

STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED

PROJECT NH 0011(00)079  
SD HIGHWAY 11  
MINNEHAHA COUNTY

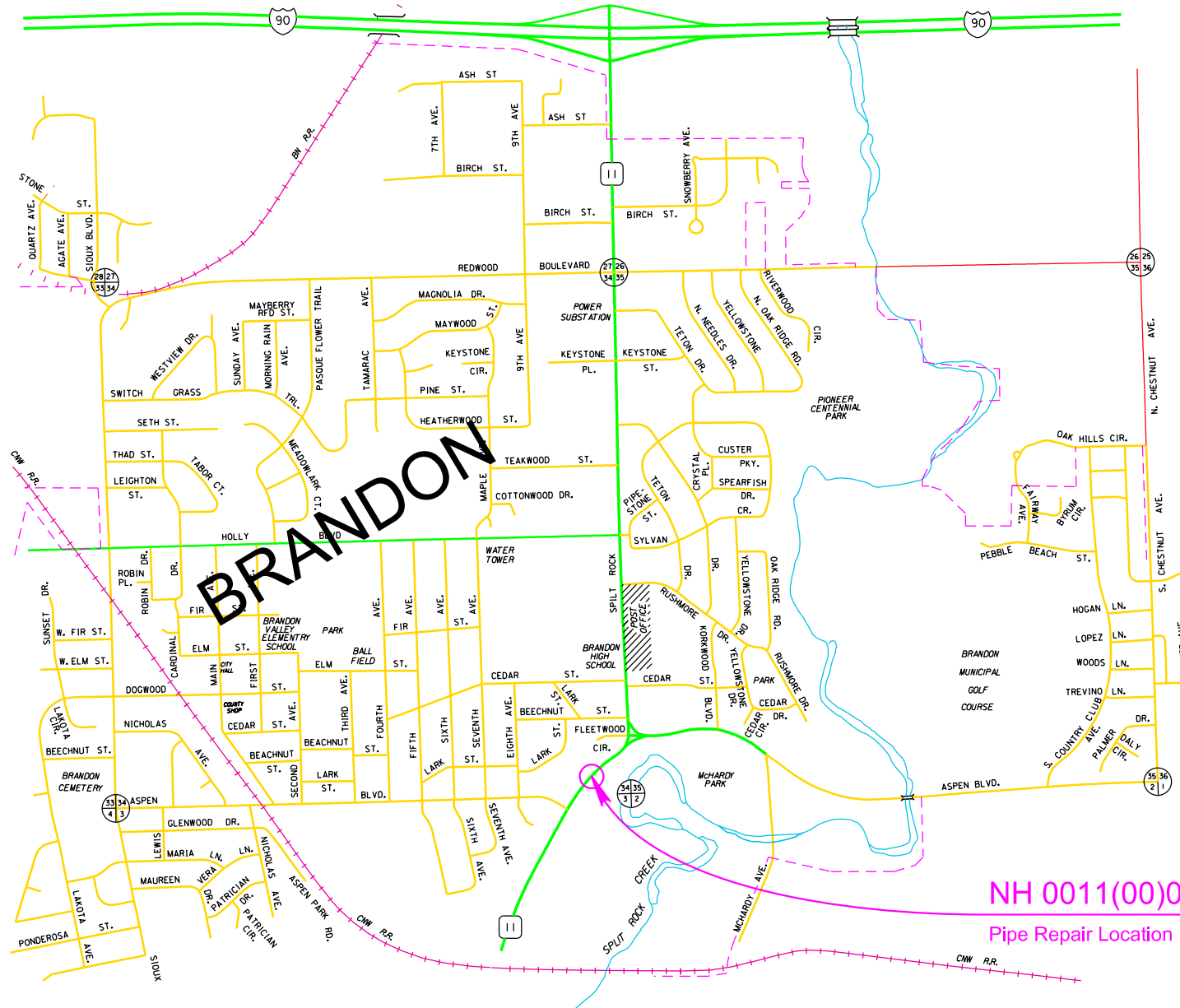
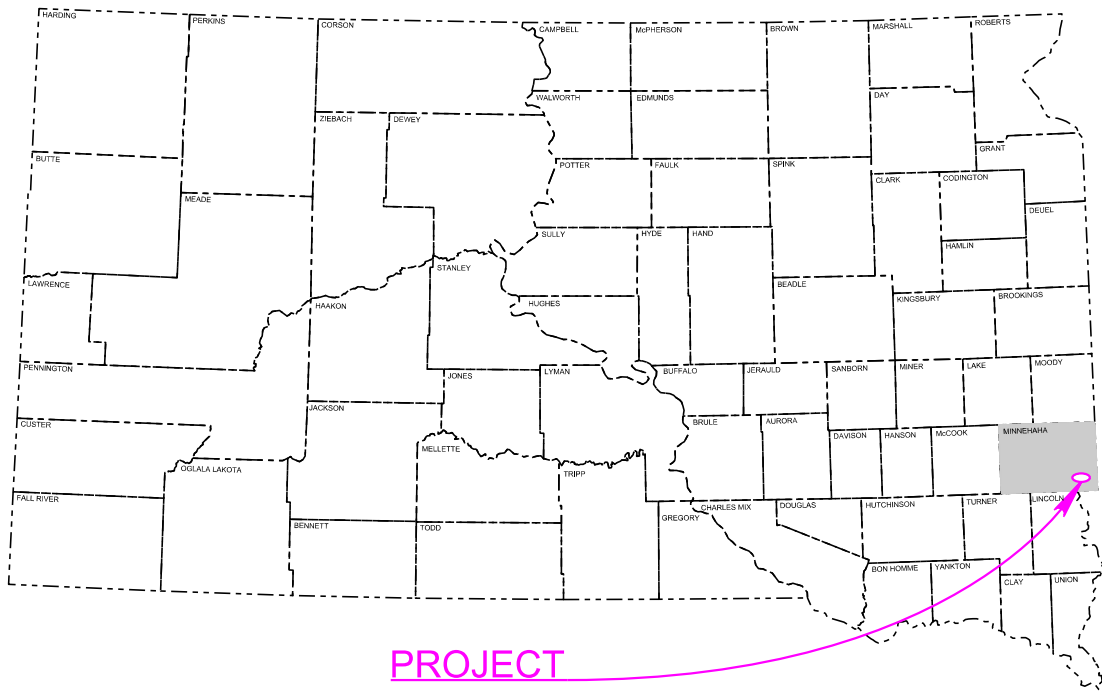
STORM SEWER PIPE REPAIR  
PCN 05JL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0011(00)079	1	26

Plotting Date: 08/13/2015

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DESIGN DESIGNATION

ADT (2014)	8991
ADT (2039)	14835
DHV	1943.4
D	50%
T DHV	3.3%
T ADT	7.3%
V	30 MPH

STORM WATER PERMIT

Major Receiving  
Body of Water: Split Rock Creek  
Area Disturbed: 0.2 ac  
Total Project Area: 0.3 ac  
Approx. Begin Lat,Long: 43.5879, -96.5737

NH 0011(00)079  
Pipe Repair Location

Plot Scale - 1:200

Plotted From -

trsf12/145

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**NON-SECTION ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
100E0100	Clearing	Lump Sum	LS
110E0400	Remove Drop Inlet	1	Each
110E0460	Remove Manhole	1	Each
110E0600	Remove Fence	33	Ft
110E1700	Remove Silt Fence	100	Ft
110E7500	Remove Pipe for Reset	36	Ft
120E0600	Contractor Furnished Borrow Excavation	100	CuYd
250E0020	Incidental Work, Grading	Lump Sum	LS
450E0122	18" RCP Class 2, Furnish	16	Ft
450E0130	18" RCP, Install	16	Ft
450E0162	30" RCP Class 2, Furnish	16	Ft
450E0170	30" RCP, Install	16	Ft
450E0182	36" RCP Class 2, Furnish	10	Ft
450E0190	36" RCP, Install	10	Ft
450E4789	36" CMP 16 Gauge, Furnish	62	Ft
450E4790	36" CMP, Install	62	Ft
450E5025	36" CMP Elbow, Furnish	2	Each
450E5026	36" CMP Elbow, Install	2	Each
450E5211	18" CMP Flared End, Furnish	1	Each
450E5212	18" CMP Flared End, Install	1	Each
450E5223	36" CMP Flared End, Furnish	1	Each
450E5224	36" CMP Flared End, Install	1	Each
450E7636	36" Steel Pipe, Furnish	140	Ft
450E9000	Reset Pipe	36	Ft
451E3336	36" Pipe Transition Coupling	1	Each
451E5136	Bore and Jack 36" Pipe	140	Ft
462E0100	Class M6 Concrete	7.5	CuYd
464E0100	Controlled Density Fill	39.3	CuYd
480E0100	Reinforcing Steel	1,293	Lb
620E0020	Type 2 Right-of-Way Fence	33	Ft
620E1020	2 Post Panel	2	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	1,948	Ft
633E5050	Surface Preparation for Pavement Marking	1,948	Ft
634E0010	Flagging	100.0	Hour
634E0110	Traffic Control Signs	176	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0280	Type 3 Barricade, 8' Single Sided	2	Each
634E0285	Type 3 Barricade, 8' Double Sided	2	Each
634E0330	Temporary Raised Pavement Markers	1,538	Ft
634E0560	Remove Pavement Marking, 4" or Equivalent	1,948	Ft
670E2200	Type C Frame and Grate	1	Each
671E4548	48" Manhole Cone Section	3.3	Ft
671E6007	Type A7 Manhole Frame and Lid	1	Each
700E0210	Class B Riprap	22.6	Ton
732E0600	Hydraulic Straw Mulch	600	Lb
733E0100	Sodding	527	SqYd
734E0010	Erosion Control	Lump Sum	LS
734E0101	Type 1 Erosion Control Blanket	832	SqYd
734E0604	High Flow Silt Fence	100	Ft
734E0610	Mucking Silt Fence	7	CuYd
734E0620	Repair Silt Fence	25	Ft
831E0110	Type B Drainage Fabric	42	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 B4: BALD EAGLE**

Bald eagles are known to occur in this area.

**Action Taken/Required:**

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

**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.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

**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 D: WATER QUALITY STANDARDS**

**COMMITMENT D2: SURFACE WATER DISCHARGE**

The Split Rock Creek is classified as a warm water semi-permanent fishery with a total suspended solids standard of 90 milligrams/liter.

**Action Taken/Required:**

If construction dewatering is required, the Contractor shall obtain a Temporary Discharge Permit from the DENR and provide a copy to the Project Engineer. Contact the DENR Surface Water Program at 605-773-3351 to apply for a permit.

**COMMITMENT E: STORM WATER**

Construction activities constitute less than 1 acre of disturbance.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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Plotting Date: 08/13/2015

**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 State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway 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 State 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 State 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.

Plot Scale - 1:200

Plotted From - trsf12145

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**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 designated option borrow 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: staging areas, borrow sites, waste disposal sites, and all material processing sites.

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES (CONTINUED)**

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.

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

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 staging areas, borrow sites, waste disposal sites, or material processing sites 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.

**SCOPE OF WORK**

The scope of work on this project shall include, but is not limited to the following:

1. Install erosion/sediment control as required.
2. Remove and stockpile topsoil to the Engineers satisfaction.
3. Excavate and remove 36" RCP downspout. Fill remaining 36" RCP with Controlled Density fill.

4. Bore and Jack 36" Steel Pipe. Construct Junction Box and Type C Drain.
5. Grade and shape the area for Seeding.
6. Seed and hydraulic mulch disturbed areas.

**REMOVE AND RESET TYPE II OBJECT MARKERS**

The Contractor will be required to remove prior to the work and reset after the work the Type II Object Markers delineating the pipe end at 454+09. Cost for this work shall be incidental to the contract unit prices for the various items.

**MAINTENANCE OF TRAFFIC**

The Contractor should make every effort to remove the lane closure from the roadway and place traffic in their normal set of lanes at the end of each day. If construction activities require closure of a lane overnight such as during the boring and jacking setup and operation, Temporary Raised Pavement Markers shall be used.

**TEMPORARY PAVEMENT MARKING**

Temporary pavement marking for all temporary markings shall consist of Raised Pavement Markers. Cost shall be included in the contract unit price per foot for "Temporary Raised Pavement Markers".

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W1-4	REVERSE CURVE (L or R)	2	48" x 48"	16	32
W13-1P	ADVISORY SPEED (plaque)	2	30" x 30"	6	12
W16-2P	FEET (supplemental distance plaque)	2	30" x 24"	5	10
W20-1	ROAD WORK AHEAD	3	48" x 48"	16	48
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16	32
W20-7	FLAGGER (symbol)	2	48" x 48"	16	32
G20-2	END ROAD WORK	2	36" x 18"	5	10
CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT					<b>176</b>

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Single Sided	2 Each
Type 3 Barricade, 8' Double Sided	2 Each

**UTILITIES**

All utilities shall be verified by the Contractor prior to starting work. Any time existing utilities impede the progress of work, the Contractor shall immediately notify the Engineer.

The Contractor shall safeguard all utilities and coordinate his efforts to coincide with utility work by others in order to minimize inconvenience to the public and utility companies. When pipe utility installation crosses existing utilities, the Contractor shall be responsible for supporting the utilities in a manner that is acceptable to the owner of the utility. Any damage caused to the utilities due to Contractor carelessness shall be repaired at the Contractor's expense to the satisfaction of the utility owner.

Existing utility locations shown on the drawings are approximate. There is no guarantee that the utilities shown include all such utilities or that the locations indicated are exact. The Contractor shall contact South Dakota One Call system, utility companies, and the City of Brandon to verify locations of all existing utilities prior to excavation.

The Contractor shall be responsible for notifying South Dakota One Call 1-800-781-7474 to have utilities field located.

**Power:**

Xcel Energy Distribution  
500 W. Russell Street, Sioux Falls, SD 57104  
Attn: Ron Aaker, Office: (605) 339-8341, Cell: (605) 366-1233

Sioux Valley Energy

108 N Heritage Rd, Brandon, SD 57005  
Attn: Jason Sage, Office: (605) 582-2185

**Water:**

City of Brandon  
205 East Elm Street, Brandon, SD 57005  
Attn: Rollie Hoeke, Office: (605) 582-2273

**Sanitary Sewer:**

City of Brandon  
205 East Elm Street, Brandon, SD 57005  
Attn: Rollie Hoeke, Office: (605) 582-2273

**Gas:**

MidAmerican Energy  
1200 S. Blauvet, Sioux Falls, SD 57105  
Attn: Eric Berg, Office: (605) 373-6038

**Communication:**

Alliance Communications  
612 E 3<sup>rd</sup> Street, Garretson, SD 57030  
Attn: Jim Hanson, Office: (605) 594-3411

**CLEARING**

Clearing activities shall consist of removing needed brush and trees necessary to construct CMP downspout and end section. All costs shall be incidental to the contract Lump Sum price for "Clearing".

**EROSION CONTROL**

All areas disturbed not covered with concrete or rip rap shall be seeded. Hydraulic Straw Mulch shall be placed on all seeded areas not covered with Erosion Control Blanket. All costs associated with Mycorrhizal Inoculum, Permanent Seeding and Removing & Replacing Topsoil shall be incidental to the contract lump sum price for "Erosion Control".

The estimated disturbed area to require erosion control is 12,000 square feet

**Mycorrhizal Inoculum**

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

- Glomus intraradices* 25%
- Glomus aggregatu* 25%
- Glomus mosseae* 25%
- Glomus etunicatum* 25%

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre.

The mycorrhizal inoculum shall be as shown below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 <a href="http://www.mycorrhizae.com/">http://www.mycorrhizae.com/</a>

**PERMANENT SEEDING**

The areas to be seeded consist of all newly graded areas within the project limits except for the top of roadways and temporary easements under cultivation.

For seeding the areas disturbed in and around temporary easement. Type D Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/1000 SqFt)
Kentucky Bluegrass	Avalanche, Appalachian, Wildhorse, Blue Bonnet	2
Perennial Ryegrass	Turf Type Varieties	2
Creeping Red Fescue	Epic, Boreal	2
Chewings Fescue	Ambrose, K2, VNS, Zodiac	2
Alkali Grass	Fults, Fults II, Quill, Salty	2
Total:		10

For Seeding on inslope where downspout is being installed. Type G Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana	7
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk	3
Big Bluestem	Bison, Bonilla, Champ, Pawnee, Sunnyview	3
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
Total:		26

**HIGH FLOW SILT FENCE**

The high flow silt fence fabric provided shall be from the approved product list. The approved product list for high flow silt fence may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

Silt fence is to be placed at locations that will minimize siltation of adjacent streams, lakes, dams, or drainage areas as determined by the Engineer BEFORE construction. Refer to Standard Plate 734.05 for details.

**EROSION CONTROL BLANKET**

Erosion control blanket shall be installed 24 feet wide at the location noted in the plans or as determined by the Engineer during construction.

The erosion control blanket provided shall be from the approved product list. The approved product list for erosion control blanket may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

**HYDRAULIC STRAW MULCH**

Hydraulic straw mulch shall be applied to the areas noted in the table. Hydraulic straw mulch shall not be placed in channels. Hydraulic straw mulch shall be applied after seeding and before water for vegetation. Areas designated for hydraulic straw mulch application do not require a grass hay or straw mulch application. The application rate is 3,000 pounds per acre.

All costs for furnishing and applying the hydraulic straw mulch including the manufacturer recommended soil stabilizer or tackifier, hauling, materials, equipment, labor, and incidentals necessary shall be paid for at the contract unit price per pound for "Hydraulic Straw Mulch".

The hydraulic straw mulch shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
HydroStraw, HydroStraw Guar Plus Formulation, or HydroStraw BFM	HydroStraw, LLC Manteno, IL Phone: 1-800-545-1755 <a href="http://hydrostraw.com">http://hydrostraw.com</a>
HydroGold	Verdyol Riverton, Manitoba Canada Phone: 1-866-280-7327 <a href="http://www.bioticearth.com">http://www.bioticearth.com</a>

**TABLE OF HYDRAULIC STRAW MULCH**

Station	to Station	L/R	Quantity (Lb)
453+85	454+85	L	600
Total:			600

**CONTRACTOR FURNISHED BORROW EXCAVATION**

Contractor furnished borrow will be required to fill the RCP removal trench and to fill scarp line on the downstream side inslope. Additional top soil may be required if a sufficient amount cannot be obtained on site. Payment for this additional topsoil shall be incidental to contract unit price per CuYd for "Contractor Furnished Borrow Excavation".

The Contractor shall provide a suitable site for Contractor furnished borrow excavation material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site. The borrow material shall be approved by the Engineer. The plans quantity for "Contractor Furnished Borrow Excavation" as shown in the Estimate of Quantities will be the basis of payment for this item.

Restoration of the Contractor furnished borrow excavation site shall be the responsibility of the Contractor.

**INCIDENTAL WORK, GRADING**

Station	L/R	Remarks
453+91	153' R	Take Out 18" CMP Flared End
453+99 to 454+11	152' R to 78' R	Take Out 36" - 48' RCP and Bends
454+29 to 454+36	79' L to 73' L	Take Out 18" - 8' RCP
454+34 to 454+42	60' L to 58' L	Take Out 18" - 8' RCP
454+34 to 454+42	60' L to 59' L	Take Out 30" - 8' RCP
454+36 to 454+41	73' L to 80' L	Take Out 30" - 8' RCP

**TABLE OF MANHOLE REMOVAL**

Station	L/R	Quantity (Each)
*454+32	61' L	1
Total:		1

\* Manhole shall be removed to a point just below the installation limits of the new junction box being constructed in the same location. The remaining junction box shall be filled with controlled density fill. The cost of the controlled density fill shall be incidental to the contract unit price per CuYd for "Controlled Density Fill" as shown in the "Controlled Density Fill for Pipe" Table.

**TABLE OF DROP INLET REMOVAL**

All costs for removal of the frame and grate assembly shall be incidental to the contract unit price per each for "Remove Drop Inlet".

Station	L/R	Quantity (Each)
454+36	73' L	1
Total:		1

**REMOVE PIPE FOR RESET**

An 18" RCP and a 30" RCP will need to be reinstalled into the new Type C drop inlet by removing the first section of pipe that is cast into the existing Type C drop inlet and installing a newly furnished pipe section. The remaining pipe will need to be removed and reset as required by the bore and jacking pit limits. All costs shall be incidental to the various bid items for removing, resetting, furnishing, and installing pipe.

**CORRUGATED METAL PIPE**

Corrugated metal pipes shall have 2 3/8-inch X 1/2-inch corrugations for 42-inch and smaller round pipe and 48-inch and smaller arch pipe unless otherwise stated in the plans. Corrugated metal pipes shall have 3-inch X 1-inch or 5-inch X 1-inch corrugations for 48-inch and larger round pipe and 54-inch and larger arch pipe unless otherwise stated in the plans.

The gauge of the corrugated metal elbows and ends shall match the thickest gauge of corrugated metal pipe it is connected to.

**CONTROLLED DENSITY FILL FOR PIPE**

Controlled density fill shall be in conformance with Section 464 of the Specifications.

The controlled density fill shall be used to fill the 36" pipe that is to remain in place. The contractor shall expose the south end of the existing 36" RCP to install a bulkhead for the controlled density fill. All costs for furnishing and installing the bulkhead and required excavation for the installation shall be incidental to the contract lump sum price for "Incidental Work, Grading".

**TABLE OF CONTROLLED DENSITY FILL FOR PIPE**

Station	Quantity (CuYd)
*454+11 – 78'R to 454+36 – 73' L	39.26
Total:	39.26

\* The quantity of Controlled Density Fill includes the quantity needed to fill the 48" existing manhole and also the remaining 36" RCP left in place under the roadway embankment.

**CONCRETE PIPE CONNECTIONS**

Pipe connections to existing pipes, manholes, junction boxes, and drop inlets shall be done by breaking a hole into the existing structure and inserting the pipe. A concrete collar shall then be poured around the pipe in the area of the connection.

When it is not possible to use a normal pipe joint (male-female ends), connections to existing pipe 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.

All costs for constructing the concrete collars including materials and labor shall be incidental to the contract unit price per foot for the corresponding pipe bid item.

**STORM SEWER**

Reinforced concrete pipe may be either bell and spigot or tongue and groove. The existing 18" and 30" RCP are likely tongue and groove. The pipe sections shall be adjoined such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Lift holes in the reinforced concrete pipe shall be plugged with grout.

Watertight joints are required for reinforced concrete pipe, drop inlets, manholes, and junction boxes where storm sewers run parallel to and within 10 feet horizontally from existing or proposed water mains.

Watertight joints are required where reinforced concrete pipes, drop inlets, manholes, or junction boxes cross water mains and are separated a distance of 18 inches or less, above or below, the water main.

If watertight joints are required then the watertight joints shall extend for a distance of 10 feet beyond the water main. This measurement shall be from the sealed concrete joint to the outer most surface of the water main.

Watertight joint seals shall conform to the following requirements:

- Reinforced Concrete Pipe (Circular):** Gasketed pipe shall conform to the requirements of ASTM C443. Non-gasketed concrete pipe shall be sealed with a mastic joint seal conforming to the requirements of ASTM C990 and encased with a minimum 2' wide by 6" thick M6 concrete collar reinforced with 6x6 W2.9 x W2.9 wire mesh.
- Reinforced Concrete Pipe (Arch):** Joints shall be sealed with a waterstop seal meeting the requirements of ASTM C990. Waterstop seals shall consist of hydrophilic compounds such as Waterstop-RX or ConSeal CS-231.

- Drop Inlets, Manholes, and Junction Boxes:** Joints shall be sealed with a waterstop seal or seal wrap meeting the requirements of ASTM C990 or encased with a minimum 2' wide by 6" thick M6 concrete collar reinforced with 6x6 W2.9 x W2.9 wire mesh. Waterstop seal shall contain hydrophilic compounds such as Waterstop-RX or ConSeal CS-231. Seal wrap shall be a self-adhesive external joint wrap such as ConWrap CS-217 or Mar Mac Seal Wrap.

Gaskets and seals (mastic, waterstop, and seal wraps) shall be installed in accordance with the manufacturer's recommendations.

The cost for furnishing and installing all gaskets, mastic joint seal, waterstop seal, seal wrap, concrete collars, and for plugging the lift holes shall be incidental to the contract unit price per foot for the corresponding pipe bid item.

**BORE AND JACK STEEL PIPE**

The Contractor shall install Steel Pipe by boring and jacking the pipe through the existing highway embankment. The pipe shall be installed by boring and jacking methods as specified herein unless an alternate plan is submitted in writing and approved by the Engineer.

As shown on the appropriate pipe cross section, some excavation of the existing roadway embankment is anticipated in order to reduce the length of the bore and jack installation.

Steel pipe for boring and jacking shall conform to the requirements of ASTM A139, Grade B. Pipe shall have a minimum wall thickness of 0.5 inches.

The exterior of the steel pipe shall be coated with a two component coal tar epoxy meeting the requirements of Sherwin-Williams Targuard or an approved equal, applied per the manufacturer's recommendations..

The pipe joints shall be welded by a certified welder in accordance with Section 410.3 D of the Specifications. After the welding has been completed, a two component coal tar epoxy meeting the requirements of Sherwin-Williams Targuard or an approved equal shall be applied in the field to cover the exposed area.

The jacking pit shall be constructed of sufficient size to accommodate equipment and workmen. The pit walls shall be sloped or shored to comply with all applicable State and Federal regulations. The Contractor shall be responsible for the design of the pit floor and jacking thrust restraint wall to carry the cyclic loads and thrust applied by the Contractor's operation. Water shall not be allowed to accumulate in the jacking pit. All components of the jacking pit shall be removed after installation of the pipe unless otherwise allowed by the Engineer.

The pipe shall be pushed into position from a jacking pit with hydraulic jacks while simultaneously excavating at the forward end of the pipe. Each pipe section shall be jacked from the jacking pit as the excavation at the boring head progresses so that the excavation is supported by the boring head or the pipe at all points.

Jacking thrust shall be applied to the pipe by means of a yoke or frame designed to distribute the thrust uniformly around the pipe joint. The thrust shall be applied to the pipe joint only in the location and only to the maximum force recommended by the pipe manufacturer. The pipe shall be jacked into place without visible damage to the pipe or joint.

**BORE AND JACK STEEL PIPE (CONTINUED)**

The boring head excavation shall be circular with a maximum diameter equal to the outside diameter of the jacking pipe plus 1 inch. The Contractor shall take whatever corrective action is necessary to prevent running, flowing, or squeezing ground conditions at the cutting face from causing large voids or significant loss of soil that may cause surface settlement.

The Contractor shall control the alignment and grade of the pipe installation to meet the following tolerances:

1. Maximum horizontal deviation from plan shown alignment shall be less than 0.15% of pipe length from the downstream end of pipe to the point of measurement.
2. Maximum vertical deviation from plan shown alignment shall be less than 0.075% of pipe length from the downstream end of pipe to the point of measurement.

All material excavated by the boring head for the pipe installation shall be disposed of by the Contractor. The excavated material from the boring pit shall be used as backfill for the pit and compacted into place to the satisfaction of the Engineer.

Steel pipe shall be installed horizontally though 140 +/- of embankment. The pipe will be placed through mainly a black clay/sand material. Large boulders are not anticipated to be encountered within the bore and jack envelope. Additional soil information can be obtained from the Sioux Falls Area Office.

Installation of the Steel Pipe to CMP transition coupling shall require the placement of a welded Stop to prevent the coupling from slipping off the steel pipe. The location and size will be determined in the field by the Engineer and installed by a certified welder. The Stop shall be coated with a coal tar epoxy. All costs, including labor and materials for the installation of the Stop shall be incidental to the contract unit price per foot for the corresponding steel pipe furnish bid item. Alternative methods of attachment may be allowed with the approval of the Engineer.

Payment for furnishing the pipe shall be incidental to the contract unit price per foot for the corresponding steel pipe furnish bid item.

All costs involved with boring and jacking the pipe including labor, equipment, welding and materials, including disposal of waste material, and all costs related to constructing and backfilling the jacking pit and excavating and backfilling the roadway embankment shall be incidental to the contract unit price per foot for the corresponding bore and jack pipe bid item.

**STEEL PIPE TO CMP TRANSITION**

A Steel Pipe to CMP Transition is required for the pipe installation. The length of the transitions is assumed to be six feet. The steel pipe used in the transition shall meet the same requirements, including pipe specifications, coal tar epoxy coating, and welding to adjoining steel pipe sections as the steel pipe used in the bore and jack installation.

The transition section fabricator shall submit two (2) copies of the shop plans to the Office of Bridge Design for review 15 days prior to fabrication. One reviewed copy will be sent back to the fabricator who will then make changes, if any, and then send the Office of Bridge Design seven (7) final approved copies for distribution.

All costs for the furnishing and installation of the transition shall be incidental to the contract unit price per each for "36" Pipe Transition Coupling".

**DROP INLETS**

The plan shown quantities of the drop inlet components such as Class M6 Concrete, Reinforcing Steel and Type C Frame and Grate will be the basis of payment for these items.

If additions or reductions to the number of drop inlets are ordered by the Engineer, payment for the components required to construct the drop inlets will be made at the contract unit prices for the components of the drop inlets.

**TABLE OF DROP INLETS AND QUANTITIES**

Station	L / R	Drop Inlet Size	Drop Inlet Type	Class M6 Concrete (CuYd)	Reinf. Steel (Lb)	Frame and Grate Type
454+36	L	3'x4'	C	1.17	161	C
Totals:				1.17	161	

Total Type C Frame and Grate 1

**TABLE OF JUNCTION BOXES AND QUANTITIES**

Station	L / R	Size L'xW'xH'	Frame and Lid (Type)	Class M6 Concrete (CuYd)	Reinforcing Steel (Lb)	** 48" Manhole Cone Section (Ft)
454+32.45	L	5'x5'x8.0'	A7	6.30	1132	3.3
Totals:				6.30	1132	3.3

Total Type A7 Manhole Frame and Lid 1

\*\* Eccentric

STATE OF SOUTH DAKOTA	PROJECT NH 0011(00)079	SHEET 6	TOTAL SHEETS 26
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Plotting Date: 08/13/2015

**TABLE OF RIPRAP AND DRAINAGE FABRIC**

Station	L/R	Class B Riprap (Ton)	Type B Drainage Fabric (SqYd)
453+97	R	22.6	42
Totals:		22.6	42

**TABLE OF FENCE QUANTITIES**

Station	L/R	Right-of-Way Fence Type 2	2 Post Panel	Remove Fence
453+94 to 454+28	R	33 (Ft)	2 (Each)	33 (Ft)

**BRACE PANELS FOR ROW FENCE**

The E-Z Brace or an approved equal may be utilized as an alternate horizontal brace in the brace panels if approved by the Engineer. The E-Z Brace shall be attached to each wood post utilizing two 5/16" x 3" lag screws. Holes of appropriate diameter, based on wood post condition, shall be drilled before placement of lag screws. The following are contacts regarding the E-Z Brace:

Roger Papka  
E-Z Brace  
1160 Karen St.  
Watertown, SD 57201  
605-881-6142

Dennis Mack  
E-Z Brace  
108 18<sup>th</sup> St. NE  
Watertown, SD 57201  
605-881-4990

Plot Scale - 1:200

Plotted From - trs12145

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# PIPE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT NH 0011(00)079	SHEET 7	TOTAL SHEETS 26
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Plotting Date: 08/13/2015

Plot Scale - 1:200

Plotted From - trsf12145

Station	Offset (L/R)	Reinforced Concrete			Steel				Corrugated Metal					Pipe Transition																									
		Circular			Circular				Circular	Circular Flared End		Circular Elbow			Steel to CMP Transition Coupling																								
		18" Cl. 2  Ft	30" Cl. 2  Ft	36" Cl. 2  Ft	36"   Ft					36" 16 Ga  Ft	18"   Each	36"   Each	36"   Each	20°   Each	36"   Each																								
453+90.84 - 153.10' R											1																												
453+97.28 - 151.10' R to 454+09.27 - 85.75' R									62			1		2																									
454+09.27 - 85.75' R to 454+32.45 - 60.64' L					140																																		
454+29.06 - 78.79' L to 454+36.00 - 72.88' L		8																																					
454+32.45 - 60.64' L to 454+36.00 - 72.88' L				10																																			
454+32.45 - 60.64' L to 454+42.22 - 58.09' L		8																																					
454+32.45 - 60.64' L to 454+42.35 - 58.67' L			8																																				
454+36.00 - 72.88' L to 454+40.61 - 80.42' L			8																																				
<b>Total:</b>		16	16	10	140				62		1	1		2																									

File - ...Minn05.L\PipeQuantities.dgn

# HORIZONTAL ALIGNMENT & CONTROL DATA

STATE OF SOUTH DAKOTA	PROJECT NH 0011(00)079	SHEET 8	TOTAL SHEETS 26
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Plotting Date: 08/13/2015

## MAINLINE

Type	Station			Northing	Easting
PC	450+87.46			479527.575	2964015.650
PI	454+41.12	R = 1432.39	Delta = 27°44'18" R	479838.725	2964183.765
PT	457+80.91			480035.872	2964477.380

HORIZONTAL AND VERTICAL CONTROL POINTS				
POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION
CP1	Duranail & Washer Stamped "SDDOT CONTROL PT" – West Edge of Concrete Shoulder of Hwy 11 – Approx 50' South of Aspen Blvd	479379.167	2963906.557	1353.75
CP2	Duranail & Washer Stamped "SDDOT CONTROL PT" – West Curb of Hwy 11 – Approx 30' North of Aspen Blvd Intersection	479530.061	2963984.757	1350.41
CP3	Duranail & Washer Stamped "SDDOT CONTROL PT" – Top of Curb in Island in SE Quadrant of Fleetwood Circle & Splitrock Blvd	480183.164	2964618.117	1357.48

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. South Zone (NAD 83/2011); epoch 2010.00; Geoid 12A; SF = 0.999845882

Plot Scale - 1:200

Plotted From - trs112145

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# EXISTING TOPOGRAPHY SYMBOLOGY AND LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0011(00)079	9	26

Plotting Date: 08/13/2015

Plot Scale - 1:200

Plotted From - trs12145

Anchor		Hedge		Shrub Tree	
Antenna		Highway R.O.W. Marker		Sidewalk	
Approach		Interstate Close Gate		Sign Face	
Assumed Corner		Iron Pin		Sign Post	
Azimuth Marker		Irrigation Ditch		Slough Or Marsh	
BBQ Grill/ Fireplace		Lake Edge		Spring	
Bearing Tree		Lawn Sprinkler		Stream Gauge	
Bench Mark		Mailbox		Street Marker	
Box Culvert		Manhole Electric		Subsurface Utility Exploration Test Hole	
Bridge		Manhole Gas		Telephone Fiber Optics	
Brush		Manhole Misc		Telephone Junction Box	
Buildings		Manhole Sanitary Sewer		Telephone Pole	
Bulk Tank		Manhole Storm Sewer		Television Cable Jct Box	
Cattle Guard		Manhole Telephone		Television Tower	
Cemetery		Manhole Water		Test Wells/Bore Holes	
Centerline		Merry-Go-Round		Traffic Signal	
Cistern		Microwave Radio Tower		Trash Barrel	
Clothes Line		Misc. Line		Tree Belt	
Commercial Sign Double Face		Misc. Property Corner		Tree Coniferous	
Commercial Sign One Post		Misc. Post		Tree Deciduous	
Commercial Sign Overhead		Overhang Or Encroachment		Tree Stumps	
Commercial Sign Two Post		Overhead Utility Line		Triangulation Station	
Concrete Symbol		Parking Meter		Underground Electric Line	
Creek Edge		Pipe With End Section		Underground Gas Line	
Curb/Gutter		Pipe With Headwall		Underground High Pressure Gas Line	
Curb		Pipe Without End Section		Underground Sanitary Sewer	
Dam Grade/Dike/Levee		Playground Slide		Underground Storm Sewer	
Deck Edge		Playground Swing		Underground Tank	
Ditch Block		Power And Light Pole		Underground Telephone Line	
Doorway Threshold		Power And Telephone Pole		Underground Television Cable	
Drainage Profile		Power Meter		Underground Water Line	
Drop Inlet		Power Pole		Warning Sign One Post	
Edge Of Asphalt		Power Pole And Transformer		Warning Sign Two Post	
Edge Of Concrete		Power Tower Structure		Water Fountain	
Edge Of Gravel		Propane Tank		Water Hydrant	
Edge Of Other		Property Pipe		Water Hydrant	
Edge Of Shoulder		Property Pipe With Cap		Water Meter	
Elec. Trans./Power Jct. Box		Property Stone		Water Tower	
Fence Barbwire		Public Telephone		Water Valve	
Fence Chainlink		Railroad Crossing Signal		Water Well	
Fence Electric		Railroad Milepost Marker		Weir Rock	
Fence Misc.		Railroad Profile		Windmill	
Fence Rock		Railroad R.O.W. Marker		Wingwall	
Fence Snow		Railroad Signs		Witness Corner	
Fence Wood		Railroad Switch			
Fence Woven		Railroad Track		State and National Line	
Fire Hydrant		Railroad Trestle		County Line	
Flag Pole		Rebar		Section Line	
Flower Bed		Rebar With Cap		Quarter Line	
Gas Valve Or Meter		Reference Mark		Sixteenth Line	
Gas Pump Island		Regulatory Sign One Post		Property Line	
Grain Bin		Regulatory Sign Two Post		Construction Line	
Guardrail		Retaining Wall		R. O. W. Line	
Guide Sign One Post		Riprap		New R. O. W. Line	
Guide Sign Two Post		River Edge		Cut and Fill Limits	
Gutter		Rock And Wire Baskets		Control of Access	
Guy Pole		Rockpiles		New Control of Access	
Haystack		Satellite Dish		Proposed ROW (After Property Disposal)	
		Septic Tank			

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0011(00)079	10	26

Plotting Date: 08/13/2015

Kevin W & Amy D Lawrence  
(Ex H-1) Lot 14A & Ely 20' Lot 13A Blk 8  
Fleetwood Addition to City of Brandon

# FLEETWOOD ADDITION

Robert L & Connie Vandenoever  
(Ex H-1 & Ex Lot A) Lot 7C Blk 7  
Fleetwood Addition to City of Brandon  
Parcel A1

BLOCK 7

Lot 7C

Parcel A1  
453+85.88 to 454+85.00 L  
Temporary Easement containing  
(6675 sq ft), more or less

Lot 14A

Soil Sample 1

Lot 6C

Present SD Hwy 11

S. Split Rock Boulevard

452+00

453+00

454+00

455+00

456+00

457+00

457+81

Soil Sample 2

453+75 to 454+15  
Install 100 Ft High Flow Silt Fence  
for perimeter protection

PI 454+41.12  
N 479838.73  
E 2964183.76  
Del 27°44'18"R  
Dc 4°00'00"  
T 353.66'  
L 693.45'  
R 1432.39'

Terry P Froseth  
SE 1/4 SE 1/4 South of RY (Ex H-1 & 2  
& TR 2 & Fleetwood Addition) Sec 34 T 102N  
R 48W Brandon City Unplatted

Tract 2

Lot H1

453+90 to 454+84  
Install 832 SqYd Type 1 Erosion Control Blanket  
on Highway Inslope 24' Wide as Directed by The Engineer

Note: All ROW Information is Assumed and  
Was Not Drawn Based on Land Ties

33'  
33'  
Section Line

33'  
33'  
Section Line

Plot Scale - 1:40

Plotted From - Irs112145

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Plotting Date: 08/13/2015

453+79 - 22' R to 453+91 - 153' R  
Retain 18" CMP & Drop Inlet

454+08 - 152' R to 455+01 - 22' R  
Retain 18" CMP, Flared End & Drop Inlet

454+36 - 73' L to 454+11 - 78' R  
Retain Existing Manhole Below New Junction Box  
and 36" RCP filled with Flowable Fill

454+36 - 73' L to 458+91 - 13' L  
Retain 30" RCP  
(Between New Junction Box and Existing Manhole)

454+36 - 73' L to 457+90 - 22' L  
Retain 18" RCP  
(Between New Junction Box and Existing Drop Inlet)

453+91 - 153' R  
Take Out 18" CMP Flared End  
(Incidental Work, Grading)

453+99 - 152' R to 454+11 - 78' R  
Take Out 36" - 48' RCP and Bends  
(Incidental Work, Grading)

454+19 - 89' L to 454+29 - 79' L  
Remove for Reset 18" - 16' RCP

454+29 - 79' L to 454+36 - 73' L  
Take Out 18" - 8' RCP  
(Incidental Work, Grading)

454+32 - 61' L  
Remove Round Manhole  
(See General Notes)

454+34 - 60' L to 454+42 - 58' L  
Take Out 18" - 8' RCP  
(Incidental Work, Grading)

Kevin W & Amy D Lawrence  
(Ex H-1) Lot 14A & Ely 20' Lot 13A Blk 8  
Fleetwood Addition to City of Brandon

454+34 - 60' L to 454+42 - 59' L  
Take Out 30" - 8' RCP  
(Incidental Work, Grading)

454+36 - 73' L  
Remove Drop Inlet  
with Frame and Grate

454+36 - 73' L to 454+41 - 80' L  
Take Out 30" - 8' RCP  
(Incidental Work, Grading)

454+41 - 80' L to 454+51 - 95' L  
Remove for Reset 30" - 18' RCP

453+90.84 - 153.10' R  
Install 18" CMP Flared End

453+97.28-151.10' R to 454+09.27-85.75' R  
Install 36" - 62" CMP Downspout  
(4', 42' & 16' Str Pipe)  
and 2 - 36" CMP Elbows (20°)  
and 1 - 36" Steel to CMP Transition Coupling  
and 1 Flared End  
(Between Outlet & Bored & Jacked Pipe)

454+09.27-85.75' R to 454+32.45-60.64' L  
Bore & Jack 36" - 140' Steel Pipe  
(Between Elbow & Junction Box)

454+19.04-89.23' L to 454+29.06-78.79' L  
Reset 18" - 16' RCP  
(Between Existing Pipe & Installed Pipe)

454+29.06-78.79' L to 454+36.00-72.88' L  
Install 18" - 8' RCP  
(Between Reset Pipe & Type C Drop Inlet)

454+32.45- 60.64' L to 454+36.00 - 72.88' L  
Install 36" - 10' RCP  
(Between Junction Box & Type C Drop Inlet)

454+32.45-60.64' L to 454+42.22-58.09' L  
Install 18" - 8' RCP  
(Between Junction Box & Existing Pipe)

454+36.00 - 72.88' L  
Install 3'x4' Type C Drop Inlet  
and Type C Frame & Grate

454+32.45 - 60.64' L  
Install 5'x5' Junction Box  
and Type A7 Manhole Frame & Lid  
with 36" Eccentric Cone

453+97.28-151.10' R  
Install Class B Riprap - 22.6 Tons  
& Type B Drainage Fabric - 42 SY  
(Approximately 2' in Depth)

PI 454+41.12  
N 479838.73  
E 2964183.76  
Del 27°44'18"R  
Dc 4°00'00"  
T 353.66'  
L 693.45'  
R 1432.39'

454+32.45-60.64' L to 454+42.35-58.67' L  
Install 30" - 8' RCP  
(Between Junction Box & Existing Pipe)

454+36.00- 72.88' L to 454+40.61-80.42' L  
Install 30" - 8' RCP  
(Between Type C Drop Inlet & Reset Pipe)

454+36.46- 74.30' L to 454+50.67-95.49' L  
Reset 30" - 20' RCP  
(Between Installed Pipe & Existing Pipe)

Terry P Froseth  
SE 1/4 SE 1/4 South of RY (Ex H-1 & 2  
& TR 2 & Fleetwood Addition) Sec 34 T 102N  
R 48W Brandon City Unplatted

Parcel A1  
453+85.88 to 454+85.00 L  
Temporary Easement containing  
(6675 sq ft), more or less

Note: All ROW Information is Assumed and  
Was Not Drawn Based on Land Ties

Plot Scale - 1"=40'

Plotted From - Irs12/145

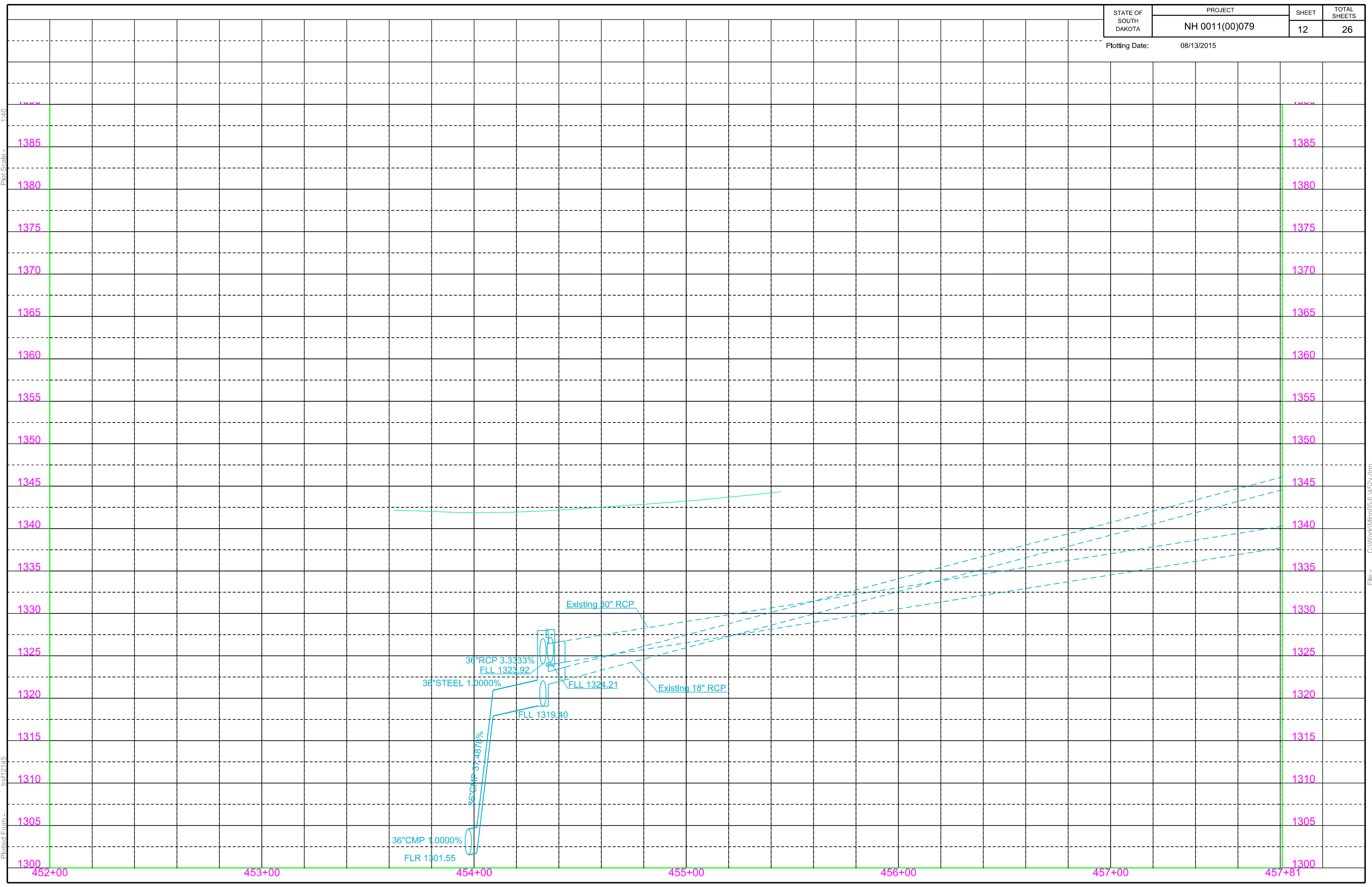
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Plotting Date: 08/13/2015

Plot Scale - 1:40

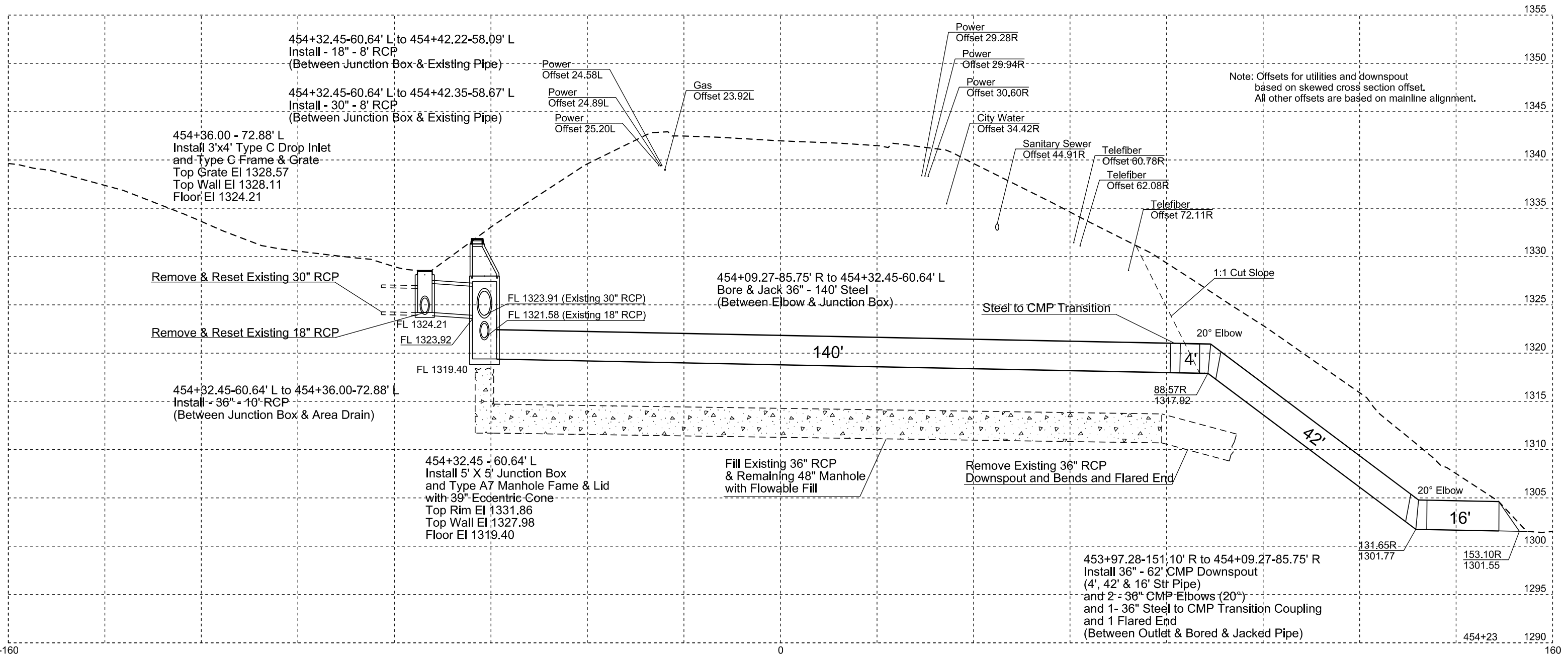
Plotted From - Irs12/145

File - C:\Work\Minm05JL1452v.dgn



# Proposed Pipe

## (Cross Section Skewed 22°14'13" LHF)



454+32.45-60.64' L to 454+42.22-58.09' L  
Install - 18" - 8' RCP  
(Between Junction Box & Existing Pipe)

454+32.45-60.64' L to 454+42.35-58.67' L  
Install - 30" - 8' RCP  
(Between Junction Box & Existing Pipe)

454+36.00 - 72.88' L  
Install 3'x4' Type C Drop Inlet  
and Type C Frame & Grate  
Top Grate EI 1328.57  
Top Wall EI 1328.11  
Floor EI 1324.21

Remove & Reset Existing 30" RCP

Remove & Reset Existing 18" RCP

454+32.45-60.64' L to 454+36.00-72.88' L  
Install - 36" - 10' RCP  
(Between Junction Box & Area Drain)

454+32.45 - 60.64' L  
Install 5' X 5' Junction Box  
and Type A7 Manhole Fame & Lid  
with 39" Eccentric Cone  
Top Rim EI 1331.86  
Top Wall EI 1327.98  
Floor EI 1319.40

454+09.27-85.75' R to 454+32.45-60.64' L  
Bore & Jack 36" - 140' Steel  
(Between Elbow & Junction Box)

Fill Existing 36" RCP  
& Remaining 48" Manhole  
with Flowable Fill

Remove Existing 36" RCP  
Downspout and Bends and Flared End

453+97.28-151; 10' R to 454+09.27-85.75' R  
Install 36" - 62' CMP Downspout  
(4', 42' & 16' Str Pipe)  
and 2 - 36" CMP Elbows (20°)  
and 1- 36" Steel to CMP Transition Coupling  
and 1 Flared End  
(Between Outlet & Bored & Jacked Pipe)

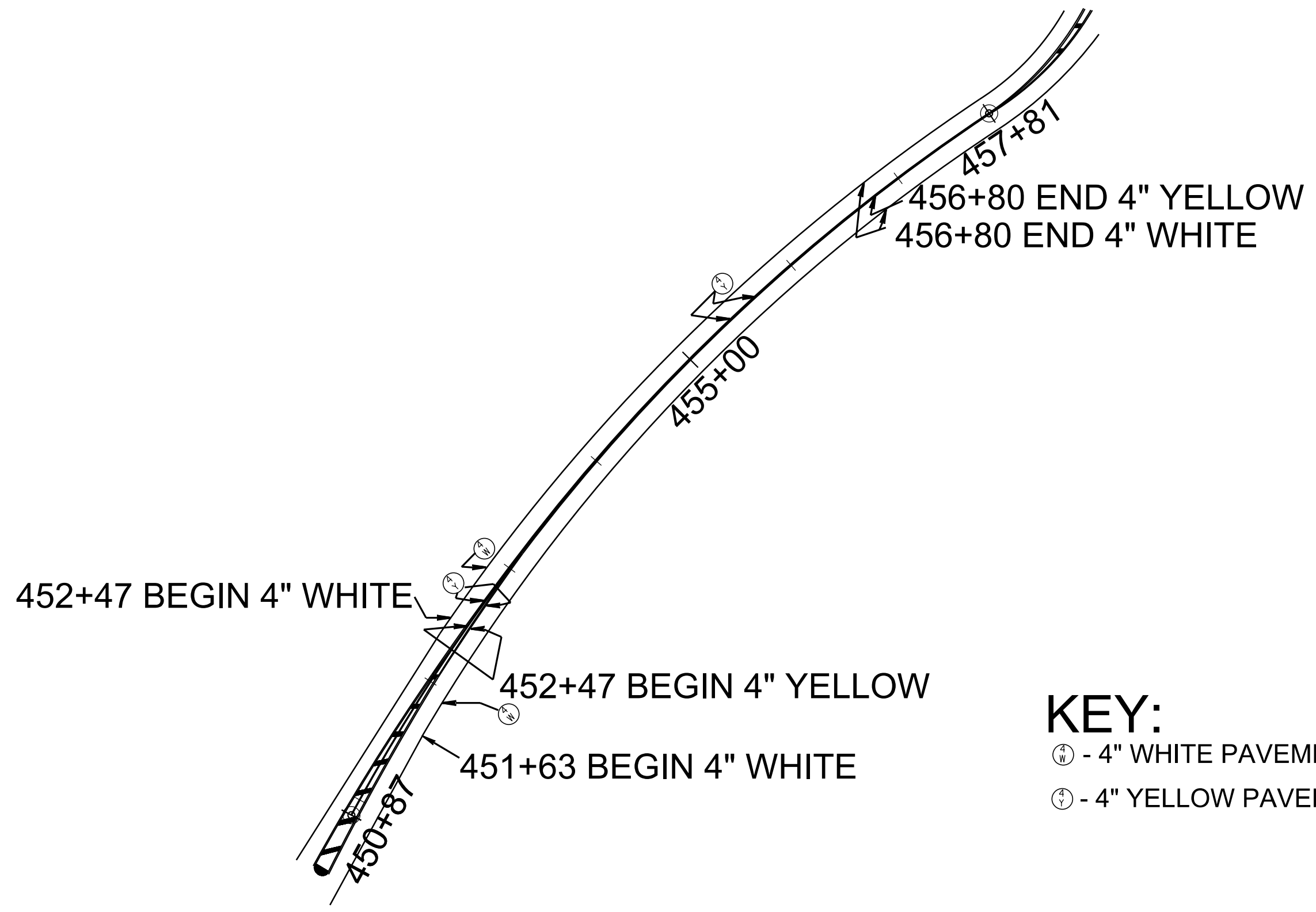
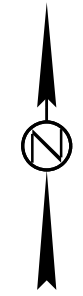
Note: Offsets for utilities and downspout  
based on skewed cross section offset.  
All other offsets are based on mainline alignment.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0011(00)079	14	26

Plotting Date: 08/13/2015

# PAVEMENT MARKING

Plot Scale - 1:80



## KEY:

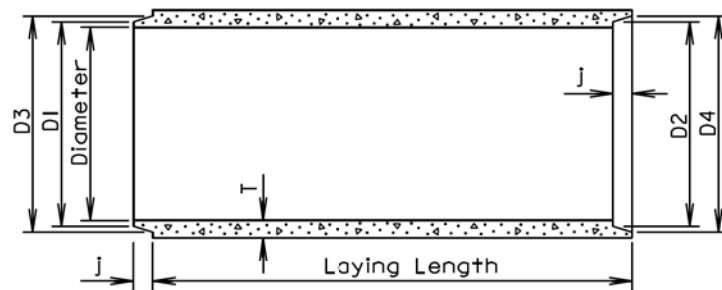
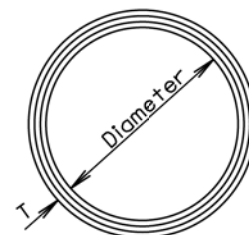
- Ⓞ<sup>4</sup><sub>W</sub> - 4" WHITE PAVEMENT MARKING TAPE
- Ⓞ<sup>4</sup><sub>Y</sub> - 4" YELLOW PAVEMENT MARKING TAPE

Plotted From - trsf12145

File - C:\Work\Minm05JL\signs.dgn

**TOLERANCES IN DIMENSIONS**

Diameter:  $\pm 1.5\%$  for 24" Dia. or less and  $\pm 1\%$  or  $\frac{3}{8}$ " whichever is more for 27" Dia. or greater.  
 Diameters at joints:  $\pm \frac{3}{16}$ " for 30" Dia. or less and  $\pm \frac{1}{4}$ " for 36" or greater.  
 Length of joint (j):  $\pm \frac{1}{4}$ ".  
 Wall thickness (T): not less than design T by more than 5% or  $\frac{3}{16}$ ", whichever is greater.  
 Laying length: shall not underrun by more than  $\frac{1}{2}$ ".


**LONGITUDINAL SECTION**

**END VIEW**
**GENERAL NOTES:**

Construction of R.C.P. shall conform to the requirements of Section 990 of the Specifications.

Not more than 2 four-foot sections shall be permitted near the ends of any culvert. Four-foot lengths shall be used only to secure the required length of culvert.

Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 3/8	14 1/4
15	127	2 1/4	2	16 1/2	16 3/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 1/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 3/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 1/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 3/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

June 26, 2015

<b>S D D O T</b>	<b>REINFORCED CONCRETE PIPE</b>	PLATE NUMBER 450.01
	Published Date: 3rd Qtr. 2015	Sheet 1 of 1

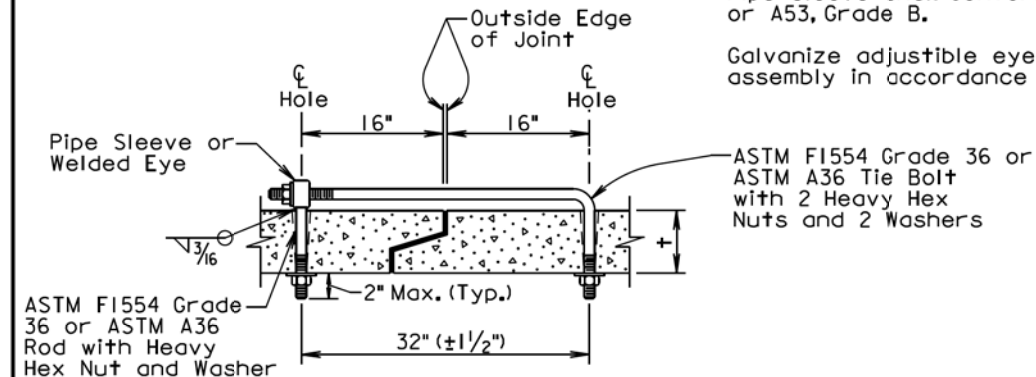
Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
$\leq \frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$
$\frac{3}{2}$ - $6\frac{1}{2}$	$\frac{3}{4}$	1
$\geq 7$	1	$1\frac{1}{4}$

**GENERAL NOTES:**

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustable eye bolt tie assembly in accordance with ASTM A153.


**ADJUSTABLE EYE BOLT TIE**

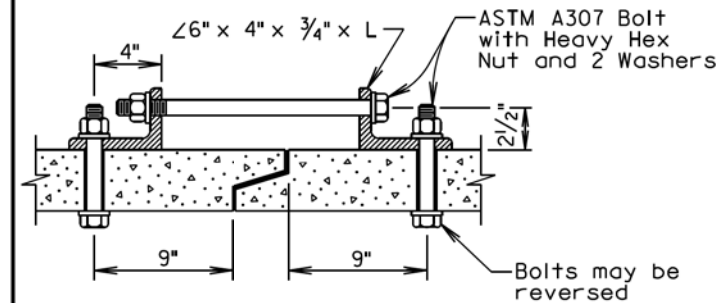
Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
$\leq 48$	4	$\frac{3}{4}$
$> 48$	6	1

**GENERAL NOTES:**

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

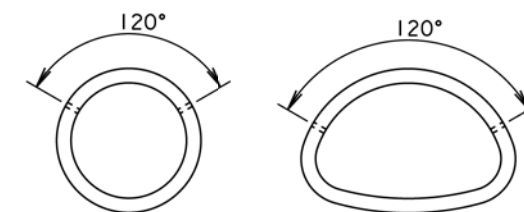
Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.


**ANGLE AND BOLT TIE**
**GENERAL NOTES:**

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

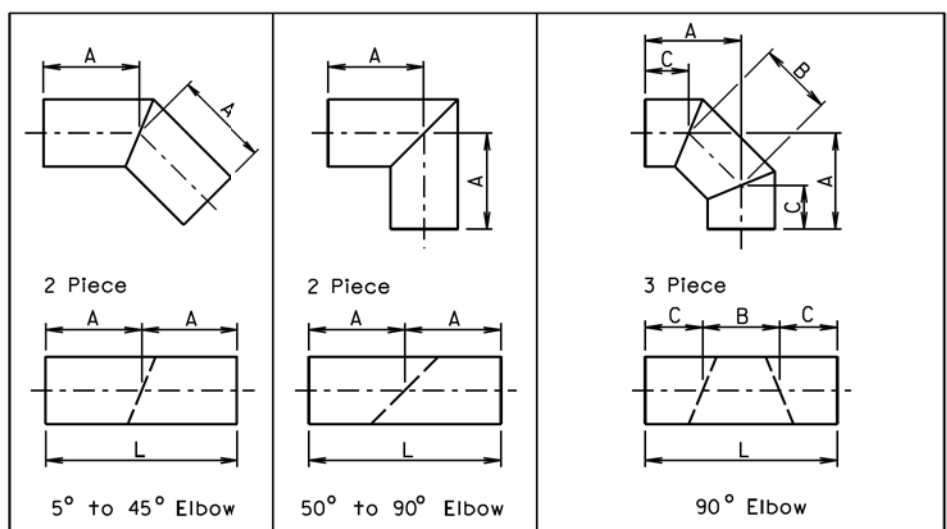
All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.


**END VIEW "CIRCULAR"**
**END VIEW "ARCH"**

February 28, 2013

<b>S D D O T</b>	<b>TIE BOLTS FOR R.C.P. AND R.C.P. ARCH</b>	PLATE NUMBER 450.18
	Published Date: 3rd Qtr. 2015	Sheet 1 of 1



Diameter	A	L	Diameter	A	L	Diameter	A	B	C	L
Inches	Feet	Feet	Inches	Feet	Feet	Inches	Inches			Feet
12	1	2	12	2	4	12	25 1/2	11	18 1/2	4
15	1	2	15	2	4	15	26 1/2	12	18	4
18	1	2	18	2	4	18	27	14	17	4
21	2	4	21	2	4	21	27	15	16 1/2	4
24	2	4	24	2	4	24	27 1/2	16	16	4
27	2	4	27	2	4	27	27 1/2	17	15 1/2	4
30	2	4	30	3	6	30	40	19	26 1/2	6
33	2	4	33	3	6	33	40	20	26	6
36	2	4	36	3	6	36	40 1/2	21	25 1/2	6
42	2	4	42	3	6	42	41	23	24 1/2	6
48	2	4	48	4	8	48	53 1/2	26	35	8
54	3	6	54	4	8	54	54	28	34	8
60	3	6	60	4	8	60	54 1/2	31	32 1/2	8
66	3	6	66	4	8	66	54	33	31 1/2	8
72	3	6	72	5	10	72	67 1/2	36	42	10
78	3	6	78	5	10	78	68	39	40 1/2	10
84	3	6	84	5	10	84	68 1/2	41	39 1/2	10
90	3	6	90	6	12	90	70	46	37	10
96	3	6	96	6	12	96	82	46	49	12

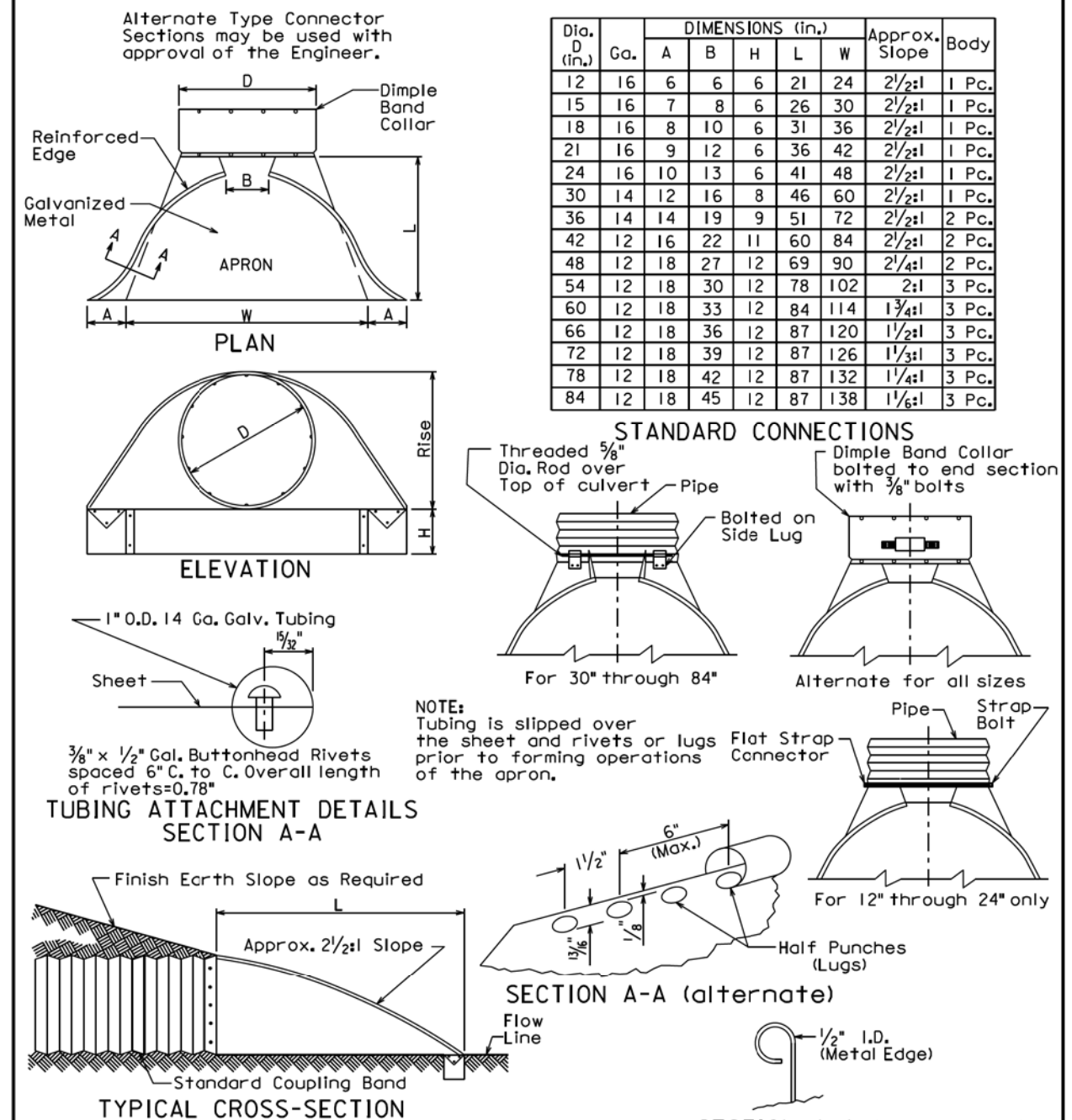
FABRICATED ELBOW LENGTHS FOR ALL CORRUGATIONS

**GENERAL NOTES:**  
 All dimensions shown are nominal.  
 L = Linear Feet of C.M.P. required to fabricate fitting.

June 26, 2001

<b>S D D O T</b>	<b>C.M.P. FABRICATED LENGTHS FOR ELBOWS</b>	PLATE NUMBER <b>450.32</b>
		Sheet 1 of 1

Published Date: 3rd Qtr. 2015



Dia. D (in.)	Ga.	DIMENSIONS (in.)					Approx. Slope	Body
		A	B	H	L	W		
12	16	6	6	6	21	24	2 1/2:1	1 Pc.
15	16	7	8	6	26	30	2 1/2:1	1 Pc.
18	16	8	10	6	31	36	2 1/2:1	1 Pc.
21	16	9	12	6	36	42	2 1/2:1	1 Pc.
24	16	10	13	6	41	48	2 1/2:1	1 Pc.
30	14	12	16	8	46	60	2 1/2:1	1 Pc.
36	14	14	19	9	51	72	2 1/2:1	2 Pc.
42	12	16	22	11	60	84	2 1/2:1	2 Pc.
48	12	18	27	12	69	90	2 1/4:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1 3/4:1	3 Pc.
66	12	18	36	12	87	120	1 1/2:1	3 Pc.
72	12	18	39	12	87	126	1 1/3:1	3 Pc.
78	12	18	42	12	87	132	1 1/4:1	3 Pc.
84	12	18	45	12	87	138	1 1/6:1	3 Pc.

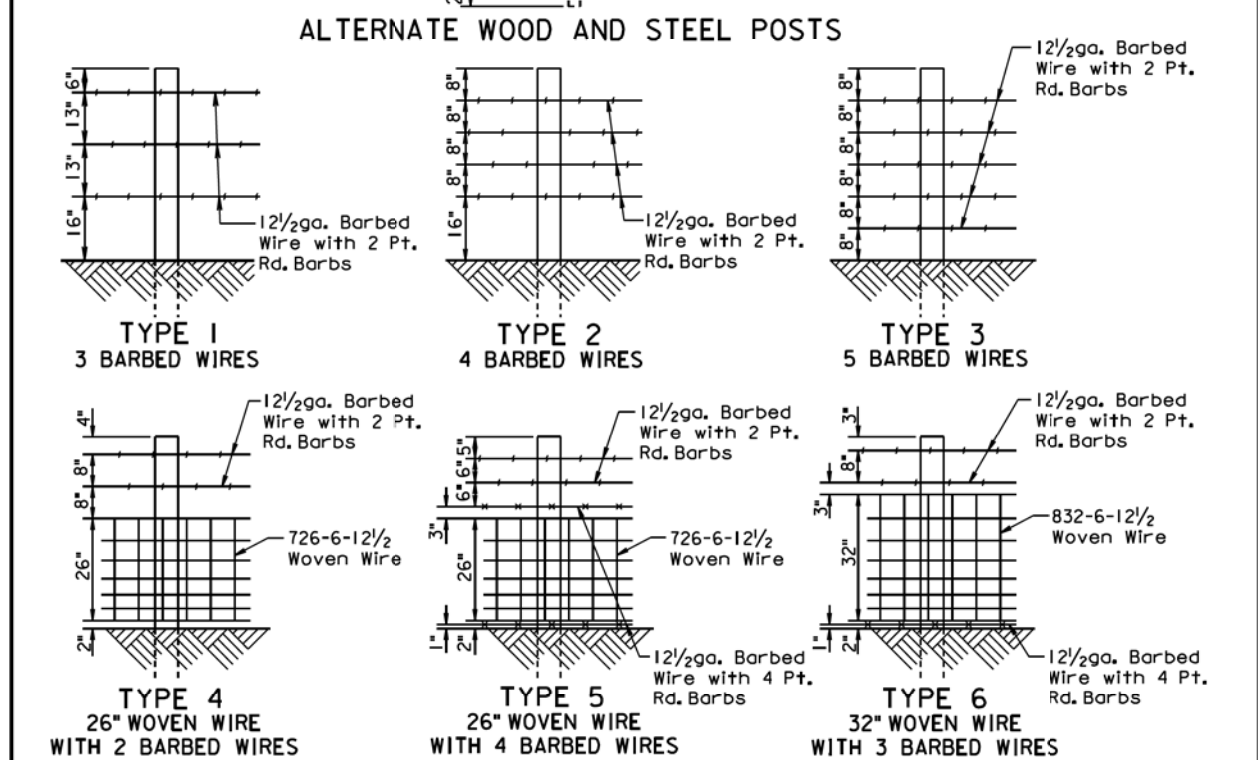
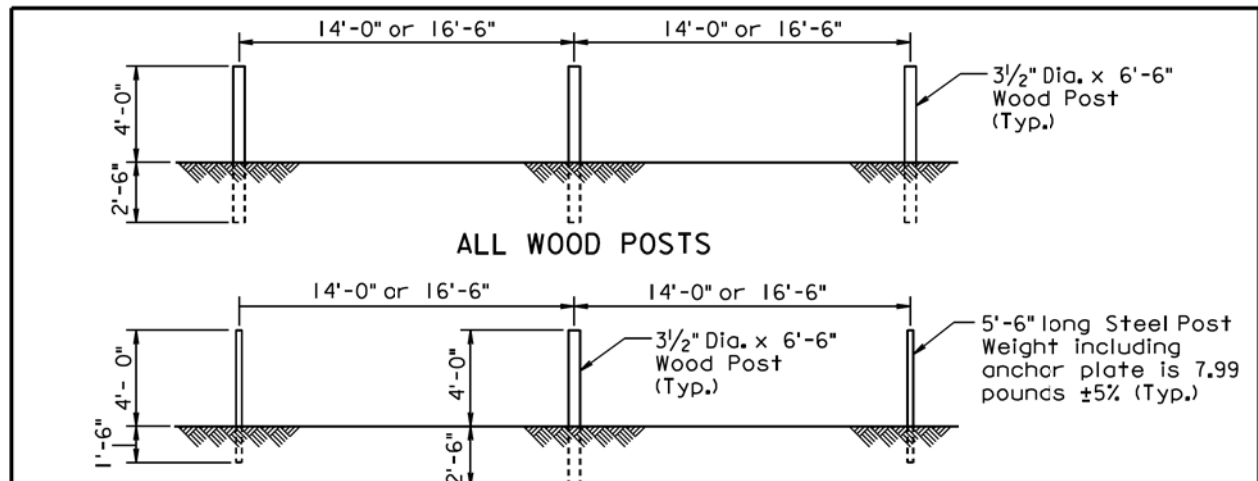
**GENERAL NOTES:**  
 All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by 3/8" Dia. galvanized rivets or bolts.  
 For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x 1/4" for 60" through 72" diameters and 2 1/2" x 2 1/2" x 1/4" for 78" and 84" diameters. The angles shall be attached by 3/8" diameter galvanized nuts and bolts.  
 Rivets and Bolts shall be 3/8" Dia. Min. for 10 Ga. and 12 Ga. sheet, and 5/16" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

March 31, 2000

<b>S D D O T</b>	<b>C.M.P. FLARED ENDS</b>	PLATE NUMBER <b>450.35</b>
		Sheet 1 of 1

Published Date: 3rd Qtr. 2015

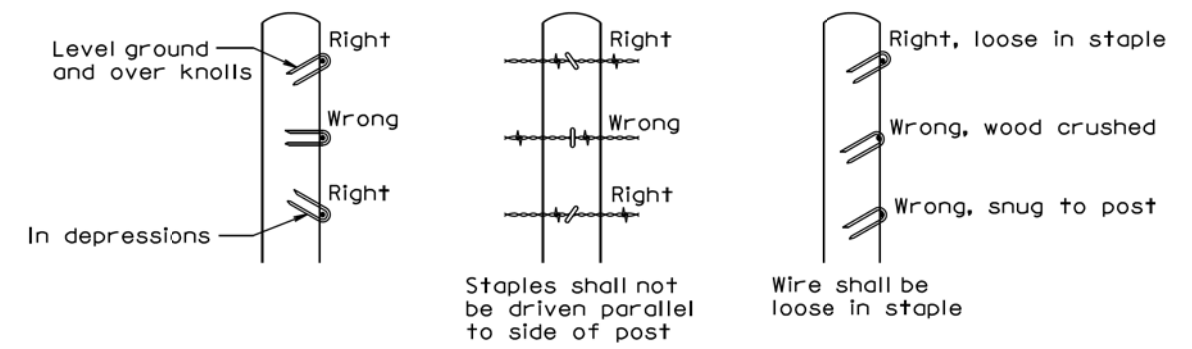




TYPE	DESCRIPTION	LINE POST SPACING	BARBED WIRE		WOVEN WIRE
			WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.
1	3 Barbed Wires	16'-6"	12/2	2 Point Round	---
2	4 Barbed Wires	16'-6"	12/2	2 Point Round	---
3	5 Barbed Wires	16'-6"	12/2	2 Point Round	---
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12/2	2 Point Round	726-6-12 1/2
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12/2	2 wires with 2 Pt. Rd., 2 wires with 4 Pt. Rd.	726-6-12 1/2
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12/2	2 wires with 2 Pt. Rd., 1 wire with 4 Pt. Rd.	832-6-12 1/2

**GENERAL NOTES:**  
 Fence types designated on the plans that are followed by the letter S shall have smooth (barbless) wires.  
 When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.  
 All degrees of curvature stated for fence are at centerline of roadway.  
 September 14, 2009

<b>S D D O T</b>	<b>RIGHT-OF-WAY FENCE</b>	PLATE NUMBER <b>620.01</b>
	Published Date: 3rd Qtr. 2015	Sheet 1 of 1

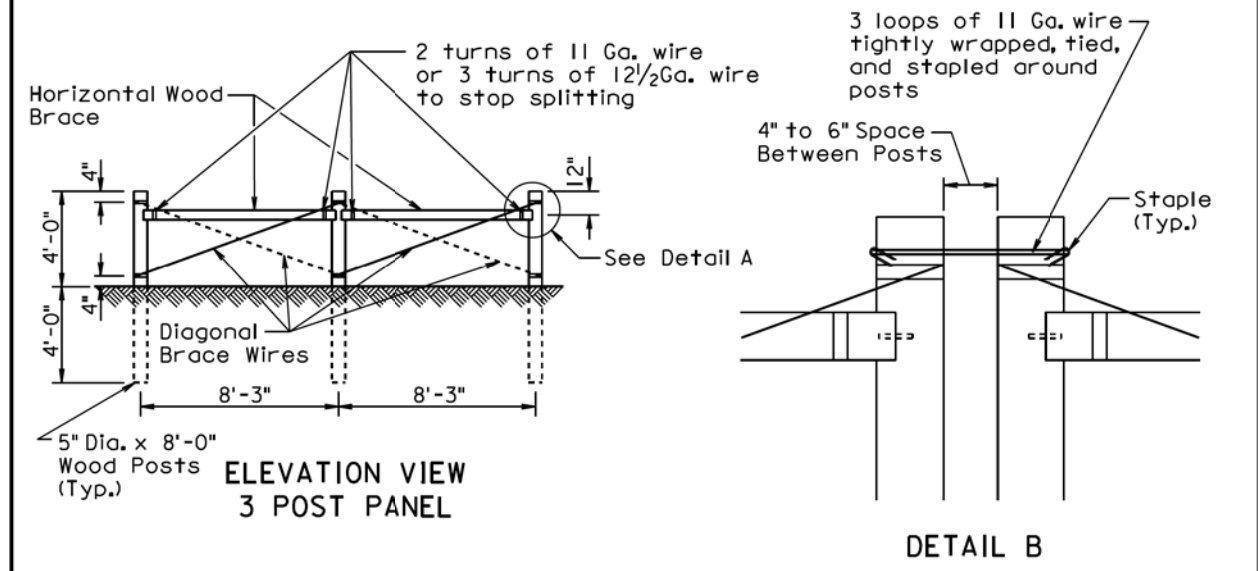
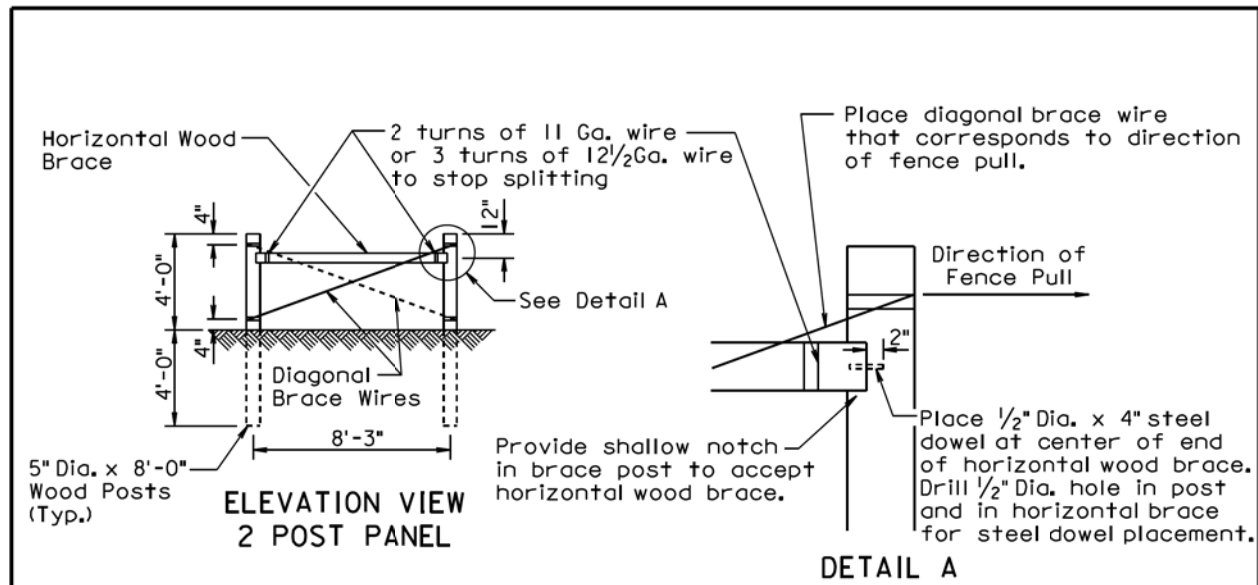


**STAPLE INSTALLATION**

**GENERAL NOTES:**  
 The Right-of-Way fence shall consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire shall be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts shall be used for brace panels. Gates shall be of the type designated in the plans or as otherwise directed by the Engineer. Fence shall be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.  
 Right-of-Way fence on Interstate Projects shall be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.  
 Right-of-Way fence other than on Interstate Projects shall be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.  
 Barbs shall be fabricated from zinc coated 14 ga. wire. Two point barbs shall be wrapped twice around one main strand at 4" spacings and the four point barbs shall be interlocked and wrapped around both main strands at 5" spacings.  
 The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts shall be as stated in AASHTO M281. Woven wire shall conform to design and specifications of ASTM A116 and barbed wire shall conform to ASTM A121.

<b>S D D O T</b>	<b>STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES</b>	PLATE NUMBER <b>620.02</b>
	Published Date: 3rd Qtr. 2015	Sheet 1 of 1

December 23, 2004



**GENERAL NOTES:**

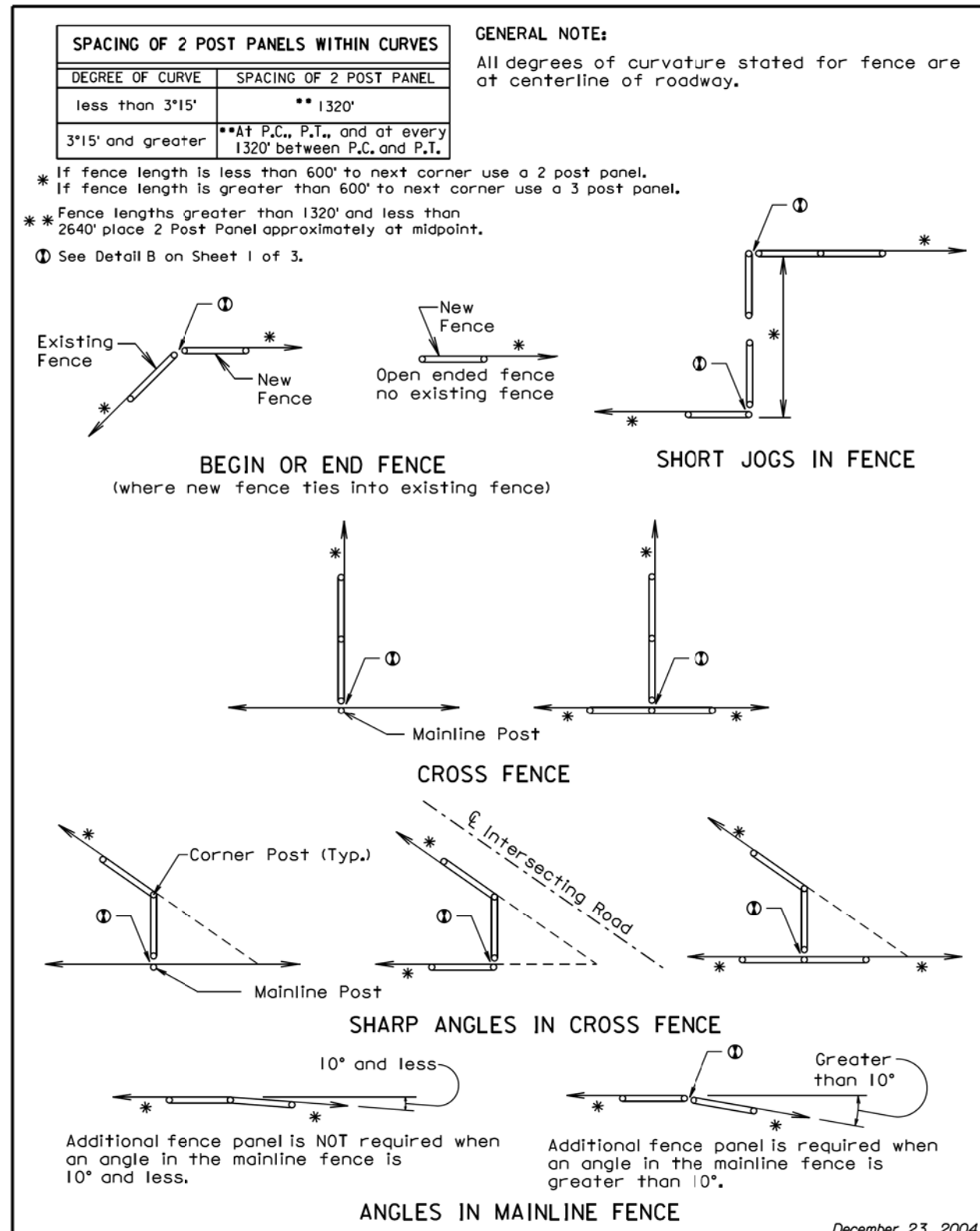
Two Post Panels shall be installed at least every 1320' between corners.

Two Post Panels shall be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces shall consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires shall be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires shall be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

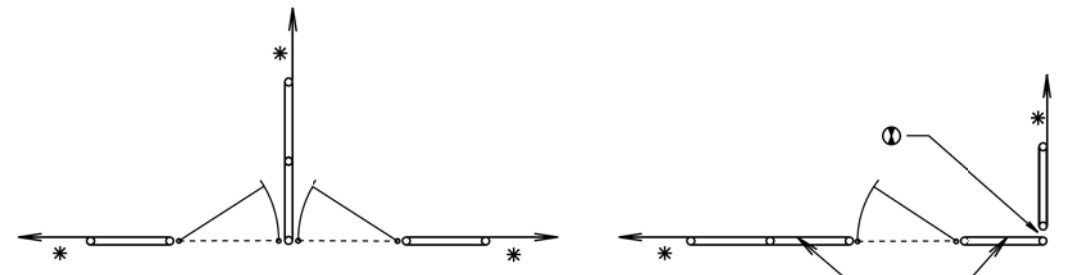
December 23, 2004



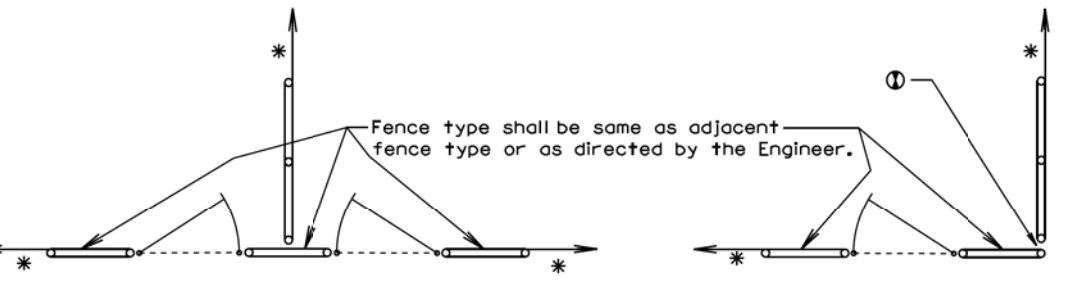
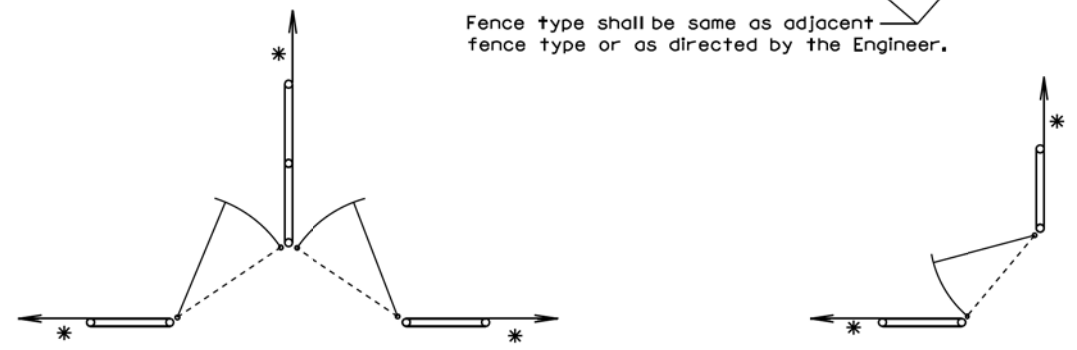
December 23, 2004



ENTRANCE  
(NOT ON CORNER)



Fence type shall be same as adjacent  
fence type or as directed by the Engineer.



DOUBLE ENTRANCES

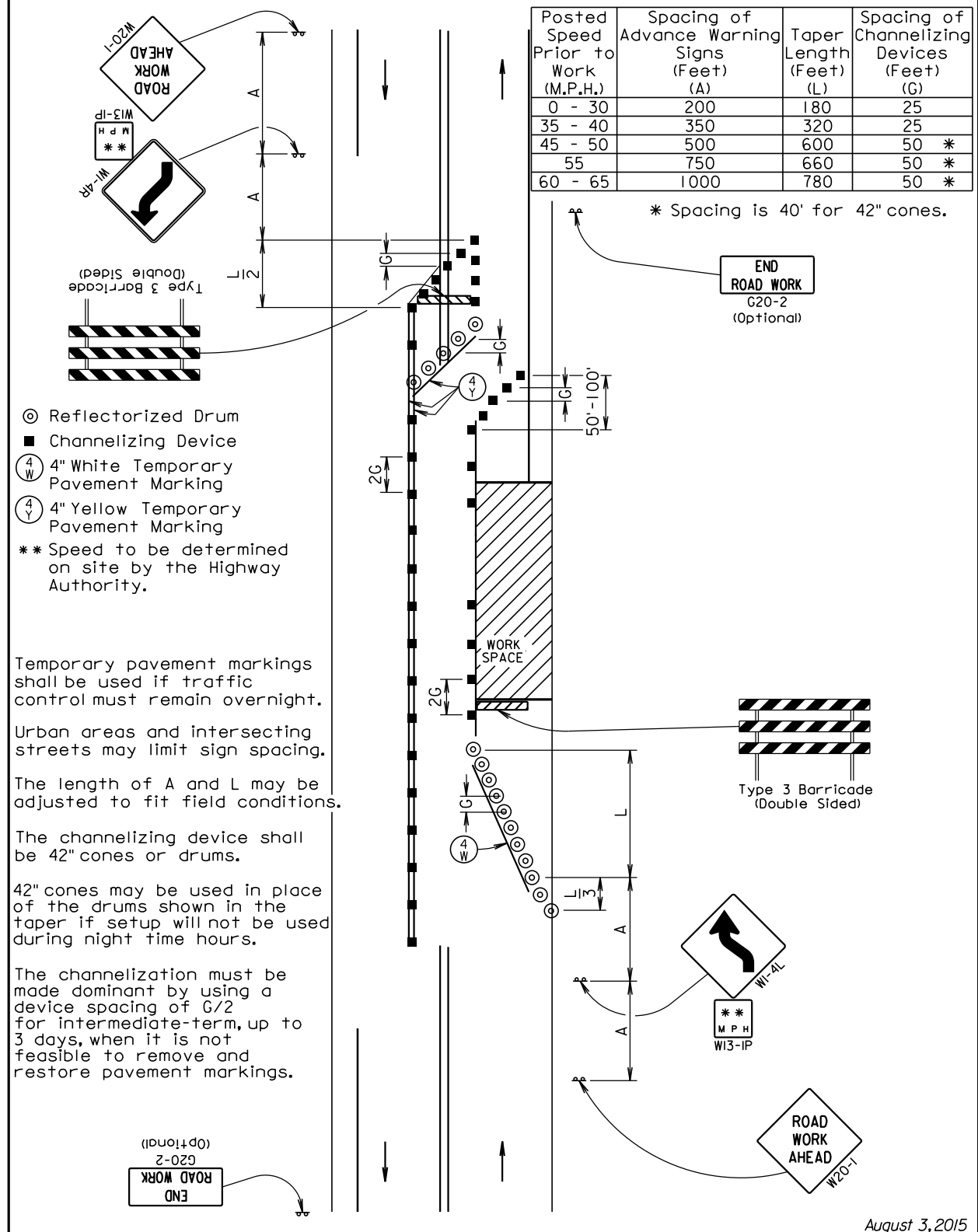
ENTRANCES AT CORNERS

GATES

\* If fence length is less than 600' to next corner use a 2 post panel.  
If fence length is greater than 600' to next corner use a 3 post panel.  
① See Detail B on Sheet 1 of 3.

December 23, 2004

### GUIDES FOR TRAFFIC CONTROL DEVICES 2-LANE, LANE SHIFT TYPICAL



August 3, 2015

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 - 50	500	50
55	750	50
60 - 65	1000	50

\* Spacing is 40' for 42" cones.

- 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.

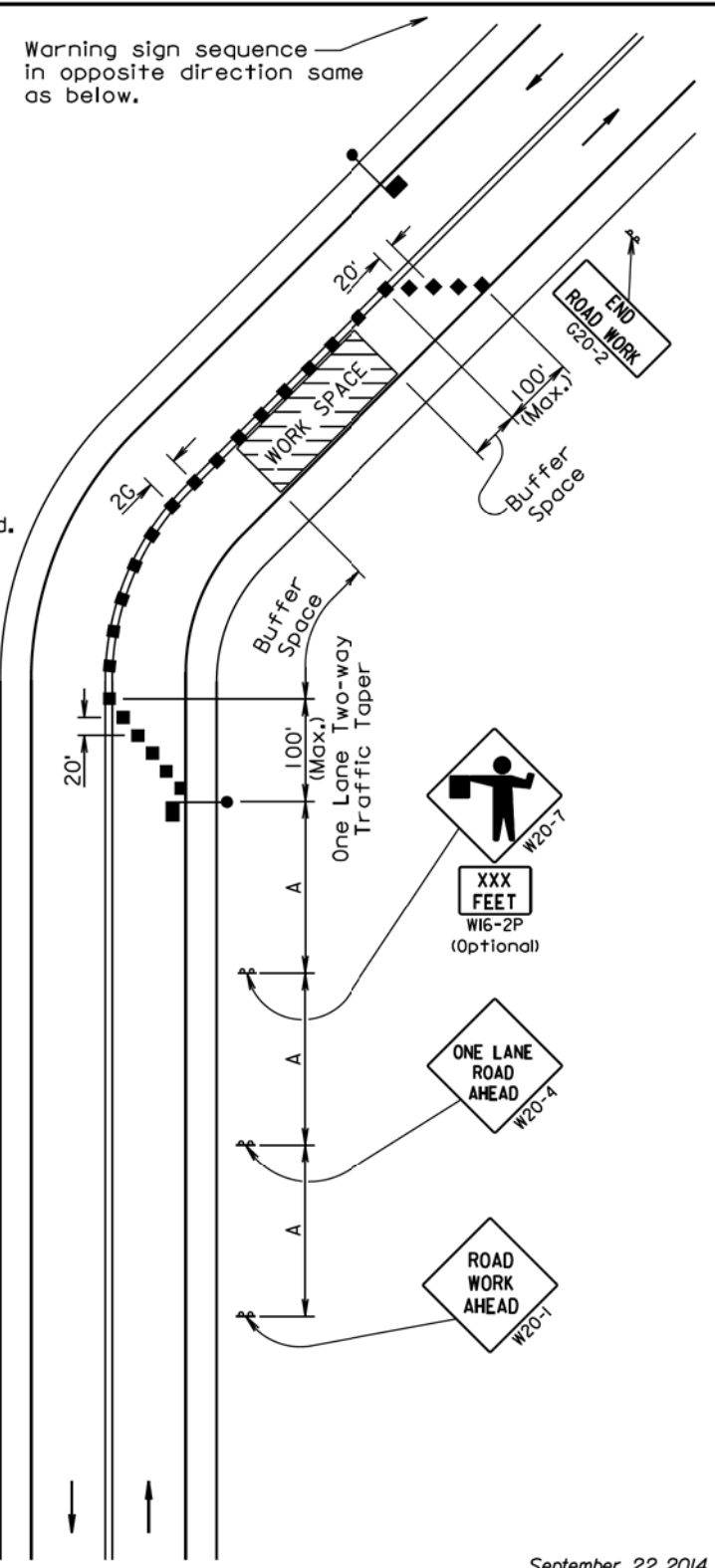
The channelizing devices shall be drums or 42" cones.

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

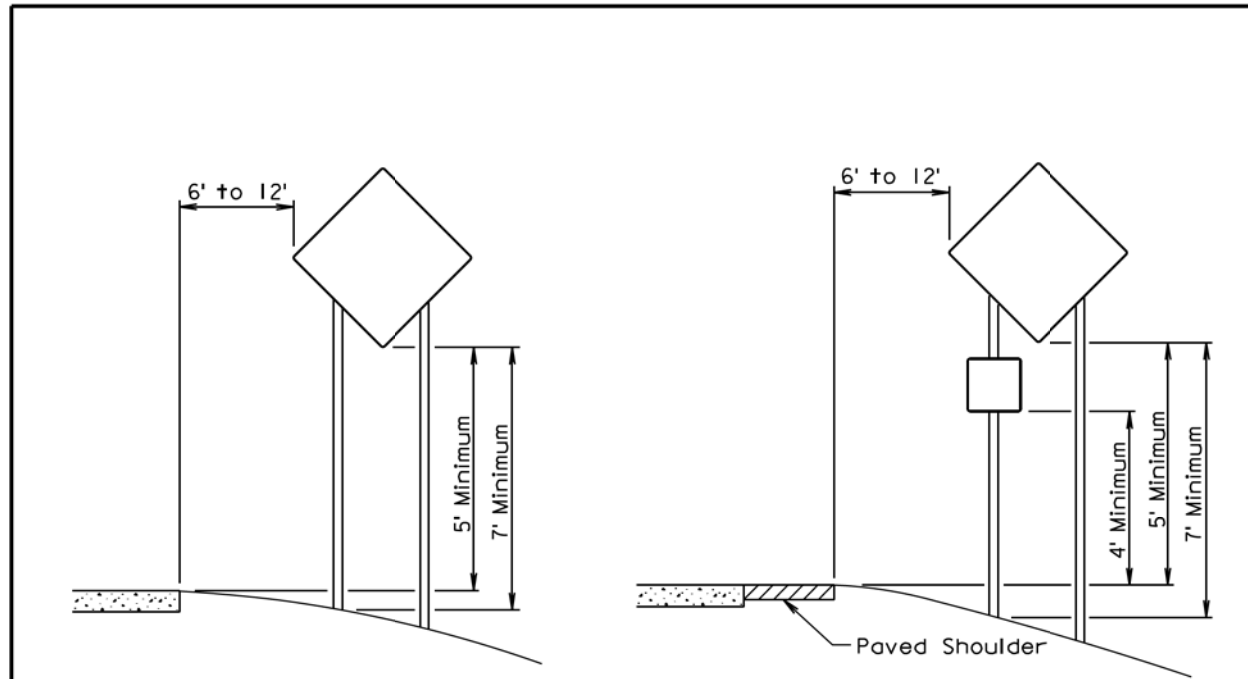
Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

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.

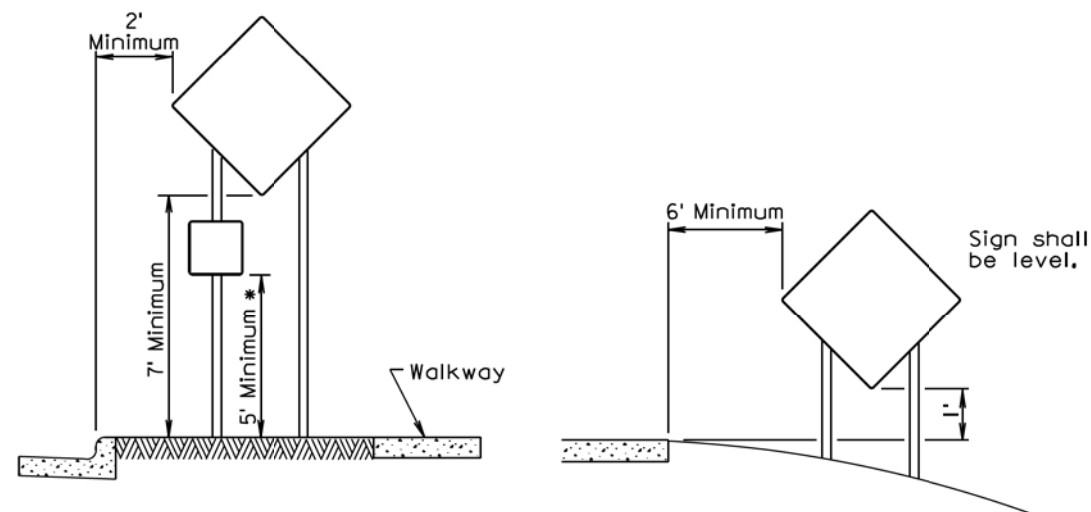


September 22, 2014



RURAL DISTRICT

RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE



URBAN DISTRICT

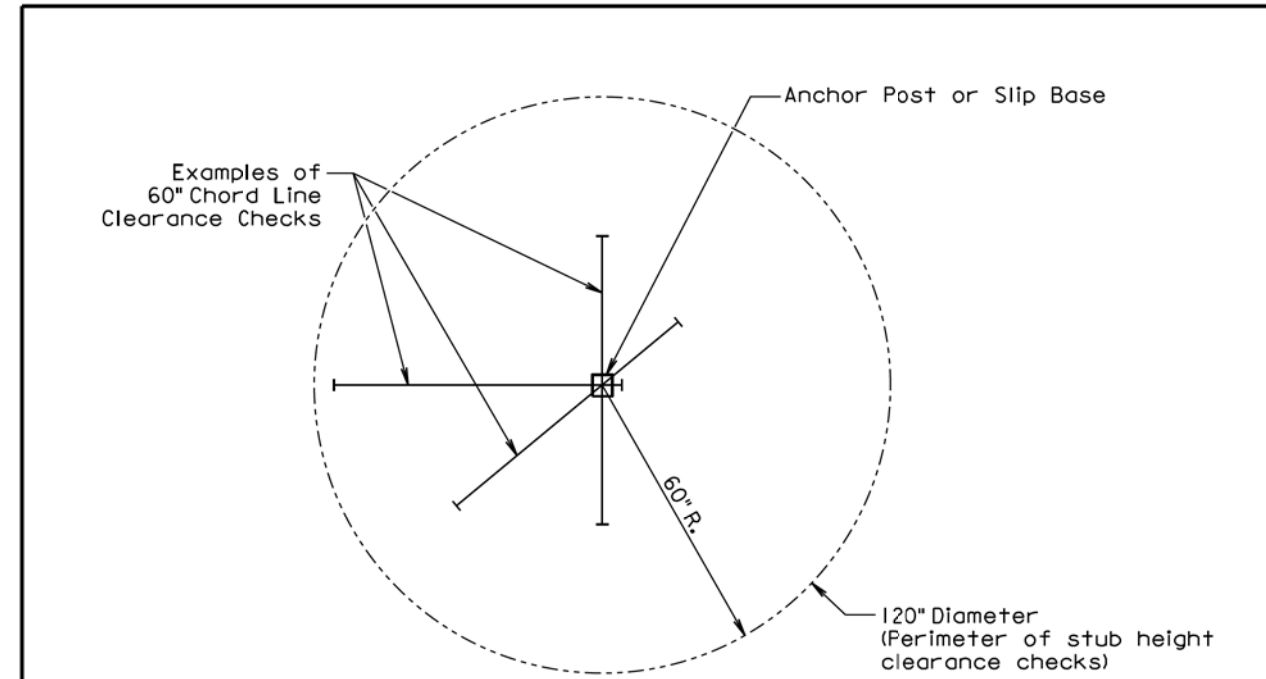
RURAL DISTRICT  
3 DAY MAXIMUM

\* 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.

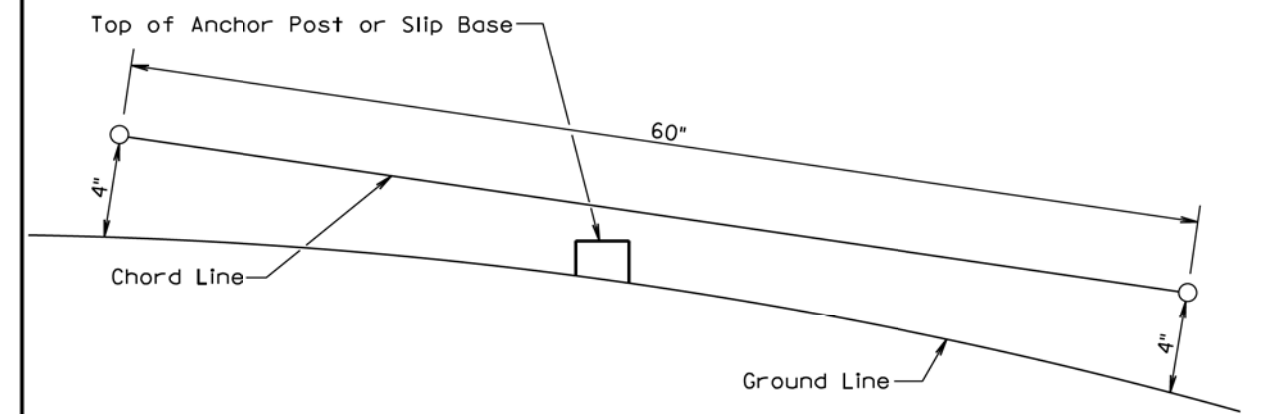
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 3rd Qtr. 2015	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW  
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

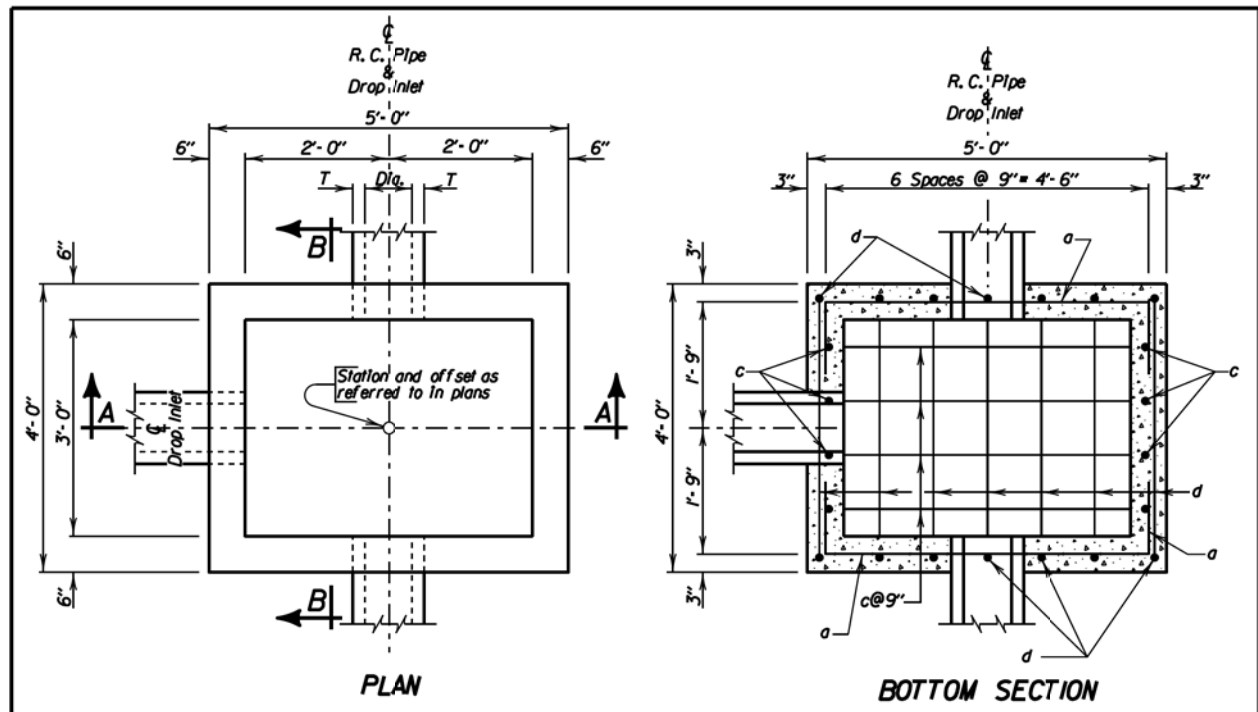
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

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: 3rd Qtr. 2015	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1



R.C. Pipe Diameter Inches	T Inches	Class M6 Concrete CuYd
12	2	0.03
15	2 1/4	0.04
18	2 1/2	0.05
24	3	0.09
30	3 1/2	0.14
36	4	0.20

ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	CuYd	0.43	0.29H
Reinforcing Steel	Lb	57	26.72H
Frame and Grate	Each	1	

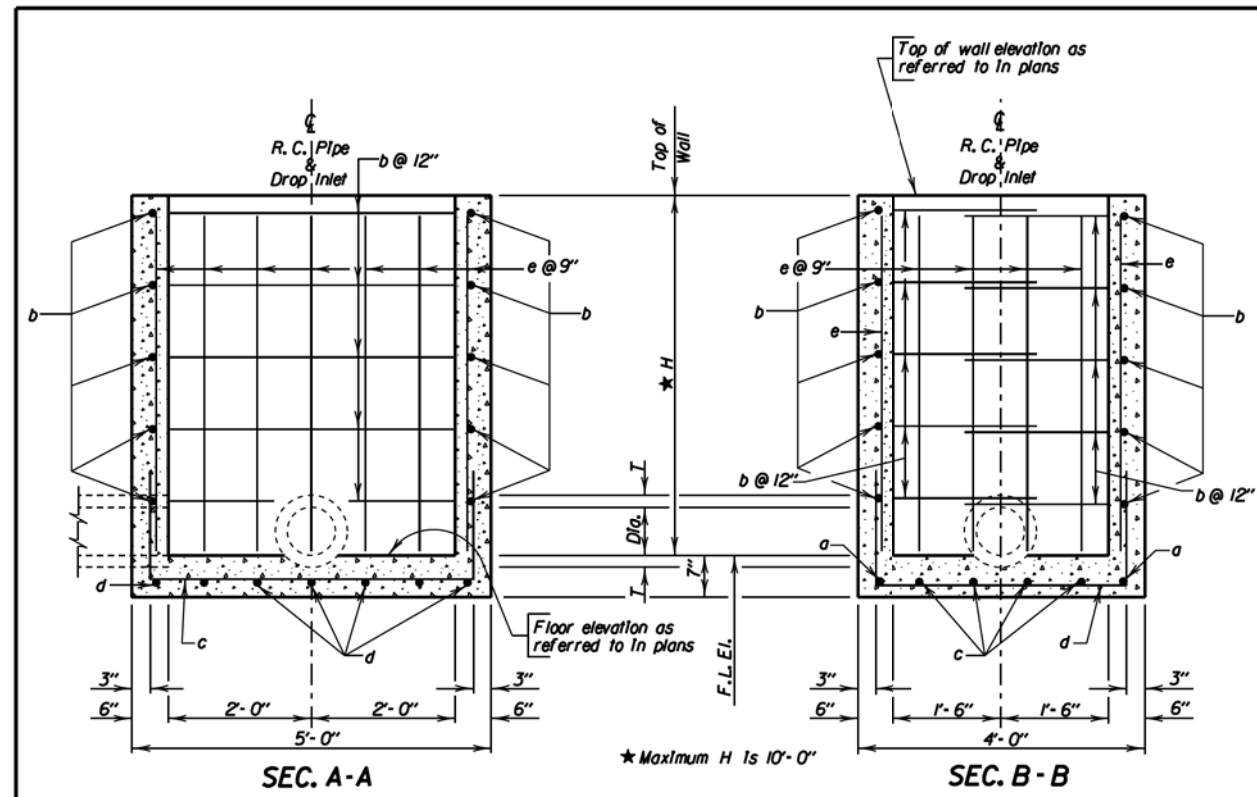
**DROP INLETS FOR 12" TO 36" DIAMETER PIPE**

**GENERAL NOTES:**

- \* Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.
- Drop Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts.
- Reinforcing steel shall conform to ASTM A615 Grade 60. The b bars shall be lapped 12 Inches. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
- Pipe shall not enter through a corner of the drop inlet.
- Use 2" clear cover on all reinforcing steel unless otherwise noted.
- Precasting of reinforced drop inlets will be permissible. Prior to precasting, the Contractor shall submit details to the Engineer for approval.
- Maximum pipe diameter shall not exceed 27 Inches on the 4 foot wide side and shall not exceed 36 Inches on the 5 foot wide side of the drop inlet.
- The dimension of H is in feet.

December 23, 2009

<b>S D D O T</b>	<b>3' X 4' TYPE C REINFORCED CONCRETE DROP INLET</b>	PLATE NUMBER 670.10
	Published Date: 3rd Qtr. 2015	Sheet 1 of 2



**DROP INLETS FOR 12" TO 36" DIAMETER PIPE**

REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
a	2	4	6'-6"	17
b	2H	4	9'-0"	17
c	4	4	7'-6"	17
d	7	4	6'-6"	17
e	22	4	H - 2"	Str.

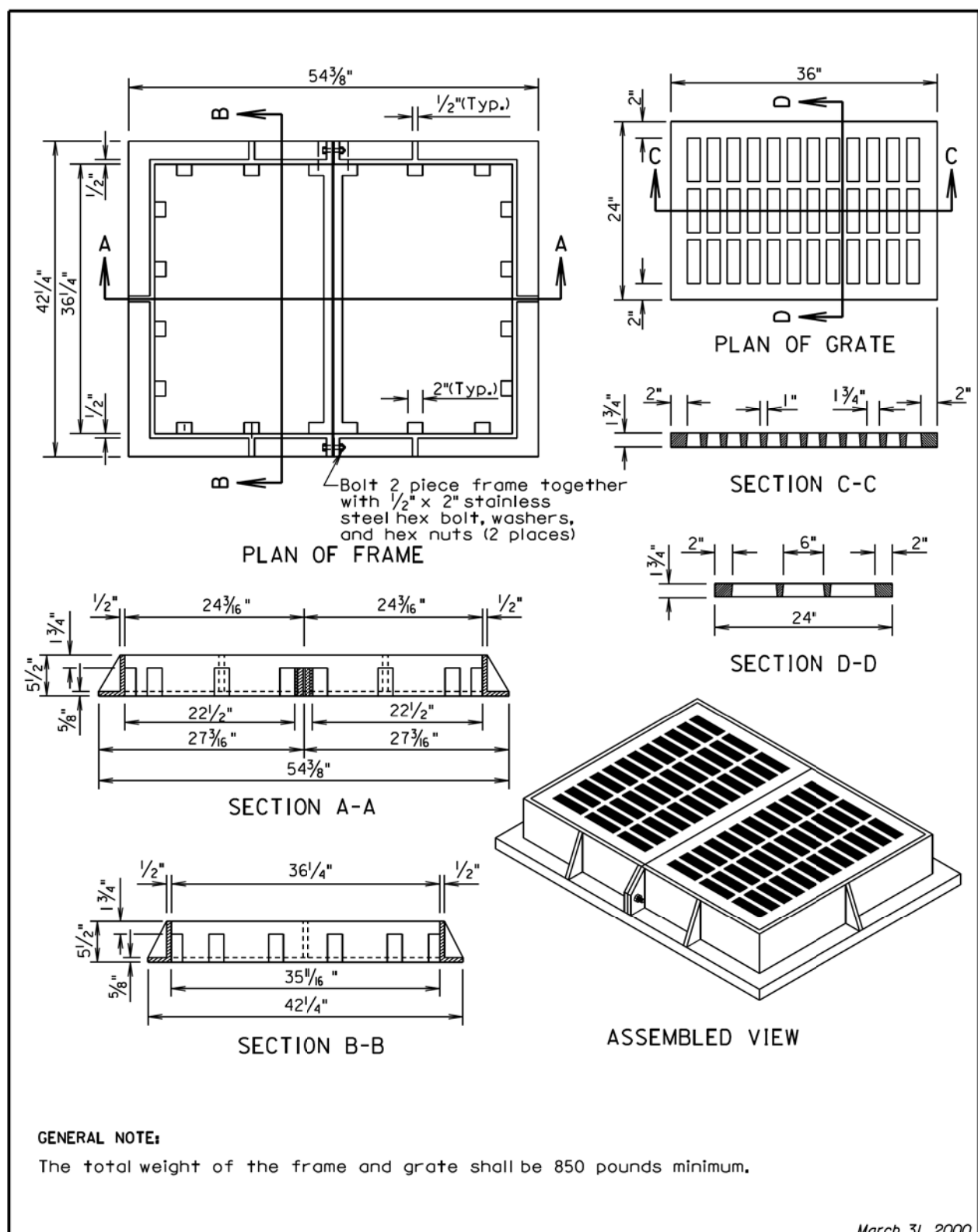
TYPE 17

TYPE 17

NOTE: All dimensions are out to out of bars.

December 23, 2009

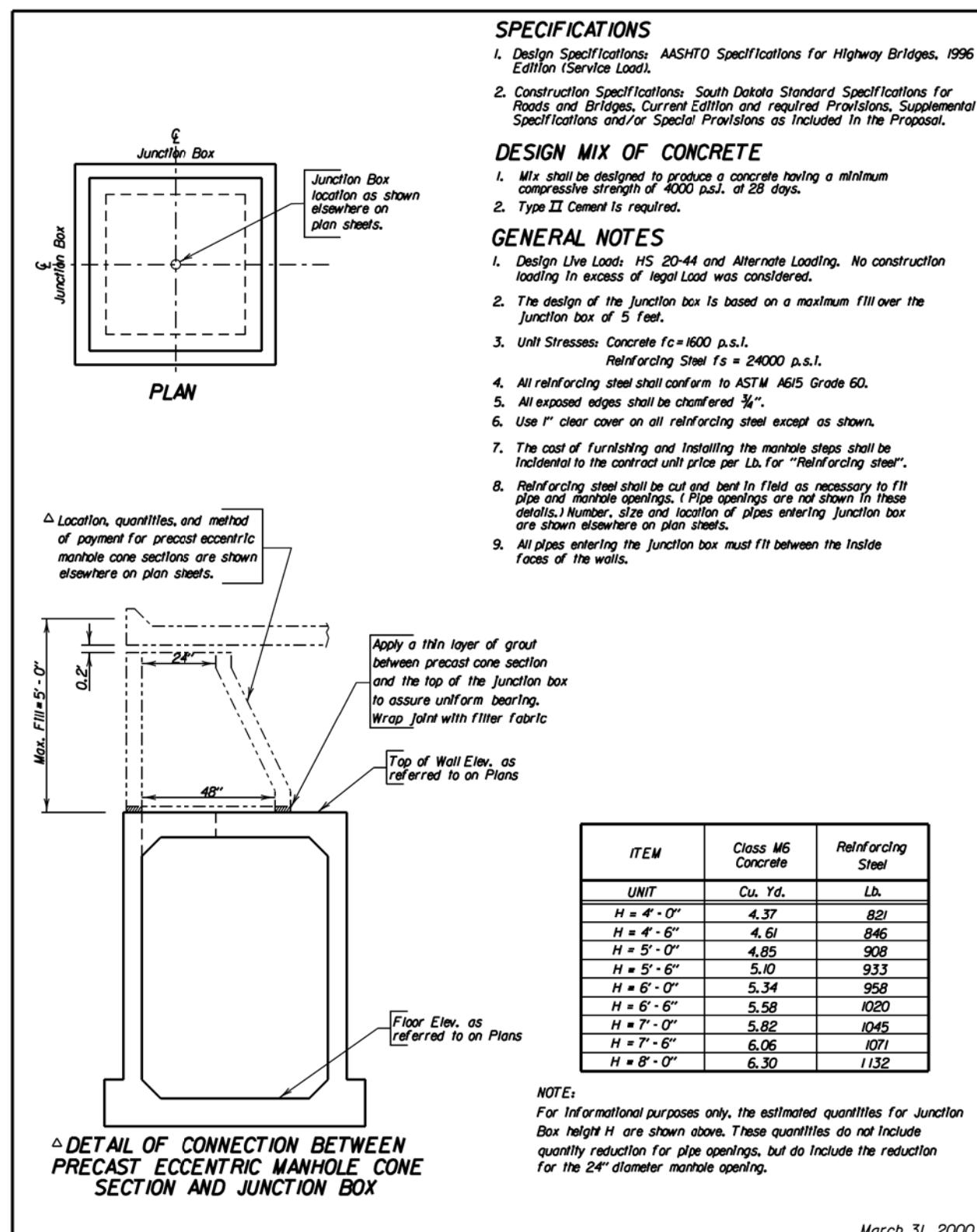
<b>S D D O T</b>	<b>3' X 4' TYPE C REINFORCED CONCRETE DROP INLET</b>	PLATE NUMBER 670.10
	Published Date: 3rd Qtr. 2015	Sheet 2 of 2



**GENERAL NOTE:**  
 The total weight of the frame and grate shall be 850 pounds minimum.

March 31, 2000

<b>S D D O T</b>	<b>TYPE C FRAME AND GRATE</b>	PLATE NUMBER 670.82
		Sheet 1 of 1
		Published Date: 3rd Qtr. 2015



**SPECIFICATIONS**

- Design Specifications: AASHTO Specifications for Highway Bridges, 1996 Edition (Service Load).
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications and/or Special Provisions as Included in the Proposal.

**DESIGN MIX OF CONCRETE**

- Mix shall be designed to produce a concrete having a minimum compressive strength of 4000 p.s.i. at 28 days.
- Type II Cement is required.

**GENERAL NOTES**

- Design Live Load: HS 20-44 and Alternate Loading. No construction loading in excess of legal load was considered.
- The design of the junction box is based on a maximum fill over the junction box of 5 feet.
- Unit Stresses: Concrete  $f_c = 1600$  p.s.i.  
Reinforcing Steel  $f_s = 24000$  p.s.i.
- All reinforcing steel shall conform to ASTM A615 Grade 60.
- All exposed edges shall be chamfered 3/4".
- Use 1" clear cover on all reinforcing steel except as shown.
- The cost of furnishing and installing the manhole steps shall be incidental to the contract unit price per Lb. for "Reinforcing steel".
- Reinforcing steel shall be cut and bent in field as necessary to fit pipe and manhole openings. (Pipe openings are not shown in these details.) Number, size and location of pipes entering junction box are shown elsewhere on plan sheets.
- All pipes entering the junction box must fit between the inside faces of the walls.

ITEM	Class M6 Concrete	Reinforcing Steel
UNIT	Cu. Yd.	Lb.
H = 4' - 0"	4.37	821
H = 4' - 6"	4.61	846
H = 5' - 0"	4.85	908
H = 5' - 6"	5.10	933
H = 6' - 0"	5.34	958
H = 6' - 6"	5.58	1020
H = 7' - 0"	5.82	1045
H = 7' - 6"	6.06	1071
H = 8' - 0"	6.30	1132

**NOTE:**  
 For informational purposes only, the estimated quantities for Junction Box height H are shown above. These quantities do not include quantity reduction for pipe openings, but do include the reduction for the 24" diameter manhole opening.

March 31, 2000

<b>S D D O T</b>	<b>5' X 5' JUNCTION BOX</b>	PLATE NUMBER 671.01
		Sheet 1 of 3
		Published Date: 3rd Qtr. 2015

### REINFORCING SCHEDULE

Bending Details					Bending Details																																																	
Mk.	No.	Size	Length	Type	Mk.	No.	Size	Length	Type																																													
					<p>NOTE:            ∅ Cast Iron Manhole Steps ( R - 1980 - C ) from Neenah Foundry or equivalent.            ∅ Locate in center of top slab with 3" clearance at manhole opening.            All dimensions are out to out of bars.</p>																																																	
										<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>∅al</td><td>1</td><td>6</td><td>9'-0"</td><td>T3</td></tr> <tr><td>∅a2</td><td>4</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>k3</td><td>28</td><td>4</td><td>5'-9"</td><td>17A</td></tr> <tr><td>k3</td><td>48</td><td>4</td><td>8'-6"</td><td>17</td></tr> <tr><td>ml</td><td>18</td><td>5</td><td>6'-9"</td><td>Str.</td></tr> <tr><td>nl</td><td>18</td><td>5</td><td>5'-9"</td><td>Str.</td></tr> <tr><td>pl</td><td>52</td><td>4</td><td>5'-0"</td><td>Str.</td></tr> <tr><td>ql</td><td>8</td><td>4</td><td>3'-6"</td><td>17A</td></tr> </table>					∅al	1	6	9'-0"	T3	∅a2	4	-	-	-	k3	28	4	5'-9"	17A	k3	48	4	8'-6"	17	ml	18	5	6'-9"	Str.	nl	18	5	5'-9"	Str.	pl	52	4	5'-0"	Str.	ql	8	4	3'-6"	17A
										∅al	1	6	9'-0"	T3																																								
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										k3	48	4	8'-6"	17																																								
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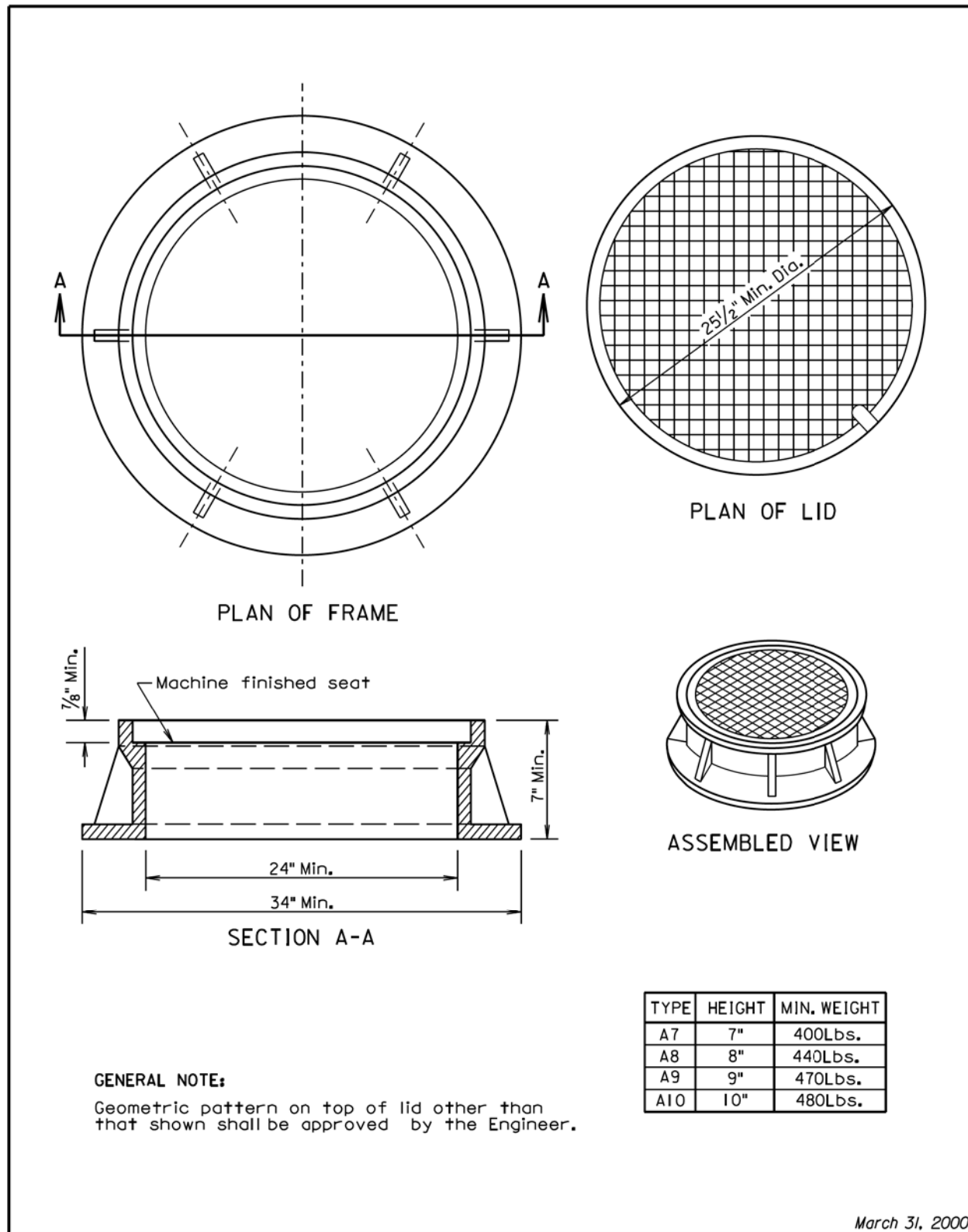
**SEC. A-A**

**PLAN**

**ELEVATION**

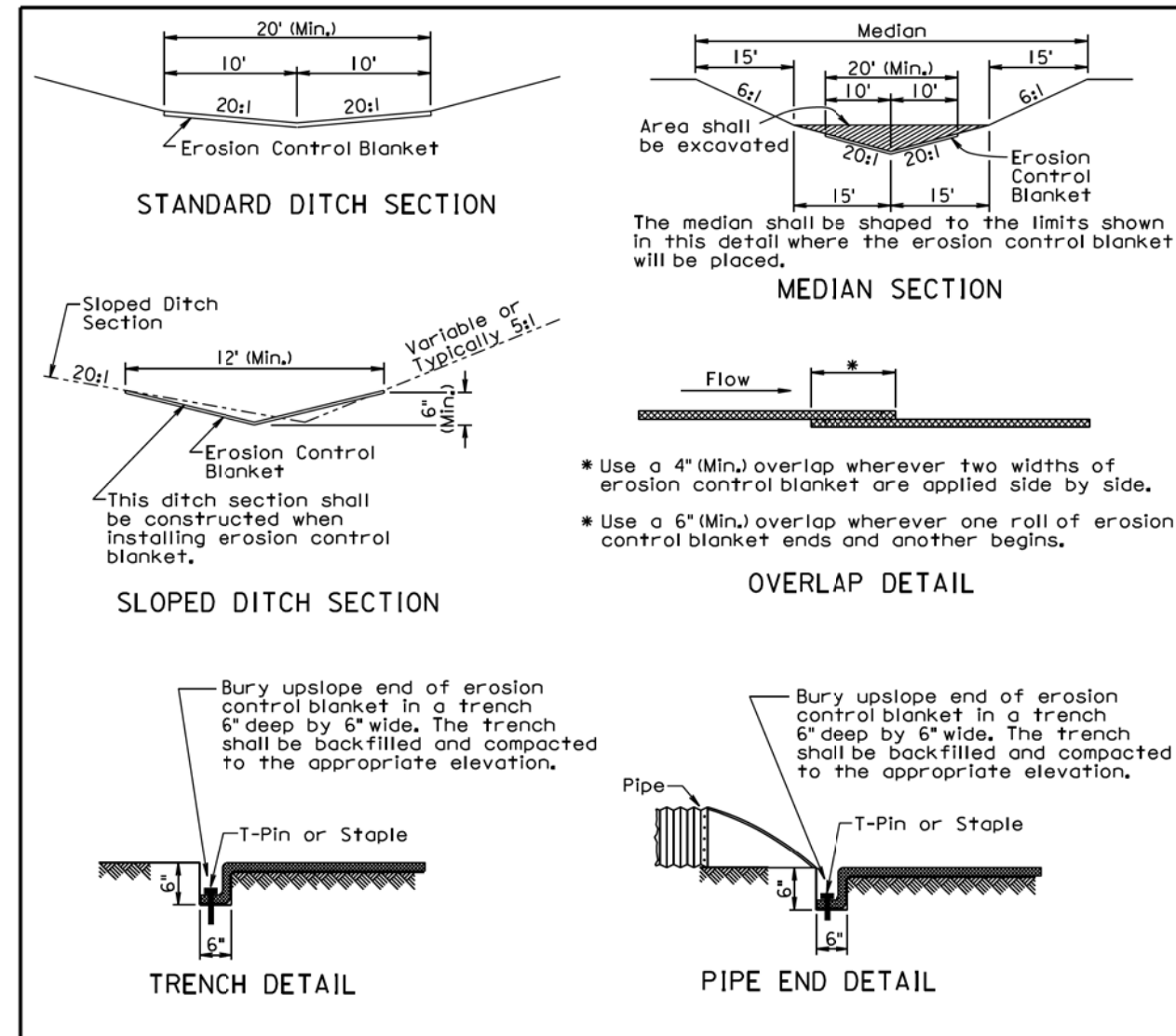




**GENERAL NOTE:**  
Geometric pattern on top of lid other than that shown shall be approved by the Engineer.

March 31, 2000

<b>S D D O T</b>	<b>TYPE A MANHOLE FRAME AND LID</b>	PLATE NUMBER 671.10
		Sheet 1 of 1
		Published Date: 3rd Qtr. 2015



\* Use a 4" (Min.) overlap wherever two widths of erosion control blanket are applied side by side.  
\* Use a 6" (Min.) overlap wherever one roll of erosion control blanket ends and another begins.

**GENERAL NOTES:**  
Prior to placement of the erosion control blanket, the areas shall be properly prepared, shaped, seeded, and fertilized.  
Erosion control blanket shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The upslope end of the erosion control blanket shall be buried in a trench 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of erosion control blanket ends and another begins, with the upslope erosion control blanket placed on top of the downslope erosion control blanket.  
The erosion control blanket shall be pinned to the ground according to the manufacturer's installation recommendations.  
After the placement of the erosion control blanket, the Contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow of side drainage directly onto the erosion control blanket.  
All ditch sections shall be shaped when installing the erosion control blanket. All costs for shaping the ditches shall be incidental to the contract unit price per foot for "Shaping for Erosion Control Blanket".

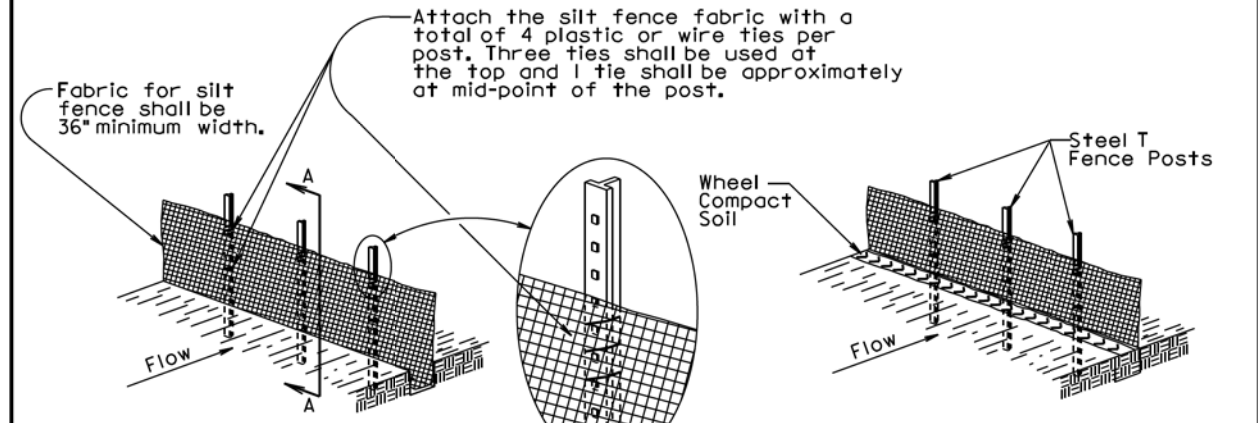
December 23, 2004

<b>S D D O T</b>	<b>EROSION CONTROL BLANKET</b>	PLATE NUMBER 734.01
		Sheet 1 of 1
		Published Date: 3rd Qtr. 2015

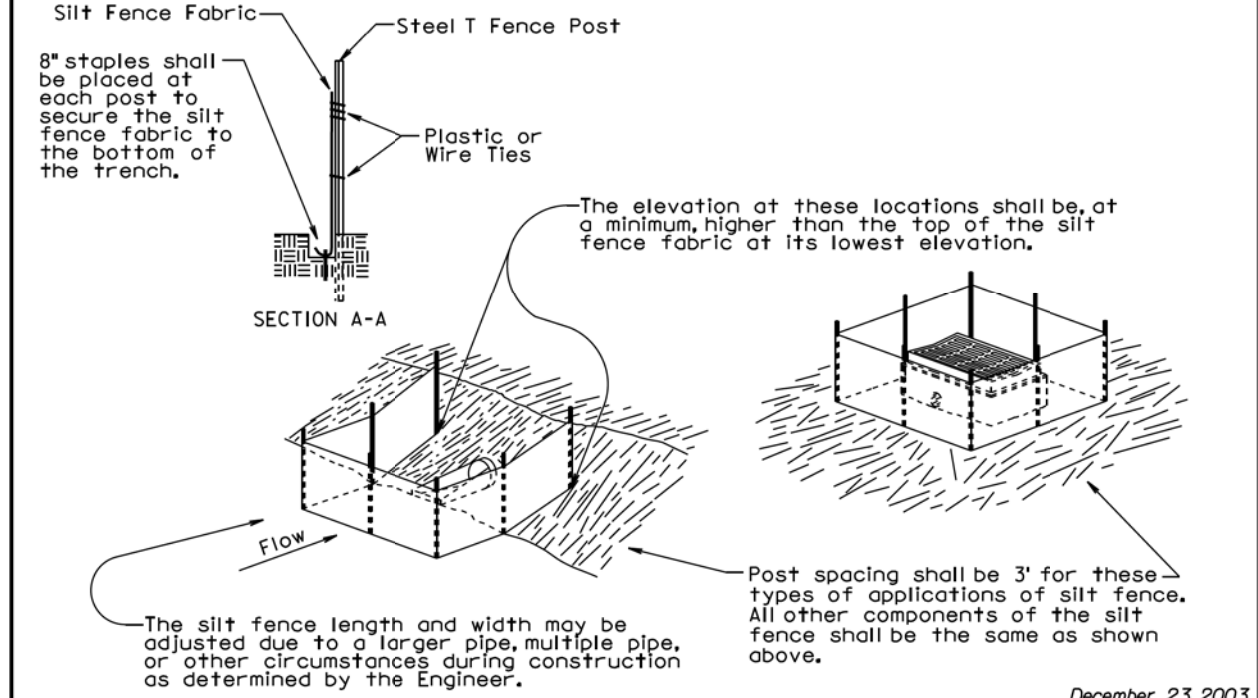
### MANUAL HIGH FLOW SILT FENCE INSTALLATION



① EXCAVATE TRENCH  
② DRIVE STEEL T FENCE POSTS



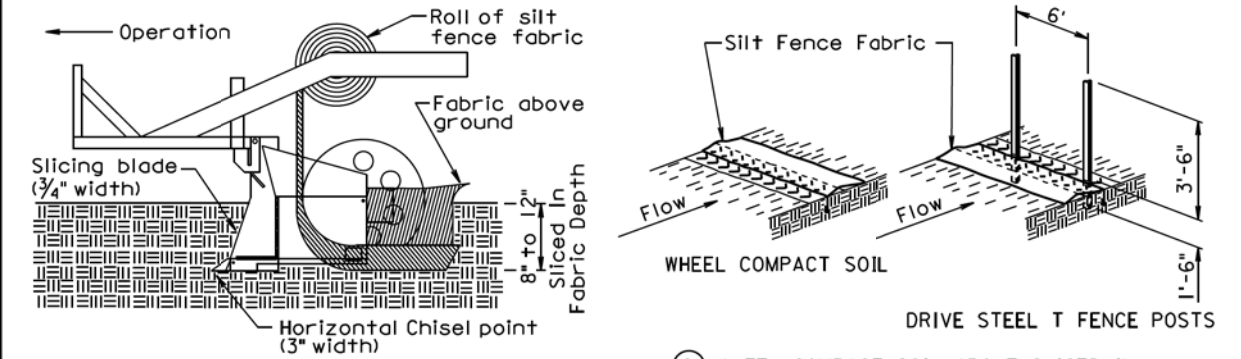
③ ATTACH SILT FENCE FABRIC  
④ BACKFILL TRENCH AND WHEEL COMPACT SOIL



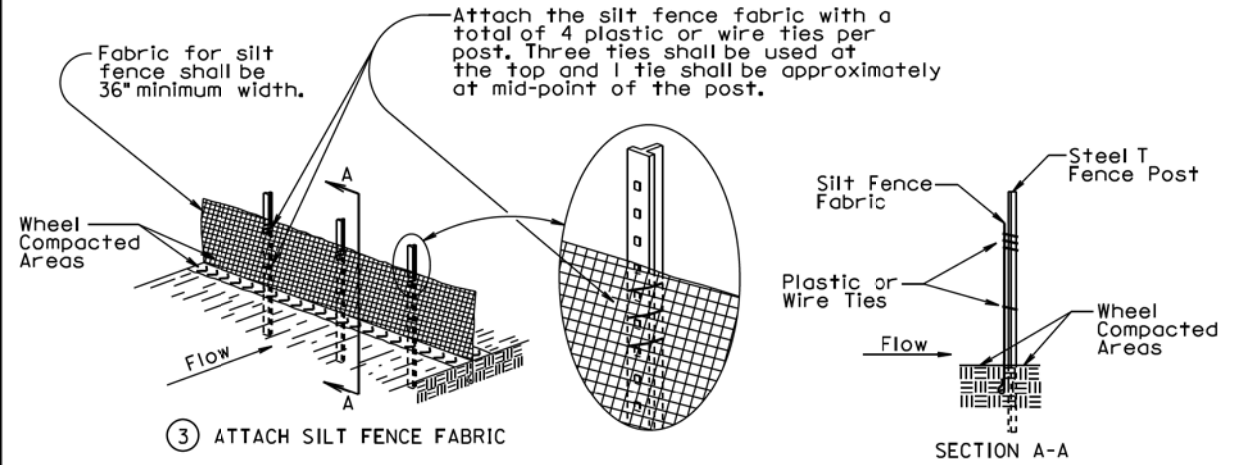
December 23, 2003

<b>S D D O T</b>	<b>HIGH FLOW SILT FENCE</b>	PLATE NUMBER <b>734.05</b>
	Published Date: 3rd Qtr. 2015	Sheet 1 of 2

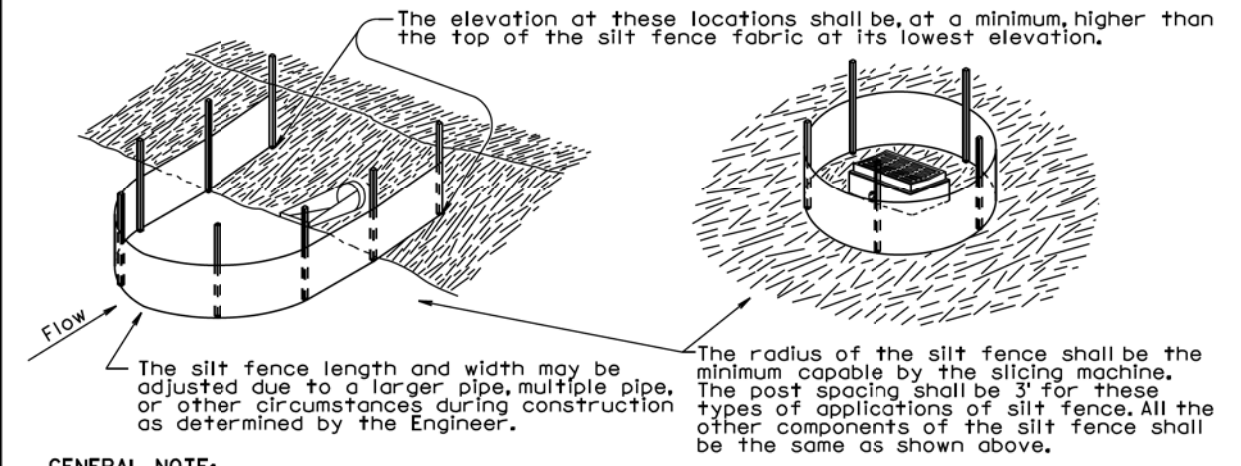
### MACHINE SLICED HIGH FLOW SILT FENCE INSTALLATION



① INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.  
② WHEEL COMPACT SOIL ABOVE SLICED IN PORTION OF FABRIC AND THEN DRIVE STEEL T FENCE POSTS.



③ ATTACH SILT FENCE FABRIC



**GENERAL NOTE:**

If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end shall be provided on top of the extra length of silt fence fabric to prevent underflow.

December 23, 2003

<b>S D D O T</b>	<b>HIGH FLOW SILT FENCE</b>	PLATE NUMBER <b>734.05</b>
	Published Date: 3rd Qtr. 2015	Sheet 2 of 2