

Section F: Surfacing Plans

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F1	F22

Plotting Date: 08/04/2025

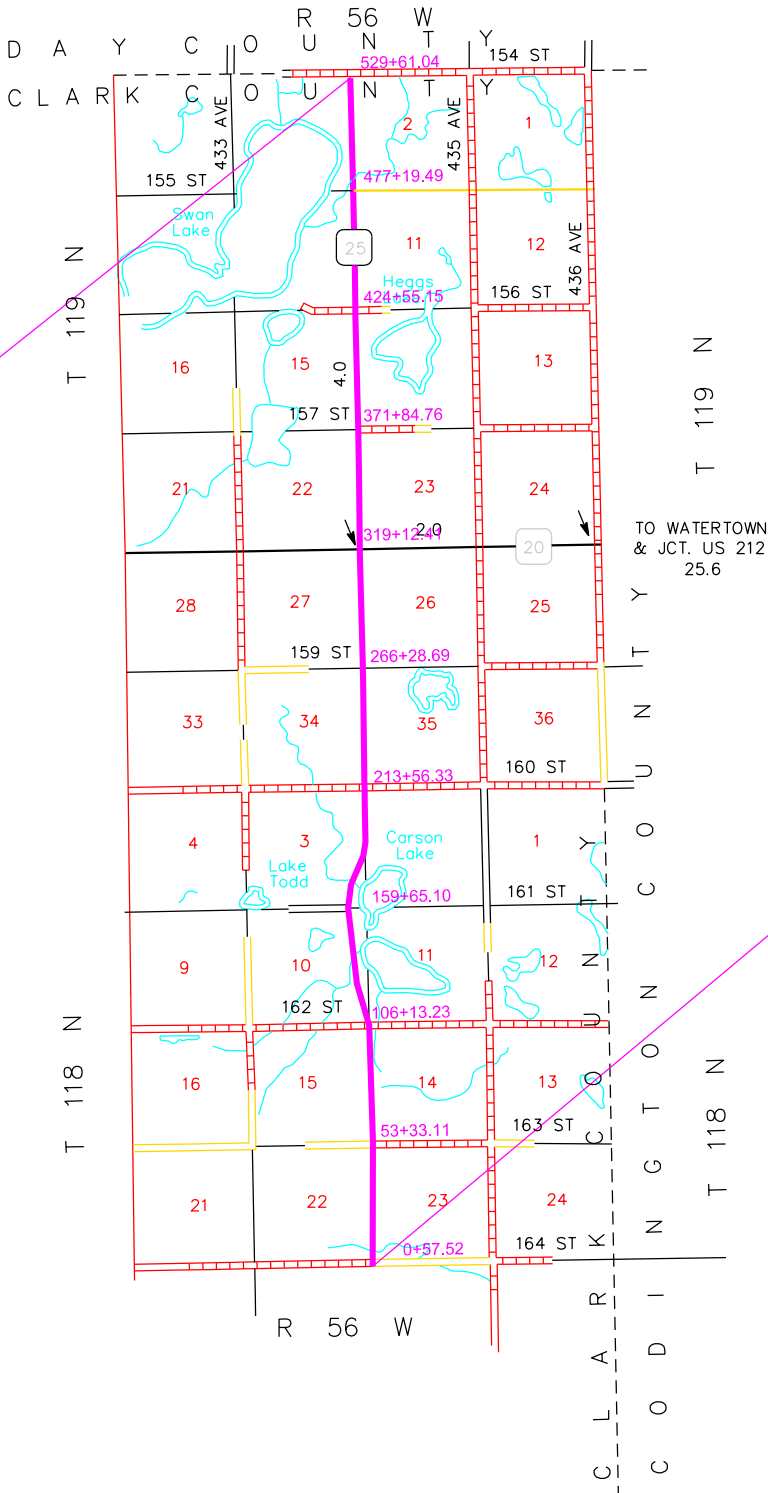
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END P 0025(112)158
END SURFACING

Station 529+20
Located at northwest corner of Section 2 - Township
119 North - Range 56 West of the 5th PM
MRM 168.84+0.000



BEGIN P 0025(112)158
BEGIN SURFACING

Station 0+50
Located at the southeast corner of Section 22 -
Township 118 North - Range 56 West of the 5th PM
MRM 158.00+0.834



SECTION F ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3320	Checker	Lump Sum	LS
009E4200	Construction Schedule, Category II	Lump Sum	LS
120E0100	Unclassified Excavation, Digouts	501	CuYd
120E6200	Water for Granular Material	137.4	MGal
210E1005	Surface Preparation	2,500	Mile
260E1010	Base Course	1,921.6	Ton
260E1080	Base Course, Salvaged, State Furnished	9,357.0	Ton
320E0032	PG 58H-34 Asphalt Binder	2,234.3	Ton
320E1202	CLASS Q2R HOT MIXED ASPHALT CONCRETE	47,869.9	Ton
320E4000	Hydrated Lime	475.2	Ton
320E7012	Grind 12" Rumble Strip or Stripe in Asphalt Concrete	20.0	Mile
320E7028	Grind Centerline Rumble Stripe in Asphalt Concrete	8.2	Mile
320E7030	Grind Sinusoidal Centerline Rumble Stripe in Asphalt Concrete	1.5	Mile
330E0010	MC-70 Asphalt for Prime	146.1	Ton
330E0100	SS-1h or CSS-1h Asphalt for Tack	107.6	Ton
330E0210	SS-1h or CSS-1h Asphalt for Flush Seal	44.0	Ton
330E1000	Blotting Sand for Prime	464.0	Ton
330E2000	Sand for Flush Seal	584.7	Ton
600E0300	Type III Field Laboratory	1	Each
900E0022	Remove and Reset Mailbox	7	Each
900E1980	Storage Unit	1	Each
900E5840	Permanent Vehicle Classification System	1	Each

UTILITIES

The Contractor will contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It will be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor will contact the Engineer to determine modifications that will be necessary to avoid utility impacts.

TYPE III FIELD LABORATORY

The Contractor will provide high-speed broadband internet connection to the field lab. The multiport internet connection may be hardwired, through a cellular method, or other approved service that allows Wi-Fi connection. Prior to obtaining the internet connection, the Contractor will submit the internet connection's technical data to the Area Office to check for compatibility with the state's computer equipment. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer. The internet service will be incidental to the contract unit price per each for "Type III Field Laboratory".

SURFACING THICKNESS DIMENSIONS

The plans shown spread rates will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, the depth/quantity may be varied to achieve the required elevation.

UNCLASSIFIED EXCAVATION, DIGOUTS

The locations and extent of digout areas will be determined in the field by the Engineer. The backfilling material for the digouts will be Base Course.

Included in the Estimate of Quantities are 50 cubic yards of Unclassified Excavation, Digouts per mile for the removal of unstable material throughout the project.

Included in the Estimate of Quantities are 100 tons of Base Course per mile for backfill of Unclassified Excavation, Digouts.

The digouts will be extended through the shoulder and backfilled with granular material that will daylight to the inslope to allow water to escape the subsurface.

SURFACE PREPARATION

Prior to placement of the Class Q2R Hot Mixed Asphalt Concrete, the Contractor will be required to prepare the existing surface according to the Surface Preparation specifications provided in Section 210, at locations determined by the Engineer.

The locations provided on the typical sections for Asphalt Surface Treatment, In Place, represent the locations where an asphalt surface treatment is anticipated to be in place at the time of construction. The Contractor is advised that locations and dimensions of actual Asphalt Surface Treatment, In Place, may vary from that given on the typical sections. There will be no increase in the payment for Surface Preparation based on the actual surface treatment in place at the time of construction.

Quantities for Surface Preparation, MC-70 Asphalt for Prime, and Blotting Sand for Prime have been provided for 2.5 miles of the asphalt surfacing project. Actual limits to receive Surface Preparation, MC-70 Asphalt for Prime, and Blotting Sand for Prime ahead of Class Q2R Hot Mixed Asphalt Concrete placement will be limited to particular project conditions and will be subject to approval by the Engineer. In no case will Surface Preparation operations ahead of Class Q2R Hot Mixed Asphalt Concrete placement operations exceed fourteen calendar days.

The Contractor will ensure excess in place granular material is removed at locations (end of project, bridges, intersecting roads and entrances) to achieve the required elevation for the placement of the asphalt concrete. Payment for the removal of excess in place granular material will be incidental to the contract unit price per mile for Surface Preparation. This material may be reused as Base Course, Salvaged, State Furnished at the discretion of the Engineer.

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CHECKING SPREAD RATES

The Contractor will be responsible for checking the Asphalt Concrete and Base Course, Salvaged, State Furnished/ Base Course spread rates and taking the weigh delivery tickets as the surfacing material arrives on the project and is placed onto the roadway.

The Contractor will compute the required spread rates for each typical surfacing section and create a spread chart prior to the start of material delivery and placement. The Engineer will review and check the Contractor's calculations and spread charts. The station to station spread will be written on each ticket as the surfacing material is delivered to the roadway.

At the end of each day's shift, the Contractor will verify the following:

- All tickets are present and accounted for,
- The quantity summary for each item is calculated,
- The amount of material wasted if any,
- Each day's ticket summary is marked with the corresponding 'computed by',
- The ticket summary is initialed and certified that the delivered and placed quantity is correct.

All daily tickets and the summary by item will be given to the Engineer no later than the following morning.

If the checker is not properly and accurately performing the required duties, the Contractor will correct the problem or replace the checker with an individual capable of performing the duties to the satisfaction of the Engineer. Failure to do so will result in suspension of the work.

The Department will perform depth checks. The Contractor will be responsible for placement of material to the correct depth unless otherwise directed by the Engineer. If the placed material is not within a tolerance of ±1/2 inch of the plan shown depth, the Contractor will correct the problem at no additional cost to the Department. Excess material above the tolerance will not be paid for. Achieving the correct depth may require picking up and moving material or other action as required by the Engineer.

All costs for providing the Contractor furnished checker and performing all related duties will be incidental to the contract lump sum price for the "Checker". No allowances will be made to the contract lump sum price for "Checker" due to authorized quantity variations unless the quantities for the material being checked vary above or below the estimated quantities by more than 25 percent. Payment for the Checker will then be increased or decreased by the same proportion as the placed material quantity bears to the estimated material quantity.

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Plot Scale -
Plotted From -
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BASE COURSE, SALVAGED, STATE FURNISHED

Base Course, Salvaged, State Furnished estimated at 9,357 tons (for informational purposes only) of granular material will be obtained from the stockpile site located in the SW ¼ of Section 23, Township 119 North, Range 56 West of the 5th P.M, Clark County, South Dakota.

The state furnished material has been processed to meet the requirements of Section 884.2 D.7 prior to stockpiling. No gradation testing will be required for the Base Course, Salvaged, State Furnished material.

The Base Course, Salvaged, State Furnished is royalty free to the Contractor.

The Base Course, Salvaged, State Furnished material placed on the shoulders will be shaped and compacted with 4% moisture or as directed by the Engineer, to the typical sections, and in accordance with Section 260.3 D.

All other requirements for Base Course, Salvaged will apply.

PERFORMANCE GRADED ASPHALT BINDER

Performance Graded Asphalt Binder will conform to Section 890, AASHTO M 332, and the Combined State Binder Group Method of Acceptance for Asphalt Binders, available from the Department’s Bituminous Engineer.

CLASS Q2R HOT MIXED ASPHALT CONCRETE

Mineral Aggregate:
Asphalt concrete aggregates will consist of reclaimed asphalt pavement (RAP) and virgin aggregate.

Virgin mineral aggregate for Class Q2R Hot Mixed Asphalt Concrete will conform to the requirements of Class Q2.

The Class Q2R Hot Mixed Asphalt Concrete will include 20 percent RAP in the mixture.

RAP will be obtained from the stockpiled salvaged asphalt mix material produced from project PCN 04EW, estimated at 9,924 tons, located in the SW ¼ of Section 23, Township 119 North, Range 56 West of the 5th P.M, Clark County, South Dakota. The RAP produced from PCN 04EW was planned to be removed and stockpiled the year prior to this project. The RAP was processed to meet the requirements of Section 884.2 C.1 prior to stockpiling. There is potential that some of the RAP has clumped or gummed together since the time it was processed and stockpiled. The Contractor may be required to re-process the material to meet the requirements of Section 884.2 C.1, prior to incorporating into the mixture. This determination will be made by the Engineer during construction. All costs to process the material will be incidental to “Class Q2R Hot Mixed Asphalt Concrete”.

Mix Design Criteria:
Gyratory Controlled QC/QA Mix Design requirements for the Class Q2R Hot Mixed Asphalt Concrete will conform to the requirements of Class Q2.

All remaining requirements for Class Q2 will apply.

SUMMARY OF CLASS Q2R HOT MIXED ASPHALT CONCRETE COMPACTION

Location	With Specified Density Compaction	Without Specified Density Compaction
	Ton	Ton
SD25 - Mainline - Section 1		
Sta. 0+50.00 to Sta. 306+15.00	25,708.1	---
Sta. 306+15.00 to Sta. 310+34.95	425.5	---
Sta. 327+92.97 to Sta. 332+13.00	426.0	---
Sta. 332+13.00 to Sta. 529+20.00	16,575.6	---
SD25 - Mainline - Section 2		
Sta. 310+34.95 to Sta. 327+92.97	1,863.4	207.0
AC Shoulders through Superelevated Curves	---	688.3
Intersecting Roads	---	760.0
AC Shoulder Tie In - Intersecting Roads – (19 each)	---	277.0
AC Shoulder Tie In - Entrances – (51 each)	---	652.0
Mailbox Turnouts - (7 each)	---	287.0
Total:	47,869.9	

BLOTING SAND FOR PRIME

Included in the Estimate of Quantities are 5 tons of Blotting Sand for Prime to be used where necessary for maintenance of traffic as directed by the Engineer. (Rate = 10 pounds per square yard)

GRIND RUMBLE STRIPES IN ASPHALT CONCRETE

Asphalt concrete rumble stripes will be constructed on the shoulders. Rumble stripes will be paid for at the contract unit price per mile for “Grind 12” Rumble Strip or Stripe in Asphalt Concrete”. It is estimated that 20.0 miles of asphalt concrete rumble stripes will be required.

Rumble stripe installation will be completed prior to application of the flush seal and permanent pavement markings. In the event the flush seal is eliminated from the contract, the Contractor will still be required to apply a flush seal to the newly installed 12” rumble stripes at a width of 18” and at the same rate as specified in this plan set. No adjustment in payment will be made and SS-1h or CSS-1h Asphalt for Flush Seal will be paid at the contract unit price per ton.

TABLE OF SHOULDER RUMBLE STRIPES

Sta	to	Sta.	Length (Mile)
0+50.00	to	310+34.95	5.9
310+34.95	to	327+92.97	0.3
327+92.97	to	529+20.00	3.8
		Total:	*10.0

*Single Shoulder length – Both Shoulders = 20.0 miles

GRIND CENTERLINE RUMBLE STRIPE IN ASPHALT CONCRETE

Rumble stripes will be constructed on the centerline, as detailed in the plans. Centerline rumble stripe installation will be completed prior to application of the flush seal and permanent pavement markings. Rumble stripes will be paid for at the contract unit price per mile for “Grind Centerline Rumble Stripe in Asphalt Concrete”. It is estimated that 8.3 miles of centerline rumble stripes will be required.

Centerline rumble stripes will be constructed according to the details of Standard Plate 320.18 outside the limits shown in the Table of Sinusoidal Centerline Rumble Stripes.

TABLE OF CENTERLINE RUMBLE STRIPES

Sta	to	Sta.	Length (Mile)
0+50.00	to	5+95.00	0.1
18+45.00	to	34+70.00	0.3
47+45.00	to	147+50.00	1.9
166+85.00	to	187+40.00	0.4
200+45.00	to	269+75.00	1.3
282+35.00	to	311+10.00	0.5
323+85.00	to	510+00.00	3.5
516+90.00	to	529+20.00	0.2
		Total:	8.2

GRIND SINUSOIDAL CENTERLINE RUMBLE STRIPE IN ASPHALT CONCRETE

Sinusoidal rumble stripes will be constructed on the centerline, as detailed in the plan set. Sinusoidal rumble stripes will be paid for at the contract unit price per mile for “Grind Sinusoidal Centerline Rumble Stripe in Asphalt Concrete”. It is estimated that 1.7 miles of sinusoidal rumble stripes will be required.

TABLE OF SINUSOIDAL CENTERLINE RUMBLE STRIPES

Sta	to	Sta.	Length (Mile)
5+95.00	to	18+45.00	0.2
34+70.00	to	47+45.00	0.2
147+50.00	to	166+85.00	0.4
187+40.00	to	200+45.00	0.2
269+75.00	to	282+35.00	0.2
311+10.00	to	323+85.00	0.2
510+00.00	to	516+90.00	0.1
Total:			1.5

CENTERLINE RUMBLE STRIPES – ASPHALT FOR FLUSH SEAL

Asphalt for Flush Seal will be applied after the centerline rumble stripes have been installed and prior to the application of permanent pavement markings. The application width will extend 1 ft beyond the centerline of the roadway in each direction to create a total application rate of 0.10 Gal/SqYd on the centerline rumble stripes.

In the event the flush seal is eliminated from the contract, the Contractor will still be required to apply asphalt for flush seal to the newly installed centerline rumble stripes at a width of 24” and a rate of 0.10 Gal/SqYd. No adjustment in payment will be made and SS-1h or CSS-1h Asphalt for Flush Seal will be paid at the contract unit price per ton.

STORAGE UNIT

The Contractor will provide a storage unit such as a portable storage container or a semi-trailer meeting the minimum size requirements from the table below:

Project Total Asphalt Concrete Tonnage	Minimum Internal Size (Cu Ft)	Minimum External Size (L x W x H)
Less than 50,000 ton	1,166	20’ x 8’ x 8.6’ std
More than 50,000 ton	2,360	40’ x 8’ x 8.6’ std
All Gyratory Controlled QC/QA Projects	2,360	40’ x 8’ x 8.6’ std

The storage unit is intended for use only by the Engineer for the duration of the project. The QC lab personnel or the Contractor will not be allowed to use the storage container while it is on the project, without permission of the Engineer.

The storage unit will be on site and operational prior to asphalt concrete production. Upon completion of asphalt concrete production, the Engineer will notify the Contractor when the storage unit can be removed from the project. The storage unit use will not exceed 30 calendar days from the completion of asphalt concrete production. The storage unit will remain the property of the Contractor.

The storage unit will be weather proof and will be set in a level position. The storage unit will be able to be locked with a padlock.

The storage unit will be placed adjacent to the QA lab, as approved by the Engineer.

The following will apply when the storage unit provided on the project is a portable storage container:

1. The portable storage container will be constructed of steel.
2. The portable storage container will be set such that it is raised above the surrounding ground level to keep water from ponding under or around the storage container.

The following will apply when the storage unit provided on the project is a semi-trailer:

1. A set of steps and hand railings will be provided at the exterior door.
2. If the floor of the semi-trailer is 18 inches or more above the ground, a landing will be constructed at the exterior door. The minimum dimensions for the landing will be 4 feet by 5 feet. The top of the landing will be level with the threshold or opening of the doorway.
3. The semi-trailer may be connected to the QA lab by a stable elevated walkway. The walkway will be a minimum of 48 inches wide and contain handrails installed at 32 inches above the deck of the walkway. The walkway will be constructed such that it is stable and the deck does not deform during use and allows for proper door operation. Walkway construction will be approved by the Engineer.

All cost for furnishing, maintaining, and removing the storage unit including labor, equipment, and materials including any necessary walkways, landings, stairways, and handrails will be included in the contract unit price per each for “Storage Unit”.

INTERSECTING ROADS AND ENTRANCES

Intersecting roads and entrances will be satisfactorily cleared of vegetation, shaped and compacted prior to placement of mainline surfacing. This work will be considered incidental to other contract items. Separate measurement and payment will not be made.

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MAILBOXES

Mailboxes will be moved and adjusted to the correct height and location by resetting the posts in accordance with Standard Plate 900.01 and 900.02. The local Postmaster will determine the recommended mounting height. The Contractor will coordinate with the Engineer on the proper postal representative to contact. The cost of removing and resetting existing mailboxes will be paid for at the contract unit price per each for Remove and Reset Mailbox.

TABLE OF REMOVE & RESET MAILBOX

Station	L/R	Single (Each)	Double (Each)
12+15	R	1	
40+10	L	1	
152+67	R	1	
159+80	L		1
194+50	R	1	
275+65	L	1	
515+93	R	1	
Totals:		6	1

TABLE OF SUPERELEVATION

Station	to	Station	Remarks
0+00.00		98+03.72	Normal Crown Section
98+03.72		99+65.72	Superelevation Runoff
99+65.72		109+36.07	0.038 Superelevation Rate
			13°57' 42" Curve Lt.
109+36.07		110+98.07	Superelevation Runoff
110+98.07		127+97.60	Normal Crown Section
127+97.60		129+48.60	Superelevation Runoff
129+48.60		136+72.75	0.034 Superelevation Rate
			8° 37' 41" Curve Rt.
136+72.75		138+23.75	Superelevation Runoff
138+23.75		154+02.12	Normal Crown Section
154+02.12		155+75.12	Superelevation Runoff
155+75.12		173+10.05	0.042 Superelevation Rate
			27°17' 37" Curve Rt.
173+10.05		174+83.05	Superelevation Runoff
174+83.05		179+28.95	Normal Crown Section
179+28.95		181+01.95	Superelevation Runoff
181+01.95		194+84.75	0.042 Superelevation Rate
			22° 21' 24" Curve Lt.
194+84.75		196+57.75	Superelevation Runoff
196+57.75		529+20.00	Normal Crown Section

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Permanent Vehicle Classification System

The Contractor will install a permanent vehicle classification system on SD Highway 25 at Approximately MRM 158 + 0.994 in the east Right of Way (Approximately 800’ North of 164th St), the SDDOT Project Engineer will determine the exact location, to include:

1. The Contractor will purchase and install 2 (one per lane) Roadtrax Class II BL (Brass Linguini) 8’ piezo’s for vehicle classification. The Contractor will install the piezo’s by sawing or routing the piezo’s into the Asphalt Concrete surface to the measurements shown in Sawed-In Detector Loop Detail. The Contractor will supply all necessary equipment, manpower and materials to complete this installation. A sample of the major steps of the piezo installation is attached for informational purpose only. Drawings B and C provide additional information about the BL piezo installation. The piezo will have enough passive cable length to reach the electronics cabinet (No Splices will be allowed). The SDDOT Project Engineer will determine if the weather is acceptable to install piezo’ s and loops (40 F and rising with no rain) and no piezo’ s will be allowed to be installed after November 1. All saw cuts must be cleaned to the satisfaction of the SDDOT Project Engineer before sealing the cuts.
2. The Contractor will install 4 traffic loops (6’ X 6’) (two per lane) by sawing or routing loops into the asphalt concrete surface to the measurements shown in Sawed-In Detector Loop Detail. The loops must have 4 turns of jacketed loop wire meeting the requirements of IMSA Specification No 51-1(1 conductor, PVC/Nylon with Tube Jacket 12 AWG). Home run shielded wire will be stranded 14AWG with DC resistance < 3.0 ohms per 1000 feet and has cross-link polyethylene insulation (XHWW). The Contractor will supply all necessary equipment, manpower, and materials to complete the loop installation.
3. The Contractor will provide and install underground 3/4-inch rigid conduit, schedule 80 to a depth at least 24 inches below ground from the edge of the roadway to 2 electrical junction boxes. (see Sawed-In Detector Loop Detail). The junction boxes will be located 6 feet off the edge of each shoulder, with 2-inch conduit the remainder of the way to the electronics cabinet. Costs associated with furnishing and installing the electrical junction boxes and conduit will be incidental to the contract unit price for “Permanent Vehicle Classification System”, Bid Item: 900E5840. For Junction Box details, see “Junction Box Detail”. Power must be brought into the cabinet separately and not through existing conduit and junction boxes with sensor wires. Drawing D provides additional information about the conduit installation. A buried cable marker will be placed in the trench for the conduit as indicated on Standard Plate 635.76. Cost of the marker will be incidental to the contract unit price per each for "Permanent Vehicle Classification System".
4. A representative of SDDOT Office of Inventory Management & Research - Traffic Section will be on site and direct the installation of the piezo’ s and the loop arrays. The Contractor must advise the SDDOT Office of Inventory Management & Research - Traffic section at least 2 weeks prior to the date of installation of the sensors. Installation of the loops and piezos will be conducted at the same time and in a continuous manner. Inventory Management & Research – Traffic Section can be reached at 605.773.3278 or 605.773.6644.
5. The Contractor will provide and install a new NEMA 3R, Type M cabinet, measuring 50” tall x30” wide x 17” deep. The electronics cabinet will be installed on a new M6 PCC concrete base. The concrete base must meet the specifications of standard plate 635.60,

base mounted. The Concrete access pad will be installed in a manner to where a person can view traffic and access the interior of the cabinet simultaneously. The cabinet will be installed in the east Right of Way, near MRM 158 + 0.994. The cabinet base will have a minimum of 2 conduit run through the concrete base. One Conduit for sensor wires, one conduit for power. The SDDOT Project Engineer will approve the exact location of the electronics cabinet. The electronics cabinet will include an aluminum two-shelf cabinet with a fan and thermostat, a cabinet light controlled by a door switch, lightning surge suppression and terminal blocks for four (4) inductive loop and two (2) piezo’s. The electronic cabinet will be fitted with a #2 Corbin style lock and supplied with 2 keys. The cabinet and base will have a water drain hole in the lowest corner of the cabinet and through the concrete base so that water will freely drain from the cabinet. The cabinet door will be located on the east side of the cabinet. The Contractor will install 110 V AC (100 Amp) electric service to the electronics cabinet. The electrical service cabinet will be a standard electrical service cabinet located adjacent to the power source. The Contractor will install a NEMA 3R rainproof, 60 amp rated, non-fused safety switch (with lock) adjacent to the traffic signal cabinet. The secondary disconnect will be mounted on a galvanized steel post in accordance with standard plate 635.35.

The Contractor will be responsible for contacting the utility company to coordinate the installation of the electrical service and connection to the electrical service. The Contractor will contact the utility company at least 2 weeks prior to needing the electrical service installed.

Codington Clark Electric Co-Op
(605) 886-5848

All cost for contacting the utility company and coordinating the electrical service installation and all hookup fees will be incidental to the contract unit price for “Permanent Vehicle Classification System.”

6. The Contractor will provide a Sierra Wireless RV55 cell phone modem to be used in the electronics cabinet. The Contractor will pay for all charges (installation and connect fees, lighting surge suppression, supplies, etc.) for the electric to be installed into the electronics cabinet. The Contractor will install and wire all piezo’s, inductive loops, counter, electronics, software, and hardware and initialize the system. After the Contactor determines the system to be operational then the SDDOT Office of Inventory Management & Research - Traffic Section will review for final approval.
7. The Contractor will purchase one Oriux ADR-3000 with inputs for 2 piezo’s and 4 inductive loops and install in the electronics cabinet. ACT Traffic Solutions (Chanhassen, MN) is Orioux’s South Dakota distributor.
8. The basis of payment for the Permanent Vehicle Classification System will be the contract item "Permanent Vehicle Classification System". All costs associated with furnishing, installing and making vehicle classification system operational will be incidental to the contract unit price per each for "Permanent Vehicle Classification System".

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Sample Major Steps of Piezo Installation – For Informational Purposes Only

1. Carefully mark the slot to be cut, perpendicular to the flow of traffic. Ensure that the sensors are properly positioned in the lane. Shorter sensors are positioned to one side; longer sensors are typically centered on the lane.
2. Cut a slot ¾" wide (+ 1/16") and 3/4" deep (-0", +1/4"). (19mm wide, + 1mm, 19 to 25mm deep). The slot should be ≈ 6" (150mm) longer than the sensor. The lead out should be centered in the slot. The leadout cable is typically 3/8" (9mm) wide and 3" (75mm) deep. It is normally done to the same specifications as the inductive loop and the homerun cables for these.
3. It is strongly recommended that a 3/4" (19mm) wide diamond blade be used for cutting the slot, or that blades be ganged together to get a single 3/4" (19mm) wide cut. The slot should be wet cut to minimize damage to the road.
4. Once all cutting is completed (including the inductive loops) sweep and wash out the debris left in the slot and ensure it is clean and dry. Use high pressure water, a power washer, or water and compressed air to clean ALL foreign matter out of the slot and 6" (150mm) on all sides of the slot. Remove all excess water and debris with a vacuum cleaner and/or sweeping.
5. Carefully dry the slot using torches, torpedo heaters, or natural evaporation, depending on weather conditions. The slot needs to be clean and dry to ensure the chemical bonding of the grout to the pavement.
6. Place a strip of 2" (50mm) wide duct tape along the pavement next to the slot. This facilitates leveling the grout and clean-up.
7. Lay the sensor on the tape next to the slot. Ensure that the sensor is straight and flat. Place the clips on the sensor, about every 6" (150mm).

Slightly bend the end of the sensor down at a 30 deg angle, so that it is below the surface. Do the same at the end with the passive cable, bending the sensor about 1" (25mm) from the lead attachment.
8. Trial fit the sensor in the slot, carefully pressing down on the brass element on either side of the clips. Press down only far enough to make sure sensor and clips fit into the slot.

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Sample Major Steps of Piezo Installation – For Informational Purposes Only - CONTINUED

- 9. Block off the end of the slot where the cable exits using plumbers' putty or foam backer rod after sensor installation. Ensure that there is an adequate 'dam' so that the encapsulation material does not flow out. The dam MUST be about 3-5" (75-125mm) past the end of the lead attachment area. The installation grout must completely encapsulate the lead attachment area. If ducting or conduit is used for the lead in cable, it should not extend to the lead attachment. It must stop 3-5" (75-125mm) short of the lead attachment so that the lead attachment can be fully encapsulated.
- 10. Test the sensor for Capacitance, Dissipation Factor and Resistance, according to the directions enclosed with the packing slip in the delivery box. Record the test results and the sensor serial number. This information should be stored in the counter cabinet or returned to a data storage file. Then remove the sensor from slot.
- 11. Mix the grout according to the manufacturer's instructions. Be sure to pre-mix the resin combining the two parts since the filled materials have a tendency to settle. Fill the slot half full of encapsulation material and then place the sensor in the slot pressing the clips to the bottom of the slot. Then fill the rest of the slot with the remaining encapsulation material. Using a trowel, distribute the encapsulation material along the sensor, and smooth it out.
- 12. Remove the tape on the sides of the sensor as soon as the adhesive starts to cure.
- 13. Carefully remove the plumber's putty or backer rod used to form the dams at the end of the sensor.
- 14. Route the lead in cable through the slot cut for it, and cover with loop sealant or grout. NOTE: Hot Tar should not be used since the temperature is difficult to control and it can burn the cable.
- 15. When the encapsulation material is fully cured, grind the top of the encapsulation material flush with the road using an angle grinder. The profile should be flat and flush with the road, ensuring that there are no concave portions.
- 16. Clean up the site. When the encapsulation material is fully cured, it may be opened to traffic. Failure to wait for encapsulation material to fully cure may ruin the installation and cause it to fail prematurely.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F6	F22

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Plot Scale -

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TRPR18387

RATES OF MATERIALS
Rates quantities are included in the Table of Materials Quantities

The Estimate of Surfacing Quantities is based on the following quantities of materials per **MILE**.

MAINLINE – Section 1

Sta. 0+50.00 to Sta. 306+15.00
Sta. 332+13.00 to Sta. 529+20.00

SS-1h or CSS-1h Emulsified Asphalt for Tack at the rate of 4.94 tons applied 33 feet wide (Rate = 0.06 gallon per square yard).

CLASS Q2R HOT MIXED ASPHALT CONCRETE – 1ST LIFT

Crushed Aggregate	1863 tons
Salvaged Asphalt Concrete	466 tons
PG 58H-34 Asphalt Binder	<u>115 tons</u>
Total Mix without Hydrated Lime	2444 tons
Hydrated Lime	<u>24 tons</u>
Total Mix with Hydrated Lime	2468 tons

The exact proportions of these materials will be determined on construction.

MAINLINE– Section 1

Sta. 0+50.00 to Sta. 306+15.00
Sta. 332+13.00 to Sta. 529+20.00

SS-1h or CSS-1h Emulsified Asphalt for Tack at the rate of 4.94 tons applied 33 feet wide (Rate = 0.06 gallon per square yard).

CLASS Q2R HOT MIXED ASPHALT CONCRETE – TOP LIFT

Crushed Aggregate	1489 tons
Salvaged Asphalt Concrete	372 tons
PG 58H-34 Asphalt Binder	<u>92 tons</u>
Total Mix without Hydrated Lime	1953 tons
Hydrated Lime	<u>20 tons</u>
Total Mix with Hydrated Lime	1973 tons

The exact proportions of these materials will be determined on construction.

FLUSH SEAL

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal at the rate of 3.99 tons/mile applied 32 feet wide (Rate = 0.05 gallon per square yard).

Sand for Flush Seal at the rate of 51.63 ton/mile applied 22 feet wide (Rate = 8 lbs. per square yard).

The Estimate of Surfacing Quantities is based on the following quantities of materials per **STATION**.

MAINLINE– Section 2

Sta. 310+34.95 to Sta. 327+92.97

SS-1h or CSS-1h Emulsified Asphalt for Tack at the rate of 0.13 tons applied 45 feet wide (Rate = 0.06 gallon per square yard).

CLASS Q2R HOT MIXED ASPHALT CONCRETE – 1ST LIFT

Crushed Aggregate	49.40 tons
Salvaged Asphalt Concrete	12.35 tons
PG 58H-34 Asphalt Binder	<u>3.05 tons</u>
Total Mix without Hydrated Lime	64.80 tons
Hydrated Lime	<u>0.65 tons</u>
Total Mix with Hydrated Lime	65.45 tons

The exact proportions of these materials will be determined on construction.

MAINLINE– Section 2

Sta. 310+34.95 to Sta. 327+92.97

SS-1h or CSS-1h Emulsified Asphalt for Tack at the rate of 0.13 tons applied 45 feet wide (Rate = 0.06 gallon per square yard).

CLASS Q2R HOT MIXED ASPHALT CONCRETE – TOP LIFT

Crushed Aggregate	39.48 tons
Salvaged Asphalt Concrete	9.87 tons
PG 58H-34 Asphalt Binder	<u>2.43 tons</u>
Total Mix without Hydrated Lime	51.78 tons
Hydrated Lime	<u>0.52 tons</u>
Total Mix with Hydrated Lime	52.30 tons

The exact proportions of these materials will be determined on construction.

FLUSH SEAL

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal at the rate of 5.49 tons/station applied 44 feet wide (Rate = 0.05 gallon per square yard).

Sand for Flush Seal at the rate of 77.44 ton/station applied 33 feet wide (Rate = 8 lbs. per square yard).

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The Estimate of Surfacing Quantities is based on the following quantities of materials per **MILE**.

MAINLINE SHOULDERS (Each)

Sta. 0+50.00 to Sta. 529+20.00

Each Shoulder

Base Course, Salvaged, State Furnished/ Base Course
466 tons

Water for Granular Material at the rate of 5.6 Mgal

The exact proportions of these materials will be determined on construction.

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Plot Scale -
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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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TABLE OF MATERIALS QUANTITIES

LOCATION Station to Station	WATER FOR GRANULAR MATERIAL (MGal)	BASE COURSE, SALVAGED, STATE FURNISHED/ BASE COURSE (Ton)	CLASS Q2R ASPHALT CONCRETE		PG 58H-34 ASPHALT BINDER		ASPHALT FOR PRIME (Ton)	BLOTTING SAND FOR PRIME (Ton)	HYDRATED LIME		ASPHALT FOR TACK		ASPHALT FOR FLUSH SEAL (Ton)	SAND FOR FLUSH SEAL (Ton)
			1st Lift	Top Lift	1st Lift	Top Lift			1st Lift	Top Lift	1st Lift	Top Lift		
			(Ton)	(Ton)	(Ton)	(Ton)			(Ton)	(Ton)	(Ton)	(Ton)		
SD 25 - Mainline - Section 1														
0+50.00 to 306+15.00	51.8	4,313.1	14,286.8	11,421.3	665.7	532.6			138.9	115.8	28.6	28.6	23.1	298.9
306+15.00 to 310+34.95	0.9	74.1	237.3	188.2	11.0	8.8			2.4	1.8	0.5	0.5	0.4	5.1
327+92.97 to 332+13.00	0.9	74.2	237.6	188.4	11.1	8.8			2.4	1.8	0.5	0.5	0.4	5.1
332+13.00 to 529+20.00	41.8	3,478.6	9,211.6	7,364.0	429.2	343.4			89.6	74.6	18.4	18.4	14.9	192.7
SD 25 - Mainline - Section 2														
310+34.95 to 327+92.97	3.7	310.3	1,150.8	919.6	53.6	42.7			11.4	9.1	2.3	2.3	1.8	25.8
Intersecting Roads and Entrances														
28' Intersecting Roads - 19 each	9.5	760.0	380.0	380.0	19.0	19.0	5.7	19.0	3.8	3.8				
24' Entrances - 39 each	11.7	819.0												
32' Entrances - 1 each	0.3	28.0												
40' Entrances - 12 each	4.8	420.0												
AC Shoulder Tie In -Intersecting Roads - 19			154.0	123.0	7.0	6.0			2.0	1.0	0.3	0.3	0.4	8.0
AC Shoulder Tie In - Entrances - 51			363.0	289.0	17.0	13.0			4.0	3.0	0.7	0.7	1.0	20.0
Surface Preparation - Section 1							59.0	175.0						
Surface Preparation - Section 2							80.0	265.0						
Unclassified Excavation - Digouts	12.0	1,001.3												
Blotting Sand for Maintenance of Traffic								5.0						
AC Shoulders through Superelevated Curves														
98+03.72 to 110+98.07			71.8	73.5	3.4	3.4			0.7	0.7	0.5	0.5	0.4	4.7
127+97.60 to 138+23.75			56.9	58.3	2.7	2.7			0.6	0.6	0.4	0.4	0.3	3.7
154+02.12 to 174+83.05			115.5	118.2	5.5	5.5			1.2	1.2	0.7	0.7	0.6	7.5
179+28.95 to 196+57.75			95.9	98.2	4.6	4.6			1.0	1.0	0.6	0.6	0.5	6.2
Mailbox Turnouts - (7 each)			161.0	126.0	7.0	7.0	1.4		1.4	1.4	0.3	0.3	0.2	7.0
Rates	Totals:	137.4	11,278.6	47,869.9	2,234.3		146.1	464.0	475.2		107.6		44.0	584.7

Application Rates: PG 58H-34 Asphalt Binder at 4.7%
MC-70 Asphalt for Prime rate = 0.30 gallon per square yard
SS-1h or CSS-1h Asphalt for Tack rate = 0.09 gallon per square yard- 1st lift, 0.06 gallon per square yard – Top lift
SS-1h or CSS-1h Asphalt for Flush Seal rate = 0.05 gallon per square yard
Water for Granular Material = 0.012 Mgal/ton

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LOCATION OF FARM ENTRANCES

FARM ENTRANCES			
24' Farm Entrance		32' Farm Entrance	40' Farm Entrance
(39 each)		(1 each)	(12 each)
Sta. 11+87 Lt.& Rt.	Sta. 273+40 Rt.	Sta. 486+13 Lt.	Sta. 79+67 Lt.& Rt.
Sta. 18+72 Lt.	Sta. 275+58 Lt.		Sta. 119+85 Lt.
Sta. 20+58 Rt.	Sta. 283+09 Lt.		Sta. 239+81 Lt.
Sta. 32+55 Lt.	Sta. 292+69 Lt.		Sta. 292+69 Rt.
Sta. 40+29 Lt.& Rt.	Sta. 301+11 Lt.& Rt.		Sta. 298+23 Rt.
Sta. 65+53 Lt.& Rt.	Sta. 316+62 Rt.		Sta. 345+50 Lt.& Rt.
Sta. 90+00 Lt.& Rt.	Sta. 354+00 Lt.		Sta. 411+37 Lt.& Rt.
Sta. 114+27 Rt.	Sta. 379+91 Lt.		Sta. 503+57 Lt.& Rt.
Sta. 152+57 Lt.& Rt.	Sta. 388+35 Rt.		
Sta. 186+61 Lt.& Rt.	Sta. 388+49 Lt.		
Sta. 194+65 Lt.& Rt.	Sta. 440+66 Rt.		
Sta. 213+56-230' Lt & Bk	Sta. 456+63 Rt.		
Sta. 226+75 Lt.& Rt.	Sta. 468+00 Lt.& Rt.		
Sta. 256+00 Lt.	Sta. 515+83 Rt.		

LOCATION OF INTERSECTING ROADS

INTERSECTING ROADS
28+' Intersecting Roads
(19 each)
Sta. 00+67 Lt.& Rt.
Sta. 53+33 Lt.& Rt.
Sta. 106+11 Lt.& Rt.
Sta. 159+65 Lt.
Sta. 213+56 Lt & Rt.
Sta. 266+29 Lt & Rt.
Sta. 319+12 Lt & Rt.- 100' Rad Ah& Bk
Sta. 371+85 Lt & Rt.- 35' Rad
Sta. 424+55 Lt & Rt.
Sta. 450+87 Lt.
Sta. 477+20 Rt.

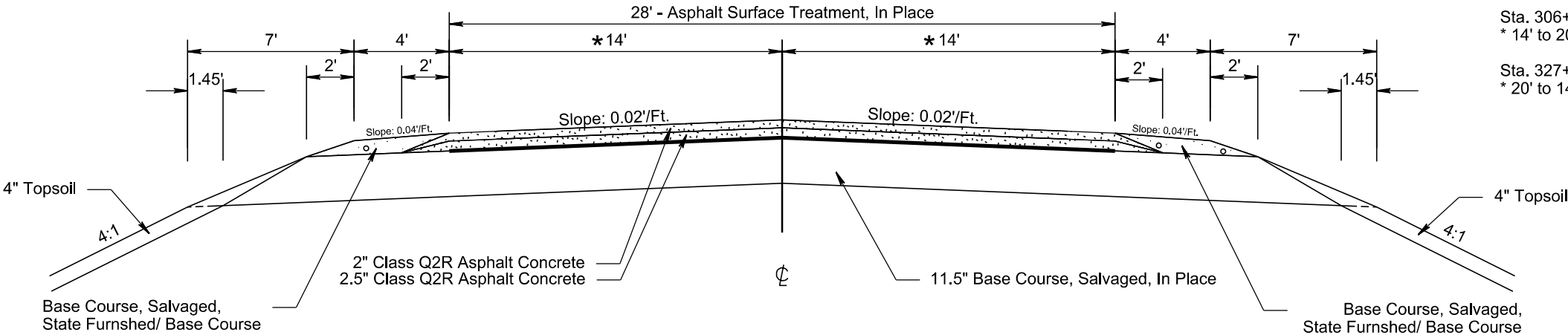
TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F10	F22

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Section 1

Sta. 0+50 to Sta. 310+34.95
Sta. 327+92.97 to Sta. 529+20



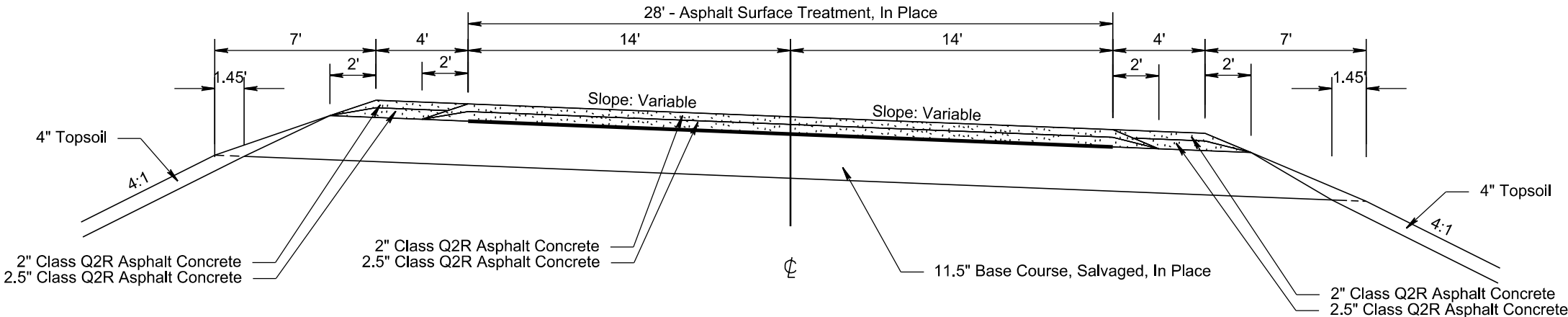
Transitions:

Sta. 306+15.00 to Sta. 310+34.95
* 14' to 20'

Sta. 327+92.97 to Sta. 332+13.00
* 20' to 14'

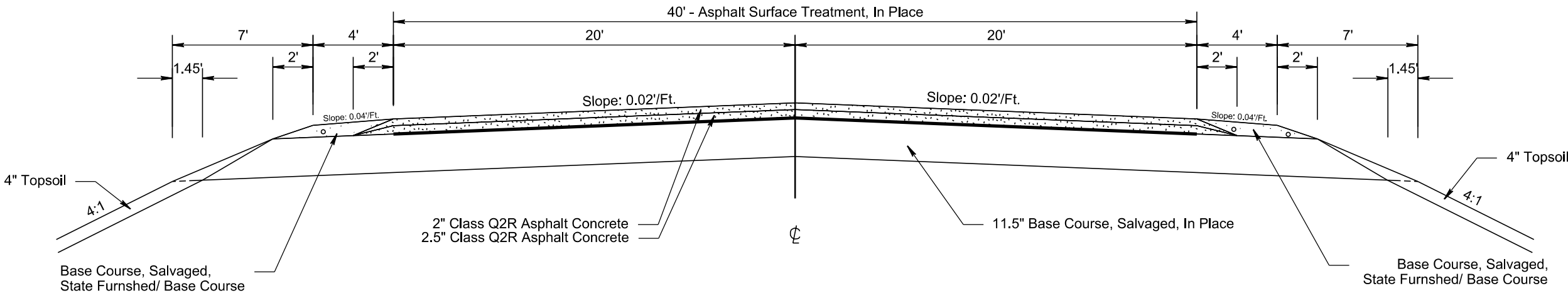
Section 1a

Sta. 98+03.72 to Sta. 110+98.07 Lt.
Sta. 127+97.60 to Sta. 138+23.75 Rt.
Sta. 154+02.12 to Sta. 174+83.05 Rt.
Sta. 179+28.95 to Sta. 196+57.75 Lt.



Section 2

Sta. 310+34.95 to Sta. 327+92.97



PLOT SCALE - 1+6.00001

PLOTTED FROM - TRPR18387

PLOT NAME - 10

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F11	F22

Plotting Date: 03/17/2025

Items below are incidental to "Permanent Vehicle Classification System" and are shown for reference only																			
Location to Location		Rigid Conduit				Copper Wire				Twisted Shielded Pair									
		Schedule 40		Schedule 80		1/C #10 AWG				#16 AWG									
		2"		3/4"	2"														
		Ft		Ft	Ft														
Traffic Counter 1 (8+75-R)																			
Elec. Serv	Traffic Counter	15					95												
Traffic Counter	JB2	50								210									
JB2	JB1				60					125									
JB1	Conduit Stub for loops and Piezo			10															
JB2	Conduit Stub for loops and Piezo			10															
Total:		65		20	60		95			335									

Plot Scale - 1:200

Plotted From - TRPR17199

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Plot Scale -

Plotted From - TRPR17199

CONDUIT LAYOUT

SD 25

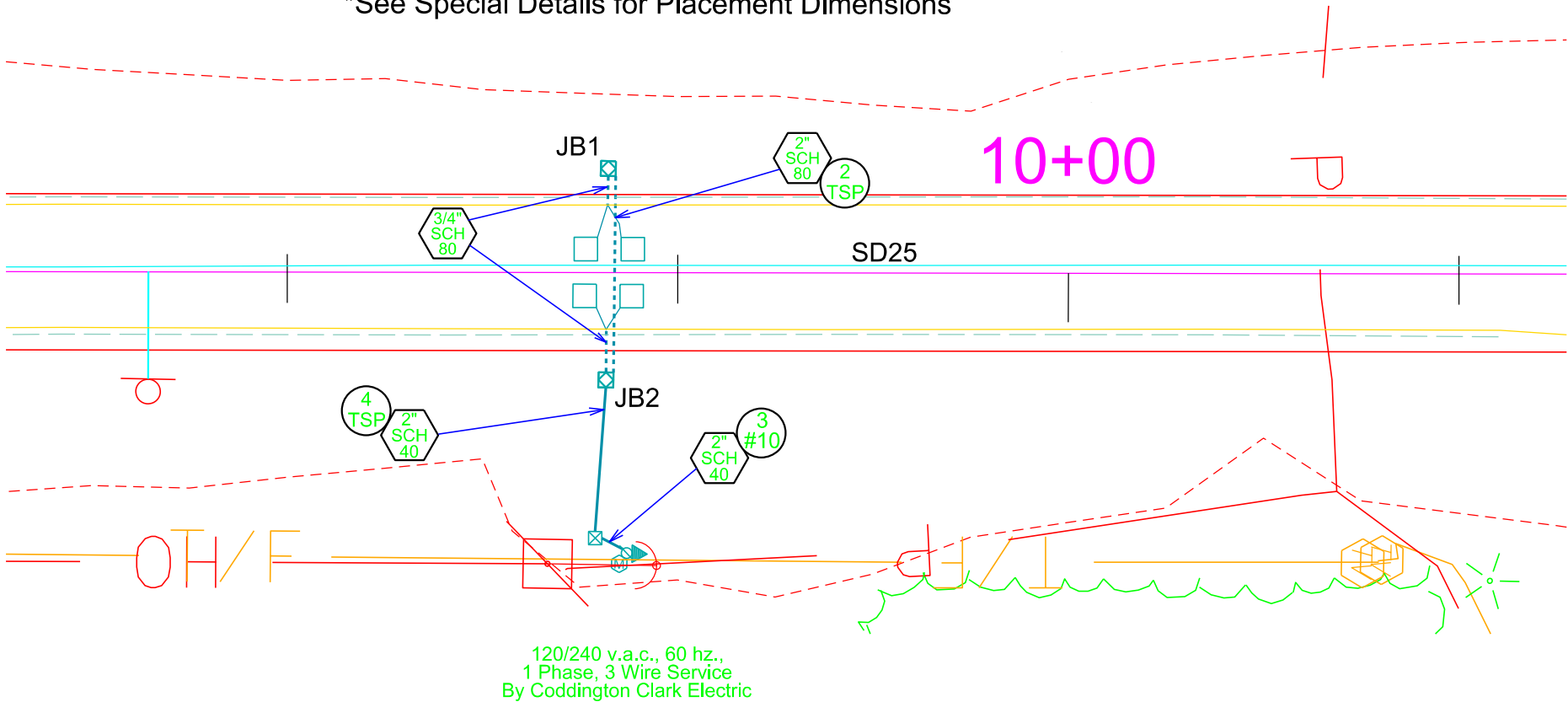
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F12	F22
Plotting Date:		03/17/2025	



*See Special Details for Placement Dimensions

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
☑	Permanent Vehicle Classification System	1	EACH

ITEMS INCIDENTAL TO PERMANENT VEHICLE CLASSIFICATION SYSTEM			
KEY	ITEM	EST QUANT	UNIT
□	Preformed Detector Loop	4	EACH
3/4" SCH 80	3/4" Rigid Conduit, Schedule 80	20	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	65	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	60	FT
#10	1/C #10 AWG Copper Wire	95	FT
TSP	#16 AWG Copper Twisted Shielded Pair	335	FT
☑	Special Electrical Junction Box (JB1,JB2)	2	EACH
▲	Electrical Service Cabinet	1	EACH
Ø	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Piezo Sensor	2	EACH



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Plot Scale -

Plotted From -
TRPR17199

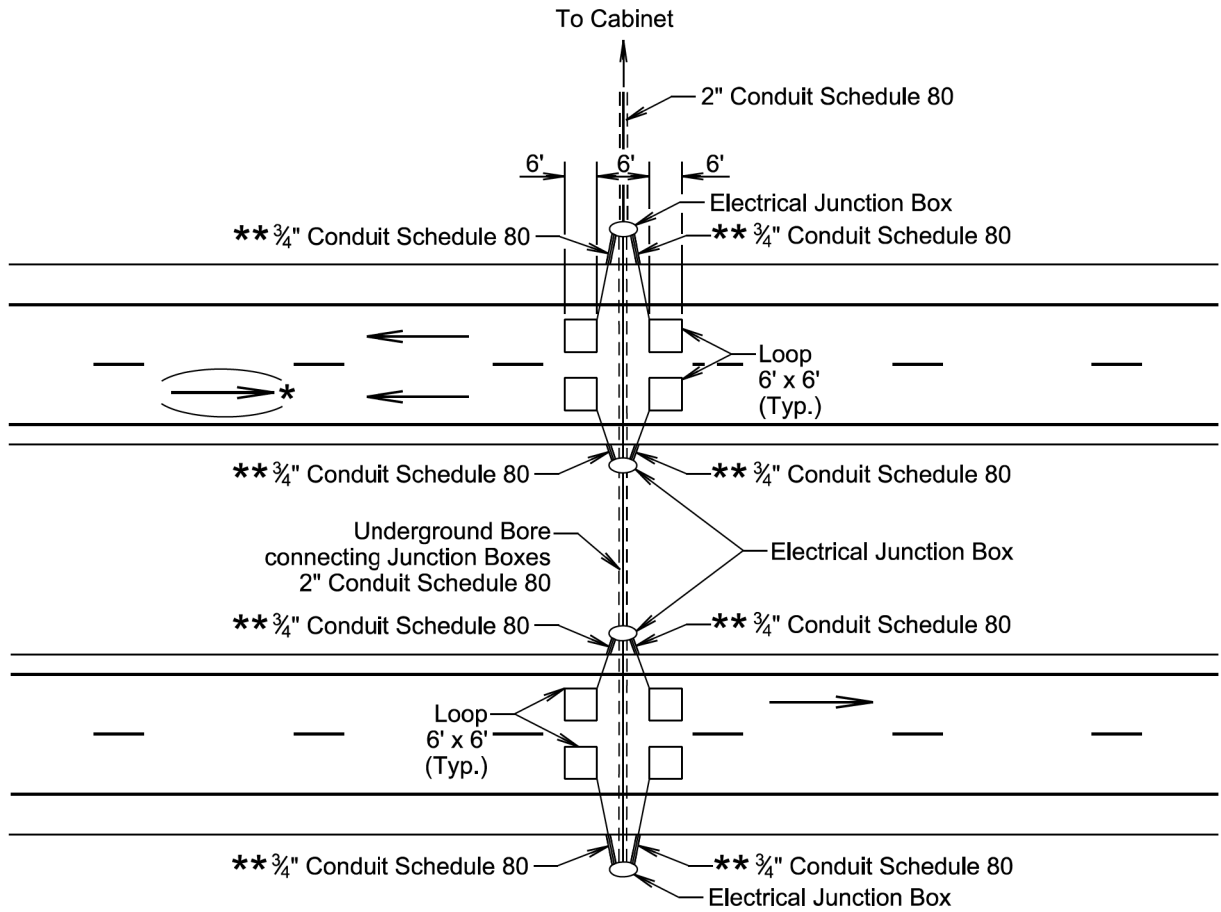
SPECIAL DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F13	F22
Plotting Date: 03/17/2025			

SAWED-IN DETECTOR LOOP

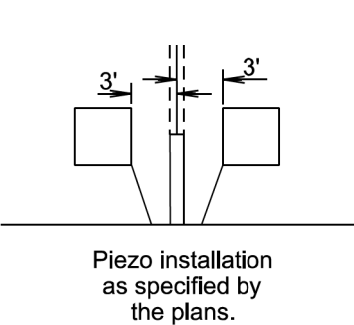
Sheet 1 of 2

* 4 Lane divided layout shown. 2 Lane layout would be the same except it would end at uppermost electrical junction box located in the median.

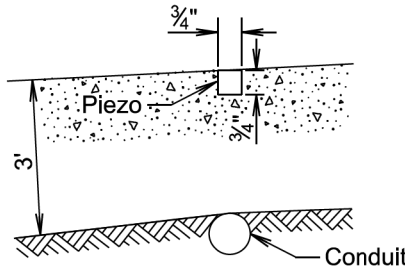


** Shown to edge of paved shoulder. If shoulder is not paved, extend conduit to edge of pavement.

PLAN VIEW



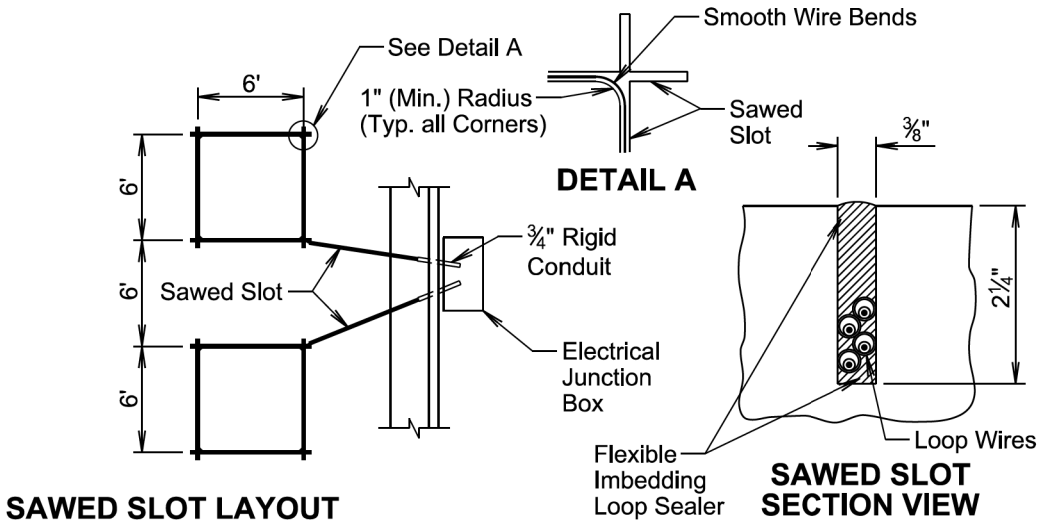
Piezo installation
as specified by
the plans.



CROSS SECTION

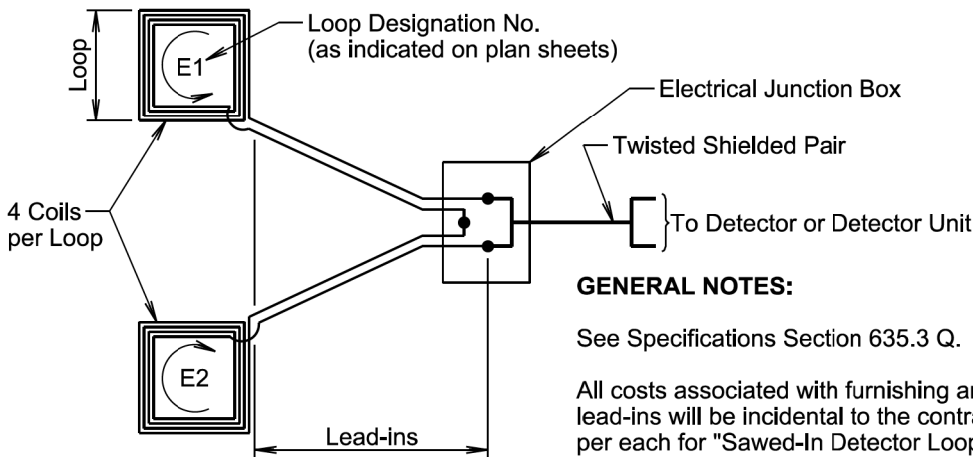
SAWED-IN DETECTOR LOOP

Sheet 2 of 2



SAWED SLOT LAYOUT

SAWED SLOT
SECTION VIEW



WIRING DIAGRAM

GENERAL NOTES:

See Specifications Section 635.3 Q.

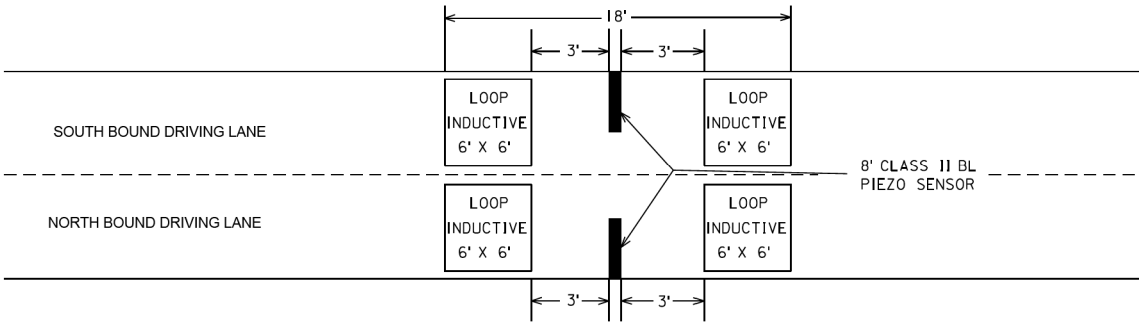
All costs associated with furnishing and installing the lead-ins will be incidental to the contract unit price per each for "Sawed-In Detector Loop".

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F14	F22

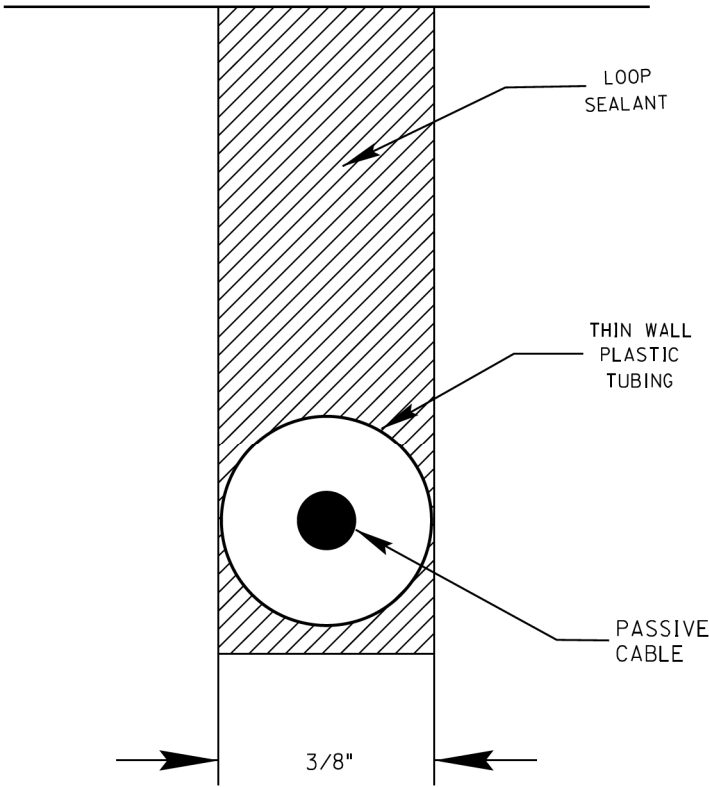
Plotting Date: 03/17/2025

DRAWING A



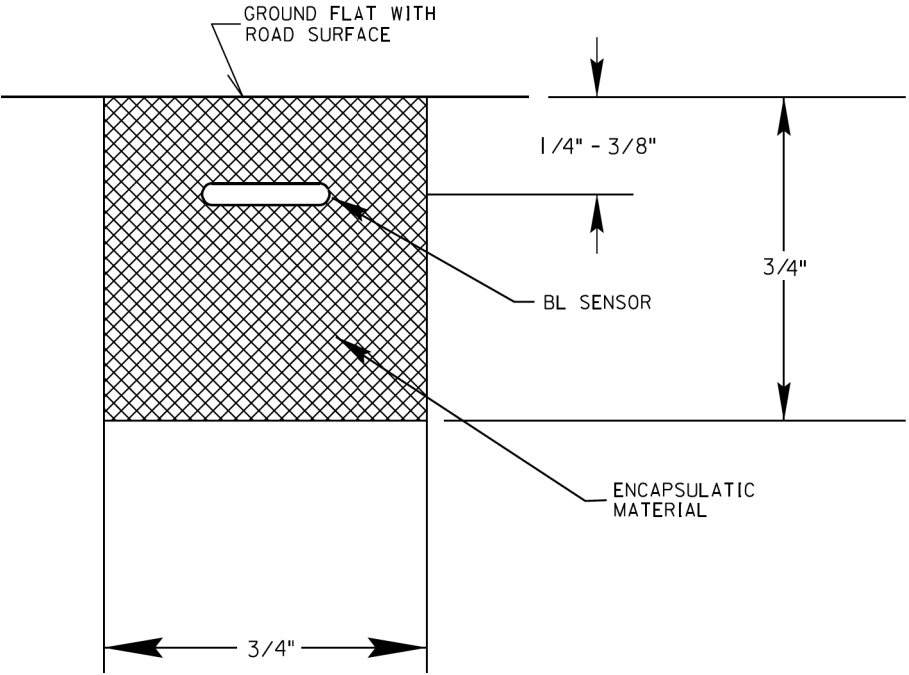
DRAWING B

A-A: THE PASSIVE CABLE CAN BE PUT IN A THIN WALL PLASTIC TUBE FOR ADDITIONAL PROTECTION.



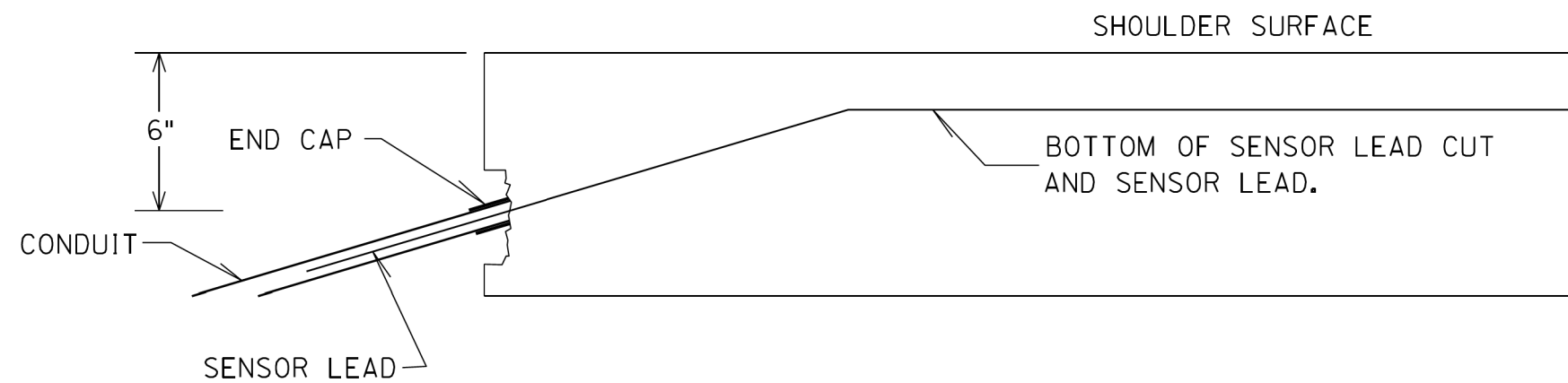
DRAWING C

B-B: TYPICAL CROSS SECTION OF A BL SENSOR INSTALLATION.



EDGE OF ROAD CONDUIT DETAILS

DRAWING D



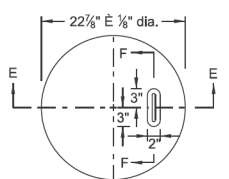
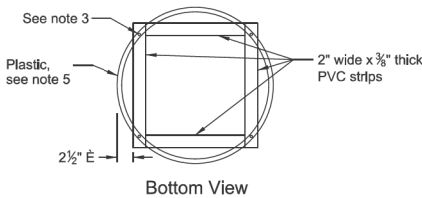
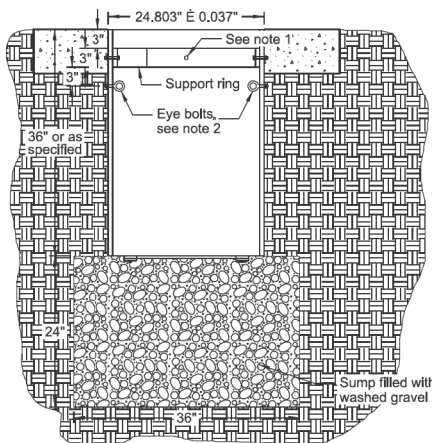
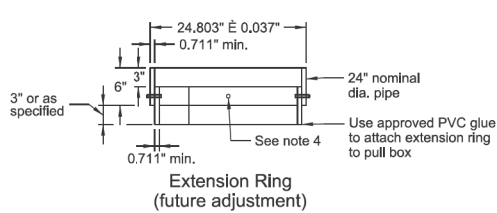
NOTES:

1. THE SENSOR LEAD SAW CUT IS EXTENDED TO THE END OF THE PAVEMENT, IN THE FINAL 1 FOOT, THE SAW BLADE IS DROPPED TO ITS MAXIMUM DEPTH.
2. THE EARTH IS EXCAVATED AND THE CONDUIT IS INSTALLED AS CLOSE TO THE EDGE OF PAVEMENT AS POSSIBLE.
3. AFTER PULLING THE SENSOR LEAD, THE END OF THE CONDUIT IS SEALED WITH AN END CAP OR OTHER MEANS.

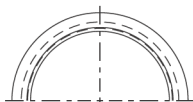
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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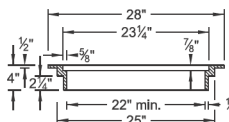
Junction Box Detail



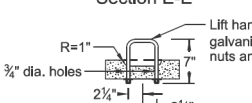
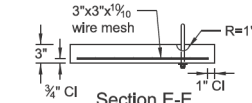
Top View



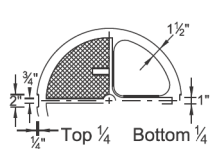
Half Top View



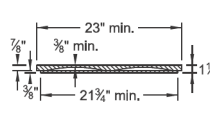
Section Frame



Section F-F

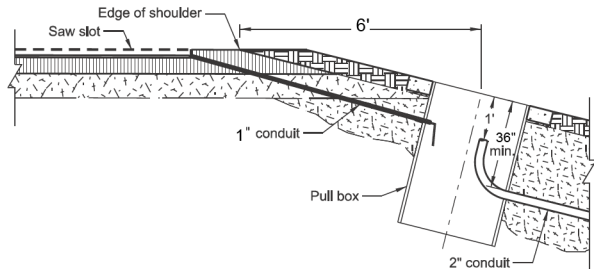


Top 1/4 Bottom 1/4

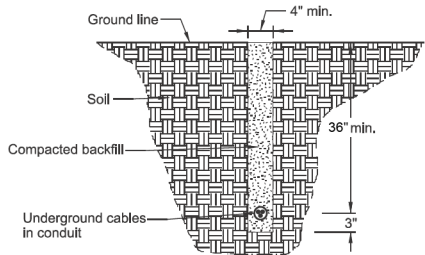


Section Cover

Cast Iron Frame and Cover



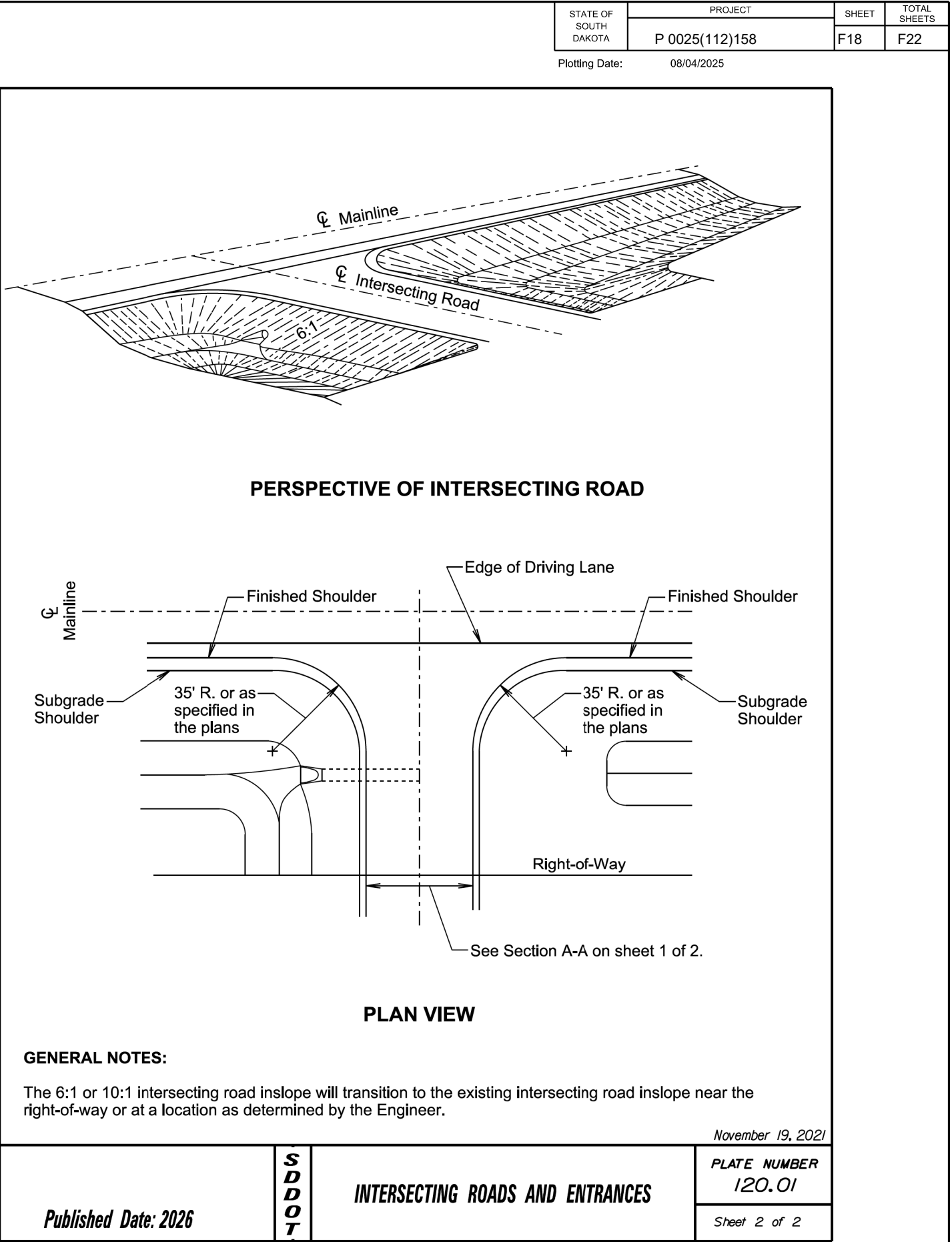
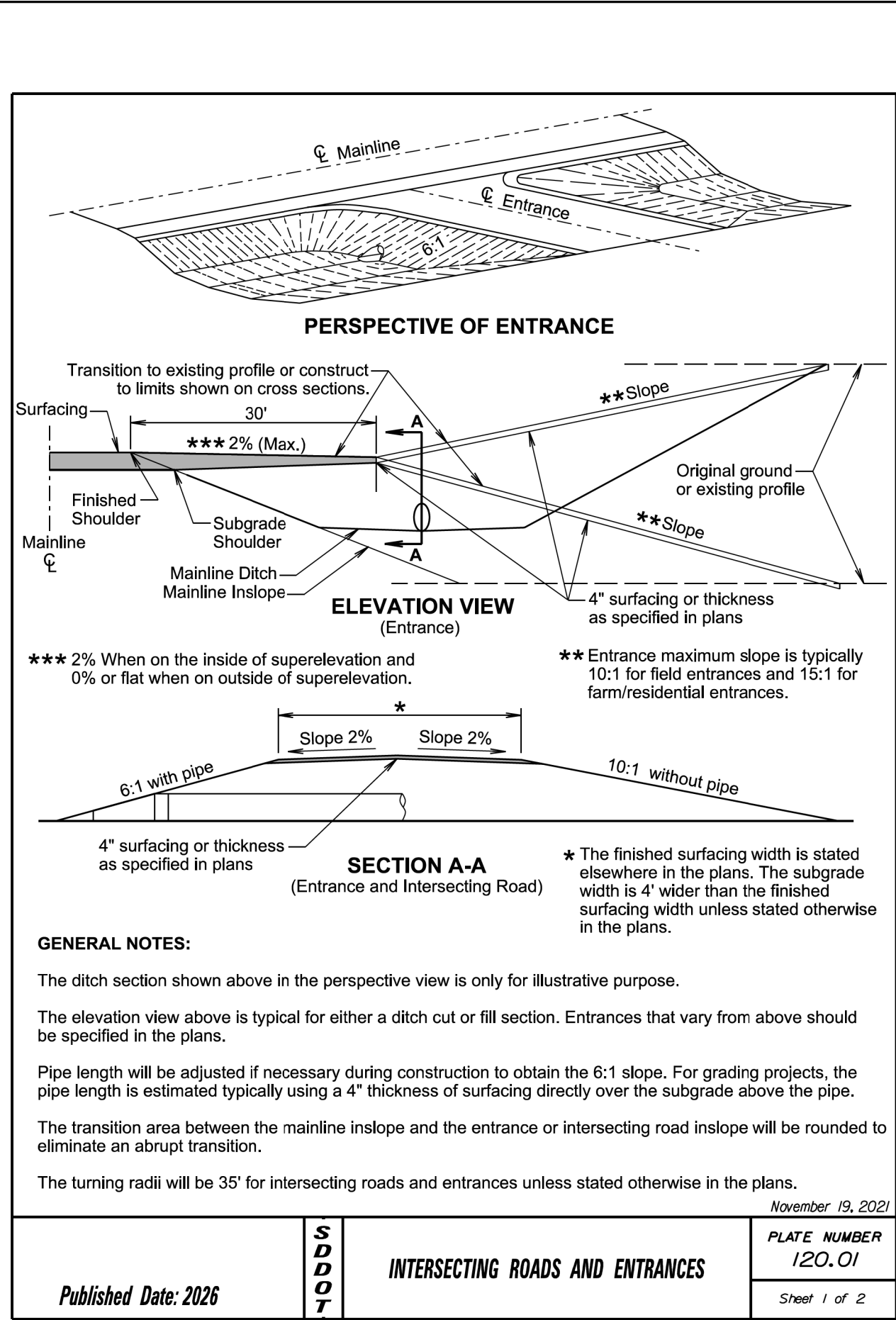
Saw Slot to Pull Box Details

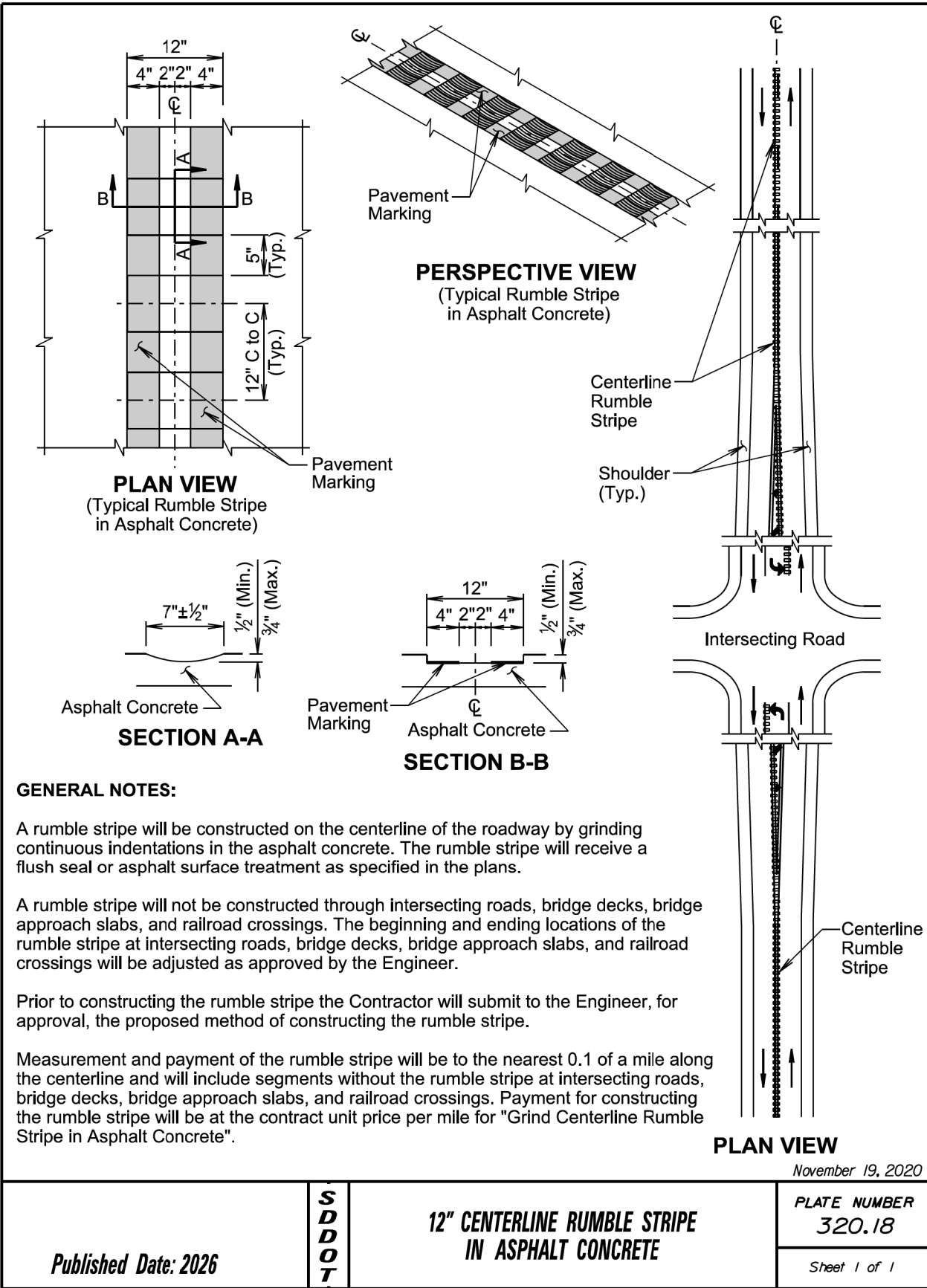
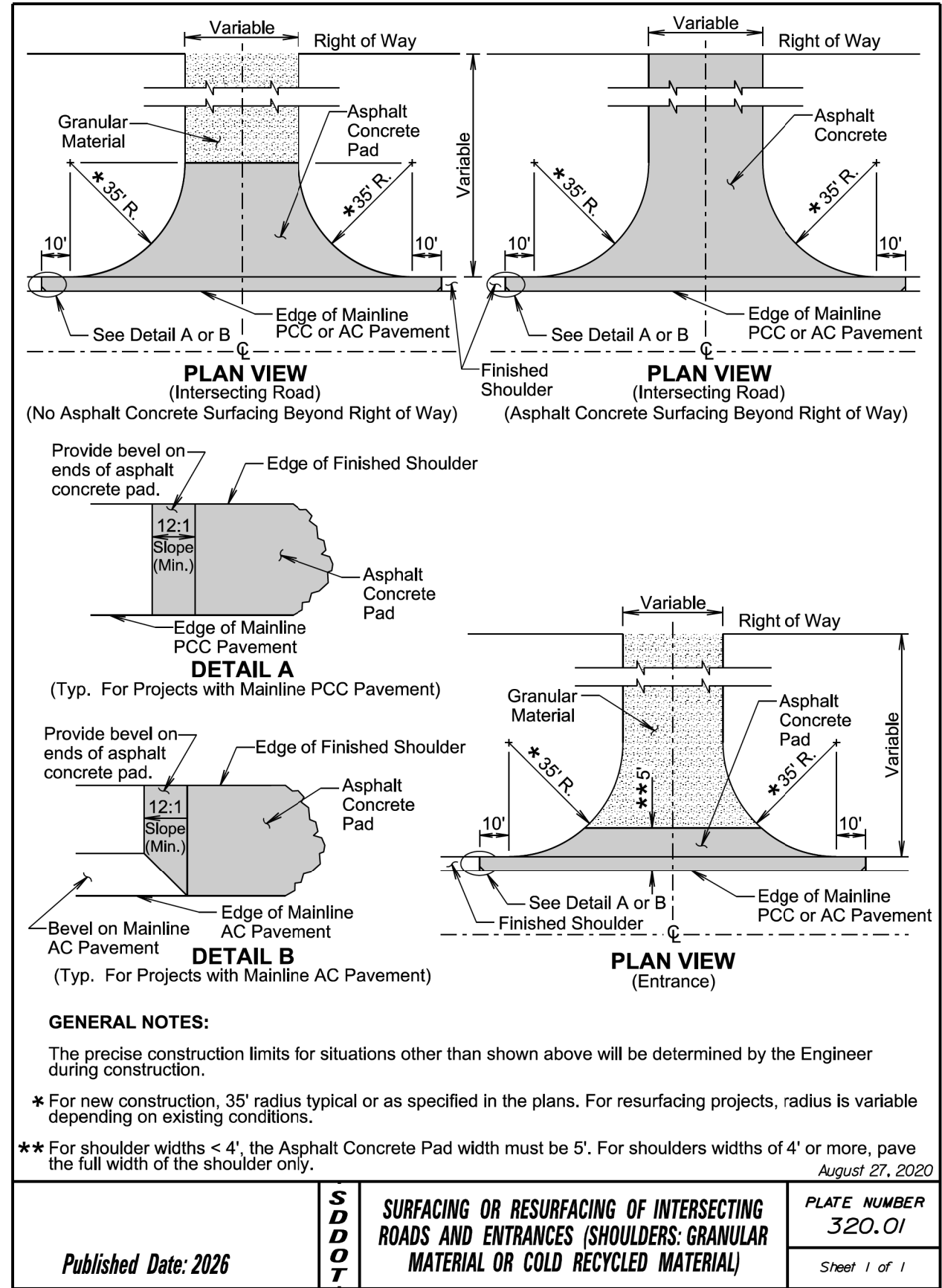


Cable Installation
(plow or trench)

PVC Pull Box

1. Attach split 24" nominal diameter PVC cover support ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, 3/8" dia. x 1 1/4" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four 1/4" x 1 1/4" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Size conduit holes located in barrel section no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation, install water tight seal for inside walls and cover.
8. PVC pipe to meet requirements of ASTM F679 or equal.
9. Provide Austenitic Stainless Steel Hex Head bolts and nuts. Other fasteners to be galvanized as per ASTM A153.
10. Install an epoxy coating on the top and sides of the concrete cover. Provide an epoxy protective coating that is light gray, clear, or neutral in color and apply as recommended by the pull box manufacturer. Before application, clean with a wire brush and dry the surfaces of the concrete to which the epoxy protective coating is applied.
11. If a Cast Iron cover is provided, use grey iron as per AASHTO M 306.







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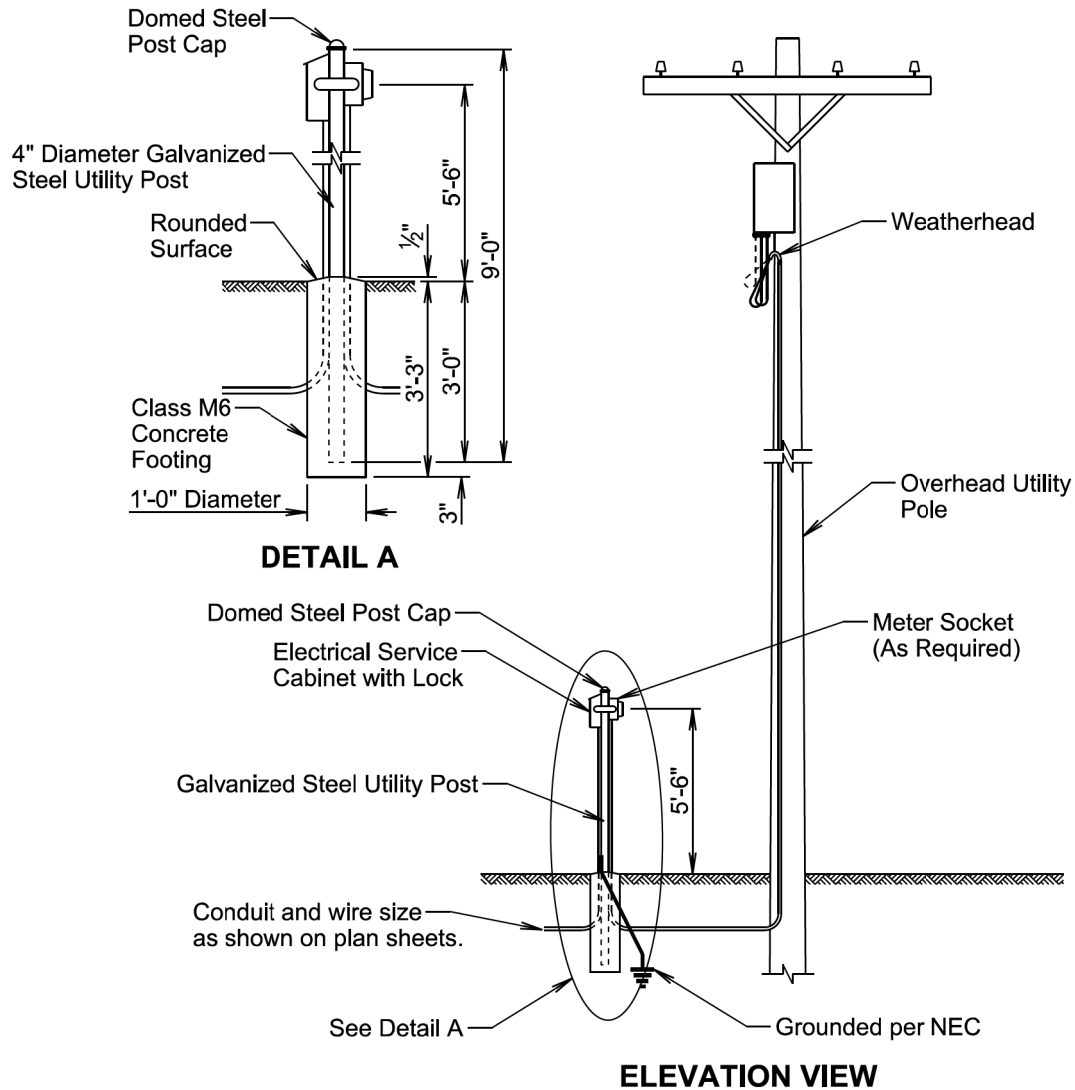
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Plot Scale - 1:200

Plotted From - TRPR18387

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0025(112)158	F21	F22

Plotting Date: 08/04/2025
Revised: 04/03/2025 RTS



GENERAL NOTES:

The concrete for the post footing will be class M6 concrete.

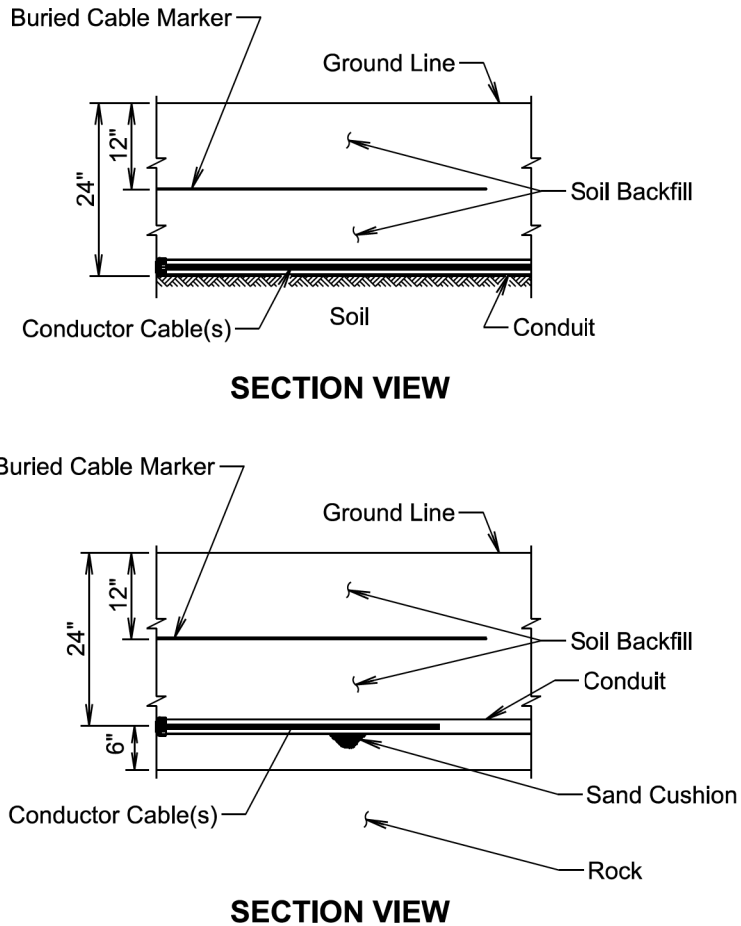
The 4" diameter galvanized steel utility post will be 9' long and will be in conformance with AASHTO Standard Specifications M181. The post will be Type 1 and either Grade 1 or Grade 2. The domed steel post cap will be in conformance with AASHTO Standard Specifications M181 and will be Type 1.

The Contractor will contact and coordinate his/her work with the Utility Companies regarding hookup requirements, fees, materials, and equipment necessary.

All costs for furnishing and installing all materials from the electrical service cabinet to the transformer including labor, equipment, hookup fees, all items within the cabinet, lockable enclosure with receptacle outlet, lock and keys, post, concrete footing, post cap, meter socket if required, conduit, and incidentals will be incidental to the contract unit price per each for "Electrical Service Cabinet".

March 31, 2024

<i>Published Date: 2026</i>	S D D O T	GALVANIZED STEEL UTILITY POST WITH OVERHEAD UTILITY POLE	PLATE NUMBER 635.35
			Sheet 1 of 1



GENERAL NOTE:

The Buried Cable Marker will be plastic, approximately 6" wide, and will be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker will have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below will be printed in a contrasting color on the cable marker. The Buried Cable Marker will be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker will be incidental to the contract unit price per foot for the bid item used for the electrical conductor.

November 19, 2022

<i>Published Date: 2026</i>	S D D O T	CONDUIT INSTALLATION	PLATE NUMBER 635.76
			Sheet 1 of 1

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