

Transmittal No. 22-01
March 4, 2022

Standard Plates

Distribution: Electronic Distribution Recipients

Subject: Standard Plate 9321

The following Standard Plate is updated:
9321 Woven Wire Fence – Steel Post

See attached Summary of Changes for details.

Instructions:

1. Record this transmittal letter number, date and subject on the transmittal record sheet located in the front of the manual. The previous Transmittal Letter was 21-04, dated July 28, 2021
2. Remove from the manual:
 - Numerical Index of Standard Plates
 - Standard Plate 9321E
3. Insert into the manual:
 - Numerical Index of Standard Plates, Sheets 1-4 of 4 (02-28-2022)
 - Standard Plate 9321F (02-28-2022)

The Standard Plates Manual and associated Transmittal Letters are available online in PDF format at <https://standardplates.dot.state.mn.us/stdplate.aspx>

4. Direct any technical questions regarding this transmittal to Khamsai Yang, State Design Standards Engineer, at (612) 322-5601, or by email to DesignStandards.DOT@state.mn.us



Khamsai Yang, P.E.
State Design Standards Engineer
Office of Project Management and Technical Support

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Summary of Changes
Standard Plate 9321F
Woven Wire Fence – Steel Post
Transmittal Letter No. 22-01

General

1. This update is a total redo of the previous standard. This update replaces the combination of woven wire (Design 832-6-11) and barbed wire fence types with a single woven wire fence (Design 1047-6-11) type.
2. Standard Plate 9320-Woven Wire Fence-Wood Post is removed from the standards as all woven wire fence shall be steel post.
3. Plate expanded from one sheet to two sheets.
4. The normal fence height increases from 46" above ground to 49".
5. The normal top of fence post height increases from 48" to 50" above ground.
6. All concrete post footing depths increased to 60".

Pull Post Earth Set Detail

1. Post embedment modified from 36" to 34".

Line Post Detail

1. Line post length modified from 78" to 84".

Pull Post Concrete Set Detail

1. Post concrete embedment modified from 36" to 34".

Corner Post Earth Set Detail

1. Corner post embedment modified from 48" to 46".

Corner Post Concrete Set Detail

1. Corner post concrete embedment modified from 36" to 34".

Pedestrian Gate and Vehicular Gate Details

1. Post concrete embedment modified from 36" to 38".

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STANDARD PLATES

BLANK.....	0000 SERIES
PAVEMENT	1000 SERIES
BLANK.....	2000 SERIES
CULVERTS AND APPURTENANCES	3000 SERIES
SEWER APPURTENANCES.....	4000 SERIES
EROSION CONTROL STRUCTURES	5000 SERIES
BLANK.....	6000 SERIES
CURB, CURB AND GUTTER, SIDEWALK	7000 SERIES
BARRICADES, SIGNALS, MARKERS, ETC.....	8000 SERIES
MISCELLANEOUS	9000 SERIES

PLATE NO.

0000 SERIES—BLANK

1000 SERIES—PAVEMENT

- 1070M Supplemental Pavement Reinforcement
- 1103L Typical Dowel Bar Assembly (2 Sheets)
- 1210G Concrete Pavement Adjacent to Railway Crossing

2000 SERIES—BLANK

3000 SERIES—CULVERTS AND APPURTENANCES

- 3000M Reinforced Concrete Pipe (6 Sheets)
- 3001B Reinforced Concrete Reducer Pipe
- 3002B Reinforced Concrete Increaser Pipe
- 3006H Gasket Joint for R.C. Pipe (2 Sheets)
- 3007F Shear Reinforcement for Precast Drainage Structures
- 3014K Reinforced Concrete Pipe Arch (3 Sheets)
- 3020H Reinforced Precast Concrete Cattle Pass (60" & 72")
- 3022C Precast Concrete Safety Apron (3 Sheets)
- 3040F Corrugated Metal Pipe Culvert (Standard 2-2/3" x 1/2" Corrugation)
- 3041E Corrugated Metal Pipe (3" x 1" Corrugation)
- 3050B Design Data Structural Plate Structures (18" Corner Radius)
- 3051B Design Data Structural Plate Structures (31" Corner Radius)
- 3065C Connection between Existing Culv. & New "C" Culv. Barrel (2 Sheets)
- 3066A C.M. Extension for Box Culvert
- 3100G Concrete Apron for Reinforced Concrete Pipe
- 3110G Concrete Apron for Reinforced Concrete Pipe-Arch
- 3114H Sectional Concrete Apron for Reinforced Concrete Pipe-Arch
- 3122K Metal Apron for C.M. Pipe-Arch Culvert
- 3123J Metal Apron for C.S. Pipe
- 3124B Metal Apron Connection
- 3125A Inlet Protection for Metal Culverts (90" dia. to 96" dia.)
- 3126B Inlet Protection for Structural Plate Pipe (60" thru 96" dia. or span)
- 3127A Inlet Protection for Structural Plate Pipe (102" thru 180" dia. or span)
- 3128H Metal Safety Apron & Grate (2 Sheets)
- 3129A Metal Apron for Corrugated Polyethylene Pipe (Use at Entrances and Driveways)
- 3131C Precast Concrete Headwall for Subsurface Drains
- 3132A Grate for 1:4 Precast Concrete Aprons

PLATE NO.

3133D	Riprap at RCP Outlets
3134D	Riprap at CSP Outlets
3135A	Hand-Placed Riprap at Precast Concrete Cattle Pass
3136B	Slotted Vane Drain for P.V.C. Pipe
3137B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Stackable)
3138B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Not Stackable)
3139B	Riprap at Precast Concrete End Sections
3142A	Outlet Screen for C.M. & S.C. Pipes
3143C	Inspection Tees
3145G	Concrete Pipe or Precast Culvert Ties
3146C	Anti-Seepage Diaphragm (For CMP and CMP-A)
3148A	Safety Slope Metal End Section for Circular & Arched Pipes (2 Sheets)
3221D	Corrugated Steel Pipe Coupling Band (3 Sheets)

4000 SERIES—SEWER APPURTENANCES

Drainage Structure and Castings (4 Sheets)

- Structure and Casting Combinations
- Standard Casting Assemblies
- List of Castings
- List of Drainage Structures

4000J	Manhole or Catch Basin (Masonry, Field Constructed) - Design A
4002F	Manhole or Catch Basin (Masonry, Field Construction) - Design C
4003B	30" Precast Catch Basin – Design N
4005M	Manhole or Catch Basin Type A & B Cone Sections Precast - Design F
4006L	Manhole or Catch Basin Precast - Designs G and H
4007C	Precast Mechanical Joint Sewer Manhole
4008E	Catch Basin (Sectional Concrete Pipe) - Design I
4009H	Manhole or Catch Basin (Sectional Concrete Pipe) - Design J
4010H	Concrete Short Cone & Adjusting Ring (Sectional Concrete)
4011E	Precast Concrete Base
4017C	Catch Basin (Concrete Pipe and Metal Pipe) - Designs PC and PM
4018B	Manhole or Catch Basin (Reducer Cone Section Precast) Design D
4020J	Manhole or Catch Basin (For Use With or Without Traffic Loads) (2 sheets)
4021F	Precast Curb Opening Catch Basin
4022A	Manhole or Catch Basin Cover (3 ft. X 2 ft. Opening)
4024A	48" Dia. Precast Shallow Depth Catch Basin - Design SD
4025B	Drop Inlets or Catch Basins - Design DI (Concrete & Metal)
4026A	Concrete Encased Concrete Adjusting Rings
4101D	Ring Casting For Manhole or Catch Basin
4108F	Adjusting Rings for Catch Basins and Manholes
4110F	Cover Casting for Manhole (For Use in all Traffic Areas) – Casting No. 715 and 716
4125D	Catch Basin Frame Casting (For Square Grate) – Casting No. 806
4126F	Catch Basin Frame Casting – Casting No. 801
4129G	Catch Basin Frame Casting (For Square Grate) - Casting No. 802A
4132G	Catch Basin Frame Casting (For Square Grate) – Casting No. 805
4133A	Curb Box Casting for Catch Basin - Casting No. 824
4134A	Curb Box Casting for Catch Basin (For Design B Curbs) - Casting No. 825
4140D	Special Grate Castings for Catch Basin (Convex and Concave) - Casting No. 720 and 721
4143E	Stool Grate & Concrete Frame (Median Drains) - Casting No. 731
4149C	Grate Casting for Catch Basin - Casting No. 810
4150C	Grate Casting for All Pipe Drainage Structures
4151B	Grate Casting for Catch Basin (Square Type) - Casting No. 811
4152C	Catch Basin Grate Casting - Casting No. 814A

PLATE NO.

- 4153A Catch Basin Grate Casting - Casting No. 815
- 4154B Catch Basin Grate Casting - Casting No. 816
- 4155A ADA Grate Inlet Casting – Casting No. 817
- 4160D Curb Box Casting for Catch Basin - Casting No. 823A and 833A
- 4161F Curb Box Casting for Catch Basin - Casting No. 821B, 822 and 831A
- 4180J Manhole or Catch Basin Step

5000 SERIES—EROSION CONTROL STRUCTURES

- 5010A Reinforced Concrete Pipe Energy Dissipator

6000 SERIES—BLANK

7000 SERIES—CURB, CURB AND GUTTER, SIDEWALK

- 7000E Integrant Curbs (Design B, Design V and Design D)
- 7020K Concrete Curb (Design B, Design V, Design S, Design DR and Design BR) (2 Sheets)
- 7038A Detectable Warning Surface Truncated Domes
- 7065C Bituminous Curb
- 7100H Concrete Curb and Gutter (Design B and Design V)
- 7102K Concrete Curb and Gutter (Design D, Design S, and Design R)
- 7105C Concrete Median (Mountable Type)
- 7107I Entrance Nose (Urban Design)
- 7108G Exit Nose (Urban Design)
- 7109C Median Nose and Island (Undivided to Divided Roadway)
- 7111J Installation of Catch Basin Castings (Concrete Curb and Gutter)
- 7112C Installation & Reinforcement of Catch Basin & Manhole Castings (Concrete Integrant Curbs)
- 7113A Concrete Approach Nose Detail

8000 SERIES—BARRICADES, SIGNALS, MARKERS, ETC.

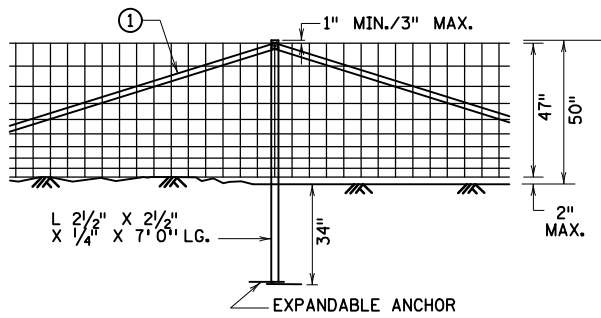
- 8000K Temporary Channelizers (3 Sheets)
- 8106D Equipment Pad B
- 8107A RLF Equipment Pad Foundation Layout
- 8110E Traffic Signal Bracketing (Pole Mounted)
- 8111E Traffic Signal Bracketing (Pedestal Mounted) (3 Sheets)
- 8112I Pedestal Foundation (Traffic Control Signals)
- 8117G Precast Concrete Handhole With Vehicle Load
- 8118D Service Equipment & Pole Traffic Control Signals
- 8119C Ground Mounted Cabinet Foundation
- 8120Q Pole Foundation (PA85)
- 8121H Transformer Base and Pole Base Plate (PA85, PA90 and PA100) (2 Sheets)
- 8122F Pedestal and Pedestal Base (For Traffic Control Signals Support) (2 Sheets)
- 8123G Pole and Mast Arm Luminaires and Traffic Lights Assembly (For All Pole Types) (2 Sheets)
- 8126L Pole Foundation (PA90 and PA100)
- 8127E Light Foundation - Design E, Precast/Cast-In-Place, 40 ft. Pole or Less (2 Sheets)
- 8128E Light Foundation - Design H, Precast/Cast-In-Place, 49 ft. Pole (2 Sheets)
- 8129A Shim and Washer (Traffic Control Signals and Roadway Lighting)
- 8130E Saw Cut Loop Detectors (3 Sheets)
- 8132B Preformed Rigid PVC Conduit Loop Detector (3 Sheets)
- 8133A Pole and Mast Arm - Type BA (9 Sheets)
- 8134C Pole Foundation - Type BA (4 Sheets)
- 8135A Anchor Rod Assembly for Light Tower Foundation

PLATE NO.

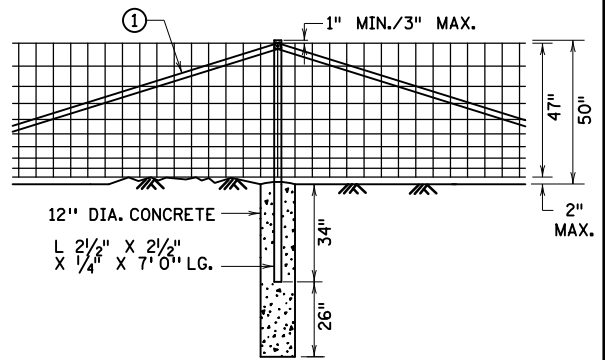
8150C	Installation of Culvert Markers
8307S	W-Beam Guardrail & End Anchorages (Installation with Wood Posts) (4 Sheets)
8308C	Reinforced Concrete Median Barrier Type F (Non-Glare Screen Type) (4 Sheets)
8309C	Reinforced Concrete Median Barrier Type F & Glare Screen (4 Sheets)
8316C	Post Seat for Anchorage on Footing or Box Culverts
8318C	Guardrail Anchorage Plate for Bridges and BCT'S
8326D	Flexible Plastic Glare Screen
8330G	3-Cable Guardrail (With Wood Posts) (Assembly Details) (2 Sheets)
8331B	3-Cable Guardrail (With Steel Posts) (3 Sheets)
8332E	Anchor Rod Assembly for Light Foundation - Barrier
8333B	3-Cable Guardrail Anchor (Anchor Details) (4 Sheets)
8337D	Temporary Portable Precast Concrete Barrier - Type F (3 Sheets)
8338D	W-Beam Guardrail & End Anchorages (Installation with Steel Posts) (4 Sheets)
8339A	3-Cable (Steel Posts) to W Beam (Wood Posts) Guardrail Transition
8340A	3-Cable (Steel Posts) to W Beam (Steel Posts) Guardrail Transition
8342B	High-Tension Cable Barrier Line Post Foundation (Concrete Design)
8343A	High-Tension Cable Barrier Line Post Foundation (Steel Design)
8347B	Portable Precast Concrete Barrier Anchors
8350A	Thrie Beam Anchorage Plate
8352B	Thrie Beam Wedge Plate for Single Slope Barrier
8355A	W-Beam Guardrail
8356A	W-Beam to Thrie-Beam Transition Guardrail
8357A	Thrie Beam Guardrail
8358A	Thrie-Beam Slotted Rail for Bullnose (2 Sheets)
8360B	Guardrail Post Length Marking
8361B	Guardrail Steel Post (3 Sheets)
8362A	Universal Breakaway Steel Post (UBSP) (2 Sheets)
8365A	BCT Timber Post
8366A	BCT Foundation Tube
8368A	CRT Wood Post
8369A	Guardrail Blockout (2 Sheets)
8370A	BCT Cable and Components (2 Sheets)
8371A	Nose Cable – Bullnose Guardrail
8400F	Pipe Railing

9000 SERIES—MISCELLANEOUS

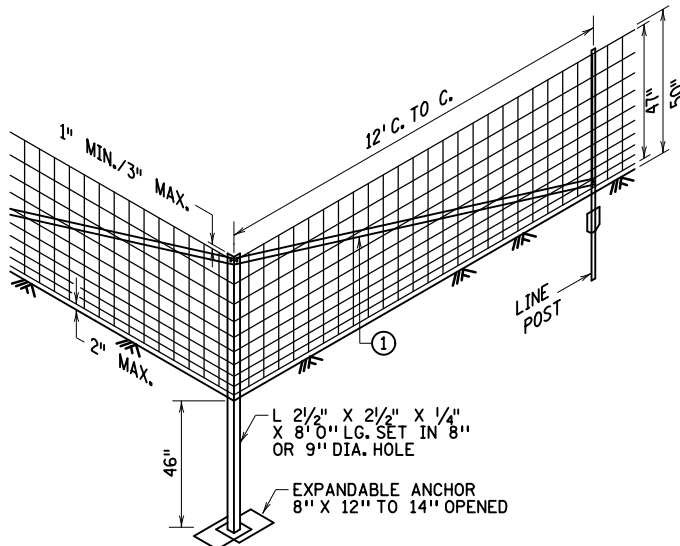
9000E	Approaches and Entrances - Recommended Standards
9101B	Shaping and Sodding of Slopes at Box Culvert Ends
9303B	Geodetic Survey Disks (Aluminum) (2 Sheets)
9304A	Geodetic Survey Disks (Removable Type Disk)
9308A	Survey Monument Cap (2 Sheets)
9309G	PLS (Public Land Survey) Monument (2 Sheets)
9320G	Woven Wire Fence (Wood Post)
9321F	Woven Wire Fence (Steel Post) (2 Sheets)
9322K	Chain Link Fence (2 Sheets)
9323D	Barbed Wire Fence (Wood Post)
9324C	Barbed Wire Fence (Steel Post)
9350B	Mailbox Support - Swing-Away Type



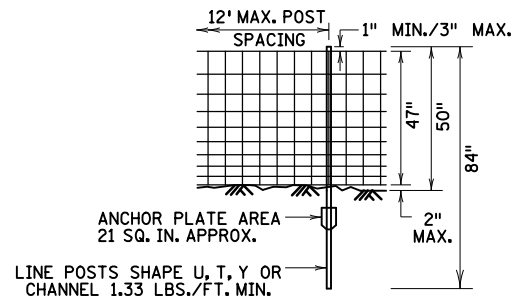
PULL POST
EARTH SET



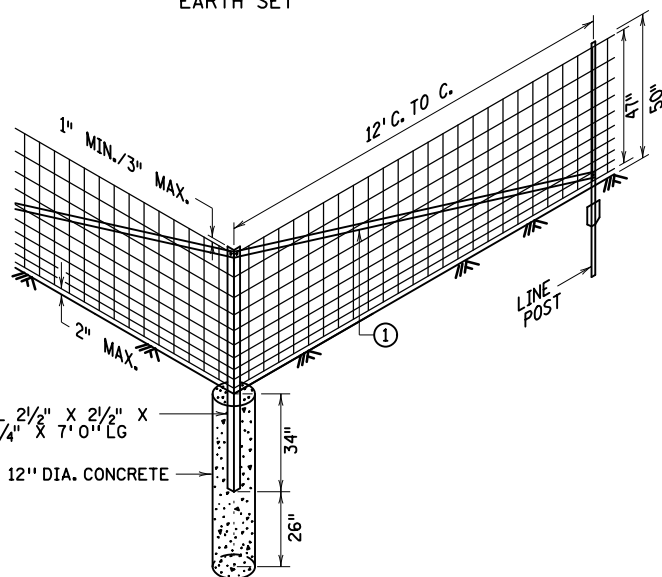
PULL POST
CONCRETE SET (660' INTERVAL MAX.)



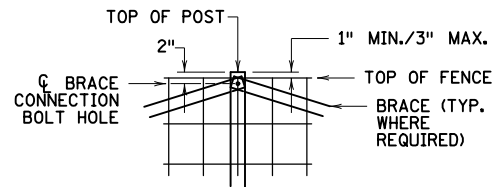
CORNER POST
EARTH SET



LINE POST



CORNER POST
CONCRETE SET



TOP OF POST DETAIL
(CORNER POST, PULL POST, GATE POSTS)

NOTES:

WOVEN WIRE FARM FENCE DESIGN 1047-6-11, COATING TYPE A OR TYPE Z CLASS 3.

FENCING PLACED TIGHT TO GROUND WITH MAXIMUM 2" ALLOWED AT UNEVEN TERRAIN.

TOP AND BOTTOM WIRE SHALL BE CLAMPED TO EVERY POST. CLAMP EVERY OTHER WIRE ALTERNATING ON SUCCESSIVE POSTS.

USE CONCRETE MIX 3G52 FOR FENCE POST FOOTINGS.

ELECTRICAL GROUNDS IN ACCORDANCE WITH SPEC. 2557.

① L 2" X 2" X 1/4" X 12' 10" L.G. BRACE (TYPICAL). TOP CONNECTION 2" BELOW TOP OF POST.

APPROVED 02-28-2022

Rom S. Jha
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
WOVEN WIRE FENCE
STEEL POST

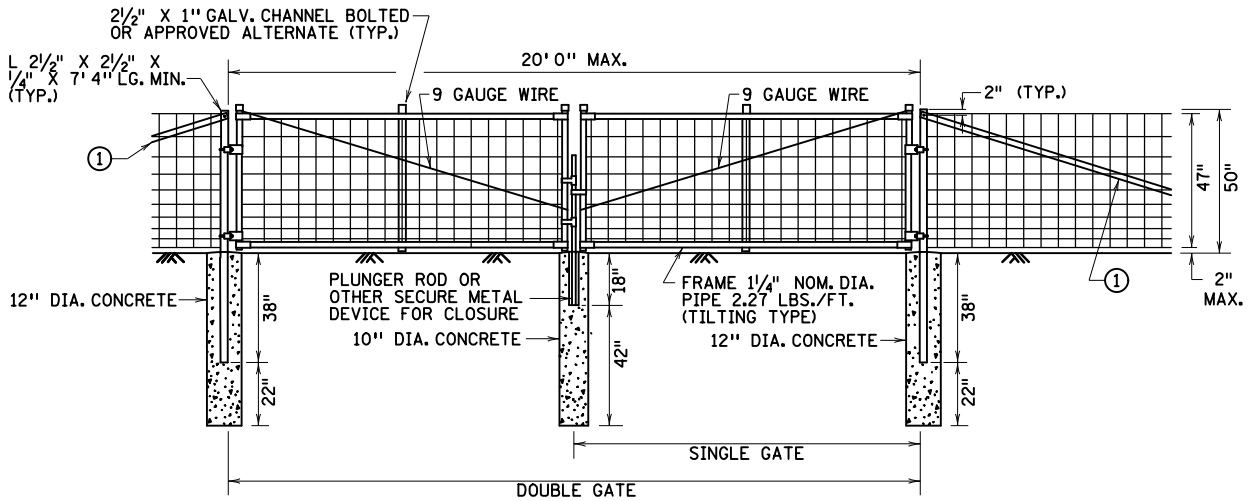
SPECIFICATION
REFERENCE

2557

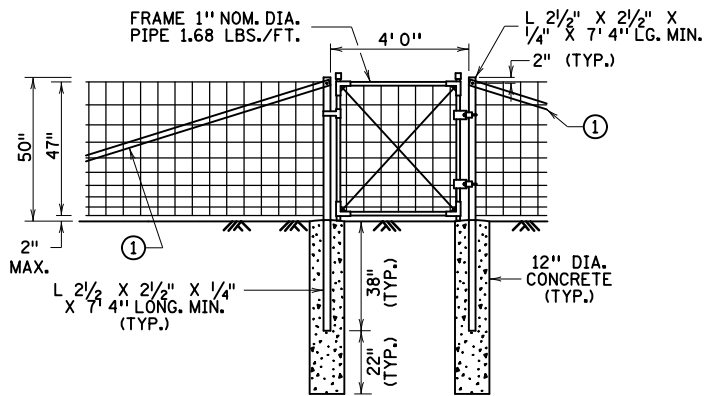
STANDARD
PLATE
NO.

9321F

1 OF 2



VEHICULAR GATE



PEDESTRIAN GATE

NOTES:

WOVEN WIRE FARM FENCE DESIGN 1047-6-11, COATING TYPE A OR TYPE Z CLASS 3.

FENCING PLACED TIGHT TO GROUND WITH MAXIMUM 2" ALLOWED AT UNEVEN TERRAIN.

TOP AND BOTTOM WIRE SHALL BE CLAMPED TO EVERY POST. CLAMP EVERY OTHER WIRE ALTERNATING ON SUCCESSIVE POSTS.

USE CONCRETE MIX 3G52 FOR FENCE POST FOOTINGS.

ELECTRICAL GROUNDS IN ACCORDANCE WITH SPEC. 2557.

① L 2" X 2" X 1/4" X 12' 10" LG. BRACE (TYPICAL). TOP CONNECTION 2" BELOW TOP OF POST.

APPROVED 02-28-2022

Rom S. [Signature]
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
WOVEN WIRE FENCE
STEEL POST

SPECIFICATION
REFERENCE

2557

STANDARD
PLATE
NO.

9321F

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