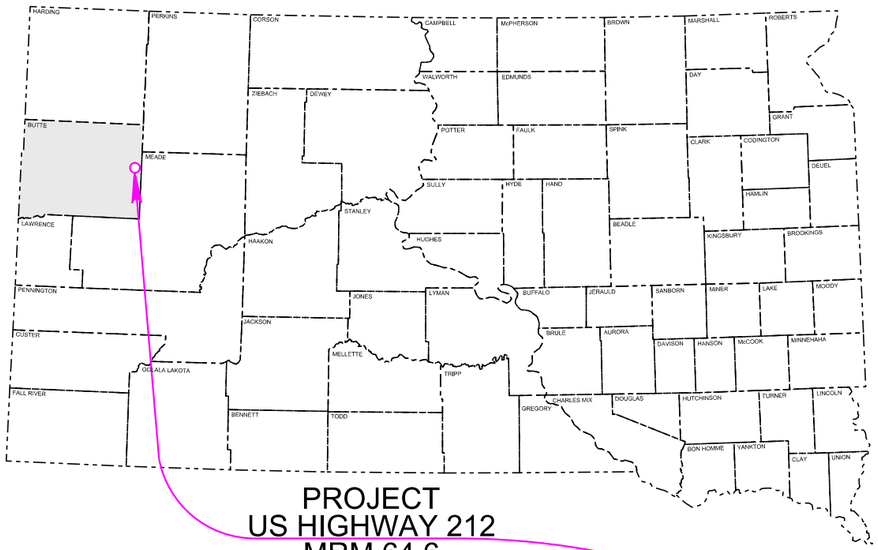


PROJECT
US HIGHWAY 212
MRM 64.6

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

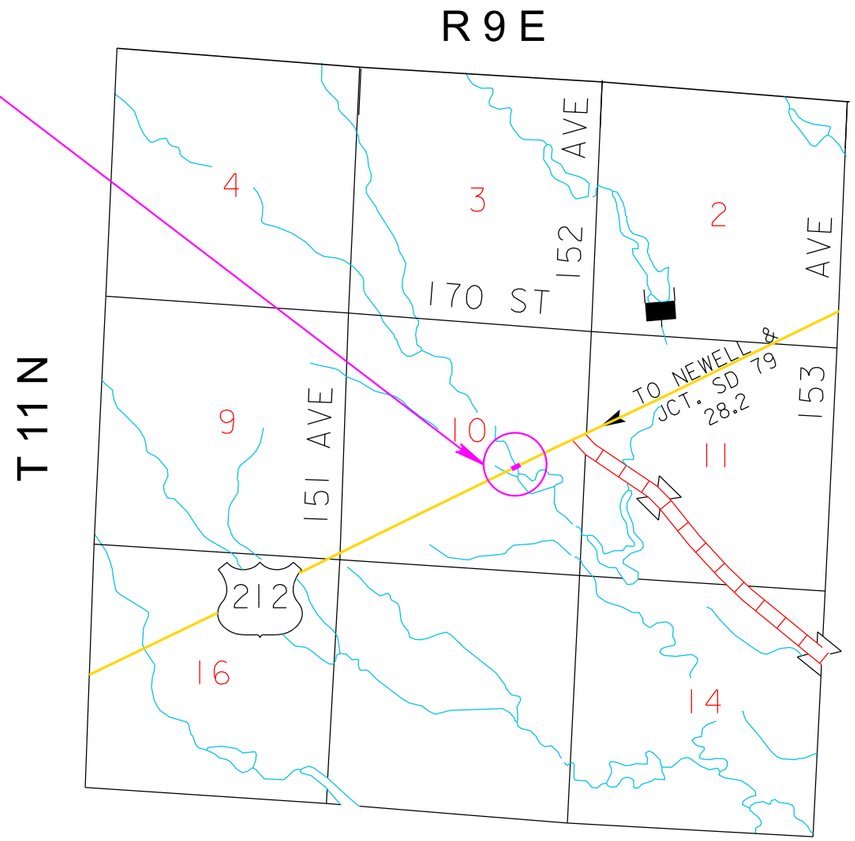
PROJECT 212-471
US HIGHWAY 212
BUTTE COUNTY

SUBGRADE REPAIR & BOX CULVERT JOINT REPAIR
PCN i4m7

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	1	18

Plotting Date: 05/11/2017

INDEX OF SHEETS



DESIGN DESIGNATION

ADT (2016)	570
ADT (2036)	642
DHV	100
D	50%
T DHV	7.2%
T ADT	15.9%
V	70 mph

STORM WATER PERMIT

None Required

Plot Scale - 1:200
Plotted From - trrc11626
File - ...\Design\title.dgn

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	378.0	SqYd
120E0010	Unclassified Excavation	129	CuYd
260E1010	Base Course	238.0	Ton
320E1200	Asphalt Concrete Composite	123.0	Ton
320E7008	Grind 8" Rumble Strip or Stripe in Asphalt Concrete	0.1	Mile
450E4699	Tie Bolts for RCP	16	Each
450E8300	Culvert Joint Cleaning	54.0	Ft
450E8305	Repair Culvert Joint	54.0	Ft
450E8310	Chemical Grout Void Fill	30.0	Gal
633E1400	Pavement Marking Paint, 4" White	200	Ft
633E1405	Pavement Marking Paint, 4" Yellow	30	Ft
634E0010	Flagging	80.0	Hour
634E0110	Traffic Control Signs	205.4	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	1	Each
634E0310	Temporary Flexible Vertical Markers (Tabs)	1,200	Ft
634E0600	4" Temporary Pavement Marking Tape Type I	144	Ft
634E1002	Detour Signing	432.0	SqFt
734E0900	Temporary Diversion Channel and/or Pipe	1	Each
734E5005	Dewatering	Lump Sum	LS
831E0300	Reinforcement Fabric (MSE)	378	SqYd

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

UTILITIES

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

Utilities are not planned to be affected on this project. 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 shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

SEQUENCE OF OPERATIONS

Variations from this sequence shall be submitted to the Engineer for approval.

1. Set up Traffic Control.
2. Excavate material.
3. Construct concrete collar on centerline box culvert joint.
4. Foam/Grout/Tie Culvert Joints
5. Place reinforcement fabric, base course, and surfacing.
6. Repeat steps 2 and 5 for other lane.
7. Grind rumble stripes.
8. Place flush seal.
9. Place permanent pavement marking.
10. Remove traffic control.

UNCLASSIFIED EXCAVATION

Unclassified Excavation is provided on the project for removing material below the existing surfacing for subgrade repair and exposing the top of the box culvert for centerline joint repair.

Unclassified excavation material may be used on the project at the discretion of the Engineer. Any unclassified material not used shall become the property of the Contractor for their disposal in accordance with the Environmental Commitments. The estimate of quantities provides 129 cubic yards of Unclassified Excavation for performing this work.

All excavation along the existing surfacing edge shall be performed, so that a shoulder drop off does not exist adjacent to lanes open to the traveling public. The Contractor shall provide a temporary 3:1 slope adjacent to the existing surfacing if the excavation and placement of material cannot be completed prior to nightfall. All costs associated with providing and removing this temporary slope shall be incidental to the various bid items on the project.

Plans quantity shall be the basis of payment for the Unclassified Excavation quantity. If changes are made in the field during construction, measurements shall be taken and the quantity shall be adjusted accordingly.

SUBGRADE REPAIR

The Asphalt Concrete where the subgrade repair work is planned shall be sawcut. Material shall be excavated to 1.5’ below the original top of the pavement. Material shall be excavated to the top of the box culvert at centerline, approximately 4’ wide, for placement of the concrete collar at the centerline joint of the box culvert.

The Reinforcement Fabric (MSE) shall be placed on the bottom and the sides of the excavated subgrade. Gravel Cushion shall be placed on top of the Reinforcement Fabric (MSE).

All costs for excavating and disposing of this material shall be incidental to the contract unit price per cubic yard for Unclassified Excavation.

Base Course shall be placed to a depth 12”. Three 2” lifts of Asphalt Concrete Composite shall be placed on top of the Base Course.

Density shall be to the satisfaction of the Engineer.

BASE COURSE

Included in the Estimate of Quantities is 238 tons of Base Course for backfilling the subgrade repair.

Base Course shall be Contractor furnished.

Compaction of the Base Course shall be to the satisfaction of the Engineer.

WATER FOR COMPACTION

Water for Granular Material shall be provided at a rate of 20 gallons per cubic yard of Base Course.

The cost of water for compaction of the Base Course shall be incidental to the contract unit price per ton for Base Course. Four percent, plus or minus, moisture will be required at the time of compaction unless otherwise directed by the Engineer.

REINFORCEMENT FABRIC (MSE)

The geotextile to be used will conform to specification of Geotextiles and Impermeable Plastic Membrane, Reinforcement Fabric (MSE) (Section 831 of the Specifications). The geotextile will be on the Approved Products List for this material or will be certified by the supplier to meet this specification prior to installation.

Seams in the geotextile shall be overlapped a minimum of 2 feet and shingled to prevent granular material being forced under the fabric. No equipment will be allowed on the geotextile until the granular material has been placed. Granular material shall be dumped. Pushed into place, and compacted to specified density.

Geotextile will be paid for at the contract unit price per square yard for “Reinforcement Fabric (MSE)”. Payment quantities will be based on area covered plus 15%. Payment will be full compensation for furnishing and install the geotextile.

SURFACING THICKNESS DIMENSIONS

Plans tonnage shall be applied even though the thickness may vary from that shown in the plans. At those locations where material must be placed to achieve a required elevation, plans tonnage may be varied to achieve the required elevation.

TABLE OF MATERIALS QUANTITIES

MRM	Length (Ft)	Width (Ft)	Depth (Ft)	Remove Asphalt Concrete (SqYd)	Unclassified Excavation (CuYd)	Base Course (Tons)	Asphalt Concrete Composite (Tons)	Reinforcement Fabric (MSE) (SqYd)
65+0.622	100	34	1.5	378	129	238	123	378

DEWATERING

At the time of construction, the box culvert may contain standing water that shall be pumped prior to repair work on the bottom slab of the culvert for each barrel.

If dewatering is required at the RCBC site and the discharge is turbid or contains sediment-laden water, it must be treated through use of vegetative buffer strips, flocculants, or other sediment reducing measures. The Contractor shall submit a dewatering plan to the Engineer prior to initiating dewatering activities. All costs associated with equipment, labor, and materials necessary shall be incidental to the contract lump sum price for “Dewatering”.

If the Contractor elects to transport sediment laden water off the project, no additional payment for loading, transporting, and labor costs will be made. Water transported off the project limits shall not be disposed of in an area where it can enter a waterway. The disposal site must be approved by the Engineer.

REINFORCED CONCRETE PIPE JOINT REPAIR AND VOID GROUTING

The existing box culvert at MRM 64+0.622 is a twin 9’x9’ cast-in-place box culvert with three construction joints. The centerline construction joint is the only joint needing repair. The centerline joints inside the culvert needing repair include the top, bottom, and exterior sides of each barrel. The interior wall is excluded from joint repair work but shall have tie bolts installed.

The Contractor shall provide a notarized statement, from the Manufacturer, that the products used for culvert joint repair meet the specified requirements, along with the Manufacturer's current product specification and installation instructions.

The Contractor shall be an Approved Contractor of the Manufacturer of the specified product and shall provide written certification from the Manufacturer attesting to their Approved Contractor status.

All product documentation and Contractor submittals must be submitted to the Engineer prior to or at the preconstruction conference. The Contractor must have the Engineer's approval prior to commencing any of this work.

The Contractor shall follow the Manufacturer's installation instructions and specifications throughout the repair process.

Temperature of the specified products is critical from the point of pumping to the point of injection. All polyurethanes react faster at higher temperatures. Drum heaters and heated hoses are required when ambient or ground temperatures are below 70 degrees Fahrenheit. The optimum hose temperature will vary with the weather conditions and the particular job site conditions with the minimum hose temperature being 75 degrees Fahrenheit and the maximum hose temperature being 95 degrees Fahrenheit and the drum temperature not to exceed 90 degrees Fahrenheit.

The Contractor shall provide worker and inspector safety and worker protective gear in accordance with the manufacturer, including but not limited to chemical goggles, face shields, eye wash system and NBR gloves.

The Contractor shall provide safe storage and handling of materials prior to delivery and at the project site. All material installation, handling and storage shall be in accordance with the Manufacturer's recommendations.

The Contractor shall visit the project to determine the extent of culvert joints to be cleaned and filled, prior to bidding.

CULVERT JOINT CLEANING

This work shall consist of cleaning of the culvert joints, washing the entire culvert and joints with a high pressure washer, and if needed, wire brush cleaning of each joint to be repaired as directed by the Engineer. The entire culvert shall be clean and dry and most notably the specified joints shall be thoroughly cleaned to the satisfaction of the Engineer using a power washer with water pressure of at least 2500 psi. The culvert must be in a clean condition so that no deleterious material is trapped in the joints that are being repaired. The Contractor shall dispose of all debris removed from the culverts during the cleaning operation as approved by the Engineer.

All costs for equipment, material and labor for the culvert joint cleaning work shall be incidental to the contract unit price per foot for Culvert Joint Cleaning. Culvert Pipe Cleaning will be measured to the nearest 0.1 foot of joint which is cleaned for joint repair.

REPAIR CULVERT JOINT

The culvert joints shall be repaired in accordance with the Chemical Grout Manufacturer’s directions to prevent future infiltration/exfiltration of soils and water and to keep the chemical grout from expanding back into the structure during injection.

The culvert joint will be repaired with a sealant comprised of water reactive hydrophilic polyurethane resin and dry oil free oakum. All grout will be injected under such pressure so as not to damage the existing drainage structure or roadway structure.

The Contractor shall submit to the Engineer for approval a detailed procedure for the installation of the polyurethane grout.

The work shall include, but is not limited to sealing each pipe joint with a hydrophilic polyurethane grout meeting the following specifications:

> GEL FOAM II (Saturated Oakum Rope Joint Packing) as manufactured by Green Mountain International, LLC or equal.
>
> ULTRA (Single Component Grout for Joint Injection) as manufactured by Green Mountain International, LLC or equal.

Excess grout and oakum shall be trimmed from the interior face of the joint prior to applying the UV Protection (Gel Coat). The epoxy gel coat compound shall be as recommended by the Manufacturer for both surface sealing and protecting the hydrophilic grout from UV exposure. The epoxy gel compound shall be mixed and handled in accordance with the Manufacturer's recommendations and shall meet the following requirements:

> Epoxy gel sealant compounds manufactured by Green Mountain Grouts, LLC or equal.

All costs for all equipment, material and labor required to complete the work shall be incidental to the contract unit price per foot for Repair Culvert Joint. Completion of the work includes initial saturated oakum rope packing of each joint, follow up injection of grout into the back side of each joint, trimming the excess grout and oakum from the interior face of the joint, application of the epoxy gel coat and site clean-up. Payment will be made per 0.1 foot of culvert joint repaired.

DUAL COMPONENT CHEMICAL GROUT FOR VOID FILLING

The external voids surrounding the culvert will be filled with an injected high expansion chemical grout compound. Holes shall be strategically drilled as required and grout injected throughout the structure to effectively fill all voids that have developed outside of the structure due to the infiltration of external soils and materials into the culvert and “piping” (water running outside and under the structure due to separated joints). It is the Contractor's responsibility to locate reinforcing bars and conduit prior to drilling any grout holes. All grout shall be injected under such pressure so as not to damage the existing drainage structure or roadway structure. All joints shall be appropriately cleaned and sealed, with appropriate recommended cure time, prior to the injection of the void grouting. After completion of the void filling, all holes shall be properly sealed.

The Contractor must supply the Engineer with three (3) prior job references of projects where they have successfully injected urethane resin for subgrade void filling applications, or soil stabilization.

The chemical grout shall be a dual component hydrophobic polyurethane grout compound which is non-flammable and non-toxic when cured.

The chemical grout mixture shall have expansion properties listed in the data sheets of greater than twenty (20) times its original volume and cure to rigid closed cell polyurethane foam. The grout shall expand to fill any voids and must bond to the exterior surface of the structure. The chemical grout shall be VF dual component polyurethane grouts as manufactured by Green Mountain International LLC or equal.

The typical method consists of placing a layer of chemical grout behind or around the structure. The Contractor shall submit for approval by the Engineer a detailed grouting plan showing the spacing, orientation and depth of the grout holes, as well as type of polyurethane grout to be used, range of gel times, equipment, mixing procedures, recommended injection pressure, technique for monitoring grout travel and any other pertinent information. The grouting plan should address the prevention of overfilling and prevention of damage to structures or roadway. The Contractor shall submit this detailed procedure for the installation of the expansion grout to the Engineer for approval. The holes are drilled with a rotary percussion hammer drill using a sharp masonry bit with a minimum diameter of 3/8 inch to a maximum diameter of 5/8 inch. Care must be taken to prevent holes from causing damage to reinforcing bars or utility conduits. Drilled holes should be vacuumed and flushed. Use injection grout and methods as recommended by Manufacturer.

Injection can be monitored by either applicator's visual inspection or by pumping a specific amount of injection grout into each hole. The work will start at the inlet end of the pipe and proceed downstream to the outlet. Inject bottom row every other hole. When material appears at the adjacent port, discontinue injection at entry port and begin injection at the adjacent port. Continue injection process section by section from bottom of pipe to top of pipe in a continuous manner to next pipe section. Injection pressure will vary from 200 psi to 3000 psi depending on the width of the joint, thickness of the structure, and condition of the concrete. After the grout cures, excess material shall be trimmed to be flush with the pipe interior wall and the pipe left clean.

All costs for equipment, material, and labor required to fill external voids surrounding the culvert shall be incidental to the contract unit price per gallon for Chemical Grout Void Fill. Any overfilling of voids that result in damage to overlying pavement, highway user ride quality, or drainage structure integrity shall be corrected and paid for by the Contractor. All corrections shall be approved by the Engineer. Payment shall be to the 0.1 gallon of chemical grout used, prior to expansion of the material.

TABLE REINFORCED CONCRETE PIPE JOINT REPAIR AND VOID GROUTING

Location	Remarks	Number of Tie Bolts Each	Culvert Joint Cleaning Ft	Repair Culvert Joint Ft	Chemical Grout Void Fill Gal
MRM 64+0.622	Twin 9’x9’ Box Culvert (Centerline Joint)	16	54	54	30

SEPARATED JOINT ON TOP OF BOX CULVERT

A concrete collar shall be placed on the outside centerline construction joint on top of the box culvert. Excavation activities shall expose the top of the box culvert.

The collar shall be made by placing a 2’ wide by 6" thick M6 concrete collar around the outside of the connection. The concrete collar shall be reinforced with 6x6 W2.9 x W2.9 wire mesh. The concrete collar shall be attached to the box culvert with two tie bolts per barrel, included in the table above.

All costs for constructing the concrete collar including materials and labor shall be incidental to the contract unit price per cubic yard for “Unclassified Excavation”.

TIE BOLTS FOR RCP

The centerline joint of the twin box culvert, as listed in the “Table of Reinforced Concrete Pipe Joint Repair and Void Grouting” in the plan notes shall have tie bolts installed. Two tie bolts per side (bottom, top, interior and exterior side walls) of each barrel shall be installed. Original box culvert construction plans are included in this set of plans for existing reinforcement spacing. Tie bolt assembly details are shown on Standard Plate 560.01 but should be noted the existing box culvert is cast-in-place and not precast. In areas where the outside of the box culvert is not exposed (exterior and bottom sides) epoxy anchors shall be used instead of through bolts. The Contractor shall drill holes at an angle as to cause the legs of the tie bolt to bind against the outside face of the hole upon tie bolt tightening. Bending of the tie bolt legs may need to be done in order to achieve this. Prior to inserting the tie bolt the Contractor shall fill the hole with epoxy resin. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, (Equivalent to ASTM C881, Type IV). The Contractor shall allow the resin to properly set-up prior to the final tightening of the tie bolts. All cost for drilling tie bolt holes, epoxy resin, and furnishing and installing the tie bolts shall be incidental to the contract unit price per each for “Tie Bolts for RCP”.

For informational purposes: Field drilling will be required to install the tie bolts on existing box culvert sections. All cost for removing/resetting existing tie bolts, drilling tie bolt holes, and furnishing and installing the tie bolts shall be incidental to the respective remove/reset or furnish/install bid items for that location.

RUMBLE STRIPES

Rumble Stripe installation shall be completed prior to application of the Flush Seal and Permanent Pavement Markings. The Engineer shall provide the exact start and stop locations for the rumble stripe installation.

Water shall be used with the rumble stripe installation for dust control.

The gaps for the rumble stripe installation as detailed on the standard plates shall be included with the measurement and payment.

Construction of Asphalt Concrete Rumble Stripes shall be paid for at the contract unit price per mile for “Grind 8” Rumble Strip or Stripe in Asphalt Concrete”.

RUMBLE STRIPE ROADWAY CLEANING

The Contractor shall remove loose material from the driving surface and/or asphalt shoulders of the roadway on a daily basis following rumble strip installation. Loose material may be broomed so that there will not be a windrow of loose material left after the brooming along the edge of the shoulder. Any windrow left shall be picked up by the Contractor. It shall be the Contractor’s responsibility to ensure the loose material does not enter any vegetated areas and/or waterways.

All costs associated with this work shall be incidental to the contract unit price per mile for “Grind 8” Rumble Strip or Stripe in Asphalt Concrete”.

PERMANENT PAVEMENT MARKING – GENERAL NOTES

The Contractor shall repaint all the existing pavement marking paint including centerline, edge line, lane lines, arrows, gore areas, etc. All costs associated with this work shall be incidental to the various pavement marking bid items.

Application of permanent pavement marking paint shall be completed within 14 calendar days following the completion of the flush seal. A minimum 7 day cure time shall be required for the Flush Seal prior to pavement marking paint application.

All pavement markings shall be a Waterborne Pavement Marking Paint with High Grade Polymer.

Traffic Control shall be incidental to the cost of application. The striper and advance or trailing warning vehicle shall be equipped with flashing amber lights or advance warning arrow panel.

WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

All materials shall be applied as per manufacturer's recommendations.

This material shall consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (Dow DT-400 or Dow HD-21A or equivalent). The Contractor shall provide certification that the material is one of the following products or an equivalent as approved by the Operations Traffic Engineer:

Diamond Vogel's Waterborne High Build Polymer Marking Paint
Ennis-Flint's High Build Polymer Marking Paint

No further testing of this material will be required. Reflective media consisting of glass beads as well as bonded core reflective elements shall be adhered to the paint.

The bonded core reflective elements shall contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. All microcrystalline ceramic beads bonded to reflective elements shall have a minimum index of refraction of 1.8 when tested using the liquid oil immersion method.

RATES OF MATERIALS FOR WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

Solid 4" line = 27.8 Gals/Mile
Glass Beads = 5.3 Lbs/Gal.
Composite Reflective Elements = 2.1 Lbs/Gal.

All cost for materials, labor and equipment necessary to furnish and install the pavement markings shall be incidental to the contract unit price per foot for "Pavement Marking Paint, White or Yellow".

TABLE OF PERMANENT PAVEMENT MARKING QUANTITIES

Location	Pavement Marking Paint, 4" White (Ft)	Pavement Marking Paint, 4" Yellow (Ft)
MRM 64+0.622	200	30

TRAFFIC CONTROL – GENERAL NOTES

Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.

Unless otherwise stated in these plans, no work will be allowed during hours of darkness.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of the vegetation, surfacing, embankment, delineators, and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

Existing guide, route, informational logo, regulatory, warning signs and delineation shall be temporarily reset and maintained during construction as directed by the Engineer. Removing, relocating, salvaging and resetting of the above items shall be the responsibility of the Contractor.

All non-applicable existing signing and temporary traffic control devices shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 48 hours. The cost of removing or covering non-applicable signs and temporary traffic control devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

All materials and equipment shall be stored a minimum distance of 30' from the traveled way during nonworking hours.

All haul trucks shall be equipped with a second flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights shall be incidental to the various related contract bid items.

All construction operations shall be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.

TEMPORARY ROAD MARKERS

Temporary Flexible Vertical Markers (Tabs) shall be used for all markings as shown in the plans other than the temporary stop bars, or as directed by the Engineer.

All costs to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove the temporary flexible vertical markers (tabs) shall be included in the contract price per foot for "Temporary Flexible Vertical Markers (Tabs)".

TEMPORARY PAVEMENT MARKING TAPE TYPE 1

Temporary Pavement Marking Tape Type 1 shall be used to mark the Stop Bars as indicated by the Standard Plate 634.25.

All costs to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove the Temporary Pavement Marking Tape Type 1 shall be included in the contract price per foot per 4" line or equivalent for "4" Temporary Pavement Marking Tape Type 1".

TABLE OF TEMPORARY PAVEMENT MARKING QUANTITIES

Location	Temporary Flexible Vertical Markers, (Ft)	4" Temporary Pavement Marking Tape, Type I (Ft)
MRM 64+0.622	1200	144

OVERWIDTH TRAFFIC

Details of the approximate locations of the Overwidth Detour Signing are as shown in these plans. Prior to installing the sings the Contractor shall mark out the sign locations and review them with the Engineer.

Overwidth Detour Signing shall be furnished and installed by the Contractor as detailed in these plans. It will be the responsibility of the Contractor to maintain and reinstall these signs during the project as required by construction progress. Upon completion of the project, the Contractor shall remove the Overwidth Detour Signing. Overwidth Detour Signing shall be installed on fixed location, ground mounted, breakaway signs.

Payment for furnishing, installing, maintaining, and removing the signs and hardware shall be incidental to the contract unit price per square foot for Detour Signing.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	7	18

INVENTORY OF TRAFFIC CONTROL DEVICES

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	2	30"	5.2	10.4
W1-3	REVERSE TURN (L or R)	1	48" x 48"	16.0	16.0
W3-1	STOP AHEAD (symbol)	2	48" x 48"	16.0	32.0
W16-2P	___ FEET (supplemental distance plaque)	2	30" x 24"	5.0	10.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-5	SHOULDER WORK	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			205.4

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	1 Each

ITEMIZED LIST FOR DETOUR SIGNING

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
SPECIAL	WIDTH RESTRICTION 12 FT WIDE 25 MILES AHEAD	1	96" x 48"	32.0	32.0
SPECIAL	WIDTH RESTRICTION 12 FT WIDE 45 MILES AHEAD	1	96" x 48"	32.0	32.0
SPECIAL	WIDTH RESTRICTION 12 FT WIDE (Legend Varies)	6	96" x 84"	56.0	336.0
SPECIAL	NO VEHICLES OVER 12 FT WIDE	2	96" x 24"	16.0	32.0
		CONVENTIONAL ROAD DETOUR SIGNING SQFT			432.0

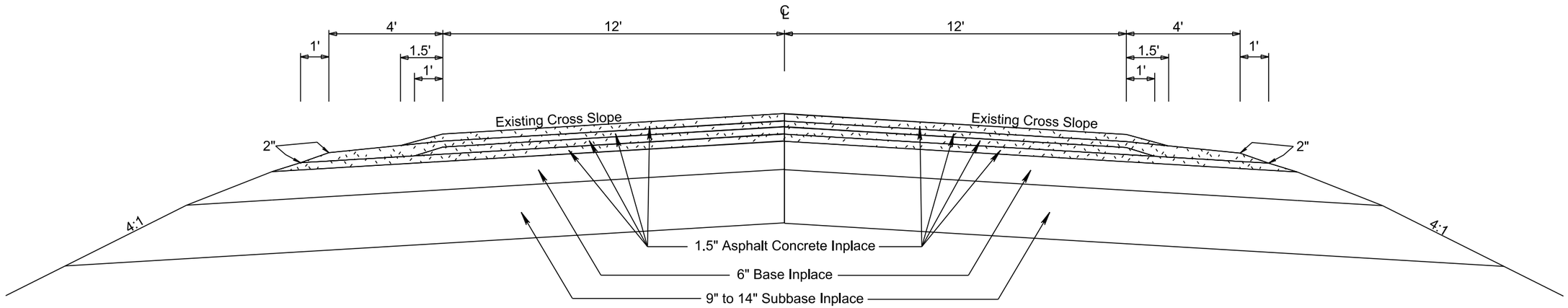
TYPICAL SURFACING SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	8	18

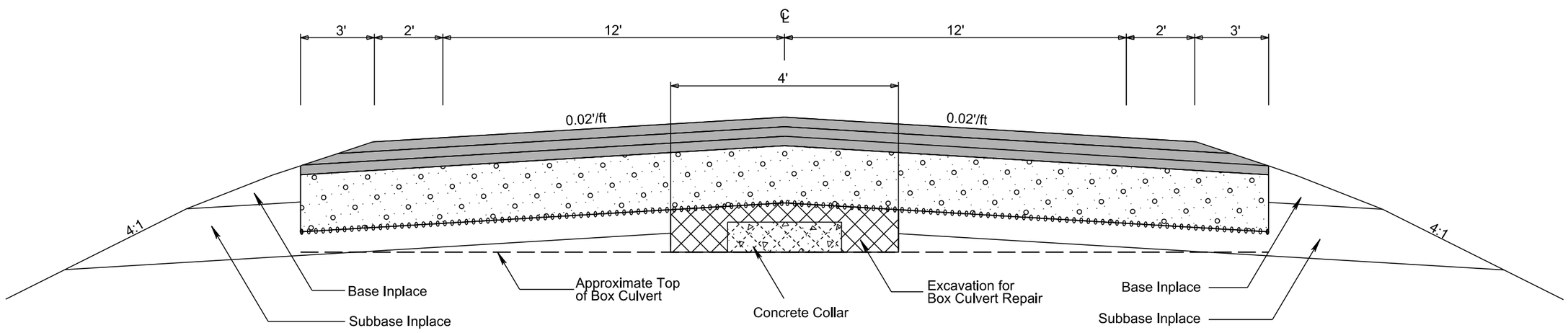
Plotting Date: 05/11/2017

Plot Scale - 1:200

In-Place Surfacing



Resurfacing Section



3-2" lifts Asphalt Concrete Composite

1' Base Course

Reinforcement Fabric (MSE)

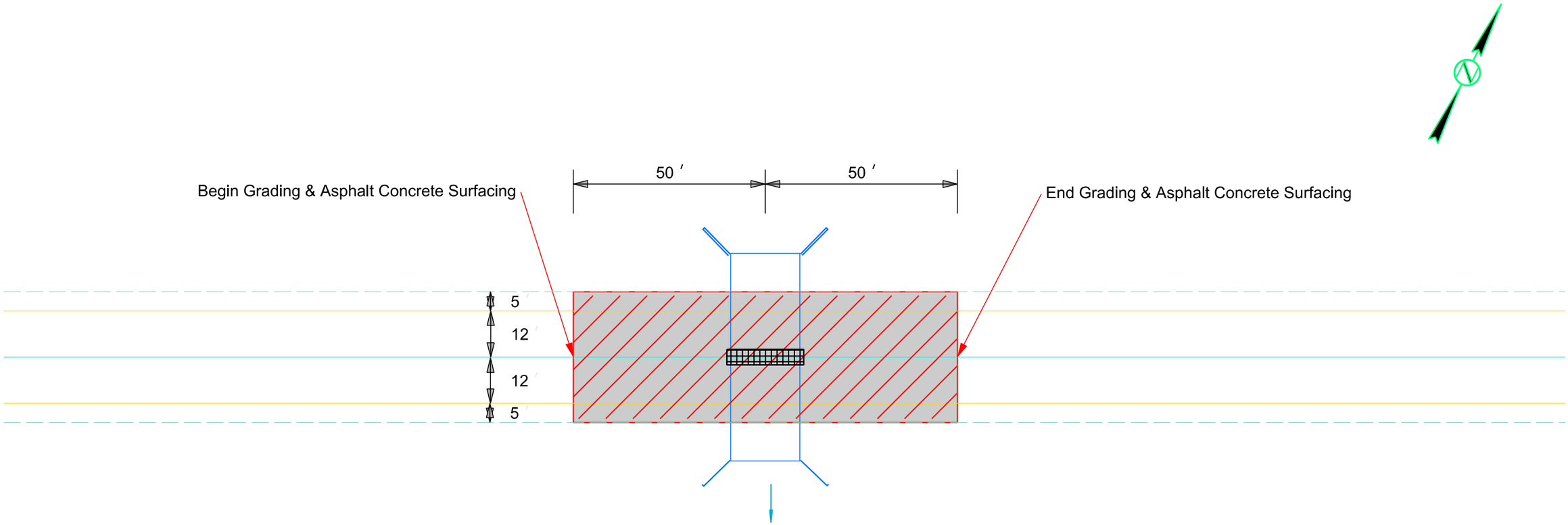
Plotted From - trnc11626

File - ...\Design\typ.dgn

PAVING DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	9	18

Plotting Date: 05/11/2017



Digout 1.5' Deep and Replace with 1' Base Course and 6" of Asphalt Concrete Composite

Excavate to the Top of the Box Culvert for Concrete Collar Placement (Centerline Joint)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	10	18

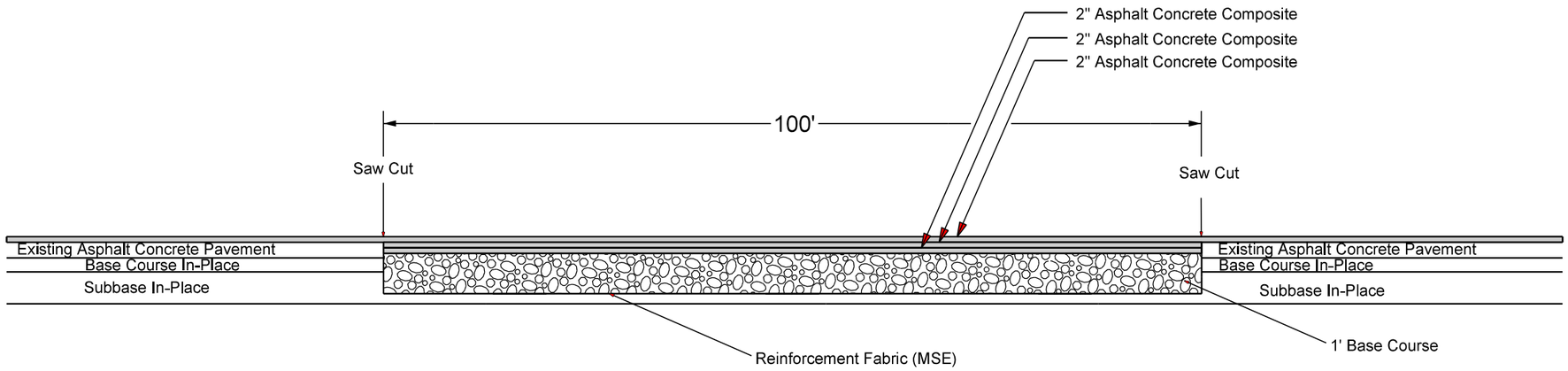
Plotting Date: 05/11/2017

Base Repair Detail

LONGITUDINAL SECTION ALONG CENTERLINE

Length of Poor Subgrade

Asphalt Concrete Pavement Repair
(Not to Scale)



Plot Scale - 1:4

Plotted From - lrrc11626

File - ...\SubgradeRepairDetail.dgn

TYPICAL PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	11	18

Plotting Date: 05/11/2017

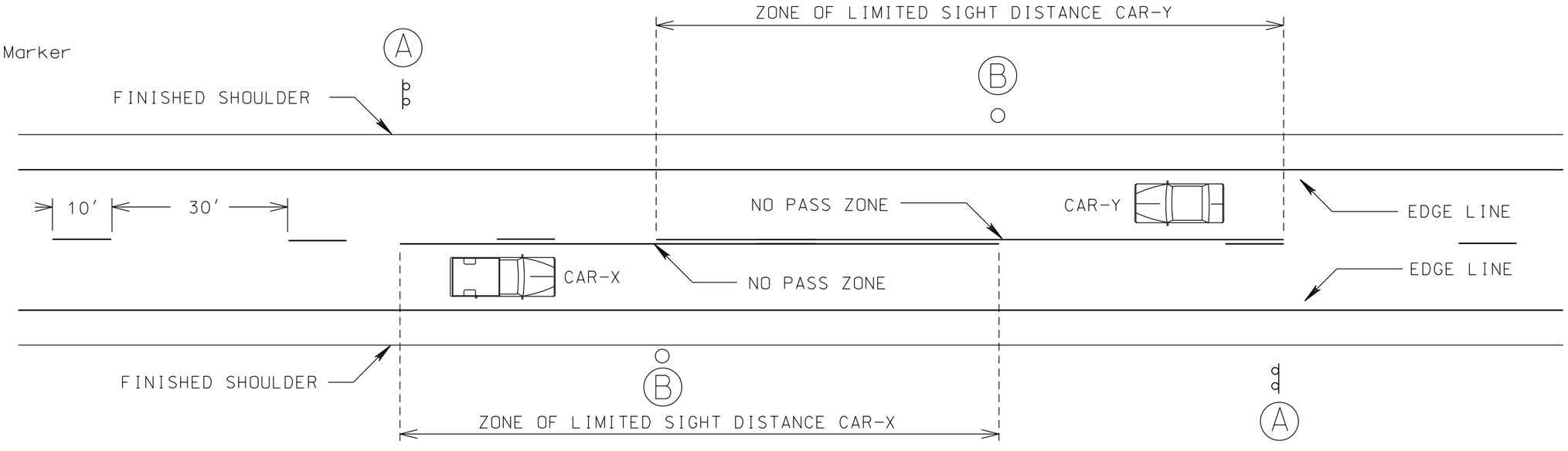
Plot Scale = 1:20

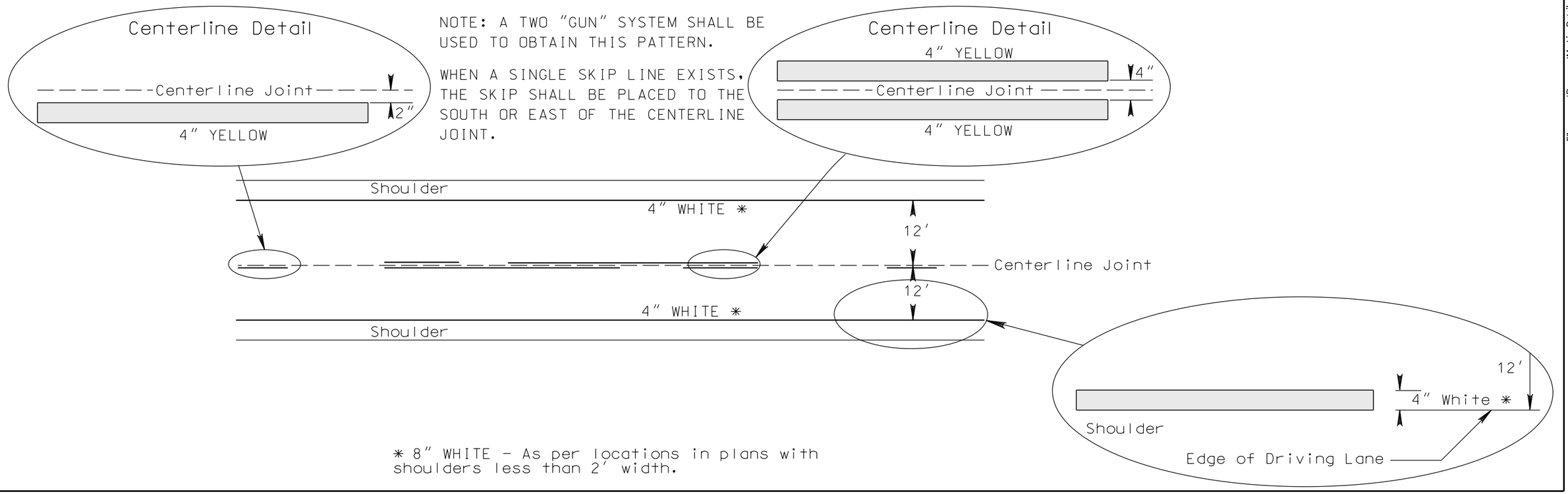
Plotted From - trnc11626

File - ...\PavementMarkingDetails.dgn

(A) NO PASSING ZONE

(B) End of Zone Marker



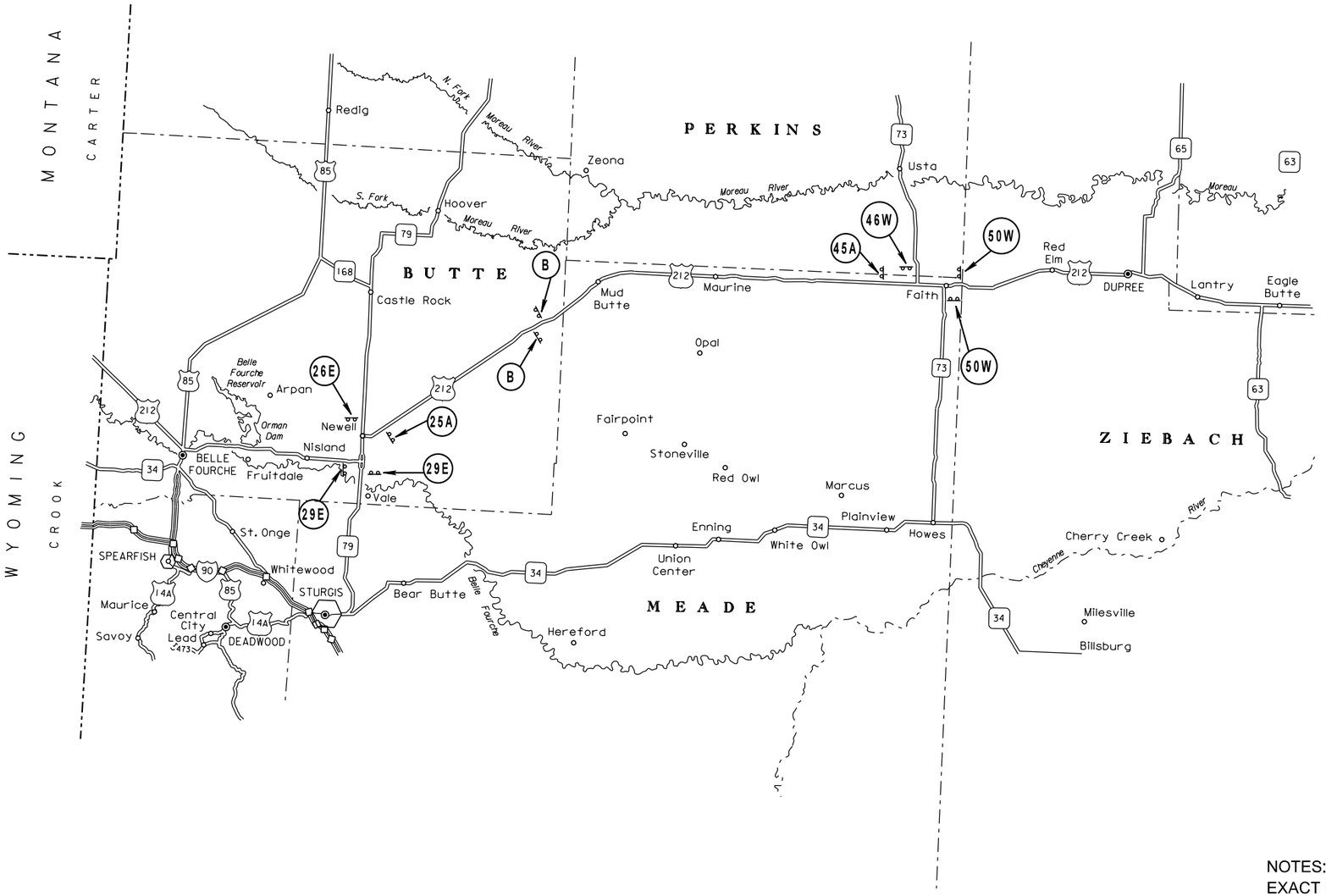


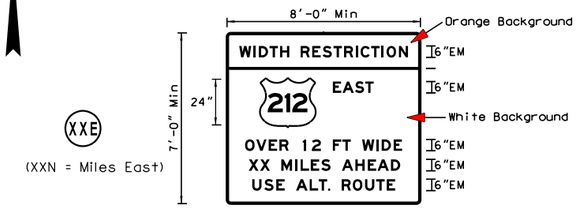
* 8" WHITE - As per locations in plans with shoulders less than 2' width.

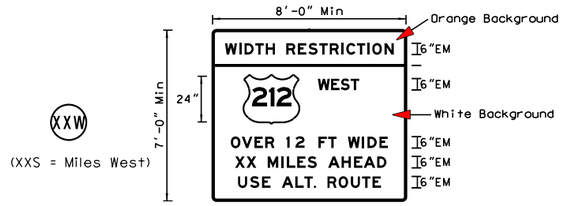
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	12	18

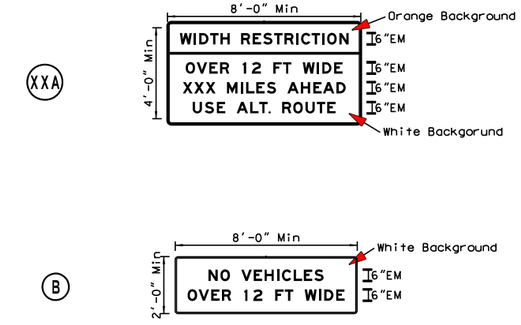
Plotting Date: 05/11/2017

OVERWIDTH DETOUR LAYOUT









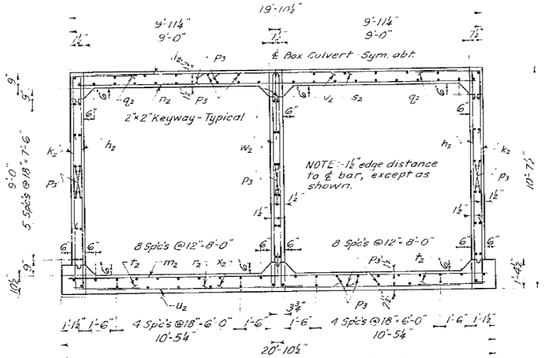
NOTES:
EXACT LOCATION OF SIGNS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. SIGNS TO BE FURNISHED, INSTALLED, MAINTAINED, AND REMOVED BY THE CONTRACTOR.
LETTER SIZE AND SPACING SHALL CONFORM TO THE M.U.T.C.D..
SIGN FACE SHALL BE ORANGE (TYPE XI) AND WHITE (TYPE IV) SHEETING WITH BLACK VINYL LETTERING.

Plot Scale - 1:200
Plotted From - trrc11626
File - ...\Design\title.dgn

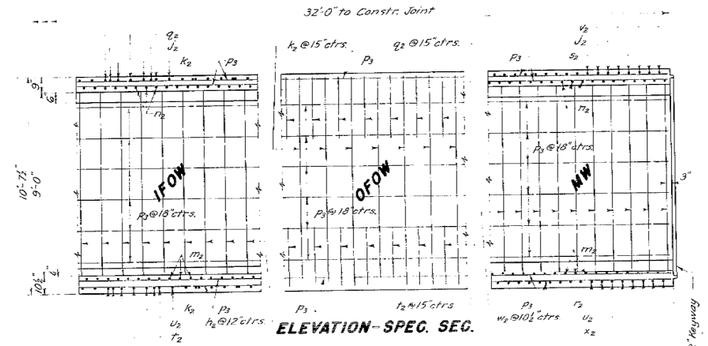
STATE	FED. ROAD DIST. NO.	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
S.D.	5		42	296

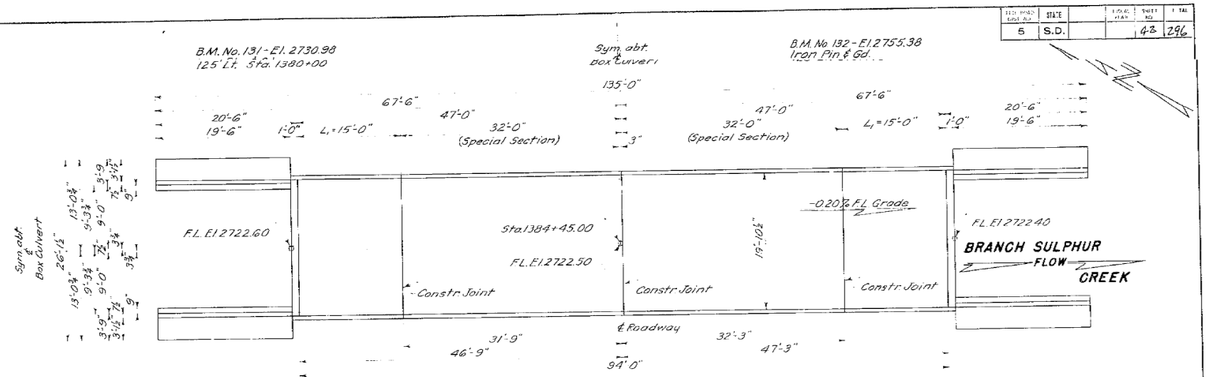
INDEX OF CULVERT SHEETS:—

Sheet No. 1 - Layout, Special Section Details, and Quantities
Sheet No. 2 - Standard Box Culvert **L-2-9'x9'**



SPECIAL BARREL SECTION



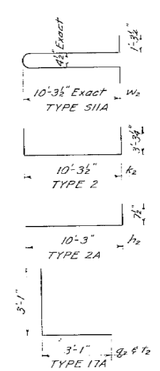


LAYOUT PLAN

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
h_2	128	4	10'-9"	2A
J_2	32	7	17'-6"	Str.
k_2	104	6	16'-6"	2
m_2	128	5	20'-3"	Str.
n_2	128	5	19'-3"	Str.
p_3	206	4	31'-9"	Str.
q_2	100	6	6'-0"	17A
r_2	30	7	7'-6"	Str.
s_2	30	7	7'-6"	Str.
t_2	100	7	6'-0"	17A
u_2	32	7	17'-6"	Str.
v_2	64	7	6'-0"	Str.
w_2	74	4	23'-0"	11A
x_2	64	7	6'-0"	Str.

Bending Details



NOTE:- All dimensions are out to out of bars.

ESTIMATED QUANTITIES

		1 Inlet & 1 Outlet	2 Barrels - L	Special Sec.	Total
Class 'A' Concrete	Cu. Yds.	33.69	57.30	122.20	213.19
Reinforcing Steel	Lbs.	4,737	9,510	21,183	35,430
Struct. Exc. (Below Flow Line)	Cu. Yds.	20.0	20.3	43.2	83.5

GENERAL NOTES:—

1. Use current South Dakota Standard Specifications for Roads and Bridges.
2. Design Loading for Special Section:- H20-44 (1953) A.A.S.H.O.
3. Unit Stresses:- Concrete - f'_c = 1,600 p.s.i.
   Reinf. Steel - f_s = 20,000 p.s.i.
4. All reinforcing steel shall conform to A.S.T.M. A305-50T and A15-50T (Intermediate Grade).

LAYOUT, SPECIAL SECTION DETAILS, AND QUANTITIES
FOR
SPECIAL 2-9' x 9' BOX CULVERT

OVER BRANCH SULPHUR CREEK SEC. 11-T11N-R9E
STA. 1384+45.00 S64(9)
BUTTE COUNTY
SOUTH DAKOTA
STATE HIGHWAY COMMISSION
JUNE 1955 (1) OF (2)

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	H.A.		BRIDGE ENGINEER

Plot Scale - 1:200
Plotted From - trc11626
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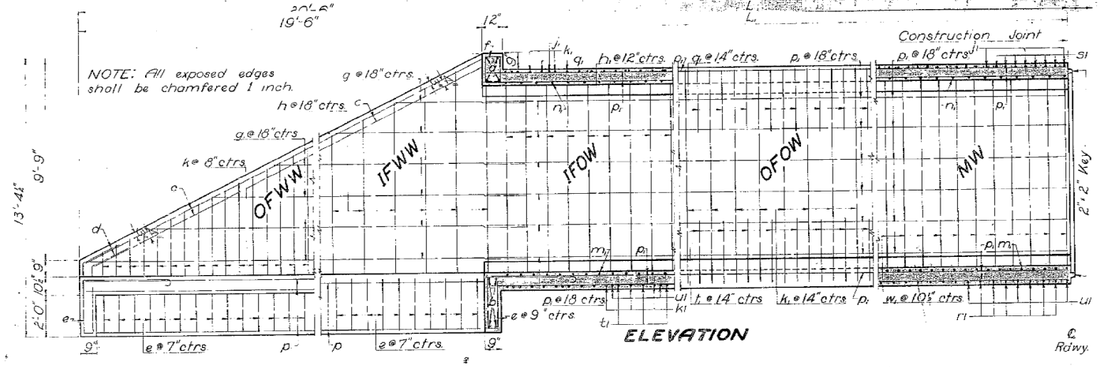
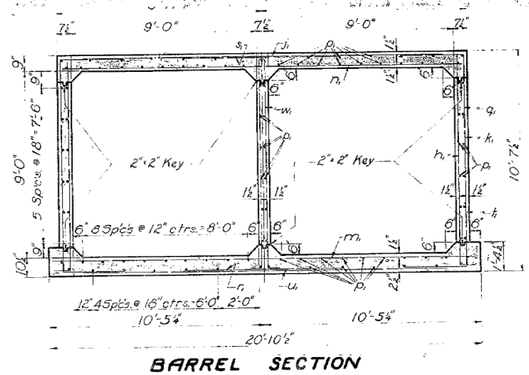
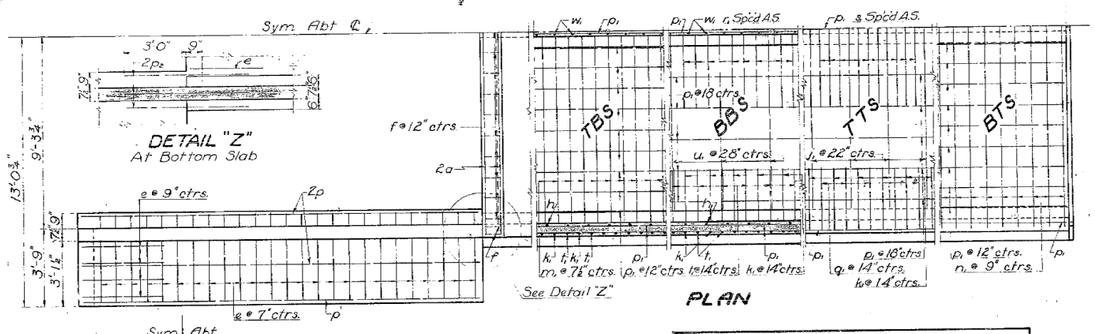
FED. ROAD DIST. NO.	STATE	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5N	S.D.		43	276

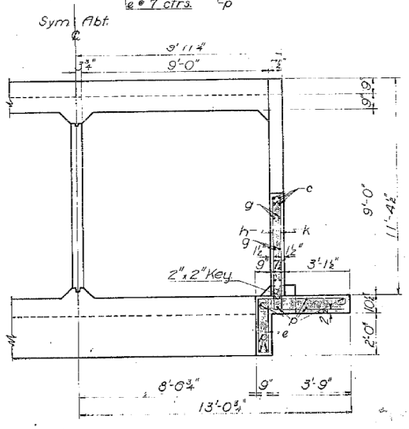




BARREL SECTION



PLAN



WING SECTION

TABULAR DATA

	Fills 1 to 5
Length - L	2L
No. Constr. Joints	1

LEGEND FOR PLACING RE-STEEL

- OFWW - Outside Face of Wing Wall
- IFWW - Inside Face of Wing Wall
- OFOW - Outside Face of Outer Wall
- IFOW - Inside Face of Outer Wall
- MW - Middle Wall
- TTS - Top of Top Slab
- BTS - Bottom of Top Slab
- TBS - Top of Bottom Slab
- BBS - Bottom of Bottom Slab

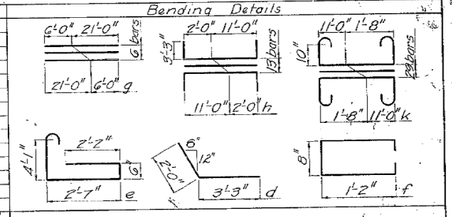
QUANTITIES

	CLASS A CONC. Cu. Yds.	RE-STEEL Lbs.	STR. EXC. Cu. Yds. below F.L.
1 Inlet & 1 Outlet	33.69	4737	19.96
2 Barrels - L	5.62 Li	634 Li	1.35 Li

REINFORCING SCHEDULE

	Mk.	No.	Sz.	Lgth.
CONSTANT RE-STEEL 1 Inlet & 1 Outlet	a	8	⅜" ø	19'-6"
	b	8	⅜" ø	18'-0"
	c	16	⅜" ø	21'-9"
	d	16	⅜" ø	5'-3"
	e	196	⅜" ø	10'-0"
	f	46	⅜" ø	3'-6"
	g	24	⅜" ø	27'-0"
	h	26	⅜" ø	19'-6"
	k	58	⅜" ø	16'-0"
	p	28	⅜" ø	19'-3"
	p2	24	⅜" ø	6'-0"
VARIABLE RE-STEEL 2 Barrels - L	h1	4.6 Li	⅜" ø	10'-9"
	j1	1.1 Li	⅜" ø	17'-6"
	k1	3.4 Li	⅜" ø	16'-6"
	m1	3.2 Li	⅝" ø	20'-3"
	n1	2.7 Li	⅝" ø	19'-3"
	p1	20 G	⅜" ø	Li+9"
	q1	3.4 Li	⅜" ø	6'-0"
	r1	3.4 Li	⅜" ø	7'-6"
	s1	3.3 Li	⅜" ø	7'-6"
	t1	3.4 Li	⅜" ø	6'-0"
	u1	.9 Li	⅜" ø	17'-6"
	w1	2.3 Li	⅜" ø	23'-0"

Bending Details



Hooks shall have 5 dia's. clear openings. Dimensions are to ℄ of bars.

DETAILS FOR

STANDARD 2-9'×9' BOX CULVERT

DESIGNED FOR 1' TO 5' FILLS

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

JUNE 1938 H15-35

Rev. 4-17-47
Rev. Dec. 26, 1945

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	RET		BRIDGE ENGINEER

2-9×9

Plot Scale - 1:200

Plotted From - trrc11626

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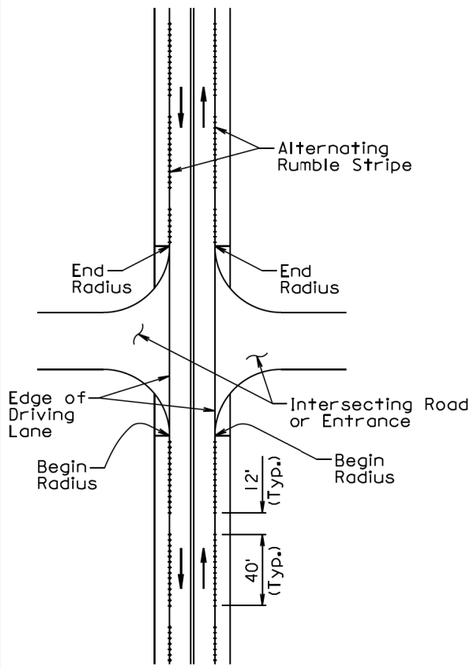
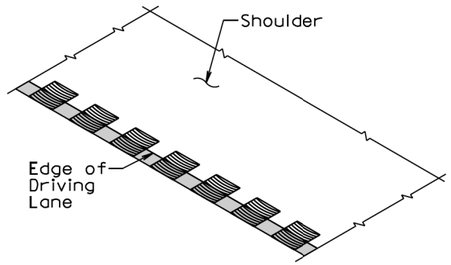
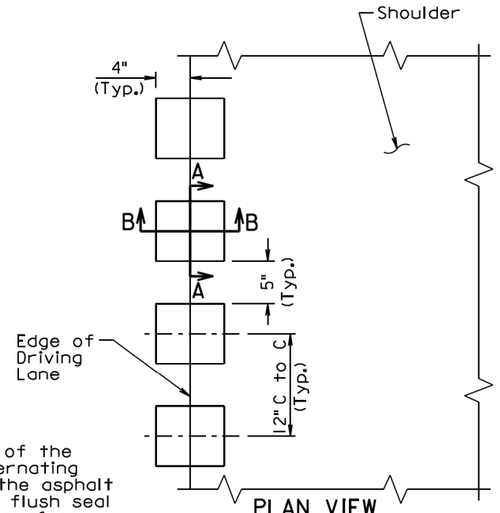


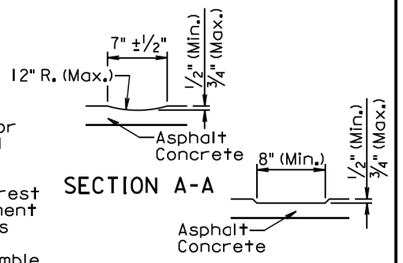
PLAN VIEW



PERSPECTIVE OF TYPICAL
RUMBLE STRIPE IN ASPHALT CONCRETE



PLAN VIEW
TYPICAL RUMBLE STRIPE
IN ASPHALT CONCRETE



SECTION A-A

SECTION B-B

GENERAL NOTES:

A rumble stripe shall be constructed on all of the asphalt concrete shoulders by grinding alternating patterns of 40' continuous indentations in the asphalt concrete. The rumble stripe shall receive a flush seal with the shoulder flush sealing or asphalt surface treatment.

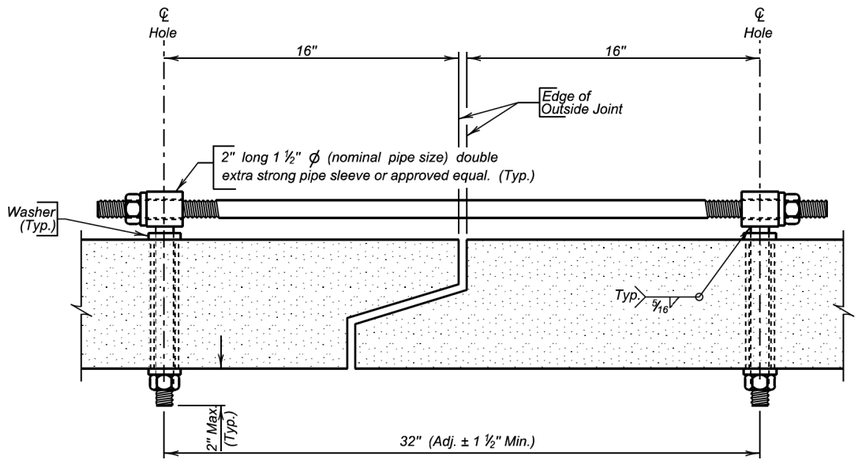
A rumble stripe shall not be constructed through intersecting roads, entrances, and turnouts. The lengths of the 40' segments with continuous indentations and the 12' segments without a rumble stripe adjacent to the intersecting roads, entrances, and turnouts shall be adjusted as approved by the Engineer.

Prior to constructing the rumble stripe the Contractor shall submit to the Engineer, for approval, the proposed method of constructing the rumble stripe.

Measurement of the rumble stripe shall be to the nearest 0.1 of a mile for each shoulder. Measurement and payment of the rumble stripe shall include the 12' long segments without rumble stripes and the segments adjacent to intersecting roads, entrances, and turnouts without rumble stripes. Payment for constructing the rumble stripe shall be at the contract unit price per mile for "Grind 8" Rumble Strip or Stripe in Asphalt Concrete".

June 26, 2011

Published Date: 2nd Qtr. 2017	SDDOT	8" RUMBLE STRIPE IN ASPHALT CONCRETE ON NONDIVIDED HIGHWAY SHOULDERS	PLATE NUMBER 320.20 Sheet 1 of 1



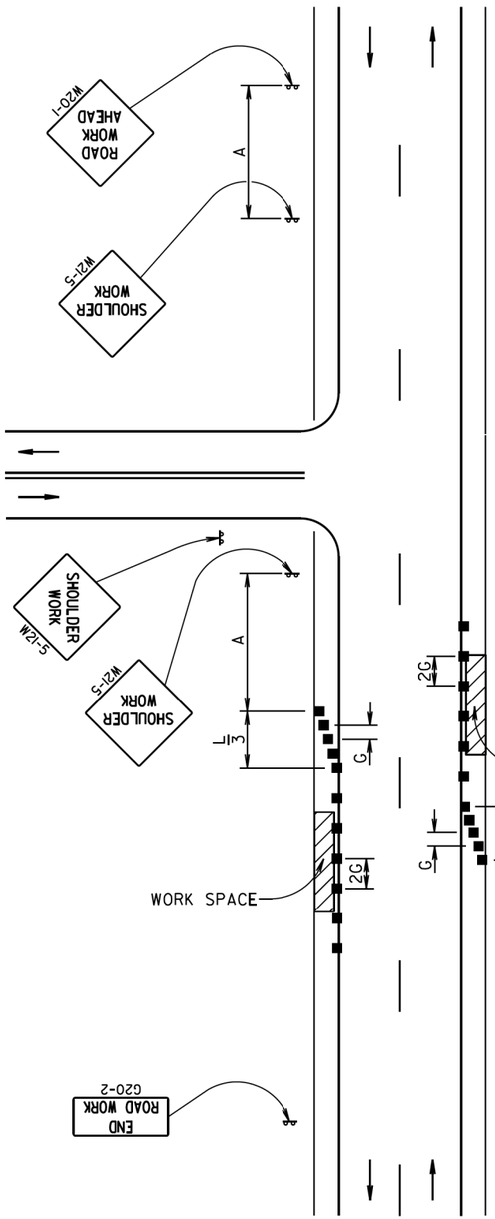
TIE BOLT ASSEMBLY

GENERAL NOTES:

1. *All holes for tie bolts shall be cast-in-place, 16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.*
2. *Ties shall be 1 inch ∅ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.*
3. *Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.*
4. *Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.*
5. *Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.*
6. *All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".*

March 21, 2016

Published Date: 2nd Qtr. 2017	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01 Sheet 1 of 1



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device

END ROAD WORK G20-2

The channelizing devices shall be drums or 42" cones if traffic control must remain overnight.

For short duration operations (1 hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

June 3, 2016

Published Date: 2nd Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS	PLATE NUMBER 634.03
			Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45	500	25
50	500	50
55	750	50
60 - 65	1000	50

Flagger

■ Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

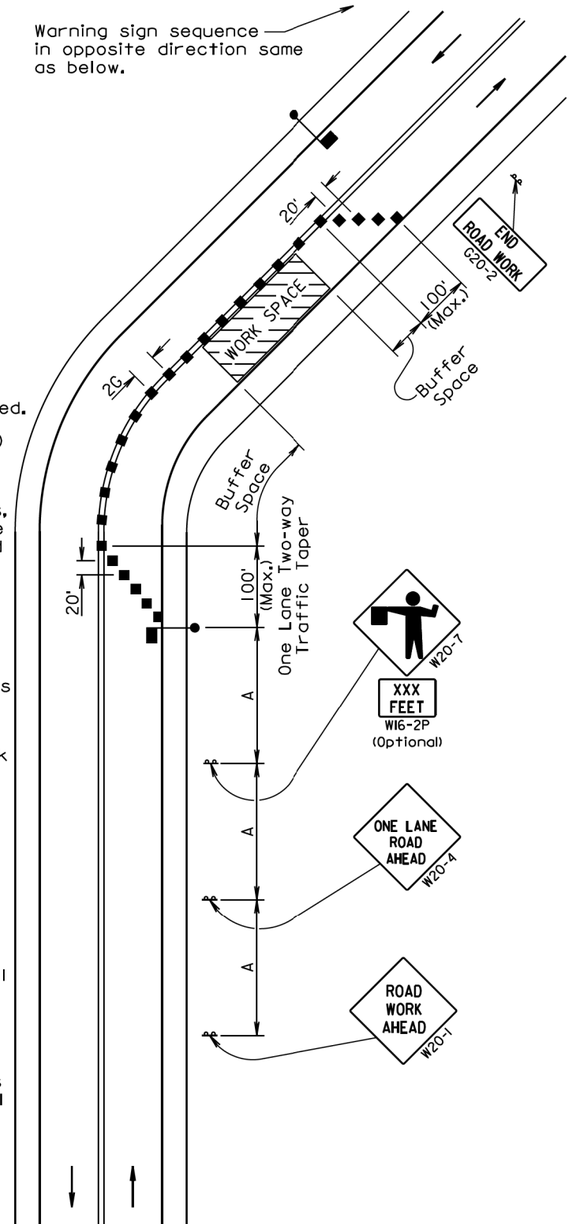
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK G20-2

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

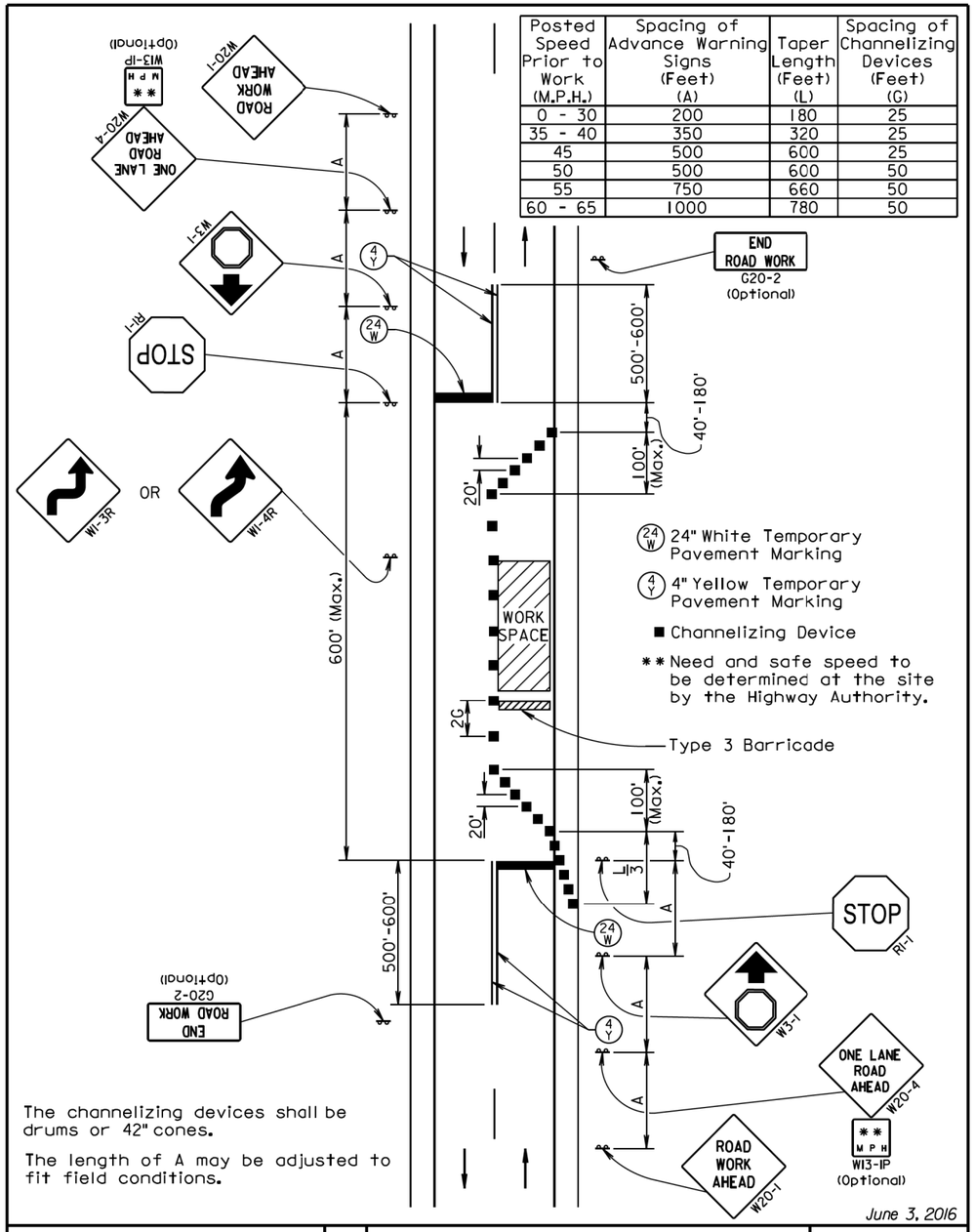
The length of A may be adjusted to fit field conditions.



June 3, 2016

Published Date: 2nd Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

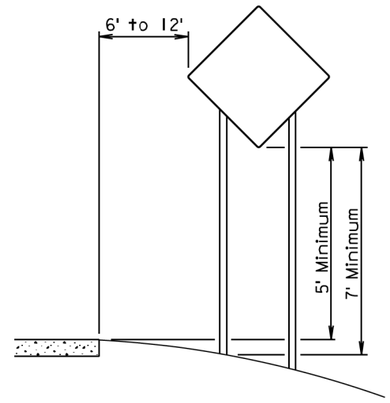


The channelizing devices shall be drums or 42" cones.

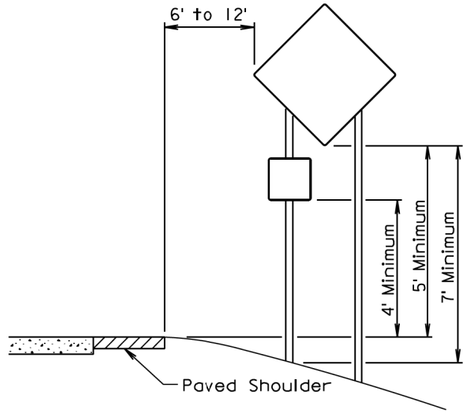
The length of A may be adjusted to fit field conditions.

June 3, 2016

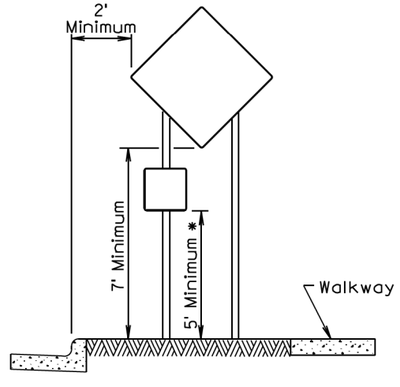
Published Date: 2nd Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25 Sheet 1 of 1



RURAL DISTRICT

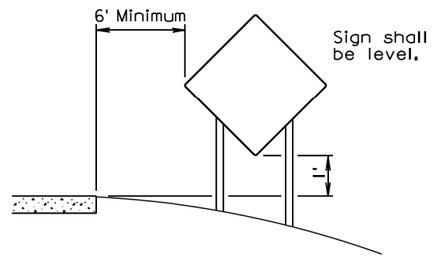


RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



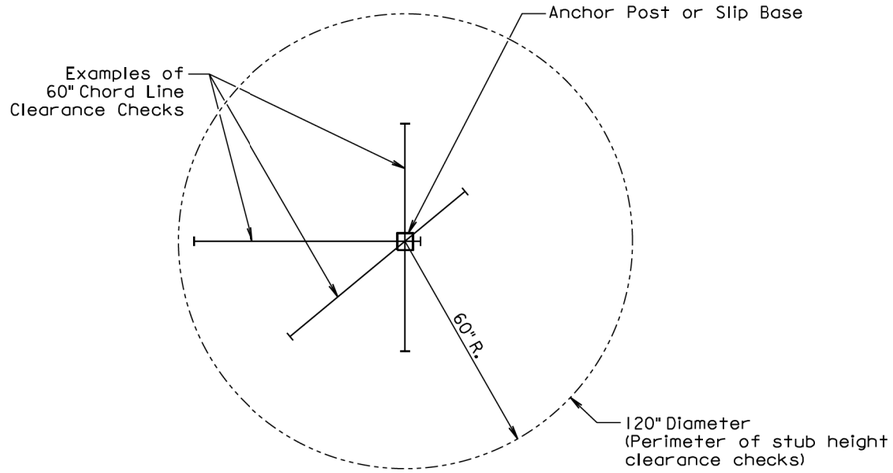
RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 2nd Qtr. 2017	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85 Sheet 1 of 1

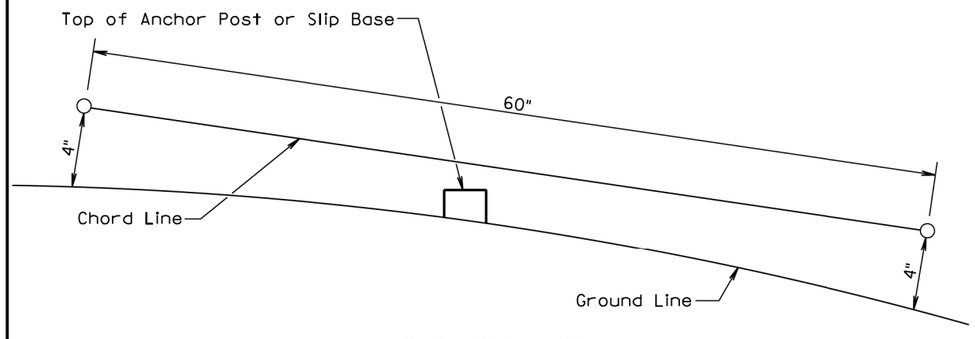
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	18	18

Plotting Date: 05/11/2017



PLAN VIEW

(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 2nd Qtr. 2017	SDDOT	***BREAKAWAY SUPPORT STUB CLEARANCE***	***PLATE NUMBER*** 634.99
			Sheet 1 of 1

Plot Scale - 1:200

- Plotted From - trrc11626

File - ...\Design\s63499.dgn