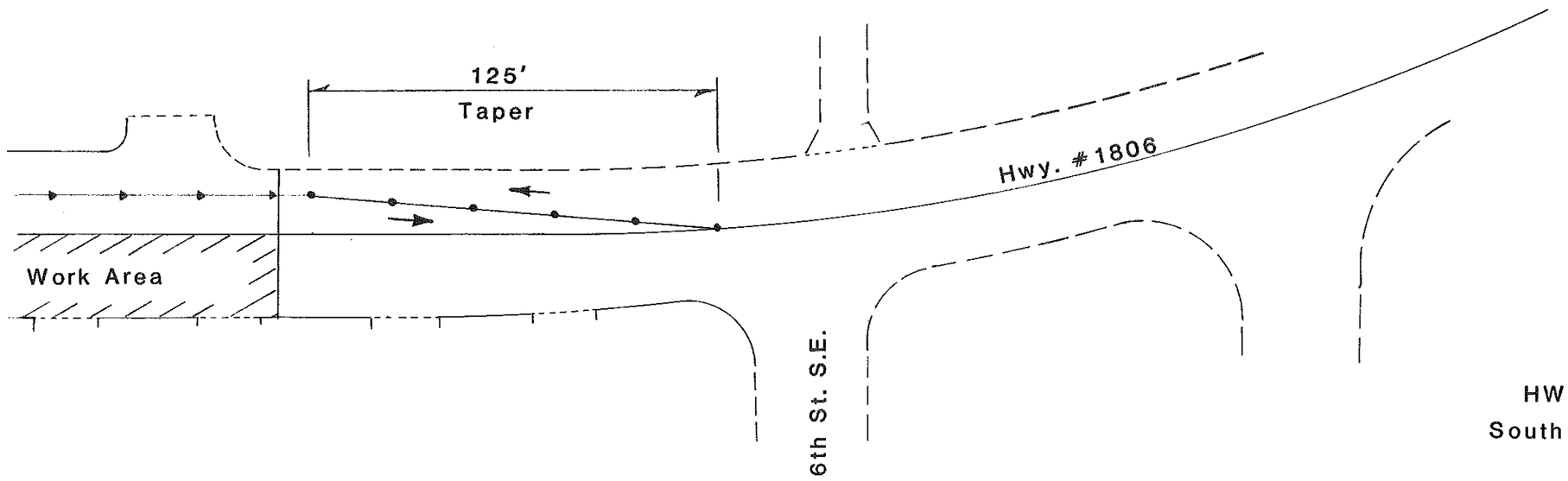
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		66

F-1-806(015)069



Temp Stripe-Solid Line-Type R 250 L.F.

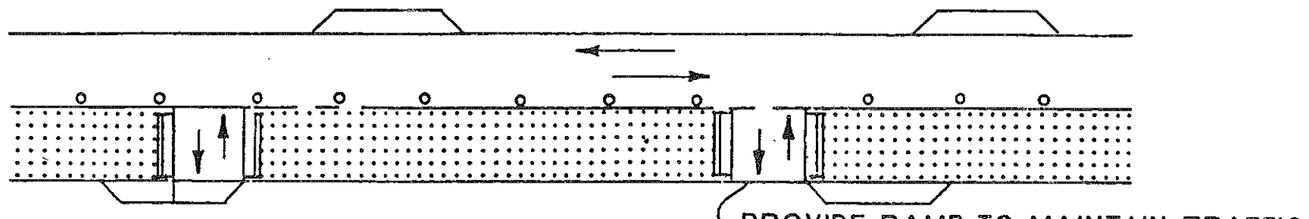
Obliteration of Pvm't. Marking 40 L.F.



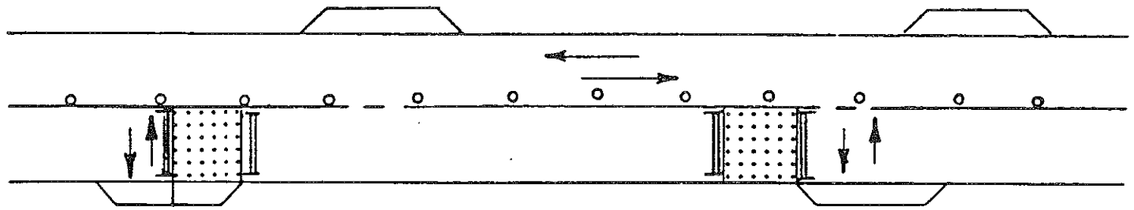
HWY. #1806
South End Taper

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO.
8	N.D.	F-FG-1-806(015)069	67

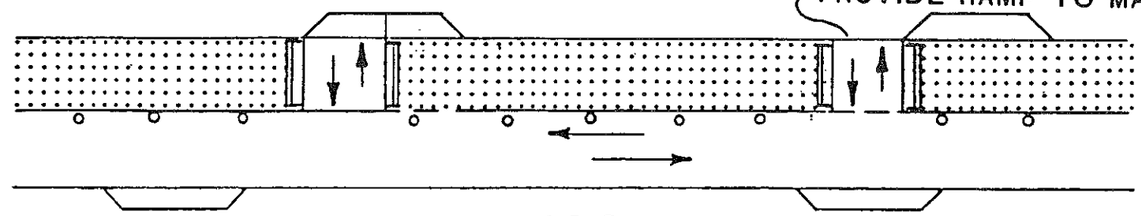
CONSTRUCTION SEQUENCE



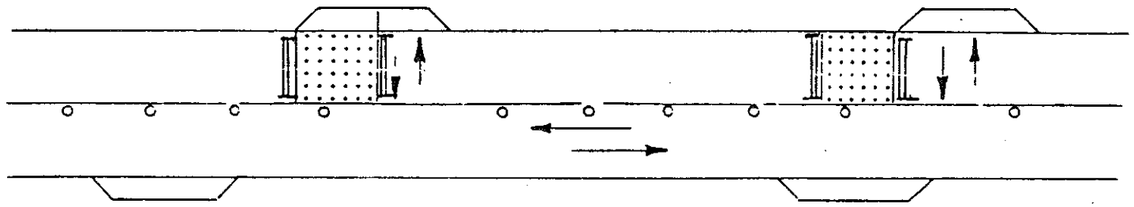
PHASE 1



PHASE 2



PHASE 3



PHASE 4

NOTES:

1. See Note 704-P01 (Maintaining Access). Access shall be maintained on an all weather surface at all times.
2. Construction signing, arrow panels, cones, & delineator drums shall be located as shown on Traffic Control Layouts.
3. Sequence shown is a suggestion. Construction sequence & work area length to be determined by the contractor & approved by the Engineer.
4. High Early Strength PCC Pavement & weekend or 24 hour continuous operations may be necesary to provide access.
5. On-street parking shall be prohibited in the construction area.
6. Aggregate base course shall be paid for at unit price bid.

o DELINEATOR DRUM

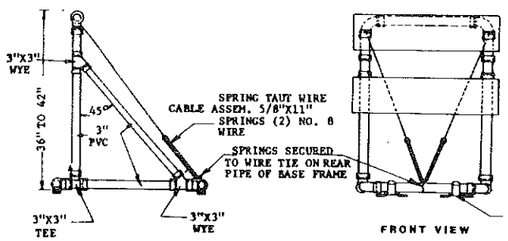
WORK AREA

TYPE II BARRICADE

BARRICADE DETAILS

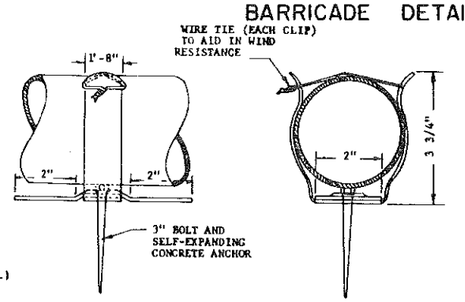
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-FG-1-806(015)069	68

D 754-5



SIDE VIEW

FRONT VIEW

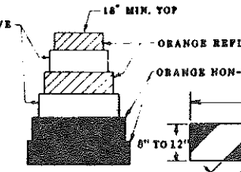


TYPICAL CLAMP DETAIL

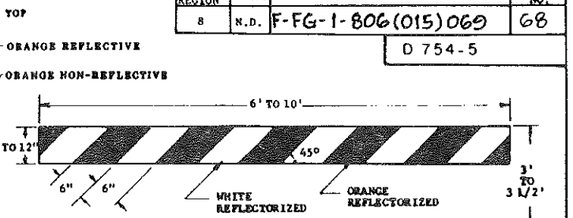
(SINGLE FIRE EXTINGUISHER CLIPS, 3 1/2" DIA.)

DELINEATOR DRUMS

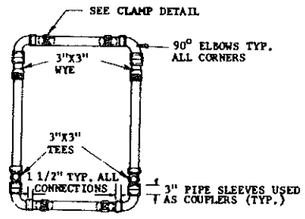
THE MARKINGS ON DRUMS SHALL BE ORANGE AND WHITE STRIPES 4 TO 6 INCHES WIDE. THERE SHALL BE AT LEAST TWO ORANGE AND TWO WHITE STRIPES. WHERE DRUMS HAVE RIBS OR INDENTATION THERE SHALL BE NO REFLECTORIZED SHEETING IN THIS AREA. THIS SPACE SHALL BE NO MORE THAN 2 INCHES WIDE. THE DRUM SURFACE SHALL BE PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE REFLECTIVE SHEETING IS APPLIED.



DELINEATOR DRUM
36" MIN. HEIGHT



TYPE I BARRICADE



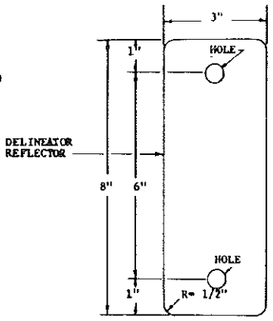
BASE

BREAKAWAY BARRICADE ASSEMBLY

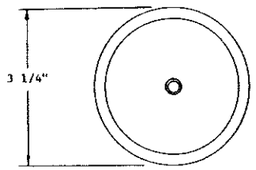
NOTE: THE PIPE, WYES, TEES AND ELBOWS USED TO CONSTRUCT TYPE II BARRICADES (SPECIAL) SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION: D2241 FOR PVC 1120 OR 1220, SDR 21, PRESSURE RATING 200 P.S.I. THE WYES, TEES, AND ELBOWS SHALL SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION: D-2466, TYPE II, GRADE 1. ALL JOINTS SHALL BE SLIP-FIT AND SHALL NOT BE THEADED OR CEMENTED.

3" PVC PIPE CONFORMING TO ASTM D2665-DWV OR ASTM D2729 MAY BE USED AS AN ALTERNATE TO ASTM D2241-SDR 21.

THE 9" X 48" BARRICADE RAIL SHALL BE FABRICATED FROM 0.025" ANODIZED ALUMINUM AND SHALL BE ATTACHED WITH 1 INCH NO. 14 PAN BEAD METAL SCREWS. COLORS: REFLECTIVE ORANGE AND REFLECTIVE WHITE.

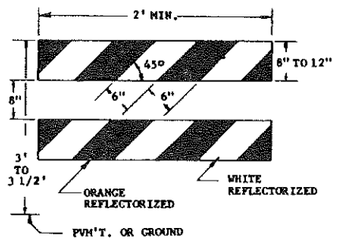


3" x 8" - 16 GUAGE GALVANIZED STEEL SHEETS, OR OR .080" ALUMINUM PLATE WITH WHITE REFLECTIVE SHEETING (TYPE 3A OR 3B) AS SPECIFIED IN SECTION 894 OF THE STANDARD SPECIFICATIONS.

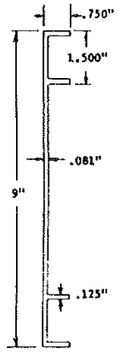


ACRYLIC PLASTIC REFLECTOR

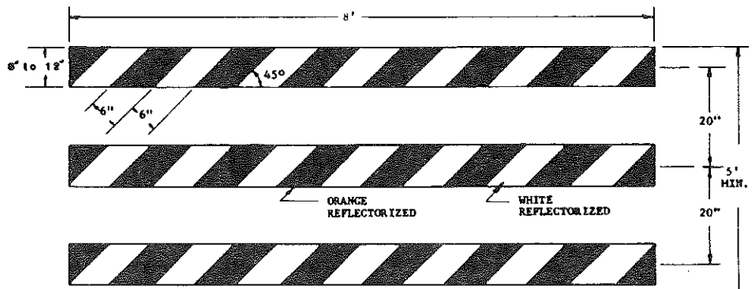
DELINEATOR REFLECTOR SHALL MEET THE REQUIREMENTS OF SECTION 894.



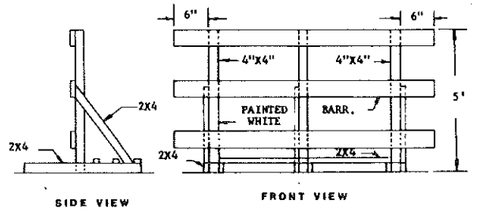
TYPE II BARRICADE



EXTRUDED ALUMINUM BARRICADE BAR DETAIL



TYPE III BARRICADE

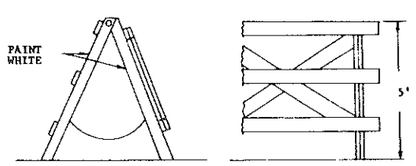


SIDE VIEW

FRONT VIEW

MOVABLE BARRICADE ASSEMBLY

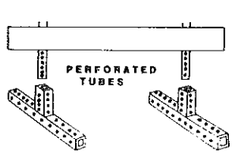
NOTE: EACH MOVABLE BARRICADE SHALL BE WEIGHTED DOWN BY A SUFFICIENT NUMBER OF SAND BAGS OR OTHER SUITABLE WEIGHT SO THAT IT WILL NOT BE BLOWN OVER BY THE WIND UNLESS THE MOVABLE SUPPORTING STRUCTURE IS CONSTRUCTED IN SUCH A MANNER THAT THE WIND CANNOT BLOW IT OVER. WEIGHT USED SHALL BE APPROVED BY THE 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.



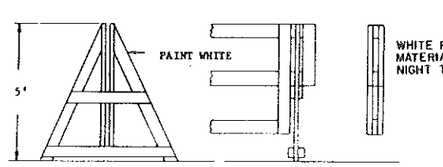
SIDE VIEW

FRONT VIEW

HINGED BARRICADE ASSEMBLY



SECTIONAL BARRICADE

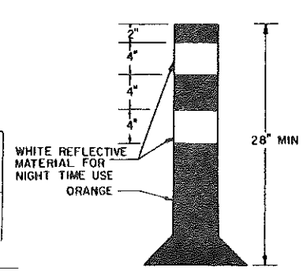


SIDE VIEW

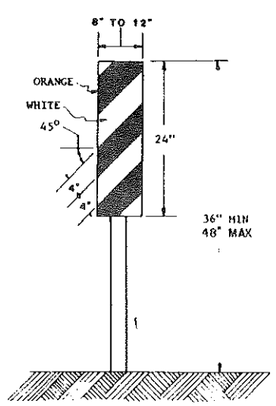
FRONT VIEW

END VIEW

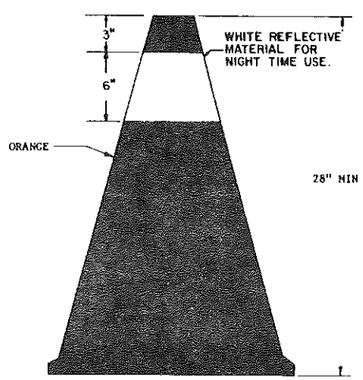
DEMOUNTABLE BARRICADE ASSEMBLY



TUBULAR MARKER



VERTICAL PANEL



CONE

BARRICADES: Number Of Refectorized Rail Faces

TYPE I	TYPE II	TYPE III
2(One Each Direction)	4(Two Each Direction)	6(Three Each Direction)

BARRICADE RAIL MATERIAL MAY BE 1" NOMINAL THICKNESS STANDARD LUMBER OR 3/4" PLYWOOD AND PREPARED AS RECOMMENDED BY THE SHEETING MANUFACTURER BEFORE REFLECTIVE SHEETING IS APPLIED.

10-1-86 REVISIONS	
DATE	CHANGE
8-3-87	Type Sheeting
10-1-87	Delineator Drum Note

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

APPROVED David K.O. Barr
DESIGN ENGINEER

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)069	69

NOTES (FLOOD WALL)

100 SCOPE OF WORK: The flood wall portion of this project consists of placing the wells for the post supports, placing and compacting required earth work, and placing the concrete footings. The posts and stop logs shall then be set in place to assure that all pieces fit properly. After the entire flood wall is satisfactorily in place, the posts and stop logs shall be removed and stored in the chain link enclosure located 100 feet left of Station 9+60. The wells for the posts shall then be covered with the caps fabricated for this purpose.

203 EXCAVATION: Any excavation, backfill, and/or compaction required to place the footings and post wells shall be incidental to other pay items.

602 CONCRETE: All footing concrete shall be Class AE-3 or AE-4. The class of concrete in the concrete pile stop logs shall be as supplied by the prestressed concrete pile supplier. Type I or Type II cement may be used.

612 REINFORCING STEEL: Dimensions for bent bars are given out to out and to tangent intersections unless otherwise noted. Bent bars shall be bent around ACI standard size pins.

612 All reinforcing steel shall be Grade 60.

616 STRUCTURAL STEEL: Structural tubing shall conform to ASTM A 500, cold-formed welded and seamless carbon steel structural tubing in rounds and shapes, Grade B. All other structural steel shall conform to AASHTO M 183 (ASTM A36).

616 AASHTO M 164 (ASTM A325) high strength bolts shall be used for all bolted connections.

844 TIMBER: All timber items shall be West Coat Douglas Fir, Grade 1 or better. This material shall be rough cut and treated with a preservative in accordance with AWPA C-2 to a minimum retention of 0.4 lbs./ft.^{2}. The type of preservative shall be Light Petroleum Solvent-Penta Solution LP-3.

854 GALVANIZING: All bolts and structural steel items shall be hot-dip galvanized in accordance with AASHTO M-111 or AASHTO M-232.

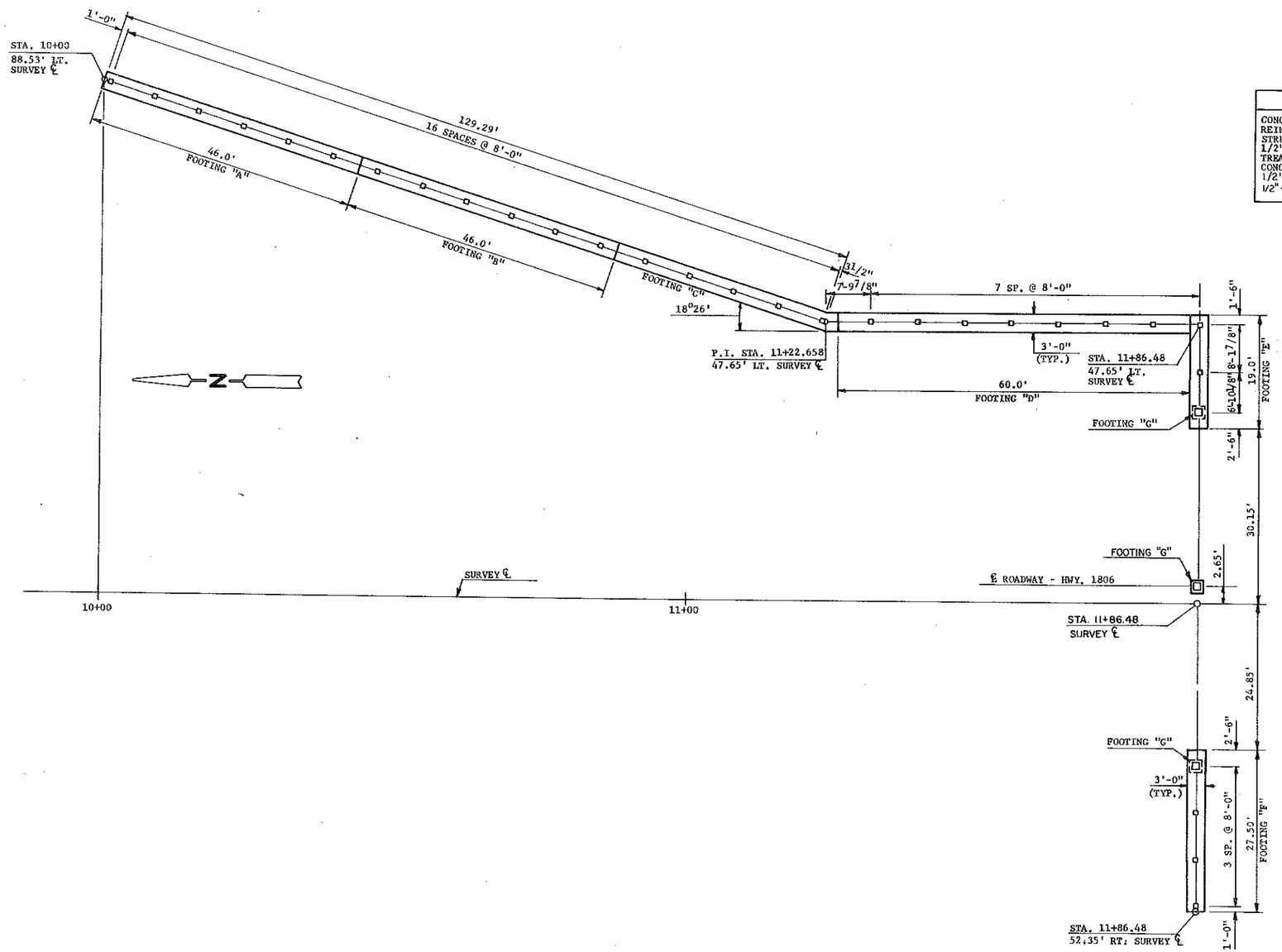
The quantities listed on the plans are for informational purposes only. The Lump Sum pay item "Flood Walls" shall include all labor, material, and equipment required to complete this project.

SHOP DRAWINGS: The contractor shall submit the following shop drawings to the engineer for approval:

1. Structural steel items
2. Stop log items

DESIGN STRENGTH: F'C 3,000 PSI Cl. AE-3 or AE-4 concrete
Fy 60,000 PSI GR. 60 reinforcing steel
Fy 36,000 PSI structural steel

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	70



QUANTITIES

ITEM	UNIT	QUANTITY *
CONCRETE	CU. YDS.	13.5
REINFORCING STEEL	LBS.	1084
STRUCTURAL STEEL	LBS.	7993
1/2"ϕ x 4 1/2" BOLTS	EACH	174
TREATED TIMBER STOP LOGS	MBM	2.741
CONCRETE STOP LOGS (12" PRESTRESSED PILE)	FT.	238'-4"
1/2"x1 1/2" BOLTS	EACH	30
1/2"x 6" BOLTS	EACH	12

* FOR INFORMATIONAL PURPOSES ONLY

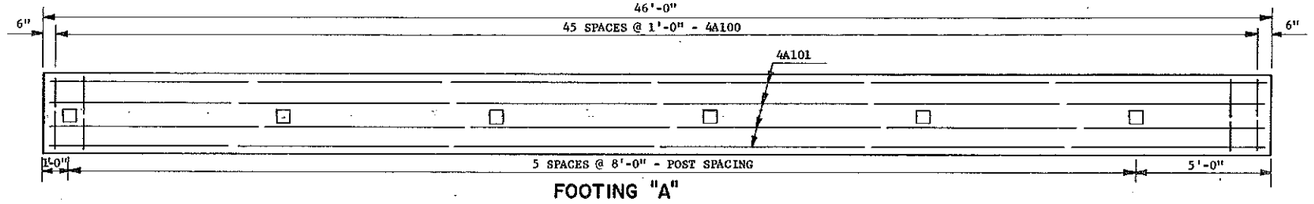
MANDAN FLOOD WALL

LAYOUT SHEET

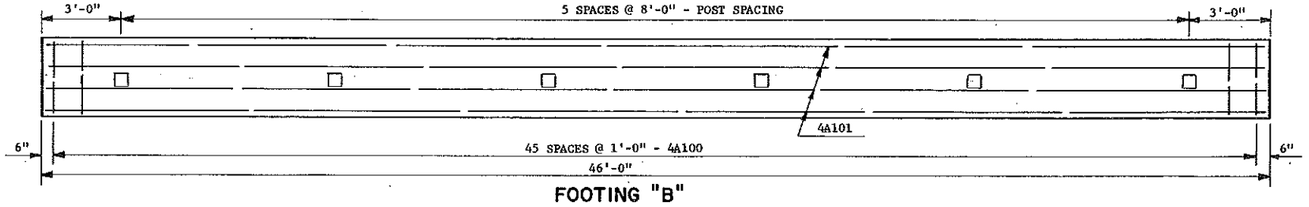
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	71

REINFORCEMENT BAR LIST

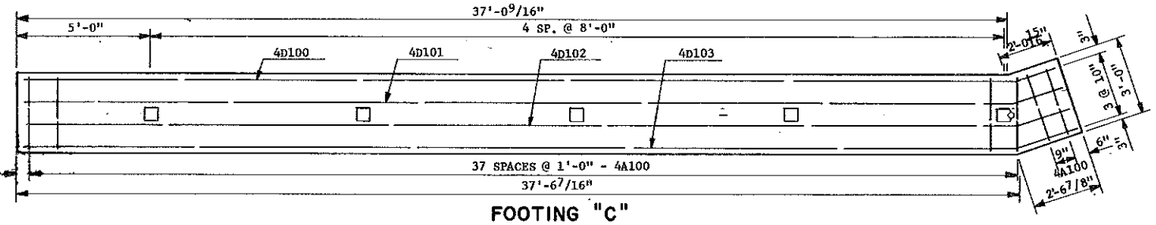
MARK	NO.	SIZE	LENGTH	SHAPE
4A100	240	4	2'-8"	STR.
4A101	8	4	45'-8"	"
4A102	4	4	59'-8"	"
4A103	2	4	18'-8"	"
4A104	2	4	15'-7"	"
4A105	2	4	27'-2"	"
4A106	2	4	24'-2"	"
4A107	18	4	1'-8"	"
4D100	1	4	38'10"	BENT
4D101	1	4	39'-1"	"
4D102	1	4	39'-5"	"
4D103	1	4	39'-9"	"
4G100	4	4	5'-0"	BENT



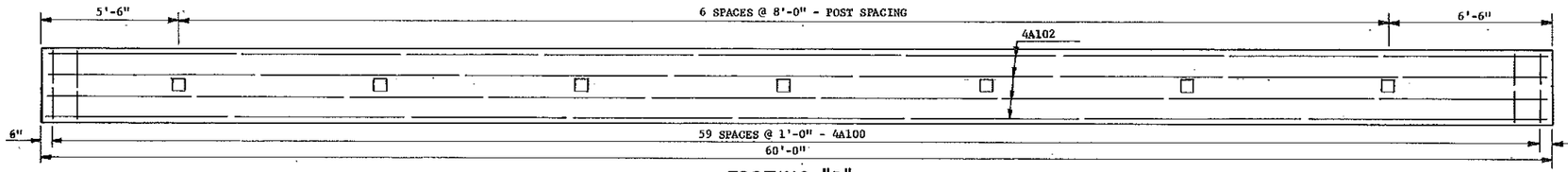
FOOTING "A"



FOOTING "B"



FOOTING "C"



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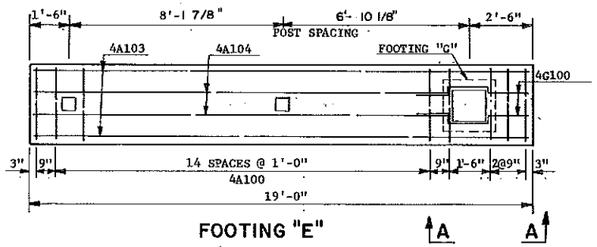
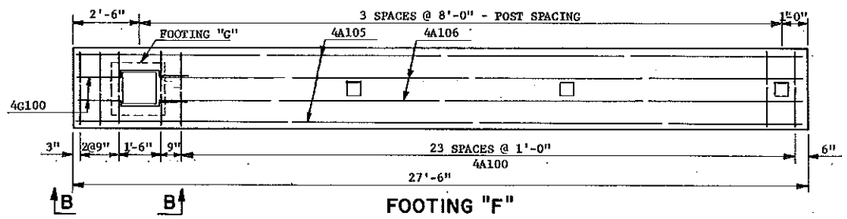


FOOTING "E"



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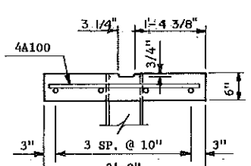
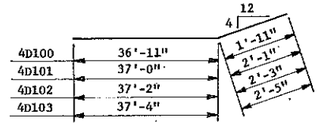
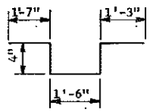


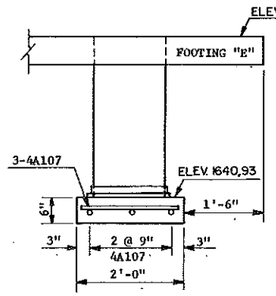
TYPICAL SECTION OF FOOTING



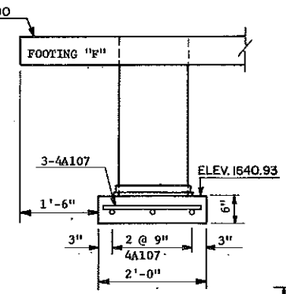
4D100 - 4D103



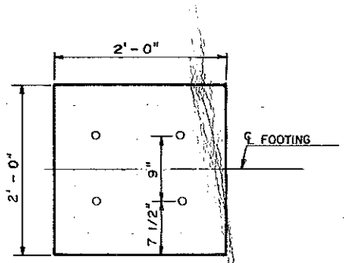
4G100

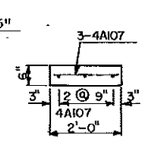


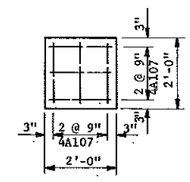
A-A



B-B

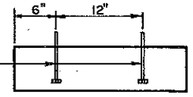






FOOTING "G"

STA. 11+86.48-32.65' LT. SURVEY ℄
STA. 11+86.48-2.65' LT. SURVEY ℄
STA. 11+86.48-27.35' RT. SURVEY ℄



FOOTING "G" DETAIL

QUANTITIES

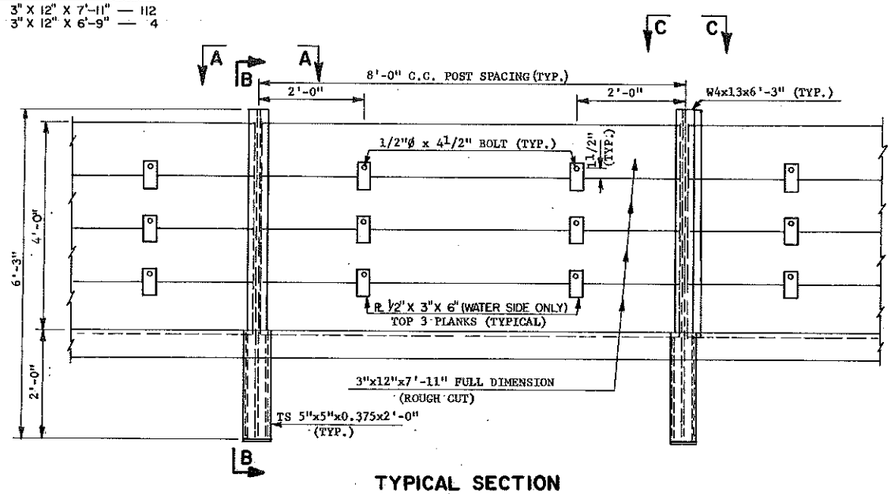
CLASS AE-3 CONCRETE	13.5 C.Y.
REINFORCING STEEL	1084 LBS.

MANDAN FLOOD WALL

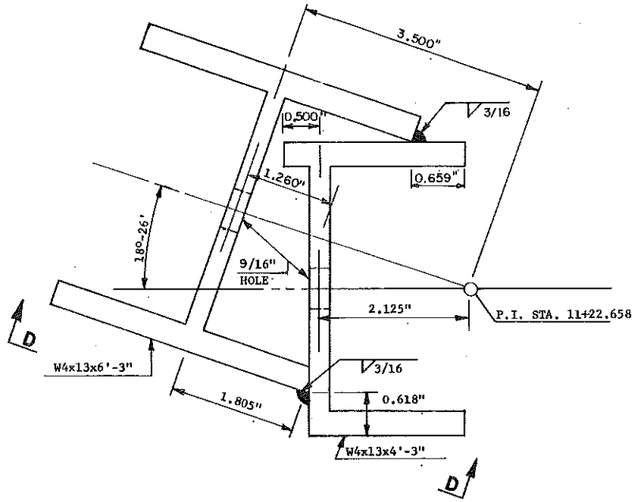
FOOTING DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	72

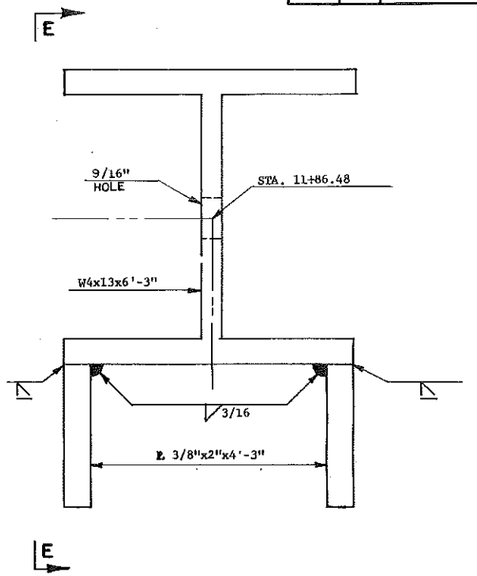
TIMBER STOP LOG LIST
3" X 12" X 7'-11" — 112
3" X 12" X 6'-9" — 4



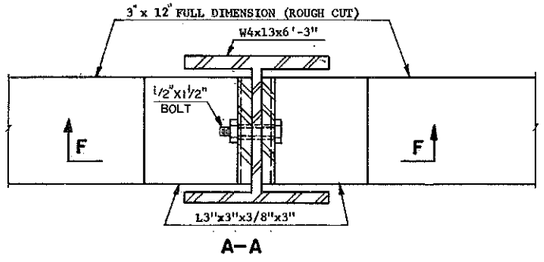
TYPICAL SECTION



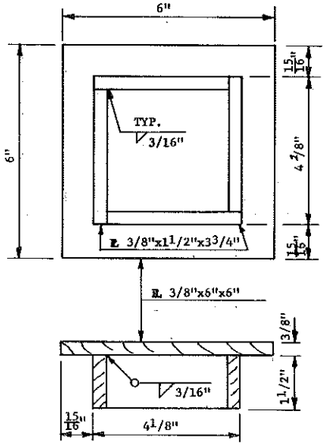
C - C



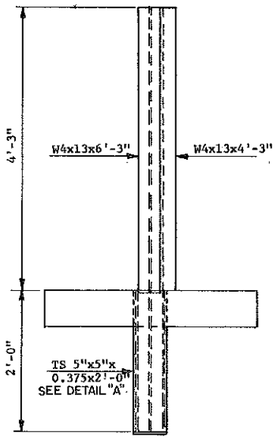
POST AT STA. 11+86.48 - 47.65' Lt. SURVEY ℄



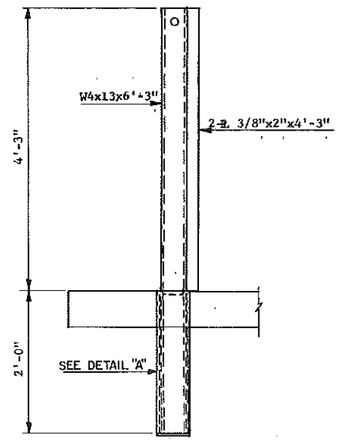
A-A



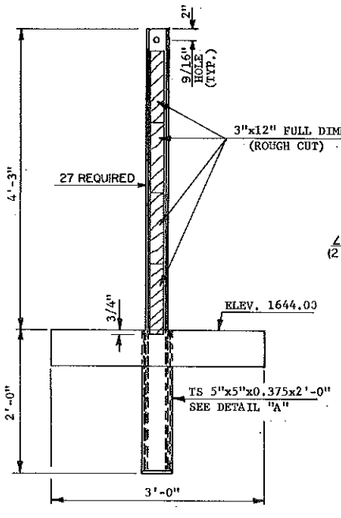
CAP DETAIL
29 REQUIRED



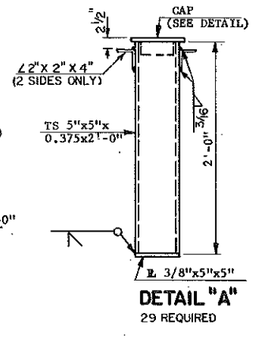
D-D
1 REQUIRED



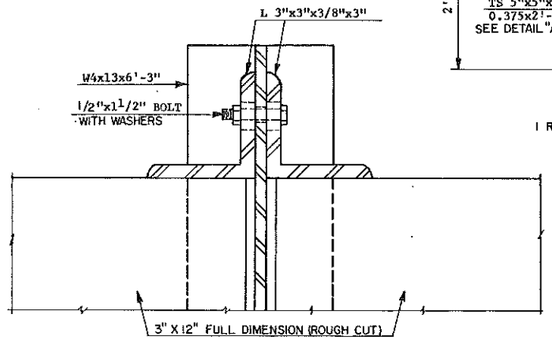
E-E
1 REQUIRED



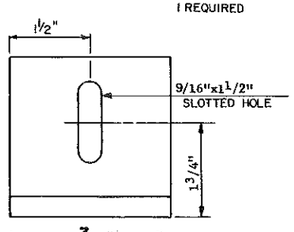
B-B



DETAIL "A"
29 REQUIRED



F-F

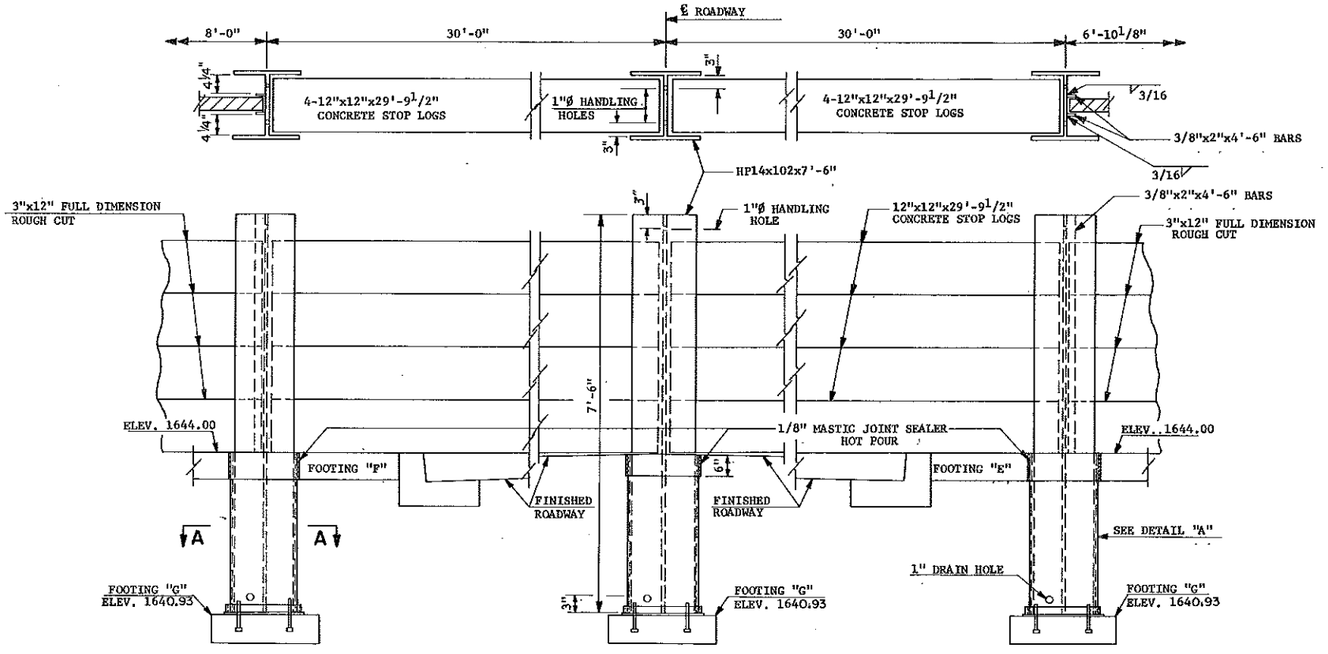


L3X3X 3/8" X 3"
55 REQUIRED

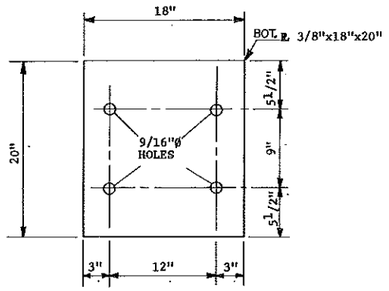
MANDAN FLOOD WALL

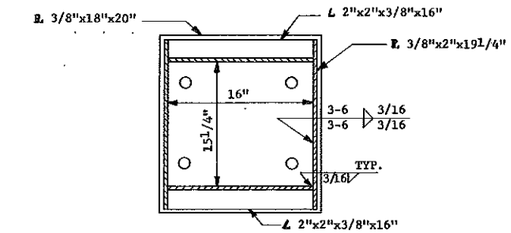
POST & TIMBER DETAILS

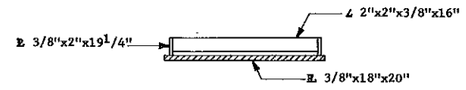
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	73



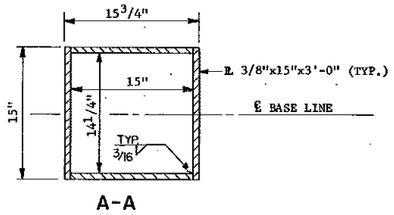
VIEW SHOWING STOP LOG STRUCTURE AT ROADWAY



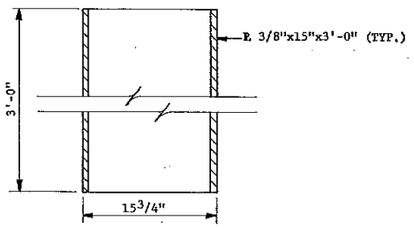




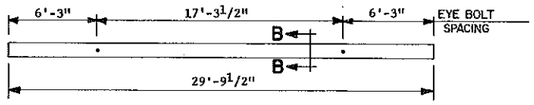
BASE PLATE DETAILS
(3 REQUIRED)



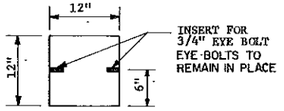
A-A



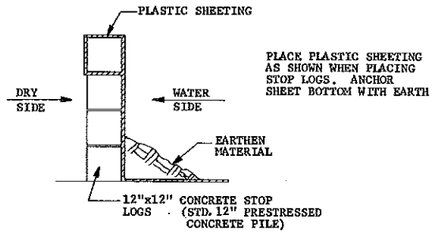
DETAIL "A"



STOP LOG PICKUP DETAIL

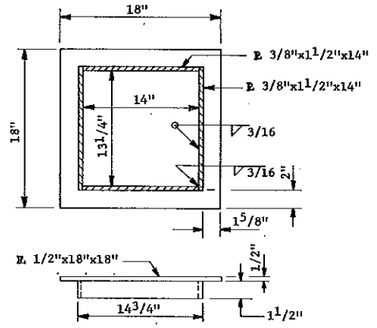


SECTION B-B



WATERPROOFING ROADWAY STOP LOGS

THE FURNISHING & PLACEMENT OF PLASTIC SHEETING & EARTHEN MATERIAL IS NOT PART OF THIS CONTRACT.



CAP DETAILS
(3 REQUIRED)

MANDAN FLOOD WALL

STOP LOG DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	74

SEE DWG. 1806-070.039-10

SEE DWG. 1806-070.039-10

SLOPE .311%

ELEV. TOP OF TIE - 1649.41 AT EAST ABUT. ℄ BEARING
1649.19 AT WEST ABUT. ℄ BEARING

EL. 1642.43

EL. 1642.65

BN EMBLEM ON OUTSIDE GIRDERS TO BE FURNISHED AND INSTALLED BY RAILROAD FORCES

16'-6" MIN.

6'-7⅜" TOP OF TIE TO BOTTOM OF GIRDER

8'-0" WALK

8'-0" WALK

2:1

2:1

DATUM LINE ELEV. 1630.0

BORING NO. 1A

STA. 5+90

ELEVATION

ABUTMENT NO. 1

ABUTMENT NO. 2

90'-0"

98'-9¼"

72'-3½"

℄ OF EXISTING RDWY. ℄ SURVEY

℄ SURVEY = OFFICE LOCATION 79°08'37"

34'-2"

10'-6"

℄ MAINLINE

STA. 6+24.19

STA. 6+20.64 = 10500+08.96 RR

32'-0" = FACE TO FACE OF EXISTING ABUTMENT WALL

18'-6"

35'-6"

INSIDE FACE OF NEW ABUTMENT WALL

31'-6"

INSIDE FACE OF NEW ABUTMENT WALL

24'-0"

℄ TRACK 1

STA. 6+45.08

18'-0"

℄ TRACK 2

STA. 6+63.41

EXISTING WALLS

18'-0"

℄ TRACK 3

STA. 6+81.73

10'-6"

83'-0"

EXISTING RETAINING WALL

20'-0"

10'-0"

BORING NO. 2

BORING NO. 1

20'-0"

24'-0"

PLAN

8" MIN. BALLAST

DECK DRAIN & WATERPROOFING SEE DWG. 1806-070.039-20

TYPICAL RAIL & BALLAST SECTION

APPROVED:
CHIEF ENGINEER DESIGN
BURLINGTON NORTHERN RAILROAD
1/22/88

BURLINGTON NORTHERN RAILROAD CO.
YELLOWSTONE DIVISION, 1st SUB. DIV.
BRIDGE NO. 199.1

DESIGN LOADING	SCALE
COOPER E-80 & DIESEL IMPACT	1/8" = 1'-0"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

6TH AVENUE S.E. UNDERPASS, MANDAN
BURLINGTON NORTHERN RAILWAY

PROJECT FG-1-806(015)069 STA. 6+20.64

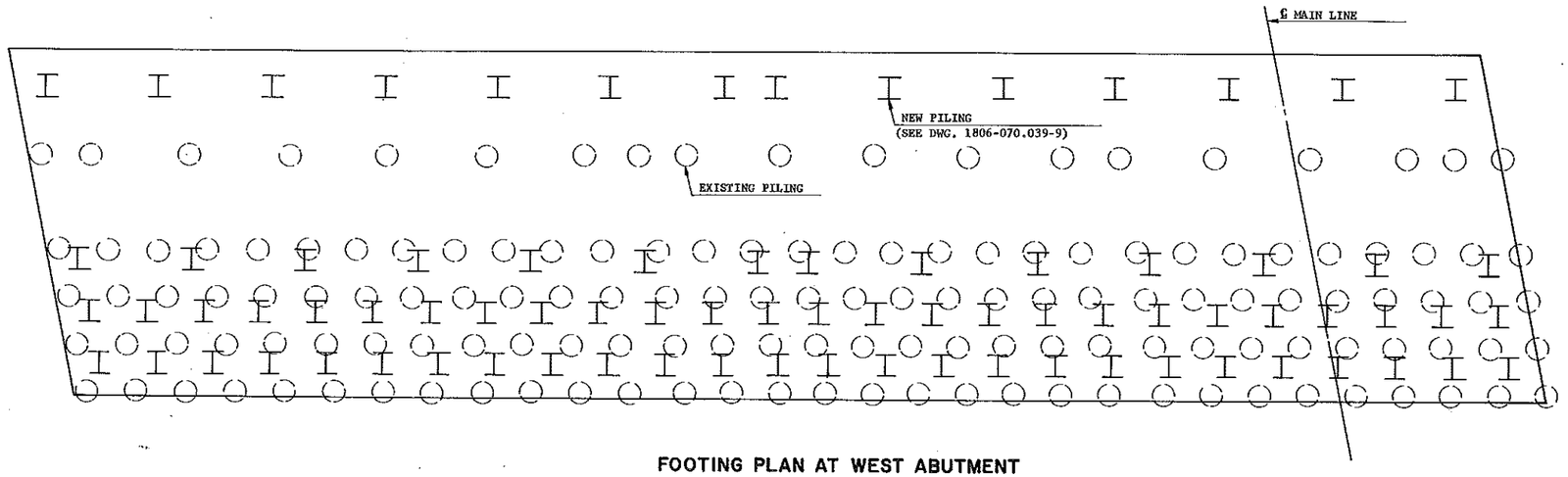
MORTON COUNTY

APPROVED:
1-13-88 DATE
BRIDGE ENGINEER

FOREST D. GUSH REGISTERED PROFESSIONAL ENGINEER 948 NORTH DAKOTA

1806-070.039

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	75



FOOTING PLAN AT WEST ABUTMENT

SHOWING NEW PILING AND EXISTING PILING

INDEX OF DRAWING

DESCRIPTION	DWG NO.
LAYOUT	1806 070.039
EXISTING PILING, PILE LOAD, INDEX OF DRAWING	1806 070 039-1
STRUCTURE 8 R.R. TRACK TO BE REMOVED	1806 070.039-2
NOTES	1806 070.039-3 & 4 & 4A
BORING LOGS	1806 070.039-5
ABUTMENT DETAILS	1806 070.039-6-9
MISC. ABUTMENT DETAILS	1806 070.039-10
N.W. & S.E. WING WLLS	1806 070.039-11 & 12
N.E. & S.W. WING WALLS	1806 070.039-13 & 14
GIRDER DETAIL, ELASTOMERIC BEARING	1806 070.039-15
DIAPHRAGH DETAILS	1806 070.039-16
SLAB DETAILS	1806 070.039-17
EXPANSION JOINT DETAILS	1806 070.039-18
RAILING DETAILS	1806 070.039-19
WATERPROOFING & DRAINAGE DETAILS	1806 070.039-20
SEAL SLAB LAYOUT	1806 070.039-21
SEAL SLAB SECTION	1806 070.039-22
SEAL SLAB SECTION	1806 070.039-23
SEAL SLAB SECTION	1806 070.039-24
SEAL SLAB SECTION	1806 070.039-25
SEAL SLAB SECTION	1806 070.039-26
SEAL SLAB SECTION	1806 070.039-27
SEAL SLAB SECTION	1806 070.039-28
SEAL SLAB SECTION	1806 070.039-29
SEAL SLAB SECTION	1806 070.039-30
SEAL SLAB SECTION	1806 070.039-31
SEAL SLAB SECTION	1806 070.039-32
SEAL SLAB SECTION	1806 070.039-33
RETAINING WALL LAYOUT	1806 070.039-34
WALL A1 & A2 DETAILS	1806 070.039-35
WALL A3, A4, & A5 DETAILS	1806 070.039-36
WALL B1 DETAILS	1806 070.039-37
WALL B2, B3, & B4 DETAILS	1806 070.039-38
WALL C1, C2, D1 & D2 DETAILS	1806 070.039-39
WALL C3, C4, D3 & D4 DETAILS	1806 070.039-40
PEDESTRIAN RAILING	1806 070.039-41
SPECIAL SURFACE TREATMENT	1806 070.039-42

ESTIMATE OF QUANTITIES

LOCATION
BN UNDERPASS MANDAN

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0105	REMOVAL OF STRUCTURE	L SUM	1.0
210	0100	CLASS 1 EXCAVATION	CU YD	430.0
210	0110	CLASS 2 EXCAVATION	CU YD	20.0
210	0200	SELECT BACKFILL	CU YD	900.0
210	0201	FOUNDATION PREPARATION	EA	1.0
602	0130	CLASS AAE-3 CONCRETE	CU YD	32.0
602	1120	SUPERSTRUCTURE CONCRETE	CU YD	147.0
602	1123	SEAL SLAB CLASS YE-1 CONCRETE	CU.YD	3026.0
602	1124	SEAL SLAB CLASS AE-3 CONCRETE	CU.YD	1724.0
602	1129	CLASS AE-3 MODIFIED CONCRETE	CU YD	1898.0
602	1130	CLASS AE-3 CONCRETE	CU YD	571.0
604	9915	PRESTRESSED I-BEAM 54"	L FT	1792.0
612	0115	REINFORCING STEEL GRADE 60	LBS	296392.0
612	0116	REINFORCING STEEL GRADE 60 EPOXY	LBS	2403.0
612	0125	SEAL SLAB REBARS GRADE 60	LBS.	58521.0
612	0130	SEAL SLAB REBARS GRADE 60 EPOXY	LBS.	21534.0
616	0362	STRUCTURAL STEEL M183	LBS	4520.0
622	0016	STEEL H-PILE TIPS HP 14X73	EA	204.0
622	0060	STEEL PILING HP 14x73	L FT	17176.0
622	1900	STEEL TEST PILING HP 14x73	L FT	180.0
624	0123	PEDESTRIAN RAILING	L FT	1206.0
626	0100	COFFERDAM	EA	2.0
740	122	THREE PLY FABRIC WATERPROOFING	SQ YD	50.0
740	140	BUTYL RUB. MEMBRANE WATERPROFING	SQ FT	7507.0
740	0160	SEAL SLAB WATERPROOFING MEMBRANE	SQ.YD	3743.0
740	0162	SEAL SLAB WATERSTOPS 6 IN.	L.F.	825.0
740	0163	SEAL SLAB WATERSTOPS 9 IN.	L.F.	140.0
930	8600	ELASTOMERIC BEARING PAD	SQ FT	92.0
930	9525	DECK DRAINAGE SYSTEM	L SUM	1.0
930	9930	ANTI-GRAFFITI COATING	SQ FT	7975.0

PILE LOADING

COMPUTED PILE LOADS - TONS PER PILE HP 14x73

	LOCATION	DEAD LOAD	LIVE LOAD	OVER TURNING	TOTAL
ABUTMENTS CASE I	ROW 1	19.1	14.4	42.0	75.5
	ROW 2	32.5	12.9	17.0	62.4
	ROW 3	45.9	11.3	8.0	49.2
	ROW 4	96.0	5.4	-101.7	-0.3
ABUTMENTS CASE II	ROW 1	19.1		42.0	61.1
	ROW 2	32.5		17.0	49.5
	ROW 3	45.9		-8.0	37.9
	ROW 4	96.0		-101.7	-5.7

ALL ABUTMENT AND WING WALL PILING(HP 14x73) SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 75 TONS.

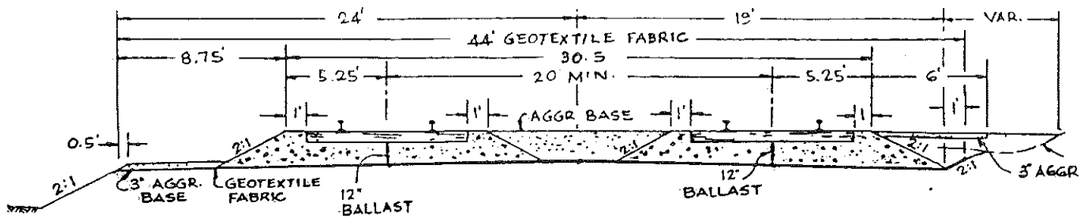
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.
EXISTING PILING
INDEX OF DRAWING
ESTIMATE OF QUANTITIES

1806-070.039-1

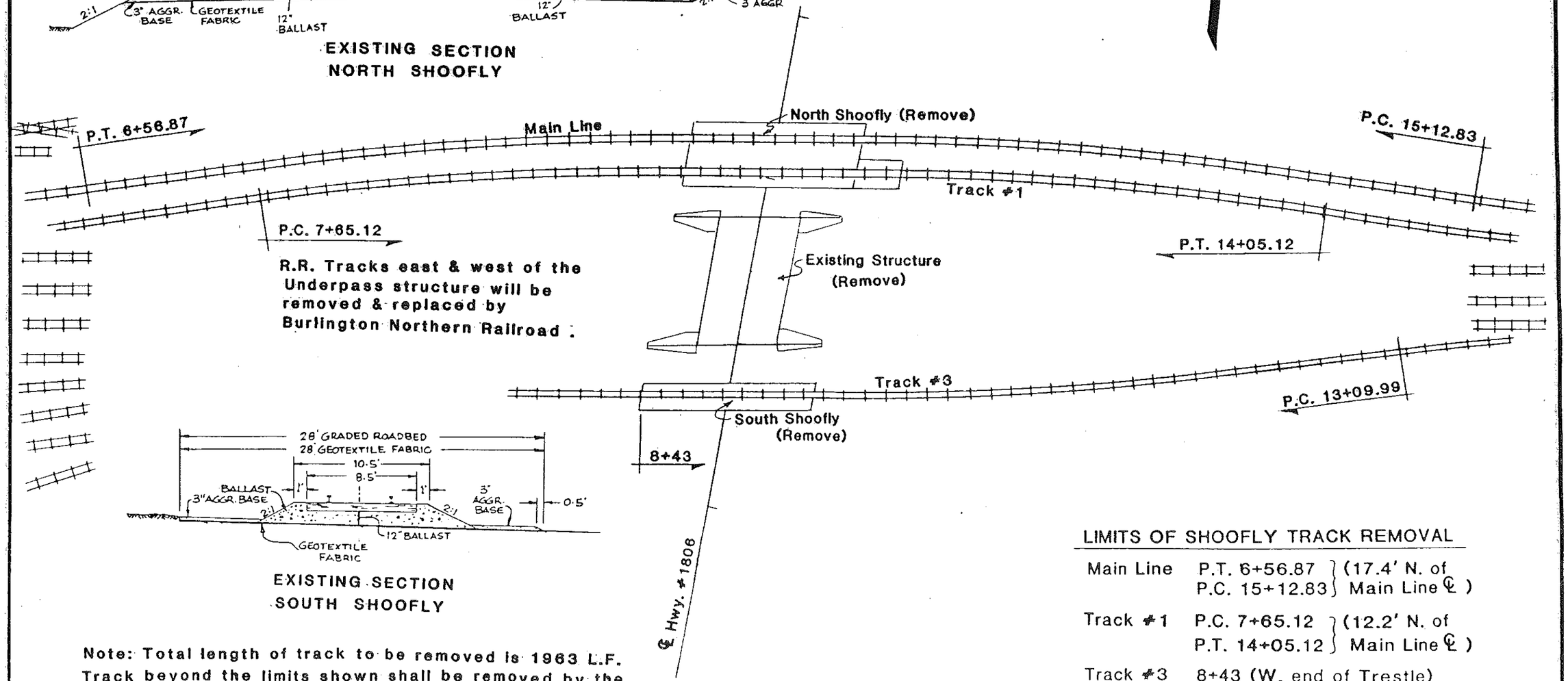
FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.		76

FG-1-806(015)069

LAYOUT SHOWING STRUCTURE & R.R. TRACK TO BE REMOVED



EXISTING SECTION NORTH SHOOFLY



R.R. Tracks east & west of the Underpass structure will be removed & replaced by Burlington Northern Railroad.

EXISTING SECTION SOUTH SHOOFLY

Note: Total length of track to be removed is 1963 L.F. Track beyond the limits shown shall be removed by the B.N. Railroad. See Structural Note 202 "Removal of Structure".

LIMITS OF SHOOFLY TRACK REMOVAL

Main Line	P.T. 6+56.87 P.C. 15+12.83	(17.4' N. of ℄ Main Line)
Track #1	P.C. 7+65.12 P.T. 14+05.12	(12.2' N. of ℄ Main Line)
Track #3	8+43 (W. end of Trestle) P.C. 13+09.99 (16' S. of Tr. #3)	

1806-070 039-2

100 GENERAL WORK DESCRIPTION: Removal of the existing structure and timber trestles and the construction of a new railroad bridge, seal slab, and retaining walls.

100 GENERAL: The cost of furnishing and placing preformed expansion joint filler, gray rubber joint filler, concrete inserts, tie wire, bar spacers, bar supports, dampproofing, dowel bars, end caps, bituminous felt, and other miscellaneous items shall be included in the price bid for Class AE-3 Concrete, Class AE-3 Modified Concrete, and Superstructure Concrete.

107 RAILROAD CONSTRUCTION: The contractor shall provide protection of Railway Company tracks and traffic in accordance with 107.06 of the Standard Specifications.

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

W. R. Grinstad
Yellowstone Division Superintendent
2718 Montana Avenue
Billings, MT 58101
Telephone: (406)256-4221

The Railroad will install at no cost to the contractor, two temporary construction crossings across the shoofly yard track (south track) for the contractor's operation. When the contractor utilizes these crossings, a railroad flagman is required.

202 REMOVAL OF STRUCTURE: The lump sum bid for "Removal of Structure" shall be full compensation for all labor, equipment, and materials necessary for removing the following items:

1. The existing railroad underpass structure. This structure is a single span railroad bridge with rolled beams 38 feet long with a concrete deck. The substructures are made of concrete. Track rails will be removed by others.

2. The timber trestles located north and south of the railroad underpass structure. Information pertaining to these trestles (or the railroad underpass) can be obtained by contacting the Bridge Division in Bismarck, North Dakota. The telephone number is (701)224-2592. The contractor shall remove the north and south trestles immediately after the train traffic has been moved over to the new railroad bridge.

3. The shoofly railroad tracks including the rails, ties, ballast, geotextile fabric, temporary embankment, and sheet piling. See detail sheet 1806-070.039-2 showing the layout of structure and railroad track to be removed for locations and quantities. After the removal, the ground shall be graded and leveled as directed by the Engineer.

4. The existing east abutment timber piling and timber piling for the in place timber trestles shall be removed or cut down to an elevation of one foot below the seal slab section. The existing west abutment timber piling shall be removed or cut at the bottom elevation of the new abutment footing. The existing abutment footings have 143 timber piling at elevation 1625. Timber piling from the trestles and timber sheeting used when the existing underpass was constructed may have to be removed.

210 EXCAVATION: Class 1 excavation for retaining wall construction shall extend from the datum to the upper limits as designated on the plans. Payment for Class 1 excavation will be based on plan quantity.

210 EXCAVATION: Class 2 excavation for retaining wall construction shall include all excavation below the datum line as designated on the plans. Payment for Class 2 excavation will be based on plan quantity.

210 BACKFILL: Select backfill shall be compacted in accordance with Section 203.02F except required density shall be 100% of AASHTO T-99 or 95% of AASHTO T-180. The coarse aggregate filter material and filter fabric shall be incidental to the price bid for "6" perforated PVC pipe."

602 SURFACE FINISH "D": Surface Finish "D" shall be required for the inside walls and ceiling of the pedestrian walkways, the inside area of the windows, the faces of the abutments around and above the walkways, and the exposed wing walls of the abutments. An Anti-Graffiti coating shall be applied to the above noted areas. The Anti-Graffiti coating shall be supplied by one of the following manufacturers:

Coatings For Industry, Inc.
319 Township Line Road
Souderton, PA 18964

ProSoCo, Inc.
P.O. Box 1578
Kansas City, KS 66117

Preco Industries, Ltd.
55 Skyline Drive
Plainview, NY 11803 9966

Anti-Graffiti coating shall be applied in accordance with the manufacturer's recommendations.

602 CONCRETE: Construction shall conform to the provisions of Section 602, "Concrete Structures" of the Standard Specifications and the following additional requirements: Abutment shall be Class AE-3 modified concrete with six (6) sacks of 95 lb. cement per cubic yard and a maximum water content of 5.5 gallons per sack of cement. The deck concrete shall be superstructure concrete. The deck sidewalks shall be Class AAE-3 concrete. The wing walls, retaining walls, base slab, and the roadway section of the seal slab shall be Class AE-3 concrete. The seal slab shall be Class YE-1 concrete. The class of concrete paid for will be that shown on the plans.

602 SUPERSTRUCTURE CONCRETE: Girders may have slight variations in the anticipated camber. To build the deck to the designated thickness will require slight adjustments in deck elevation and/or riser dimensions. These adjustments result in minor concrete quantity discrepancies. The contractor shall consider this quantity discrepancy when he bids the unit price for Superstructure Concrete. The Department will only pay for the plan quantity of Superstructure Concrete. Superstructure concrete shall have a minimum 28-day compression strength of 5,000 psi.

612 REINFORCING STEEL: Dimensions for bent bars are given out to out and to tangent intersections unless otherwise noted.

612 The bar fabricator shall add a prefix to all bar designations to differentiate between the several parts of the structure.

612 All reinforcing steel shall be Grade 60.

622 PILING: Piling shall be driven with a steam, air, or diesel hammer with a rated energy and ram weight not less than 63,854 foot-pound-tons, as computed by the formula W(E-15,167) + 0.842E 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 4,800 pounds.

The abutments and wing walls have a total of 204 H-piles which will require pile points. The pile points shall be carbon-steel castings with a minimum yield strength of 40,000 psi.

The unit price bid for pile points shall include material and installation. Piles shall be driven to elevation 1550 or below as required to obtain design bearing.

The plan drawing 1806-070.039-1 shows the expected location of existing timber piling for the west abutment with the piling for the new abutment. After the existing abutment has been removed and the area excavated to expose the true location of the timber piles, it may be necessary to shift some of the batter H-piles to avoid the timber piles in place, if these timber piling are not removed.

622 Test piles shall be driven to a bearing not less than 125% of the design load as determined by the dynamic formula in section 622.03 A.2.

SHOP DRAWINGS: The contractor shall submit the following shop drawings to the Construction office for approval;

1. Prestressed concrete I girders.
2. Deck drainage collection system.
3. Railing details.

DESIGN STRENGTH:	F'C	2,500 PSI Cl. YE-1 Concrete
	F'C	3,000 PSI Cl. AE-3 or AE-4 Concrete
	F'C	3,500 PSI Cl. AE-3 Modified Concrete
	F'C	5,000 PSI Superstructure Concrete
	F'C	5,500 PSI Prestressed Girder Concrete
	FY	36,000 PSI Structural Steel
	FY	60,000 PSI GR. 60 Reinforced Steel

DRAINAGE SYSTEM: Drainage system bottom pans, cover, corrugated metal pipes, reducers, collar, and all necessary connections and fasteners shall be galvanized and bituminous coated.

The item "Deck Drainage System" to include all material required for the complete drainage system including pipe clamps, deck drains, sleeves, and all underground pipe behind and through abutments.

Threaded bolt anchorages to be cinch-anchor type as manufactured by the National Lead Company, the rawl-anchor type as manufactured by the Rawlplug Company, or approved equal.

JOINT FILLER: Preformed expansion joint filler shall comply with AASHTO M33.

Gray rubber joint filler shall conform to the requirement of AASHTO M153, Type 1. Dimensions shall be as shown on the plans and tolerance of +1/16 inch in thickness ±1/8 inch in depth and +1/4 inch in length shall be permitted.

LEGEND: F.F. Denotes Front Face
B.F. Denotes Back Face
TYP. Denotes Typical

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 taken. 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.

COFFERDAMS: Cofferdams shall be required for the construction of the abutments and wing walls. The contractor shall be responsible for the design construction, dewatering, maintaining, and removal of the cofferdams as noted in Section 626 of the Standard Specifications . The sheet piling and the excavation inside the cofferdams shall be included in the price bid for "Cofferdams."

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.

BASE SLAB: Base slab construction shall conform to the provisions in Section 602, "Concrete Structures" of the Standard Specifications and the following additional requirement: Base slab concrete shall be Class AE-3 concrete. Base slab concrete shall be placed in the dry and need not be vibrated. Base slab concrete shall be cured by the wet cure method according to the provisions of Section 602.03 F.2.C. The surface of the base slab concrete shall be finished such that it will be free of angular breaks, sharp edges, and honeycomb and the finished surface will not vary more than 1/2 inch from a ten-foot straight edge placed in any direction on the surface. Any curing compound used shall be compatible to the waterproofing system.

No vehicular traffic that may damage the slab will be permitted on the base slab concrete.

SEAL SLAB: Seal slab construction shall apply to the section between Station 6+00 and Station 8+30. Seal slab construction shall conform to the provisions in Section 602, "Concrete Structures" of the Standard Specifications and the following additional requirements: Seal slab concrete shall be Class YE-1 concrete.

Seal slab concrete placement between construction joints shall be completed in one continuous operation with a minimum concrete placement rate of 100 cubic yards per hour.

Seal slab construction between Station 7+05 to Station 7+65 may be placed in two lifts to aid in the forming of the drop inlets and the anchorage of the drainage pipes.

The cement shall conform to AASHTO M-85, Type II, for moderate heat of hydration and for less shrinkage. Fly ash may be substituted on the basis of 20% fly ash for 15% cement. Fly ash shall conform to Section 820 of the Standard Specifications.

The surface of the seal slab shall be tined or raked to roughen the surface slightly to aid in the bonding of the roadway concrete section.

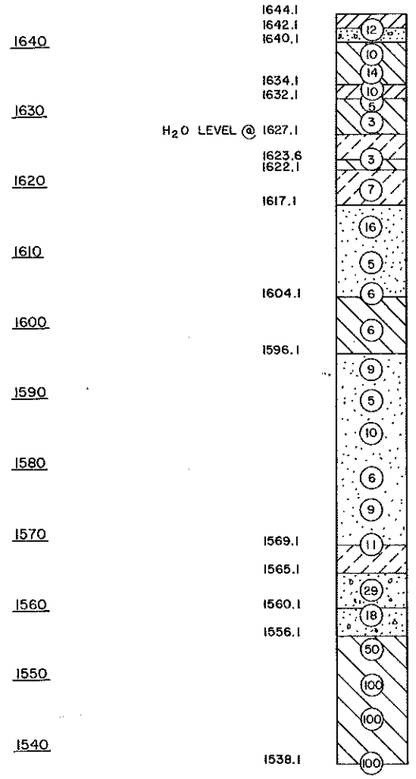
After mixing, the seal slab concrete temperature shall be maintained at not more than 60°F. until placed in the work. The amount of cooling of 1½" aggregate and water will depend on ambient air temperature and the temperature of the material in the stockpile.

Seal slab concrete shall be cured by the wet cure method according to the provisions of Section 602.03 F.2.C. of the Standard Specifications. The minimum time between placement of adjacent concrete slabs is 14 days.

ROADWAY SECTION: The roadway section between Station 5+55.75 to Station 9+05 shall be Class AE-3 concrete. Construction shall conform to the provisions in Section 550, "Portland Cement Concrete Pavement" of the Standard Specifications. The roadway section shall be paid for at the unit price bid for Seal Slab, Class AE-3 Concrete and Seal Slab Reinforcing Steel, Grade 60 Epoxy.

All seal slab retaining walls and walls A-1, A-2, A-3, B-1, B-2, C-1, C-2, D-1, and D-2 shall be given the special surface treatment as shown on sheet 1805-070.039-42 in the plans. Drain holes in the north retaining walls shall be provided with a filtering material so the weep holes remain clear.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-I-806(15)	80



FILL, MOSTLY CLAY, DARK BROWN, FROZEN

FILL, MOSTLY CINDERS WITH A LITTLE SAND & GRAVEL, BLACK, FROZEN TO 3'

(A-7-6) CLAY, BROWN, RATHER STIFF

(A-7-6) CLAY, GRAYISH BROWN, RATHER STIFF

(A-7-6) CLAY, GRAY, MEDIUM TO SOFT, GASOLINE ODOR FROM 12'-18'

(A-4) SANDY LOAM, GRAY

(A-7-6) CLAY, BROWNISH GRAY, SOFT

(A-4) SANDY LOAM, GRAY, WET, LOOSE

BOTTOM OF ABUTMENT FOOTING - EAST ABUT. 1615.99
WEST ABUT. 1615.77

(A-2-4) SAND, FINE TO MEDIUM GRAINED, GRAY, MEDIUM DENSE TO LOOSE, A FEW LAYERS OF FAT CLAY

(A-7-6) CLAY, GRAY, MEDIUM, A FEW LAYERS OF WATERBEARING SAND.

(A-2-6) SAND, GRAY, MEDIUM DENSE AND LOOSE, LAYERS OF SILT AND CLAY.

(A-4) SANDY LOAM, GRAY, WET, MEDIUM DENSE

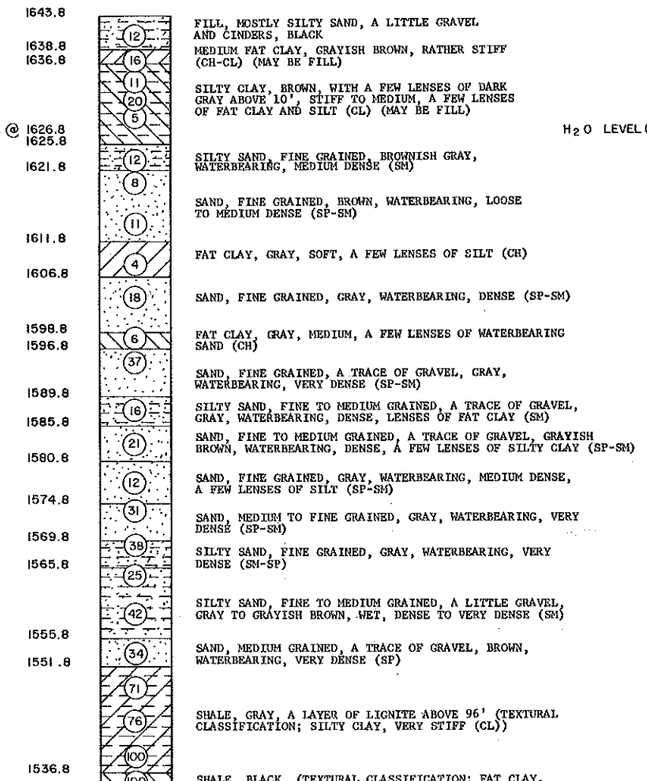
(A-2-4) SAND WITH A LITTLE GRAVEL, FINE TO MEDIUM GRAINED, GRAYISH BROWN, WATERBEARING, DENSE

(A-3) SAND WITH A LITTLE GRAVEL, MEDIUM TO COARSE GRAINED, GRAYISH BROWN, WATERBEARING, DENSE

(A-7-6) SHALE, GRAY, VERY STIFF, (TEXTURAL CLASSIFICATION: CLAY

BORING NO. 1A

NORTHWEST EXISTING BRIDGE



FILL, MOSTLY SILTY SAND, A LITTLE GRAVEL AND CINDERS, BLACK

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)

SILTY SAND, FINE GRAINED, BROWNISH GRAY, WATERBEARING, MEDIUM DENSE (SM)

SAND, FINE GRAINED, BROWN, WATERBEARING, LOOSE TO MEDIUM DENSE (SP-SM)

FAT CLAY, GRAY, SOFT, A FEW LENSES OF SILT (CH)

SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)

FAT CLAY, GRAY, MEDIUM, A FEW LENSES OF WATERBEARING SAND (CH)

SAND, FINE GRAINED, A TRACE OF GRAVEL, GRAY, WATERBEARING, VERY DENSE (SP-SM)

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)

SAND, FINE GRAINED, GRAY, WATERBEARING, MEDIUM DENSE, A FEW LENSES OF SILT (SP-SM)

SAND, MEDIUM TO FINE GRAINED, GRAY, WATERBEARING, VERY DENSE (SP-SM)

SILTY SAND, FINE GRAINED, GRAY, WATERBEARING, VERY DENSE (SM-SP)

SILTY SAND, FINE TO MEDIUM GRAINED, A LITTLE GRAVEL, GRAY TO GRAYISH BROWN, WET, DENSE TO VERY DENSE (SM)

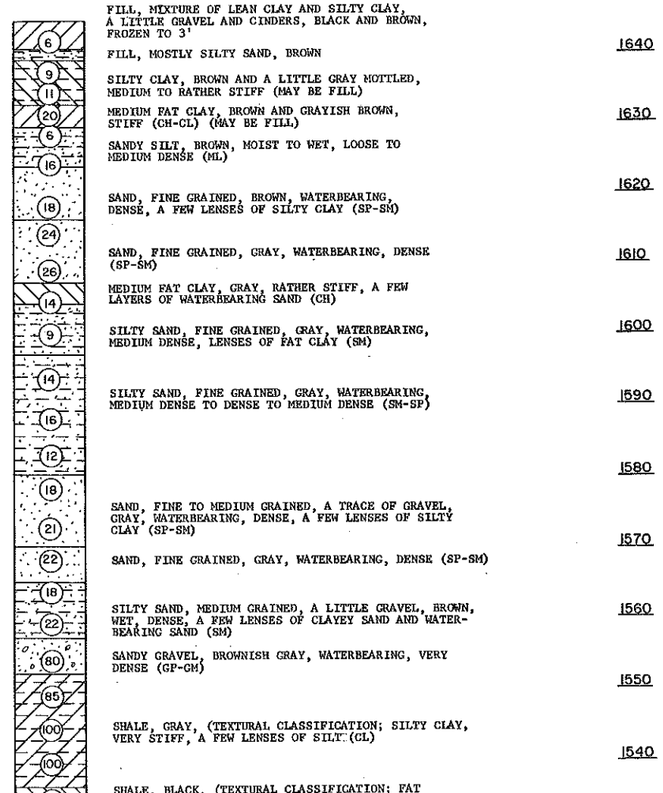
SAND, MEDIUM GRAINED, A TRACE OF GRAVEL, BROWN, WATERBEARING, VERY DENSE (SP)

SHALE, GRAY, A LAYER OF LIGNITE ABOVE 96' (TEXTURAL CLASSIFICATION; SILTY CLAY, VERY STIFF (CL))

SHALE, BLACK, (TEXTURAL CLASSIFICATION; FAT CLAY, VERY STIFF (CH-OH)

BORING NO. 1

SOUTHWEST EXISTING BRIDGE



FILL, MIXTURE OF LEAN CLAY AND SILTY CLAY, A LITTLE GRAVEL AND CINDERS, BLACK AND BROWN, FROZEN TO 3'

FILL, MOSTLY SILTY SAND, BROWN

SILTY CLAY, BROWN AND A LITTLE GRAY MOTTLED, MEDIUM TO RATHER STIFF (MAY BE FILL)

MEDIUM FAT CLAY, BROWN AND GRAYISH BROWN, STIFF (CH-CL) (MAY BE FILL)

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)

SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)

MEDIUM FAT CLAY, GRAY, RATHER STIFF, A FEW LAYERS OF WATERBEARING SAND (CH)

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)

SAND, FINE TO MEDIUM GRAINED, A TRACE OF GRAVEL, GRAY, WATERBEARING, DENSE, A FEW LENSES OF SILTY CLAY (SP-SM)

SAND, FINE GRAINED, GRAY, WATERBEARING, DENSE (SP-SM)

SILTY SAND, MEDIUM GRAINED, A LITTLE GRAVEL, BROWN, WET, DENSE, A FEW LENSES OF CLAYEY SAND AND WATER-BEARING SAND (SM)

SANDY GRAVEL, BROWNISH GRAY, WATERBEARING, VERY DENSE (GP-GM)

SHALE, GRAY, (TEXTURAL CLASSIFICATION; SILTY CLAY, VERY STIFF, A FEW LENSES OF SILT (CL)

SHALE, BLACK, (TEXTURAL CLASSIFICATION; FAT CLAY, VERY STIFF (CH-OH)

BORING NO. 2

SOUTHEAST EXISTING BRIDGE

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:

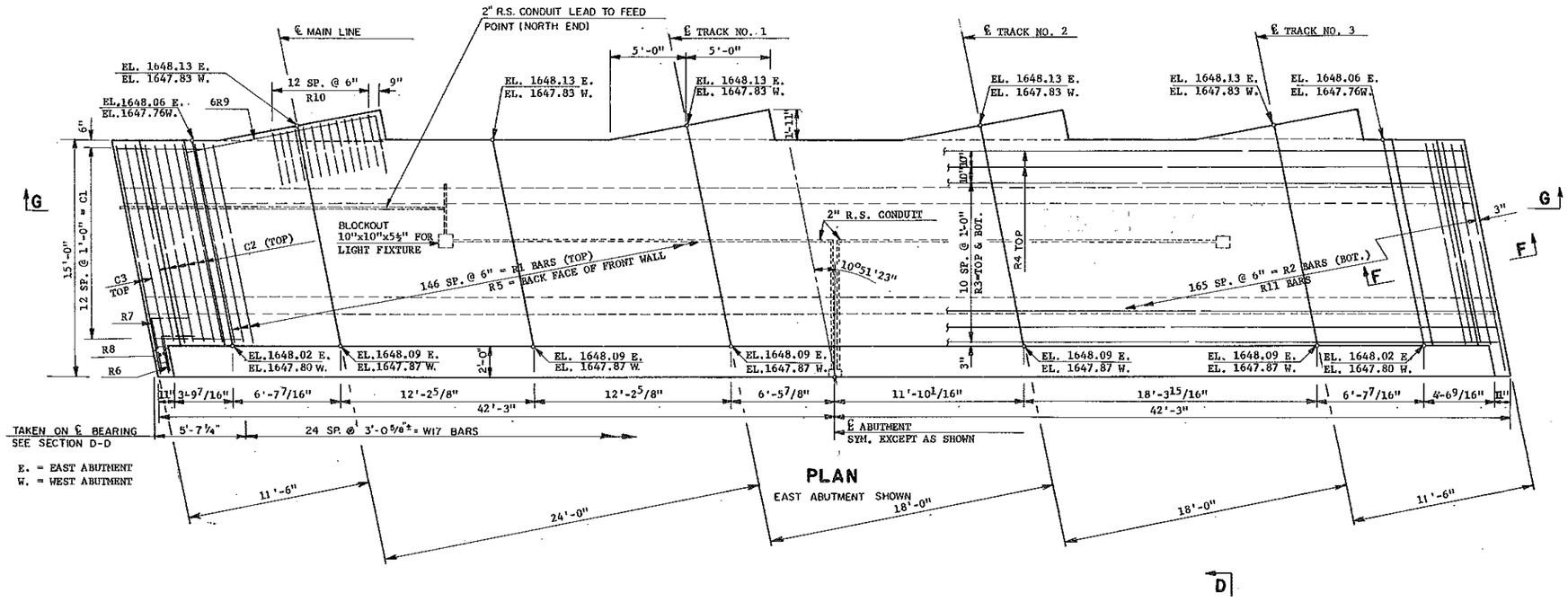
P - MAXIMUM LOAD (LBS. SQ. FT.)
Ø - ANGLE OF INTERNAL FRICTION (DEGREES)
C - COHESION (LBS. SQ. FT.)
M - MOISTURE (PERCENT)
W - DRY WEIGHT (LBS./CU. FT.)
* - TRIAXIAL

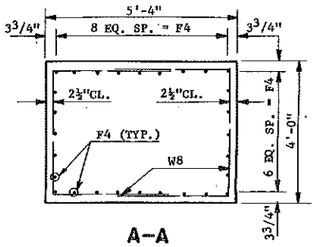
N.D. 1806
MANDAN

BORING LOG

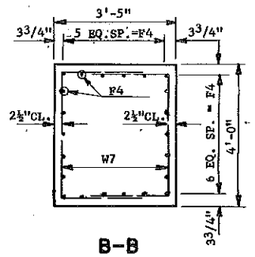
1806 - 070.039 - 5

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	81

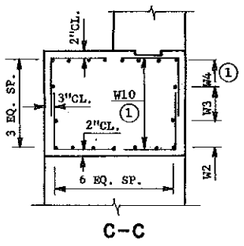




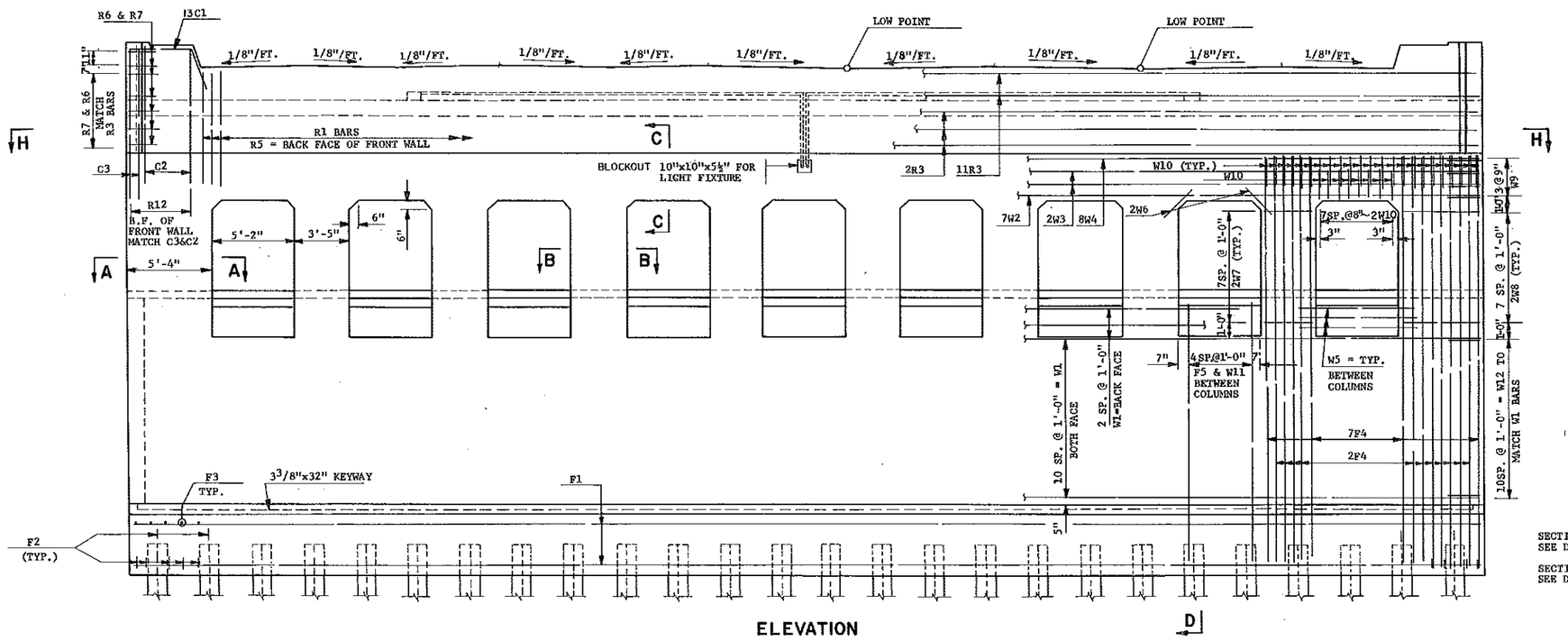
A–A



B–B



C–C



SECTIONS D-D & FF SEE DWG. 1806-070.039-8

SECTION G-G & H-H SEE DWG. 1806-070.039-7

① W4 & W10 BARS MAY NEED TO BE SHIFTED TO PROVIDE CLEARANCE FOR DRILLING ANCHOR BOLT HOLES.

QUANTITIES

SEE DRAWING NO. 1806-070.039-9

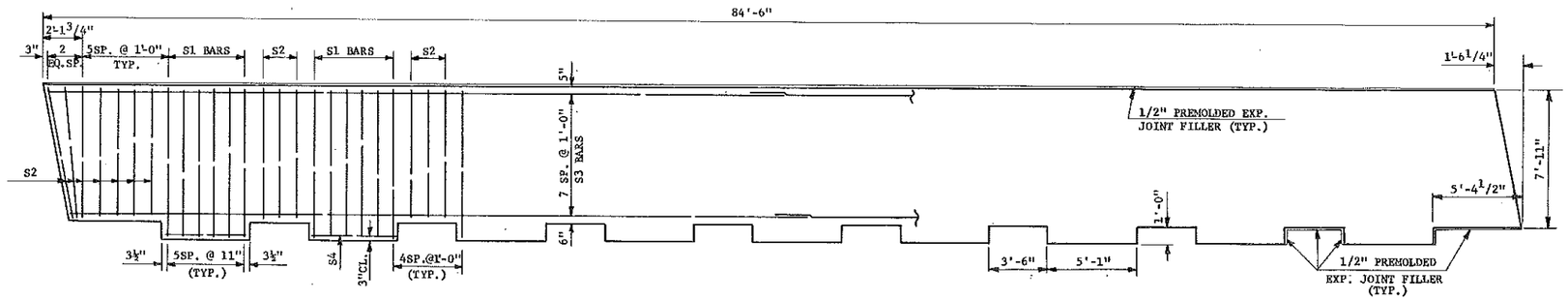
6TH AVENUE S.E. UNDERPASS

MANDAN, N.D.

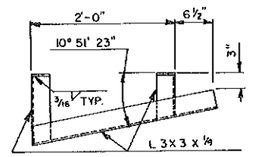
ABUTMENT DETAILS

1806-070.039-6

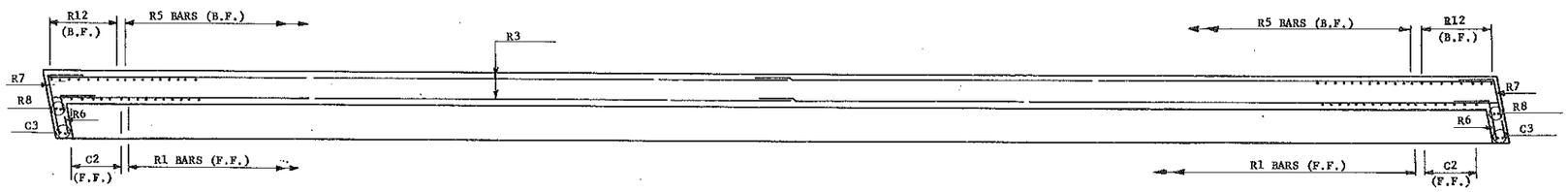
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	82



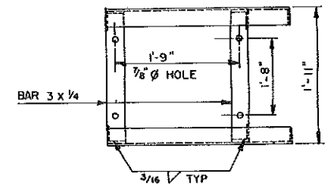
SIDEWALK PLAN



PLAN

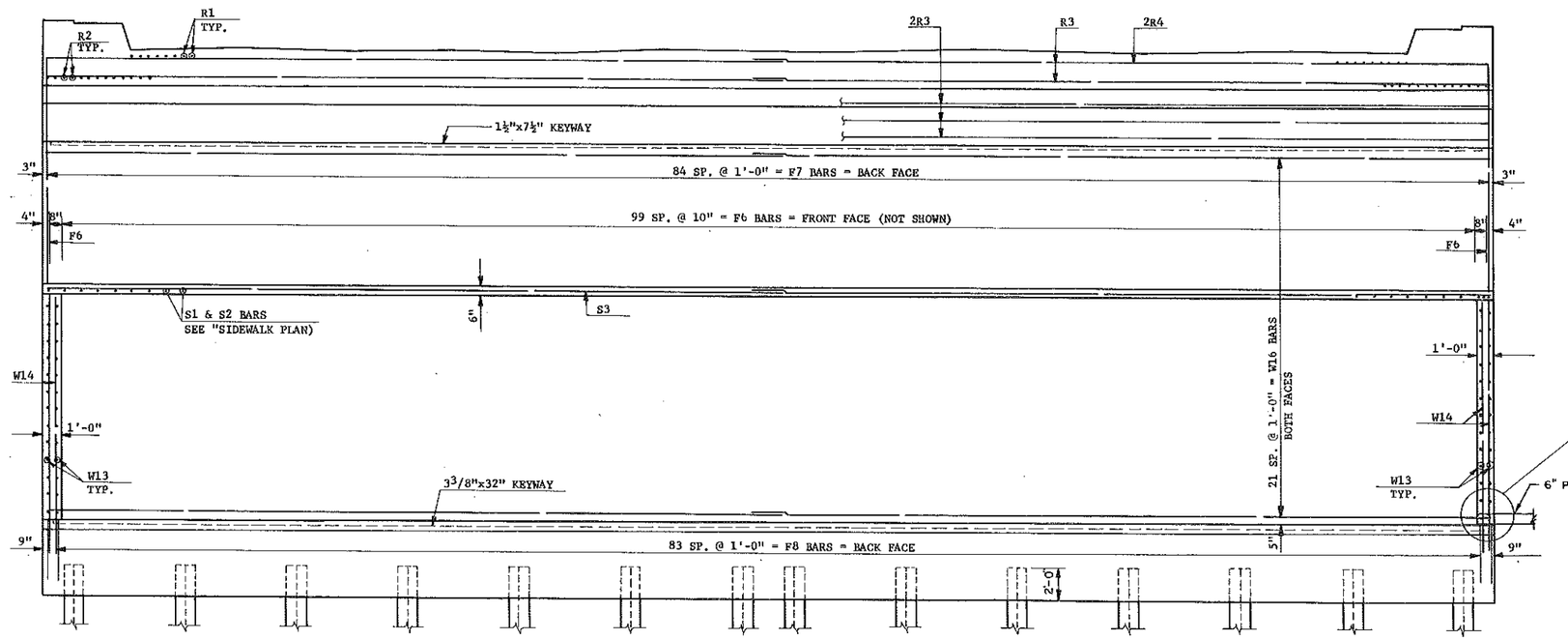


H-H
SECTION OF FRONT WALL ONLY

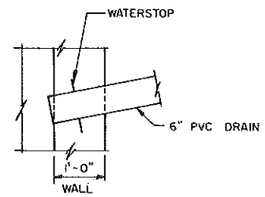


BN SIGN BRACKET
(2 REQUIRED)

NOTE: STRUCTURAL STEEL FOR THE SIGN BRACKET SHALL BE INCLUDED IN THE BID ITEM AS PEDESTRIAN RAIL.
(INSERTS FURNISHED BY FABRICATOR)



G-G



QUANTITIES

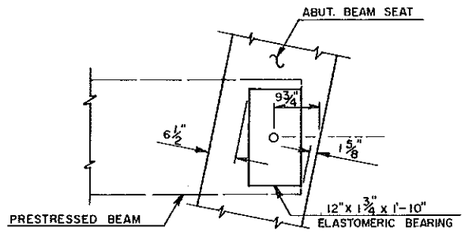
SEE DRAWING 1806-070.039-9

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

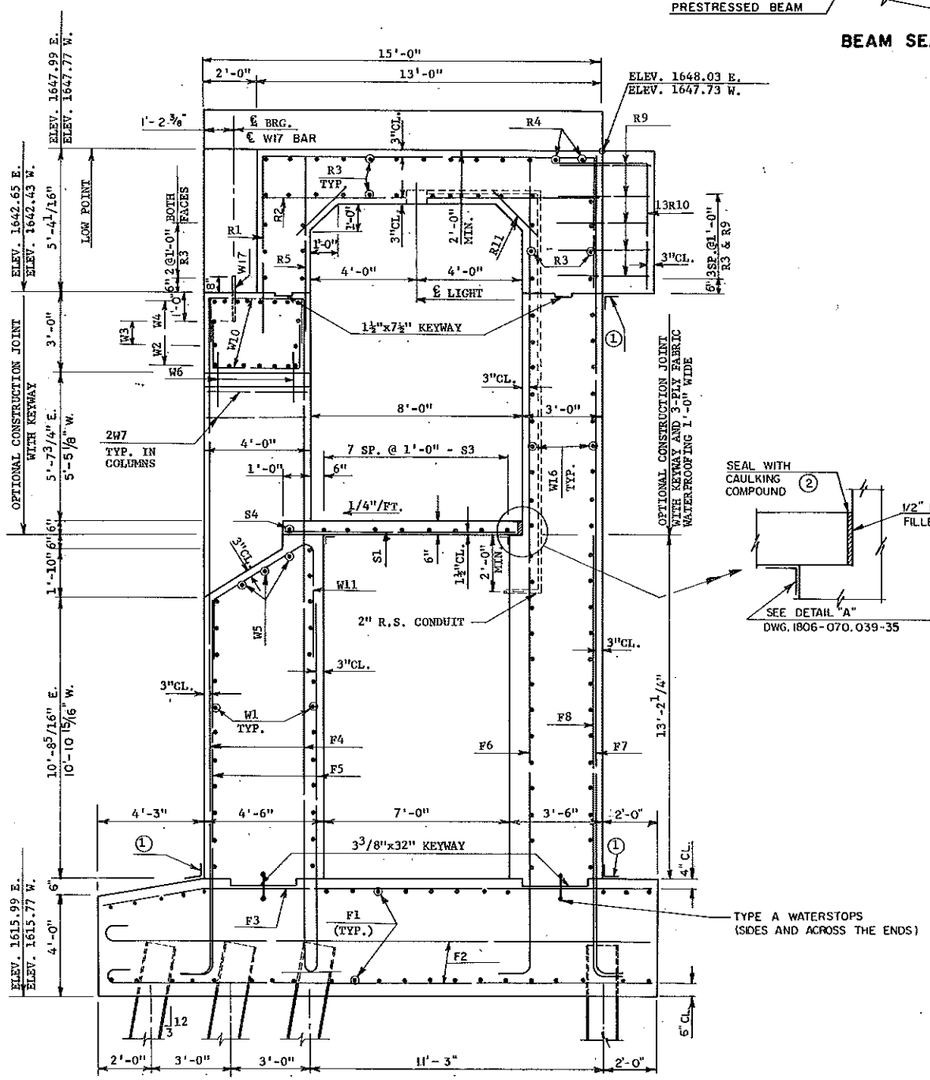
ABUTMENT DETAILS

1806-070.039-7

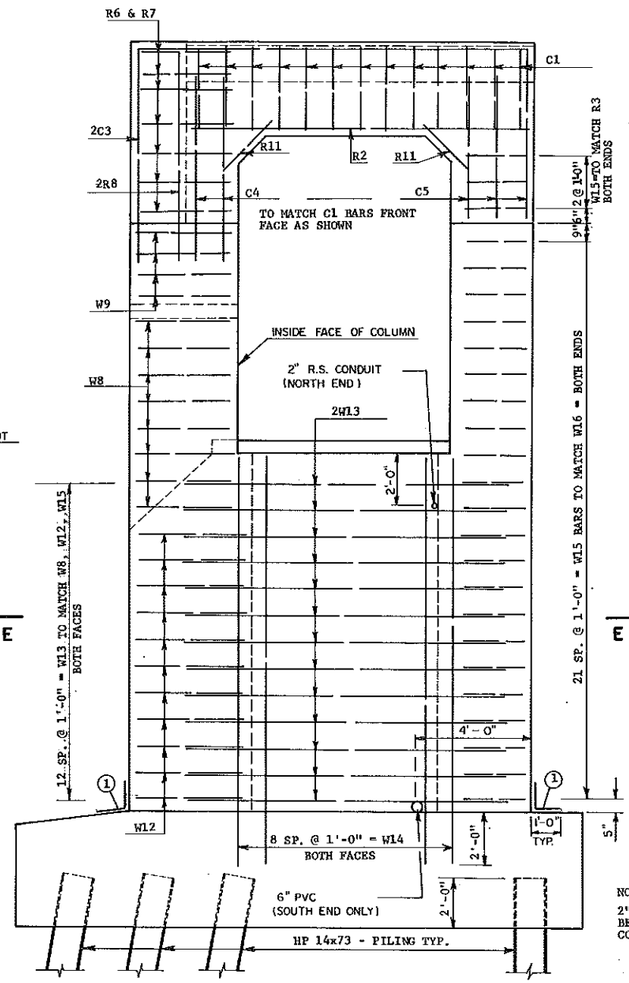
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IG-1-806(15)	83



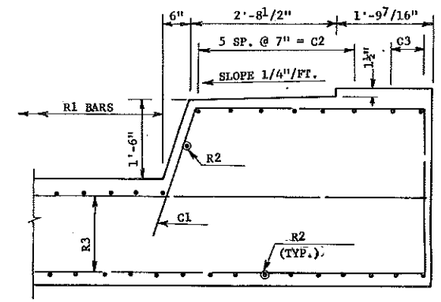
BEAM SEAT DETAIL



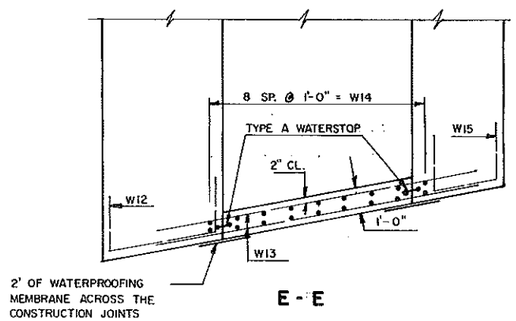
D-D



END VIEW



F-F



E-E

(1) WATERPROOFING MEMBRANE

(2) CAULKING COMPOUND -- SPEC. NO. TT-S-00227E CLASS A TYPE II.

NOTE:

2" R.S.C.-COST OF LIGHTING CONDUIT SHALL BE INCIDENTAL TO CLASS AE-3 MODIFIED CONCRETE.

QUANTITIES

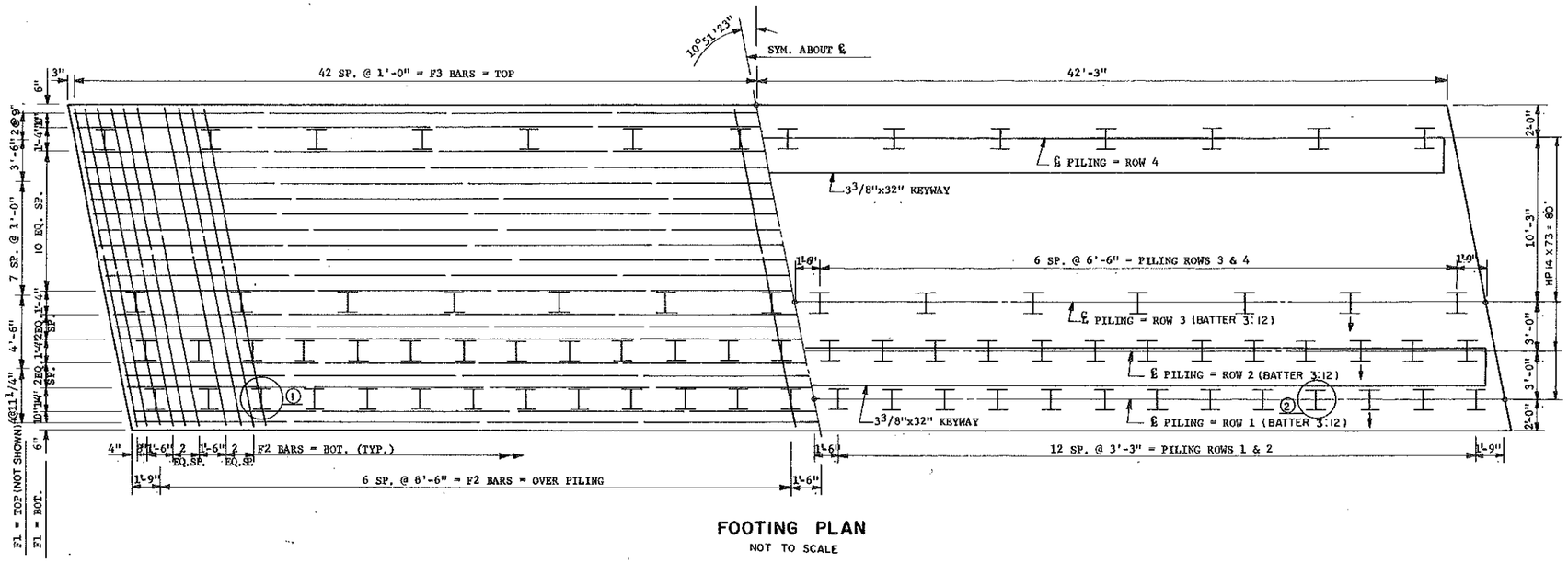
SEE DRAWING 1806-070.039-9

6TH AVENUE S.E. UNDERPASS
MANDAN, ND

ABUTMENT DETAILS

1806-070.039-8

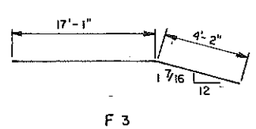
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	84



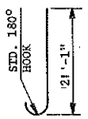
FOOTING PLAN
NOT TO SCALE

① TEST PILE FOR EAST ABUTMENT HP14 X 73 = 90'

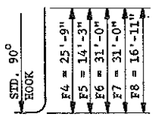
② TEST PILE FOR WEST ABUTMENT HP 14 X 73 = 90'



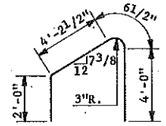
F 3



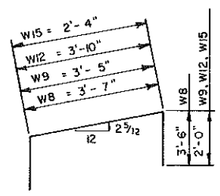
F2



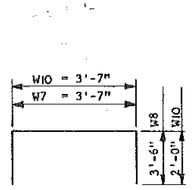
F4 – F8



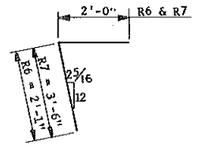
W11



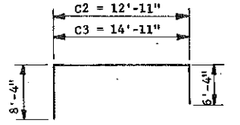
W8, W9, W12 & W15



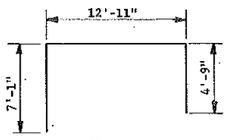
W7 – W10, W12, W15



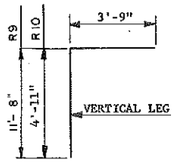
R6, R7



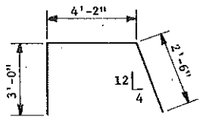
C2 & C3



R1



R9 & R10



C1

BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT

BAR LIST (ONE ABUT.)

MARK	NO.	SIZE	LENGTH	SHAPE
F1	74	5	43'-1"	STR.
F2	93	10	22'-6"	BENT
F3	85	6	21'-3"	"
F4	232	10	27'-7"	BENT
F5	90	5	15'-1"	"
F6	102	8	32'-4"	"
F7	85	10	32'-10"	"
F8	84	10	18'-9"	"
W1	48	6	43'-1"	STR.
W2	14	7	43'-3"	"
W3	8	5	43'-1"	"
W4	16	9	43'-7"	"
W5	27	5	7'-2"	"
W6	36	6	2'-6"	"
W7	128	5	8'-7"	BENT
W8	32	5	10'-7"	"
W9	8	5	7'-5"	"
W10	210	6	7'-7"	"
W11	45	5	10'-9"	"
W12	22	5	7'-10"	"
W13	52	5	12'-9"	STR.
W14	36	5	15'-0"	"
W15	52	5	6'-4"	BENT
W16	88	6	43'-1"	STR.
W17	25	10	1'-8"	"
S1	54	5	8'-4"	STR.
S2	38	5	7'-4"	STR.
S3	16	5	43'-1"	"
S4	9	5	4'-9"	"
R1	147	7	24'-9"	BENT
R2	166	7	12'-11"	STR.
R3	70	6	43'-1"	"
R4	4	8	43'-4"	"
R5	147	5	7'-1"	"
R6	14	5	4'-1"	BENT
R7	14	5	5'-6"	"
R8	4	5	8'-10"	STR.
R9	20	5	15'-5"	BENT
R10	52	7	8'-8"	"
R11	332	6	2'-6"	STR.
R12	16	5	9'-0"	"
C1	26	5	9'-8"	BENT
C2	12	6	27'-7"	"
C3	4	6	29'-7"	"
C4	4	5	6'-10"	"
C5	6	5	5'-4"	"

QUANTITIES (ONE ABUT.)

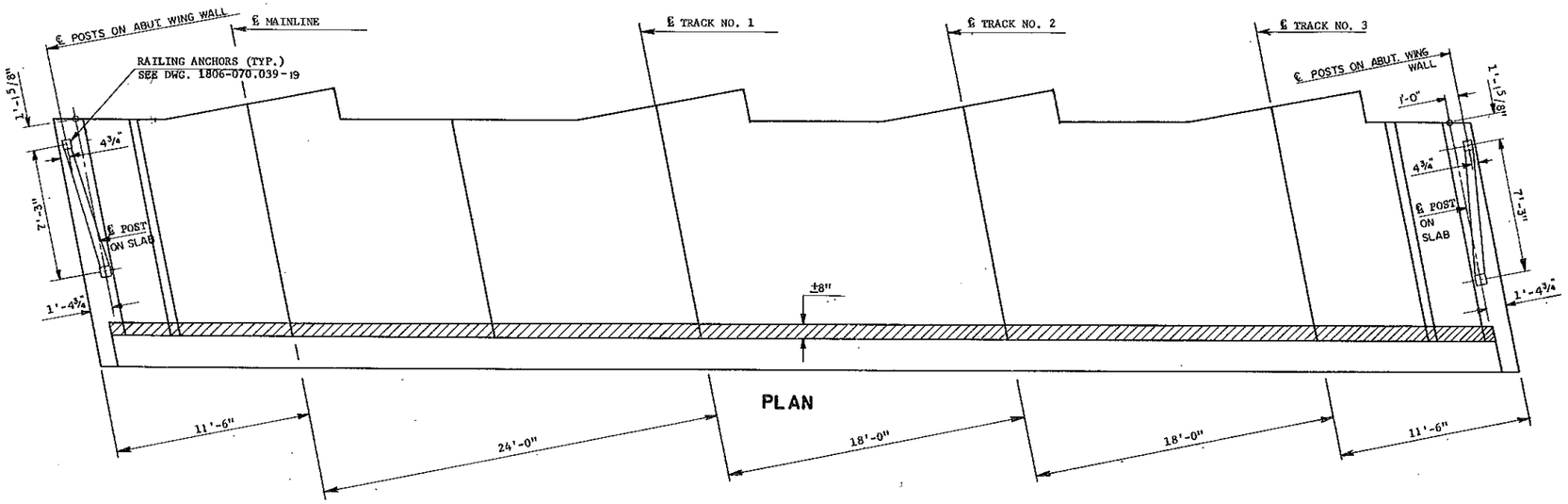
CLASS AE-3 MOD. CONC.	949	C.Y.
REINFORCING STEEL	114,344	LBS.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

ABUTMENT DETAILS

1806-070.039-9

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	85

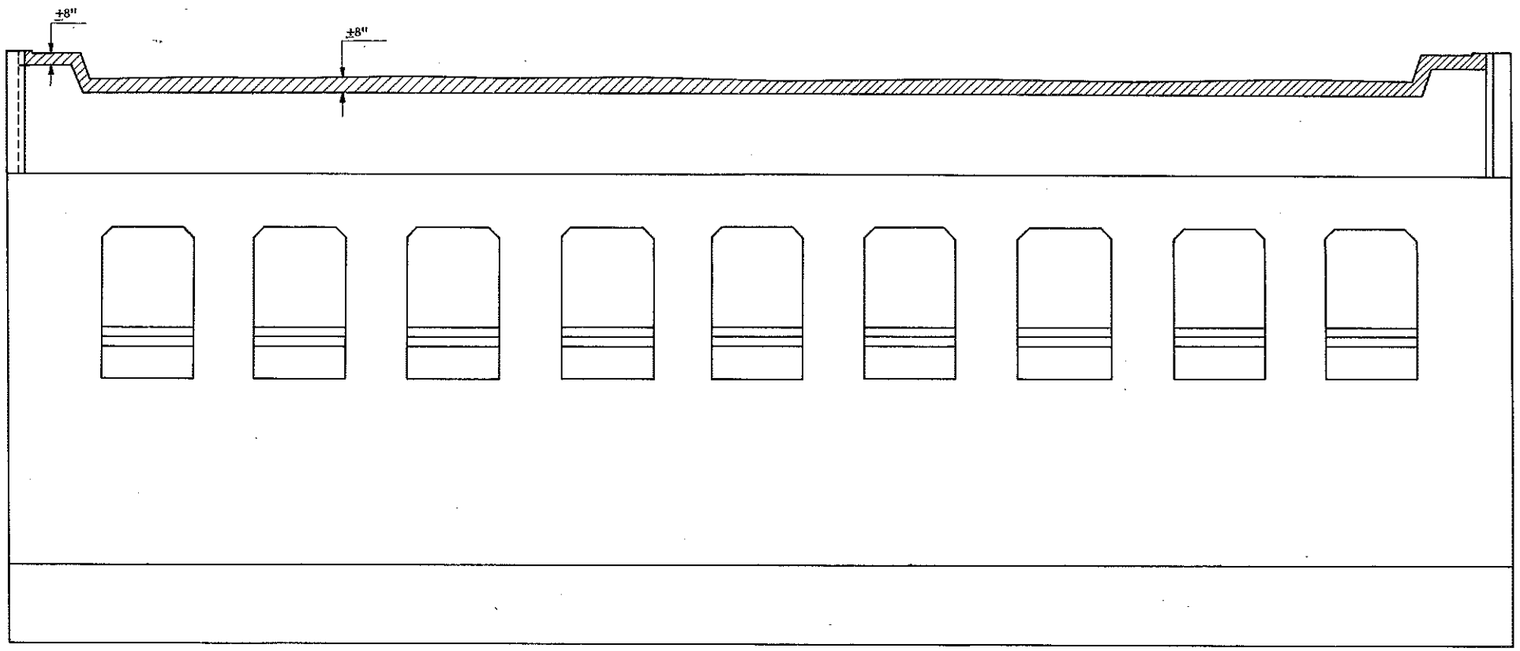


PLAN

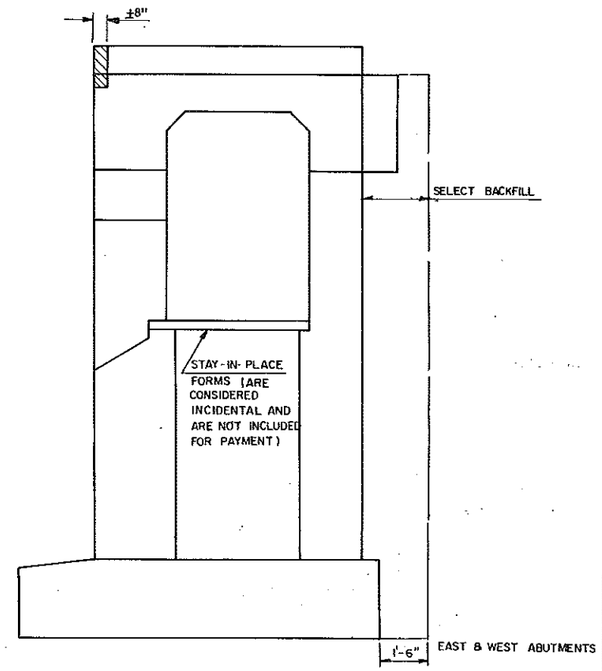
NOTE:

CROSSHATCHED AREA SHALL BE BLOCKED OUT AND POURED AFTER THE ENTIRE EXPANSION JOINT ASSEMBLY HAS BEEN ADJUSTED TO FINAL POSITION.

FOR EXPANSION JOINT DETAILS, SEE DWG. 1806-070.039-18



ELEVATION



TYPICAL SECTION

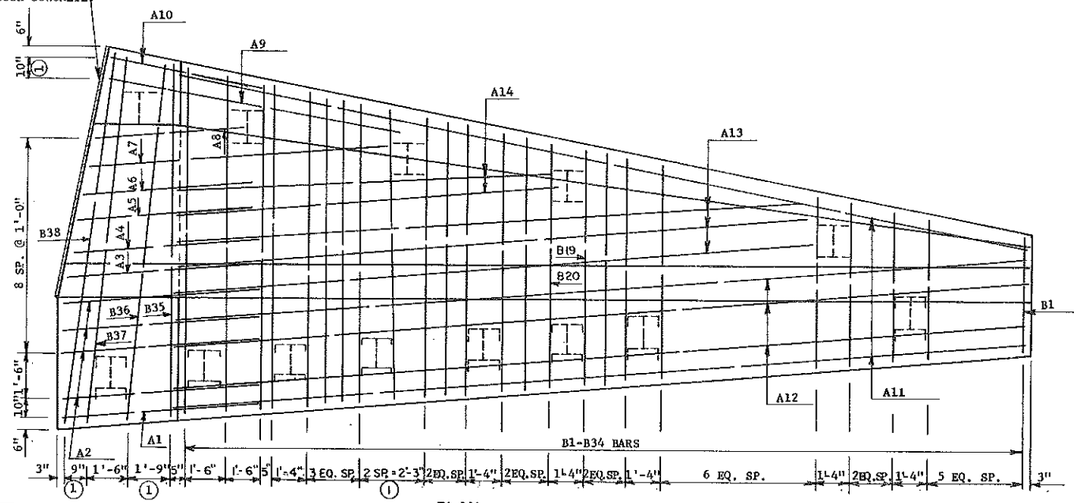
6TH AVENUE S.E. UNDERPASS

MANDAN, N.D.

MISC. ABUTMENT DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FC-1-806(15)	86

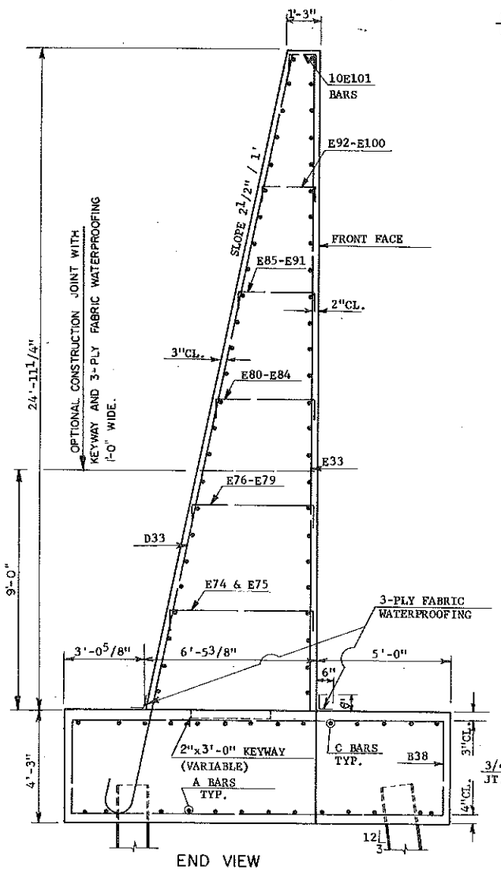
3/4" PREFORMED EXPANSION JOINT FILLER - PLACE WHERE CONCRETE WOULD TOUCH CONCRETE



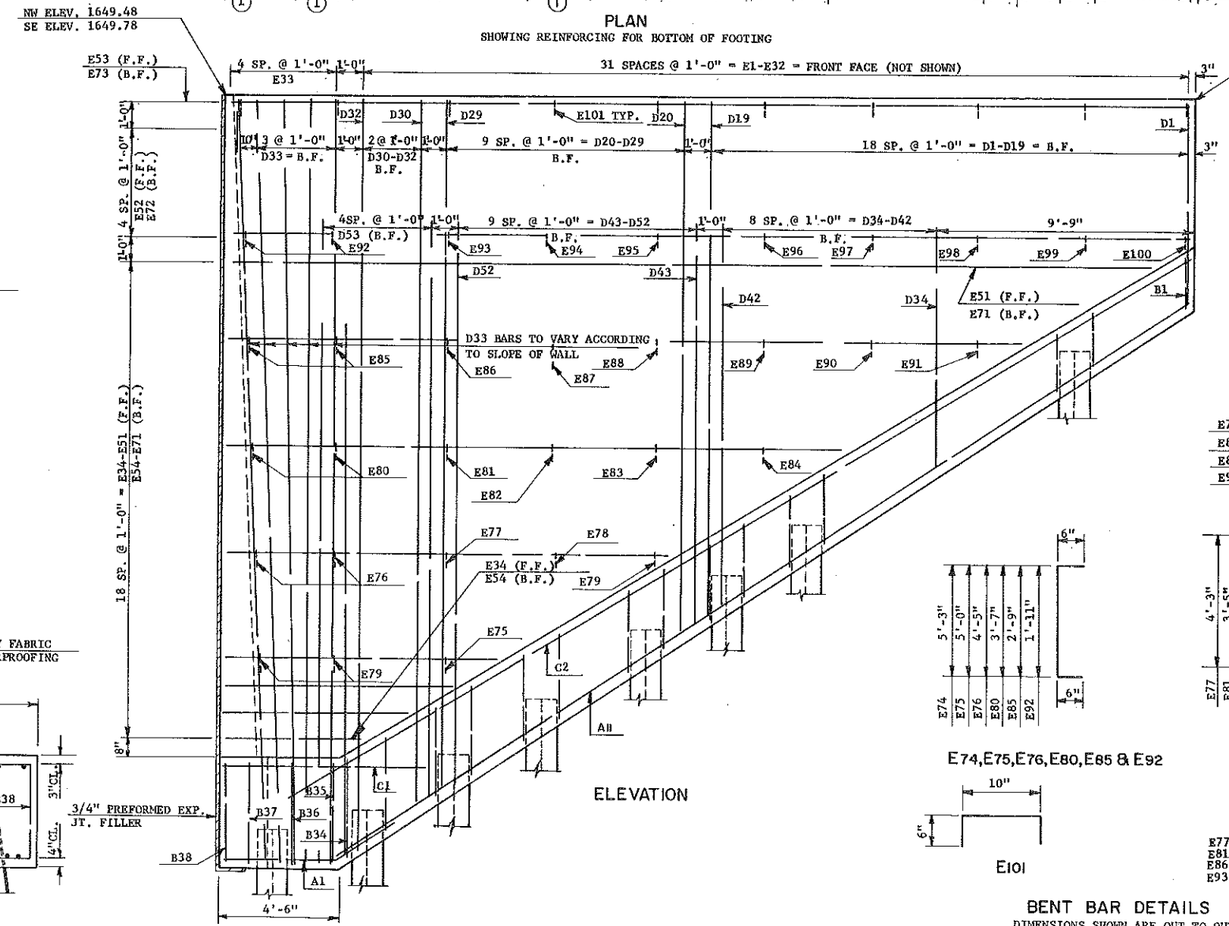
PLAN
SHOWING REINFORCING FOR BOTTOM OF FOOTING

① VARIABLE SPACING

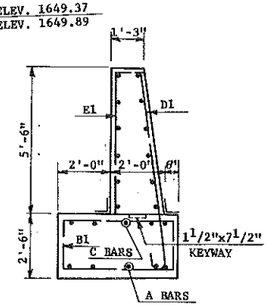
BAR LIST (CONTINUED FROM DWG. NO. 1806-070.039-12)				
MARK	NO.	SIZE	LENGTH	SHAPE
E74	2	4	6'-3"	BENT
E75	1	4	6'-0"	BENT
E76	2	4	5'-5"	BENT
E77-E79	1 SET	4	15'-2"	BENT
E80	2	4	4'-7"	BENT
E81-E84	1 SET	4	17'-4"	BENT
E85	2	4	3'-9"	BENT
E86-E91	1 SET	4	21'-5"	BENT
E92	2	4	2'-11"	BENT
E93-E100	1 SET	4	21'-4"	BENT
E101	10	4	1'-10"	BENT



END VIEW



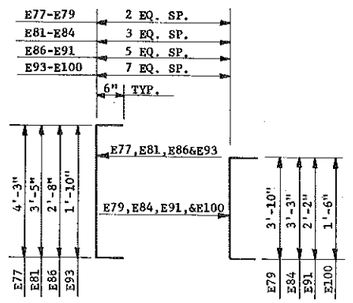
ELEVATION



END VIEW

E74,E75,E76,E80,E85 & E92

E101



E77 - E79
E81 - E84
E86 - E91
E93 - E100

1 SET SHOWN
1 SET REQUIRED

E77-E79 = TOTAL LENGTH OF 1 SET = 15'-2"
E81-E84 = TOTAL LENGTH OF 1 SET = 17'-4"
E86-E91 = TOTAL LENGTH OF 1 SET = 21'-5"
E93-E100= TOTAL LENGTH OF 1 SET = 21'-4"

BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT

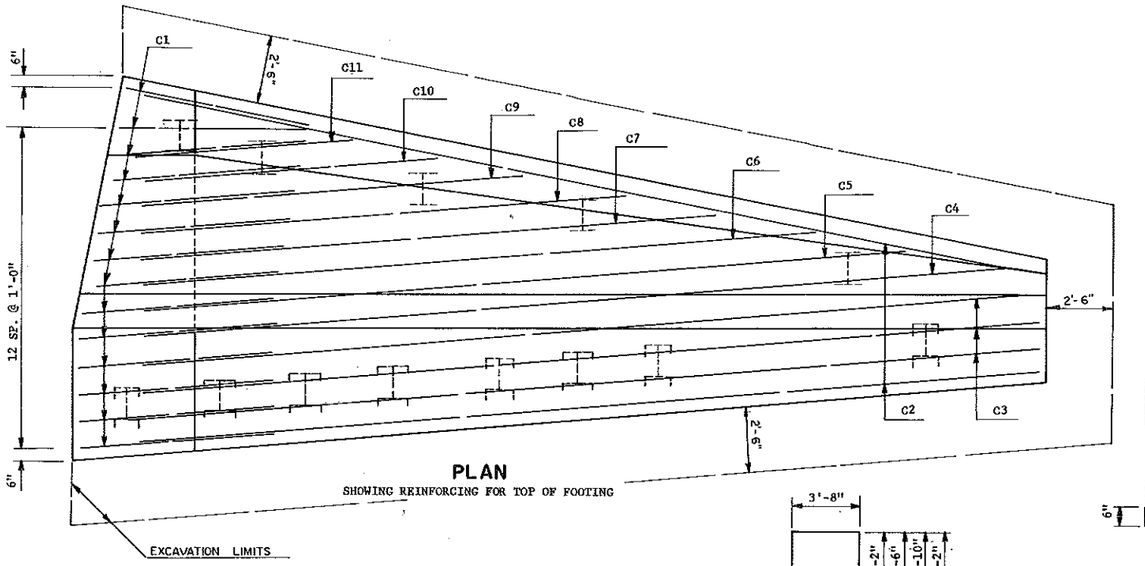
QUANTITIES
SEE DWG. 1806-070.039-12

6TH AVENUE S.E. UNDERPASS
MANDAN, ND

NW & SE WING WALLS

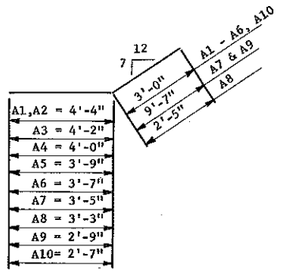
1806-070.039-11

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	87

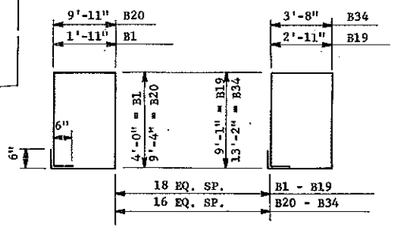


PLAN

SHOWING REINFORCING FOR TOP OF FOOTING



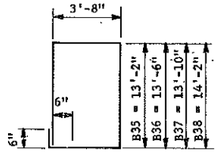
A1 – A10



B1 – B19 & B20 – B34

ONE SET REQUIRED - ONE SET SHOWN

B1 - B19 - TOTAL LENGTH OF ONE SET = 359'-5"
B20 - B34 - TOTAL LENGTH OF ONE SET = 511'-5"



B35 – B38

C4 – C11 & E54 – E71

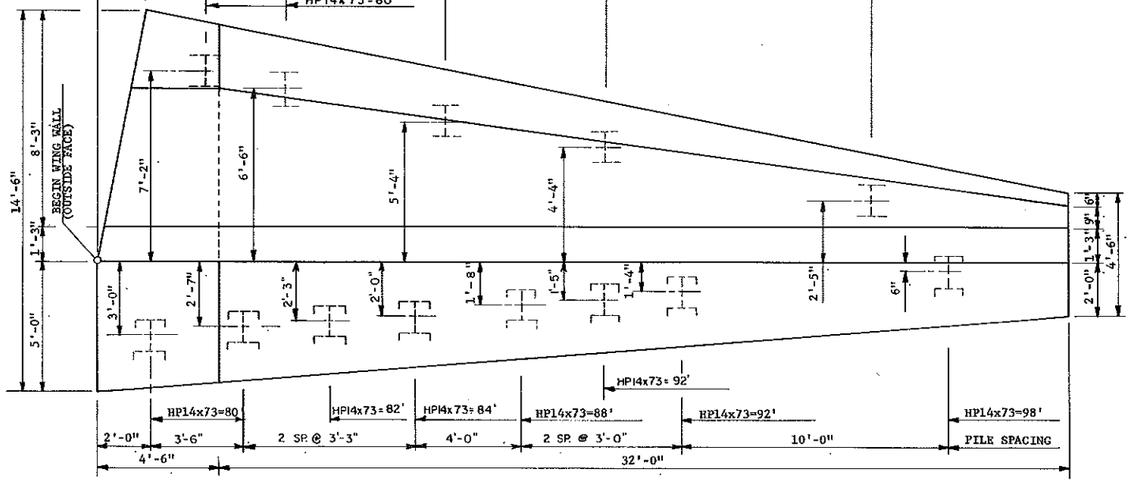
1 SET SHOWN
1 SET REQUIRED

TOTAL LENGTH OF 1 SET = 187'-8"
TOTAL LENGTH OF 1 SET = 380'-0"

D1 – D19, D20 – D29 & D30 – D32

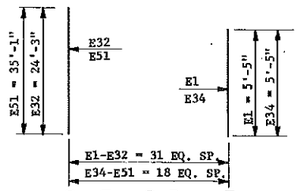
1 SET SHOWN
1 SET REQUIRED

D1-D19 = TOTAL LENGTH OF 1 SET = 270'-9"
D20-D29 = TOTAL LENGTH OF 1 SET = 243'-9"
D30-D32 = TOTAL LENGTH OF 1 SET = 88'-0"



PLAN

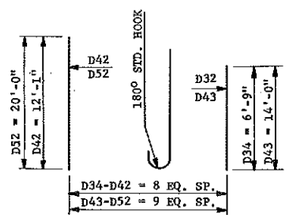
SHOWING PILING SPACES
SHOWING DIMENSIONS



E1 – E32 & E34 – E51

1 SET SHOWN
1 SET REQUIRED

E1-E32 = TOTAL LENGTH OF 1 SET = 474'-8"
E34-E51 = TOTAL LENGTH OF 1 SET = 384'-9"



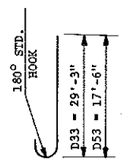
D34 – D42 & D43 – D52

1 SET SHOWN
1 SET REQUIRED

D34-D42 = TOTAL LENGTH OF 1 SET = 90'-9"
D43-D52 = TOTAL LENGTH OF 1 SET = 179'-2"

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT



D33 & D53

BAR LIST (ONE WING)

MARK	NO.	SIZE	LENGTH	SHAPE
A1	1	7	7'-4"	BENT
A2	4	6	7'-4"	"
A3	1	6	7'-2"	"
A4	1	6	7'-0"	"
A5	1	6	6'-9"	"
A6	1	6	6'-7"	"
A7	1	6	13'-0"	"
A8	1	6	5'-8"	"
A9	1	6	12'-4"	"
A10	1	7	5'-7"	"
A11	2	7	38'-3"	STR.
A12	3	6	38'-3"	"
A13	3	6	28'-3"	"
A14	2	6	16'-5"	"
B1-B19	1 SET	6	359'-5"	BENT
B20-B34	1 SET	10	511'-5"	BENT
B35	1	11	34'-8"	"
B36	1	11	35'-4"	"
B37	1	11	36'-0"	"
B38	1	11	36'-8"	"
C1	14	6	7'-4"	STR.
C2	2	7	39'-3"	"
C3	3	6	39'-3"	"
C4-C11	1 SET	6	187'-8"	"
D1-D19	1 SET	6	270'-9"	BENT
D20-D29	1 SET	8	243'-9"	"
D30-D32	1 SET	10	88'-0"	"
D33	5	10	30'-8"	"
D34-D42	1 SET	6	90'-9"	"
D43-D52	1 SET	8	179'-2"	"
D53	5	10	18'-11"	"
E1-E32	1 SET	5	474'-8"	STR.
E33	5	5	24'-9"	"
E34-E51	1 SET	5	384'-9"	"
E52	5	5	36'-2"	"
E53	1	6	36'-2"	"
E54-E71	1 SET	5	380'-0"	"
E72	5	5	35'-11"	"
E73	1	6	36'-0"	STR.

NOTE:
ADDITIONAL BARS AND BENT BAR DETAILS ARE SHOWN ON DRWG. NO. 1806-039-11

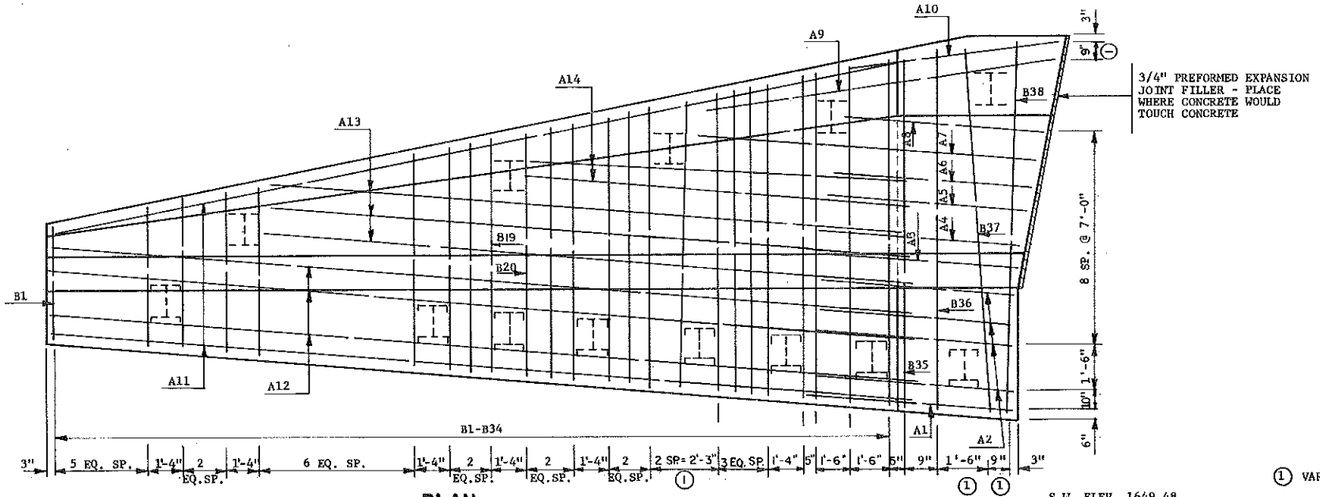
QUANTITIES (ONE WING)

CLASS AE-3 CONCRETE	114.5	C.Y.
REINFORCING STEEL	10,056	LBS.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.
N.W. & S.E. WING WALLS

1806-070.039-12

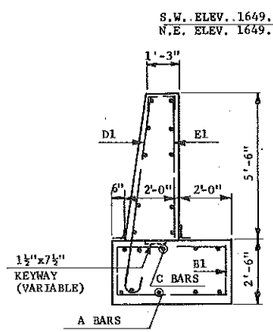
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	88



PLAN

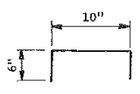
SHOWING REINFORCING BOTTOM OF FOOTING

1 VARIABLE SPACING

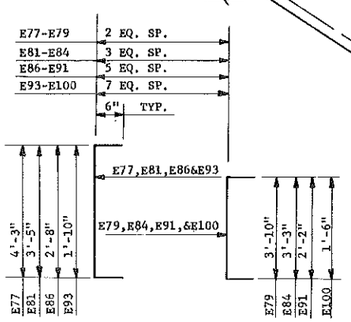


END VIEW

E74, E75, E76, E80, E85, & E92



E 101



E77–E79
E81–E84
E86–E91
E93–E100

1 SET SHOWN
1 SET REQUIRED

E77-E79 = TOTAL LENGTH OF 1 SET = 15'-2"
E81-E84 = TOTAL LENGTH OF 1 SET = 17'-4"
E86-E91 = TOTAL LENGTH OF 1 SET = 21'-5"
E93-E100= TOTAL LENGTH OF 1 SET = 21'-4"

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

ELEVATION

END VIEW

BAR LIST (CONTINUED FROM DRWG. NO. 1806-070.039-12)

MARK	NO	SIZE	LENGTH	SHAPE
E 74	2	4	6'- 3"	BENT
E 75	1	4	6'- 0"	"
E 76	2	4	5'- 5"	"
E 77-E79	1SET	4	15'- 2"	"
E 80	2	4	4'- 7"	"
E 81-E84	1SET	4	17'- 4"	"
E 85	2	4	3'- 9"	"
E 86-E91	1SET	4	21'- 5"	"
E 92	2	4	2'-11"	"
E93-E100	1SET	4	21'- 4"	"
E101	10	4	1'-10"	"

QUANTITIES

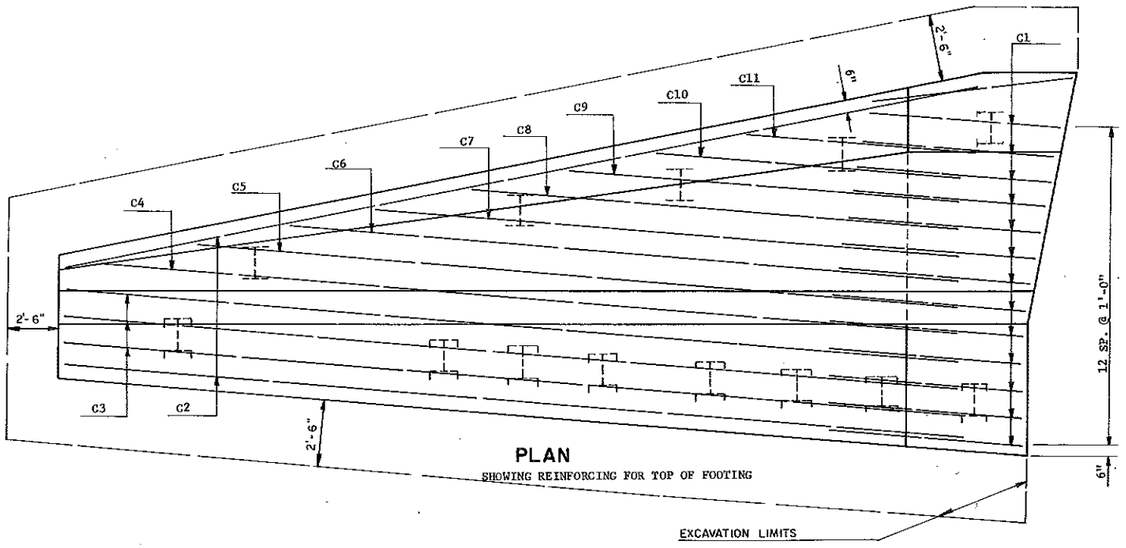
See Dwg. 1806-070.039-14

6TH AVENUE S.E. UNDERPASS
MANDAN, N. D.

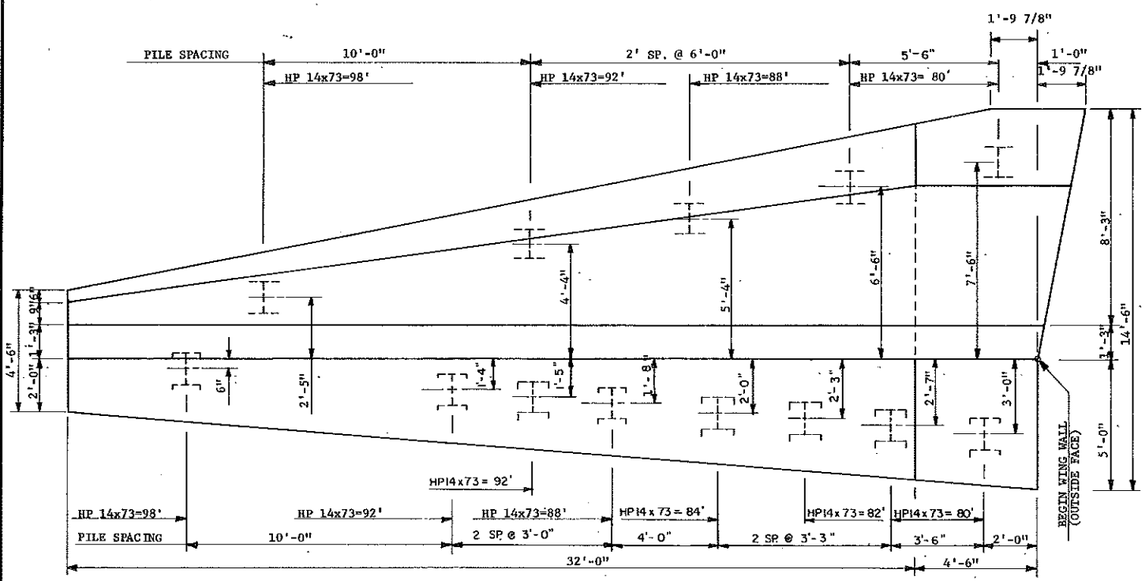
NE. & SW. WING WALLS

1806-070.039-13

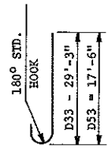
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	89



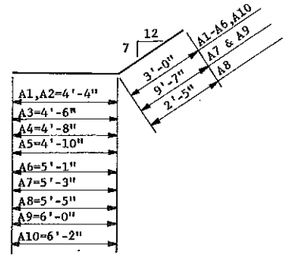
PLAN
SHOWING REINFORCING FOR TOP OF FOOTING



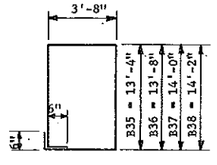
PLAN
SHOWING PILE SPACES
SHOWING DIMENSIONS



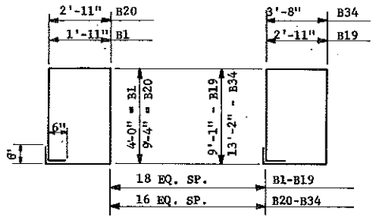
D33 & D53



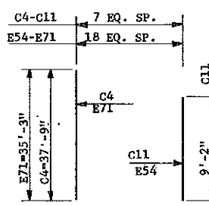
A1 - A10



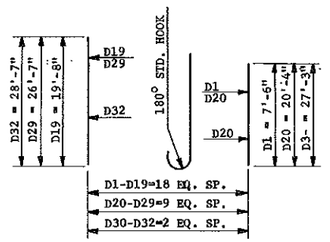
B35 - B38



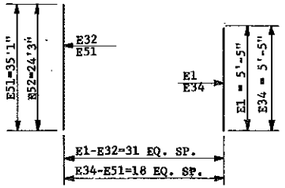
B1 - B19 & B20 - B34
ONE SET REQUIRED - ONE SET SHOWN
B1-B19=TOTAL LENGTH OF ONE SET= 27'-1 359'-5"
B20 -B34=TOTAL LENGTH OF ONE SET = 497'-3 511'-5"



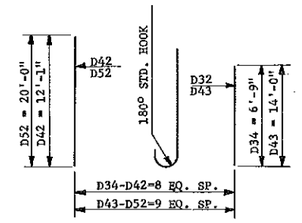
C4 - C11 & E54 - E71
1 SET SHOWN
1 SET REQUIRED
C4-C11 TOTAL LENGTH OF 1 SET = 187'-8"
E54-E71 TOTAL LENGTH OF 1 SET = 387'-2"



D1 - D19, D20 - D29 & D30 - D32
1 SET SHOWN
1 SET REQUIRED
D1-D19=TOTAL LENGTH OF 1 SET = 270'-9"
D20-D29=TOTAL LENGTH OF 1 SET = 243'-9"
D30-D32=TOTAL LENGTH OF 1 SET = 88'-0"



E1 - E32 & E34 - E51
1 SET SHOWN
1 SET REQUIRED
E1-E32=TOTAL LENGTH OF 1 SET = 474'-8"
E34-E51=TOTAL LENGTH OF 1 SET = 384'-9"



D34 - D42 & D43 - D52
1 SET SHOWN
1 SET REQUIRED
D34-D42=TOTAL LENGTH OF 1 SET=90'-9"
D43-D52=TOTAL LENGTH OF 1 SET=179'-2'

BENT BAR DETAILS
DIMENSION SHOWN ARE OUT TO OUT

BAR LIST (ONE WING)

MARK	NO.	SIZE	LENGTH	SHAPE
A1	1	7	7'-4"	BENT
A2	4	6	7'-4"	BENT
A3	1	6	7'-6"	BENT
A4	1	6	7'-8"	BENT
A5	1	6	7'-10"	BENT
A6	1	6	8'-1"	BENT
A7	1	6	14'-10"	BENT
A8	1	6	7'-10"	BENT
A9	1	6	15'-7"	BENT
A10	1	7	9'-2"	BENT
A11	2	7	38'-3"	BENT
A12	3	6	38'-3"	STR.
A13	3	6	28'-3"	STR.
A14	2	6	16'-5"	STR.
B1 B19	1 SET	6	359'-5"	BENT
B20 B34	1 SET	10	511'-5"	BENT
B35	1	11	35'-0"	BENT
B36	1	11	35'-8"	BENT
B37	1	11	36'-4"	BENT
B38	1	11	36'-6"	BENT
C1	14	6	8'-4"	STR.
C2	2	7	39'-3"	STR.
C3	3	6	39'-3"	STR.
C4-C11	1 SET	6	187'-8"	STR.
D1-D19	1 SET	6	270'-9"	BENT
D20-D29	1 SET	8	243'-9"	BENT
D30-D32	1 SET	10	88'-0"	BENT
D33	5	10	30'-8"	BENT
D34-D42	1 SET	6	90'-9"	BENT
D43-D52	1 SET	8	179'-2"	BENT
D53	10	10	18'-11"	BENT
E1-E32	1 SET	5	474'-8"	STR.
E33	5	5	24'-9"	STR.
E34-E51	1 SET	5	384'-9"	STR.
E52	5	5	36'-2"	STR.
E53	1	6	36'-2"	STR.
E54-E71	1 SET	5	387'-2"	STR.
E72	5	5	36'-4"	STR.
E73	1	6	36'-4"	STR.

NOTE:
ADDITIONAL BARS AND BENT BAR DETAILS ARE SHOWN ON DRWG. NO. 1806-070.039-13.

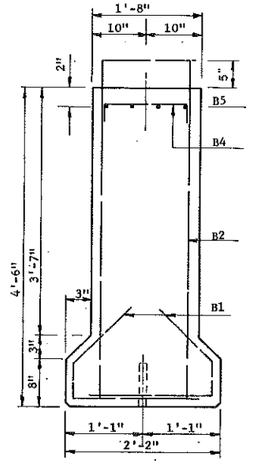
QUANTITIES (ONE WING)

CLASS AE-3 CONCRETE	121.1	C.Y.
REINFORCING STEEL	10,523	LBS.

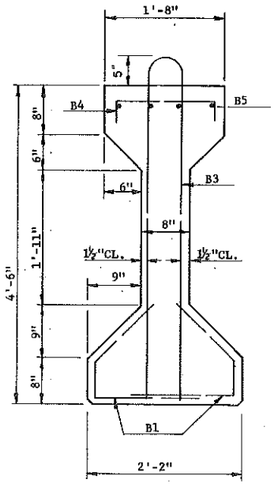
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

N.E. & S.W. WING WALLS

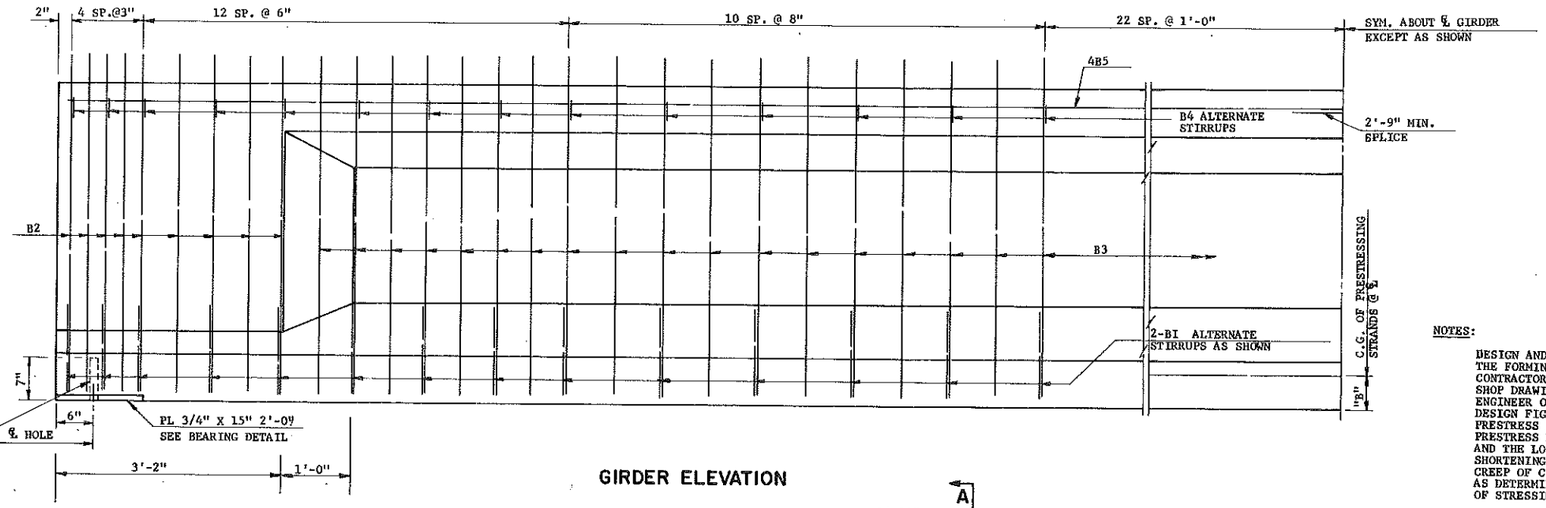
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	90



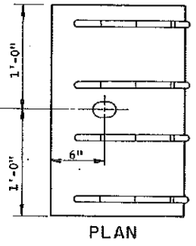
END VIEW



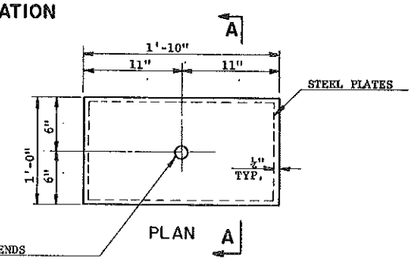
SECTION AT ℄ BEAM

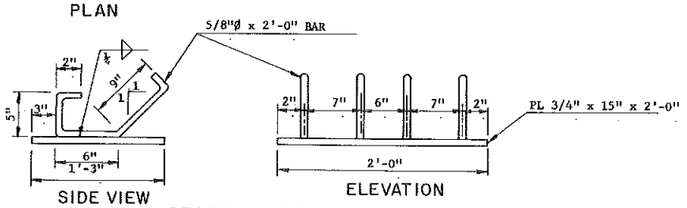


GIRDER ELEVATION

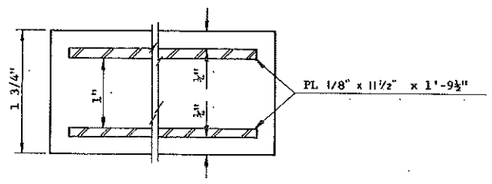


PLAN





BEARING DETAIL



A-A

ELASTOMERIC BEARING DETAIL

NOTE: BEARING SHALL BE DUROMETER 70.

BEAM SECTION DATA

WT./FT. = 877 LBS. (160 PCF)
AREA = 789 IN.^{2}
C.G. (FROM BOTTOM) = 24.73"
I = 260,730 IN.^{4}
S_B = 10,543 IN.^{3}

NOTES:

DESIGN AND SHOP DRAWINGS: AT LEAST 14 DAYS PRIOR TO THE FORMING AND POURING OF ANY GIRDERS, THE CONTRACTOR SHALL SUBMIT CHECKED DESIGN FIGURES AND SHOP DRAWINGS FOR THE APPROVAL OF THE BRIDGE ENGINEER OF THE STATE HIGHWAY DEPARTMENT. THE DESIGN FIGURES SHALL SHOW THE TOTAL INTIAL PRESTRESS FORCE REQUIRED AS THE SUM OF THE FINAL PRESTRESS FORCE TAKEN FROM THE CONTRACT DRAWINGS AND THE LOSSES IN PRESTRESS DUE TO ELASTIC SHORTENING OF CONCRETE, SHRINKAGE OF CONCRETE, CREEP OF CONCRETE, AND RELAXATION OF STEEL STRESS AS DETERMINED BY THE CONTRACTOR FOR HIS METHOD OF STRESSING.

SHOP DRAWINGS SHALL SHOW STRAND LAYOUT: PULL DOWN LOCATIONS, TENSIONING FORCES, ELONGATION AND ANY PROPOSED CHANGES IN REINFORCING STEEL.

THE FINAL PRESTRESS FORCE (REMAINING AFTER ALL LOSSES HAVE BEEN ACCOUNTED FOR) AND ITS CORRESPONDING DIMENSION "B" SHALL BE SELECTED FROM THOSE ON A CURVE DETERMINED BY THE THREE VALUES SHOWN IN THE PRESTRESSING DATA TABLE.

THE GIRDERS SHALL BE POURED IN ALL STEEL FORMS.

HOLES AND INSERTS TO ACCOMODATE THE DIAPHRAGM BARS SHALL BE PROVIDED IN THE GIRDERS AT LOCATIONS AS SHOWN ON THE SLAB SHEET.

ALL REINFORCING STEEL SHALL BE GRADE 60.

ALL REINFORCEMENT 1½" CLEAR UNLESS OTHERWISE NOTED.

MINOR CHANGES TO THE SHAPE OF THE GIRDER AND TO THE REINFORCING STEEL MAY BE MADE TO ACCOMODATE THE FORMS OF VARIOUS CONTRACTORS AND THEIR CONSTRUCTION METHODS WITH THE APPROVAL OF THE BRIDGE ENGINEER.

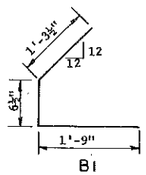
TOPS OF BEAMS SHALL BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BOND.

PROVIDE HANDLING HOOKS FOR DEVICES AS REQUIRED BY THE CONTRACTOR. HOOKS OR DEVICES PROVIDED WILL BE SUBJECT TO APPROVAL OF ENGINEER AND SHALL BE INSTALLED WITHIN 4'-0" OF THE END OF BEAM

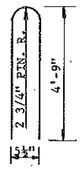
CONCRETE TEST CYLINDER STRENGH AT TIME OF STRESS TRANSFER SHALL BE AS SHOWN ON THE BRIDGE PLANS.

PRESTRESSING DATA

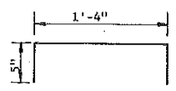
C G	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT "TON"
4.5	937.6 K	5500 PSI	5500 PSI	32.82 T.
5.0	951.8 K			
5.5	966.4 K			



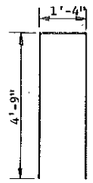
B1



B3



B4



B2

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
B1	98	4	3'-7"	BENT
B2	18	4	10'-10"	"
B3	79	4	9'-9"	"
B4	49	5	2'-2"	"
B5	8	8	37'-1"	STR

QUANTITIES (ONE GIRDER)

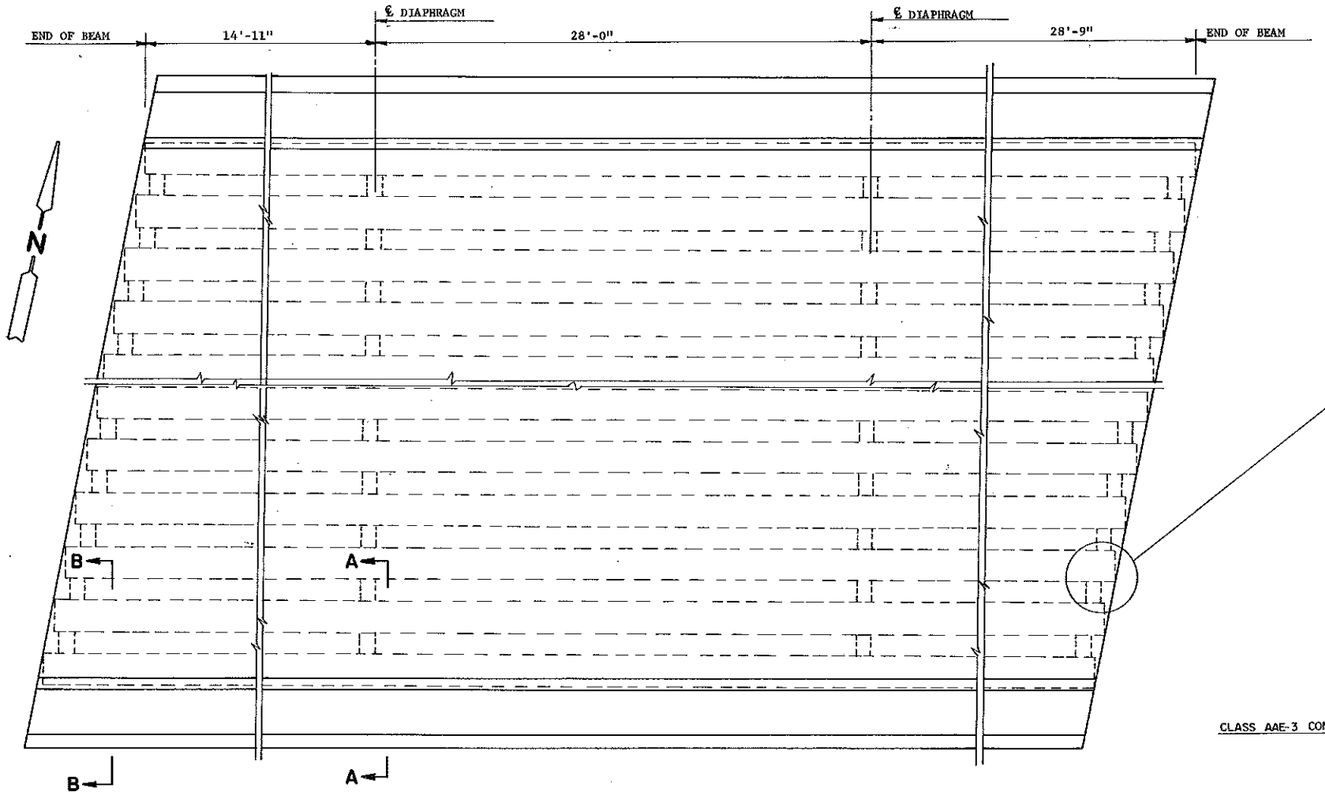
GIRDER LENGTH 71'-8" L.F.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

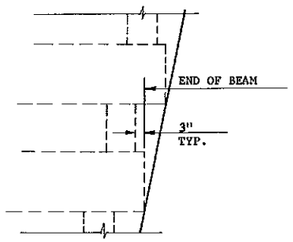
GIRDER DETAIL
ELASTOMERIC BEARING

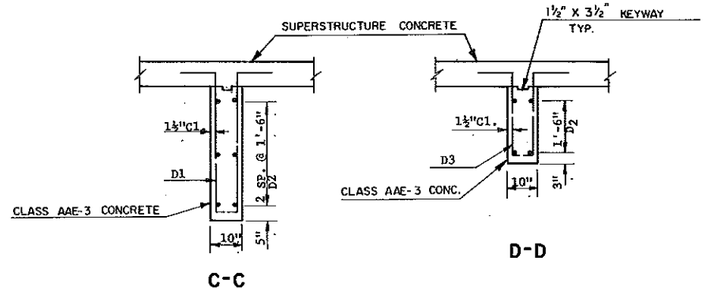
1806-070.039-15

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	91



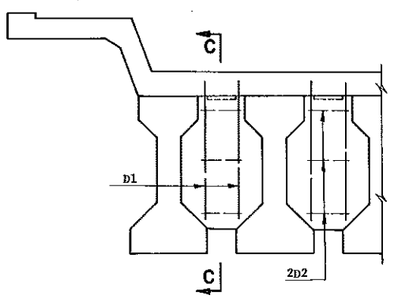
PLAN



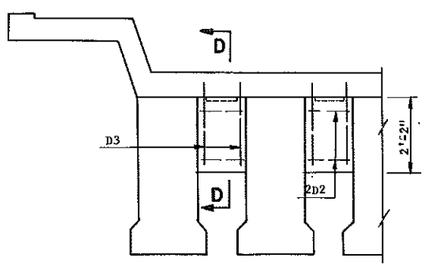


C-C

D-D



A-A



B-B

QUANTITIES

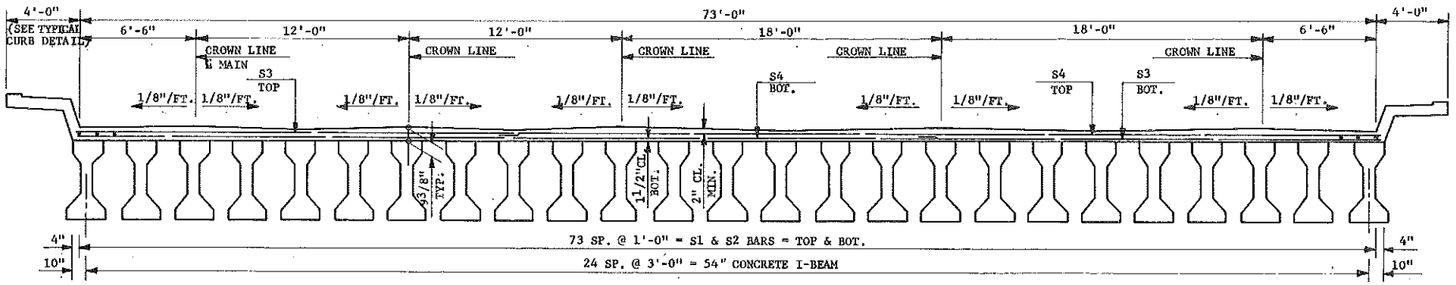
SEE DWG. 1806-070.039-17

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

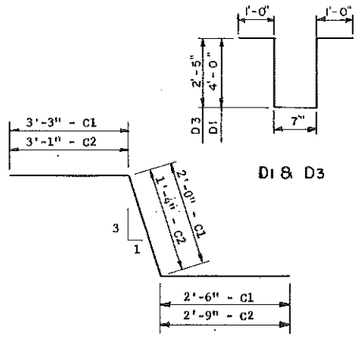
DIAPHRAGM DETAILS

1806-070.039-16

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	92



TYPICAL SECTION



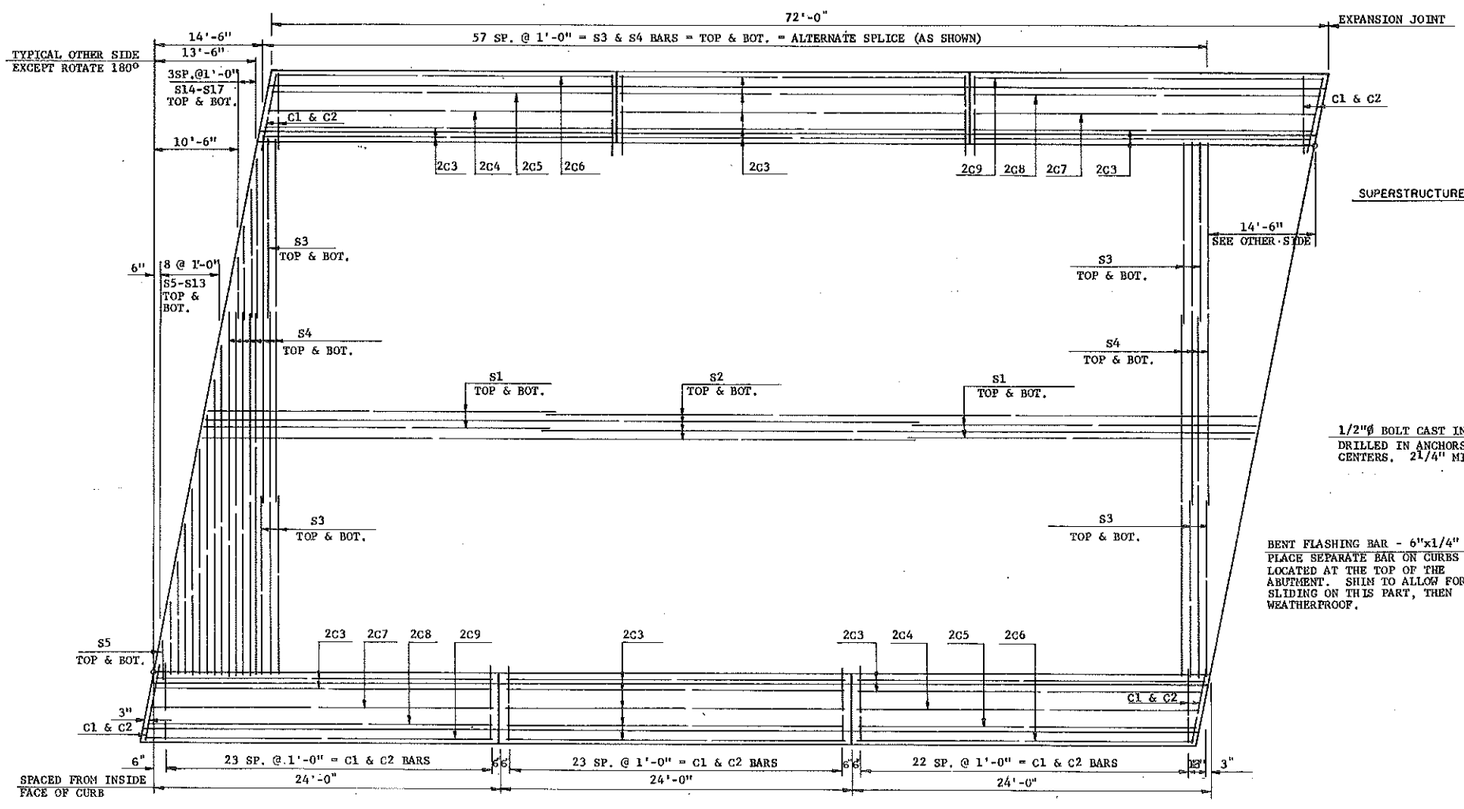
D1 & D3

C1 & C2
BENT BAR DETAIL

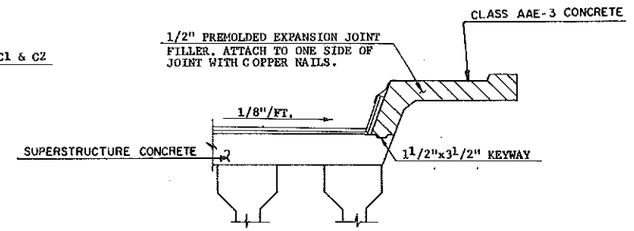
BAR LIST

	MARK	NO.	SIZE	LENGTH	SHAPE
1	C1	146	4	7'-9"	BENT
1	C2	146	4	7'-2"	"
1	C3	36	4	23'-8"	STR.
1	C4	4	4	23'-6"	"
1	C5	4	4	23'-3"	"
1	C6	4	4	23'-1"	"
1	C7	4	4	23'-10"	"
1	C8	4	4	24'-1"	"
1	C9	4	4	24'-3"	"
	S1	148	4	25'-0"	STR.
	S2	148	4	47'-6"	"
	S3	116	4	25'-0"	"
	S4	136	4	49'-4"	"
	S5-S13	4 SETS	4	212'-8"	"
	S14-S17	4 SETS	4	57'-8"	"
	D1	96	6	10'-7"	BENT
	D2	480	6	1'-0"	STR.
	D3	96	6	7'-5"	BENT

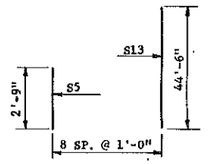
① REINFORCING STEEL BARS SHALL BE EPOXY COATED.



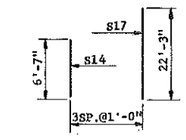
PLAN
(NOT TO SCALE)



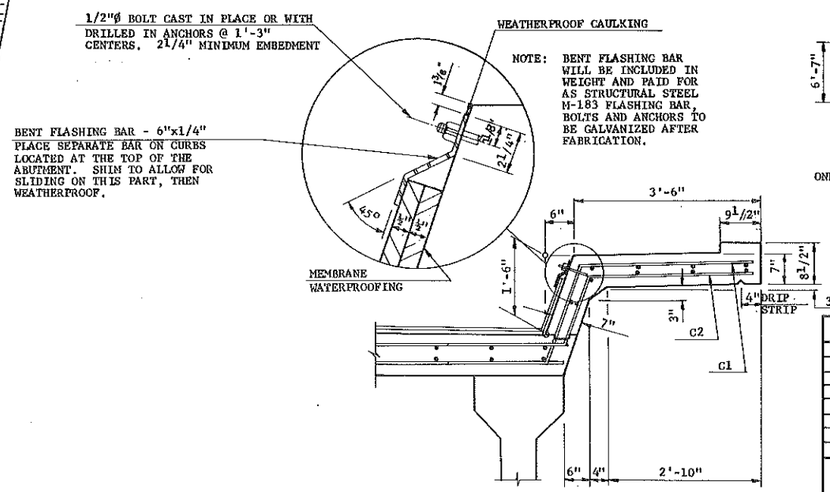
CURB DEFLECTION JOINT DETAIL



S5 - S13
ONE SET-LENGTH 212'-8"



S14 - S17
ONE SET-LENGTH 57'-8"



TYPICAL CURB DETAIL

QUANTITIES

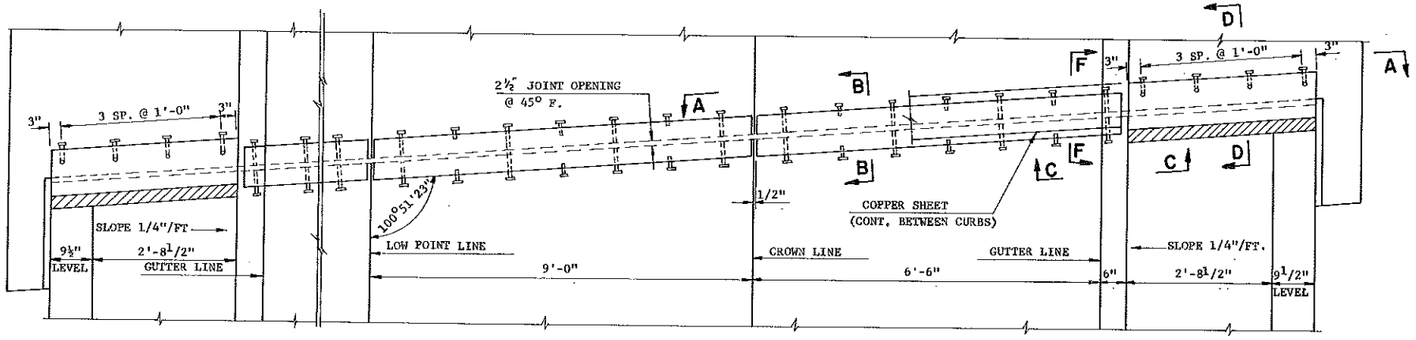
CLASS AAE-3 CONCRETE	32.0	C.Y.
REINFORCING STEEL	17,625	LBS.
REINFORCING STEEL (EPOXY)	2403	LBS.
SUPERSTRUCTURE CONCRETE	147	C.Y.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

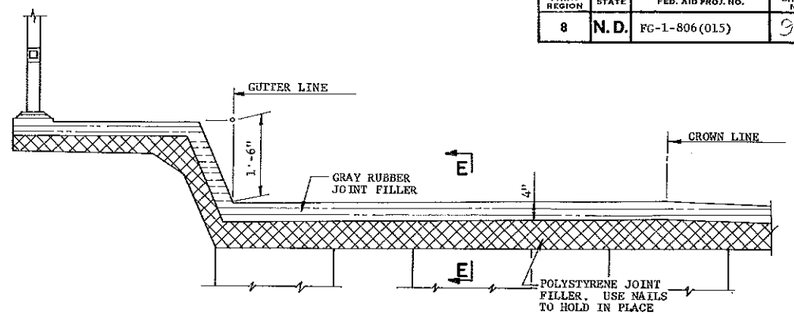
SLAB DETAILS

1806-070.039-17

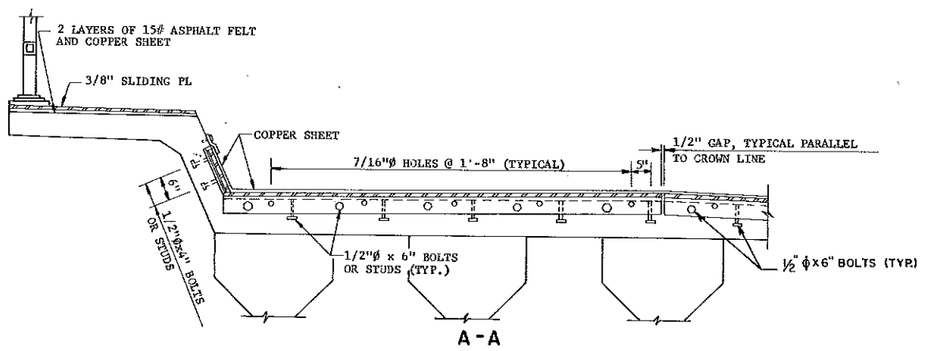
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	93



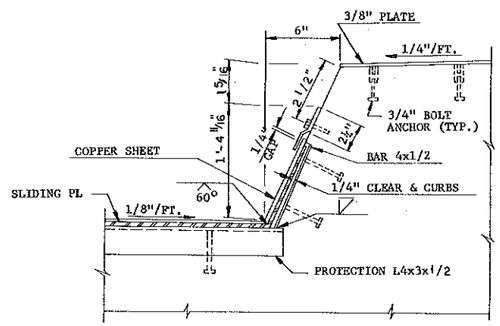
PART PLAN OF ABUTMENT NO. 2 EXPANSION JOINT



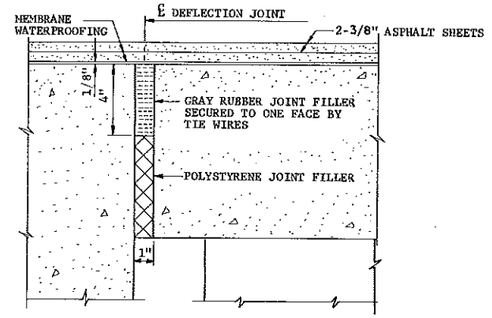
PART SECTION THRU ABUTMENT NO. 1 DEFLECTION JOINT



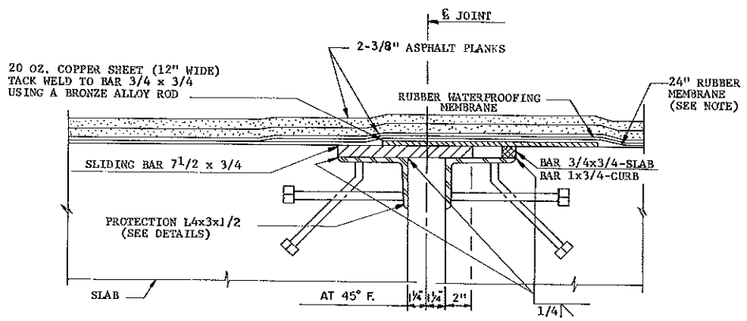
A-A



C-C



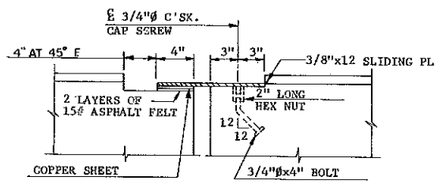
E-E



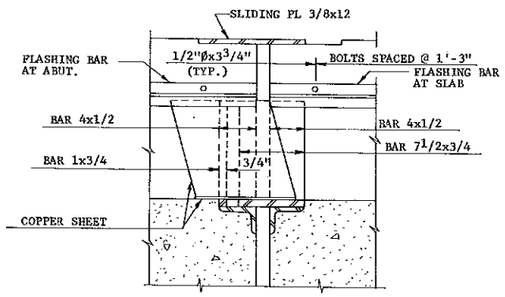
B-B

NOTE:

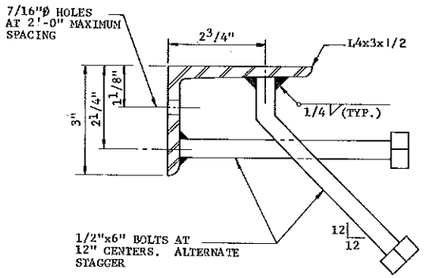
COVER TOP OF COPPER SHEET WITH 24" WIDE RUBBER MEMBRANE AND ATTACH TO THE SPAN SIDE OF THE COPPER SHEET WITH SUITABLE ADHESIVE.



D-D



F-F



PROTECTION ANGLE DETAIL

NOTE:

EXPANSION JOINT STEEL AND COPPER SHEET IS INCLUDED IN WEIGHT OF AND PAID FOR AS STRUCTURAL STEEL M-183.

THE DECK SURFACE SHALL BE GIVEN A MACHINE STEEL TROWEL FINISH.
GALVANIZE EXPANSION JOINT STEEL IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.

THE CONTRACTOR SHALL PLACE BALLAST AS SOON AS THE ASPHALT BOARD IS IN PLACE. B.N.R.R. TO FURNISH BALLAST IN RAILROAD CARS AT A MUTUALLY AGREEABLE LOCATION.

COST OF POLYSTYRENE JOINT FILLER AND GRAY RUBBER JOINT FILLER SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE PRICE BID FOR SUPERSTRUCTE CONCRETE.

PLACEMENT OF THE BALLAST SHALL BE INCIDENTAL TO THE PRICE BID FOR BUTYL RUBBER MEMBRANE WATERPROOFING.

4" OF BALLAST SHALL BE PLACED BY THE CONTRACTOR.

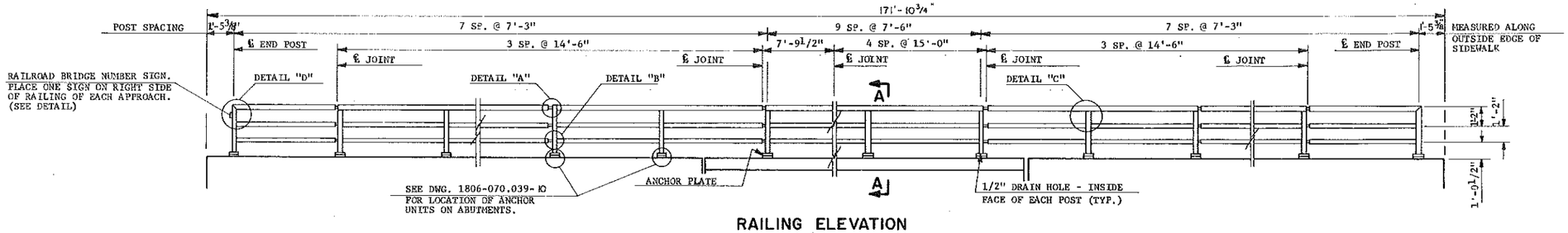
QUANTITIES		
STRUCTURAL STEEL (M-183)	4520	LBS.

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

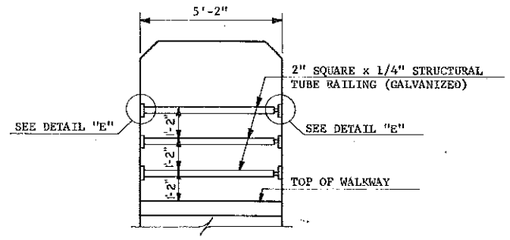
EXPANSION JOINT DETAILS

1806-070.039-18

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



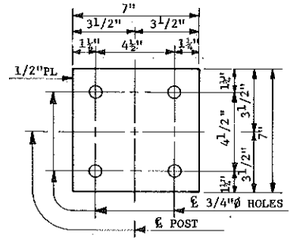
RAILING ELEVATION



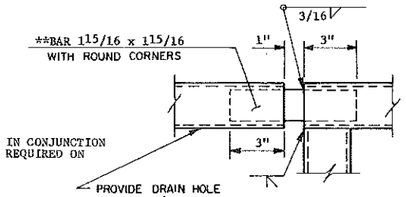
TYPICAL RAILING DETAIL SIDEWALK CORRIDOR

18 LOCATIONS

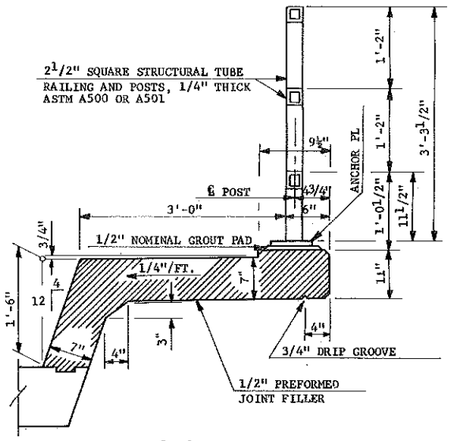
PRICE BID BY LINEAL FOOT PER WINDOW



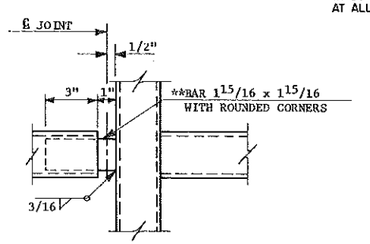
ANCHOR PLATE DETAIL



DETAIL A



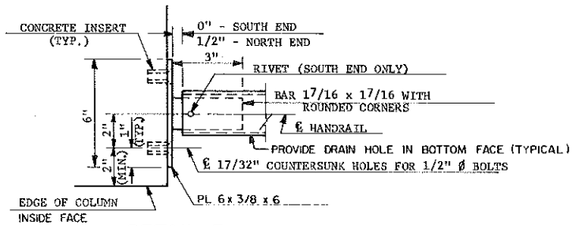
A-A



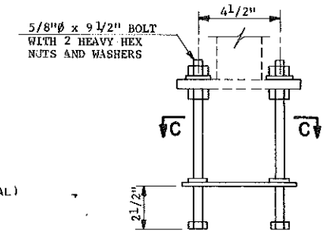
DETAIL B

NOTE:

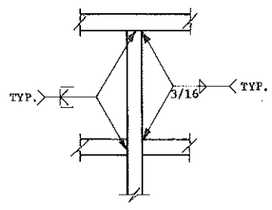
BRIDGE NUMBER SIGNS ARE OVERLAYS AND SHALL BE MADE OF 0.025" THICK 615-T6 SHEET ALUMINUM. AFTER DEGREASING AND TREATMENT OF ALUMINUM, APPLY BLACK SCOTCHAL NO. 655, OR APPROVED EQUAL, TO FACE OF SIGN. THEN APPLY 5" SERIES "D" FEDERAL HIGHWAY ADMINISTRATION STANDARD NUMERALS OF WIDE ANGLE SILVER NO. 2270 SCOTCHLITE, OR APPROVED EQUAL. SIGN OVERLAY TO BE BOLTED WITH GALVANIZED OR CADMIUM PLATED BOLTS TO A 4-GAGE GALVANIZED STEEL PLATE OF SAME SIZE, THE PLATE TO BE GIVEN TWO COATS OF JET BLACK ENAMEL TO BOTH SIDES. ALL SIGN BRACKETS, NUTS AND BOLTS, TO BE GALVANIZED AFTER FABRICATION.



DETAIL E



ANCHOR BOLT ASSEMBLY



DETAIL C

HANDRAIL NOTES: (SUPERSTRUCTURE RAILING)

RAILING SHALL BE FABRICATED IN PANEL LENGTHS AS SHOWN IN THE ELEVATION VIEW WITH EXPANSION JOINTS AS SHOWN IN DETAILS "A" AND "B" PROVIDED TO CONNECT ADJOINING FABRICATED LENGTHS.

BOLTS AND NUTS SHALL MEET THE REQUIREMENTS OF A.S.T.M. A307. MATERIALS FOR BASE PLATES, ANCHOR BOLT ASSEMBLIES, AND RAIL EXPANSION JOINTS SHALL CONFORM TO STRUCTURAL STEEL (WELDABLE M-183).

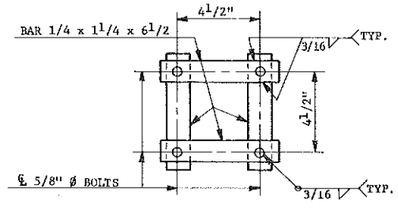
ALL RAILING AND RAILING ANCHORAGE MATERIAL SHALL BE GALVANIZED IN ACCORDANCE WITH A.S.T.M. A123.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. RAILPOSTS SHALL BE FABRICATED NORMAL TO GRADE. ADJUST RAILPOSTS AS REQUIRED TO PROVIDE PROPER HORIZONTAL ALIGNMENT.

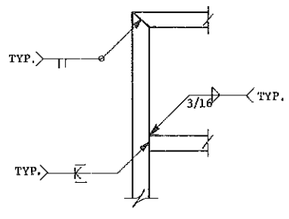
STRUCTURAL TUBING SHALL CONFORM TO A.S.T.M. DESIGNATION A500 OR A501.

ALL STEEL MATERIAL AND BRIDGE NUMBER SIGNS REQUIRED FOR THE RAILING AND RAILING ANCHORAGES TO BE INCLUDED IN THE BID ITEM AS PEDESTRIAN RAIL.

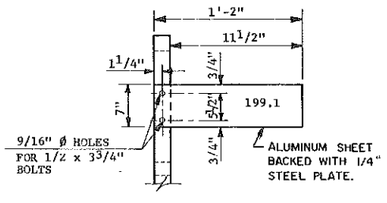
ON POSTS, FABRICATION HOLES SHALL BE PLUGGED AFTER THEY ARE GALVANIZED.



C-C



DETAIL D



BRIDGE NUMBER SIGN DETAIL

(2 REQUIRED)

QUANTITIES

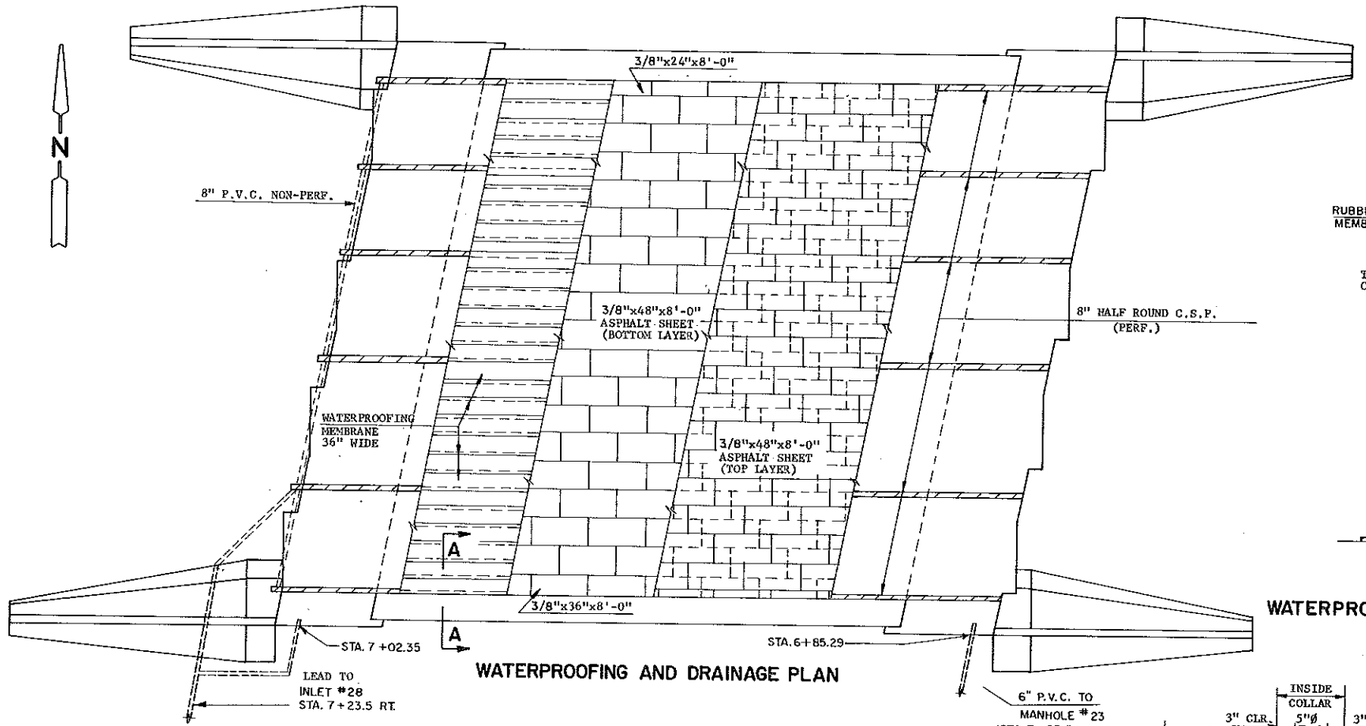
PEDESTRIAN RAIL (2 1/2" SQUARE x 1/4")	338	L.F.
PEDESTRIAN RAIL (2" SQUARE x 1/4")	93	L.F.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

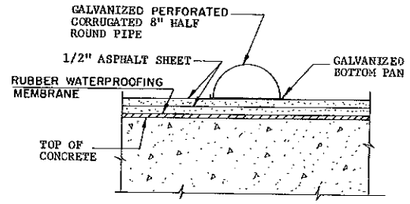
RAILING DETAILS

1806-070.039-19

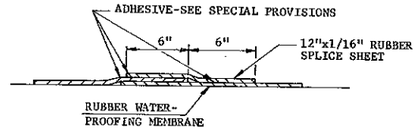
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	95



WATERPROOFING AND DRAINAGE PLAN



WATERPROOFING AND DECK DRAIN DETAIL



WATERPROOFING MEMBRANE SPLICE DETAIL

QUANTITY SUMMARY FOR DRAINAGE SYSTEM		
ITEM	UNIT	QUANTITY
8"ø HALF ROUND C.S.P.	LIN. FT.	590
6"ø C.S.P.	LIN. FT.	138
6" ø P.V.C.	LIN. FT.	52
8"ø P.V.C.	LIN. FT.	145
BOTTOM PAN	LIN. FT.	590
TEE CONNECTIONS (6" TO 8")	UNIT	3
DOUBLE TEE CONNECTION	UNIT	1
PIPE CLAMP ASSEMBLIES	UNIT	24
COLLAR	UNIT	6
END PLATE	UNIT	6
REDUCER	UNIT	6
90° ELBOW (6" TO 8")	UNIT	2
90° ELBOW (8" TO 8")	UNIT	1

DRAINAGE SYSTEM NOTES:

THE QUANTITY SUMMARY FOR DRAINAGE SYSTEM IS FOR THE CONTRACTORS CONVENIENCE ONLY AND PRICE BID FOR SYSTEM SHALL BE FOR THE COMPLETE SYSTEM AS SHOWN IN THE PLANS.

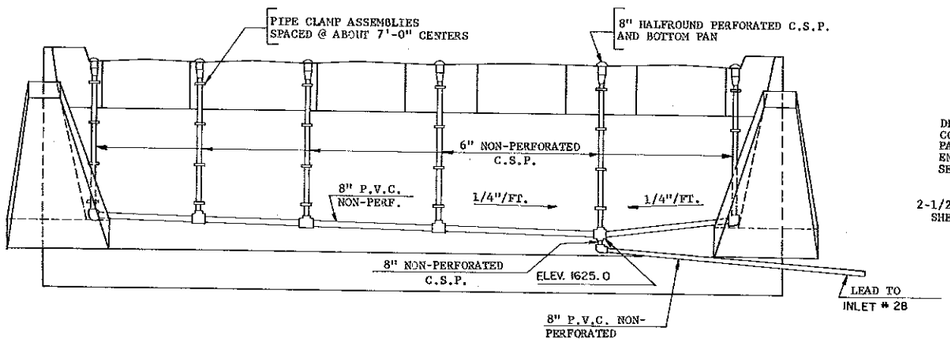
NUTS, CONCRETE INSERTS, PIPE, CLAMPS, BOTTOM PANS, COVERS, REDUCERS, AND COLLARS TO BE GALVANIZED AFTER FABRICATION.

BOTTOM PANS, COVERS, VERTICAL DRAIN PIPES, REDUCERS, COLLARS, AND ALL CONNECTIONS TO BE BITUMINOUS COATED.

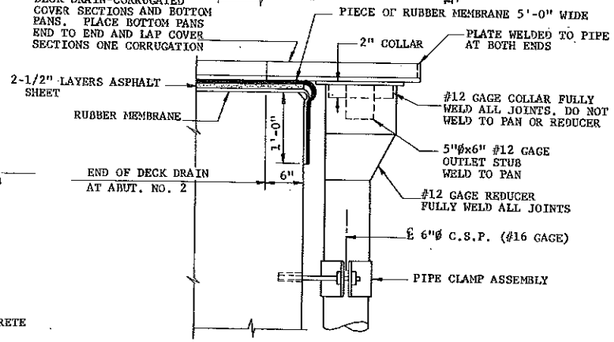
DECK WATERPROOFING NOTES:

THE QUANTITY OF RUBBER MEMBRANE WATERPROOFING FOR PAYMENT SHALL BE BASED ON THE SURFACE AREA COVERED AND IS COMPUTED USING 1'-6" SLOPE LENGTHS AT CURBS. BEFORE COVERING MEMBRANE CHECK FOR RUPTURES AND MISALIGNED SEAMS AND PATCH THEM WITH MEMBRANE AND MASTIC. ASPHALT PANELS SHOULD BE PLACED AS SOON AS POSSIBLE OVER THE MEMBRANE AND SHALL BE PLACED IN TWO LAYERS WITH JOINTS STAGGERED. ALL PANELS SHALL BE BONDED TO EACH OTHER WITH A BEAD OF ADHESIVE MASTIC. ALL JOINTS BETWEEN PANELS SHALL BE CAULKED WITH MASTIC AND A TWO FEET WIDE STRIP OF LONGITUDINALLY ALONG THE PANEL EDGES AT EACH CURB.

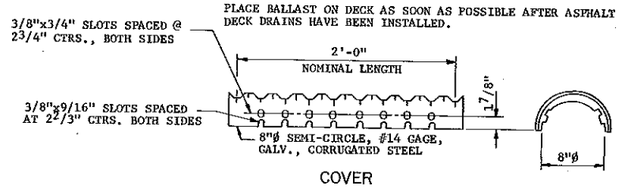
PLACE BALLAST ON DECK AS SOON AS POSSIBLE AFTER ASPHALT SHEETS AND DECK DRAINS HAVE BEEN INSTALLED.



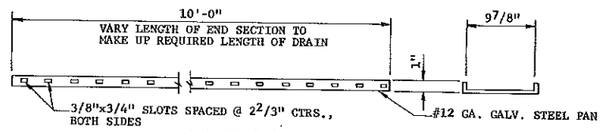
BACK ELEVATION = ABUTMENT NO. 1
SHOWING DECK DRAINAGE ONLY



DOWNSPOUT DETAIL

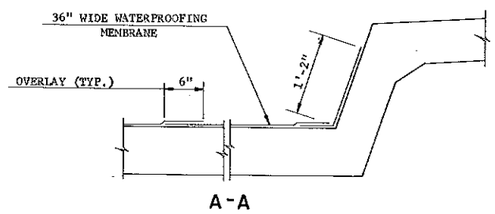


COVER

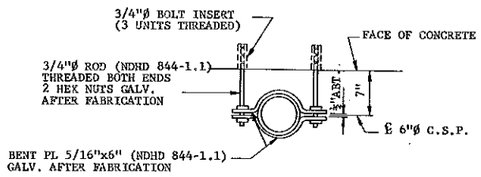


BOTTOM PAN

DECK DRAIN DETAILS



A-A



PIPE CLAMP ASSEMBLY

WATERPROOFING MATERIALS:

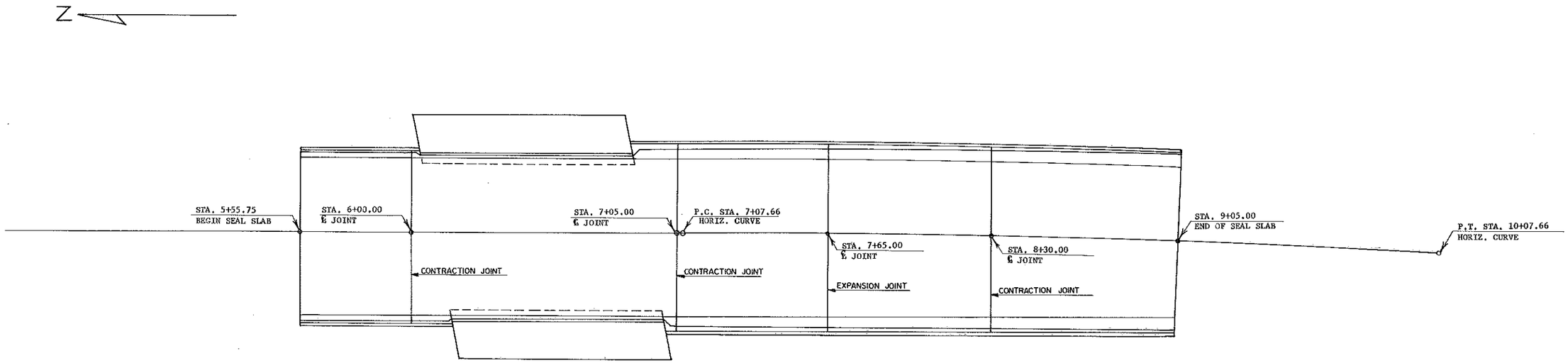
BITUTHENE MEMBRANE 1/16" X 36" WIDE X 60' ROLL — BITUTHENE PRIMER BITUTHENE MASTIC	W.R. GRACE CO. CHICAGO, IL.	OR EQUAL
"VIBRAFLEX" ASPHALT SHEET "PM5X" ADHESIVE MASTIC	W.R. MEADOWS ELGIN, IL.	OR EQUAL

QUANTITIES		
DECK DRAINAGE SYSTEM	1	LUMP SUM
BUTYL RUBBER MEMBRANE		
WATERPROOFING	7507	SQ.FT.

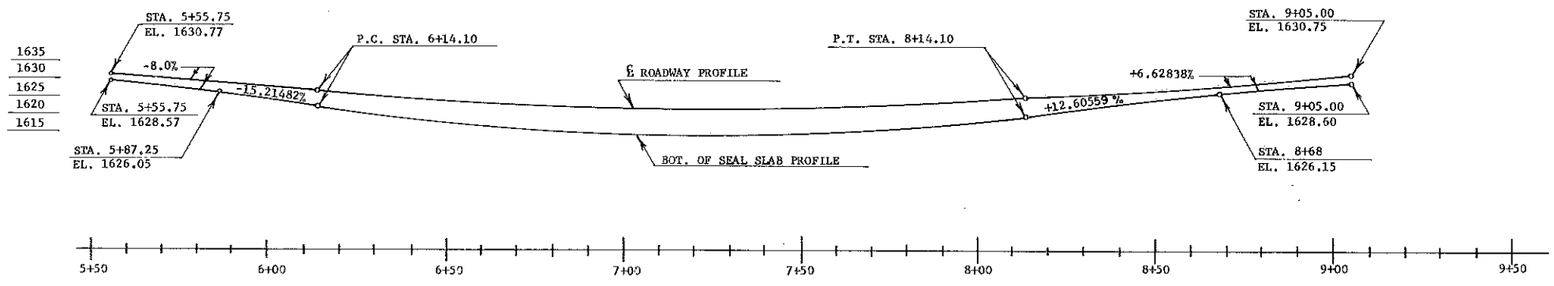
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

WATERPROOFING AND DRAINAGE DETAILS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-896(015)	26



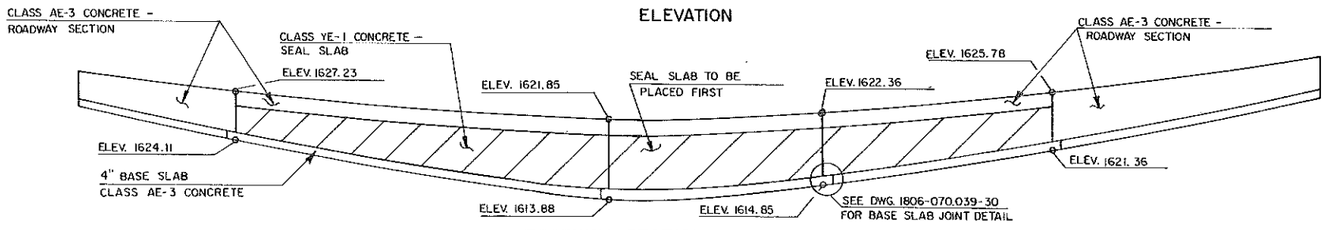
PLAN



ELEVATION

VERTICAL CURVE DATA
℄ ROADWAY
P.I. STA. 7+14.10
EL. 1618.1
V.C. 200'

VERTICAL CURVE DATA
BOT. OF SEAL SLAB
P.I. STA. 7+14.10
EL. 1606.75
V.C. 200'



ROADWAY SECTION

SHOWING CLASS CLASSIFICATION

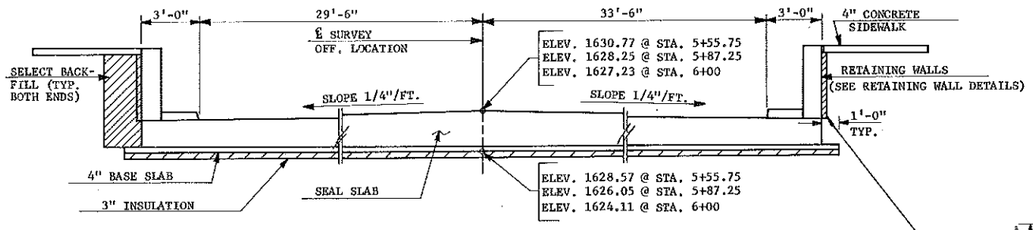
6TH AVENUE S.E UNDERPASS

MANDAN N.D

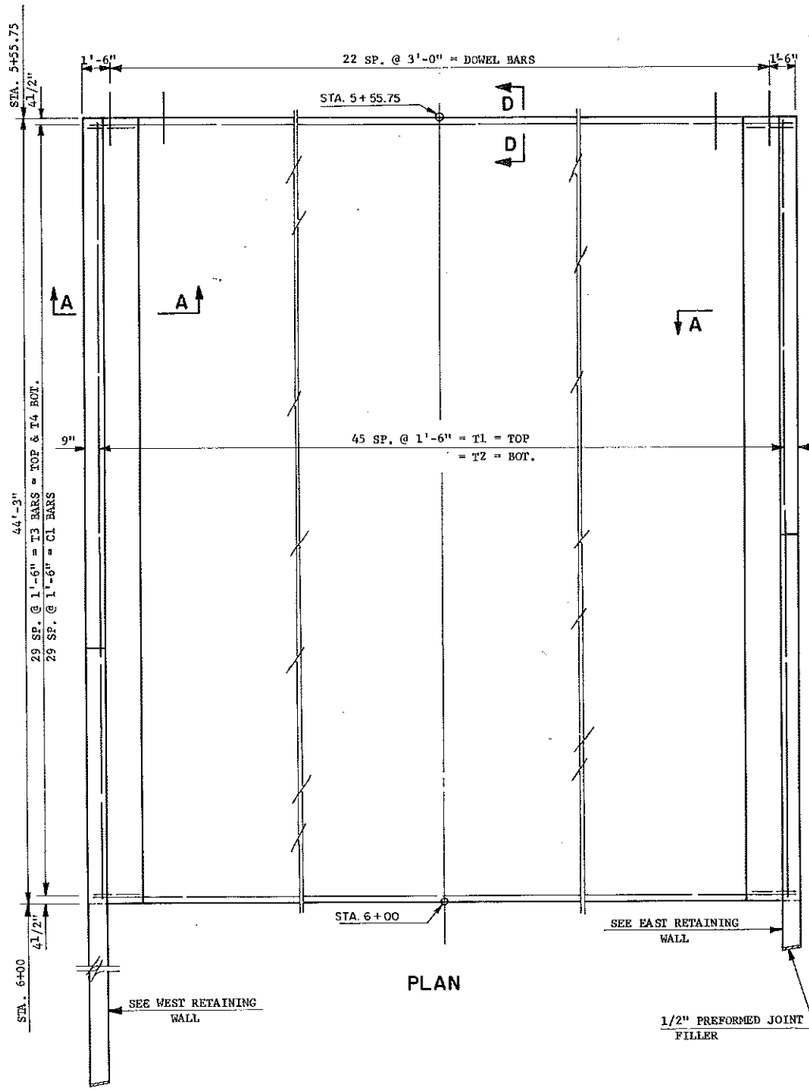
SEAL SLAB LAYOUT

1806-070.039-21

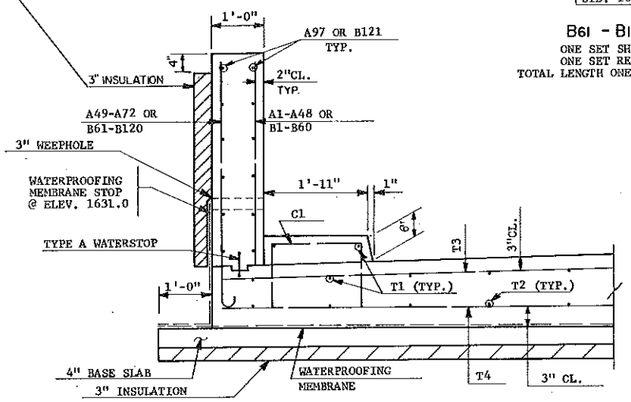
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	97



TYPICAL ROADWAY SECTION

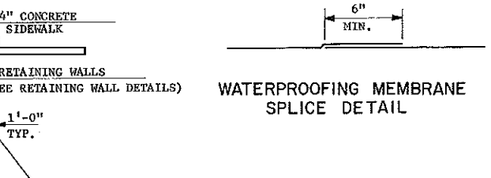


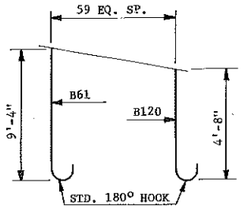
PLAN



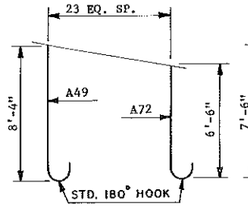
A-A

WATERPROOFING MEMBRANE SPLICE DETAIL

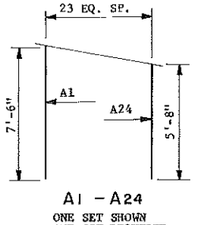




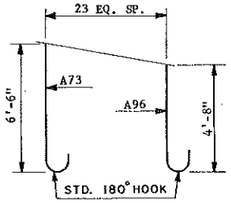
B61 - B120
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 455'-0"



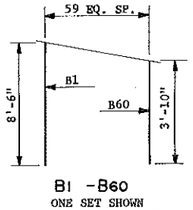
A49 - A72
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 192'-0"



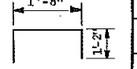
A1 - A24
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET=158'-0"



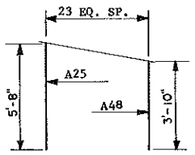
A73 - A96
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 148'-0"



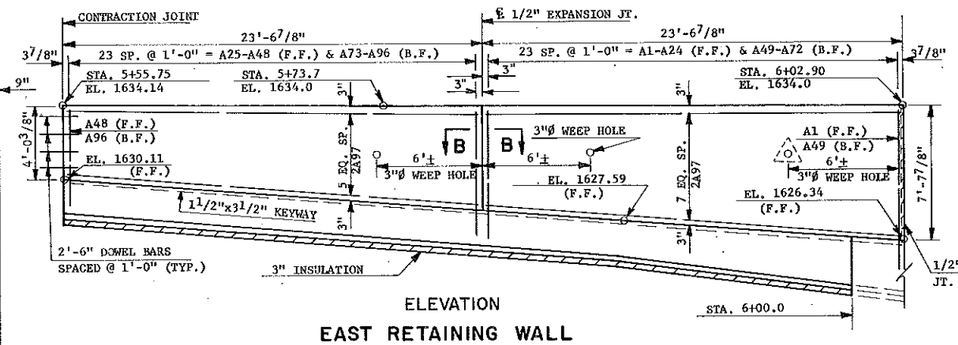
B1 - B60
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 370'-0"



BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT

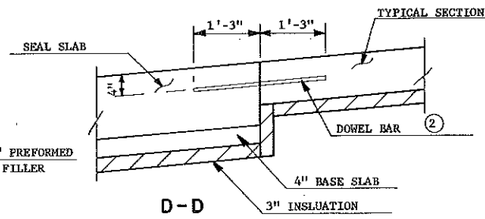


A25 - A48
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 114'-0"

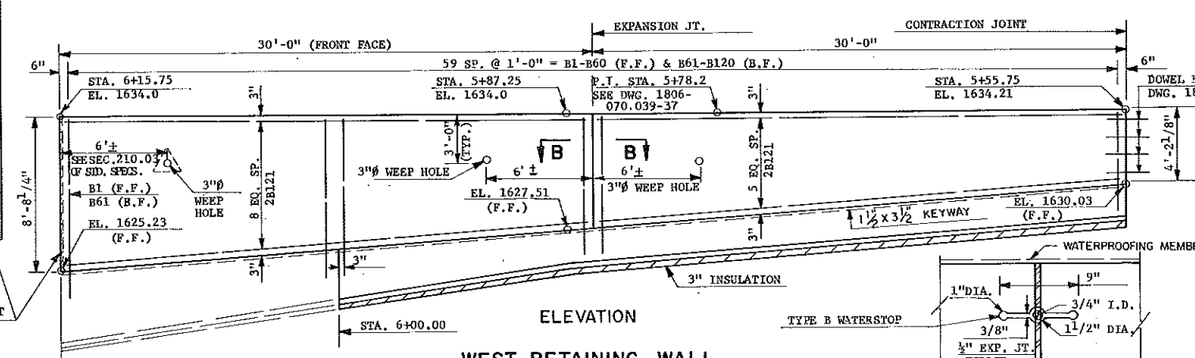


ELEVATION
EAST RETAINING WALL

A25 - A48
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 114'-0"



D-D



ELEVATION
WEST RETAINING WALL

B-B

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
A1-A24	1 SET	5	158'-0"	STR.
A25-A48	1 SET	5	114'-0"	"
A49-A72	1 SET	5	192'-0"	BENT
A73-A96	1 SET	5	148'-0"	BENT
A97	28	5	23'-4"	STR.
B1-B60	1 SET	5	370'-0"	STR.
B61-B120	1 SET	5	455'-0"	BENT
B121	30	5	29'-8"	"
(1) C1	60	4	4'-0"	BENT
(1) T1	50	4	43'-10"	STR.
T2	46	4	43'-10"	"
(1) T3	30	4	35'-1"	"
T4	30	4	35'-1"	"

(1) REINFORCING STEEL BARS SHALL BE EPOXY COATED.

(2) THE COST OF DOWEL BARS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CLASS AE-3 CONCRETE.

QUANTITIES

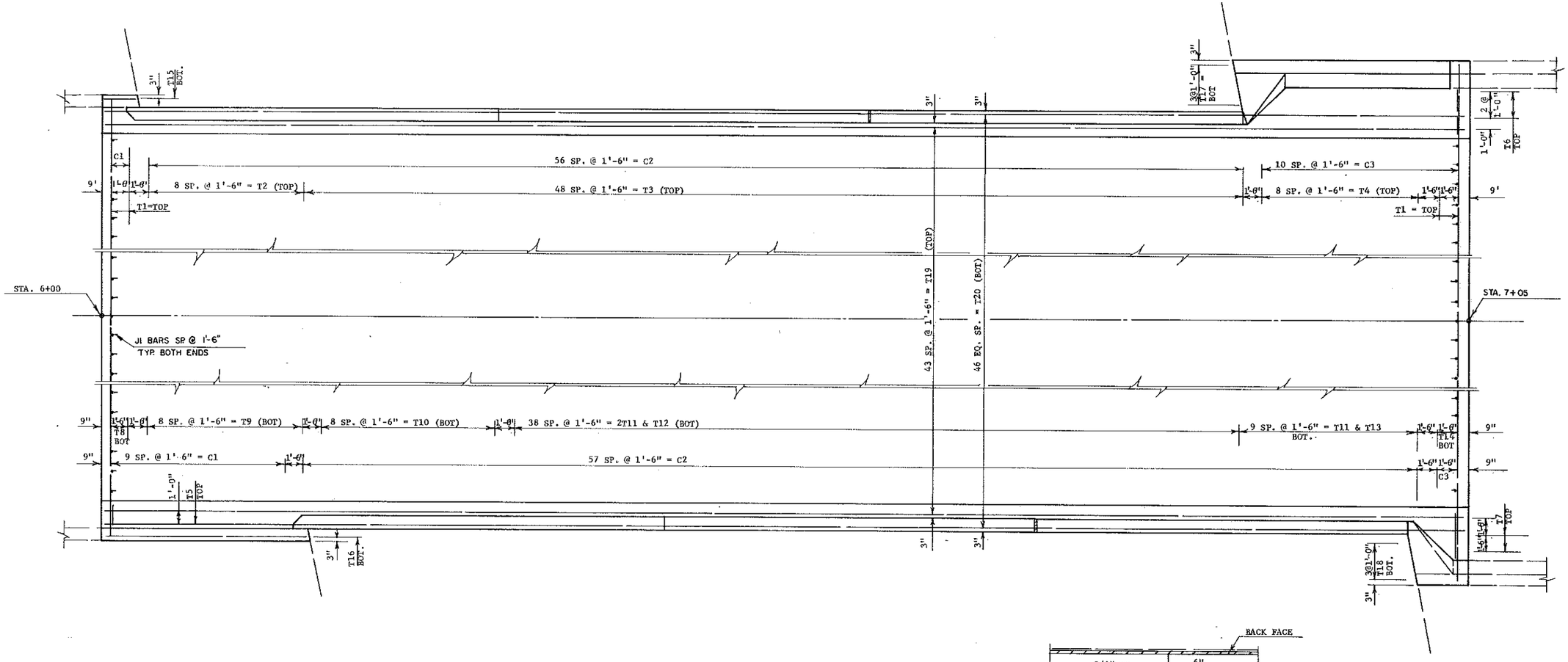
CLASS AE-3 CONCRETE	253	C.Y.
REINFORCING STEEL	5159	LBS.
REINFORCING STEEL-EPOXY	2327	LBS.

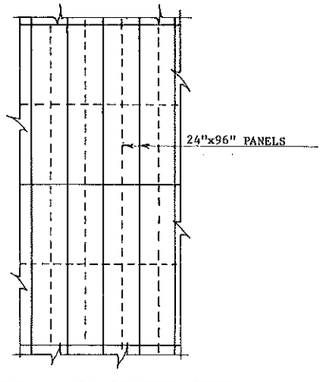
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SEAL SLAB SECTION
STA. 5+55.75-STA. 6+00

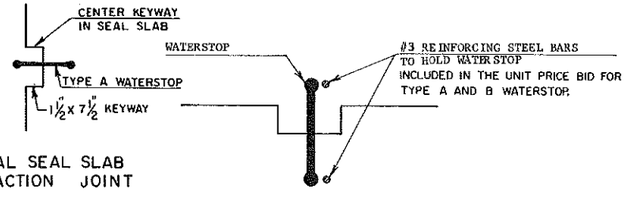
1806-070.039-22

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



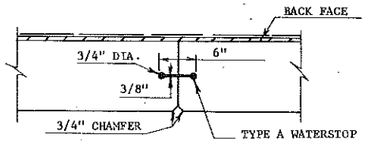


STYROFOAM PLACEMENT DETAIL



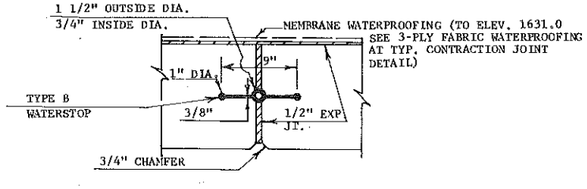
TYPICAL SEAL SLAB CONTRACTION JOINT

WATERSTOP HOLD DETAIL



TYPICAL CONTRACTION JOINT DETAIL

FOR RETAINING WALL UNDER BRIDGE



TYPICAL EXPANSION JOINT DETAIL

FOR RETAINING WALL UNDER BRIDGE

QUANTITIES

SEE DWG. 1806-070.039-27

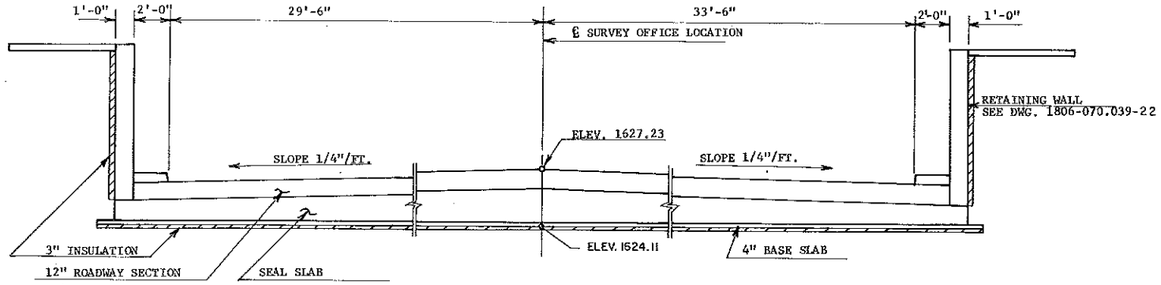
6TH AVENUE S.E. UNDERPASS
MANDAN N.D.

SEAL SLAB SECTION

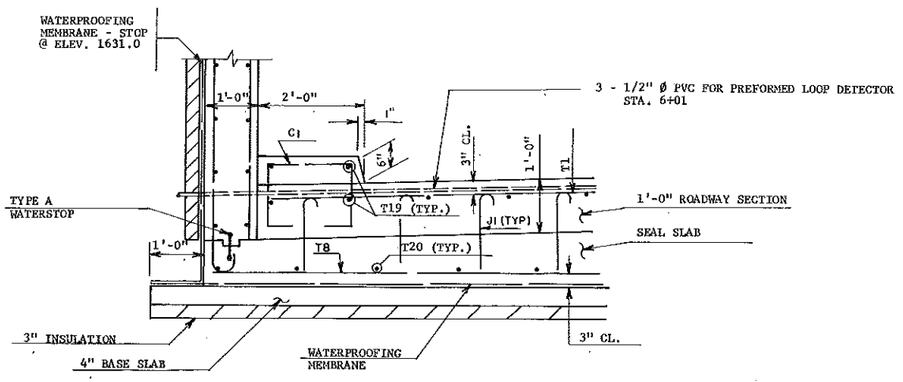
STA. 6+00 — STA. 7+05

1806-070.039-23

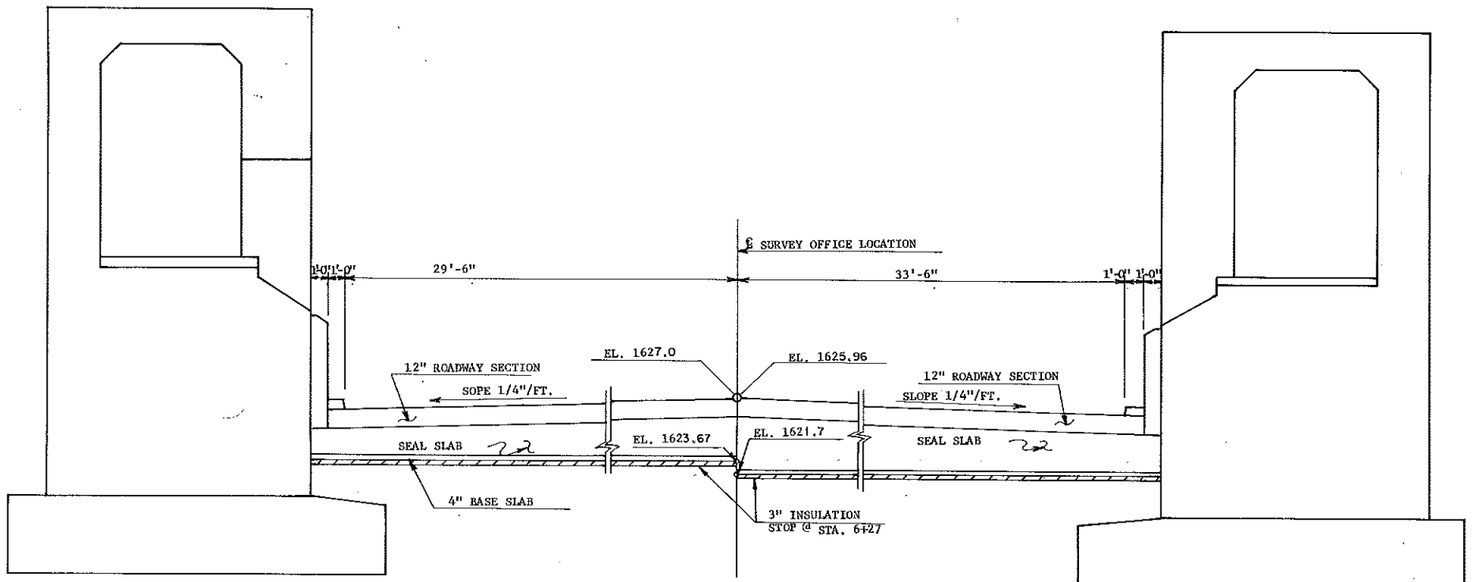
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	[illegible]



ROADWAY SECTION - STA 6+00
FACING SOUTH

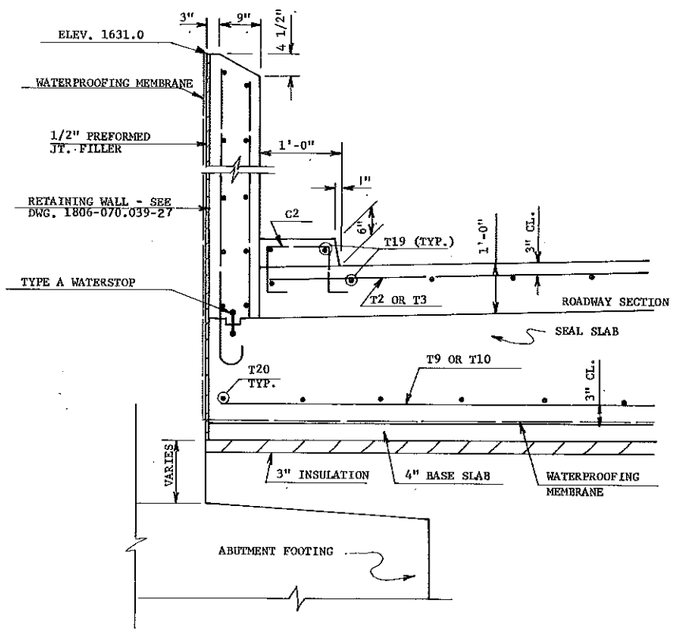


TYPICAL SECTION
STA. 6+00 - STA. 6+01.90 EAST SIDE
STA. 6+00 - STA. 6+14.75 WEST SIDE



EAST ROADWAY SECTION AT STA. 6+02.90

WEST ROADWAY SECTION AT STA. 6+15.75



TYPICAL SECTION
STA. 6+02.90 - STA. 6+25 EAST SIDE
STA. 6+15.75 - STA. 6+25 WEST SIDE

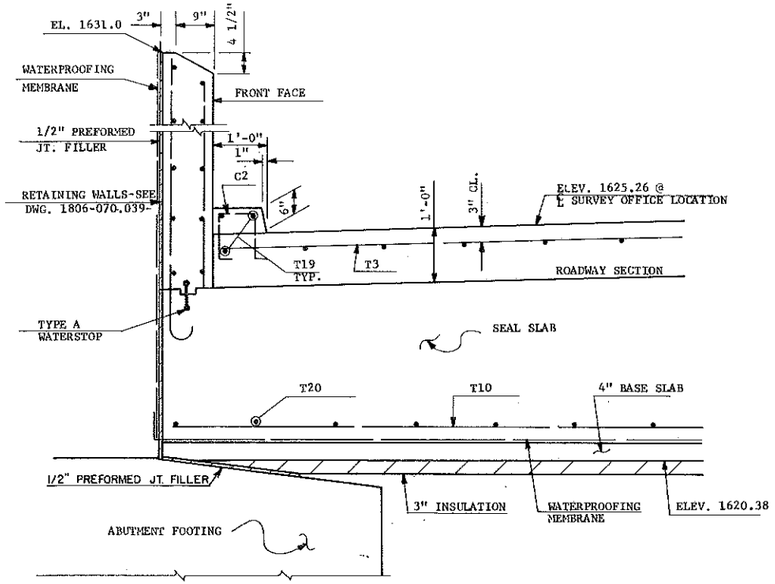
QUANTITIES

SEE DWG. 1806-070.039-27

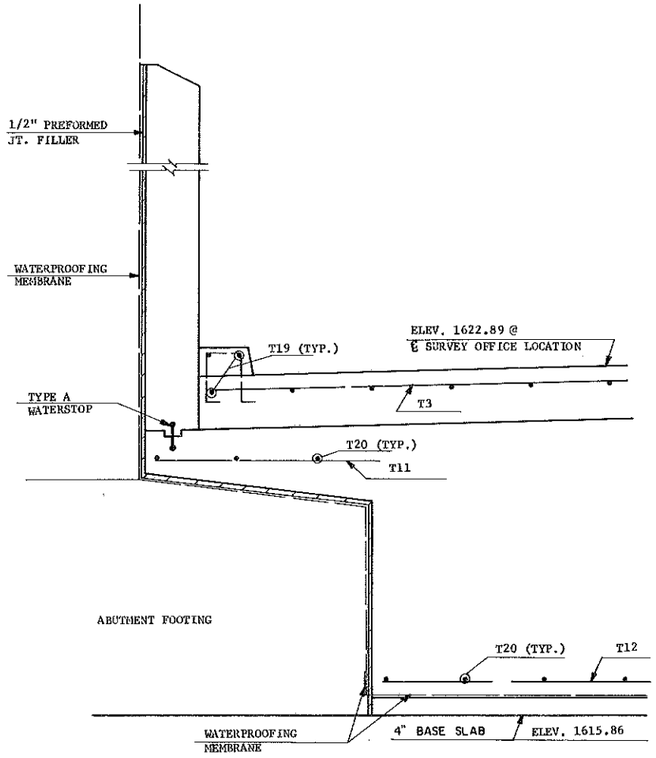
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SEAL SLAB SECTION
STA. 6+00 - STA. 7+05

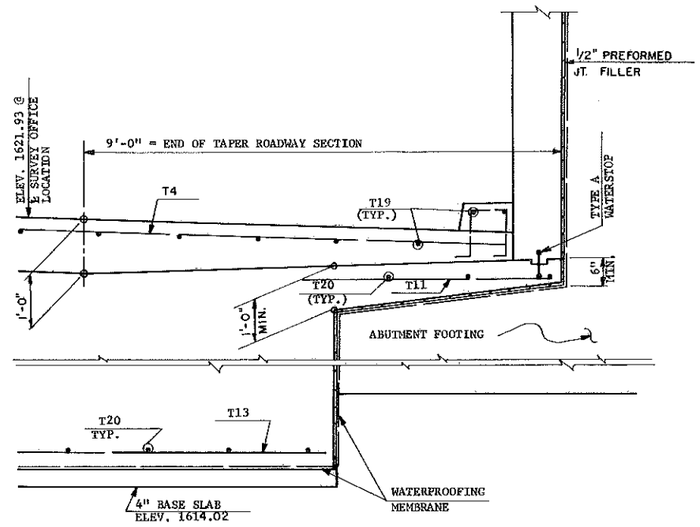
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	[illegible]



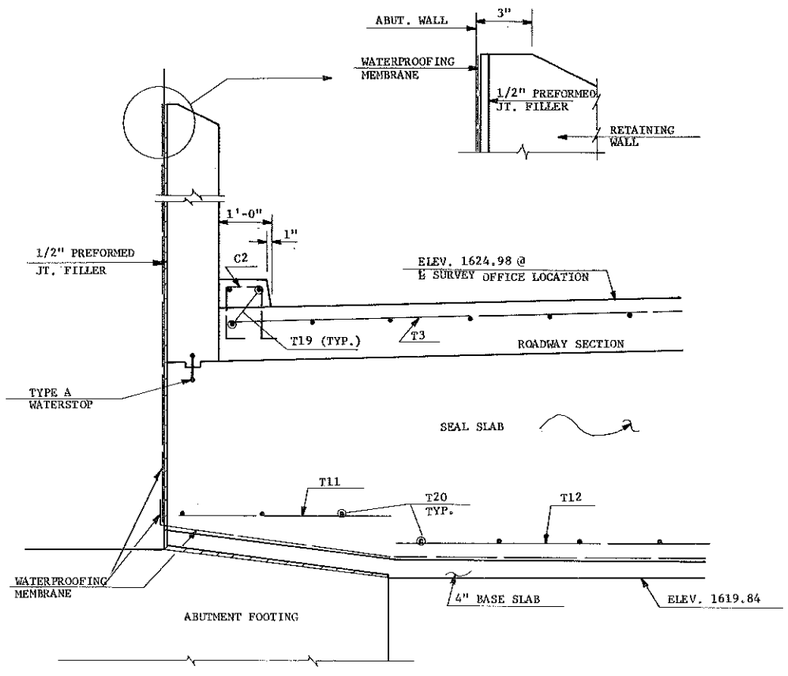
TYPICAL SECTION AT STA. 6+25



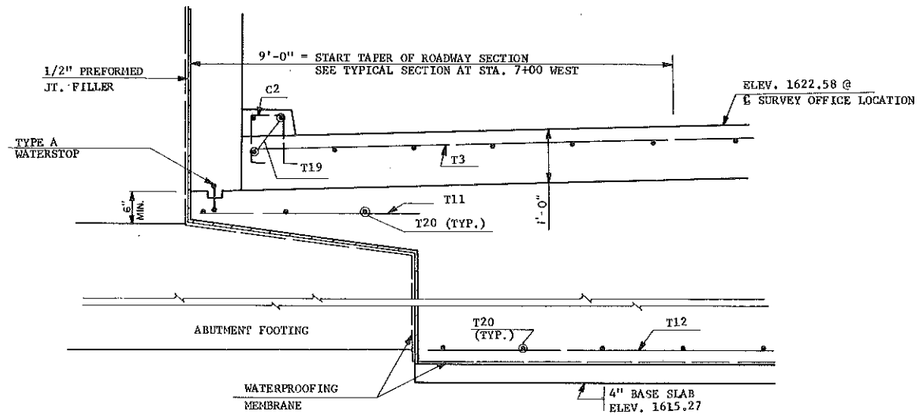
TYPICAL SECTION AT STA. 6+67



TYPICAL SECTION AT STA. 7+00



TYPICAL SECTION AT STA. 6+29



TYPICAL SECTION AT STA. 6+75

QUANTITIES

SEE DWG. 1806-070.039-26

6TH AVENUE S.E. UNDERPASS

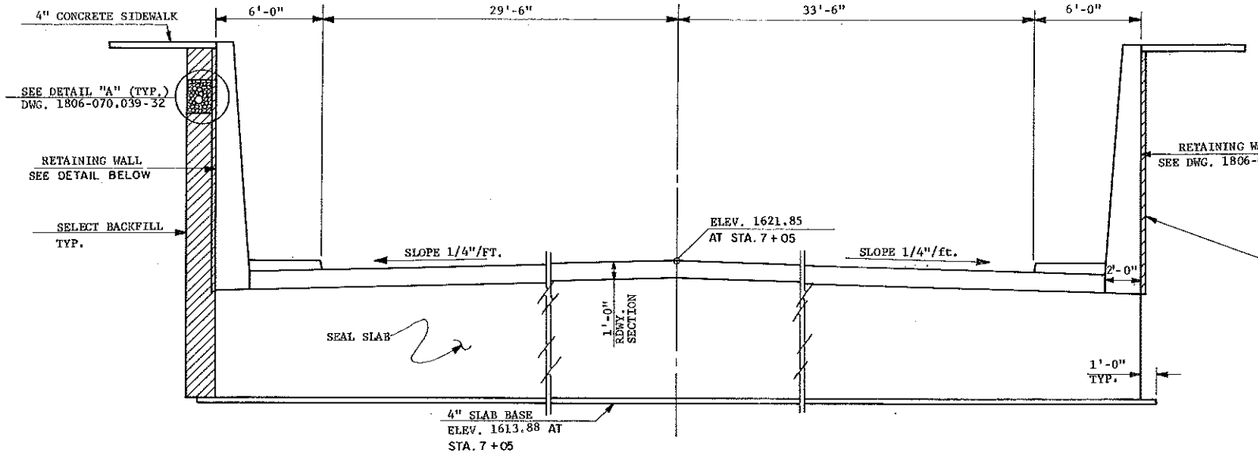
MANDAN, N.D.

SEAL SLAB SECTION

STA. 6+00 — STA. 7+05

1806-070.039-25

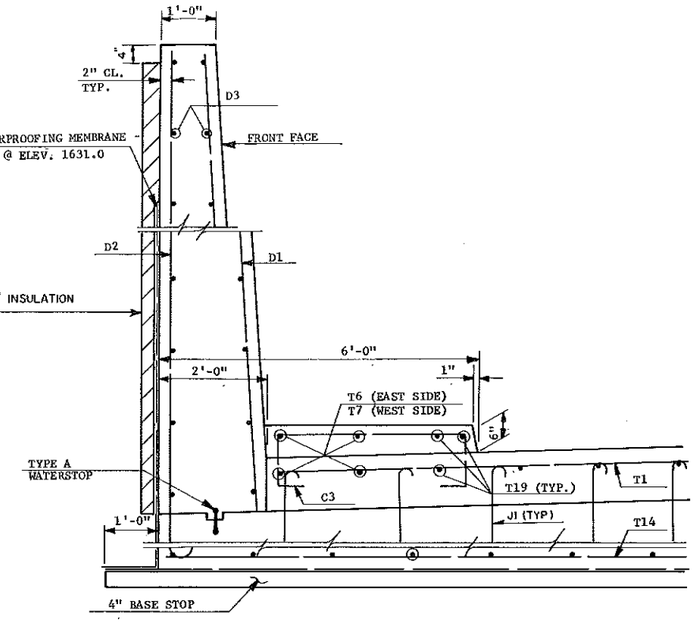
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	101



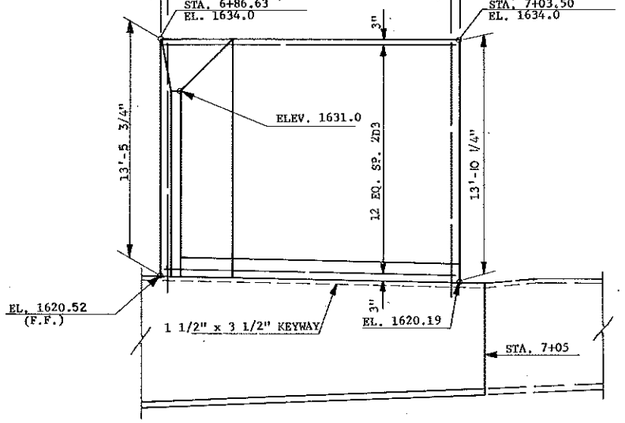
HALF SHOWING STA. 6+87.40 - STA. 7+05

TYPICAL ROADWAY SECTION

HALF SHOWING STA. 7+00.2 - STA. 7+05

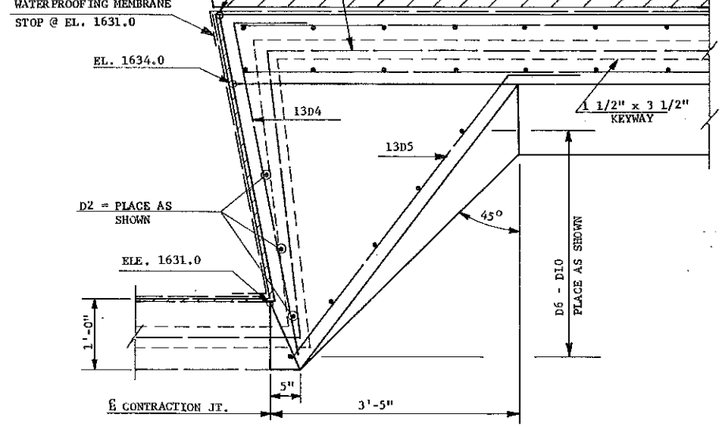


ROADWAY SECTION @ STA. 7+05



ELEVATION

EAST RETAINING WALL



PLAN VIEW @ STA. 6+86.63 EAST

QUANTITIES

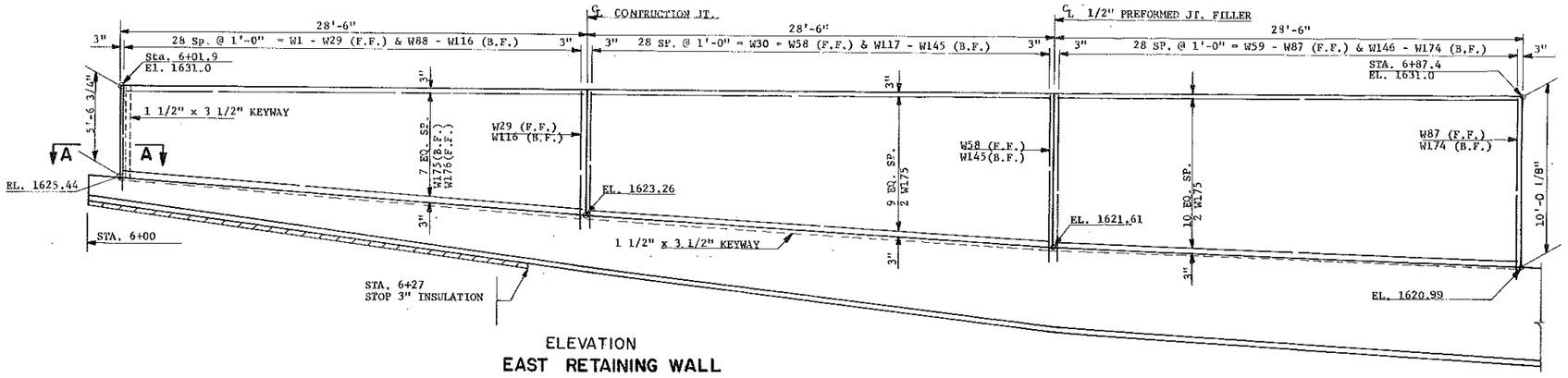
SEE DWG. 1806-070.039-27

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

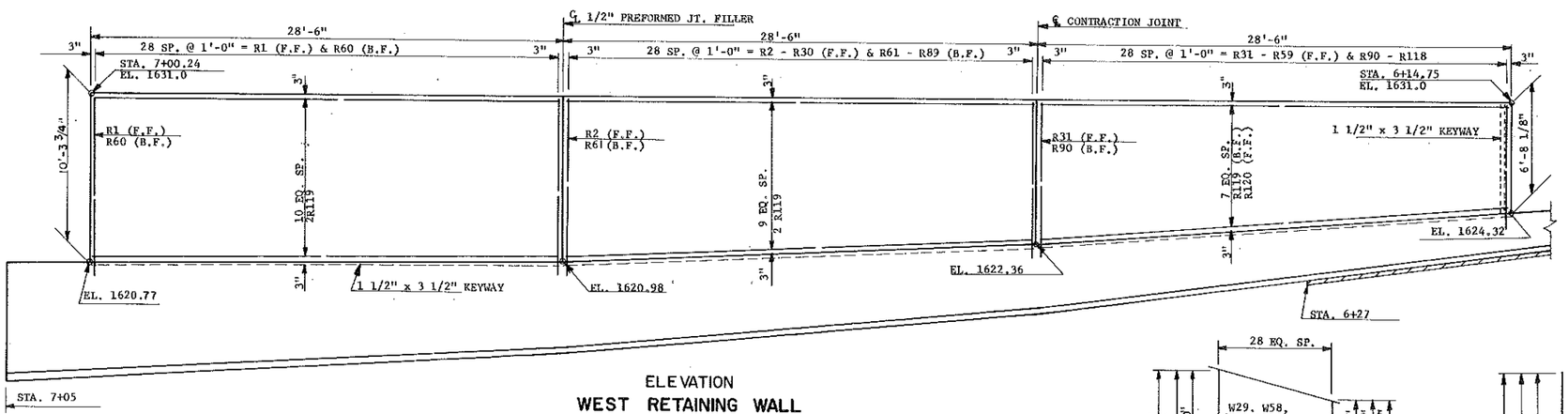
SEAL SLAB SECTION

STA. 6+00 – STA. 7+05

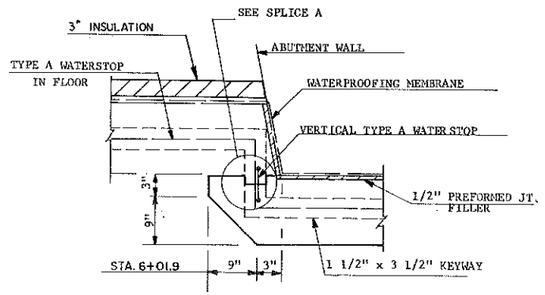
1806-070.039-26



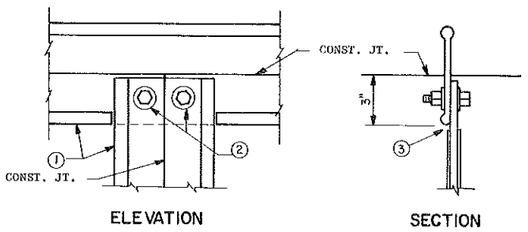
ELEVATION
EAST RETAINING WALL



ELEVATION
WEST RETAINING WALL



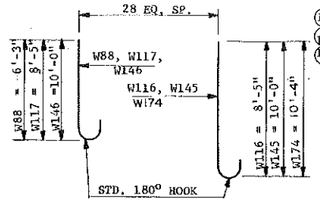
A-A



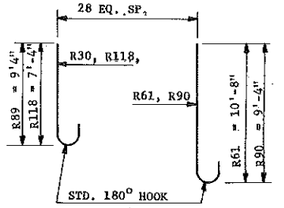
ELEVATION SECTION

SPLICE A

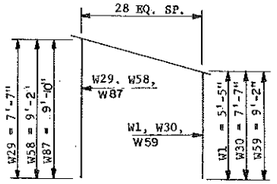
NOTE:
1. TYPE A WATERSTOP.
2. 1/2" HEX. HEAD BOLT WITH HEX. NUT AND 2-1/8" x 1 1/2" DIA. WASHERS.
3. PLANE OFF BULBS ON ABUTTING SURFACES.



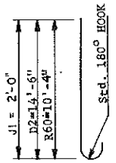
W88-W116, W117-W145 & W146-W174
ONE SET SHOWN
TOTAL LENGTH ONE SET = W88-W116 = 232'-0"
W117-W145 = 286'-6"
W146-W174 = 314'-2"



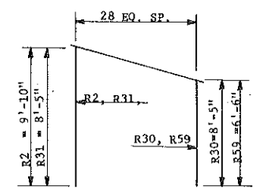
R61-R89 & R90-R118
ONE SET SHOWN
TOTAL LENGTH ONE SET = R61-R89 = 309'-4"
R90-R118 = 261'-0"



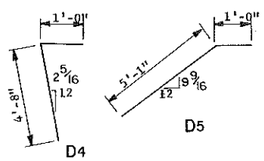
W1-W29, W30-W58 & W59-W87
ONE SET SHOWN
TOTAL LENGTH ONE SET = W1-W29= 188'-6"
W30-W58= 242'-11"
W59-W87= 275'-6"



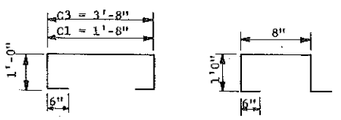
J1, D2 & R60



R2-R30 & R31-R59
ONE SET SHOWN
TOTAL LENGTH ONE SET = R2-R30 = 264'-7"
R31-R59= 216'-3"



D4 D5



C1 & C3 C2

BENT BAR DETAILS
DIMENSIONS SHOWN ARE OUT TO OUT

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	102

BAR LIST

	MARK	NO.	SIZE	LENGTH	SHAPE
	C1	12	4	4'-8"	BENT
(1)	C2	115	4	3'-8"	BENT
(1)	C3	13	4	6'-8"	BENT
	D1	22	5	13'-8"	STR.
	D2	26	6	15'-2"	BENT
	D3	26	4	16'-5"	STR.
	D4	13	4	5'-8"	BENT
	D5	13	4	6'-1"	BENT
	J1	88	4	2'-6"	"
	R1	29	5	1'-"	STR.
	R2-R30	1 SET	5	264'-7"	STR.
	R31-R59	1 SET	5	216'-3"	STR.
	R60	29	6	11'-0"	BENT
	R61-R89	1 SET	6	309'-4"	BENT
	R90-R118	1 SET	6	261'-0"	BENT
	R119	50	4	28'-2"	STR.
	R120	8	4	27'-6"	STR.
	W1-W29	1 SET	5	188'-6"	STR.
	W30-W58	1 SET	5	242'-11"	STR.
	W59-W87	1 SET	5	275'-6"	STR.
	W88-W116	1 SET	6	232'-0"	BENT
	W117-W145	1 SET	6	286'-6"	BENT
	W146-W174	1 SET	6	314'-2"	BENT
	W175	50	4	28'-2"	STR.
	W176	8	4	27'-6"	STR.
(1)	T1	8	4	34'-1"	STR.
(1)	T2	18	4	33'-1"	STR.
(1)	T3	98	4	32'-1"	STR.
(1)	T4	18	4	35'-1"	STR.
(1)	T5	1	4	15'-7"	STR.
(1)	T6	3	4	17'-3"	STR.
(1)	T7	2	4	3'-0"	STR.
	T8	4	4	35'-1"	STR.
	T9	18	4	34'-1"	STR.
	T10	22	4	33'-1"	STR.
	T11	88	4	4'-3"	STR.
	T12	78	4	29'-10"	STR.
	T13	20	4	31'-10"	STR.
	T14	4	4	38'-1"	STR.
	T15	1	4	2'-9"	STR.
	T16	1	4	15'-7"	STR.
	T17	4	4	17'-11"	STR.
	T18	4	4	4'-8"	STR.
	T19	144	4	35'-11"	STR.
	T 20	141	4	35'-11"	STR.

(1) REINFORCING STEEL SHALL BE EPOXY COATED

QUANTITIES

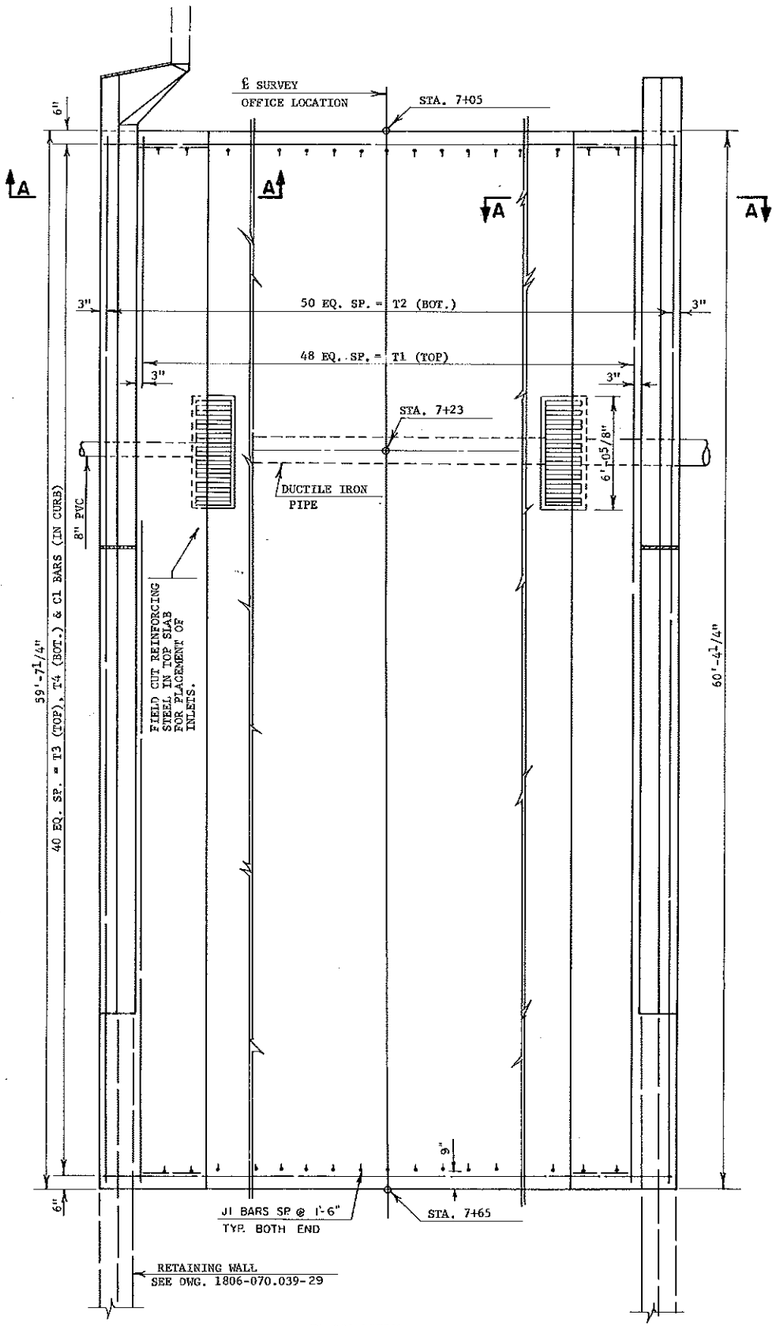
CLASS YE-1 CONCRETE	1115	C.Y.
CLASS AE-3 CONCRETE	415	C.Y.
REINFORCING STEEL	17,970	LBS.
REINFORCING STEEL-EPOXY	3528	LBS.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

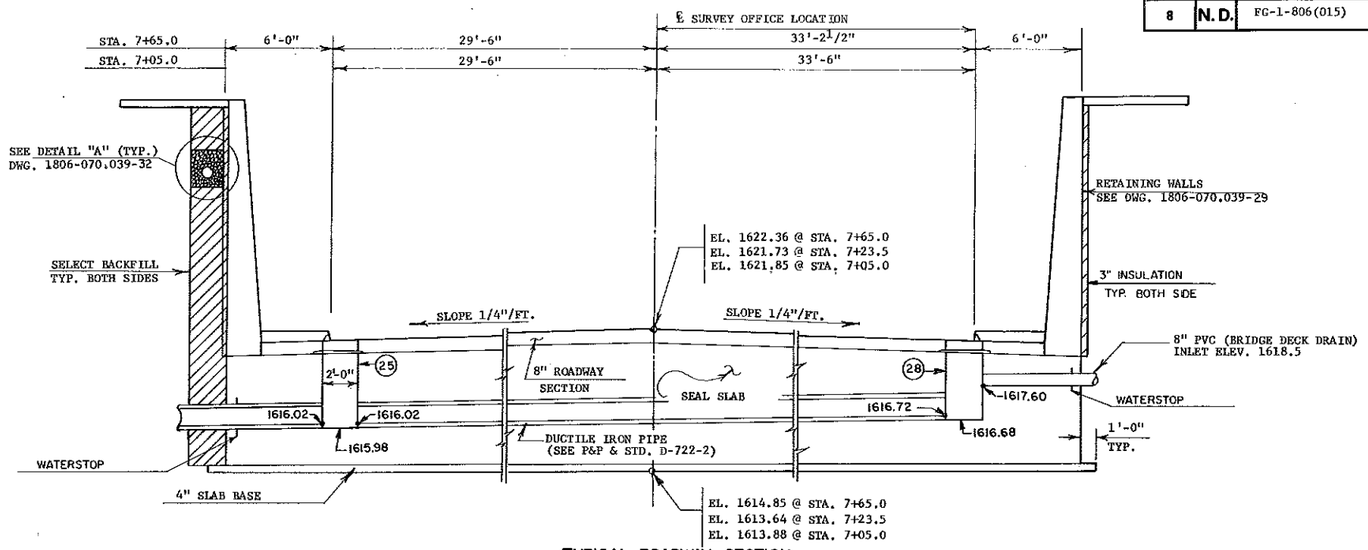
SEAL SLAB SECTION
STA. 6+00-STA. 7+05

1806-070.039-27

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	103

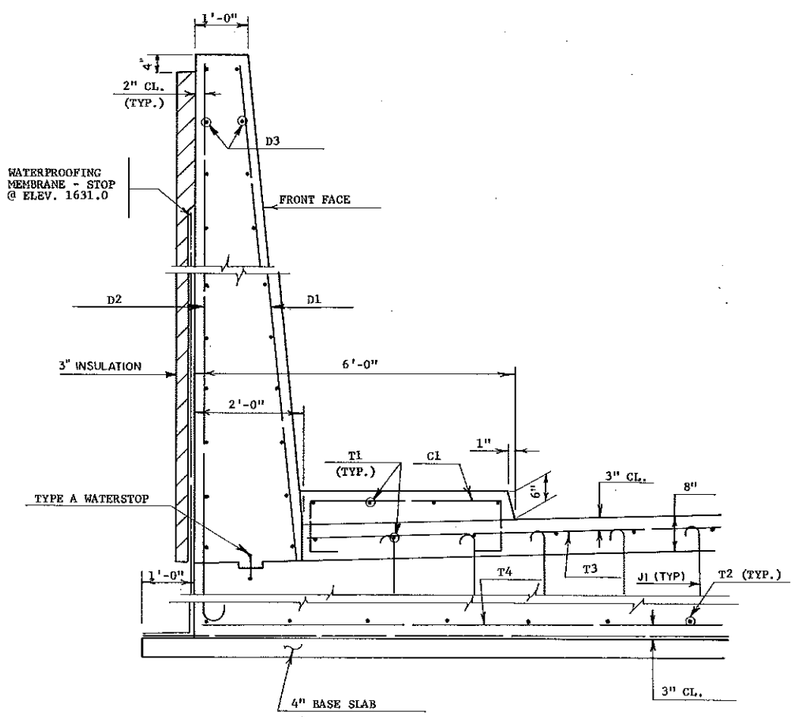


PLAN VEIW

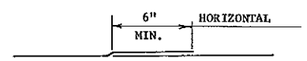


TYPICAL ROADWAY SECTION

STA. 7+05.0 THRU STA. 7+65.0



A-A



WATERPROOFING MEMBRANE SPLICE DETAIL

QUANTITIES
SEE DWG. 1806-070.039-29

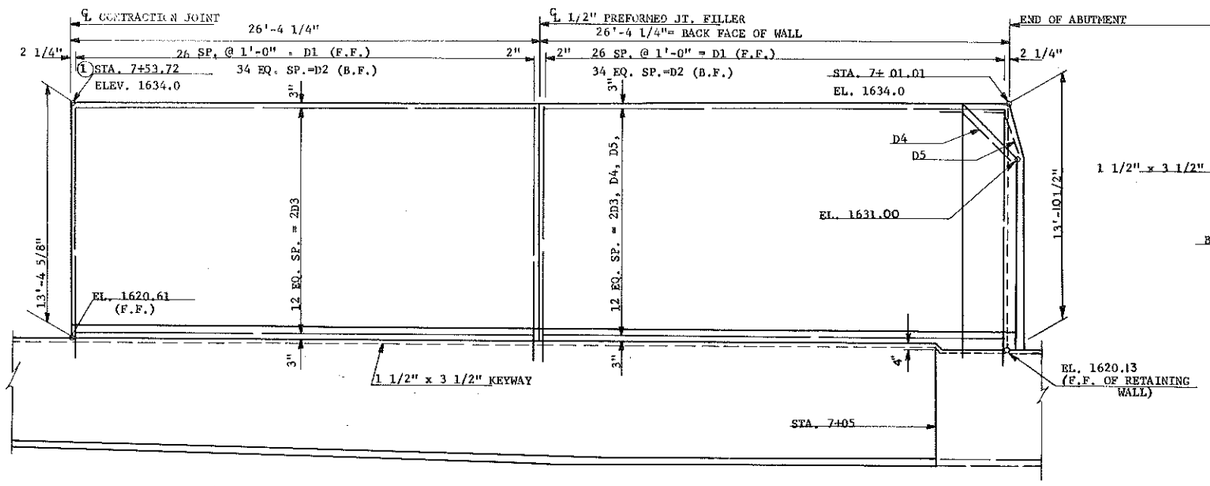
6TH AVENUE S.E. UNDERPASS
MANDAN N.D.

SEAL SLAB SECTION

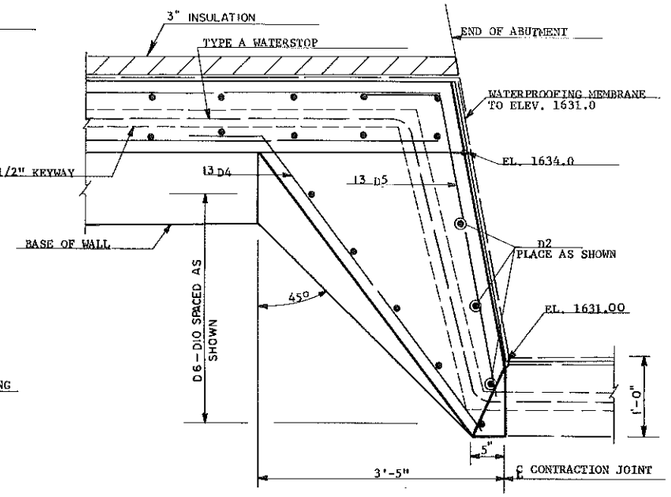
STA. 7+05 - STA. 7+65

1806-070.039-28

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	104



ELEVATION
WEST RETAINING WALL



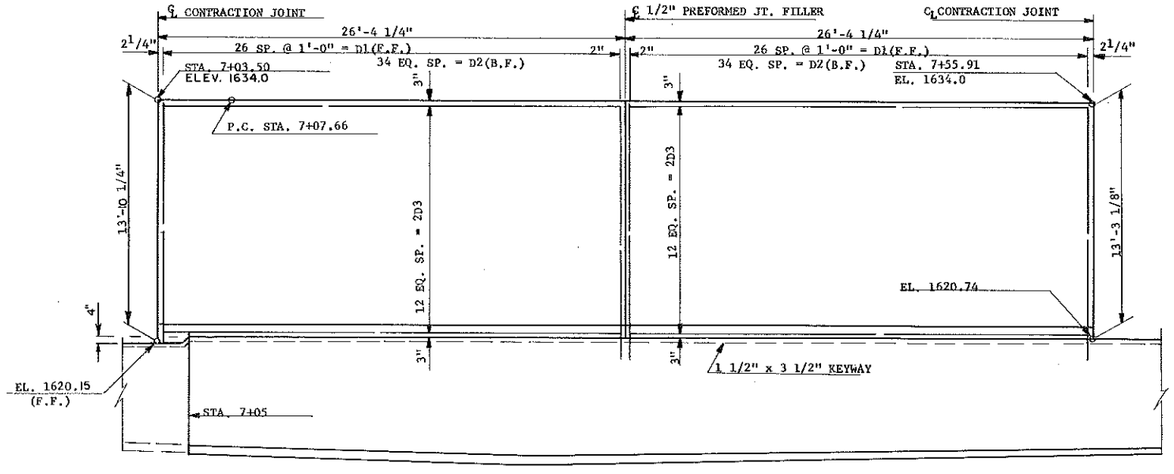
PLAN VIEW @ STA. 7+01.01

BAR LIST

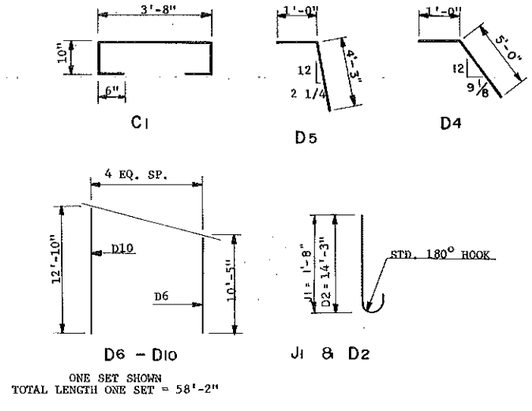
MARK	NO.	SIZE	LENGTH	SHAPE
D1	108	5	13'-1"	STR.
D2	143	6	14'-11"	BENT
D3	104	5	26'-0"	STR.
D4	13	5	6'-0"	BENT
D5	13	5	5'-3"	BENT
D6-D10	1 SET	5	58'-2"	STR.
(2) C1	82	4	6'-4"	BENT
(2) T1	114	4	30'-5"	STR.
(2) T2	102	4	30'-5"	STR.
(2) T3	82	4	36'-1"	STR.
T4	82	4	38'-1"	STR.
J1	94	4	2'-2"	BENT

(1) SURVEY OF EXISTING ROADWAY

(2) REINFORCING STEEL BARS SHALL BE EPOXY COATED.



ELEVATION
EAST RETAINING WALL



ONE SET SHOWN
TOTAL LENGTH ONE SET = 58'-2"

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

QUANTITIES

CLASS YE-1 CONCRETE	1088	C.Y.
CLASS AE-3 CONCRETE	253	C.Y.
REINFORCING STEEL	12006	LBS.
REINFORCING STEEL-EPOXY	4640	LBS.

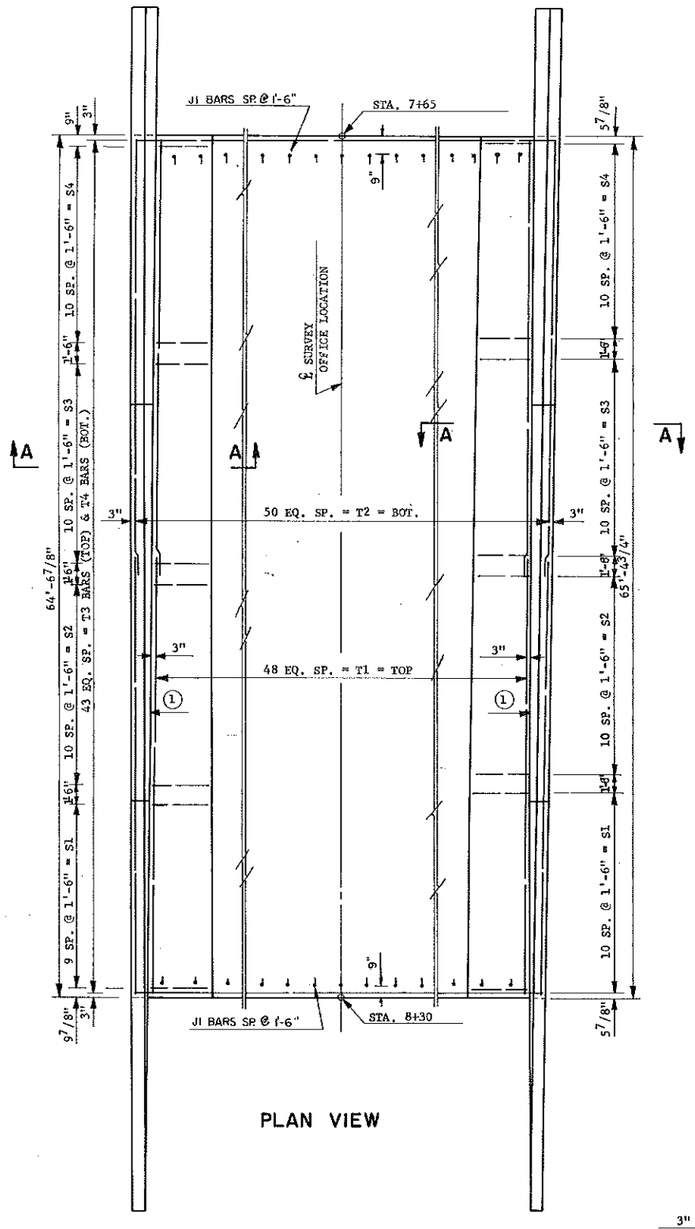
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SEAL SLAB SECTION

STA. 7+05 – STA. 7+65

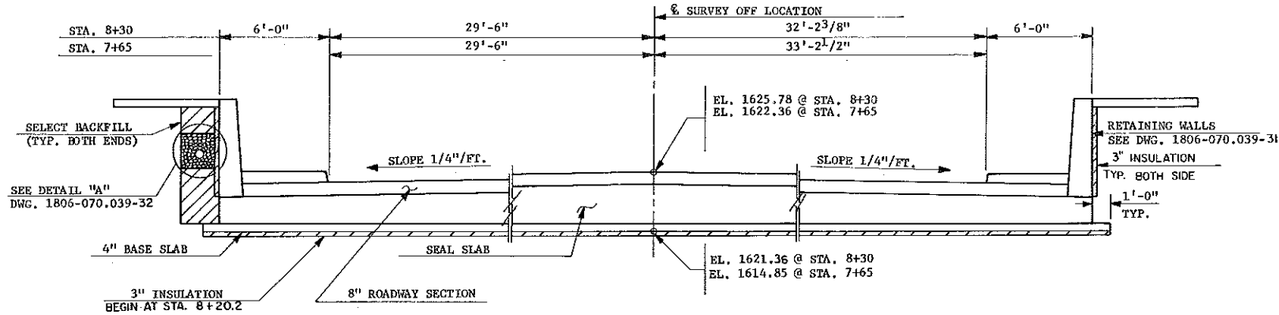
1806-070.039-29

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	105



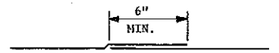
PLAN VIEW

① FRONT FACE OF THE RETAINING WALL AT THE BASE

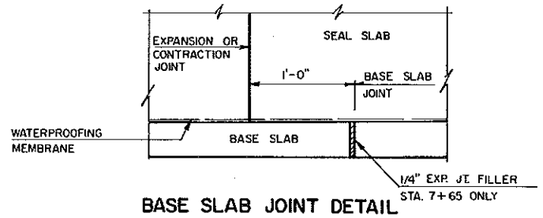


TYPICAL ROADWAY SECTION

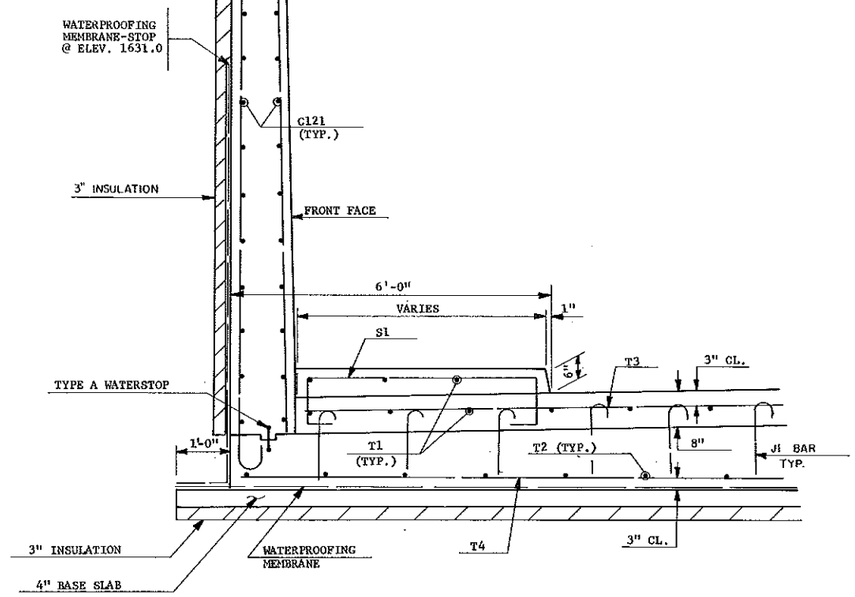
STA. 7+65 THRU STA. 8+30



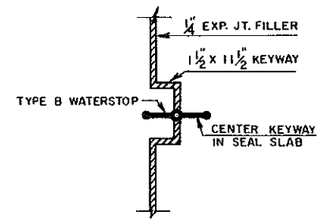
WATERPROOFING MEMBRANE SPLICE DETAIL



BASE SLAB JOINT DETAIL



A-A



EXPANSION JOINT SEAL SLAB

QUANTITIES
SEE DWG. 1806-070.039-31

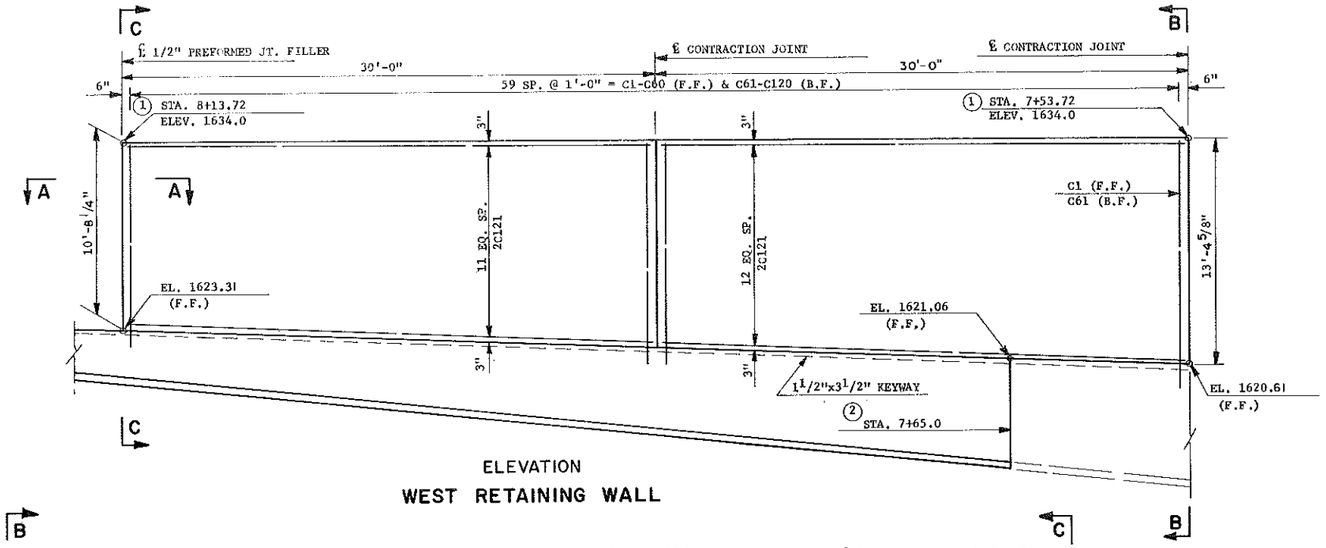
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SEAL SLAB SECTION

STA. 7+65 — STA. 8+30

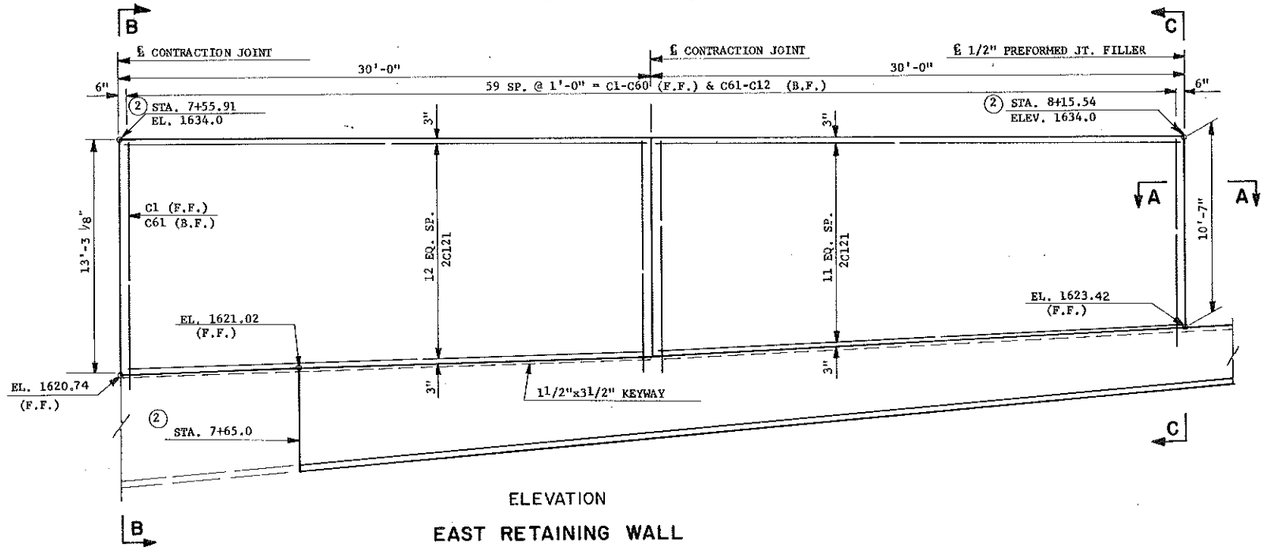
1806-070.039-30

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	106



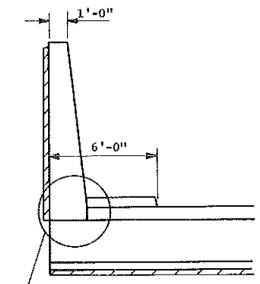
ELEVATION

WEST RETAINING WALL

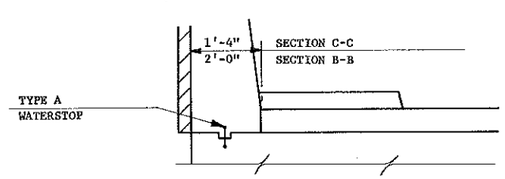


ELEVATION

EAST RETAINING WALL



B-B & C-C



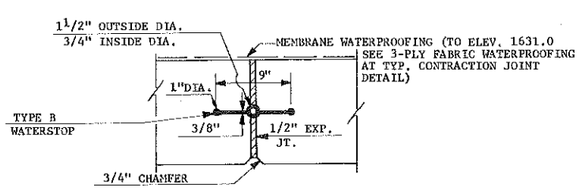
BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
C1-C60	2 SETS	6	705'-0"	STR.
C61-C120	2 SETS	6	790'-0"	BENT
C121	100	5	29'-8"	STR.
J1	94	4	2'-2"	
(3) T1	114	4	33'-3"	STR.
T2	102	4	33'-3"	"
(3) T3	88	4	37'-3"	"
T4	88	4	38'-11"	"
(3) S1	21	4	6'-10"	BENT
(3) S2	22	4	6'-8"	"
(3) S3	22	4	6'-8"	"
(3) S4	22	4	6'-4"	"

(1) SURVEY ℄

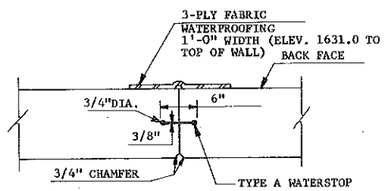
(2) ℄ OFFICE LOCATION

(3) REINFORCING STEEL BARS SHALL BE EPOXY COATED



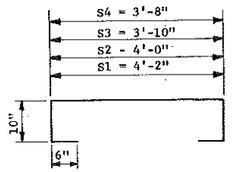
A-A

WALL INSULATION NOT SHOWN

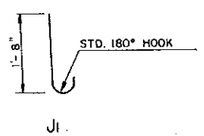


TYPICAL CONTRACTION JOINT DETAIL

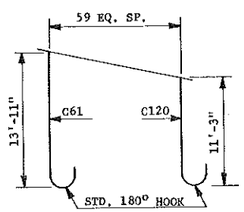
WALL INSULATION NOT SHOWN



S1 - S4

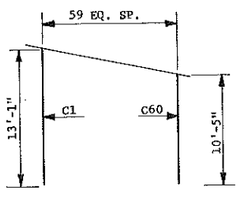


J1



C61 - C120

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 790'-0"



C1 - C60

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 705'-0"

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

QUANTITIES

CLASS YE-1 CONCRETE	823	C.Y.
CLASS AE-3 CONCRETE	257	C.Y.
REINFORCING STEEL	12260	LBS.
REINFORCING STEEL-EPOXY	5107	LBS.

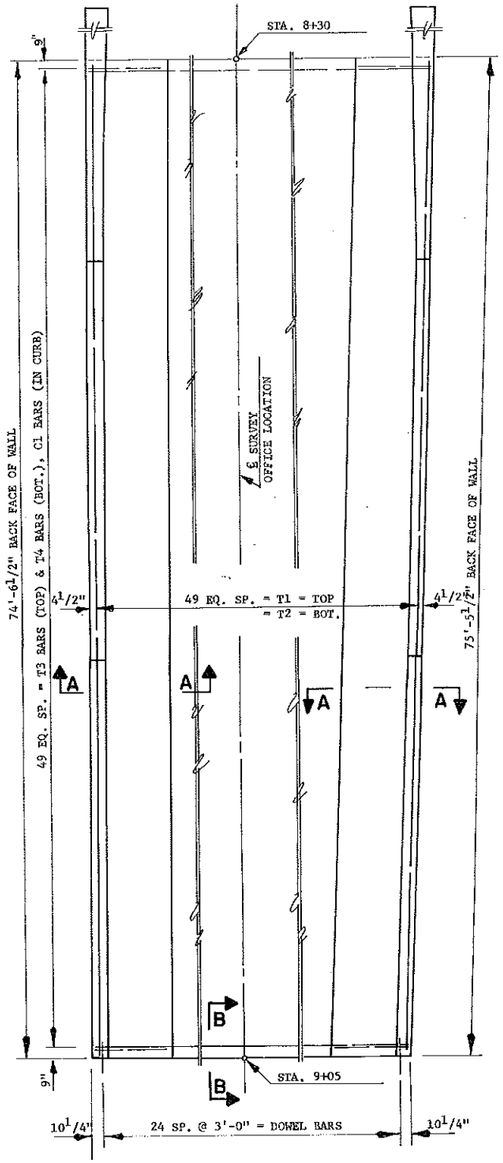
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SEAL SLAB SECTION

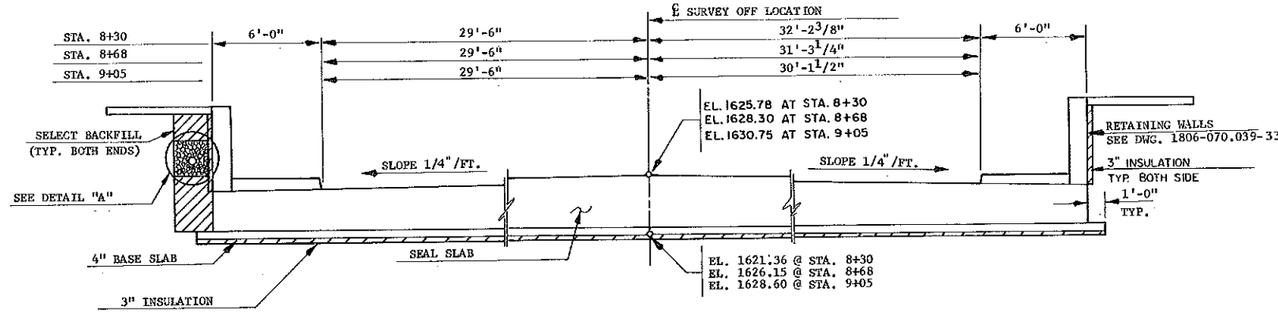
STA. 7+65 - STA. 8+30

1806-070.039-31

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	107

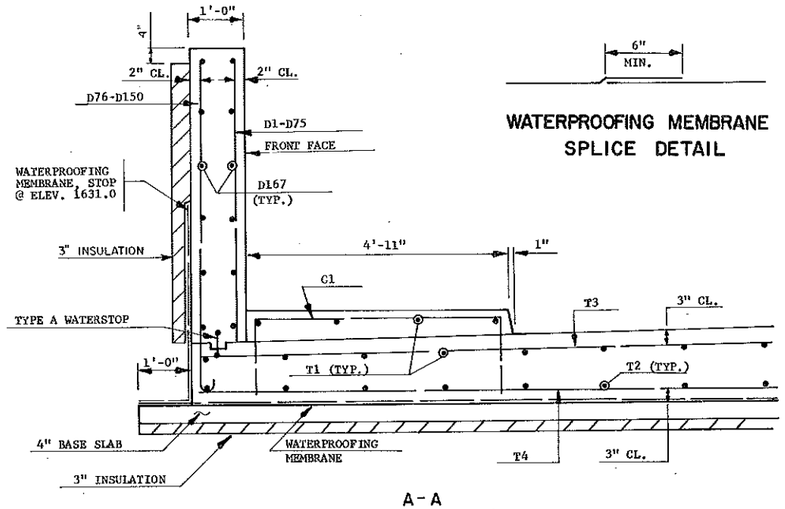


PLAN VIEW



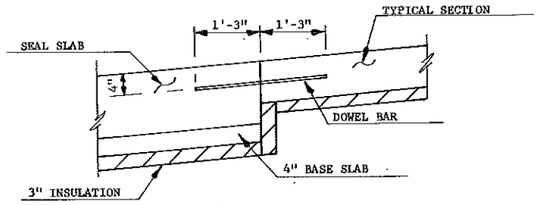
TYPICAL ROADWAY SECTION

STA. 8+30 THRU STA. 9+05

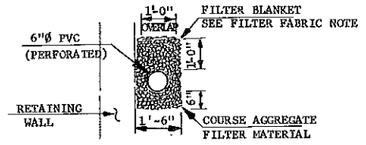


A-A

WATERPROOFING MEMBRANE SPLICE DETAIL



B-B



DETAIL "A"

FILTER FABRIC: PERFORATED PVC UNDERDRAINS SHALL HAVE A NON-WOVEN FILTER FABRIC MADE OF MAN-MADE FILTERS DESIGNED TO FILTER OUT MATERIAL SMALLER THAN THE NUMBER 40 SIEVE SIZE WITH COEFFICIENTS OF PERMEABILITY RANGING FROM 0.20 TO 1.8 FT. PER MIN. THIS FABRIC SHALL BE PLACED IN THE TRENCH AS SHOWN. NOT A SEPARATE PAY ITEM, COST TO BE INCIDENTAL TO 6" PERFORATED PVC PIPE.

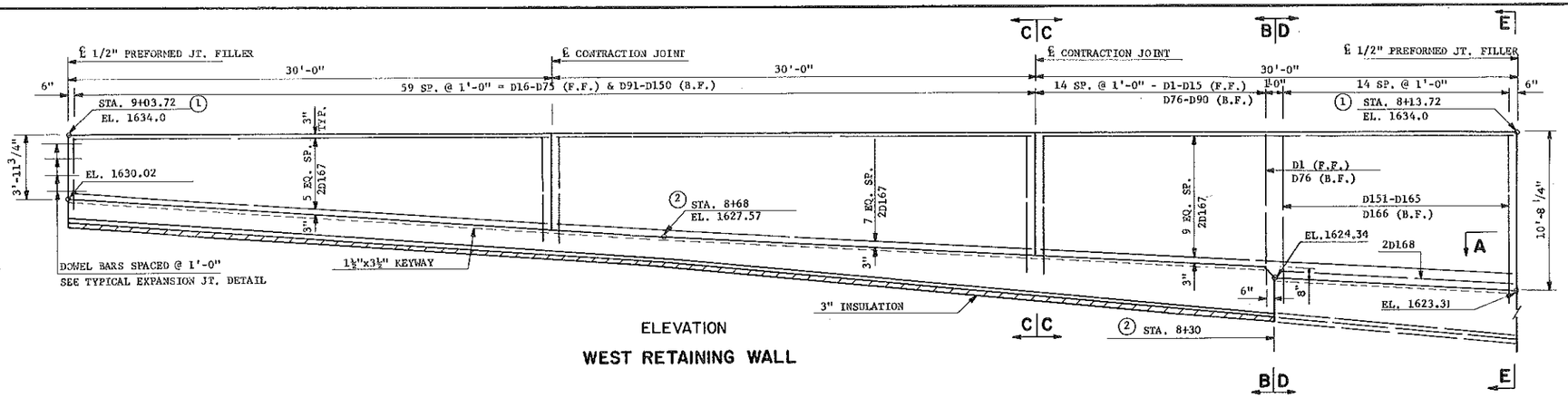
QUANTITIES
SEE DWG. 1806-070.039-33

6TH AVENUE S.E. UNDERPASS
MANDAN, N. D.

SEAL SLAB SECTION
STA. 8+30 - STA. 9+05

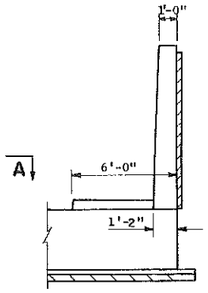
1806-070.039-32

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	108



ELEVATION

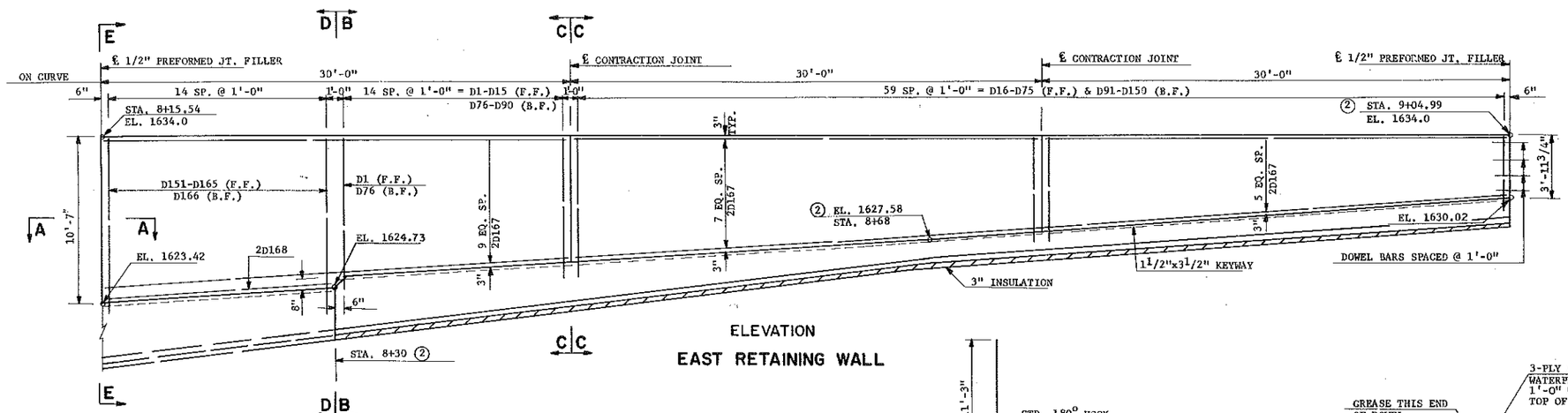
WEST RETAINING WALL



B-B

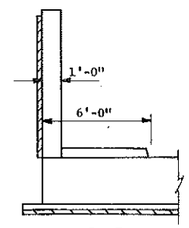
BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
D1-D15	2 SETS	5	123'-9"	STR.
D16-D75	2 SETS	5	347'-6"	STR.
D76-D90	2 SETS	6	145'-0"	BENT
D166	15	6	11'-10"	BENT
D91-D150	2 SETS	5	432'-6"	BENT
D151-D165	2 SETS	6	148'-9"	STR.
D167	96	5	29'-8"	STR.
D168	4	5	14'-8"	STR.
(3) C1	100	4	6'-11"	BENT
(3) T1	116	4	38'-4"	STR.
T2	100	4	38'-4"	STR.
(3) T3	100	4	37'-5"	STR.
T4	100	4	37'-5"	STR.



ELEVATION

EAST RETAINING WALL

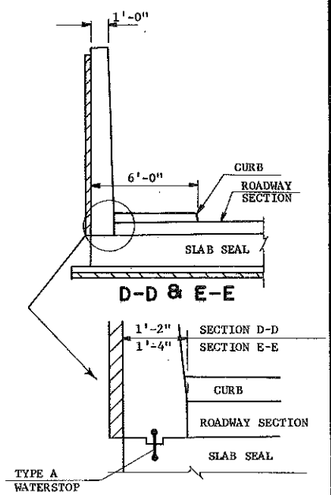


C-C

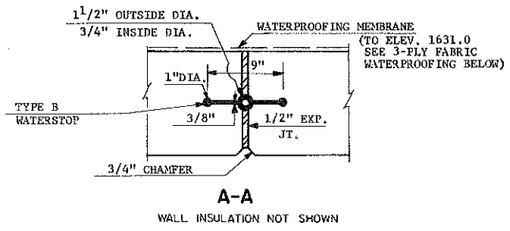
(1) SURVEY ℄

(2) ℄ OFFICE LOCATION

(3) REINFORCING STEEL BARS SHALL BE EPOXY COATED

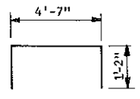


D-D & E-E

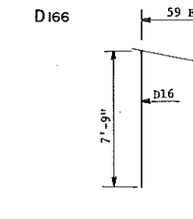


A-A

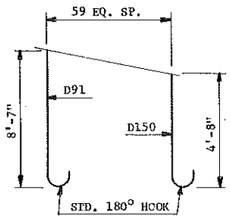
WALL INSULATION NOT SHOWN



C1



D166



D91 - D150

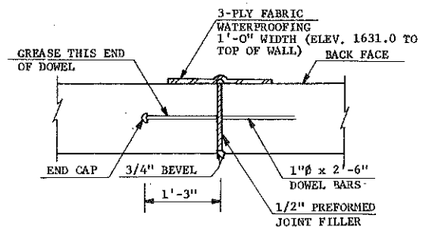
ONE SET SHOWN

TOTAL LENGTH ONE SET = 432'-6"

D16 - D75

ONE SET SHOWN

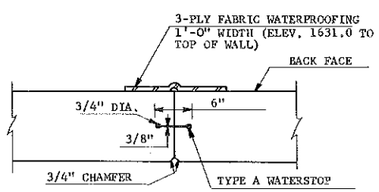
TOTAL LENGTH ONE SET = 347'-6"



TYPICAL EXPANSION JOINT DETAIL WITH DOWEL BARS

WALL INSULATION NOT SHOWN

NOTE: PROVISIONS SHALL BE MADE TO HOLD DOWEL IN A TRUE HORIZONTAL POSITION AND IN A PLANE PARALLEL TO THE FRONT FACE WHILE CONCRETE IS POURED.

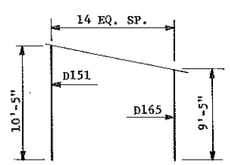


TYPICAL CONTRACTION JOINT DETAIL

WALL INSULATION NOT SHOWN

BENT BAR DETAILS

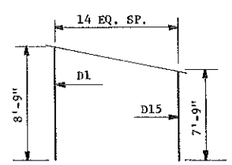
DIMENSIONS SHOWN ARE OUT TO OUT



D151 - D165

ONE SET SHOWN

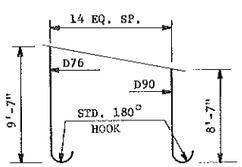
TOTAL LENGTH ONE SET = 148'-9"



D1 - D15

ONE SET SHOWN

TOTAL LENGTH ONE SET = 123'-9"



D76 D90

ONE SET SHOWN

TOTAL LENGTH ONE SET = 145'-0"

QUANTITIES

CLASS AE-3 CONCRETE	546	C.Y.
REINFORCING STEEL	11,126	LBS.
REINFORCING STEEL-EPOXY	5932	LBS.

6TH AVENUE S.E UNDERPASS

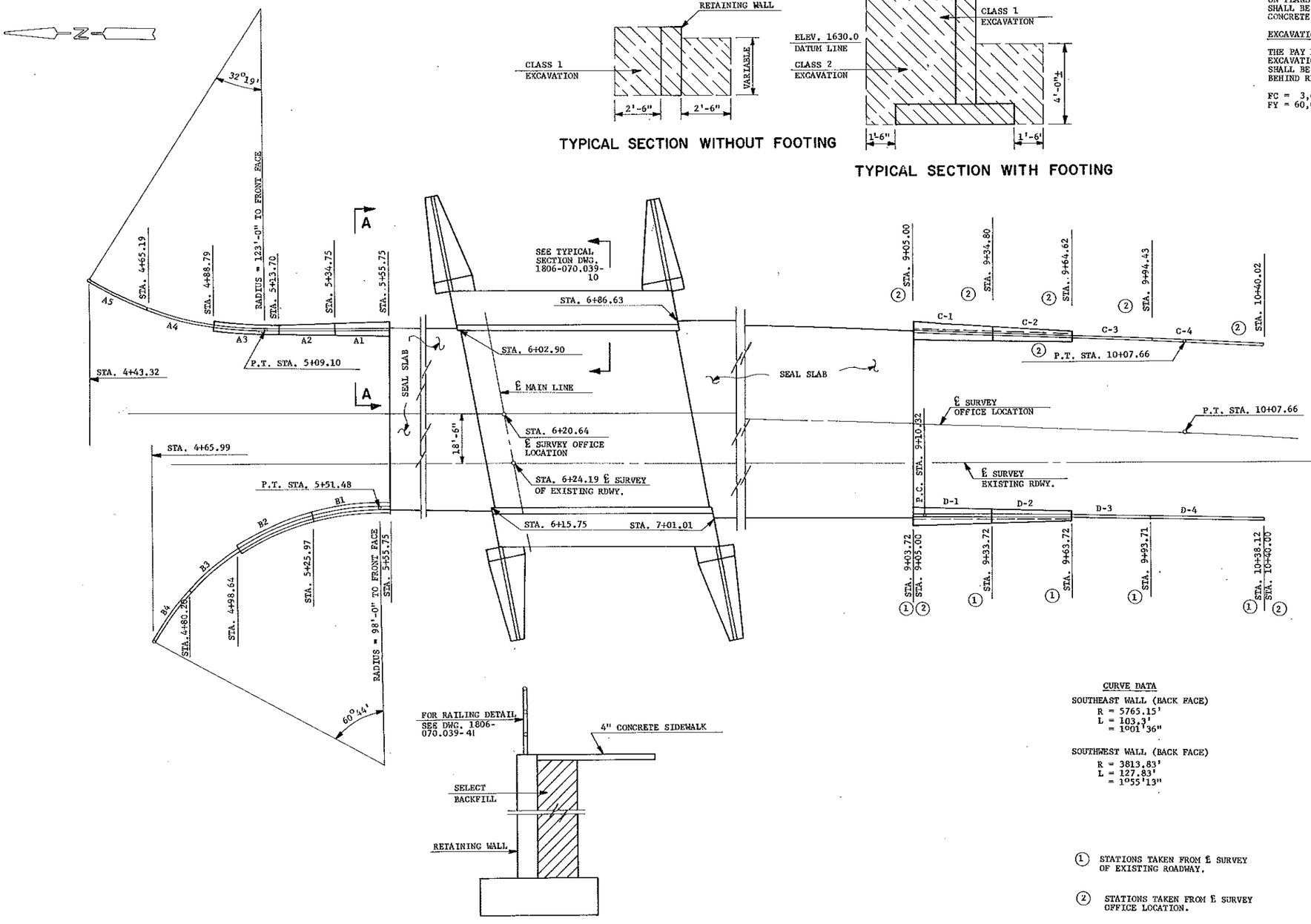
MANDAN, N.D.

SEAL SLAB SECTION

STA. 8+30 - STA. 9+05

1806-070.039-33

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	109



TYPICAL SECTION WITHOUT FOOTING

TYPICAL SECTION WITH FOOTING

A-A

NOTES:

GENERAL

THE COST OF INCIDENTAL ITEMS SUCH AS PREFORMED JOINT FILLER, DAMPPROOFING, DOWEL BARS, END CAPS, ETC. SHOWN ON PLANS, BUT NOT LISTED IN THE ESTIMATE OF QUANTITIES, SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CLASS AE-3 CONCRETE.

EXCAVATION AND BACKFILL

THE PAY LIMITS AND QUANTITIES FOR CLASS 1 AND 2 EXCAVATION ARE SHOWN ON RETAINING WALL PLANS. BACKFILL SHALL BE PLACED ON TOE BEFORE ANY BACKFILL IS PLACED BEHIND RETAINING WALL.

FC = 3,000 PSI
FY = 60,000 PSI

CURVE DATA

SOUTHEAST WALL (BACK FACE)
R = 5765.15'
L = 103.3'
= 1°01'36"

SOUTHWEST WALL (BACK FACE)
R = 3813.83'
L = 127.83'
= 1°55'13"

(1) STATIONS TAKEN FROM ℄ SURVEY OF EXISTING ROADWAY.

(2) STATIONS TAKEN FROM ℄ SURVEY OFFICE LOCATION.

NOTE:

STATIONS FOR NORTH END OF BRIDGE ARE TAKEN FROM FRONT FACE OF RETAINING WALL. STATIONS FOR SOUTH END OF BRIDGE ARE TAKEN FROM BACK FACE OF RETAINING WALL.

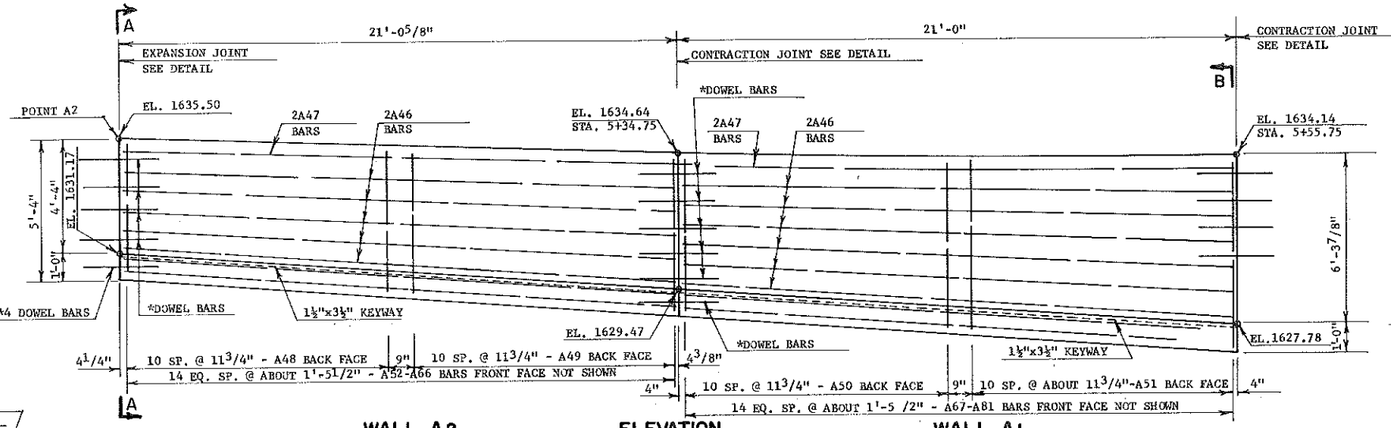
QUANTITIES

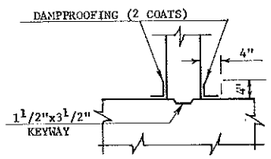
6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

RETAINING WALL LAYOUT

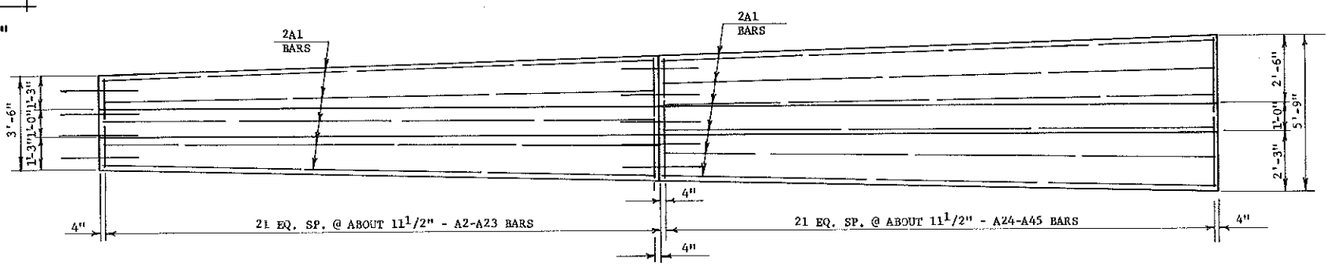
1806-070.039-34

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-805(015)	110

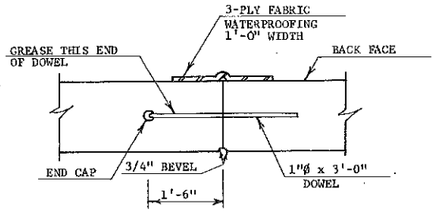




DETAIL "A"



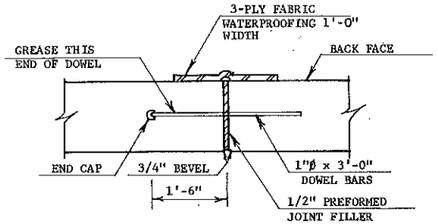
PLAN



TYPICAL CONTRACTION JOINT DETAIL

NOTE:

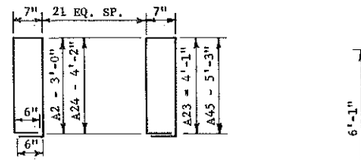
PROVISIONS SHALL BE MADE TO HOLD DOWEL IN A TRUE HORIZONTAL POSITION AND IN A PLANE PARALLEL TO THE FRONT FACE WHILE CONCRETE IS POURED.



TYPICAL EXPANSION JOINT DETAILS

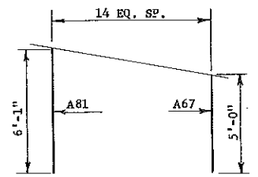
BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
A1	22	5	20'-8"	STR.
A2-A23	1 SET	5	190'-8"	BENT
A24-A45	1 SET	5	242'-0"	BENT
A46	22	5	20'-8"	STR.
A47	4	6	20'-8"	STR.
A48	11	5	5'-7"	BENT
A49	11	5	6'-0"	BENT
A50	11	5	6'-5"	BENT
A51	11	5	7'-1"	BENT
A52-A66	1 SET	4	68'-9"	STR.
A67-A81	1 SET	4	83'-2"	STR.



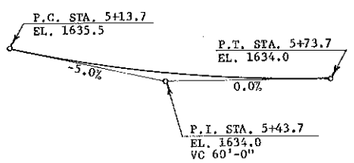
A2-A23 & A24-A45

TOTAL LENGTH OF ONE SET A2-A23 = 190'-8"
TOTAL LENGTH OF ONE SET A24-A45 = 242'-0"

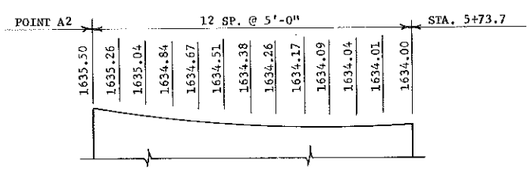


A67-A81

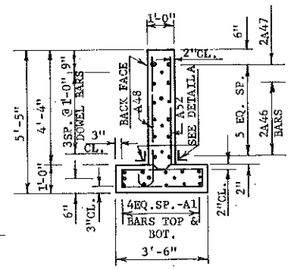
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 83'-2"



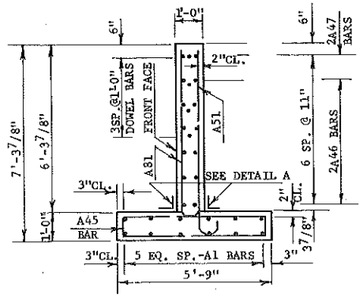
VERTICAL CURVE DATA



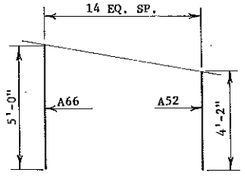
ELEVATIONS TOP OF WALL



A-A

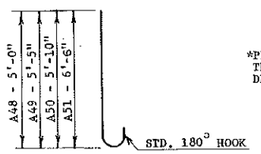


B-B



A52-A-66

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 68'-9"



*PLACE DOWEL BARS IN THE WALL THAT IS POURED FIRST. SEE DETAIL

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

QUANTITIES

CLASS AE-3 CONCRETE	15.4	C.Y.
REINFORCING STEEL	1913	LBS.

6TH AVENUE S.E. UNDERPASS

MANDAN, N.D.

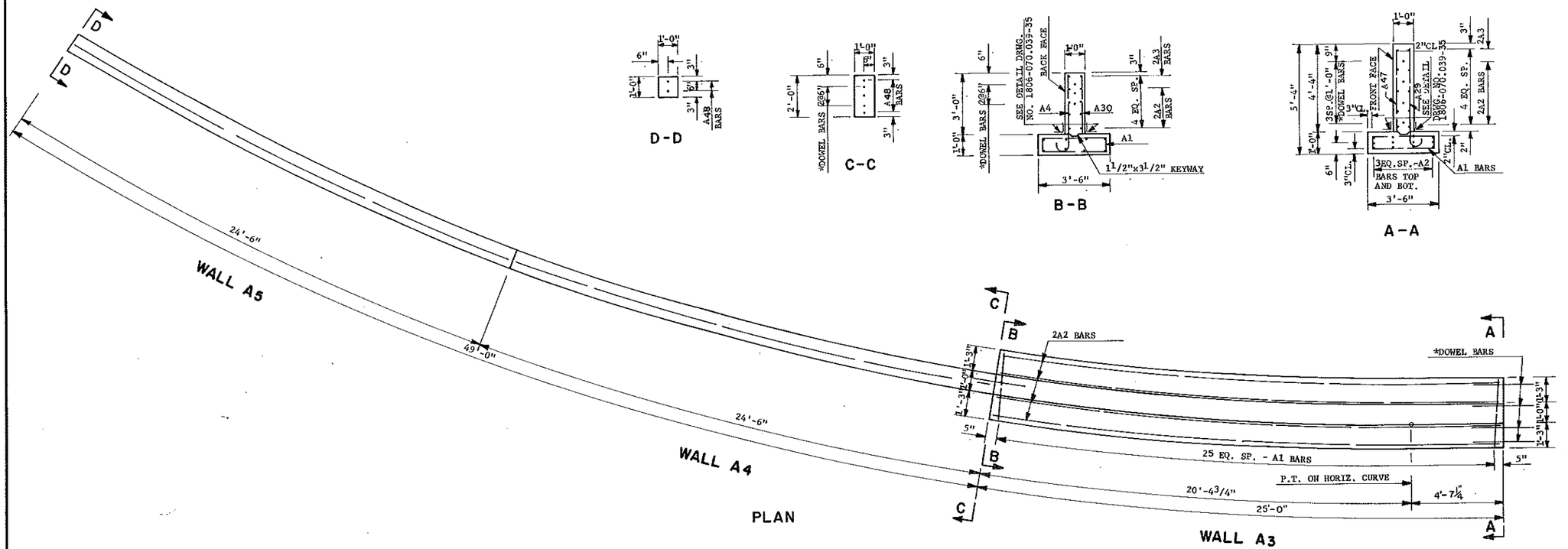
WALL A1 & A2 DETAILS

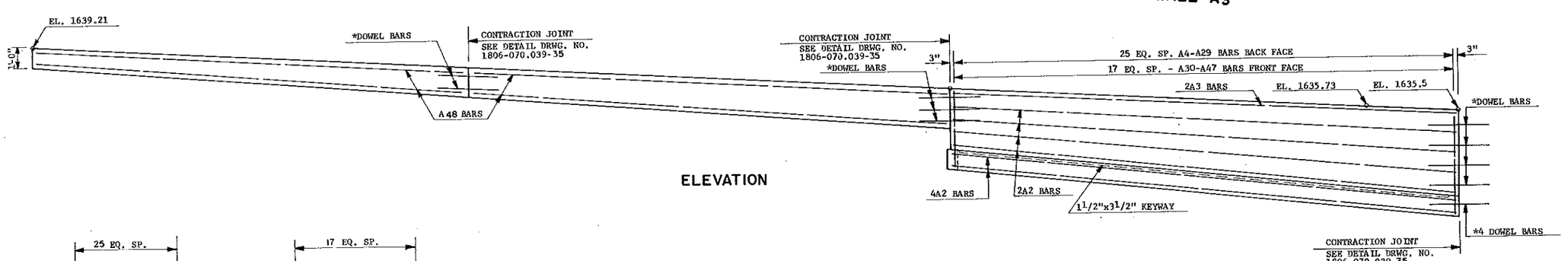
1806-070.039-35

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	111

BAR LIST

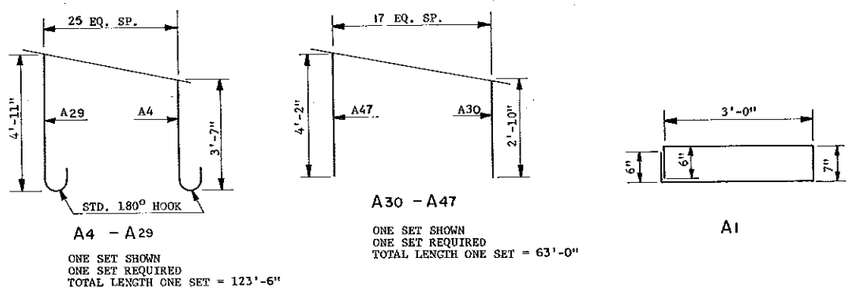
MARK	NO.	SIZE	LENGTH	SHAPE
A1	26	4	7'-7"	BENT
A2	16	4	24'-6"	STR.
A3	2	6	24'-6"	STR.
A4-A29	1 SET	4	123'-6"	BENT
A30-A47	1 SET	4	63'-0"	STR.
A48	4	4	24'-2"	STR.





ELEVATION

*PLACE DOWEL BARS IN THE WALL THAT IS POURED FIRST. SEE DRWG. NO. 1806-070.039-35



A4 - A29

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 123'-6"

A30 - A47

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 63'-0"

A1

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT

QUANTITIES

CLASS AE-3 CONCRETE	9.3	C.Y.
REINFORCING STEEL	656	LBS.

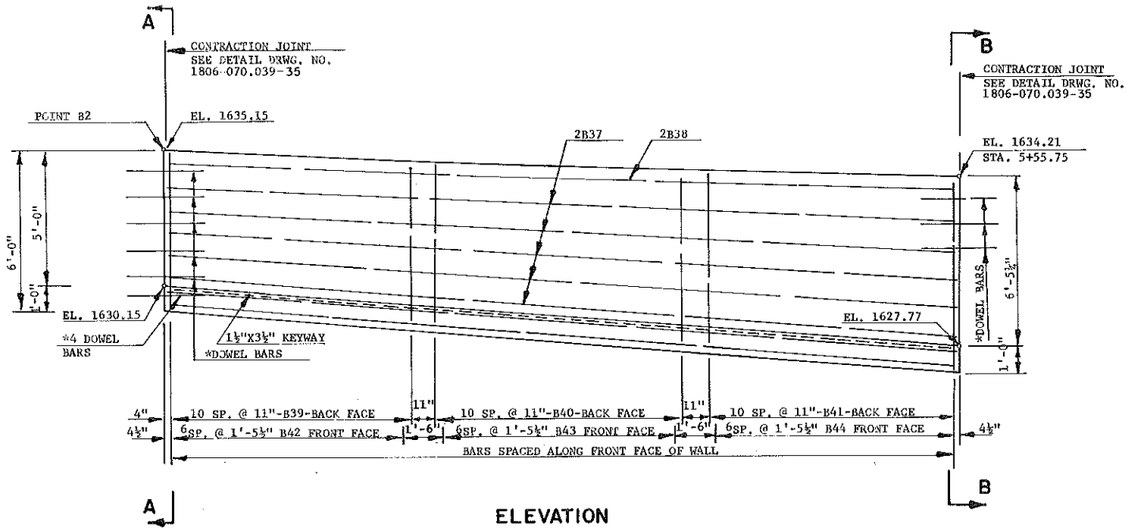
6TH AVENUE S.E. UNDERPASS

MANDAN, N.D.

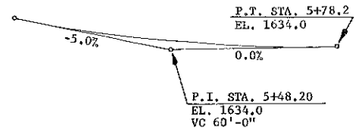
WALL A3, A4 & A5 DETAILS

1806-070.039-36

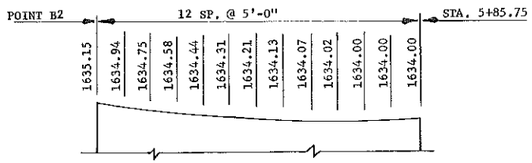
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-I-806(015)	112



ELEVATION



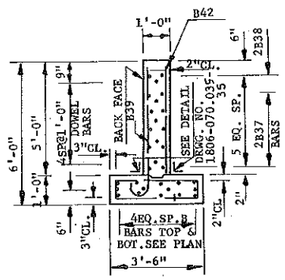
VERTICAL CURVE DATA



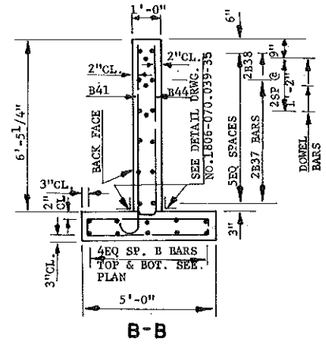
ELEVATIONS TOP OF WALL

BAR LIST				
MARK	NO	SIZE	LENGTH	SHAPE
B1	4	5	29'-3"	STR.
B2	2	5	29'-7"	"
B3	4	5	29'-10"	"
B4-B36	1 SET	5	299'-9"	BENT
B37	10	5	29'-7"	STR.
B38	2	6	29'-7"	"
B39	11	5	6'-2"	BENT
B40	11	5	6'-7"	"
B41	11	5	7'-1"	"
B42	7	4	4'-10"	STR.
B43	7	4	5'-3"	"
B44	7	4	5'-9"	"

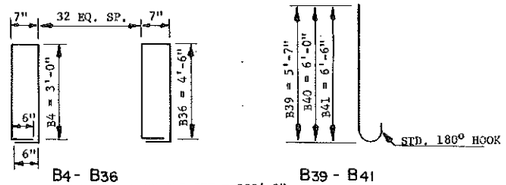
* PLACE DOWEL BARS IN WALL AND FOOTING THAT IS POURED FIRST. SEE DWRG. NO. 1806-070.039-35



A-A



B-B

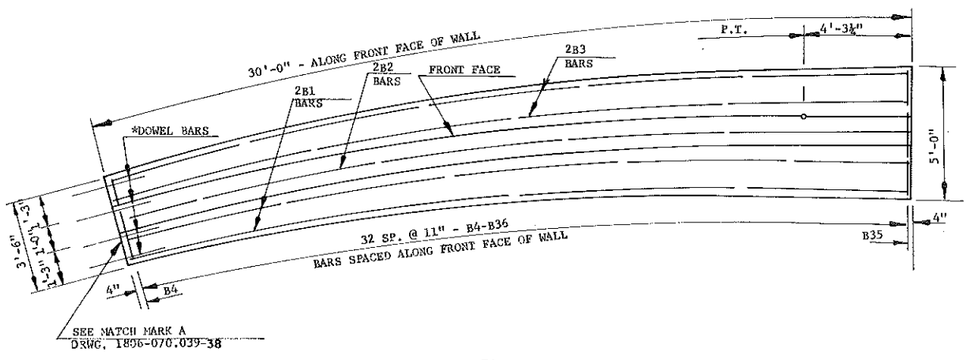


B4- B36 B39 - B41

TOTAL LENGTH OF ONE SET = 299'-9"
ONE SET SHOWN
ONE SET REQUIRED

BENT BAR DETAILS

DIMENSIONS SHOWN ARE OUT TO OUT



PLAN

QUANTITIES		
CLASS AE-3 CONCRETE	11.1	C.Y.
REINFORCING STEEL	1320	LBS.

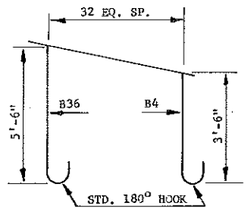
6TH AVENUE S.E. UNDERPASS

MANDAN, N.D.

WALL B1 DETAILS

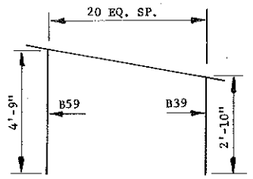
1806-070.039-37

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	113



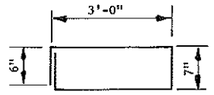
B4 - B36

ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 165'-0"



B39 - B59

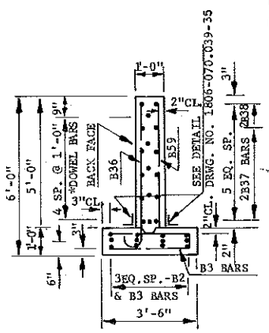
ONE SET SHOWN
ONE SET REQUIRED
TOTAL LENGTH ONE SET = 79'-8"



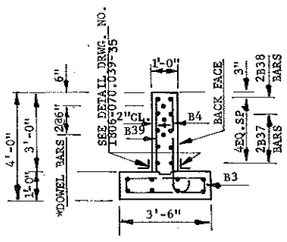
B-3

BENT BAR DETAILS

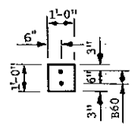
DIMENSIONS SHOWN ARE OUT TO OUT



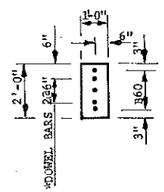
A-A



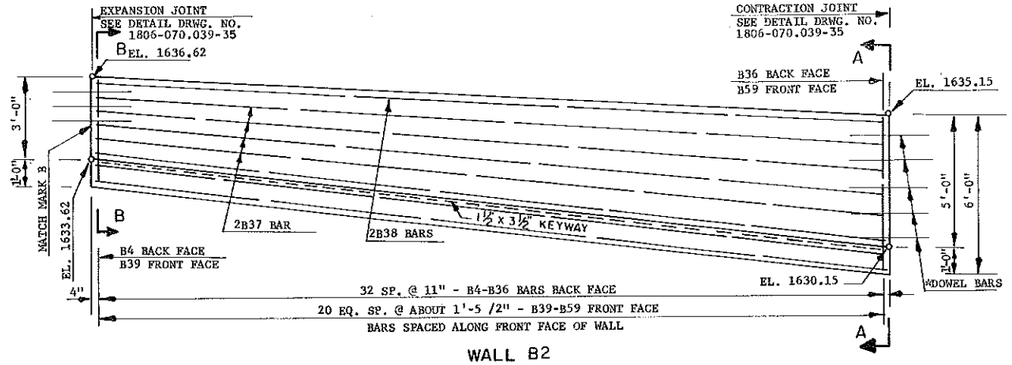
B-B



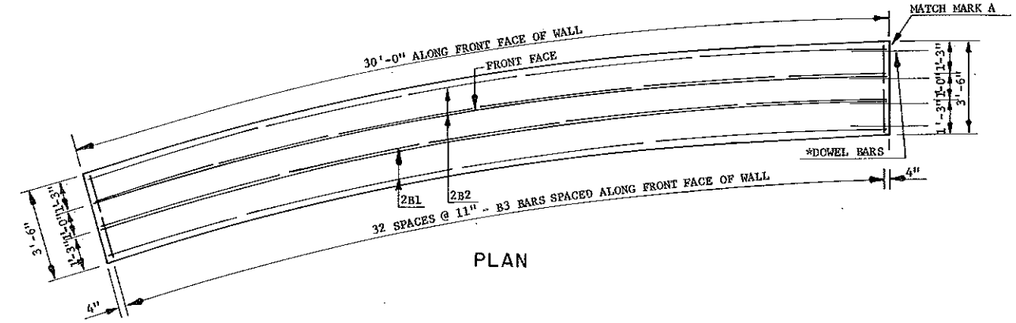
D-D



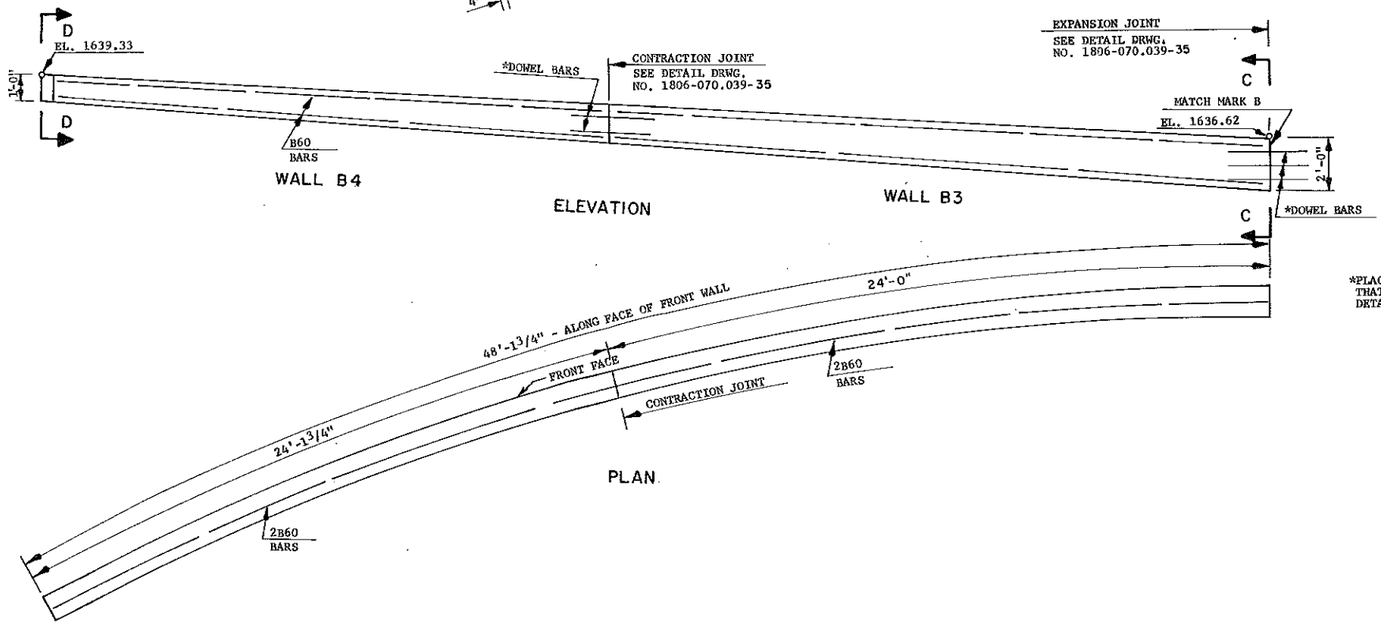
C-C



WALL B2
ELEVATION



PLAN



PLAN

*PLACE DOWEL BARS IN THE WALL THAT IS POURED FIRST. SEE DETAIL DRWG. NO. 1806-070.039-35

BAR LIST				
MARK	NO.	SIZE	LENGTH	SHAPE
B1	4	4	29'-2"	STR.
B2	4	4	29'-9"	STR.
B3	33	4	7'-7"	BENT
B4-B36	1 SET	4	165'-0"	BENT
B37	10	4	29'-9"	STR.
B38	2	6	29'-9"	STR.
B39-B59	1 SET	4	79'-8"	STR.
B60	4	4	23'-9"	STR.

QUANTITIES		
CLASS AE-3 CONCRETE	11.0	C.Y.
REINFORCING STEEL	840	LBS.

6TH AVENUE S.E. UNDERPASS

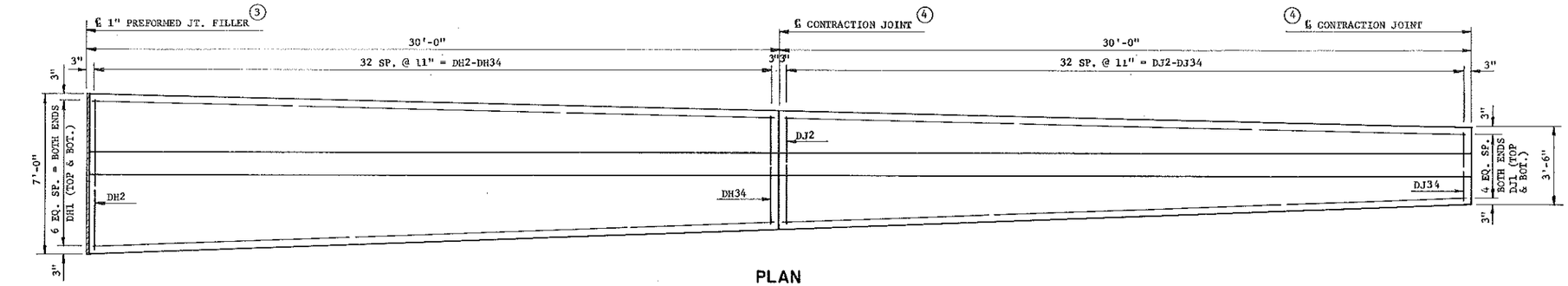
MANDAN, N. D.

WALL B2, B3 & B4

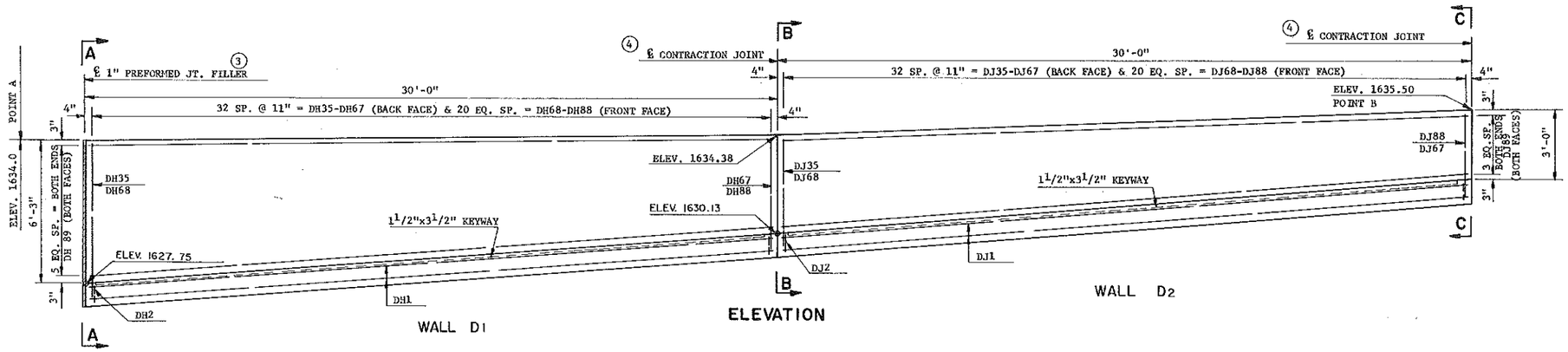
DETAILS

1806-070.039-38

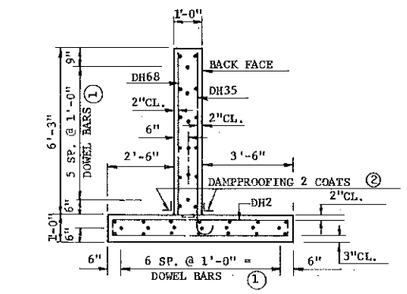
DIV'A REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	114



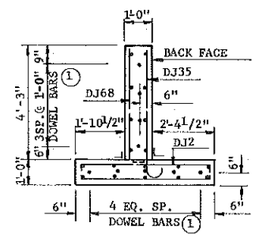
PLAN



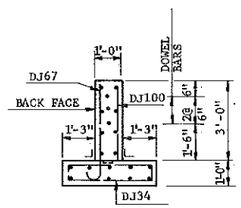
ELEVATION



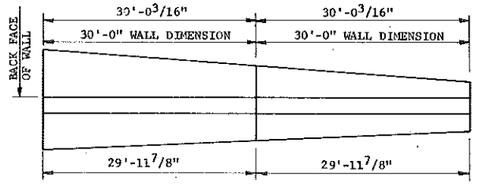
A-A



B-B



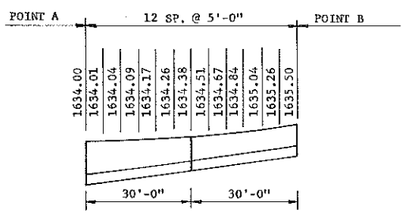
C-C



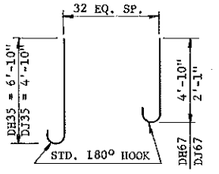
WALL C1 WALL C2

PLAN

WALLS C1, D1 AND C2, D2 ARE SYMMETRICAL EXCEPT AS SHOWN

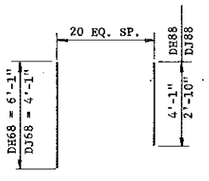


ELEVATIONS TOP OF WALL



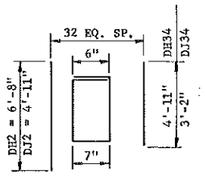
DH35-DH67 & DJ35-DJ67
ONE SET REQUIRED

TOTAL LENGTH ONE SET = DH35-DH67=211'-9"
TOTAL LENGTH ONE SET = DJ35-DJ67 = 130'-8"



DH68-DH88 & DJ68-DJ88
ONE SET REQUIRED

TOTAL LENGTH ONE SET = DH68-DH88 = 106'-9"
TOTAL LENGTH ONE SET = DJ68-DJ88 = 72'-7"



DH2-DH34 & DJ2-DJ34
SETS REQUIRED

TOTAL LENGTH ONE SET = DH2-DH34 = 434'-6"
TOTAL LENGTH ONE SET = DH2-DJ34 = 319'-0"

BAR LIST - WALL C1 or D1

MARK	NO.	SIZE	LENGTH	SHAPE
DH1	14	5	29'-8"	STR.
DH2-DH34	1 SET	5	434'-6"	BENT
DH35-DH67	1 SET	5	211'-9"	BENT
DH68-DH88	1 SET	5	106'-9"	STR.

BAR LIST - WALL C2 or D2

MARK	NO.	SIZE	LENGTH	SHAPE
DJ1	10	5	29'-8"	STR.
DJ2-DJ34	1 SET	5	319'-0"	BENT
DJ35-DJ67	1 SET	4	130'-8"	BENT
DJ68-DJ88	1 SET	4	72'-7"	STR.

① PLACE DOWEL BARS IN SECTION POURED FIRST.

② SEE DETAIL "A" 1806-070.039-35

③ SEE TYPICAL EXPANSION JOINT DETAIL DWG. 1806-070.039-35

④ SEE TYPICAL CONTRACTION JOINT DETAIL DWG. 1806-070.039-35

QUANTITIES (WALL C1 or D1)

CLASS AE-3 CONCRETE	12.6	C.Y.
REINFORCING STEEL	1219	LBS.
EXCAVATION & PILING (SEE QUANTITY LAYOUT)		

QUANTITIES (WALL C2 or D2)

CLASS AE-3 CONCRETE	8.9	C.Y.
REINFORCING STEEL	778	LBS.
EXCAVATION & PILING (SEE QUANTITY LAYOUT)		

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

RETAINING WALL
C1, C2, D1 & D2

1806-070.034-39

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)	115

BAR LIST (WALL D3)

MARK	NO.	SIZE	LENGTH	SHAPE
DK1	2	4	29'-8"	STR.

BAR LIST (WALL C3)

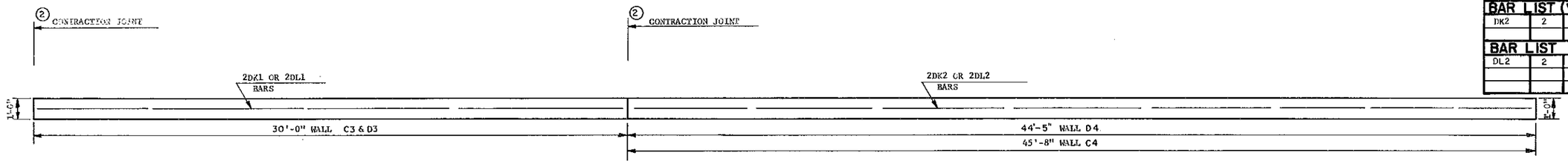
DL1	2	4	29'-8"	STR.

BAR LIST (WALL D4)

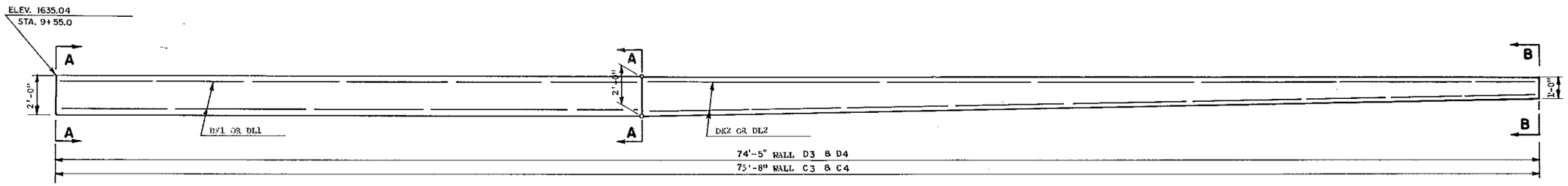
DK2	2	4	44'-1"	STR.

BAR LIST WALL C4)

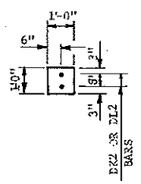
DL2	2	4	45'-4"	STR.



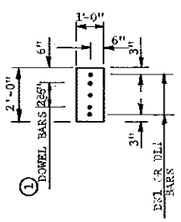
PLAN



ELEVATION



B-B



A-A

(1) PLACE DOWEL BARS IN SECTION PEIRED FIRST

(2) SEE TYPICAL CONTRACTION J. INF DETAIL DRWG. NO. 1806-070.039-35

QUANTITIES (WALL C3 OR D3)

CLASS AE-3 CONCRETE	2.2	C.Y.
REINFORCING STEEL	40	LBS.
EXCAVATION & PILING (SEE QUANTITY LAYOUT)		

QUANTITIES (WALL D4)

CLASS AE-3 CONCRETE	2.5	C.Y.
REINFORCING STEEL	57	LBS.
EXCAVATION & PILING (SEE QUANTITY LAYOUT)		

QUANTITIES (WALL C4)

CLASS AE-3 CONCRETE	2.5	C.Y.
REINFORCING STEEL	61	LBS.
EXCAVATION & PILING (SEE QUANTITY LAYOUT)		

6TH AVENUE S.E. UNDERPASS

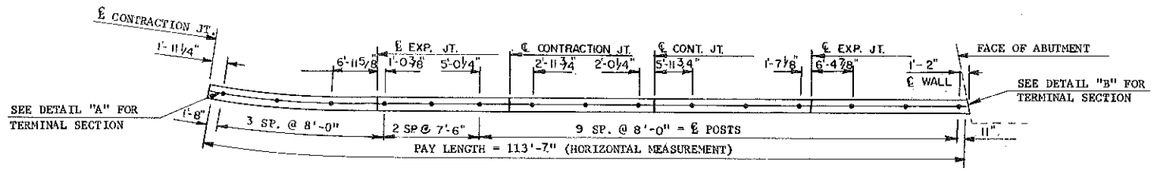
MANDAN, N.D.

RETAINING WALL

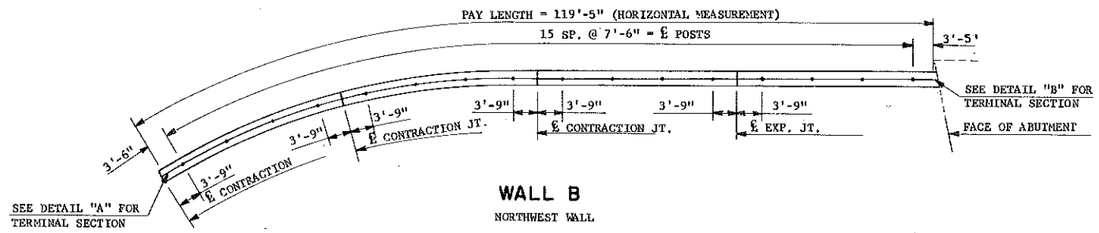
C3, C4, D3, & D4

1806-070.039-40

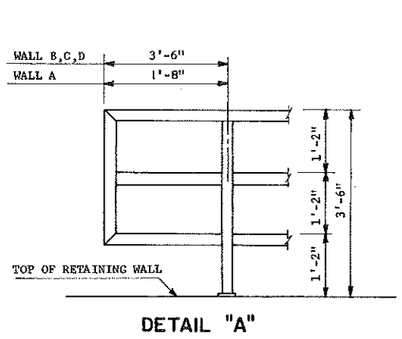
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)	116



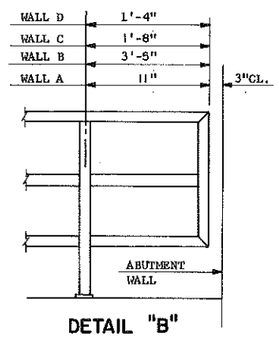
WALL A
NORTHEAST WALL



WALL B
NORTHWEST WALL



DETAIL "A"



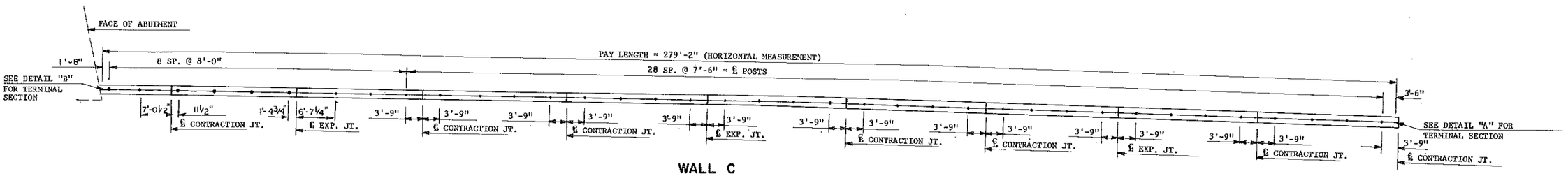
DETAIL "B"

NOTES:

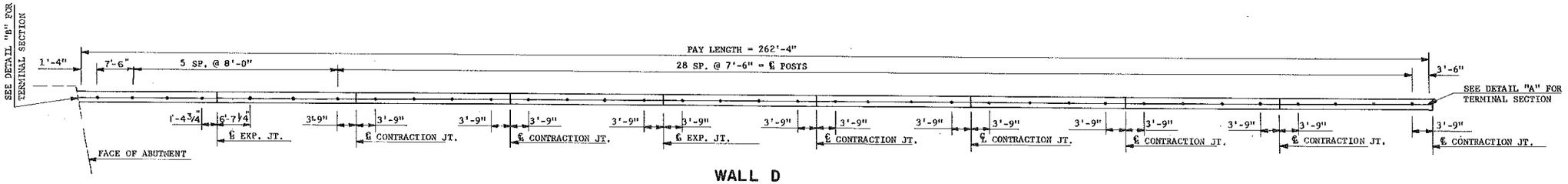
SEE DWG. 1806-070.039-19 FOR ANCHORAGE, WELDING AND FABRICATION DETAILS.

JOINTS IN THE RAILING SHALL BE LOCATED IN EACH SPAN WHERE A CONSTRUCTION JOINT OR AN EXPANSION JOINT OCCURS IN THE RETAINING WALLS. ADDITIONAL JOINTS MAY ALSO BE PROVIDED AT THE OPTION OF THE CONTRACTOR. SEE DETAILS A & B, DWG. 1806-070.039-19 FOR FABRICATION OF DEFLECTION OF JOINTS.

HANDRAIL NOTES FOR SUPERSTRUCTURE RAILING ON DWG. 1806-070.039-19 SHALL APPLY.



WALL C
SOUTHEAST WALL



WALL D
SOUTHWEST WALL

QUANTITIES

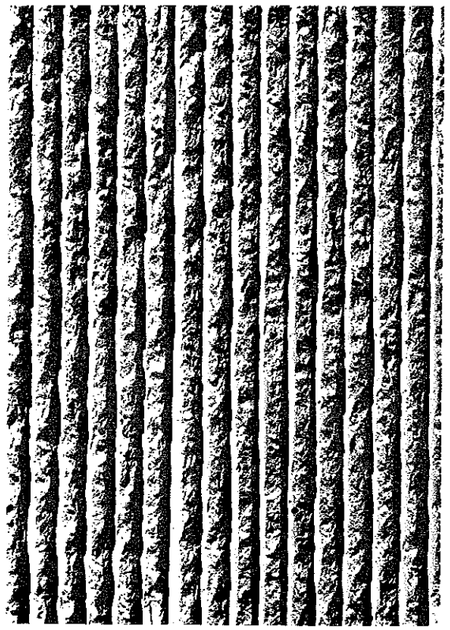
PEDESTRIAN RAIL (2" SQUARE x 1/4)	775	L.F.

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

PEDESTRIAN RAILING

1806-070.039-41

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	FG-1-806(15)	117



fractured fin

SPECIAL SURFACE TREATMENT
(ROADWAY FACE ONLY)

SPECIAL SURFACE TREATMENT:

THIS TREATMENT SHALL CONSIST OF INSTALLING FORM LINERS ON THE EXPOSED ROADWAY FACE OF THE RETAINING WALLS LISTED BELOW. THE LINERS USED SHALL BE INSTALLED TO OBTAIN A VERTICAL ACCENT. THE MATERIAL IN THE LINER SHALL BE DURABLE ENOUGH TO BE USED OVER ABOUT 20 TIMES. THE CONTRACTOR SHALL PROVIDE A SUFFICIENT QUANTITY OF LINERS TO COMPLETE A FOUR. THE LARGEST SINGLE FOUR IS ABOUT 400 S.F. OF EXPOSED SURFACE AREA. STANDARD MANUFACTURED LENGTHS OF FORM LINER MAY BE USED.

IF THE THICKNESS OF THE FORM LINER IS GREATER THAN 3/4" THE CONCRETE RETAINING WALL THICKNESS WILL HAVE TO BE ADJUSTED TO MAINTAIN MIN. OF 1 1/4" CLEARANCE TO REINFORCING STEEL ON FRONT FACE.

WHERE FORM LINERS ARE USED THE CONTRACTOR WILL NOT BE REQUIRED TO USE ADDITIONAL FINISHING EXCEPT FOR LARGE HONEYCOMB AREAS.

THE LINERS SHOWN ARE SIMILAR TO DESIGNS MANUFACTURED BY THE FOLLOWING SUPPLIERS:

BURKE CONCRETE ACCESSORIES INC.
2655 CAMPUS DRIVE, P.O. BOX 5818
SAN MATEO, CA. 94402 TEL. (415) 349-7600

GREEN STREAK PLASTIC PRODUCTS
BOX 7139, ST. LOUIS, MISSOURI 63177
TEL. (314) 225-9400

SCOTT SYSTEM, INC.
4575 IOLICT STREET, DENVER, COLORADO 80239
TEL. (303) 371-9583

THE COST OF SPECIAL SURFACE TREATMENT LINERS SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AE-3 CONCRETE.

TREATMENT SHALL BE GIVEN TO THE WALLS LISTED BELOW:

WALL A	SEGMENTS 1, 2 AND 3
WALL B	SEGMENTS 1 AND 2
WALL C	SEGMENTS 1 AND 2
WALL D	SEGMENTS 1 AND 2

SEAL SLAB RETAINING WALLS

6TH AVENUE S.E. UNDERPASS
MANDAN, N.D.

SPECIAL SURFACE TREATMENT

NOTES (ELECTRICAL)

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.

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:

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

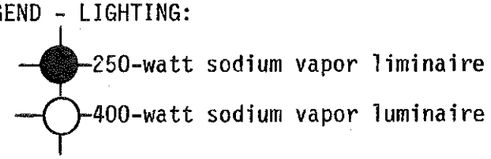
770 024 LIGHT STANDARDS: The light standards shall be of the davit type and designed for 6', 10', or 12' mast arms and shall be galvanized. The base shall be of the anchor type. Mounting heights shall be as noted in the plans.

770 034 SODIUM VAPOR LUMINAIRE (MOUNTED ON EXISTING STANDARDS): The item sodium vapor luminaire shall consist of installing the new high-pressure sodium vapor luminaire on the existing light standard at Sta. 68+22-36' Lt. The existing light standard shall remain in place. The contractor shall make the necessary connections between the new high-pressure sodium vapor luminaire and the existing light standard conductor.

The item sodium vapor luminaire will be measured by the number installed. The quantities measured will be paid for at the contract price qnd shall be full compensation for all labor, equipment, and materials necessary to complete the installation.

770 043 REMOVE STREET LIGHT LUMINAIRE: The item remove street light 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 existing light standards shall remain in place. The removed luminaires shall be the property of the city and shall be delivered to the city shop at 6th Avenue, S.W. 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.

770 750 LEGEND - LIGHTING:



NOTES (ELECTRICAL)

770 300 PAINT: This work shall consist of furnishing all paints and materials; properly preparing surfaces to be painted; applying, protecting, and drying paint coatings; and protecting all traffic, adjacent property, and the work itself against splatters or other damage due to painting operations.

Materials shall conform to the following: Standard Specifications

Item	Section
Shop Coat and Spot Coat:	852.01 A, 852.01 P
Field Coats: Black	852.01 B
White	852.01 C Type 1 - Class A
Aluminum	852.01 D
Tinted	852.01 C Type 1 - Class B
Enamel	852.01 Q

Paint shall be applied only when the air temperature is at or above 45°F. and below 100°F. It shall not be applied when the air is misty, dusty, or otherwise unsatisfactory for work. Material painted under cover in damp or cold weather shall remain under cover until dry or until weather conditions permit its exposure.

All surfaces shall be prepared by sandblasting. Existing paint remaining along the edges of blast cleaned areas shall be feathered and cleaned to assure a bond on new to old paint.

Paint shall be applied during daylight hours by brushing or spraying. After application, the paint film shall be smooth and uniform without skips or areas of excessive paint. When spraying results in unsatisfactory surfaces, the engineer shall have the authority to require brushing. The previously applied coat of paint shall have dried before the next coat is applied.

For spray application only, airless spray painting equipment shall be used. Paint shall be continually agitated during the spraying operation. The equipment shall apply the paint in a fine, even spray. The operator shall be capable of manipulating the spray so the paint will have a uniform thickness when dry. If necessary, the paint shall be immediately brushed out to secure uniform coverage and eliminate runs, wrinkling, blistering, and air holes. If adequate coverage cannot be obtained at rivets, bolt heads, nuts, corners, and edges, the engineer will require hand brushing before spraying. Protective shields shall be provided so that drift is not noticeable on adjacent property. The engineer shall have authority to suspend spray painting whenever it becomes apparent that the application or drift is not being properly controlled.

The contractor shall protect all adjacent property against disfigurements by spatters of paint or paint materials. The contractor, at his own expense, shall take precautions to prevent dust and dirt from coming in contact with the freshly painted surfaces.

All bare metal surfaces shall receive one spot coat of red lead paint. All surfaces with intact and adhering prime paint shall receive one coat of red lead paint. All steel surfaces shall receive two finish coats.

The first coat shall be red lead and the finish coats shall be specified on the plans. The first finish coat shall be tinted to distinguish it from the final finish coat.

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

770 925 REMOVE LIGHT STANDARD: The removed light standards shall become the property of the city and shall be delivered to the city shop at 6th Avenue, S.W.

770 P10 RELOCATE LIGHT STANDARD: The relocated light standards on 1st Street, S.E. shall have 4 anchor bolts (high strength, 12" minimum galvanized, 1¼" x 36" x 4"), flat washers, and hex nuts provided by the contractor. The bolt circle shall be determined in the field.

NOTES (ELECTRICAL)

772 008 EXISTING PLANS: As-built plans of existing traffic signal system (Project No. F-1-094(02)915) are available for inspection at the North Dakota State Highway Department, Bismarck district office.

772 100 PAINT: The traffic signal system components shall be painted in accordance with the following:

Transformer base - traffic signal green
Mast arm - traffic signal green
Signal head mounting hardware - yellow
Shaft - traffic signal green
Signal housing - yellow
Pedestrian pushbutton post - traffic signal green
Controller cabinet - traffic signal green

772 200 ADDITIONAL CONDUIT: The contractor shall install two additional 2" diameter conduit in the controller foundation at Station 62+97 - 95' Rt. for future interconnection to the east and west. This conduit shall be capped. Not a separate pay item, cost to be included in the price bid for "Concrete Foundation - Traffic Signals.

772 320 COORDINATION EQUIPMENT: The signals at Main St. and 6th Ave. shall not have the coordination equipment installed at this time, but provisions shall be made so that the equipment may be installed with simple switching and plug-in unit. All equipment and material required for this feature that is included in the controller cabinet shall be included in the price bid for the controller. This controller shall be a local controller when future coordination equipment is installed. The coordinated street shall be Main Street.

772 P10 REMOVE COMBINATION SIGNAL AND LIGHT STANDARD: The item, "Remove Combination Signal and Light Standard," shall consist of removing the existing signal standard, luminaire, and light standard extension from its present location.

The existing foundation shall be removed. If, in the opinion of the engineer, that it will not interfere with other construction, it be cut off and buried on foot below the ground line and surface restored to match surrounding area.

The combination signal standard shall then be loaded, hauled to, and stored at the Bismarck District storage yard.

The removed signal standard, light extension, and luminaire, shall be the property of the state.

The item, "Remove Combination Signal and Light Standard," will be measured by the number removed. The quantities measured will be paid for at the contract unit price and shall be full compensation for all labor, equipment, and materials necessary to complete the removal and storage.

772 P20 REMOVE LIGHT STANDARD EXTENSION: The item, "Remove Light Standard Extension," shall consist of removing the extension from their present locations.

The Contractor shall arrange with the local utility company to have the light circuits disconnected from the source of live power.

The conductor leading from the traffic signal base to the luminaire shall be disconnected at the base and the luminaire be removed.

The Contractor shall furnish and install an eleven-gauge pole cap with bolts and nuts.

The existing signal standard shall be relocated.

The removed light standard extension shall be loaded, hauled, and stored at the Bismarck District storage yard. The Contractor shall be responsible for any damage to the extension and luminaire and shall replace at his own expense any damaged extension and luminaire. The removed extension shall be the property of the state. The item, "Remove Light Standard Extension," will be measured by the number of light standard extensions removed. 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 removal and storage.

NOTES (ELECTRICAL)

772 P30 RELOCATE PEDESTRIAN SIGNAL HEAD: The item "Relocate Pedestrian Signal Head" shall consist of removing the pedestrian signal head from its present location and reinstalling said pedestrian signal head at a new location designated on the plans.

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

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

The contractor shall provide new mounting hardware.

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

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

772 P40 RELOCATE TRAFFIC SIGNAL HEAD: (Post Mounted, Mast Arm Mounted, or Programmed): The item "Relocate Traffic Signal Head" shall consist of removing the traffic signal head from its present location and reinstalling said traffic signal head at a new location designated on the plans.

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

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

The contractor shall provide new mounting hardware and louvered backplates.

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

The existing programmed signal head to be relocated shall be reprogrammed by the contractor and the yellow lens revised by installing a left arrow.

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

772 P50 RELOCATE SIGNAL STANDARD: The item "Relocate Signal Standard" shall consist of removing the standard from the existing location and installing the standard at the location designated on the plans.

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

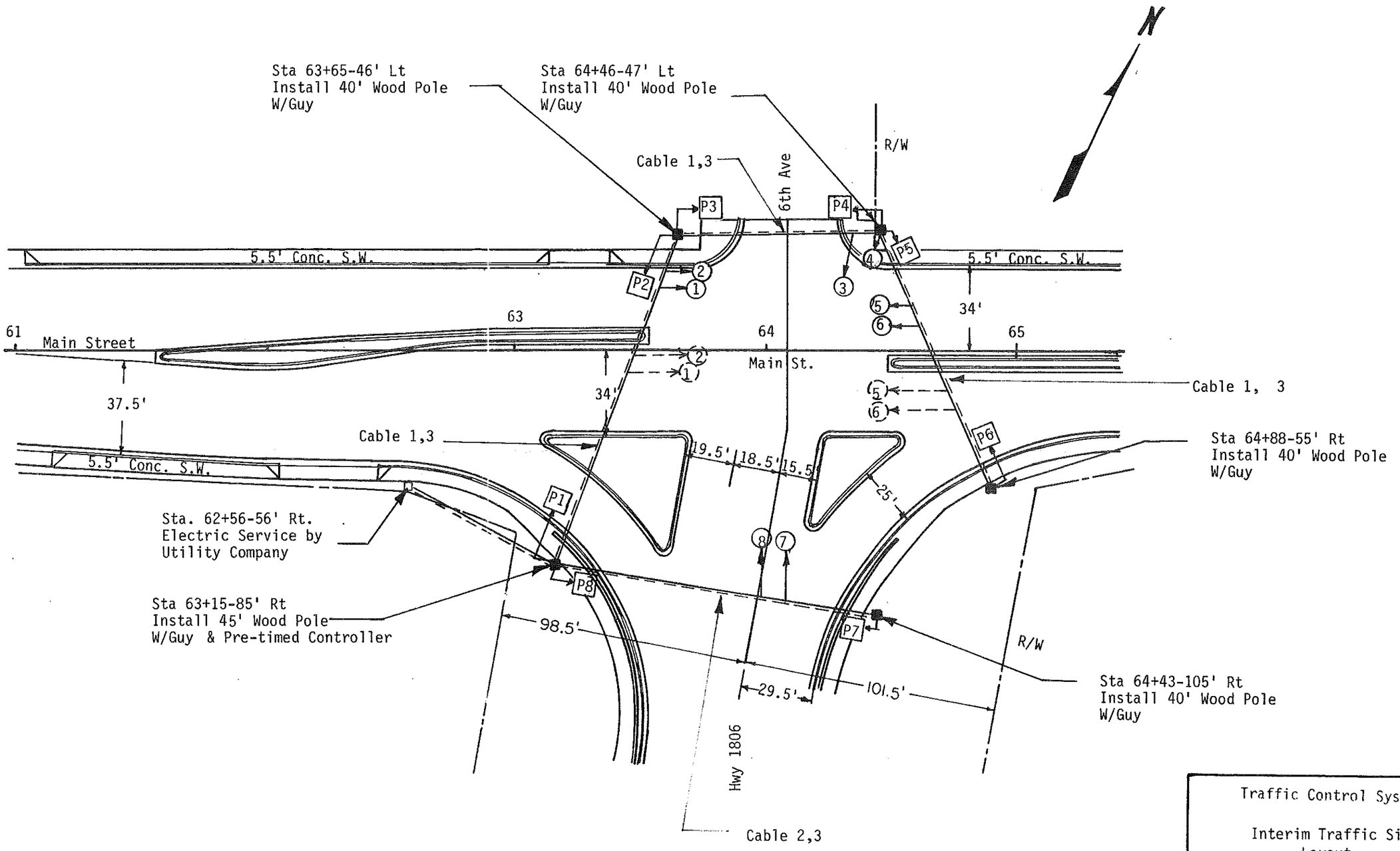
The standard shall be plumbed using shims or leveling nuts. Anchor bolts shall be securely tightened. Properly installed anchor bolts shall have a minimum of two threads exposed above the nuts. Mast arms shall be perpendicular to the centerline of the roadway they are for. The existing foundations shall be removed. If, in the opinion of the engineer, they will not interfere with other construction, they shall be cut off and buried one foot below the ground line and the surface restored to match the surrounding area. The contractor shall be responsible for any damage to the standard, mast arms, signal heads, luminaires, and fuses and shall replace any damaged equipment at no cost to the state. The standards shall be repainted according to Section 772.03 Q.

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

772 P60 REMOVE INTERIM TRAFFIC SIGNAL SYSTEM: The contractor shall remove the interim traffic signal system. All state furnished materials shall be removed and returned to the state as directed by the engineer. 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 interim traffic signals at Main Street and Highway 1806 shall be maintained by the city of Mandan. The power cost shall be the responsibility of the contractor.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	122

INSTALL INTERIM TRAFFIC SIGNAL SYSTEM 1 EA



Traffic Control System

Interim Traffic Signal
Layout
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	123

CONDUCTORS		CABLE 1 (12-10)		CABLE 2 (12-7)		CABLE 3 (12-7)		CABLE 4		CABLE 5	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1 Black			Spare		Spare	P1,P2,P5,P6	Don't Walk				
2 White			Neutral		Neutral		Neutral		Neutral		Neutral
3 Red		1,2,5,6	Red	7,8	Red	P3,P4,P7,P8	Don't Walk				
4 Green			Ground		Ground		Ground		Ground		Ground
5 Orange		1,2,5,6	Yellow	7,8	Yellow	P1,P2,P5,P6	Walk				
6 Blue		1,2,5,6	Green	7,8	Green	P3,P4,P7,P8	Walk				
7 White	Black		Spare		Spare		Spare				
8 Red	Black	3,4	Red								
9 Green	Black	3,4	Green								
10 Orange	Black	3,4	Yellow								

9" Head

9" Head

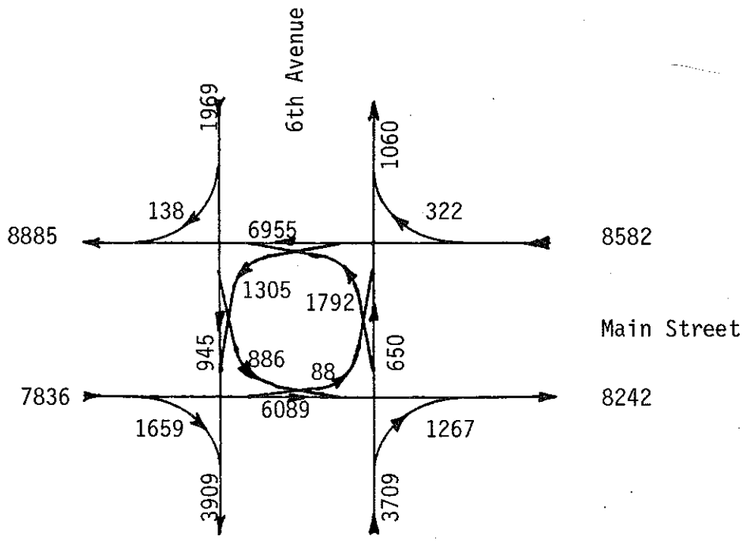
Head No.
P1 - P8

12" Head W/12" Lens

12" Head W/ 12" Lens

12" Head W/12" Lens

Head No. 1-8

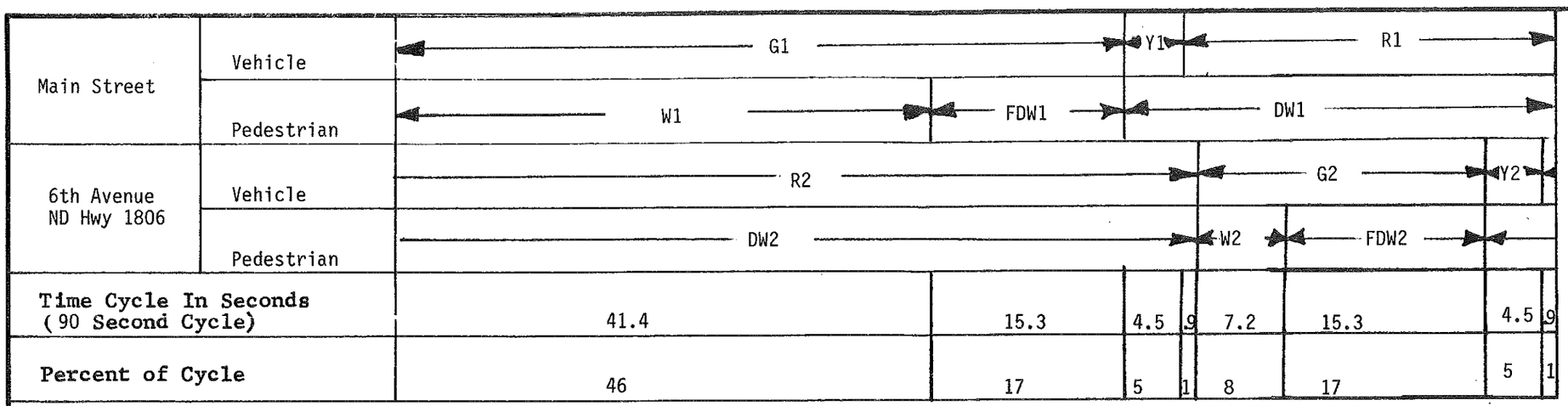


ESTIMATED 1987 ADT

TRAFFIC CONTROL SYSTEM

Interim Traffic Signal System
6th Avenue and Main Street
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	124



ALL DIALS

CAM BREAKOUT CHART

INTERVAL	CAM POSITION	CAMS																				DIAL SETTINGS		
		DL	DT	G1	Y1	R1	G2	Y2	R2	W1	DW1	DW2	DW2							FDW 1	FDW 2	Sec.	%	Setting
I	1	X	X	X					X	X			X									41.1	46	46
II	2			X					X				X							X		15.3	17	63 *
III	3	X			X				X		X		X									4.5	5	68
IV	4	X				X			X		X		X									.9	1	69
V	5	X				X	X				X	X										7.2	8	77
VI	6	X				X	X				X										X	15.3	17	94
VII	7	X				X		X			X		X									4.5	5	99
VIII	8	X				X			X		X		X									.9	1	0
I	9	X	X	X					X	X			X									41.4	46	46
II	10			X					X				X									15.3	17	63 *
III	11	X			X				X		X		X									4.5	5	68
IV	12	X				X			X		X		X									.9	1	69
V	13	X				X	X				X	X										7.2	8	77
VI	14	X				X	X				X											15.3	17	94
VII	15	X				X		X			X		X									4.5	5	99
VIVI	16	X				X			X		X		X									.9	1	0

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 - 11:00am to 4:00pm
Dial 3 - 4:00pm to 1:00am

During low volume hours such as 1:00 am to 6:00am, the signals shall be turned to flashing yellow and flashing red as shown below:

FLASHING YELLOW	FLASHING RED
Main Street	6th Avenue ND Hwy. 1806

TRAFFIC CONTROL SYSTEM

INTERIM SIGNAL
CONTROLLER SETTINGS

Mandan, ND

STATION	CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE RUNS Length	CABLE RUNS Type
Sta. 64+88-55' Rt.	18'	2½"	34'	Cable 3
Sta. 64+88-55' Rt. Sta. 64+46-47' Lt.			114' 114' 99' 117'	Span Wire Stability Wire Cable 1 Cable 3
Sta. 64+46-47' Lt.	18'	2½"	48' 42'	Cable 1 Cable 3
Sta. 64+46-47' Lt to Sta. 63+65-46' Lt.			85' 85' 88' 100'	Span Wire Stability Wire Cable 3 Cable 1
Sta. 63+65-46' Lt.	18'	2½"	48' 42'	Cable 1 Cable 3
Sta. 63+65'-46' Lt to Sta. 63+15-85' Rt.			144' 144' 162' 150'	Span Wire Stability Wire Cable 1 Cable 3
Sta. 63+15-85' Rt.	18' 18'	2½" 1"	28' 28' 28' 56' 28'	Cable 1 Cable 2 Cable 3 (2) No. 6 RHW (1) No. 6 THW
Sta. 63+15-85' Rt. Sta. 64+43-105' Rt.			134' 134' 100' 140'	Span Wire Stability Wire Cable 2 Cable 3
Sta. 64+43-105' Rt.	18'	2½"	34'	Cable 3
Sta. 63+15-85' Rt. to Sta. 62+56-56' Rt.	16'	2"	170' 85'	(2) No. 6 RHW (1) No. 6 THW

SUMMARY OF QUANTITIES

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	125

	1" Dia. Rigid Conduit	2½" Dia. Rigid Conduit	3/8" Dia. Span Wire	3/8" Dia. Stability Wire	No.12 AWG, 10 Conductor	No.12 AWG, 7 Conductor	40' Wood Poles W/Guys	150 Watt Signal Lamps	116 Watt Signal Lamps	1 Way, 3-section Head W/12" Lenses, Span Wire Mtd.	1 Way 3-section Head, W/12" Lenses, Post. Mtd.	1 Way 2-section Ped Head W/9" Lenses, Post Mtd.	Cable Hangers	Post Mounting Hardware	Span Wire Head Mounting Hardware	Feed Point - Pole Mtd.	Pretimed Controller Post Mtd.	2" Dia. Rigid Conduit	45' Wood Poles W/Guys	Underground Conductor No. 6 Type RHW	Underground Conductor No. 6 Type THW
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LS	LS	LS	EA	EA	LF	EA	LF	LF
	18	90	477	477	485	803	4	8	16	7	1	8	1	1	1	1	1	16	1	170	85
										(B)	(B)	(B)					(B)				
Total	18	90	477	477	485	803	4	8	16	7	1	8	1	1	1	1	1	16	1	226	113

(A) These items shall not be bid separately but shall be included in the price bid for "Interim Traffic Signals."

(B) Items to be furnished by the state and installed by the contractor.

(C) Contractor shall install and furnish all mounting hardware necessary to install vehicular and pedestrian heads.

TRAFFIC CONTROL SYSTEM

ND 1806 (6th Ave.)
and Main Street
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	126

Remove Controller

Sta. 63+34-58'Rt. 1 EA.

Install Pedestrian Push Button Post

63+70-38.5' Lt. 1 EA.

INSTALL PEDESTRIAN PUSH BUTTON & SIGN

Sta.	Facing	
63+10-80'Rt.	North West	1 EA.
63+59.5-43'Rt.	(1) South (1) North West	2 EA.
63+70-38.5'Lt.	East	1 EA.
63+80-51'Lt.	South	1 EA.
64+34-39.5'Rt.	(1) South (1) West	2 EA.
64+38-54'Lt.	(1) South (1) West	2 EA.
64+58-80'Rt.	North East	1 EA.

Sta. 63+80-51'Lt.
Pedestrian Pushbutton Post

Sta. 63+70-38.5'Lt.
Relocate Signal Standard 30' Mast Arm.

63+63-37'Lt.

Sta. 64+28-56'Lt.
Remove Combo. 16' M.A. Signal Std.

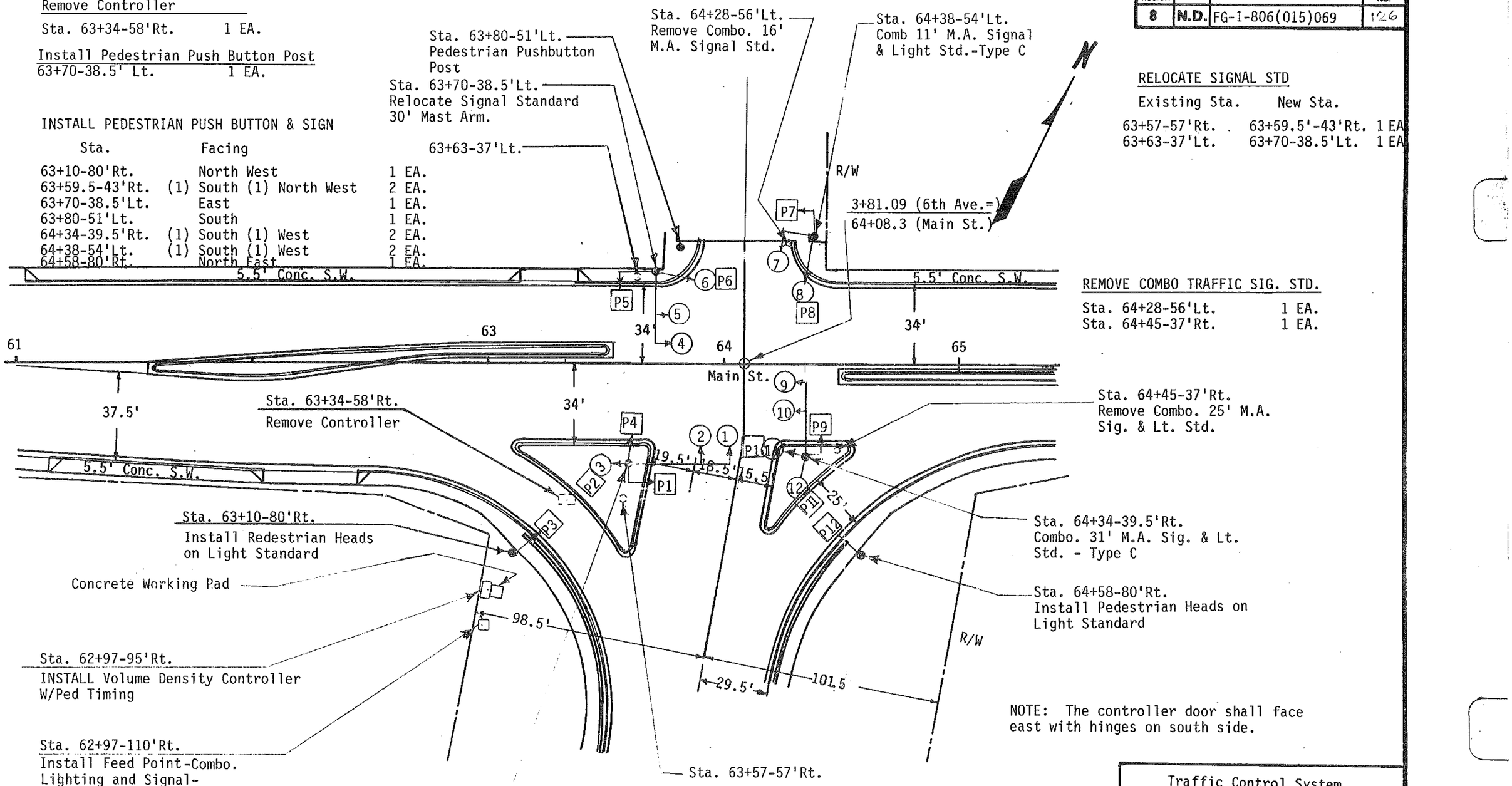
Sta. 64+38-54'Lt.
Comb 11' M.A. Signal & Light Std.-Type C

RELOCATE SIGNAL STD

Existing Sta.	New Sta.	
63+57-57'Rt.	63+59.5'-43'Rt.	1 EA
63+63-37'Lt.	63+70-38.5'Lt.	1 EA

REMOVE COMBO TRAFFIC SIG. STD.

Sta. 64+28-56'Lt. 1 EA.
Sta. 64+45-37'Rt. 1 EA.



Sta. 63+34-58'Rt.
Remove Controller

Sta. 64+45-37'Rt.
Remove Combo. 25' M.A. Sig. & Lt. Std.

Sta. 64+34-39.5'Rt.
Combo. 31' M.A. Sig. & Lt. Std. - Type C

Sta. 64+58-80'Rt.
Install Pedestrian Heads on Light Standard

Sta. 63+10-80'Rt.
Install Redestrian Heads on Light Standard

Concrete Working Pad

Sta. 62+97-95'Rt.
INSTALL Volume Density Controller W/Ped Timing

Sta. 62+97-110'Rt.
Install Feed Point-Combo. Lighting and Signal-Pad Mounted

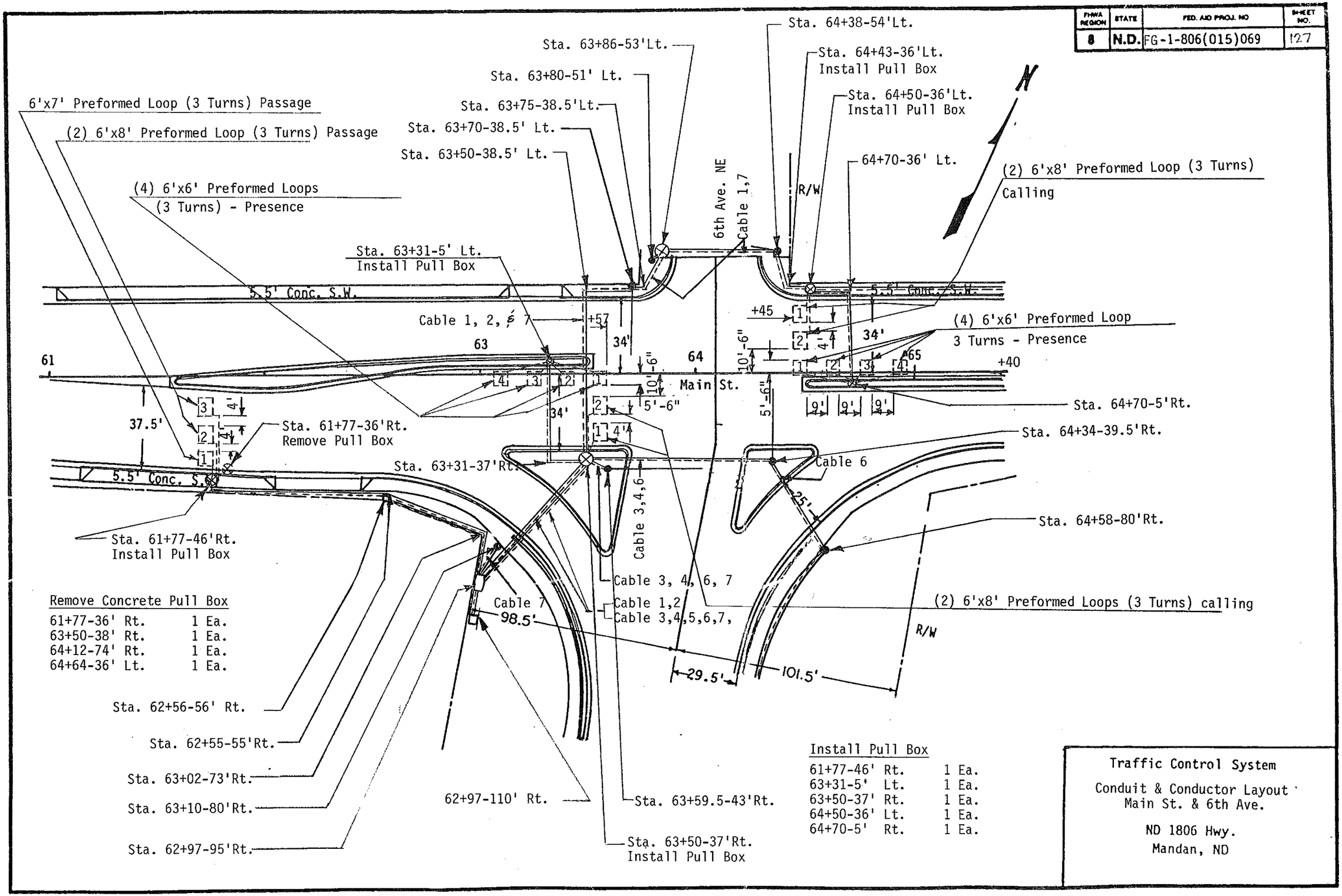
Sta. 63+57-57'Rt.

Sta. 63+59.5-43'Rt.
Relocated Signal Std.
44' Mast Arm

NOTE: The controller door shall face east with hinges on south side.

Traffic Control System
TRAFFIC SIGNAL LAYOUT
Main St. & 6th Ave.
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N.D.	FG-1-806(015)069	127



Remove Concrete Pull Box

61+77-36' Rt.	1 Ea.
63+50-38' Rt.	1 Ea.
64+12-74' Rt.	1 Ea.
64+64-36' Lt.	1 Ea.

Install Pull Box

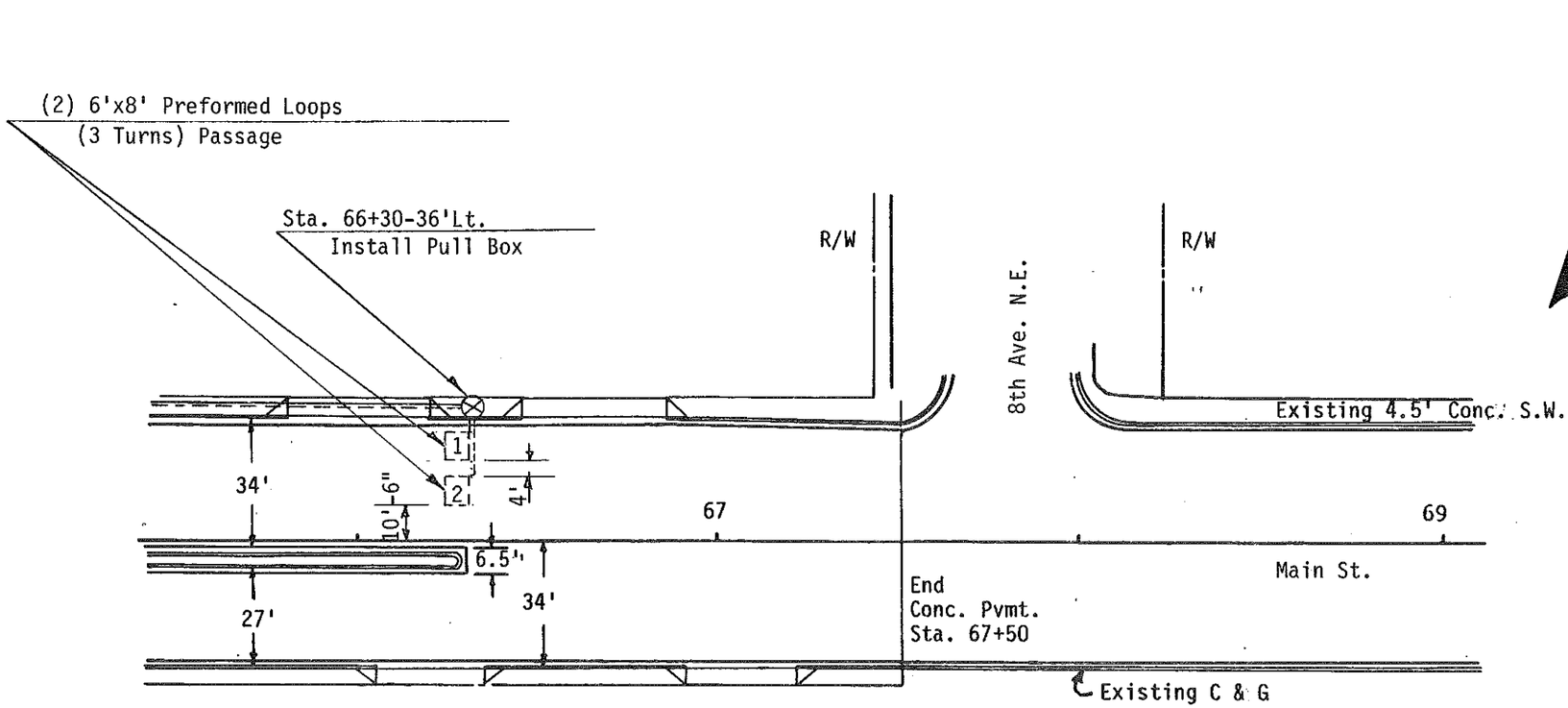
61+77-46' Rt.	1 Ea.
63+31-5' Lt.	1 Ea.
63+50-37' Rt.	1 Ea.
64+50-36' Lt.	1 Ea.
64+70-5' Rt.	1 Ea.

Traffic Control System

Conduit & Conductor Layout
Main St. & 6th Ave.

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	128



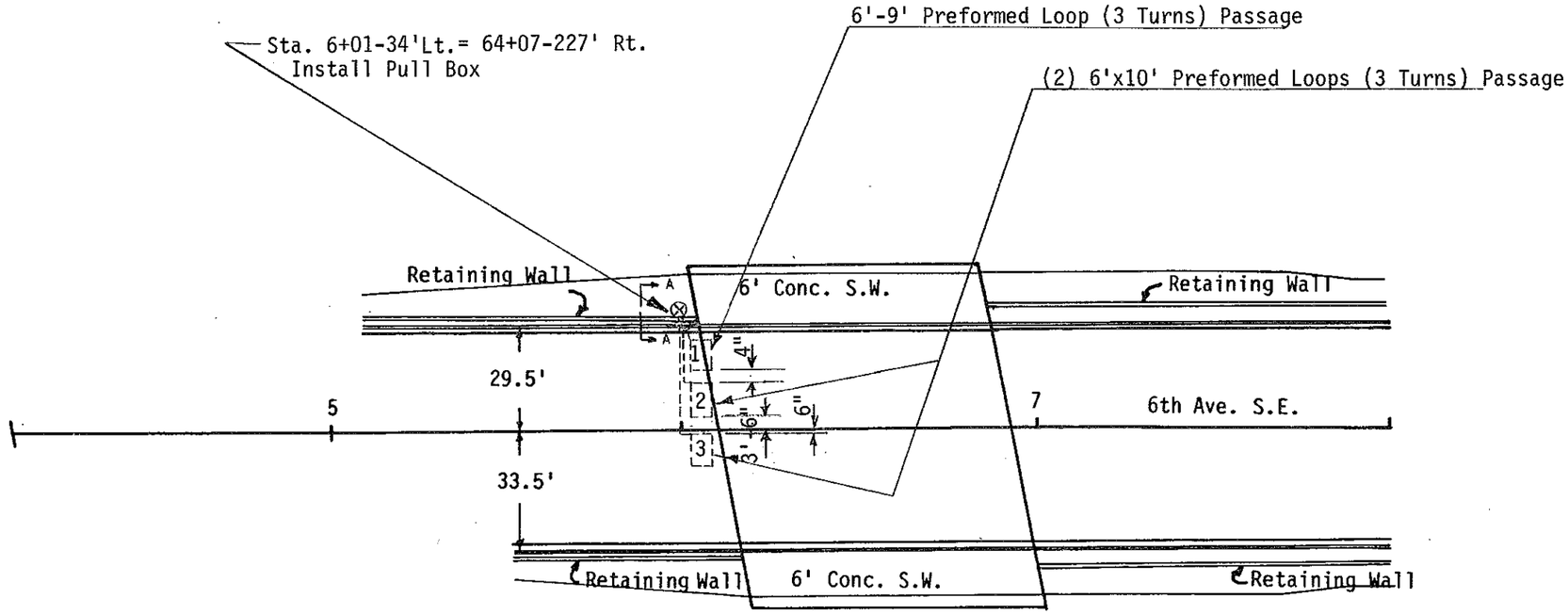
Remove Concrete Pull Box
66+28-36' Lt. 1 Ea.

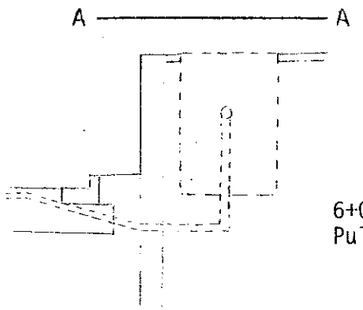
Install Pull Box
66+30-36' Lt. 1 Ea.

Traffic Control System
Conduit & Conductor Layout

Main St.
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	129





6+01-34' Lt.
Pull Box Detail

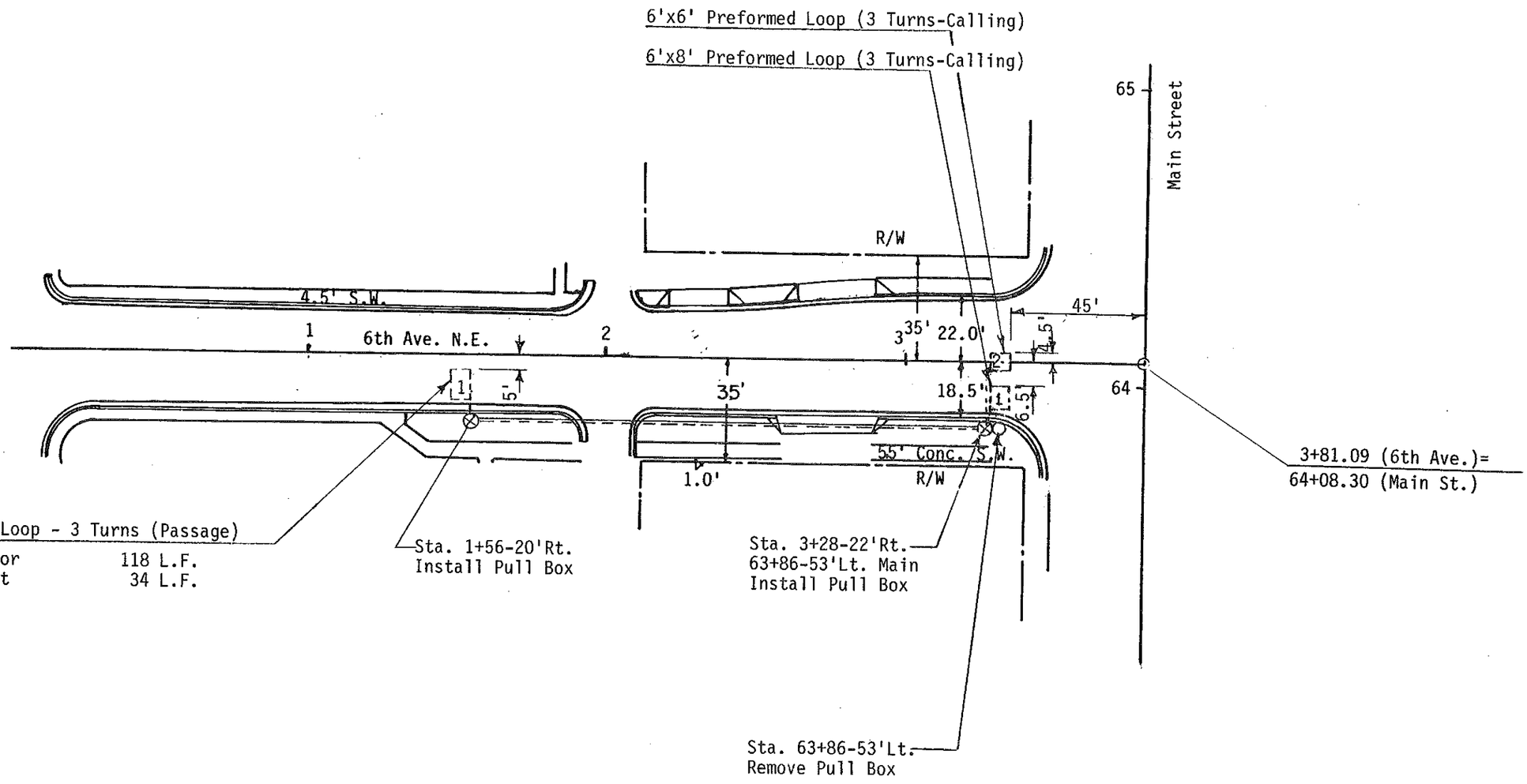
Remove Concrete Pull Box
5+48-10' Lt. 1 Ea.

Install Pull Box
6+01-34' Lt. 1 Ea.

Traffic Control System
Conduit & Conductor Layout

6th Ave. S.E.
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	130



Remove Concrete Pull Box

63+86-53' Lt. 1 Ea.

Install Pull Box

1+56-20' Rt. 1 Ea.
63+86-53' Lt. 1 Ea.

Traffic Control System

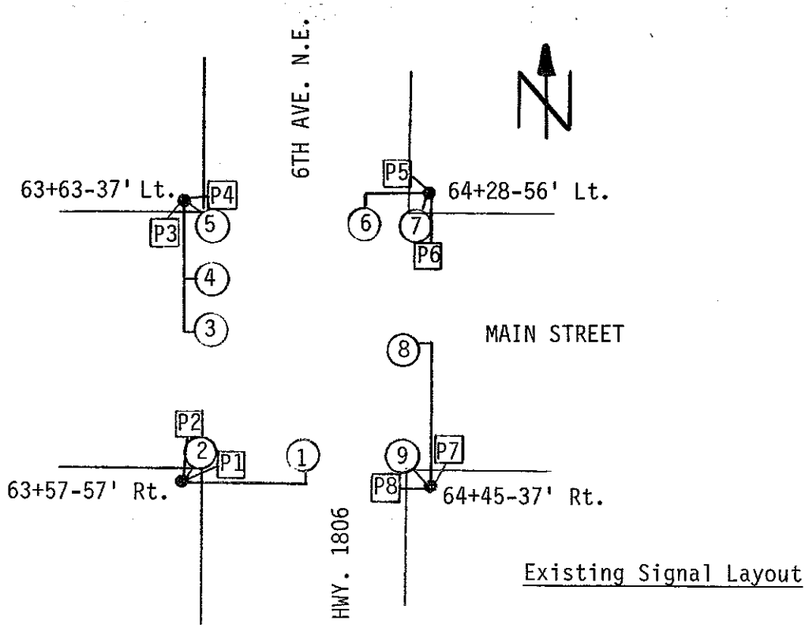
Conductor & Conduit
Layout
6th Ave. N.E. & Main St.

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	131

RELOCATE SIGNAL HEADS

Existing Head No.	Existing Location	New Location	Mounting	Head No.
1	63+57-57' Rt.-M.A. Mtd.	63+59.5-43' Rt.	M.A. Mtd.	1
2	63+57-57' Rt.-Post Mtd.	64+38-54' Lt.	Post Mtd.	8
	New Signal Head	63+59.5-43' Rt.	Post Mtd.	3
3	63+63-37' Lt.-M.A. Mtd.	63+70-38.5' Lt. (Reprogram Head)	M.A. Mtd.	4
4	63+63-37' Lt.-M.A. Mtd.	63+70-38.5' Lt.	M.A. Mtd.	5
5	63+63-37' Lt.-Post Mtd.	63+70-38.5' Lt.	Post Mtd.	6
6	64+28-56' Lt.-M.A. Mtd.	64+38-54' Lt.	M.A. Mtd.	7
7	64+28-56' Lt.-Post Mtd.	64+34-39.5' Lt.	Post Mtd.	12
8	64+45-37' Rt.-M.A. Mtd.	64+34-39.5' Rt.	M.A. Mtd.	10
	New Prog. Signal Head	64+34-39.5' Rt.	M.A. Mtd.	9
9	64+45-37' Rt.-Post Mtd.	64+34-39.5' Rt.	Post Mtd.	11
	New Signal Head	63+59.5-43' Rt.	M.A. Mtd.	2



Existing Signal Layout

RELOCATE PEDESTRIAN HEADS

Existing Head No.	Existing Location	New Location	Mounting	Head No.
P1	63+57-57' Rt.	63+59.5-43' Rt.	Post Mtd.	P1
P2	63+57-57' Rt.	63+59.5-43' Rt.	Post Mtd.	P2
	New Head	63+10-80' Rt.	Post Mtd.	P3
	New Head	63+59.5-43' Rt.	Post Mtd.	P4
P3	63+63-37' Lt.	63+70-38.5' Lt.	Post Mtd.	P5
P4	63+63-37' Lt.	63+70-38.5' Lt.	Post Mtd.	P6
P5	64+28-56' Lt.	64+38-54' Lt.	Post Mtd.	P7
P6	64+28-56' Lt.	64+38-54' Lt.	Post Mtd.	P8
P7	64+45-37' Rt.	64+34-39.5' Rt.	Post Mtd.	P9
P8	64+45-37' Rt.	64+34-39.5' Rt.	Post Mtd.	P10
	New Head	64+34-39.5' Rt.	Post Mtd.	P11
	New Head	64+58-80' Rt.	Post Mtd.	P12

TRAFFIC CONTROL SYSTEM

SIGNAL HEAD AND

PEDESTRIAN HEAD RELOCATION

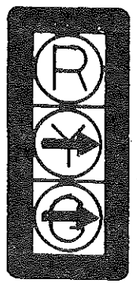
MAIN ST. & 6TH AVE.
MANDAN, N.D.

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	122

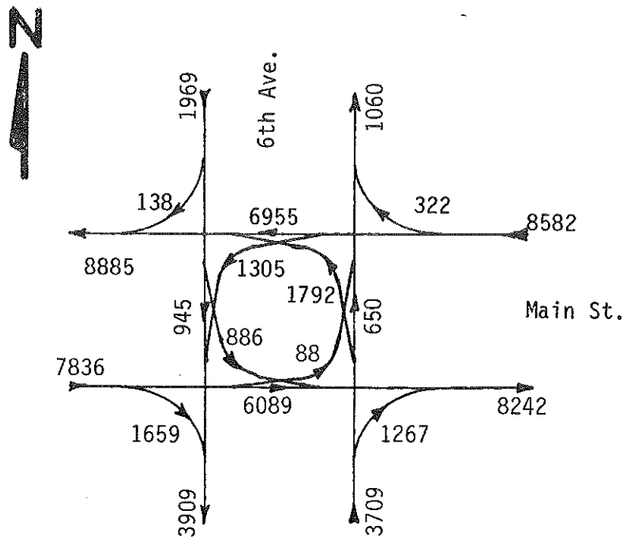
CONDUCTORS		CABLE 1 (12-7)		CABLE 2 (12-10)		CABLE 3 (12-10)		CABLE 4 (12-10)		CABLE 5 (12-7)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1 Black			Spare		Spare		Spare		Spare		Spare
2 White			Neutral		Neutral		Neutral		Neutral		Neutral
3 Red		7,8	Red	5,6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

CONDUCTORS		CABLE 6 (12-7)		CABLE 7 (12-10)			
Base	Tracer	Head	Indication	Head	Indication	Head	Indication
1 Black		P9	Don't Walk	P2,P3,P4,P5	Don't Walk		
2 White			Neutral		Neutral		Neutral
3 Red		P1,P10,P11,P12	Walk	P6, P7	Walk		
4 Green			Ground		Ground		Ground
5 Orange		P1,P10,P11,P12	Don't Walk	P6,P7	Don't Walk		
6 Blue		P9	Walk	P2,P3,P4,P5	Walk		
7 White	Black		Spare		Spare		Spare
8 Red	Black			P8	Don't Walk		
9 Green	Black			P8	Walk		
10 Orange	Black						

Existing Pedestrain Head P1-P8
New Pedestrian Heads P9,P10,P11,P12 (12" Lenses)



New Head No. 3
12" Lenses
Louvered Backplate
(Programmed Head)



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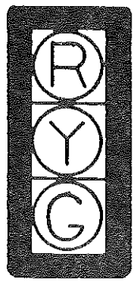
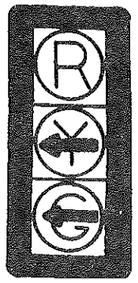
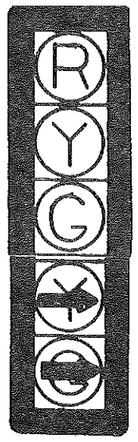


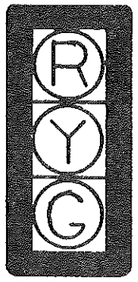
New Head No. 2
12" Lenses
Louvered
Backplate



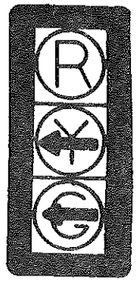
New Head No. 9
12" Lenses Programmed
Louvered Backplate



Existing Head 12
Install New Louvered Backplate
(12" Lenses)



Existing Heads
1,5,6,7,8,10,11
Install New
Louvered Backplates
(12" Lenses)



Revise Yellow Lense

Existing Head 4
Reprogrammed Head
Install New
Louvered Backplate
(12" Lenses)

TRAFFIC CONTROL SYSTEM

Conductors, Heads, & Traffic Volumes

Main St. & 6th Ave.

Mandan, ND

STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
66+30-36' Lt. to 64+50-36' Lt.	178'	1"	186'	(1) Loop Lead-In
64+70-5' Rt. to 64+70-36' Lt. to 64+50-36' Lt.	59'	1"	67'	(1) Loop Lead-In
64+50-36' Lt. to 64+43-36' Lt. to 64+38-54' Lt.	24'	1"	93'	(3) Loop Lead-In
64+38-54' Lt. to 63+86-53' Lt.	50'	2.5"	165'	(3) Loop Lead-In
			120'	(2) 12-2 Conductor
			57'	Cable 1
			57'	Cable 7
63+80-51' Lt. to 63+86-53' Lt.	5'	1"	14'	(1) 12-2 Conductor
1+56-20' Rt. to 3+28-22' Rt. (6th Ave. N.E.)	170'	2"	178'	(1) Loop Lead-In
63+86-53' Lt. to 63+75-38.5' Lt. to 63+70-38.5' Lt.	21'	3"	130'	(5) Loop Lead-In
			78'	(3) 12-2 Conductor
			28'	Cable 1
			28'	Cable 7
63+70-38.5' Lt. to 63+50-38.5' Lt. to 63+50-37' Rt.	94'	3.5"	495'	(5) Loop Lead-In
			401'	(4) 12-2 Conductor
			101'	Cable 1
			101'	Cable 2
			101'	Cable 7
63+31-5' Lt. to 63+31-37' Rt. to 63+50-37' Rt.	59'	1"	67'	(1) Loop Lead-In

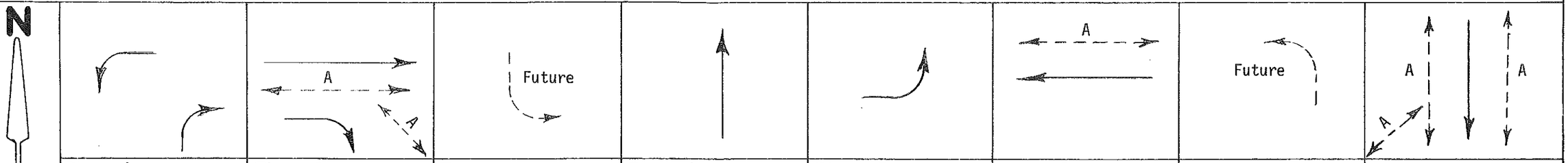
STATION	CONDUIT RUNS		CABLE RUNS	
	Length	Size	Length	Type
6+01-34' Lt. to (64+07-227' Rt.) 64+58-80' Rt.	169'	1"	177'	(1) Loop Lead-In
64+58-80' Rt. to 64+34-39.5' Rt.	45'	2"	53'	(1) Loop Lead-In
			58'	(1) 12-2 Conductor
			57'	Cable 6
64+34-39.5' Rt. to 63+50-37' Rt.	82'	3"	87'	(1) Loop Lead-In
			271'	(3) 12-2 Conductor
			89'	Cable 3
			89'	Cable 4
			89'	Cable 6
63+59.5-43' Rt. to 63+50-37' Rt.	9'	3"	38'	(2) 12-2 Conductor
			16'	Cable 3
			16'	Cable 5
			16'	Cable 6
			16'	Cable 7
63+50-37' Rt. to 62+97-95' Rt.	77'	3.5"	704'	(8) Loop Lead-In
			792'	(9) 12-2 Conductor
			88'	Cable 1
			88'	Cable 2
63+50-37' Rt. to 62+97-95' Rt.	77'	3.5"	88'	Cable 3
			88'	Cable 4
			88'	Cable 5
			88'	Cable 6
			88'	Cable 7
61+77-46' Rt. to 62+97-95' Rt.	150'	1"	167'	(1) Loop Lead-In
63+10-80' Rt. to 62+97-95' Rt.	18'	2"	37'	(1) 12-2 Conductor
			34'	Cable 7
62+97-95' Rt. to 62+97-110' Rt.	13'	2"	68'	(2) NO. 6 Type RHW
			34'	(1) NO. 6 Type THW
62+56-56' Rt. to 63+02-73' Rt. to 62+97-110' Rt.	105'	2"	357'	(3) No. 6 Type RHW

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	133

TRAFFIC CONTROL SYSTEM
CONDUIT & CONDUCTOR QUANTITIES

Main Street & 6TH Ave.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	134



Head No.	Phase 1 R/W	Clear To ø 2	4	5	6	8	Phase 2 R/W	Clear To ø 4	5	6	8	1	Phase R/W	Clear To ø	Phase 4 R/W	Clear To ø 5	6	8	1	2	Phase 5 R/W	Clear To ø 6	8	1	2	4	Phase 6 R/W	Clear To ø 8	1	2	4	5	Phase R/W	Clear To ø	Phase 8 R/W	Clear To ø 1	2	4	5	6
1																																			G	Y	Y	*	Y	Y
2																																			G	Y	Y	*	Y	Y
3							G	Y	*	*	Y	Y																													
4	G	Y	Y	*	*	Y																																			
5																											G	Y	*	*	Y	Y									
6																											G	Y	*	*	Y	Y									
7															G	Y	Y	*	Y	Y																					
8															G	Y	Y	*	Y	Y																					
9																					G	Y	Y	*	*	Y														
10							G	Y	*	*	Y	Y																														
11							G	Y	*	*	Y	Y																														
12	R	R	R	*	*	R									G	Y	Y	*	Y	Y																					
	G	Y	Y	*	*	Y																																		

CHART "A"	
On Phase	Non-Conflicting Phase Allowed to Time Concurrently
1	5 or 6
2	5 or 6
3	Future Phase
4	8
5	1 or 2
6	1 or 2
7	Future Phas
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")

A only upon Pedestrian Actuation

TRAFFIC CONTROL SYSTEM

CONTROLLER PHASING

Main St. & 6th Avenue
Mandan, ND

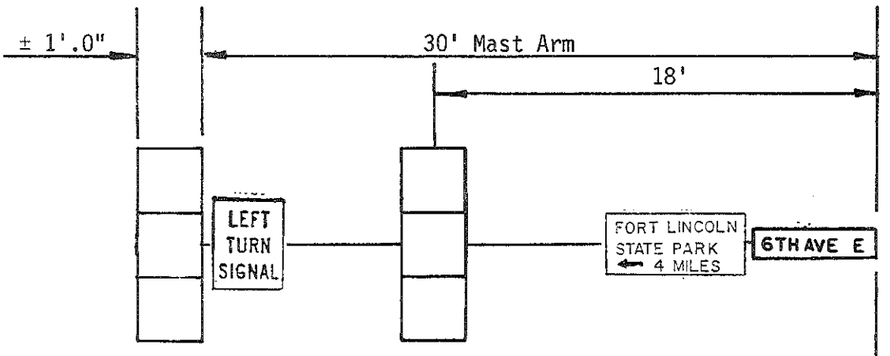
FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	135

		Ø 1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
BASIC INTERVALS (or FUNCTIONS)									
Initial		1.0	18.8		18.8	1.0	18.8		18.8
Extension (Gap)		4.9	4.9		4.9	4.9	4.9		4.9
Maximum (Maximum Green or Ext. Limit)		20	50		50	20	50		50
Yellow Change		3.1	4.0		4.0	3.1	4.0		4.0
Red Clearance		1.0	1.0		1.0	1.0	1.0		1.0
Walk		-	7.0		7.0	-	7.0		7.0
Pedestrian Clearance		-	17.0		13.4	-	17.0		13.4
VOLUME DENSITY TIMING FUNCTIONS									
Variable Initial Timing Options									
Added Initial									
Minimum Initial		1.0	6.0	FUTURE PHASE	6.0	1.0	6.0	FUTURE PHASE	6.0
Added Initial per Actuation		2.1	2.1		2.1	2.1	2.1		2.1
Actuations Before Added Initial		2.0	2.0		2.0	2.0	2.0		2.0
Computed Initial									
Minimum Initial		1.0			6.0	1.0	6.0		6.0
Maximum Initial		1.0	18.8		18.8	1.0	18.8		18.8
Actuations to Reach Maximum Initial		7	7		7	7	7		7
Extensible Initial									
Minimum Initial		1.0	6.0		6.0	1.0	6.0		6.0
Maximum Initial		1.0	18.8		18.8	1.0	18.8		18.8
Added Initial per Actuation		2.1	2.1		2.1	2.1	2.1		2.1
TIME WAITING GAP REDUCTION OPTIONS									
Passage Time		4.9	4.9		4.9	4.9	4.9		4.9
Minimum Gap		1.36	1.36		1.36	1.36	1.36		1.36
Time to Reduce to Minimum Gap		-	21.2		21.2	-	21.2		21.2
Reduce Gap Every		-	1.0		1.0	-	1.0		1.0
Reduce Gap Every Second By			.16		.16	-	.16		.16
Reduce Gap By			3.60		3.60	-	3.60		3.60
Locking Memory			X		X		X		X
Non-Locking Memory		X				X			
Flashing-Normal & Conflict Monitor		R	G		R	R	G		R
Start Up Phasing		R	G		R	R	G		R
Type of Detector Loop	Presence	X				X			
	Calling*		X				X		X
	Passage		X		X		X		X

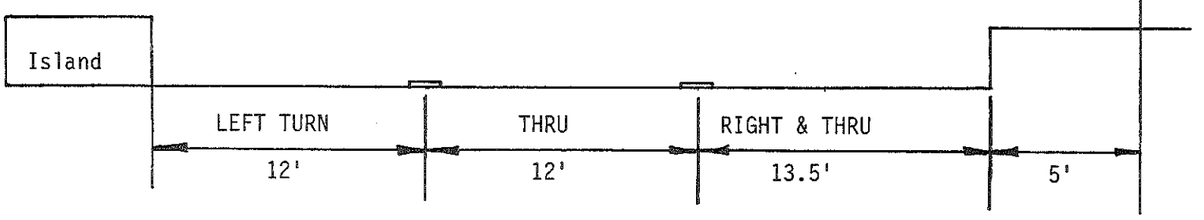
*Calling Loops shall place one call into the Controller on the Yellow or Red interval. Calling Loops shall be disconnected during the Green interval.

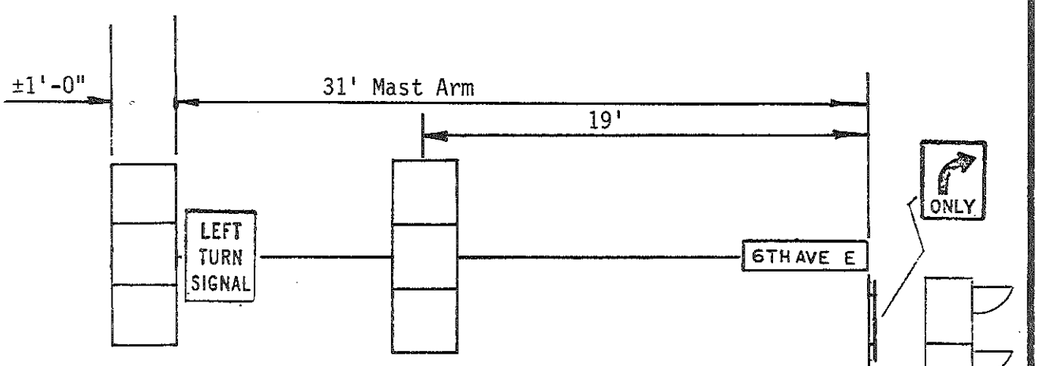
TRAFFIC CONTTOL SYSTEM
CONTROLLER SETTINGS

MAIN ST. & 6TH AVE.
MANDAN, N.D.

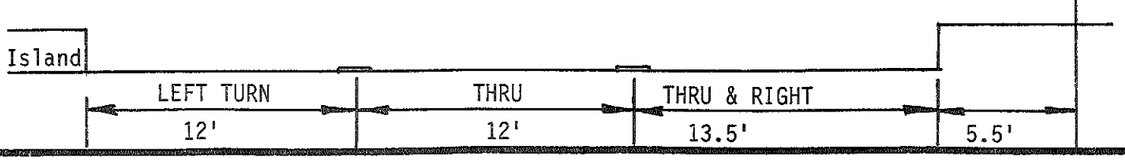


Sta. 63+70-38.5' Lt.
West Bound, East Approach
Cross Section



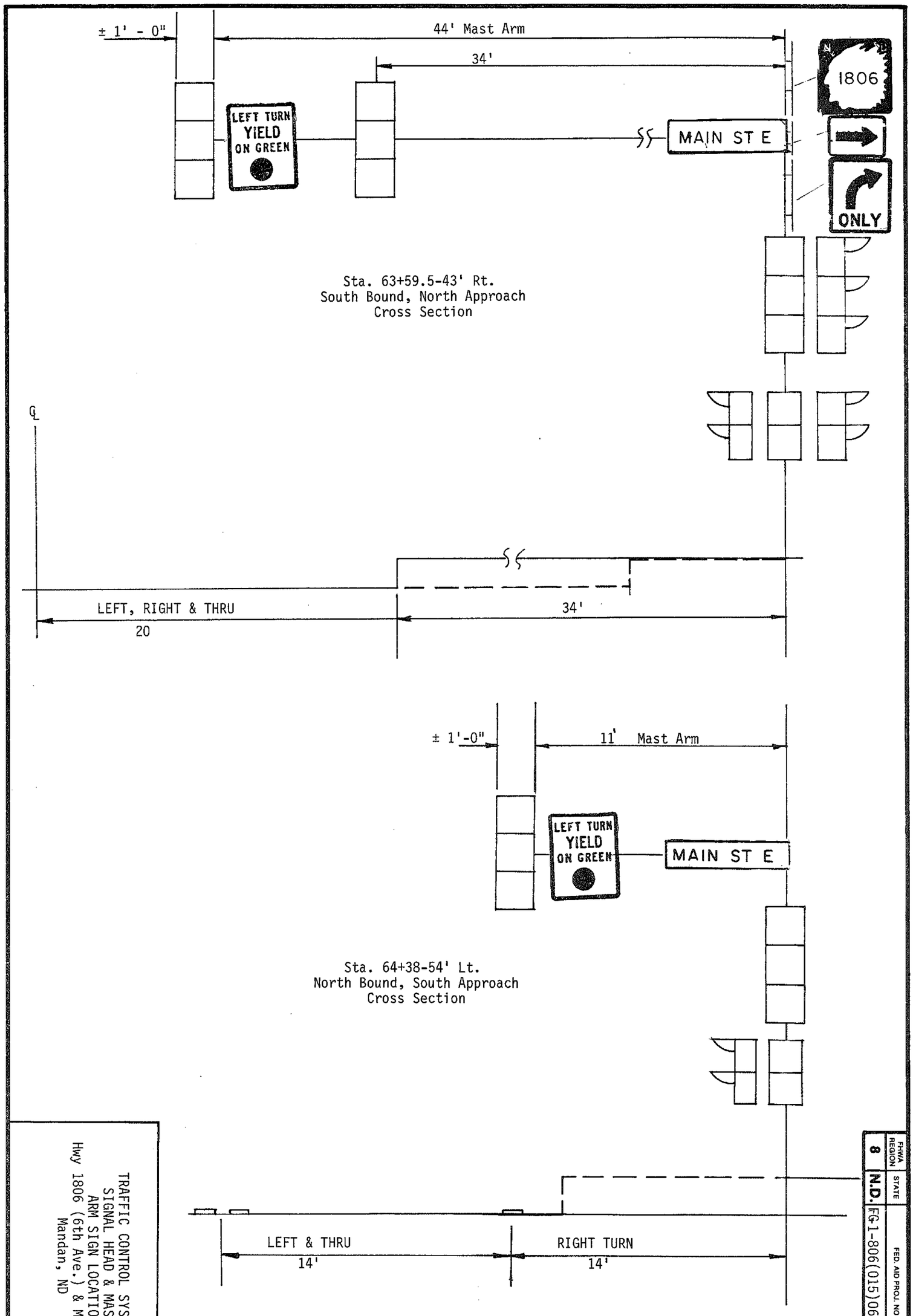


Sta. 64+34-39.5' Rt.
East Bound, West Approach
Cross Section



TRAFFIC CONTROL SYSTEM
SIGNAL HEAD & MAST
ARM SIGN LOCATION
Hwy 1806 (6th Ave.) & Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	136



TRAFFIC CONTROL SYSTEM
SIGNAL HEAD & MAST
ARM SIGN LOCATION
Hwy 1806 (6th Ave.) & Main St.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG1-806(015)069	137

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	139

QUANTITIES

	Concrete Foundations - Traffic Signals	Concrete Foundation - Feed Point - Type B	Pull Box	1" Dia. Rigid Conduit	2" Dia. Rigid Conduit	2.5" Dia. Rigid Conduit	3" Dia. Rigid Conduit	3.5" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Detector Loop Polyethylene Conduit Pre-Wired	Loop Lead-In Conductor	Preformed Loop Detector	No. 12 AWG 2 Conductor Cable	No. 12 AWG 3 Conductor Cable (A)	No. 12 AWG 5 Conductor Cable (A)	No. 12 AWG 7 Conductor Cable	No. 12 AWG 10 Conductor Cable	Saw Slot	Feed Point - Pad Mount. Signal - Lighting and Combo.
	EA	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	LF	LF	LF	LF	LF	LF	EA
62+97-95' Rt.	1																			
62+97-110' Rt.		1																		1
63+59.5-43' Rt.	1														36	139				
63+70-38.5' Lt.	1														24	109				
64+34-39.5' Rt.	1														36	111	12 (A)			
64+38-54' Lt.	1														24	49				
63+10-80' Rt.															12					
63+80-51' Lt.																				
64+58-80' Rt.															12					
Var. Locations			9	644	351	50	112	248	425	34	118	2569	22	1809			628	883	34	
TOTAL	5	1	9	644	351	50	112	248	425	34	118	2569	22	1809	144	408	640	883	34	1

	Lighting and Combo. 11 Ft. M.A. Signal and Light Standard - Type C	Combo. 31 Ft. M.A. Signal and Light Standard - Type C	1-Way, 3 Sec. Head W/12" Lenses - Mast Arm Mounted	1-Way, 3 Sec. Prog. Head W/12" Lenses - Post Mounted	1-Way, 3 Sec. Prog. Head W/12" Lenses - Mast Arm Mounted	1-Way, 2 Sec. Head Ped. Signal Post Mounted	Volume Density Controller W/Ped. Timing	Relocate Post Mounted Vehicular Head	Relocate Mast Arm Signal Head	Relocate Programmed Signal Head	Relocate Post Mtd. Pedestrian Head	Remove Combination Signal and Light Standard	Remove Traffic Signal Controller	Remove Concrete Pull Box	Relocate Signal Standard	Pedestrian Push Botton Post
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
62+97-95' Rt.							1									
62+97-110' Rt.																
63+59.5-43' Rt.			1	1		1			1		2				1	
63+70-38.5' Lt.								1	1	1	2				1	
64+34-39.5' Rt.	1				1	1		2	1		2					
64+38-54' Lt.							1	1	1		2					
63+10-80' Rt.						1										1
63+80-51' Lt.																
64+58-80' Rt.						1										
Var. Locations											2	1	7			
TOTAL	1	1	1	1	1	4	1	4	4	1	8	2	1	7	2	1

(A) Used for internal wiring of signal standards

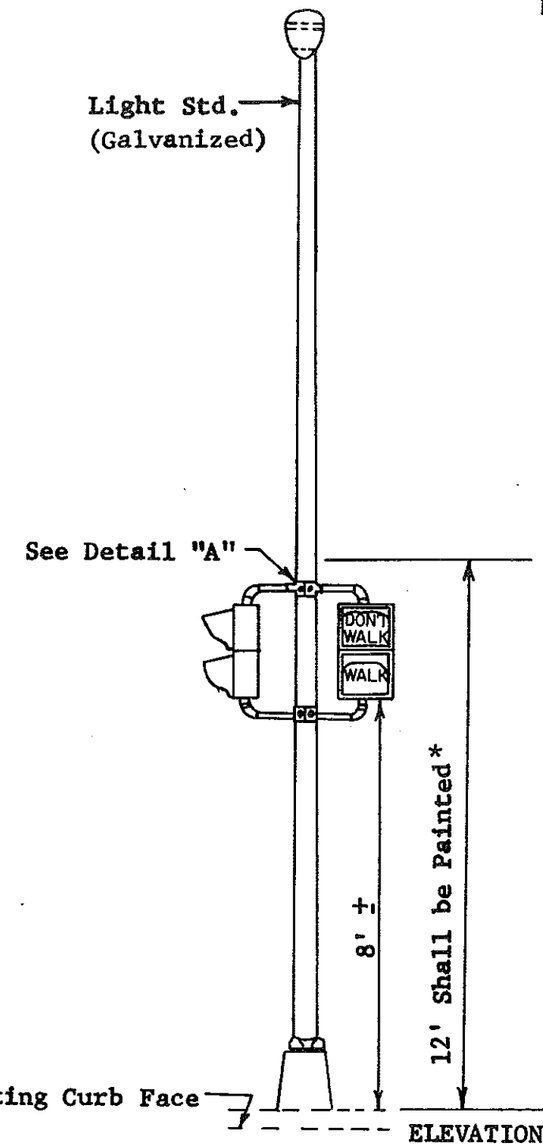
TRAFFIC CONTROL SYSTEM

Summary of Quantities
Signals
Jct. Main St. and ND 1806

Mandan, ND

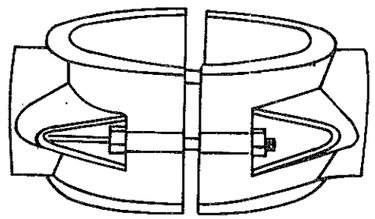
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	139

NOTE: A Pole Plate with Suitable banding material as approved by the Engineer in the field may be substituted for the pole clamps on round poles.



Sta. 63+10-80' Rt. and Sta. 64+58-80' Rt.

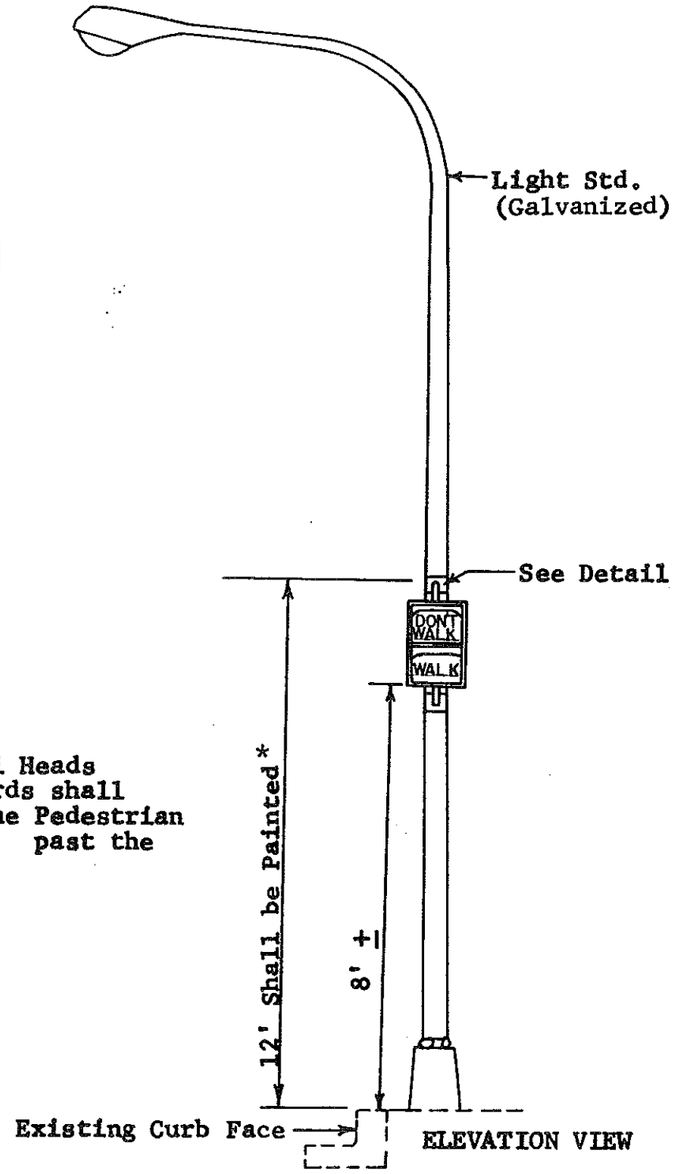
Pedestrian Signal Heads Mounted on Light Standard.



DETAIL "A"

ORNAMENTAL POLE CLAMP WITH TWO HUBS

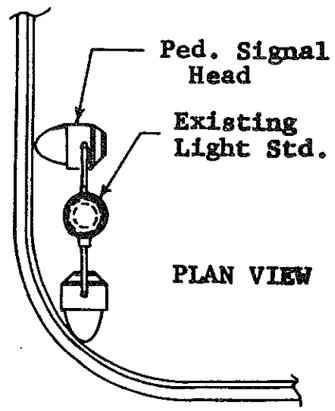
NOTE: Pedestrian Signal Heads mounted on light standards shall be mounted as shown. The Pedestrian Signals shall not extend past the curb face.



Sta. 63+10-80' Rt. and Sta. 64+58-80' Rt.

Pedestrian Signal Heads Mounted on Light Standard

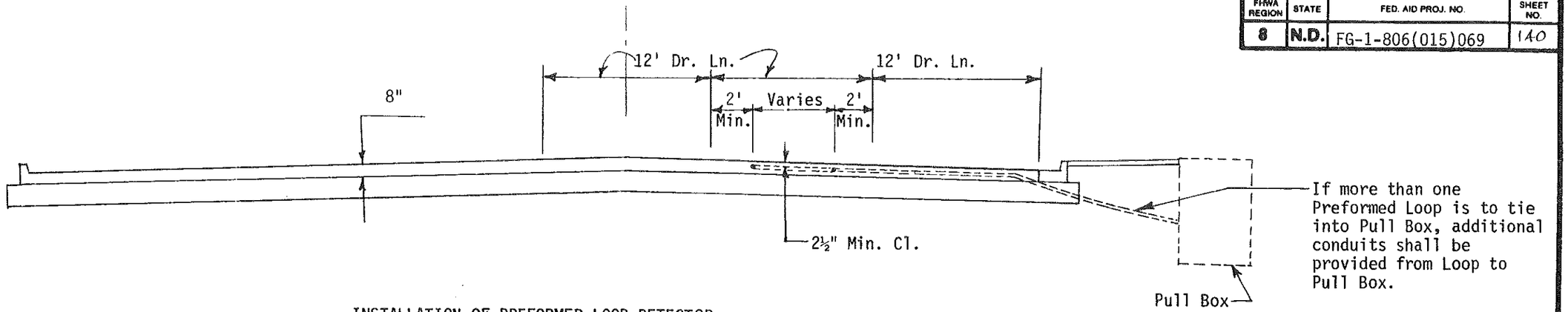
*Where pedestrian signal heads are mounted on light standards the base shall be painted dark green and the lower 12' of the light standard shall be painted dark green. Painting shall be done in accordance with Standard Specification TT-E-489, the latest revision. Not a separate pay item, cost to be included in the price bid for 1-way 2 section head pedestrian signal - post mounted.



TRAFFIC CONTROL SYSTEM
Pedestrian Heads Mounted On Light Standard DETAILS
Mandan,ND

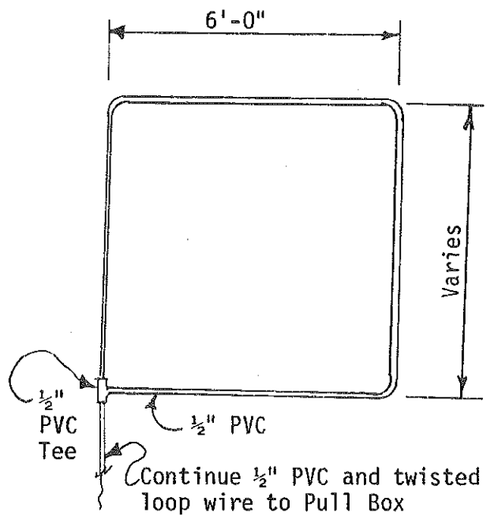
AA

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	140



INSTALLATION OF PREFORMED LOOP DETECTOR
when placed in new 8" P.C.C. PVMT.

PERFORMED LOOP DETECTOR: The Preformed Loop Detector shall be constructed of PVC and loop conductor. The loop detector shall be totally encased in ½" schedule 40 PVC, (Sprinkler pipe, heavy wall construction) with pipe fittings and glue. One corner shall be terminated with a ½" 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 or THHN/THWN, 600 V 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.



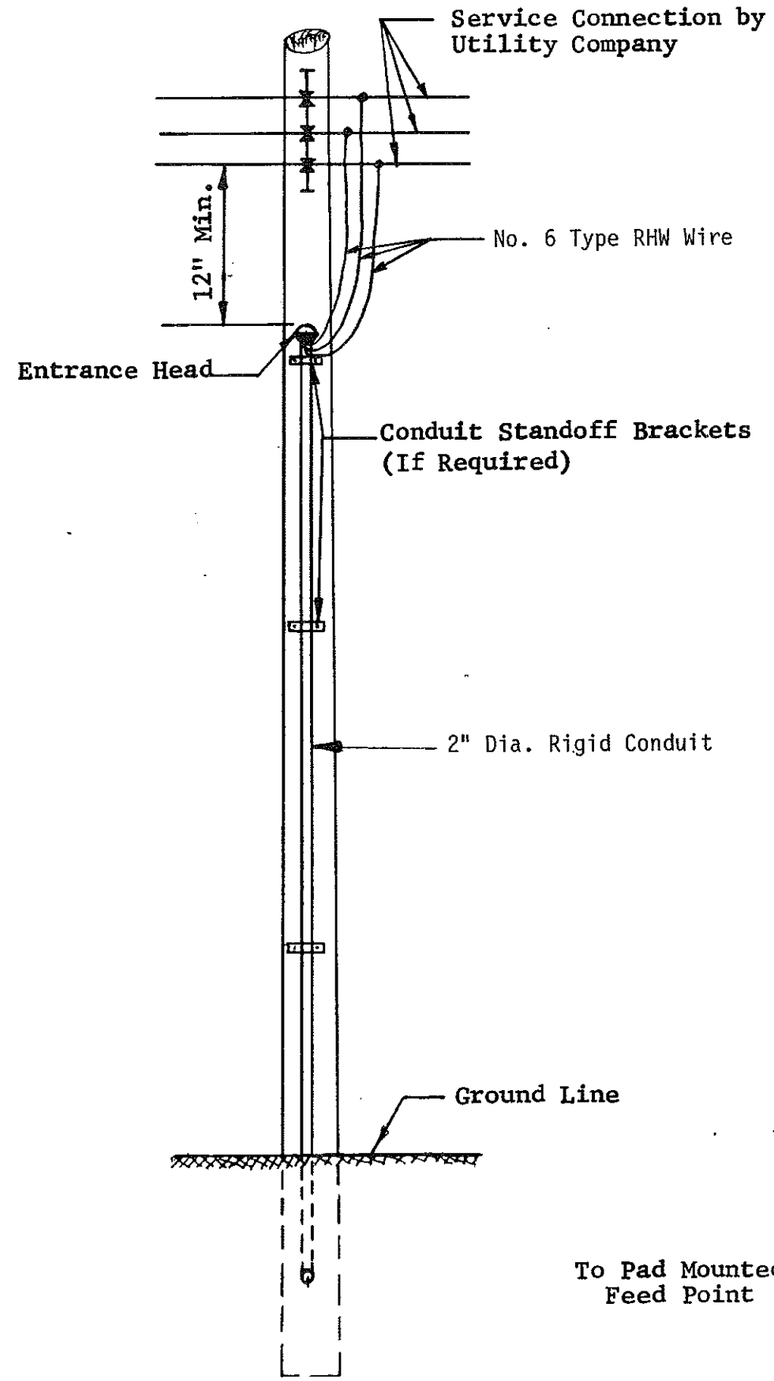
PREFORMED LOOP DETECTOR LAYOUT

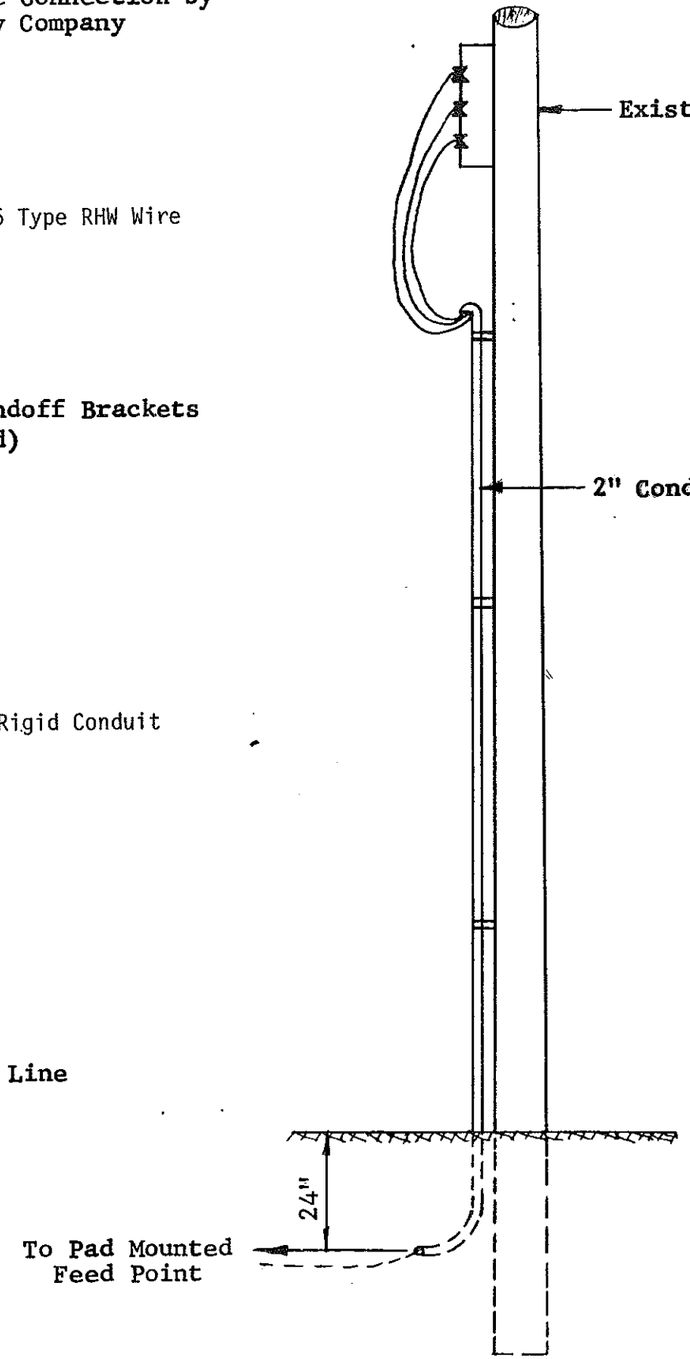
TRAFFIC CONTROL SYSTEM

PREFORMED LOOP DETECTOR DETAILS

Mandan,ND

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	141





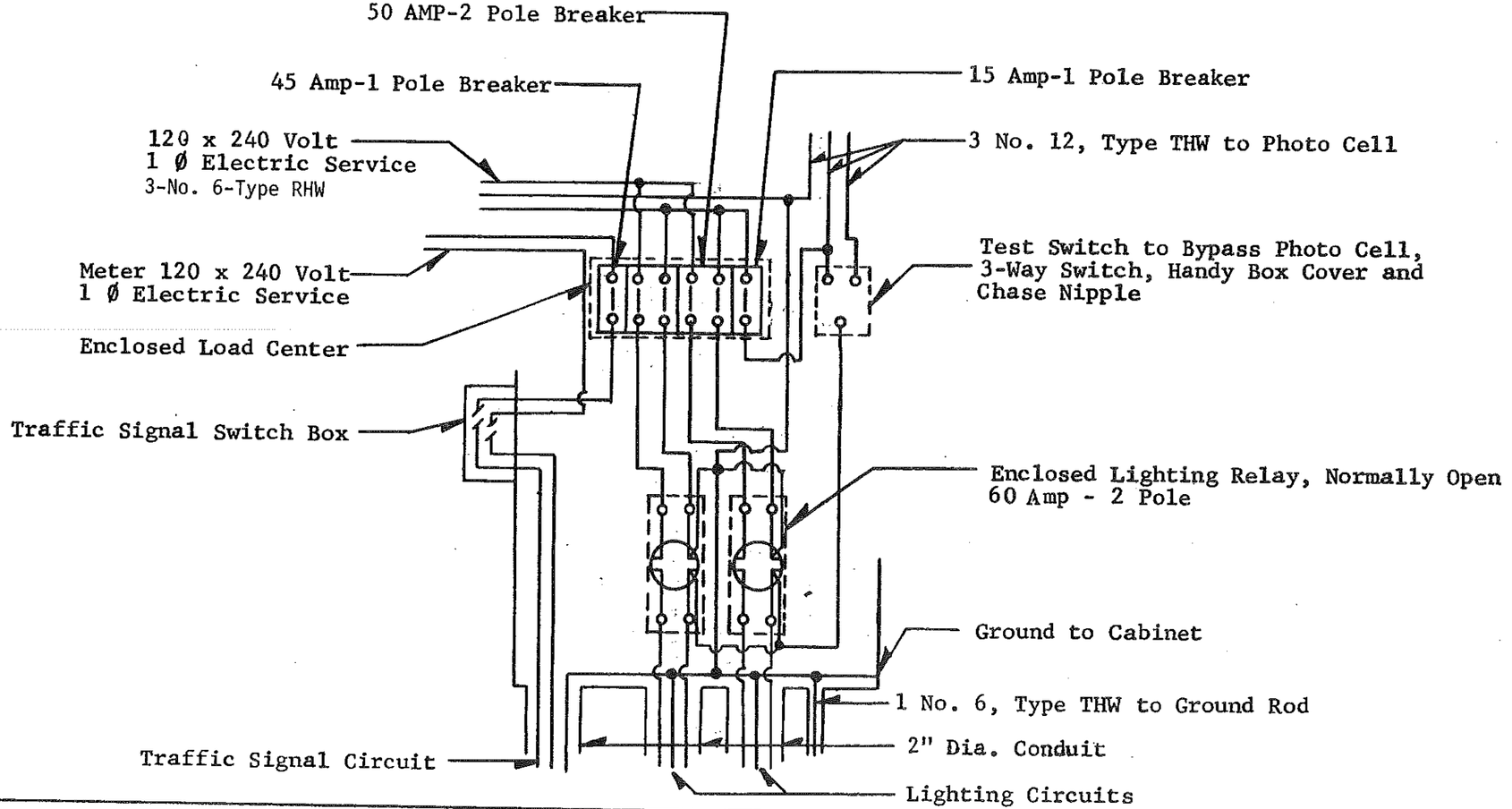
TRAFFIC CONTROL SYSTEM

Sta. 62+56-56' Rt.

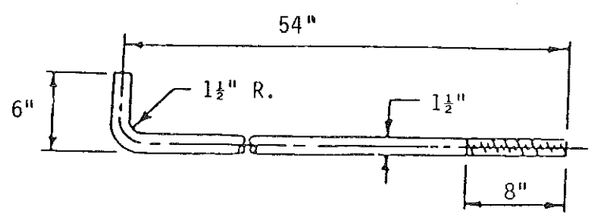
Utility Service Pole Detail

Main Street & 6th Avenue
Mandan, ND

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	FG-1-806(015)069	142

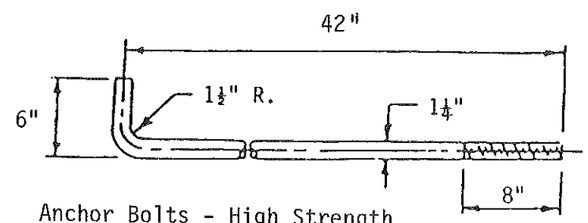


Sta. 63+59.5-45' Rt.



Anchor Bolts - High Strength
4 Anchor Bolts with Threaded End
Galvanized a Minimum Length of
12". Each Bolt Furnished with 2-hex
Nuts & 2 Flat Washers.

Sta. 63+70-38.5' Lt.



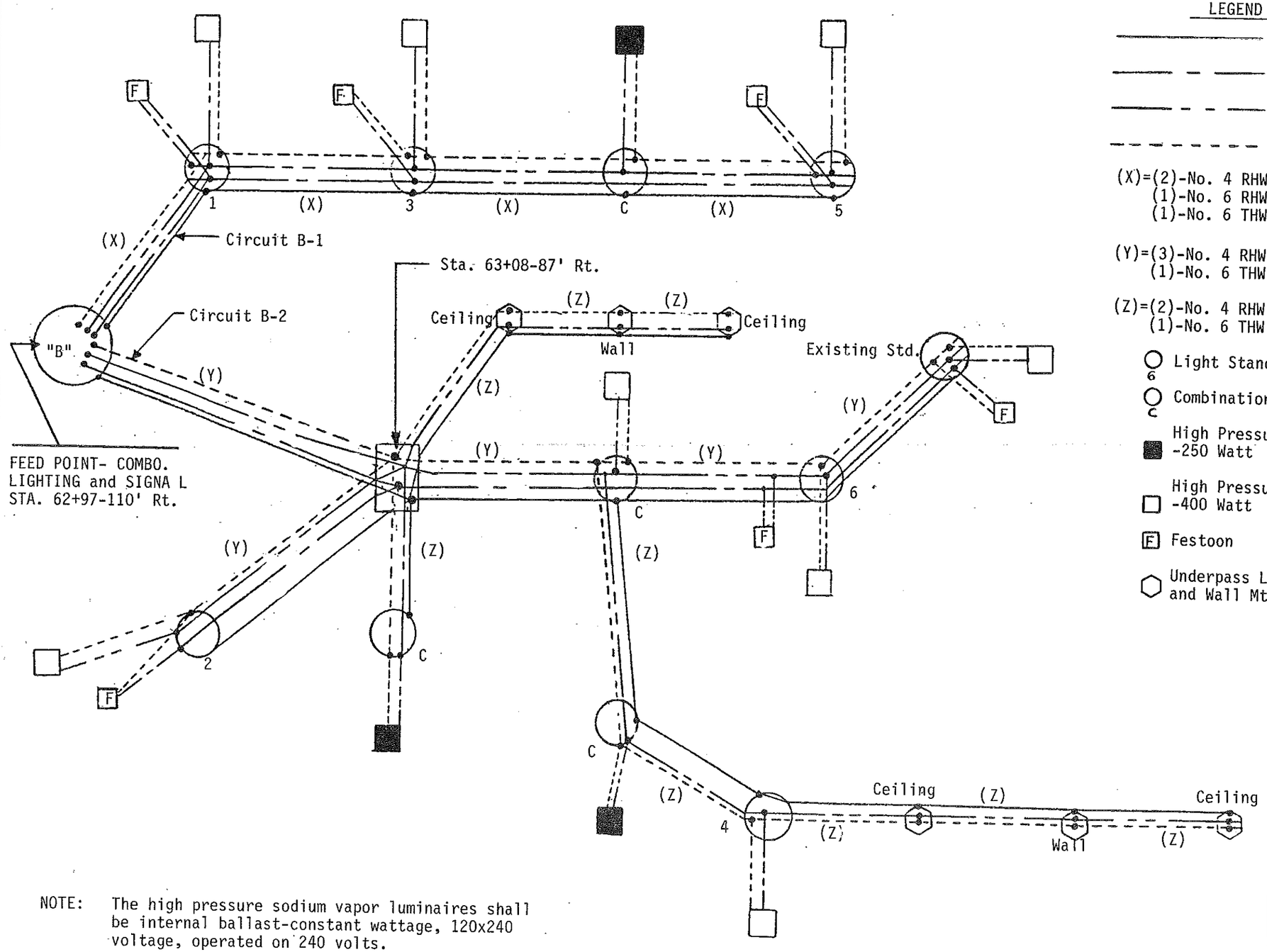
Anchor Bolts - High Strength
4 anchor bolts with threaded end
galvanized a minimum length of
12". Each bolt furnished with 2-hex
nuts & 2 flat washers.

Base Plate Info. for 63+59.5-43' Rt. &
63+70-38.5' Lt.
Base O.D. 12.5"
Bolt Circle 15.5"
Slots or Holes 1.5"

TRAFFIC CONTROL SYSTEM
Combo. Signal & Lighting
Feed Point - Circuit B-1 & B-2
Pad Mounted Detail
Sta. 62+97-110' Rt

Anchor Bolt Detail
Sta. 63+70-38.5' Lt. &
Sta. 63+59.5-43' Rt.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(15)069	144



LEGEND

- Ground Conductor Copper
- Neutral Conductor Copper
- Phase Conductor Copper
- Phase Conductor Copper

(X)=(2)-No. 4 RHW
(1)-No. 6 RHW
(1)-No. 6 THW

(Y)=(3)-No. 4 RHW
(1)-No. 6 THW

(Z)=(2)-No. 4 RHW
(1)-No. 6 THW

- Light Standard Number
- Combination Signal and Light Standard Number
- High Pressure Sodium Vapor Luminaire -250 Watt
- High Pressure Sodium Vapor Luminaire -400 Watt
- Festoon
- Underpass Lights Ceiling Mtd.(100 Watt) and Wall Mtd.(150 Watt)

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

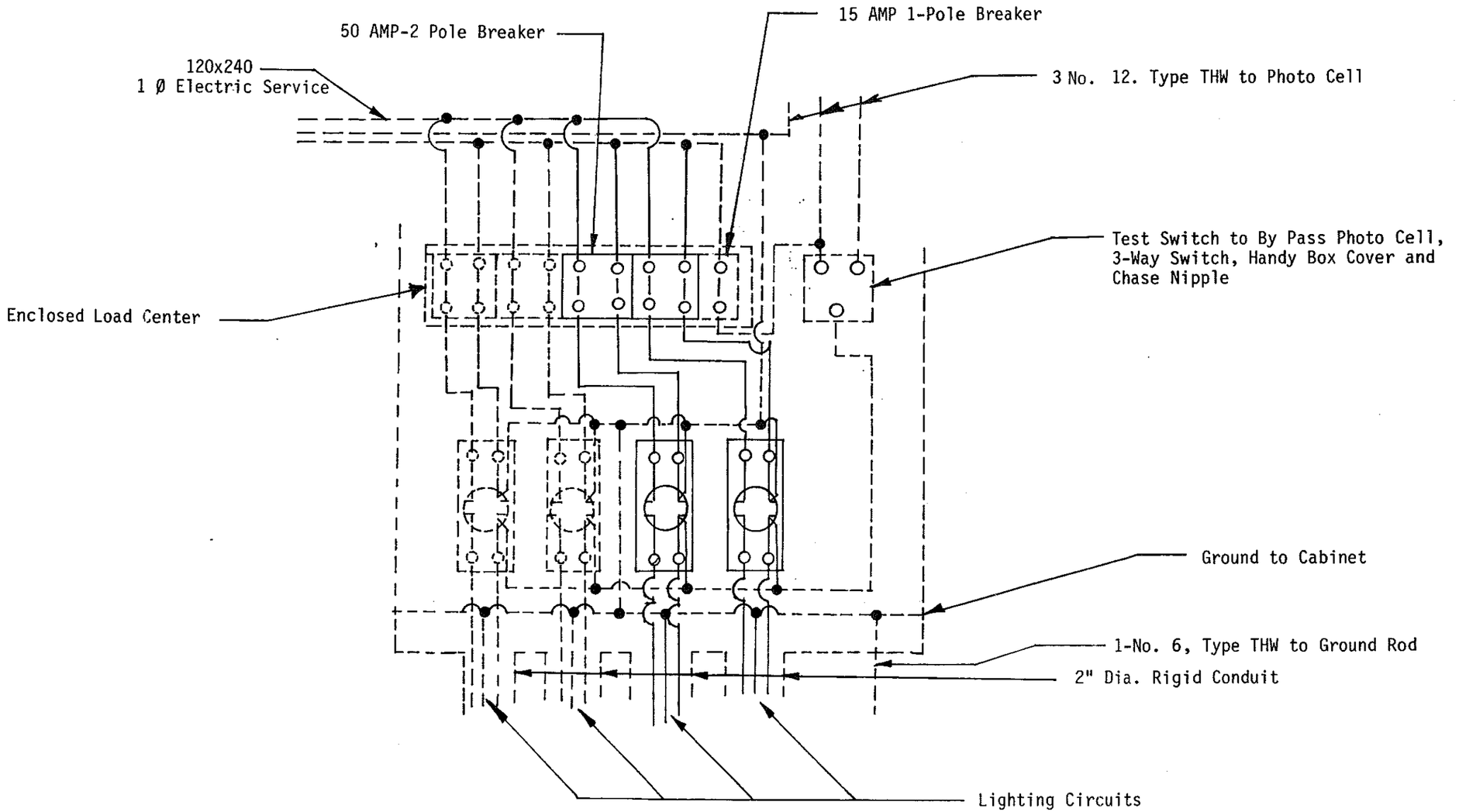
TRAFFIC CONTROL SYSTEM

LIGHTING SCHMEMATICS

Sta. 62+97-110' Rt.

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	143



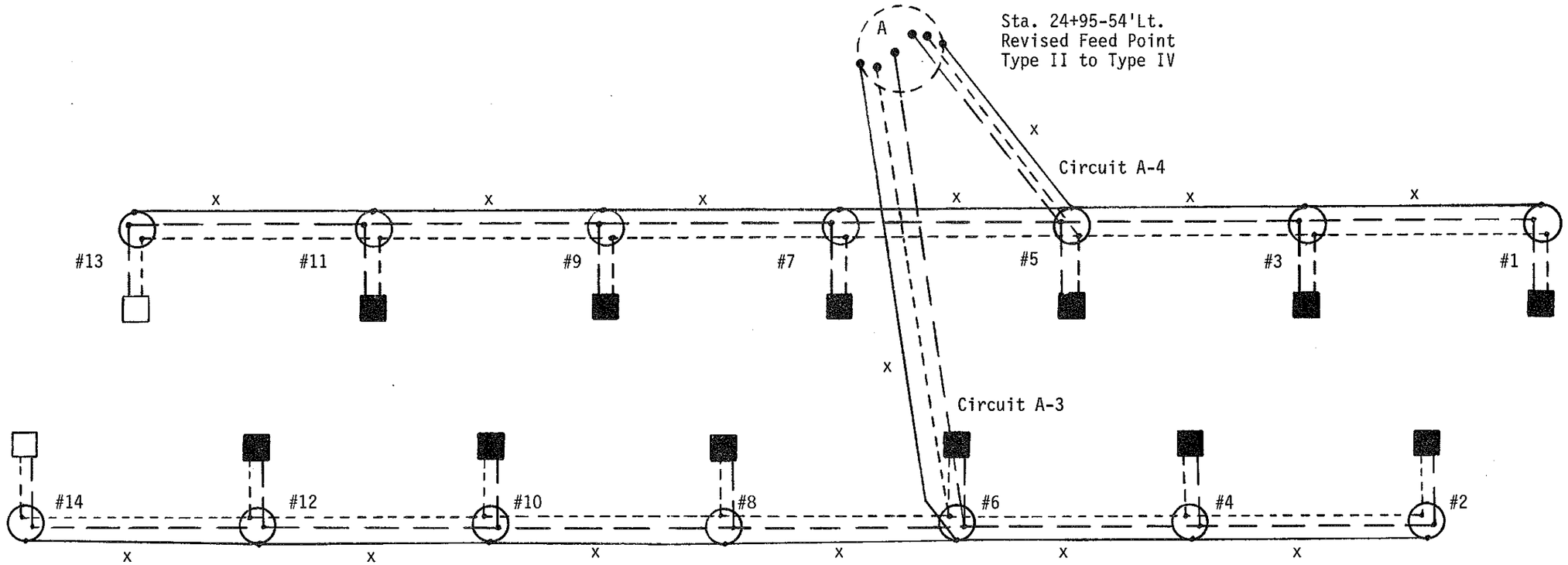
TRAFFIC CONTROL SYSTEM

Revised Feed Point Detail

Circuit A-3 & A-4
Sta. 24+95-54'Lt.
ND 1806 Hwy.

Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	145



Ground Conductor - No. 6 Copper

Phase Conductor - No. 6 Copper

Phase Conductor - No. 6 Copper

Light Standard

400 Watt Sodium Vapor Luminaire

250 Watt Sodium Vapor Luminaire

X = 2-No. 6 Type RHW
1-No. 6 Type THW

NOTE: High Pressure Sodium Vapor Luminaires (250 and 400 Watt) shall be operated on 240 volts.

TRAFFIC CONTROL SYSTEM

Lighting Schematics

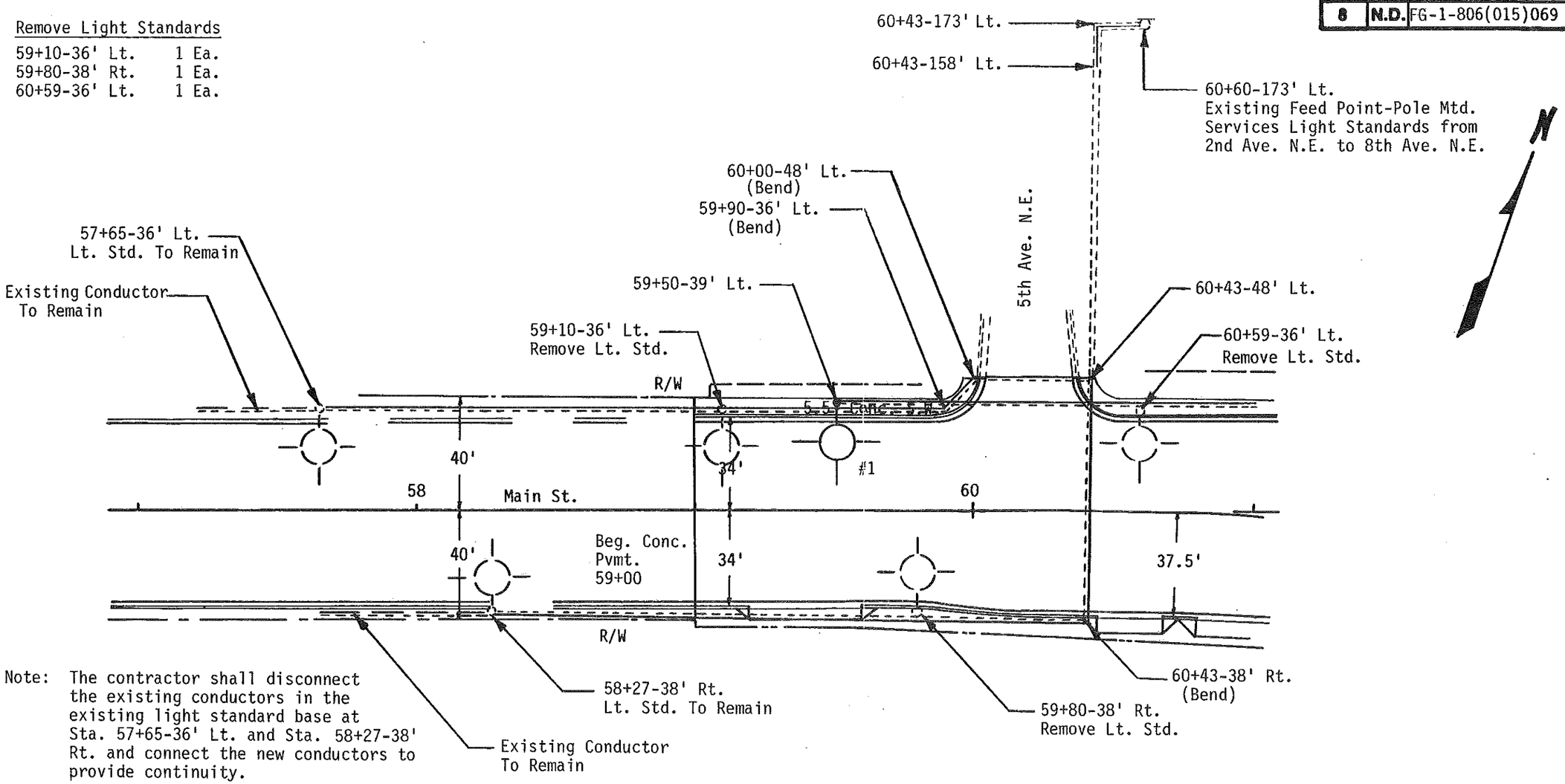
Revised Feed Point
Sta. 24+95-54'Lt.

ND 1806 Hwy.
Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	146

Remove Light Standards

59+10-36' Lt. 1 Ea.
59+80-38' Rt. 1 Ea.
60+59-36' Lt. 1 Ea.



Note: The contractor shall disconnect the existing conductors in the existing light standard base at Sta. 57+65-36' Lt. and Sta. 58+27-38' Rt. and connect the new conductors to provide continuity.

Traffic Control System

Lighting Layout

Sta. 57+00 to 61+00

Main Street

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	147

STATION	CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
	Length	Size	Length	Length	Type
59+50-39' Lt. to 61+00-39' Lt.	149'	2"		308'	(2) No. 4 RHW
				154'	(1) No. 6 RHW
				154'	(1) No. 6 THW
57+65-36' Lt. to 59+90-36' Lt.	224'	2"			
	16'	2"		864'	(3) No. 4 RHW
60+00-48' Lt. to 60+43-48' Lt.	43'	2"		288'	(1) No. 6 THW
58+27-38' Rt. to 60+43-38' Rt.	215'	2"		918'	(3) No. 2 RHW
	86'	2"		306'	(1) No. 6 THW
60+43-48' Lt. to 60+43-158' Lt.			110'	456'	(3) No. 2 RHW
	15'	2"		456'	(3) No. 4 RHW
60+43-173' Lt. to 60+60-173' Lt.	16'	2"		304'	(2) No. 6 THW

QUANTITIES

Cable Trench - Type I	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 Ft. M.A. - 40 Ft. Mt. Ht. - Festoon	H.P. Sodium Vapor Luminaire - 400 Watt	Remove Light Standard	Concrete Foundation - Highway Lighting	Underground Conductor No. 6-Type RHW			
L.F.	L.F.	L.F.	L.F.	L.F.	EA.	EA.	EA.	EA.	LF			
110	764	1374	1474	1052	1	1	3	1	154			
CITY FUNDS ONLY			154									

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
1	59+50	39' Lt.	400	B-1	MNC-IV	40' (A)	6'

(A) - FESTOON

3200

Traffic Control System
Lighting Quantities
Sta. 57+00 to 61+00
Main Street
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	148

REMOVE LIGHT STANDARDS

Sta. 61+24-38' Rt. 1 Ea.
Sta. 62+32-36' Lt. 1 Ea.
Sta. 62+90-38' Rt. 1 Ea.
Sta. 65+12-36' Lt. 1 Ea.

REMOVE STREET LIGHT LUMINAIRE

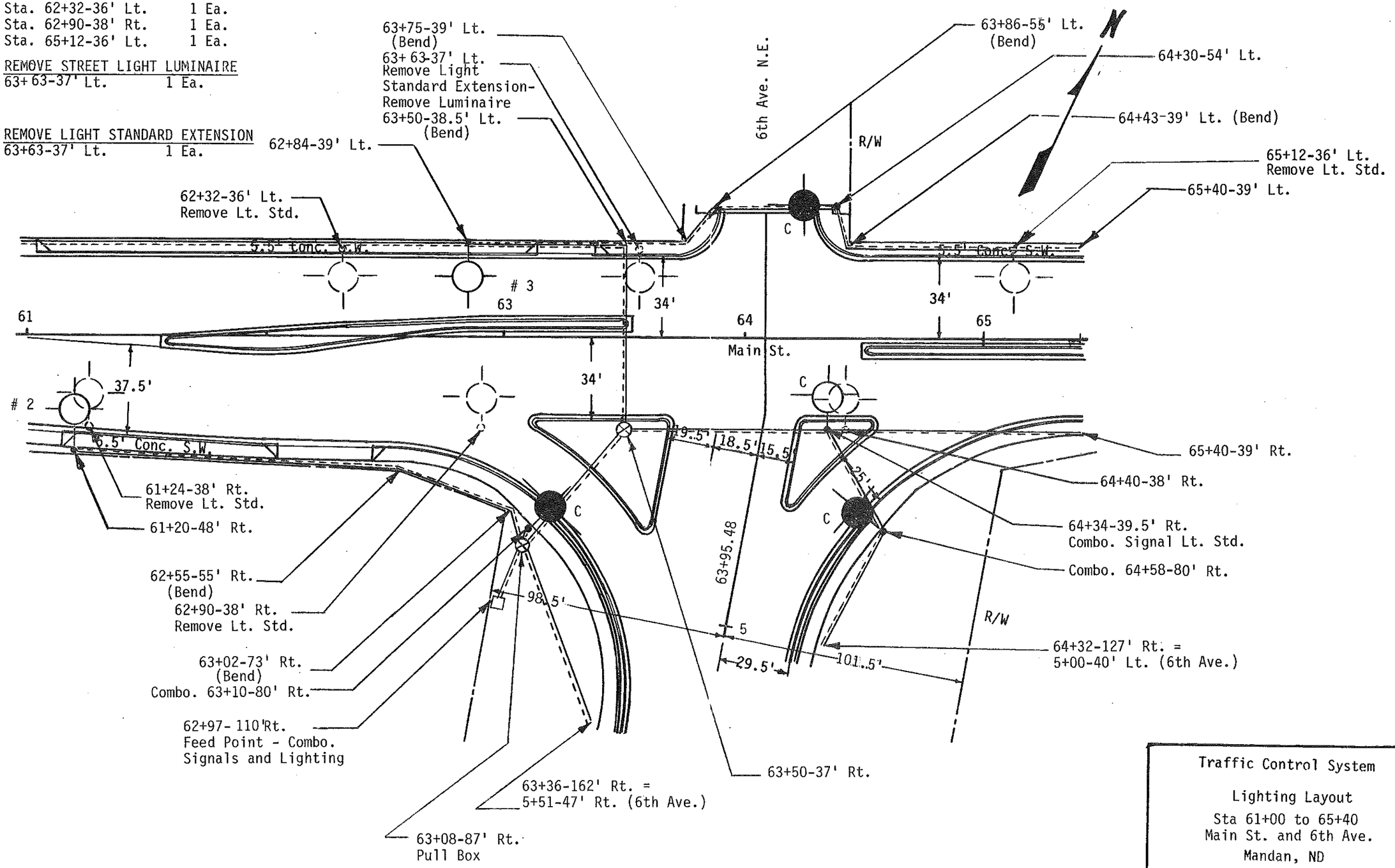
63+63-37' Lt. 1 Ea.

REMOVE LIGHT STANDARD EXTENSION

63+63-37' Lt. 1 Ea.

PULL BOX

63+08-87' Rt. 1 EA.



Traffic Control System

Lighting Layout

Sta 61+00 to 65+40
Main St. and 6th Ave.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ NO	SHEET NO.
8	N.D.	FG-1-810(015)069	142

STATION	CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
61+00-39' Lt. to 62+84-39' Lt.	183'	2"		376'	(2) No. 4 RHW
				188'	(1) No. 6 RHW
				188'	(1) No. 6 THW
62+84-39' Lt. to 63+50-38.5' Lt.	65'	2"		280'	(4) No. 4 RHW
	65'	2"		140'	(2) No. 6 RHW
				140'	(2) No. 6 THW
63+50-38.5 Lt. to 63+75-39' Lt.	25'	2"		186'	(2) No. 4 RHW
	20'	2"		93'	(1) No. 6 RHW
63+86-55' Lt. to 64+30-54' Lt.	43'	2"		93'	(1) No. 6 THW
64+30-54' Lt. to 64+43-39' Lt.	19'	2"		242'	(2) No. 4 RHW
	97'	2"		121'	(1) No. 6 RHW
65+40-39' Lt.				121'	(1) No. 6 THW
63+50-38.5' Lt. to 63+50-37' Rt.	75'	2"		152'	(2) No. 4 RHW
				76'	(1) No. 6 RHW
				76'	(1) No. 6 THW
61+20-48' Rt. to 62+55-55' Rt.	134'	2"		621'	(3) No. 4 RHW
63+02-73' Rt. to 63+08-87' Rt.	50'	2"			
	14'	2"		207'	(1) No. 6 THW
63+08-87' Rt. to 63+02-73' Rt.	13'	2"		46'	(2) No. 4 RHW
				23'	(1) No. 6 THW
63+08-87' Rt. to 63+36-162' Rt.	79'	2"		168'	(2) No. 4 RHW
				84'	(1) No. 6 THW
63+08-87' Rt. to 63+50-37' Rt.	63'	2"		337'	(5) No. 4 RHW
				65'	(1) No. 6 RHW
				134'	(2) No. 6 THW
63+08-87' Rt. to 62+97-110' Rt.	23'	2"		187'	(5) No. 4 RHW
				35'	(1) No. 6 RHW
				74'	(2) No. 6 THW
63+50-37' Rt. to 64+34-39.5' Rt.	82'	2"		264'	(3) No. 4 RHW
				88'	(1) No. 6 THW
64+34-39.5' Rt. to 64+58-80' Rt.	45'	2"		110'	(2) No. 4 RHW
				55'	(1) No. 6 THW
64+58-80' Rt. to 64+32-127' Rt.	53'	2"		116'	(2) No. 4 RHW
				58'	(1) No. 6 THW
64+34-39.5' Rt. to 65+40-39' Rt.	105'	2"		330'	(3) No. 4 RHW
				110'	(1) No. 6 THW

QUANTITIES

Concrete Foundation-Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4-Type RHW	Underground Conductor No. 6-Type RHW	Underground Conductor No. 6-Type THW	Light Standard 6 Ft. M.A.-40 Ft. Mtd. Ht.	Light Standard 6 Ft. M.A.-40 Ft. Mtd. Ht.-Festoon	Light Standard 12 Ft. M.A.-40 Ft. Mtd. Ht.-Festoon	H.P. Sodium Vapor Luminaire-250 Watt	H.P. Sodium Vapor Luminaire 400 Watt	Remove Light Standards	Remove Street Light Luminaire	Remove Light Standard Extension	Pull Box
EA.	LF	LF	LF	LF	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	EA.
4	1253	2184	718	1451	2	1	1	3	3	4	1	1	1

City Funds	1231

NO	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
2	61+20	48' Rt.	400	B-2	MNC-IV	40' (A)	12'
3	62+84	39' Lt.	400	B-1	MNC-IV	40' (A)	6'
C	63+10	80' Rt.	250	B-2	MSC-II	40'	6'
C	64+30	54' Lt.	250	B-1	MSC-II	40'	6'
C	64+34	39.5' Rt.	400	B-2	MNC-IV	40'	6'
C	64+58	80' Rt.	250	B-2	MSC-II	40'	6'

(A)-Festoon

TRAFFIC CONTROL SYSTEM
LIGHTING QUANTITIES

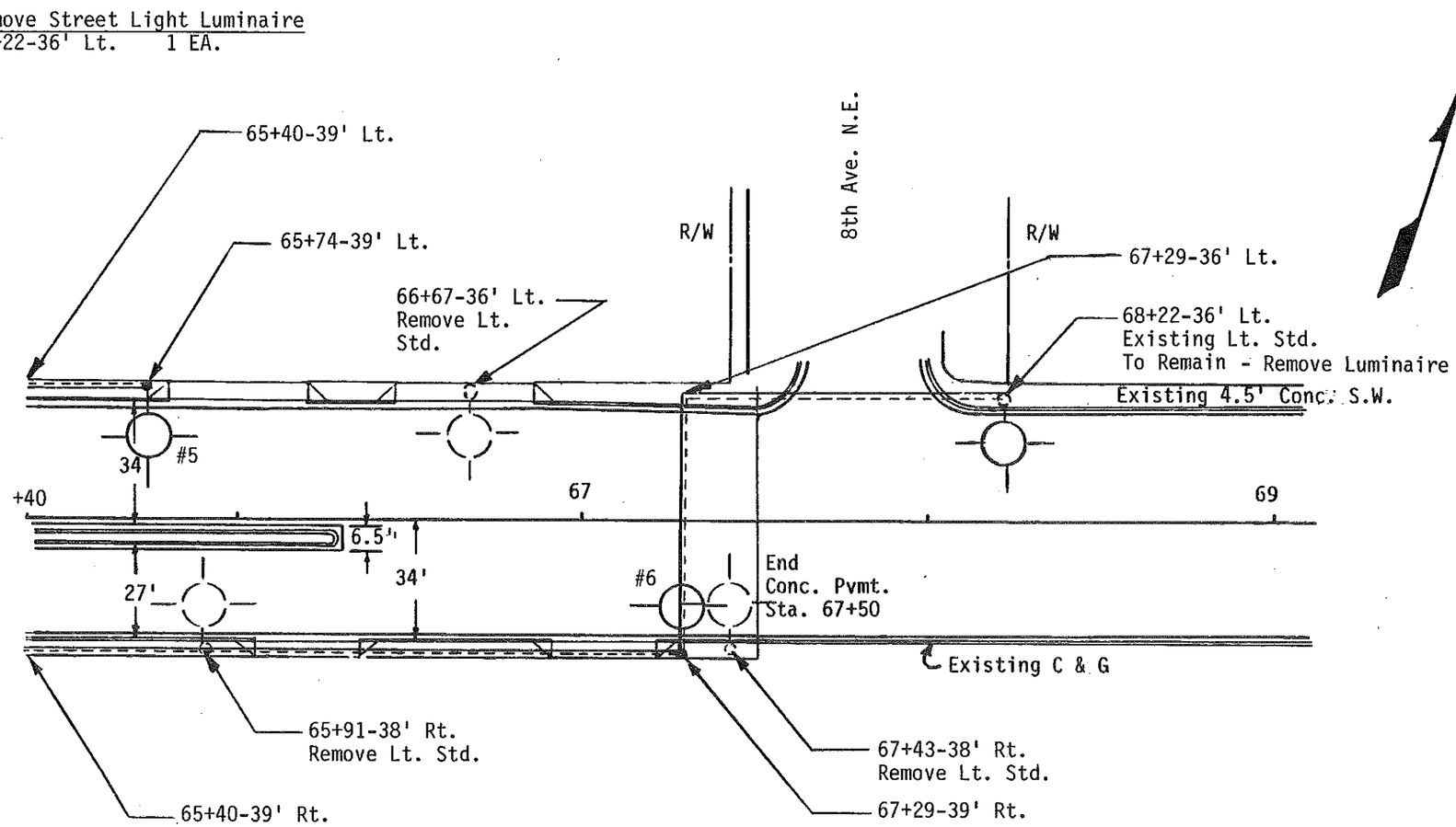
Sta. 61+00 to 65+40

Main Street & Sixth Avenue
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	150

Remove Light Standard
65+91-38' Rt. 1 EA.
66+67-36' Lt. 1 EA.
67+43-38' Rt. 1 EA.

Remove Street Light Luminaire
68+22-36' Lt. 1 EA.



Traffic Control System

Lighting Layout
Sta 65+40 to 69+00
Main St. and 8th Ave. N.E.

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	151

STATION	CONDUIT RUNS		CABLE RUNS	CABLE RUNS	
	Length	Size	Length	Length	Type
65+40-39' Lt. to 65+74-39' Lt.	33'	2"		76'	(2) No. 4 RHW
				38'	(1) No. 6 RHW
				38'	(1) No. 6 THW
68+22-36' Lt. to 67+29-36' Lt. to 67+29-39' Rt.	92'	2"		528'	(3) No. 4 RHW
	74'			176'	(1) No. 6 THW
65+40-39' Rt. to 67+29-39' Rt.	188'	2"		579'	(3) No. 4 RHW
				193'	(1) No. 6 THW

QUANTITIES

Concrete Foundations - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type RHW	Underground Conductor NO. 6 - Type THW	Light Standard 6 Ft. M.A. - 40 Ft. Mtd. Ht. - Festoon	H. P. Sodium Vapor Luminaire - 400 Watt	Remove Light Standards	Remove Street Light Luminaire				
EA.	L.F.	L.F.	L.F.	L.F	EA.	EA.	EA.	EA.				
2	387	776	38	407	2	3	3	1				

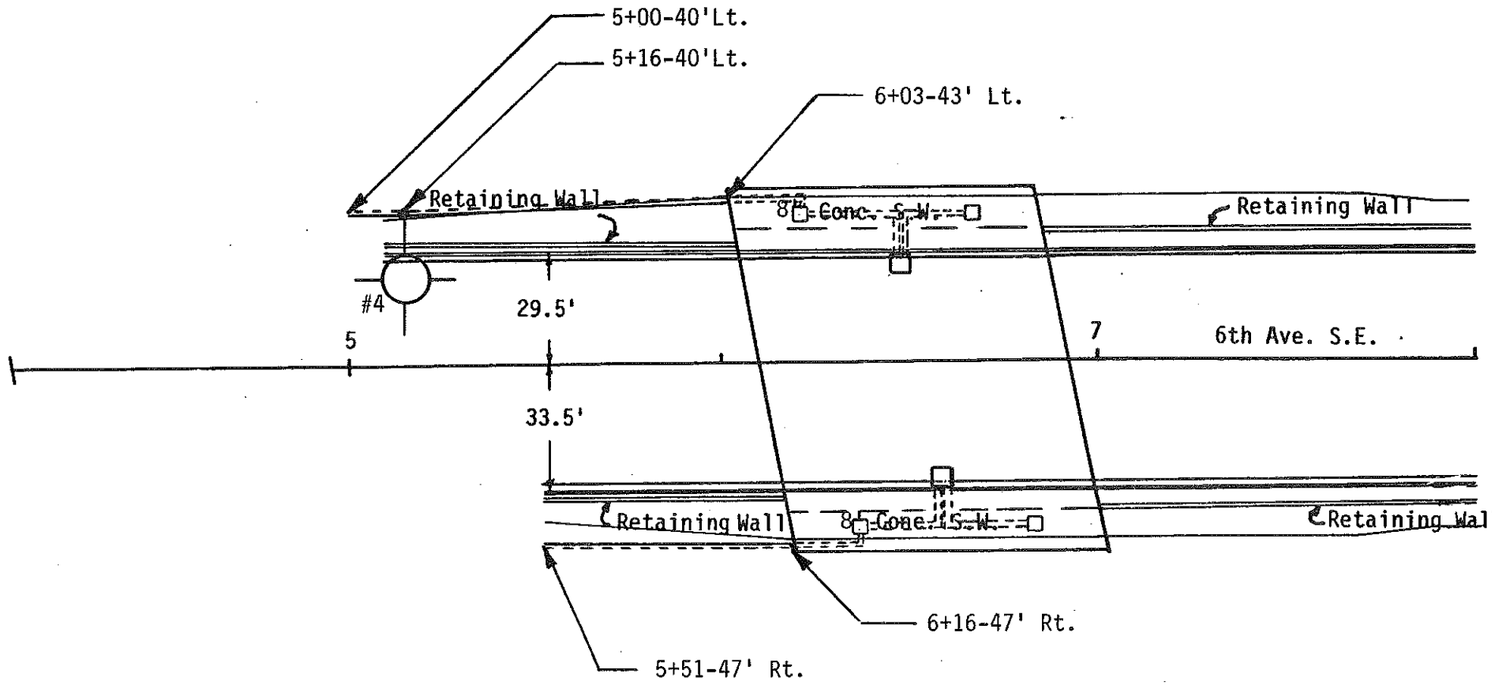
CITY FUNDS	407

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
5	65+74	39' Lt.	400	B-1	MNC-IV	40' (A)	6'
6	67+29	39' Rt.	400	B-2	MNC-IV	40' (A)	6'
	68+22	36' Lt.	400	B-2	MNC-IV	Existing	Existing

(A) - Festoon

Traffic Control System
Lighting Quantities
Sta. 65+40 to 69+00
Main Street and 8th Avenue NE
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG -1-806(015)069	152



Traffic Control System

Lighting Layout

Sta. 5+00 to 8+00

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	RG-1-806(15)69	153

STATION		CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
5+00-40'Lt. 5+16-40'Lt.	to	15'	2"		40' 20'	(2) No. 4 RHW (1) No. 6 THW
5+16-40'Lt. 6+03-43'Lt.	to	86'	2"		182' 91'	(2) No. 4 RHW (1) No. 6 THW
6+03-43'Lt. 6+21-39.5'Lt. 6+45-31.5'Lt. 6+70-39.5'Lt.	to to to				248' 124'	(2) No. 4 RHW (1) No. 6 THW
5+51-47'Rt. 6+16-47' Rt.	to	65'	2"		130' 65'	(2) No. 4 RHW (1) No. 6 THW
6+16-47'Rt. 6+34-43.5'Rt. 6+58-35.5'Rt. 6+83-43.5'Rt.	to to to				248' 124'	(2) No. 4 RHW (1) No. 6 THW

QUANTITIES

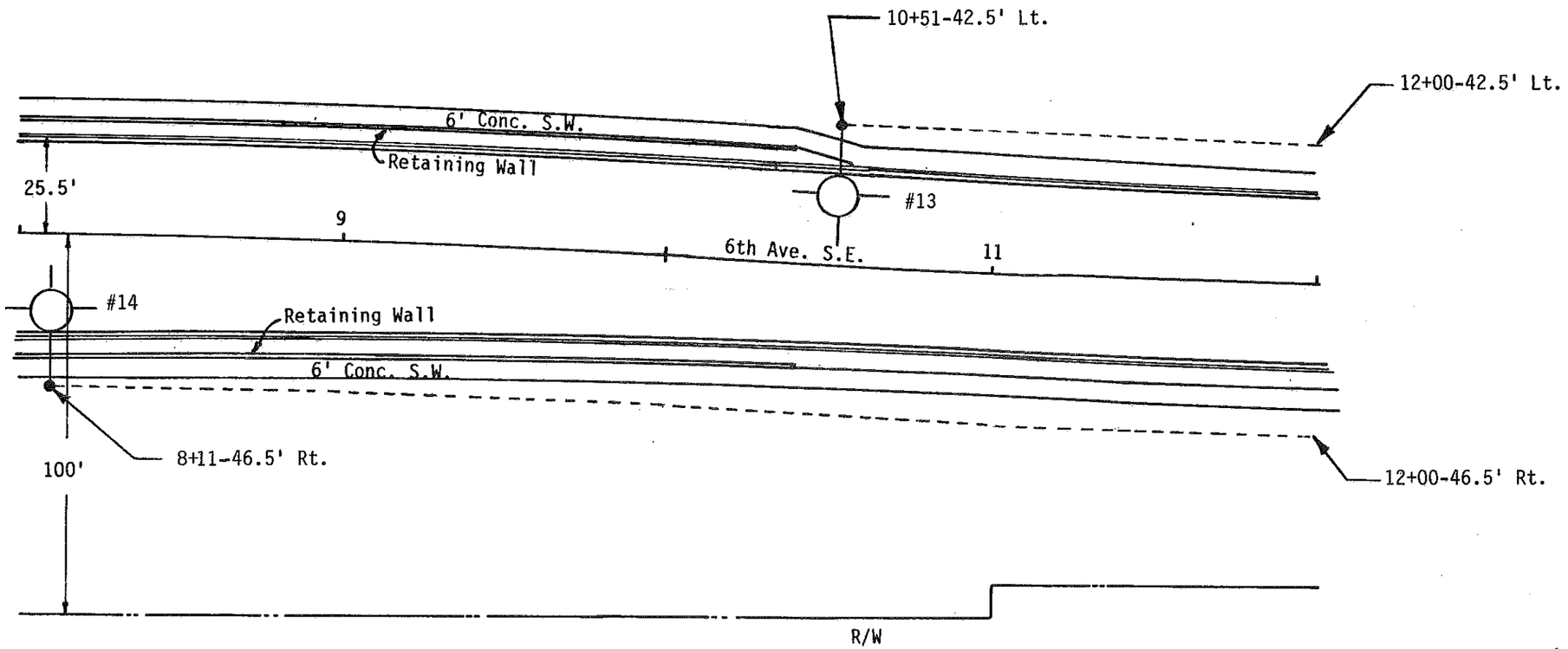
Concrete Foundation-Highway Lighting		Underground Conductor No. 4 - Type RHW	Underground Conductor No. 6 - Type THW		H.P. Sodium Vapor Luminaire - 400 Watt	Lt. Std. 10'Ft. - M.A. 40 Ft. Mtd. Ht.	2" Dia. Rigid Conduit	Underpass Light Unit Ceiling Mounted 100 watt	H.P. Sodium Vapor Wall-Mt. Luminaire - 150 Watt	
EA.		L.F.	L.F.		EA.	EA.	L.F.	EA.	EA.	
1		848	424		1	1	166	4	2	

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
4	5+16	40'Lt.	400	B-2	MS-II	40'	10'
	6+21	39.5'Lt.	100	B-2	(A)	Ceiling	Mounted
	6+45	31.5'Lt.	150	B-2	(A)	Wall	Mounted
	6+70	39.5'Lt	100	B-2	(A)	Ceiling	Mounted
	6+34	43.5'Rt.	100	B-2	(A)	Ceiling	Mounted
	6+58	35.5'Rt.	150	B-2	(A)	Wall	Mounted
	6+83	43.5'Rt.	100	B-2	(A)	Ceiling	Mounted

(A) Ceiling mounted and wall mounted light units shall be operated on 240 volts.

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 5+00 to 8+00
ND 1806 Hwy.
Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	154



Traffic Control System

Lighting Layout

Sta. 8+00 to 12+00

ND 1806 Hwy.

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	155

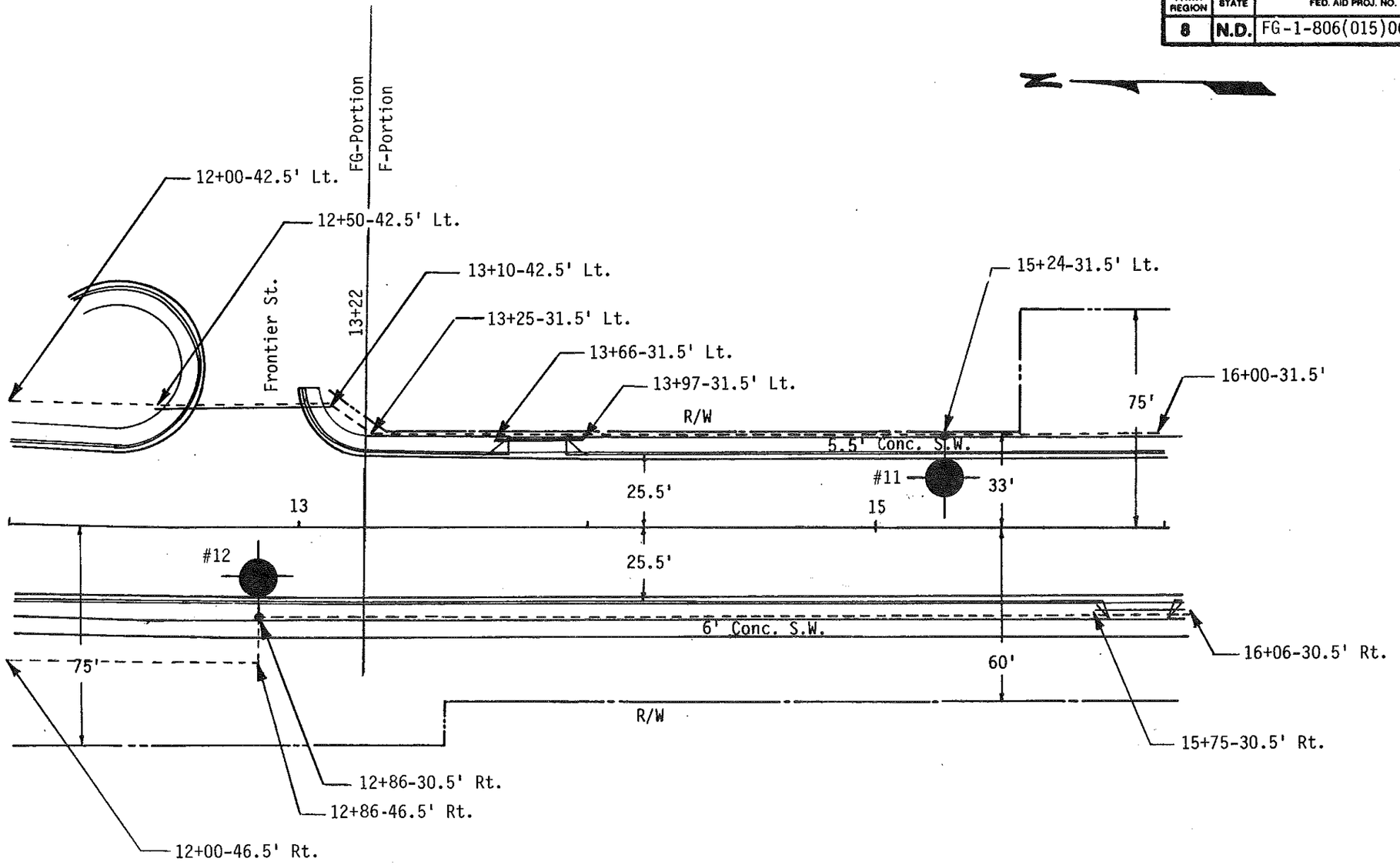
STATION	CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
8+11-46.5'Rt. to 12+00-46.5'Rt.			388'	792' 396'	(2) No. 6 RHW (1) No. 6 THW
10+51-42.5'Lt. to 12+00-42.5'Lt.			148'	312' 156'	(2) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundations – Highway Lighting	Cable Trench - Type I	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. Std. 12 Ft. M.A.- 40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 400 Watt	Lt. Std. 12 Ft. M.A.- 29 Ft. Pole				
EA.	L.F.	L.F.	L.F.	EA.	EA.	EA.				
2	536	1104	552	1	2	1				

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
13	10+51	42.5'Lt.	400	A-4	MS-II	40'	12'
14	8+11	46.5'Rt.	400	A-3	MS-II	29'	12'

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 8+00 to 12+00
ND 1806 Hwy.
Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	156



Traffic Control System

Lighting Layout
Sta. 12+00 to 16+00

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-F-1806(015)069	157

STATION		CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
12+00-46.5'Rt. 12+86-30.5'Rt.	to			101'	218' 109'	(2) No. 6 RHW (1) No. 6 THW
12+86-30.5'Rt. 15+75-30.5'Rt.	to			288'	592' 296'	(2) No. 6 RHW (1) No. 6 THW
15+75-30.5'Rt. 16+06-30.5'Rt.	to	31'	2"		62' 31'	(2) No. 6 RHW (1) No. 6 THW
12+00-42.5'Lt. 12+50-42.5'Lt.	to			50'	100' 50'	(2) No. 6 RHW (1) No. 6 THW
12+50-42.5'Lt. 13+10-42.5'Lt.	to	60'	2"		120' 60'	(2) No. 6 RHW (1) No. 6 THW
13+10-42.5'Lt. 13+66-31.5'Lt.	to			60'	120' 60'	(2) No. 6 RHW (1) No. 6 THW
13+66-31.5'Lt. 13+97-31.5'Lt.	to	31'	2"		62' 31'	(2) No. 6 RHW (1) No. 6 THW
13+97-31.5'Lt. 15+24-31.5'Lt.	to			126'	268' 134'	(2) No. 6 RHW (1) No. 6 THW
15+24-31.5'Lt. 16+00-31.5'Lt.	to			75'	166' 83'	(2) No. 6 RHW (1) No. 6 THW

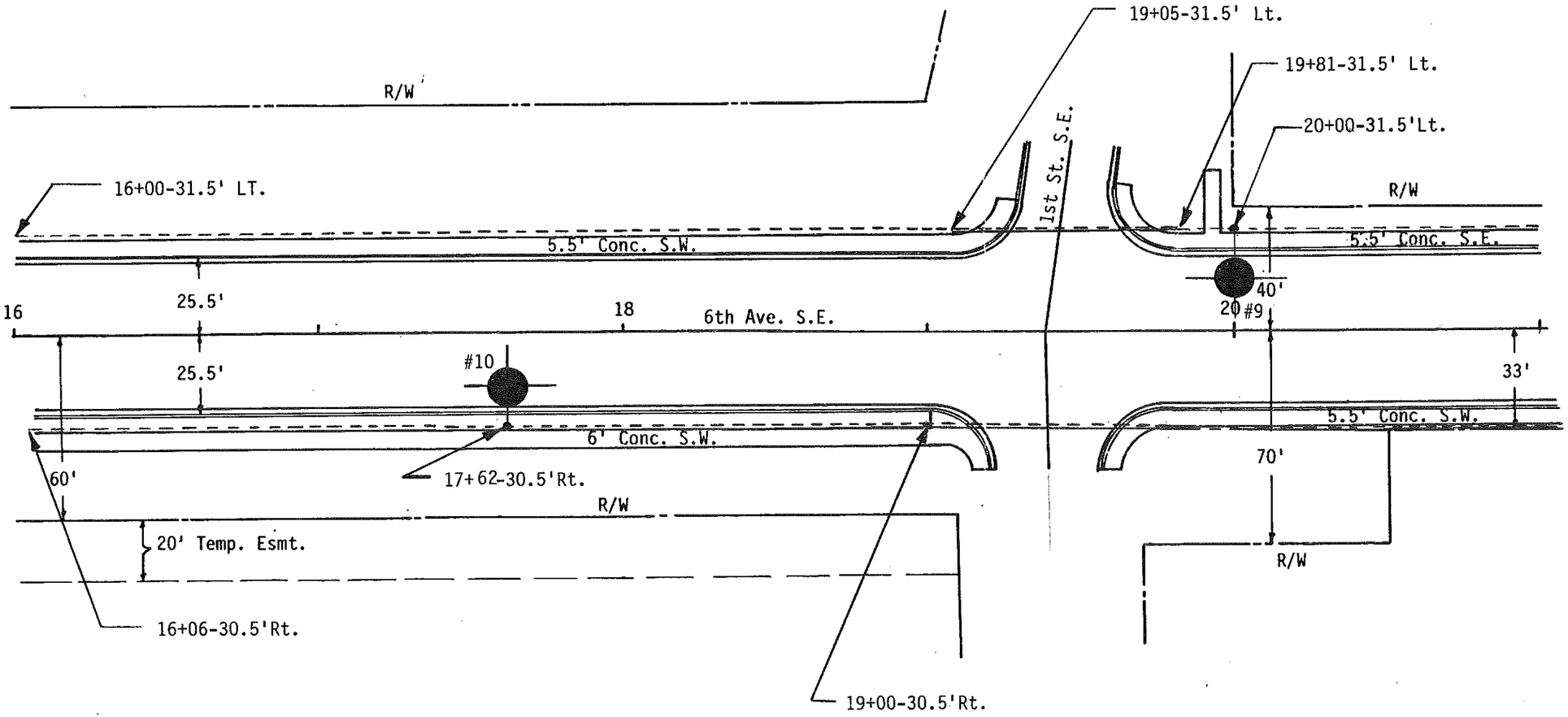
NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
12	12+86	30.5'Rt.	250	A-3	MS-II	40'	6'
11	15+24	31.5'Lt.	250	A-4	MS-II	40'	6'

QUANTITIES

	Concrete Foundations-Highway Lighting	Cable Trench - Type I	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. Std. 6 Ft. M.A.-40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt				
	EA.	L.F.	L.F.	L.F.	L.F.	EA.	EA.				
F	1	499	62	1154	577	1	1				
FG	1	201	60	554	277	1	1				

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 12+00 to 16+00
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	158



Traffic Control System

Lighting Layout
Sta. 16+00 to 21+00

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(15)69	159

STATION		CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
		Length	Size	Length	Length	Type
16+06-30.5'Rt. 17+62-30.5'Rt.	to			155'	326' 163'	(2) No. 6 RHW (1) No. 6 THW
17+62-30.5'Rt. 19+00-30.5'Rt.	to			137'	290' 145'	(2) No. 6 RHW (1) No. 6 THW
19+00-30.5'Rt. 21+00-30.5'Rt.	to	200'	2"		400' 200'	(2) No. 6 RHW (1) No. 6 THW
16+00-31.5'Lt. 19+05-31.5'Lt.	to			305'	610' 305'	(2) No. 6 RHW (1) No. 6 THW
19+05-31.5'Lt. 19+81-31.5'Lt.	to	76'	2"		152' 76'	(2) No. 6 RHW (1) No. 6 THW
19+81-31.5'Lt. 20+00-31.5'Lt.	to			18'	52' 26'	(2) No. 6 RHW (1) No. 6 THW
20+00-31.5'Lt. 21+00-31.5'Lt.	to			99'	214' 107'	(2) No. 6 RHW (1) No. 6 THW

QUANTITIES

Concrete Foundation – Highway Lighting	Cable Trench - Type I	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. Std. 6 Ft. M.A. 40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt				
EA	L.F.	L.F.	L.F.	L.F.	EA.	EA.				
2	714	276	2044	1022	2	2				

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
10	17+62	30.5'Rt.	250	A-3	MS-II	40'	6'
9	20+00	31.5'Lt.	250	A-4	MS-II	40'	6'

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 16+00 to 21+00
ND 1806 Hwy.
Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	160

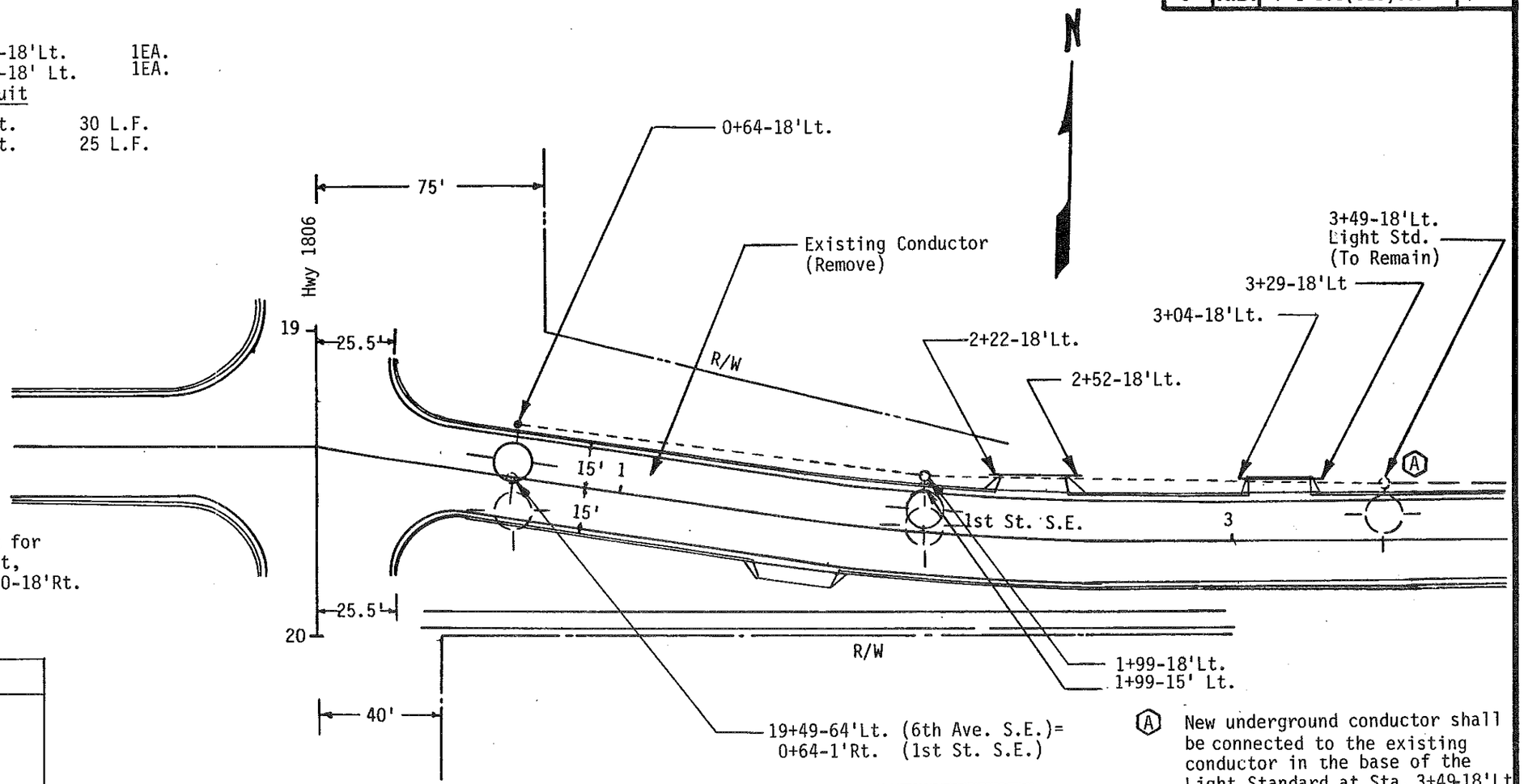
Relocate Light Standard

From	To	
0+64-1'Rt.	0+64-18'Lt.	1EA.
1+99-15' Lt.	1+99-18' Lt.	1EA.

Install 2" Dia. Rigid Conduit

2+22-18'Lt.	to	2+52-18'Lt.	30 L.F.
3+04-18'Lt.	to	3+29-18'Lt.	25 L.F.

NOTE: Lighting Feed Point for 1st St. S.E. Circuit, located at Sta. 7+90-18'Rt.



A New underground conductor shall be connected to the existing conductor in the base of the Light Standard at Sta. 3+49-18'Lt The new underground conductor 2-No. 4 RHW, 1-No. 4 THW shall supply power to the two remaining Light Standards on the circuit.

QUANTITIES					
Concrete Foundation-Highway Lighting	Relocate Light Standard	Cable Trench Type I	2" Dia. Rigid Conduit	Underground Conductor No. 4, Type RHW	Underground Conductor No. 4, Type THW
EA.	EA.	L.F.	L.F.	L.F.	L.F.
2	2	226	55	626	313

Station		Conduit Runs		Cable Trench	Cable Runs	
		Length	Size	Length	Length	Type
0+64-18'Lt.	to			133'	298'	(2) No. 4 RHW
1+99-18'Lt.					149'	(1) No. 4 THW
1+99-18'Lt.	to	55'	2"	93'	328'	(2) No. 4 RHW
3+49-18'Lt.					164'	(1) No. 4 THW

Traffic Control System

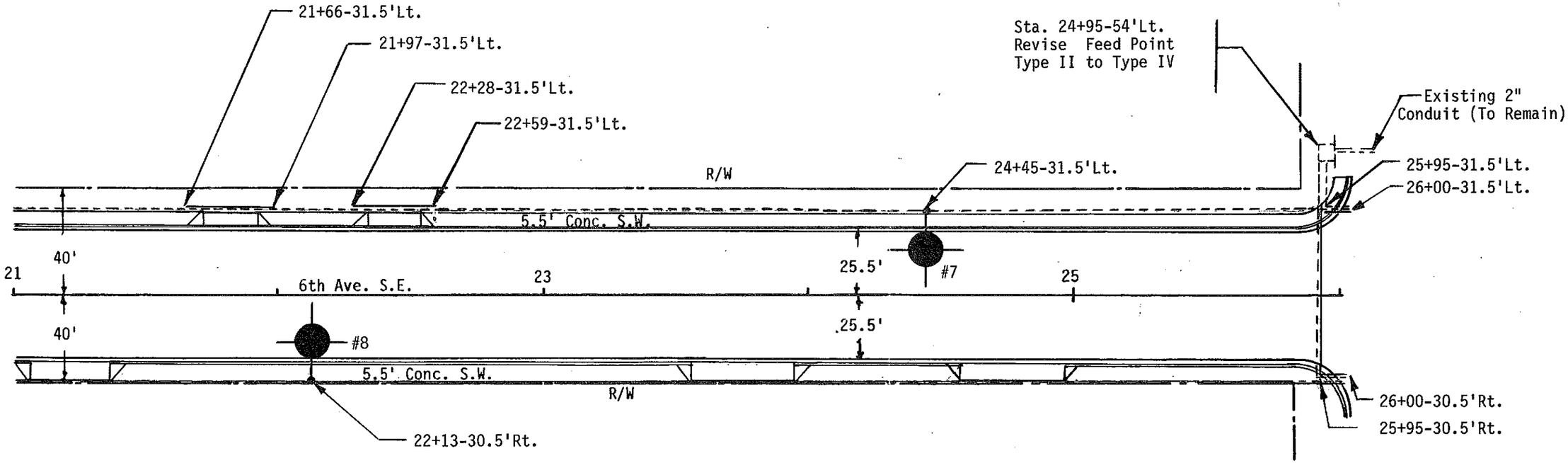
Lighting Layout and Quantities
Sta. 0+00 to 3+50

1st Street S. East
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	16

Revise Feed Point

Sta. 24+95-54'Lt. 1 EA.



Traffic Control System

Lighting Layout
Sta. 21+00 to 26+00

ND 1806 Hwy.
Mandan, ND

STATION		CONDUIT RUNS		CABLE TRENCH	CABLE RUNS	
		Length	Size	Length	Length	Type
21+00-30.5'Rt.	to	112'	2"		234'	(2) No. 6 RHW
22+13-30.5'Rt.					117'	(1) No. 6 THW
22+13-30.5'Rt.	to	386'	2"		782'	(2) No. 6 RHW
26+00-30.5'Rt.					391'	(1) No. 6 THW
26+00-30.5'Rt.	to	67'	2"		134'	(2) No. 6 RHW
25+95-30.5'Rt.	to				67'	(1) No. 6 THW
25+95-31.5'Lt.						
21+00-31.5'Lt.	to			66'	704'	(2) No. 6 RHW
21+66-31.5'Lt.	to	31'	2"		352'	(1) No. 6 THW
21+97-31.5'Lt.	to			31'		
22+28-31.5'Lt.	to	31'	2"			
22+59-31.5'Lt.	to			185'		
24+45-31.5'Lt.						
24+45-31.5'Lt.	to			149'	314'	(2) No. 6 RHW
25+95-31.5'Lt.					157'	(1) No. 6 THW
25+95-31.5'Lt.	to	5'	2"		20'	(4) No. 6 RHW
26+00-31.5'Lt.					10'	(2) No. 6 THW
25+95-31.5'Lt.	to			21'	132'	(4) No. 6 RHW
25+95-54'Lt.					66'	(2) No. 6 THW

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(15)69	62

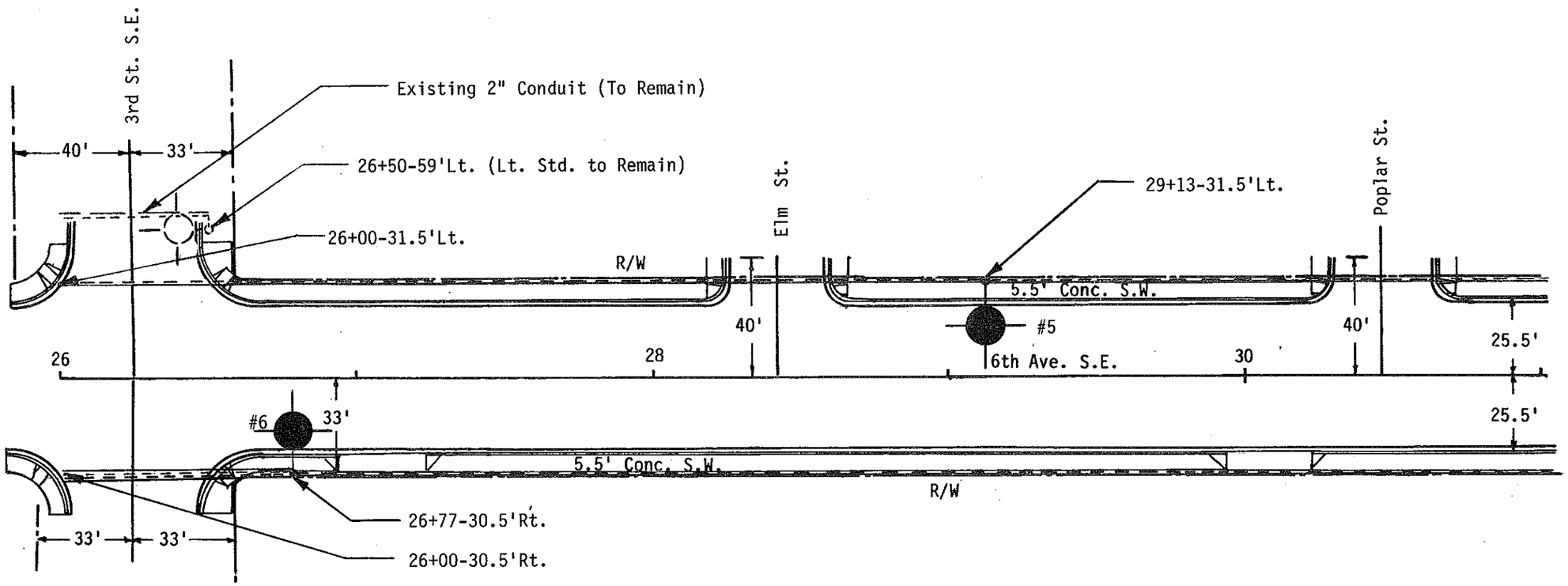
QUANTITIES

Concrete Foundation-Highway Lighting	Cable Trench - Type I	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6-Type THW	Lt. Std. 6 Ft. M.A. - 40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt	Revise Feed Point			
EA.	L.F.	L.F.	L.F.	L.F.	EA.	EA.	EA.			
2	452	632	2320	1160	2	2	1			

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
8	22+13	30.5'Rt.	250	A-3	MS-II	40'	6'
7	24+45	31.5'Lt.	250	A-4	MS-II	40'	6'

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 21+00 to 26+00
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	163



Traffic Control System
Lighting Layout
Sta. 26+00 to 31+00

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(15)69	164

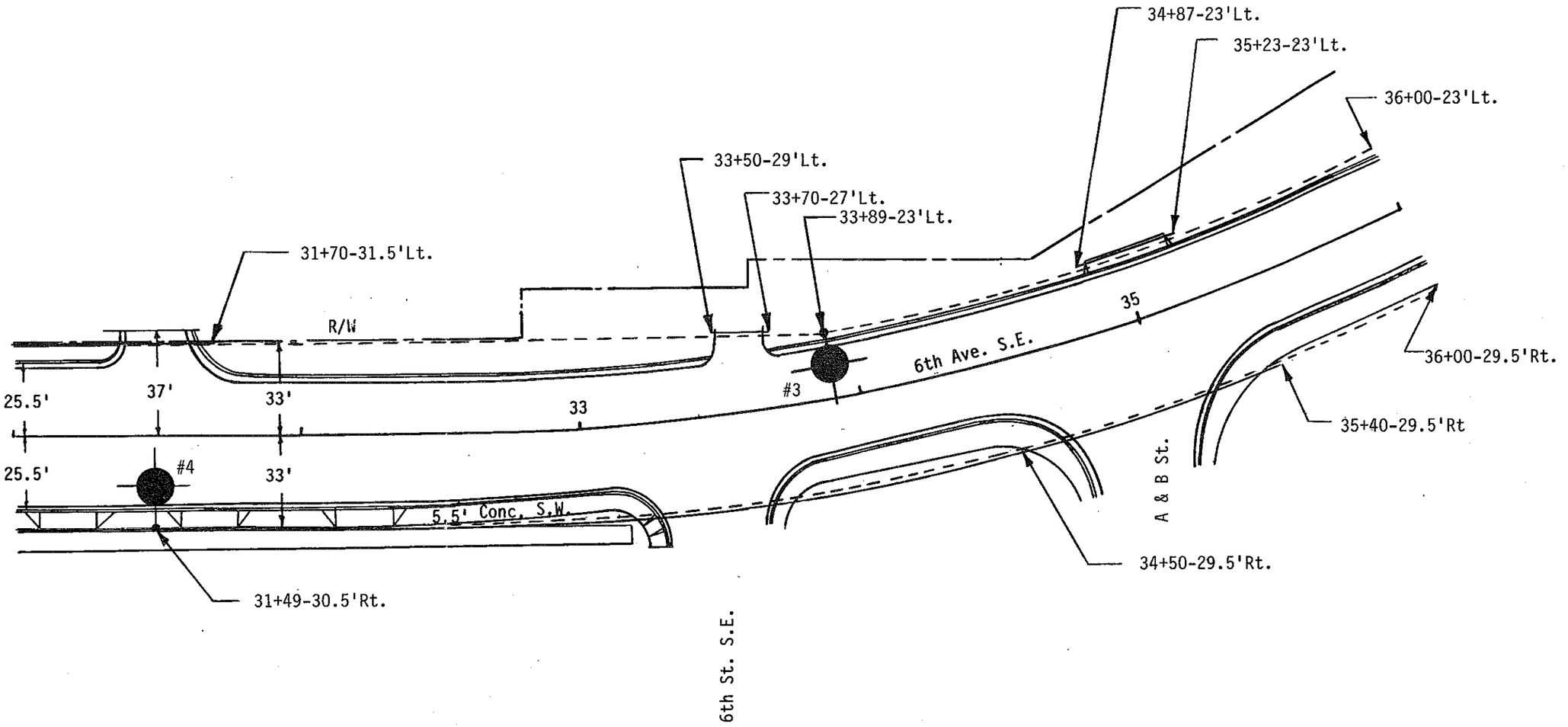
STATION		CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
26+00-30.5'Rt. 26+77-30.5'Rt.	to	152'	2"		324' 162'	(4) No. 6 RHW (2) No. 6 THW
26+77-30.5'Rt. 31+00-30.5'Rt.	to	422'	2"		854' 427'	(2) No. 6 RHW (1) No. 6 THW
26+00-31.5'Lt. 29+13-31.5'Lt.	to	312'	2"		1268' 634'	(4) No. 6 RHW (2) No. 6 THW
29+13-31.5'Lt. 31+00-31.5'Lt.	to	186'	2"		382' 191'	(2) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundation - Highway Lighting	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. STd. 6 Ft. M.A.- 40 Ft. MTd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt					
EA.	L.F.	L.F.	L.F.	EA.	EA.					
2	1072	2828	1414	2	2					

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
6	26+77	30.5'Rt.	250	A-3	MS-II	40'	6'
5	29+13	31.5'Lt.	250	A-4	MS-II	40'	6'

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 26+00 to 31+00
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	165



Traffic Control System

Lighting Layout
Sta. 31+00 to 36+00

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(15)69	166

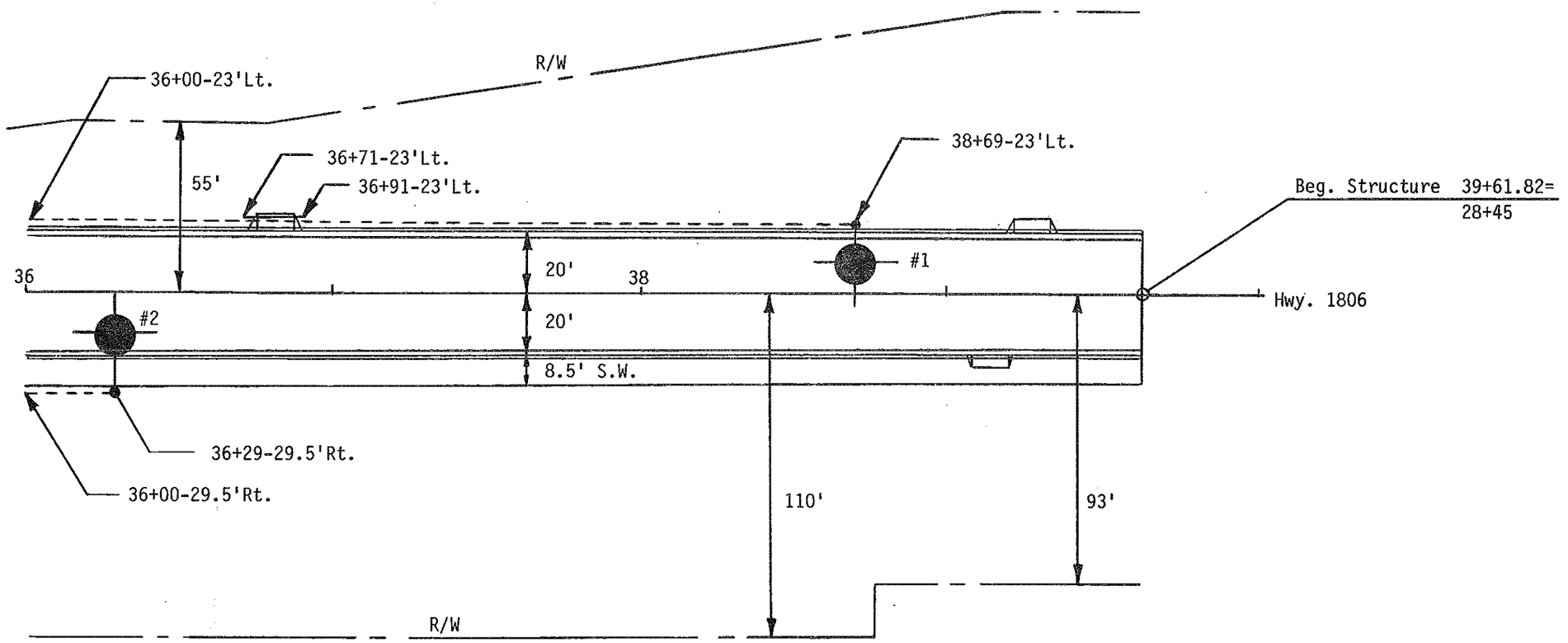
STATION		CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
31+00-30.5'Rt.	to	48'	2"		106'	(2) No. 6 RHW
31+49-30.5'Rt.					53'	(1) No. 6 THW
31+49-30.5'Rt.	to	402'	2"		814'	(2) No. 6 RHW
35+40-29.5'Rt.					407'	(1) No. 6 THW
35+40-29.5'Rt.	to			62'	124'	(2) No. 6 RHW
36+00-29.5'Rt.					62'	(1) No. 6 THW
31+00-31.5'Lt.	to	70'	2"		140'	(2) No. 6 RHW
31+70-31.5'Lt.					70'	(1) No. 6 THW
31+70-31.5'Lt.	to			180'	360'	(2) No. 6 RHW
33+50-29'Lt.					180'	(1) No. 6 THW
33+50-29'Lt.	to	20'	2"		40'	(2) No. 6 RHW
33+70-27'Lt.					20'	(1) No. 6 THW
33+70-27'Lt.	to			18'	52'	(2) No. 6 RHW
33+89-23'Lt.					26'	(1) No. 6 THW
33+89-23'Lt.	to			94'	204'	(2) No. 6 RHW
34+87-23'Lt.					102'	(1) No. 6 THW
34+87-23'Lt.	to	35'	2"		70'	(2) No. 6 RHW
35+23-23'Lt.					35'	(1) No. 6 THW
35+23-23'Lt.	to			75'	150'	(2) No. 6 RHW
36+00-23'Lt.					75'	(1) No. 6 THW

QUANTITIES										
Concrete Foundation-Highway Lighting	Cable Trench - Type I	2" Dia. Rigid Conduit	Undergound Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. Std. 6 Ft. M.A.- 40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt				
EA.	L.F.	L.F.	L.F.	L.F.	EA.	EA.				
2	429	575	2060	1030	2	2				

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
4	31+49	30.5'Rt.	250	A-3	MS-II	40'	6'
3	33+89	23'Lt.	250	A-4	MS-11	40'	6'

TRAFFIC CONTROL SYSTEM
Lighting Quantities
Sta. 31+00 to 36+00
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO
8	N.D.	F-1-806(015)069	167



TRAFFIC CONTROL SYSTEM
Lighting Layout
Sta. 36+00 to 39+61
ND 1806 Hwy.

Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(15)69	169

STATION	CONDUIT RUNS Length	CONDUIT RUNS Size	CABLE TRENCH Length	CABLE RUNS Length	CABLE RUNS Type
[illegible]			28'	72' 36'	(2) No. 6 RHW (1) No. 6 THW
[illegible]00+23'Lt. to [illegible]+71-23'Lt.			71'	142' 71'	(2) No. 6 RHW (1) No. 6 THW
36+71-23'Lt. to 36+91-23'Lt.	20'	2"		40' 20'	(2) No. 6 RHW (1) No. 6 THW
36+91-23'Lt. to 38+69-23'Lt.			177'	370' 185'	(2) No. 6 RHW (1) No. 6 THW

QUANTITIES										
Concrete Foundations-Highway Lighting	Cable Trench - Type I	2" Dia. Rigid Conduit	Underground Conductor No. 6 - Type RHW	Underground Conductor No. 6 - Type THW	Lt. Std. 6 Ft. M.A. 40 Ft. Mtd. Ht.	Lt. Std. 12 Ft. M.A.- 40 Ft. Mtd. Ht.	H.P. Sodium Vapor Luminaire - 250 Watt			
EA.	L.F.	L.F.	L.F.	L.F.	EA.	EA.	EA.			
2	276	20	624	312	1	1	2			

NO.	STATION	OFFSET	WATTAGE	CIRCUIT	IES-TYPE	POLE HT.	MAST ARM
2	36+29	29.5' Rt	250	A-3	MS-II	40'	12'
1	38+69	23'Lt.	250	A-4	MS-II	40'	6'

TRAFFIC CONTROL SYSTEM

Lighting Quantities
Sta. 36+00 to 39+61

ND 1806 Hwy.
Mandan, ND.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	162

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN AREA FLAT SHEET TYPE 2	SIGN AREA FLAT SHEET TYPE 3A or 3B	SIGN 1ST	SUPPORT 2ND	POST 3RD	LENGTHS 4TH	SIZE	SIGN 1ST	SUPPORT 2ND	SLEEVE LENGTH 3RD	4TH	SIZE	ANCHOR LNG.	UNIT SIZE	NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN.	RESET SUP.	MAX. LNG. FOR SUP. SIZE
59+10RT	7 RS			6.8				2.00						4.0	2.25	1	32.23	1		19.5
59+62LT	7 RS																	1	1	
59+65RT	HUFF GS			9.0	9.0			2.25						4.0	2.50	2	75.04	1		9.9
59+95LT	1 RS			9.8				2.25						4.0	2.50	1	39.60	1		10.5
59+75LT	442SNS																	1	1	
																		1	1	
60+15RT	442SNS		1.50	9.7				2.19						4.0	2.19	1	47.05	1		11.4
0+25LT	59 RS		5.68	9.7				2.19						4.0	2.19	1	47.05			11.4
0+25RT	59 RS			8.3				2.00						4.0	2.25	1	31.02			17.9
0+35RT	442SNS	6.00		8.8				2.00						4.0	2.25	1	32.23			19.5
1+00LT	7 RS	1.50																		
1+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
1+75LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
1+80RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
1+87LT	1 RS																	1	1	
2+15RT	1 RS																	1	1	
3+20LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
3+25LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
61+20RT	7 RS			RESET ON LIGHT STANDARD														1		
61+90LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
61+80RT	ASBY E	11.19		10.5				2.50	3.8				2.25	4.0	2.50	1	55.94			10.7
62+26LT	M1-2			9.8				2.25	0.0				0.00	4.0	2.50	1	39.60	1		10.5
62+85RT	22 RS	6.00		9.7				2.19						4.0	2.19	1	46.90			10.9
63+45LT	7 RS																	1	1	
5+40RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
5+16LT	7 RS	1.50		LIGHT STANDARD MOUNTED																
																		1	1	
64+40LT	7 RS																	1	1	
65+10LT	ASBY E			MAST ARM MOUNTED																
63+59.5RT	10 RS	5.00		RESET ON Mast Arm														1		
63+59.5RT	442SNS			RESET ON Signal STANDARD														1		
63+59.5RT	9 RS			10.8	10.8	10.8			2.50	2.4	2.4	2.4		2.25	4.0	2.50	3	159.09	1	13.3
62+80 RT	FORTLN			RESET ON Signal STANDARD														1		
63+59.5RT	ND1806			RESET ON Mast Arm														1		
63+70 LT	442SNS			RESET ON Mast Arm														1		
63+70 LT	FORTLN			MAST ARM MOUNTED																
63+70 LT	9 RS	5.00																		
SUBTOTAL NO. 1		46.69	7.18														831.39	21	8	

BASIS OF ESTIMATE

Sign Support Lengths

The sign support lengths have been calculated using the following information:

UTLIMATE PAVEMENT DEPTH

INSLOPES	VERTICAL CLEARANCE		GRADED ROADWAY WIDTHS
Lt.	Signs Viewed from Mainline	84"	Mainline
Rt.	Signs Viewed from Crossings	84"	Crossing Roadways

Traffic Control System

Sign Summary

ND 1806 Hwy.

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	170

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN AREA FLAT SHEET TYPE 2	SIGN AREA FLAT SHEET TYPE 3A or 3B	SIGN SUPPORT POST LENGTHS 1ST	2ND	3RD	4TH	SIZE	SIGN SUPPORT SLEEVE LENGTH 1ST	2ND	3RD	4TH	SIZE	ANCHOR LNG.	SIZE	UNIT NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN.	RESET SUP.	MAX. LNG. FOR SUP. SIZE
64+38LT	10 RS	5.00		MAST ARM MOUNTED																
64+38LT	442SNS			RESET ON Mast Arm														1		
64+34RT	10 RS			RESET ON Signal STANDARD														1		
64+34RT	442SNS			RESET ON LIGHT STANDARD														1		
64+34RT	9 RS			MAST ARM MOUNTED														1		
65+90RT	9 RM			9.7				2.19	0.0				0.00	4.0	2.19	1	47.05	1		10.9
65+74LT	9 GS			RESET ON LIGHT STANDARD														1		
66+45RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
67+43LT	7 RS																	1	1	
67+50LT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
67+58LT	1 RS			9.8				2.25						4.0	2.50	1	39.60	1		10.5
67+29RT	7 RS		1.50	LIGHT STANDARD MOUNTED																
68+15LT	7 RS																	1	1	
67+75RT	441SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
69+45LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
69+45RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
8+40LT	15 RS	6.25		9.2				2.19						4.0	2.19	1	45.19			10.3
9+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
10+00LT	L&CTRAIL			9.8				2.25						4.0	2.50	1	39.60	1		10.8
11+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
11+00LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
10+33-85°LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
10+50-115LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
12+15-110LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
12+20-75°LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
12+35-80°LT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
12+25LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
12+50LT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
12+60LT	1 RS			9.8				2.25						4.0	2.50	1	39.60	1		10.5
12+61RT	441SNS	1.50		LIGHT STANDARD MOUNTED																
13+15RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
SUBTOTAL NO.	2	30.75	6.68														730.49	14	2	

Traffic Control System

Sign Summary

ND 1806 Hwy.

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	171

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN AREA FLAT SHEET TYPE 2	SIGN AREA FLAT SHEET TYPE 3A or 3B	SIGN 1ST	SUPPORT 2ND	POST 3RD	LENGTHS 4TH	SIZE	SLEEVE LENGTH 1ST	2ND	3RD	4TH	SIZE	ANCHOR LNG.	UNIT SIZE	NO	TOTAL SUPPORT WEIGHT	RESET SIGN	RESET SUP.	MAX. LNG. FOR SUP. SIZE
13+60RT	L&CK TRA																	1	1	
13+40LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
14+30RT	9 RS																	1	1	
15+01LT	7 RS	1.50		LIGHT STANDARD MOUNTED																
15+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
16+05RT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
17+00LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
17+41RT	7 RS	1.50		LIGHT STANDARD MOUNTED																
18+95RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
19+00LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
19+15LT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
19+23LT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
19+70RT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
19+80RT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
19+81LT	7 RS	1.50		LIGHT STANDARD MOUNTED																
20+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
19+49-64LT	7 RS			RESET ON LIGHT STANDARD														1		
0+60RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
2+80LT	7 RS			19.5				2.00						4.0	2.25	1	58.09	1		19.5
3+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
21+45LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
22+13RT	7 RS	1.50		LIGHT STANDARD MOUNTED																
23+40LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
23+45RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
24+25RT	20 WS	9.00		10.4				2.50	1.9				2.25	4.0	2.50	1	50.56			13.7
25+75LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
25+75RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
25+80LT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
25+90RT	59RS																	1	1	
25+92LT	59RS																	1	1	
26+55RT	59RS		5.68	9.7				2.19						4.0	2.19	1	47.05			11.4
26+60LT	59RS																	1	1	
26+65RT	442SNS			8.3				2.00						4.0	2.25	1	31.02	1		17.9
26+80LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
26+77RT	7 RS	1.50		LIGHT STANDARD MOUNTED																
27+70LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
28+05LT	442SNS	6.00		8.3				2.00						4.0	2.25	1	31.02			17.9
28+40RT	441SNS	6.00		8.3				2.00						4.0	2.25	1	31.02			17.9
SUBTOTAL NO.	3	51.00	21.22														944.12	11	5	

Traffic Control System

Sign Summary

ND 1806 Hwy.

Mandan N.D.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	172

SIGN SUMMARY - PERFORATED TUBE

STATION	ASSEMBLY NUMBER	SIGN AREA FLAT TYPE 2	SIGN AREA SHEET TYPE 3A or 3B	SIGN SUPPORT POST LENGTHS 1ST	2ND	3RD	4TH	SIZE	SIGN SUPPORT SLEEVE LENGTH 1ST	2ND	3RD	4TH	SIZE	ANCHOR UNIT LNG.	SIZE	NO	TOTAL SUPPORT WEIGHT	RESET SIGN PAN.	RESET SUP.	MAX. LNG. FOR SUP. SIZE
28+15LT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
28+75LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
29+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
29+13LT	19 WS	9.00		LIGHT STANDARD MOUNTED																
30+00LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
30+12LT	442SNS	6.00		8.3				2.00						4.0	2.25	1	31.02			17.9
30+20LT	1 RS																	1	1	
30+82LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
30+45RT	442SNS	6.00		8.3				2.00						4.0	2.25	1	31.02			17.9
30+75RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
31+25LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
32+00LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
33+00RT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
33+30LT	7 RS	1.50		8.8				2.00						4.0	2.25	1	32.23			19.5
33+40LT	442SNS																	1	1	
33+80RT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
33+87RT	442SNS	6.00		8.3				2.00						4.0	2.25	1	31.02			17.9
35+00RT	1 RS		5.18	9.8				2.25						4.0	2.50	1	39.60			10.5
SUBTOTAL NO.	4	40.50	15.54														501.96	2	2	
SUBTOTAL NO.	1	46.69	7.18														831.39	21	8	
SUBTOTAL NO.	2	30.75	6.68														730.49	14	2	
SUBTOTAL NO.	3	51.00	21.22														944.12	11	5	
SUBTOTAL NO.	4	40.50	15.54														501.96	2	2	
TOTAL		168.94	50.62														3007.96	48	17	

Traffic Control System

Sign Summary

ND 1806 Hwy.

Mandan N.D.

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

INSTALL PLASTIC PVM'T MKG. FILM LINE

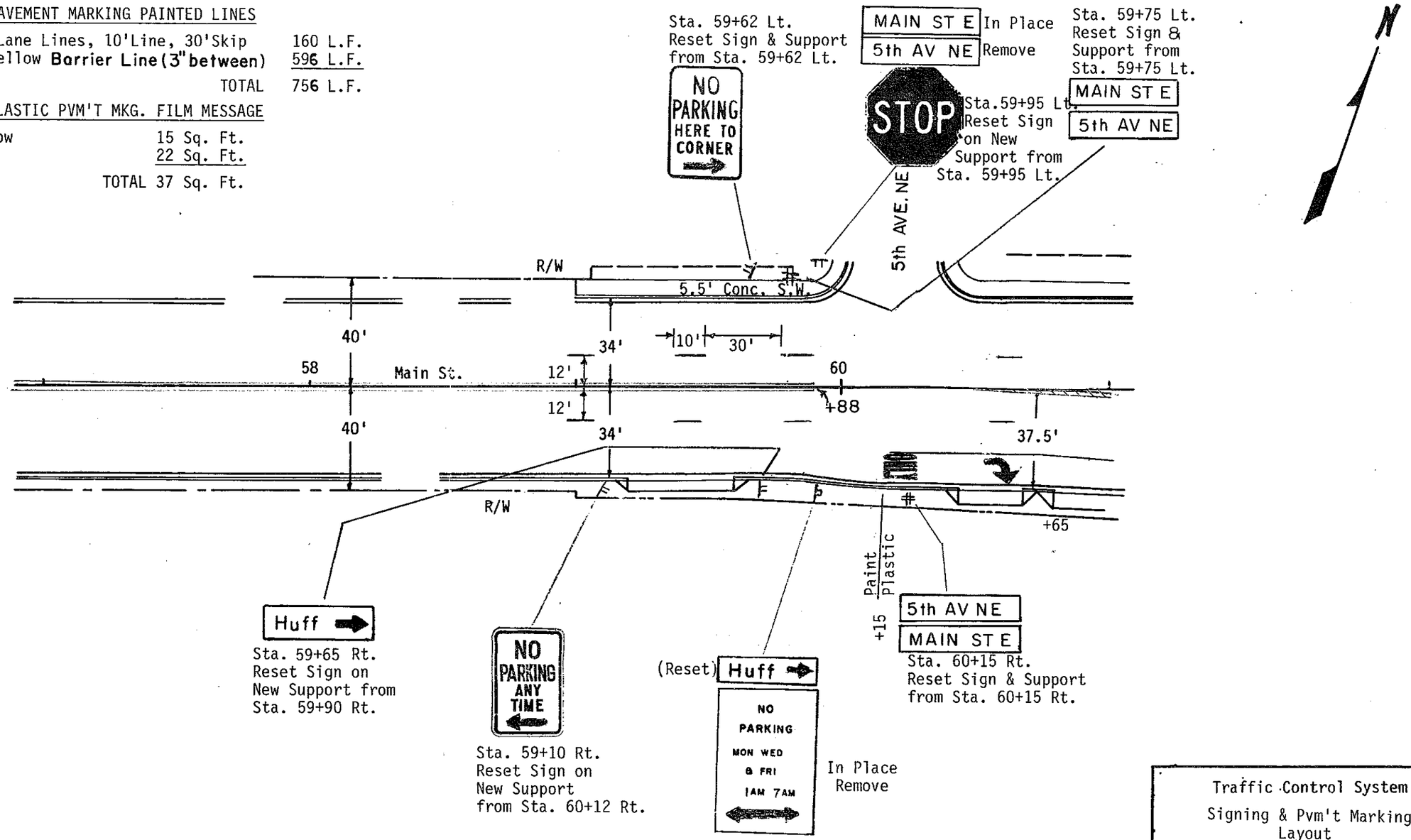
4" White Lane Lines, 10'Line,30'Skip	10 Sq. Ft.
8" Chan. Line	57 Sq. Ft.
8" Yellow Lines 45° @ 5' CTRS.	80 Sq. Ft.
TOTAL	147 Sq. Ft.

INSTALL PAVEMENT MARKING PAINTED LINES

4" White Lane Lines, 10'Line, 30'Skip	160 L.F.
DBL. 4" Yellow Barrier Line (3" between)	596 L.F.
TOTAL	756 L.F.

INSTALL PLASTIC PVM'T MKG. FILM MESSAGE

Right Arrow	15 Sq. Ft.
Only	22 Sq. Ft.
TOTAL	37 Sq. Ft.



Traffic Control System

Signing & Pvm't Marking
Layout
Sta. 57+00 to 61+00
Main Ave.
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	174

Sta. 63+70 Lt.
Reset Sign on
Mast Arm from
Sta. 63+63 Lt.

6TH AVE E

Sta. 63+70 Lt.
Reset Sign on
Mast Arm from
Sta. 63+63 Lt.

FORT LINCOLN
STATE PARK
4 MILES

Sta. 63+70 Lt.
Mast Arm
Mtd.

LEFT
TURN
SIGNAL

R10-10-24

Sta. 64+38 Lt.
Mast Arm
Mtd.

LEFT TURN
YIELD
ON GREEN

R10-12-24

Sta. 64+38 Lt.
Reset Sign on
Mast Arm from
Sta. 64+28 Lt.

MAIN ST E

R/W

5.5' Conc. S.W.

5.5' Conc. S.W.

61

63

34'

64

65

34'

Main St.

37.5'

34'

5.5' Conc. S.W.

25'

LEFT
TURN
SIGNAL

R10-10-24

Sta. 64+34 Rt.
Mast Arm Mtd.

6TH AVE E

Sta. 64+34 Rt.
Reset Sign on
Mast Arm from
Sta. 64+45 Rt.

FORT LINCOLN
STATE PARK
4 MILES

Sta. 62+80 Rt.
Reset Sign on New
Support from Mast Arm
Mtd. Sta. 64+95 Rt.
Var.

98.5'

29.5'

101.5'

R/W

1806

Sta. 63+59.5 Rt.
Reset Sign on
Signal Std. from
Sta. 63+57 Rt.

Sta. 63+59.5 Rt.
Reset Sign on
Signal Std. from
Sta. 64+28 Lt.

ONLY

Sta. 64+34 Rt.
Reset Sign on
Signal Std. from
Sta. 64+45 Rt.

LEFT TURN
YIELD
ON GREEN

R10-12-24

Sta. 63+59.5 Rt.
Mast Arm
Mtd.

MAIN ST E

Sta. 63+59.5 Rt.
Reset Sign on
Mast Arm From
Sta. 63+59.5 Rt.

Traffic Control System

New and Reset Signing
Sheet
Jct. Main Street & ND 1806
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	175

INSTALL PLASTIC PVM'T. MKG. FILM MESSAGE

LEFT ARROW	15 Sq. Ft.
ONLY	22 Sq. Ft.
TOTAL	37 Sq. Ft.

Sta. 61+90 Lt.
Assembly 7
RS

NO PARKING ANY TIME R7-1-12

Sta. 62+26 Lt
Reset Sign on new
Support from Sta.
62+26 Lt.

BUSINESS LOOP 94

NO TRUCK PARKING

In Place
Remove

Sta. 63+45 Lt
Reset Sign &
Support from
Sta. 62+80 Lt

NO PARKING ANY TIME

Sta. 64+40 Lt.
Reset Sign &
Support from
Sta. 64+40 Lt.

NO PARKING ANY TIME

Sta. 65+10 Lt.
Reset Sign & Support
from Sta. 65+10 Lt.

LEWIS and CLARK TRAIL

1806

N

6th AVE NE

R/W

+40

5.5' Conc. S.W.

8'
12'
85'
13.5'
6'
63
12'
61
+05
109
37.5'
10'
30'
+75
+25
34'
+75
64
Main St.
+35
2'
13.5'
10'
30'
12'
12'
65
4'
+13
4+10
6'
2'
5.5' Conc. S.W.
+23
14'
14'

Sta.61+20 Rt.
Reset Sign
From Sta. 61+20
Rt.
Light Std. Mtd.

NO PARKING ANY TIME

In Place
Remove

98.5'

LEWIS and CLARK TRAIL

M1-96-30

1806

M1-6-30

M6-6-21

In Place
Remove

Sta. 61+80 RT
Special Assembly E
RM

STOP WHEN FLASHING RED R10-6-24

Sta. 62+85 Rt.
Assembly 22
RS

NO PARKING ANY TIME R7-1-12

Sta. 5+40 Rt.
Assembly 7
RS

5
29.5'
101.5'
R/W

NO PARKING ANY TIME R7-1-12

Sta. 5+16 Lt.
Light Std. Mtd.

INSTALL PLASTIC PVM'T. MKG. FILM LINES

4" White Lane Lines 10'Line,30'Skip	63 Sq. Ft.
8" Chan. Line	347 Sq. Ft.
DBL. 4" Yellow Barrier Line (3" Between)	50 Sq. Ft.
8" White Lines,-5'Crt. @ 45° Cross Hatch Lines	216 Sq. Ft.
24" White Stop Line	120 Sq. Ft.
6" White Crosswalk Line	123 Sq. Ft.
TOTAL	919 Sq. Ft.

Traffic Control System

SIGNING & PVM'T MARKING
LAYOUT
6th Avenue NE & Main St.
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	176

INSTALL PAVEMENT MARKING PAINTED LINES

DBL. 4" Yellow Barrier Line (3" Between)	780 LF	Sta. 65+74 Lt. Reset Sign from Sta.66+67 Lt. Light Std. Mtd.
8" White Lines -5' crt. @ 45° cross	815 LF	
4" White Lane Lines,10'Line,30'Skip	100 LF	
TOTAL	1695 LF	

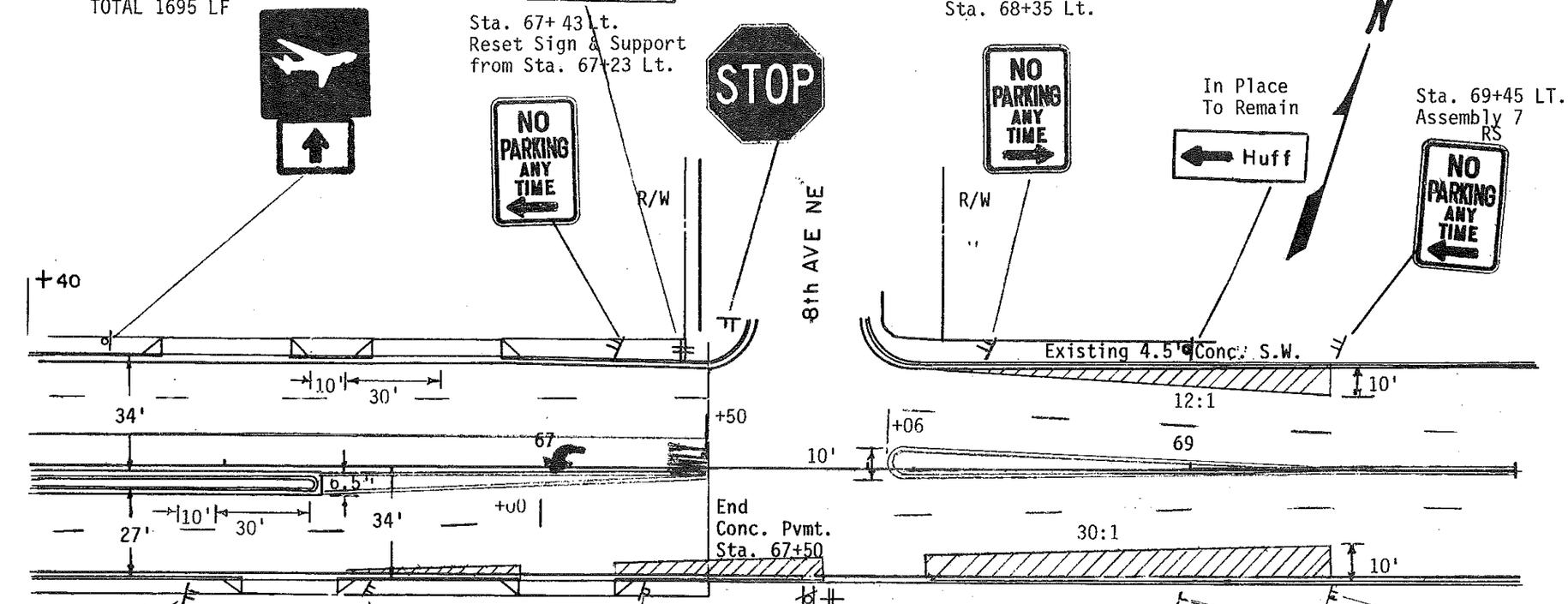
Sta. 67+50 Lt.
Reset Sign on
New Support from
Sta. 67+58 Lt.

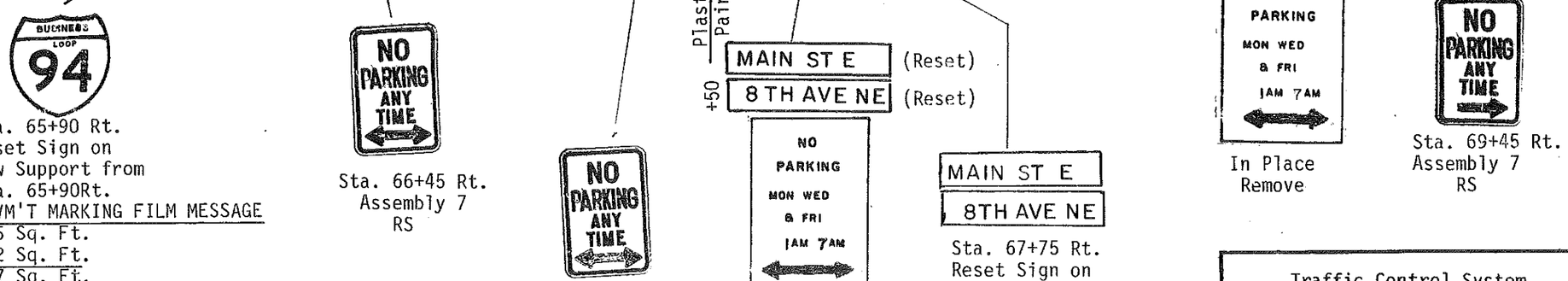
MAIN ST E
8th AVE NE

Sta. 67+58 Lt.
Reset Sign on new
Support from
Sta. 67+58 Lt.

Sta. 68+15 Lt.
Reset Sign &
Support from
Sta. 68+35 Lt.

Sta. 67+ 43 Lt.
Reset Sign & Support
from Sta. 67+23 Lt.





Sta. 65+90 Rt.
Reset Sign on
New Support from
Sta. 65+90Rt.

Sta. 66+45 Rt.
Assembly 7
RS

Sta. 67+29 Rt.
Light Std. Mtd

In Place
Remove

Sta. 67+75 Rt.
Reset Sign on
New Support from
Sta. 67+43 Rt.

In Place
Remove

Sta. 69+45 Rt.
Assembly 7
RS

INSTALL PLASTIC PVM'T MARKING FILM MESSAGE

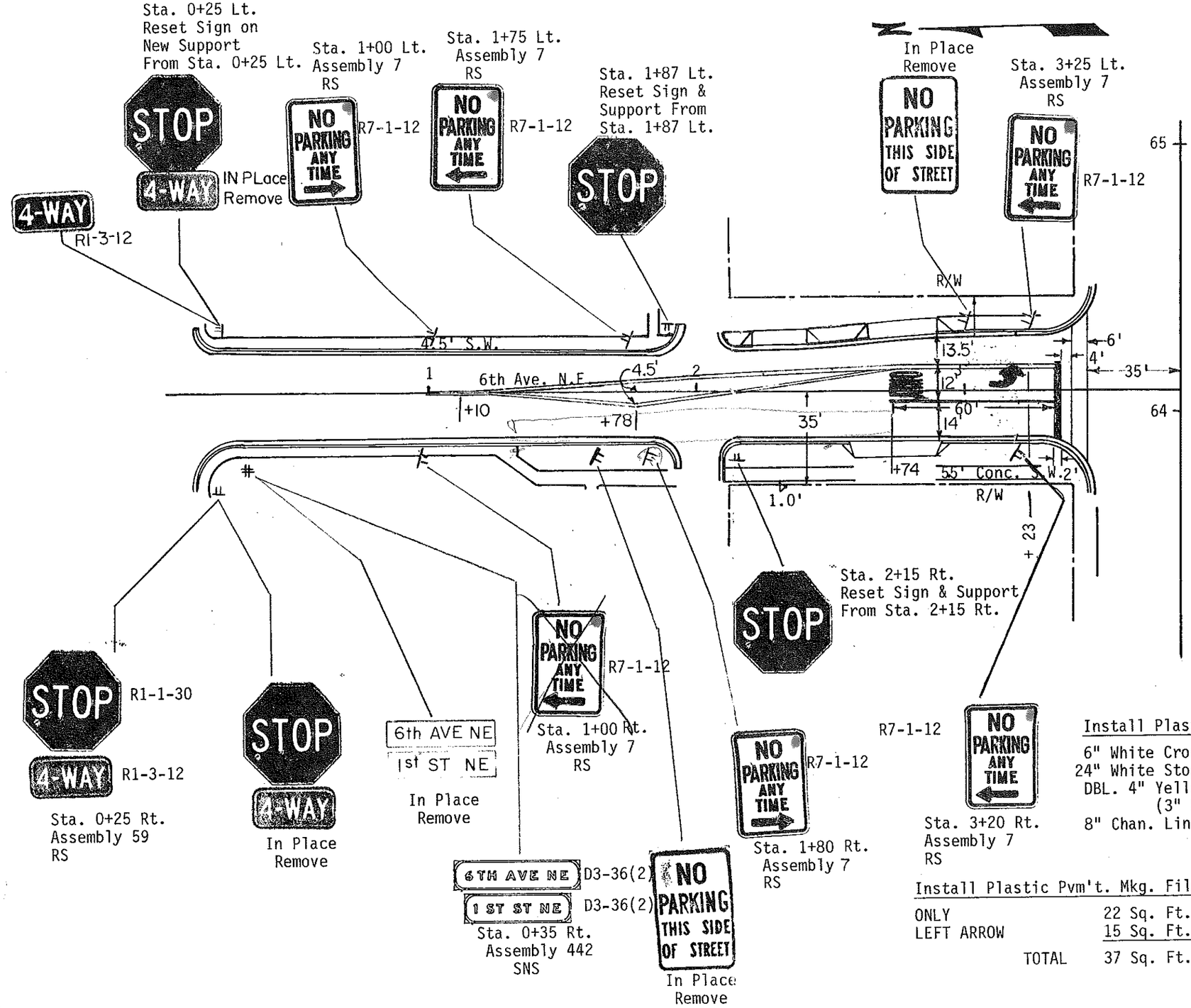
Left Arrow	15 Sq. Ft.	
Only	22 Sq. Ft.	
Total	37 Sq. Ft.	

INSTALL PLASTIC PVM'T. MARKINGS FILM LINE

4" White Lane Lines, 10'Line,30'Skip	375 Sq. Ft.	
Dbl. 4" Yellow Barrier Line (3" Between)	480 Sq. Ft.	
TOTAL	855 Sq. Ft.	

Traffic Control System
SIGNING & PVM'T MARKING
LAYOUT
8th Avenue NE & Main St
ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	177



Install Plastic Pvm't. Mkg. Film Line

6" White Crosswalk Line	67 Sq. Ft.
24" White Stop Line	60 Sq. Ft.
DBL. 4" Yellow Barrier Line (3" Between)	135 Sq. Ft.
8" Chan. Line	40 Sq. Ft.
TOTAL	302 Sq. Ft.

Install Plastic Pvm't. Mkg. Film Messages

ONLY	22 Sq. Ft.
LEFT ARROW	15 Sq. Ft.
TOTAL	37 Sq. Ft.

Traffic Control System

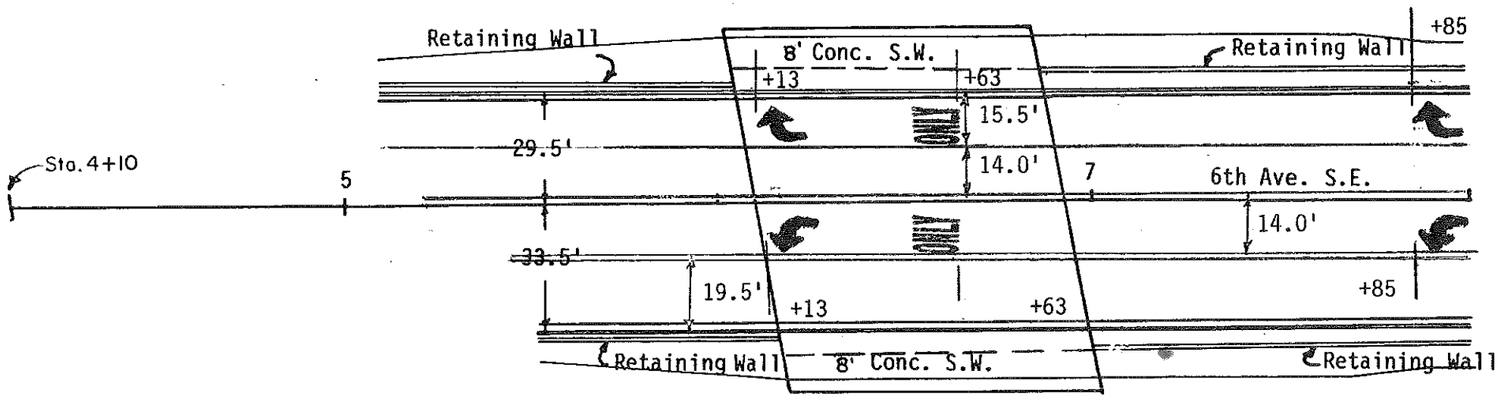
Signing & Pvm't Marking
Layout
6th Ave. N.E. Main St. E.

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	178

INSTALL PLASTIC PVM'T. MKG. FILM LINES

8" White Chan. Line		400 Sq. Ft.
DBL. 4" Yellow Barrier Line (3" Between)		200 Sq. Ft.
	TOTAL	600 Sq. Ft.



INSTALL PLASTIC PVM'T. MKG. FILM MESSAGES

Right Arrow	(2)	30 Sq. Ft.
Left Arrow	(2)	30 Sq. Ft.
ONLY	(2)	44 Sq. Ft.
	TOTAL	104 Sq. Ft.

Traffic Control System
Signing & Pvm't. Marking
Layout

ND 1806 Hwy.
Mandan, ND

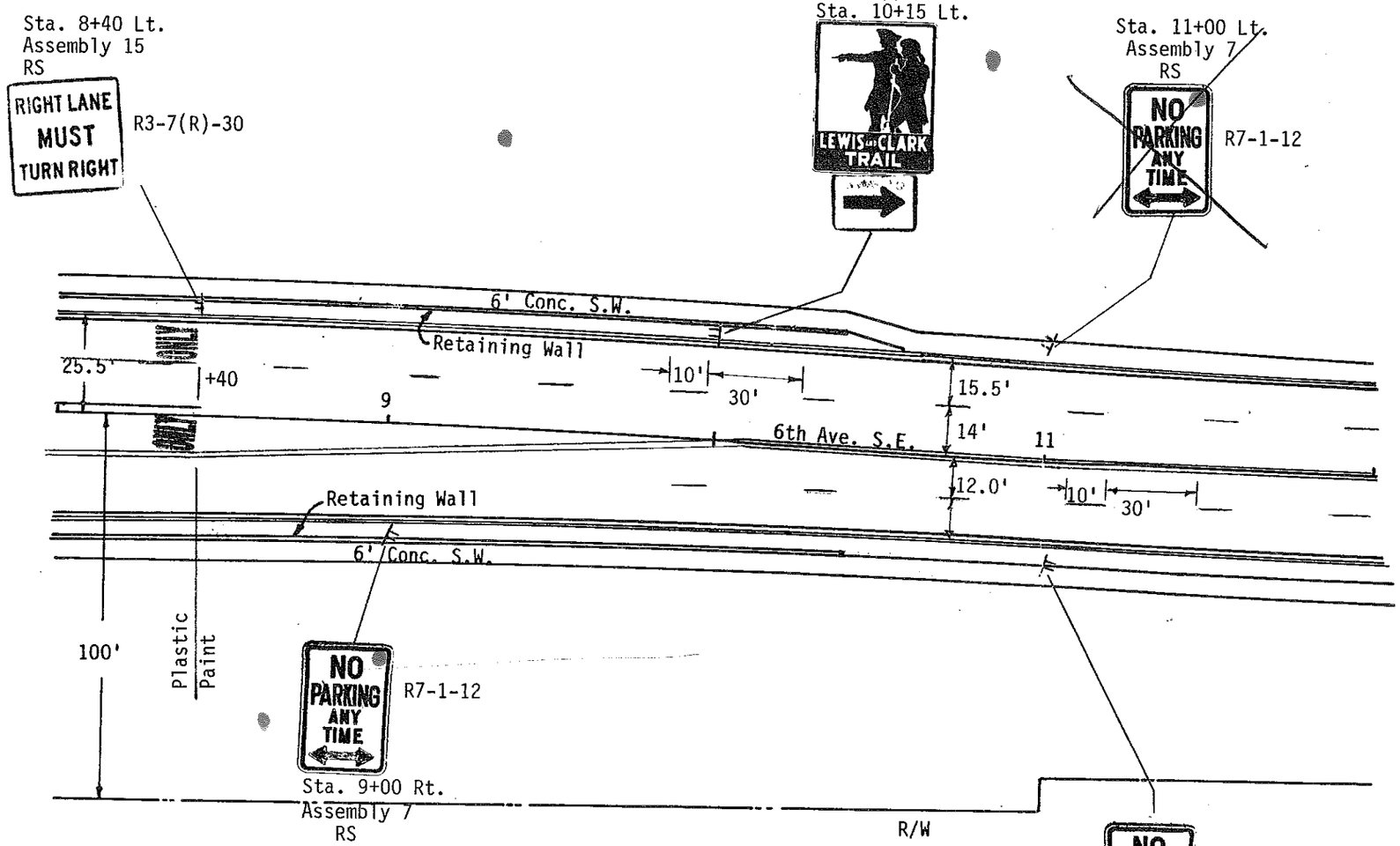
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	179

INSTALL PVM'T MARKING PAINTED LINES

4" White Lane Lines, 10'Line, 30'Skip	150	L.F.
DBL. 4" Yellow Barrier Line (3" between)	720	L.F.
TOTAL	870	L.F.

INSTALL PLASTIC PVM'T. MARKING FILM LINE

8" Chan. Line	53	Sq. Ft.
DBL. 4" Yellow Barrier Line (3" Between)	26	Sq. Ft.
TOTAL	79	Sq. Ft.



INSTALL PLASTIC PVM'T. MKG. FILM MESSAGE

ONLY	(2)	44 Sq. Ft.
	TOTAL	44 Sq. Ft.

Traffic Control System

Signing & Pvm't. Marking Layout

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG8 F-1-806(015)069	180

Sta. 12+60 LT.
Reset Sign on New
Support from Sta. 12+60 Lt.

6TH AVE SE (Reset)

S. FRONTIER TR (Reset)

Sta. 12+25 Lt.
Assembly 7
RS

NO PARKING ANY TIME R7-1-12

STOP

FG-1-806(015)069
F-1-806(015)069

Sta. 13+40 Lt.
Assembly 7
RS

NO PARKING ANY TIME R7-1-12

Install Pavement Markings Painted Lines

4" White Lane Lines, 10'Line,30'Skip		160 LF
DBL. 4" Yellow Barrier Line (3" Between)		530 LF
	TOTAL	790 LF

Sta. 15+01 Lt.
Light Std. Mtd.

R7-1-12 NO PARKING ANY TIME

R/W

75'

5.5' S.W.

STA. 13+22

+ 37

13

+ 23

10' 30' 25.5' 13.5' 12.0' 15 33'

12.0' 10' 30' 25.5' 13.5'

6' Conc. S.W.

75'

60'

R/W

6TH AVE SE

S FRONTIER TR

Sta. 12+50 Lt.
Reset Sign on
New Support
from Sta. 12+50 Lt.

D3-36(1)
D3-36(2)

6TH ST SE
S. FRONTIER TR

Sta. 12+61 Rt.
Light Std. Mtd.
Assembly 441
SNS

NO PARKING ANY TIME R7-1-12

Sta. 13+15 Rt.
Assembly 7
RS

LEWIS and CLARK TRAIL

Sta. 13+60 Rt.
Reset Sign & Support
from Sta. 13+40 Rt.

SPEED LIMIT 25

Sta. 14+30 Rt.
Reset Sign & Support
from Sta. 13+70 Rt.

R7-1-12 NO PARKING ANY TIME

Sta. 15+00 Rt.
Assembly 7
RS

Traffic Control System

Signing & Pvm't Marking Layout

ND 1806 Hwy.

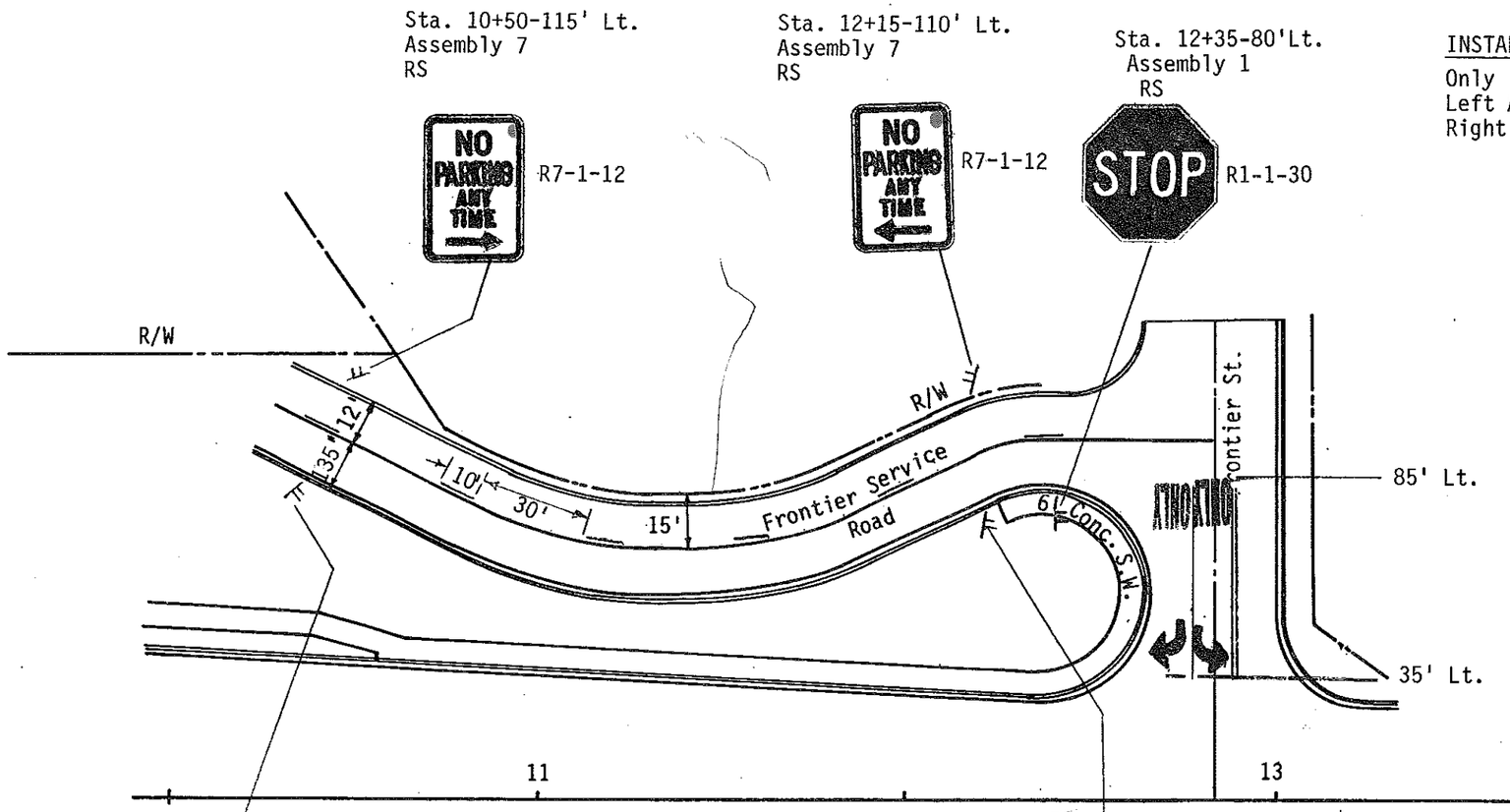
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	FG-1-806(015)069	181

Install Pavement Marking Painted Lines

4" Yellow Lane Lanes,10'Line,30'Skip 60 L.F.

TOTAL 60 L.F.



INSTALL PAVEMENT MKG. PAINTED MESSAGE

Only	(2)	44 Sq. Ft.
Left Arrow	(1)	15 Sq. Ft.
Right Arrow	(1)	15 Sq. Ft.
	Total	74 Sq. Ft.

INSTALL PAVEMENT MKG. PAINTED LINE

8" White Chan. Line		50 L.F.
Dbl. 4" Yellow Lines (3" Between)		100 L.F.
	Total	150 L.F.

Traffic Control System

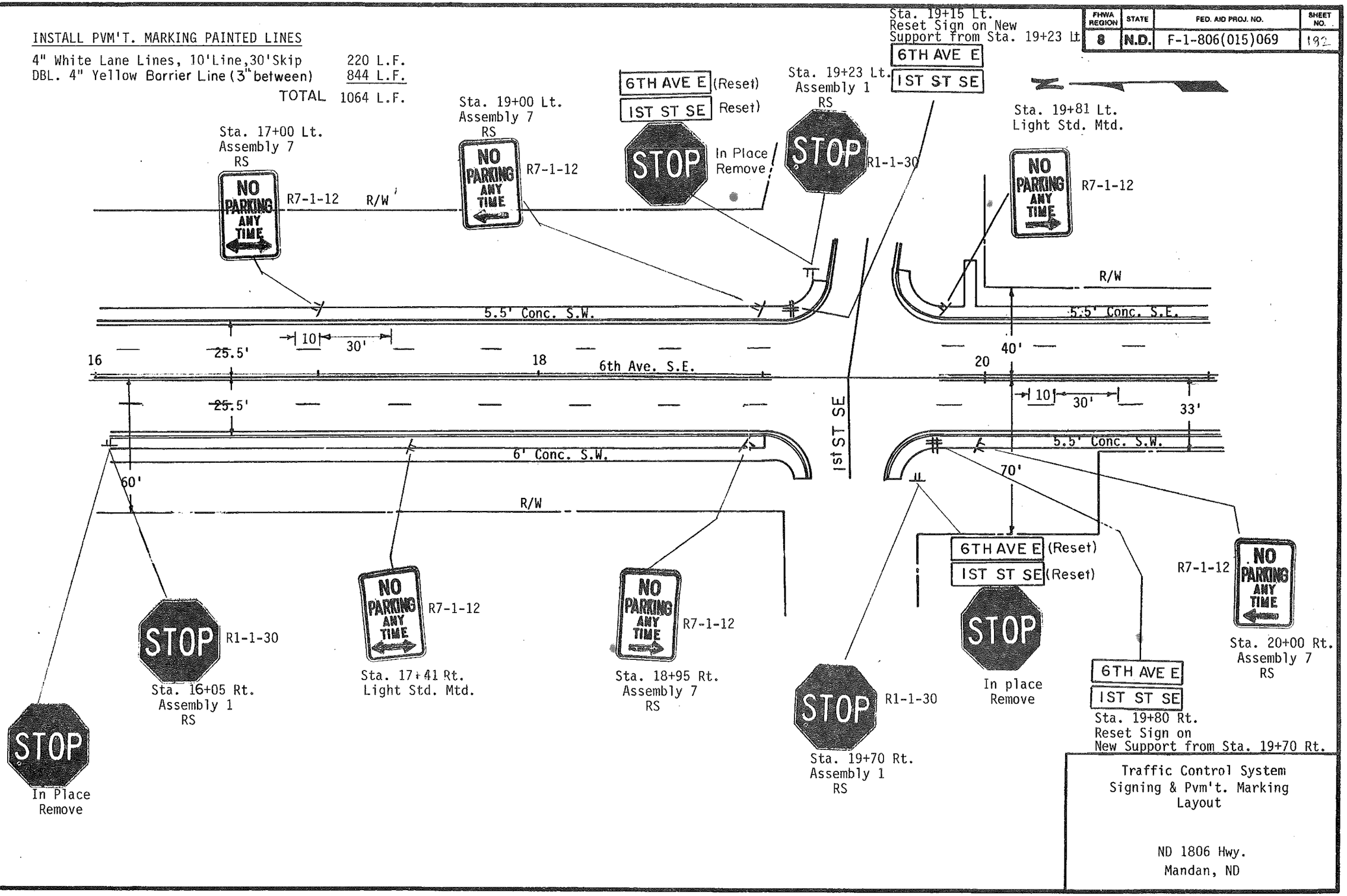
Signing & Pvm't Marking
Layout
Frontier Service Road &
ND 1806 Hwy.

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	192

INSTALL PVM'T. MARKING PAINTED LINES

4" White Lane Lines, 10'Line,30'Skip	220 L.F.
DBL. 4" Yellow Barrier Line (3" between)	844 L.F.
TOTAL	1064 L.F.



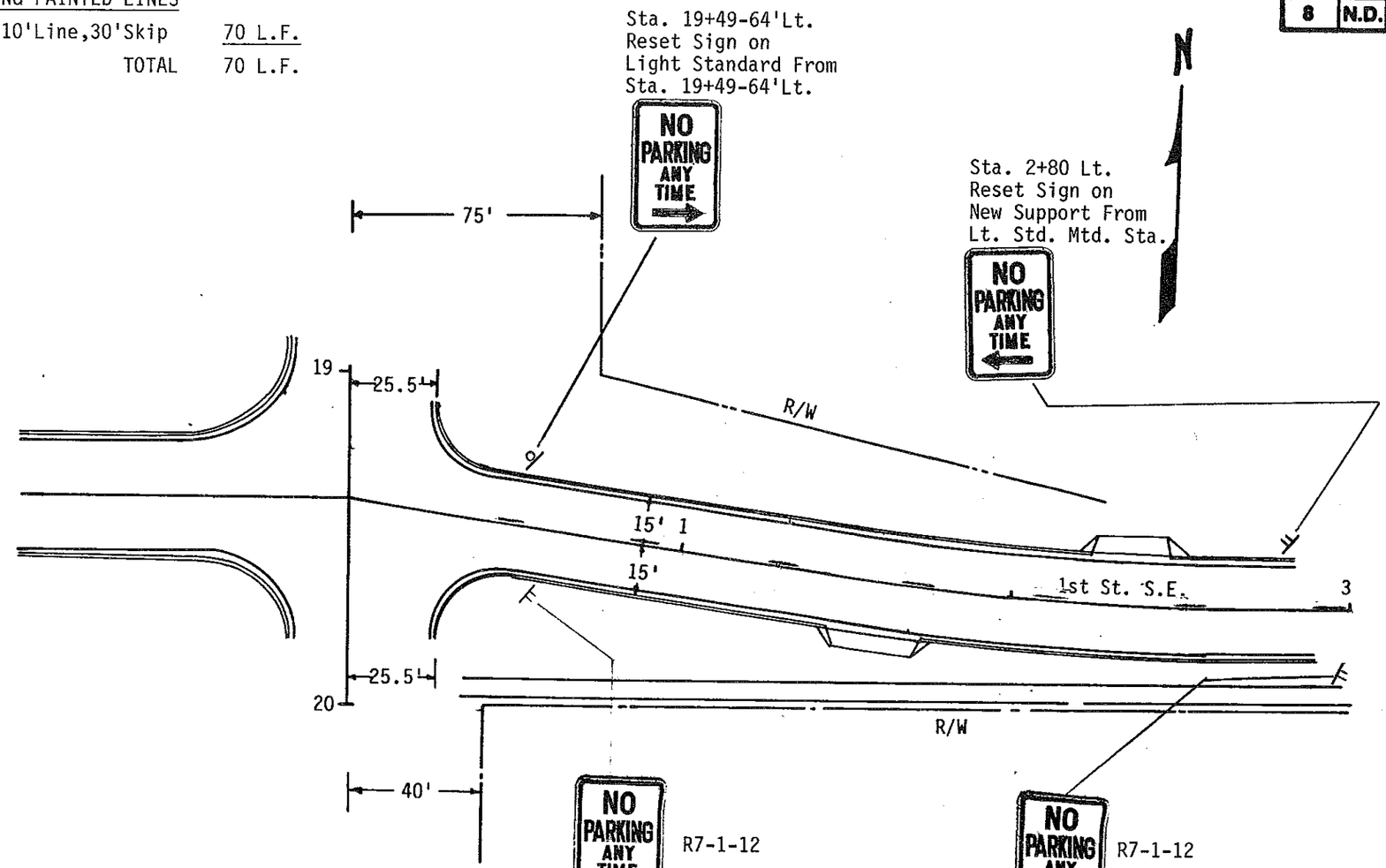
Traffic Control System
Signing & Pvm't. Marking
Layout

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	183

INSTALL PAVEMENT MARKING PAINTED LINES

4" Yellow Lane Lines, 10'Line,30'Skip	70 L.F.
TOTAL	70 L.F.



Traffic Control System

Signing & Pvm't Marking Layout

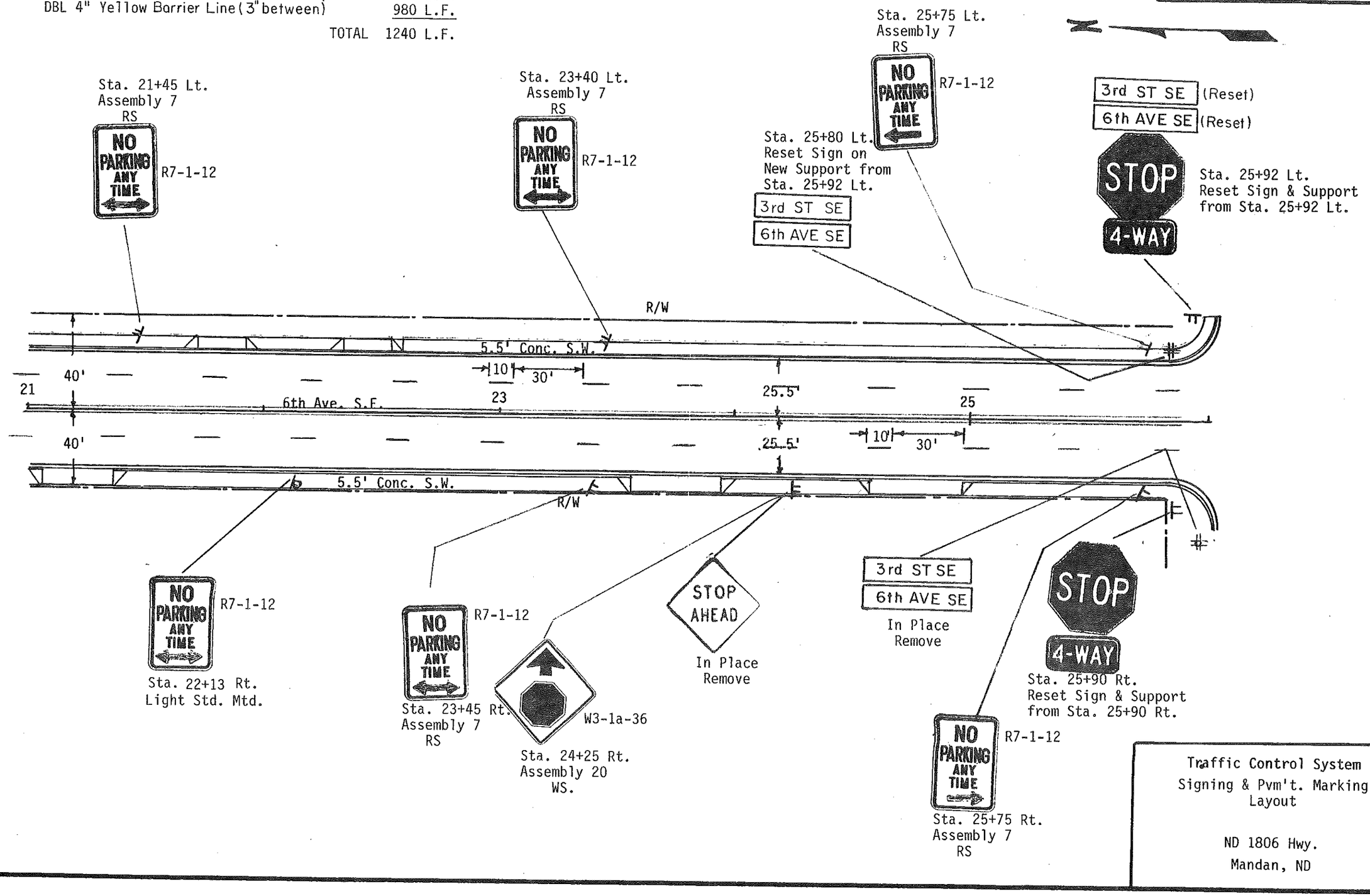
1st Street S. East

Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	184

INSTALL PVM'T. MARKING PAINTED LINES

4" White Lane Lines, 10'Line,30'Skip	260 L.F.
DBL 4" Yellow Barrier Line(3"between)	980 L.F.
TOTAL	1240 L.F.



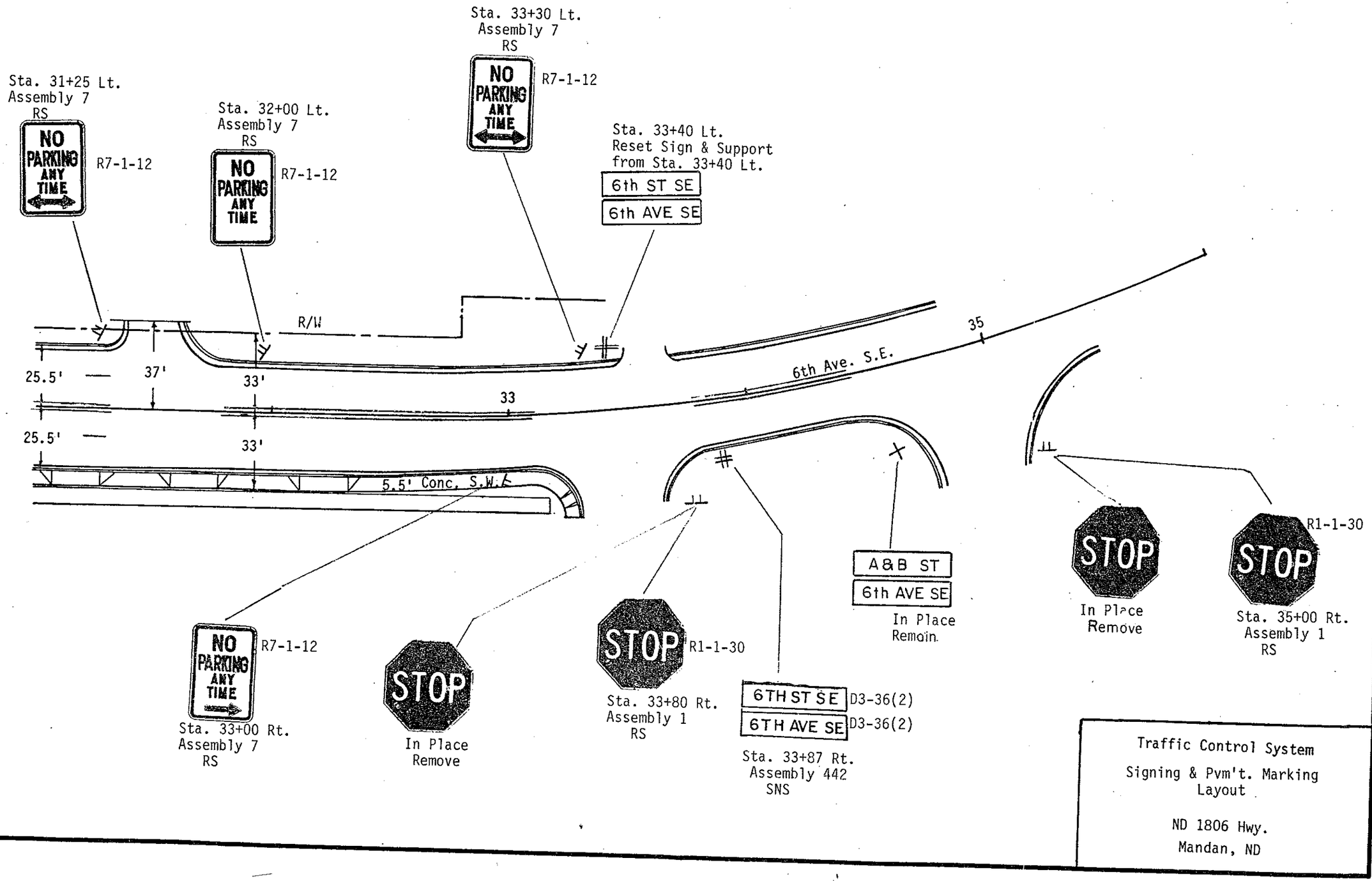
Traffic Control System
Signing & Pvm't. Marking
Layout

ND 1806 Hwy.
Mandan, ND

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	F-1-806(015)069	186

INSTALL PVM'T. MARKING PAINTED LINES

4" White Lane Lines, 10'Line,30'Skip	20 L.F.
DBL 4" Yellow Barrier Line(3"between)	450 L.F.
TOTAL	470 L.F.



Traffic Control System

Signing & Pvm't. Marking
Layout

ND 1806 Hwy.
Mandan, ND