

STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	0001-452	1	11
Plotting Date:	04/11/2013		

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DESIGN, DESIGNATION - 1-90 EXIT 55

ADT (2012)	12540
ADT (2032)	20127
DHV	2797.7
d	50%
T DHV	6.2%
T ADT	13.6%

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
460E0100	Class A45 Concrete, Miscellaneous	4.2	CuYd
460E0300	Breakout Structural Concrete	4.2	CuYd
480E0100	Reinforcing Steel	72	Lb
634E0010	Flagging	20	Hour
634E0100	Traffic Control	408	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
635E3150	150' Light Tower with Lowering Device	1	Each
635E3230	Roadway Luminaire, 1000 Watt	4	Each

WORK DESCRIPTION

Work on this project consists of the Contractor removing a portion of the existing T1 tower footing pedestal, reconstructing that footing pedestal with new anchor rods, and installing a new light tower with lowering device.

SPECIFICATIONS

South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and required provisions, supplemental specifications and/or special provisions as included in the proposal.

SHOP DRAWINGS AND CATALOG CUTS SUBMITTALS

The Contractor shall submit shop drawings and catalog cuts in accordance with Section 985 of the Standard Specifications or in Adobe PDF format.

Adobe PDF submittals shall be sent to the following email addresses:

Pete.Longman@state.sd.us Dan.Martell@state.sd.us

INCIDENTAL WORK

Incidental work includes, but is not limited to, the restoration of all disturbed areas to the satisfaction of the Engineer.

BREAKOUT STRUCTURAL CONCRETE

This work shall consist of breaking out and disposing of structural concrete. All broken out concrete and other discarded material shall be disposed of on a site obtained by the Contractor and approved by the Engineer.

Define the breakout limits with $\frac{3}{4}$ inch deep saw cuts.

The intent is to break out just enough of the existing pedestal to accommodate the new anchor rods/bolts and rebuild the pedestal to the existing dimensions.

BREAKOUT STRUCTURAL CONCRETE (CONTINUED)

Care shall be taken not to damage the existing longitudinal reinforcing steel during the breakout operations. These reinforcing bars and all concrete surfaces in the breakout area on which new concrete is to be cast shall be thoroughly cleaned by sandblasting to the satisfaction of the Engineer prior to placement of the new concrete.

Any additional breakout required due to spalling or cracking of the existing structure will be determined by the Engineer. Where additional breakout of the existing structure is required, care shall be taken not to damage any of the existing reinforcing steel. All steel will be left in place and thoroughly cleaned by sandblasting.

The Contractor shall salvage reinforcing steel, conduits, and copper wire in the existing footing pedestal and use in the reconstructed footing pedestal. The j1 bars shall be replaced as indicated on the details for 150' Light Tower Footings.

All costs for salvaging and/or replacing existing conduits and wire shall be incidental to the contract unit price per each for "150' Light Tower with Lowering Device." The j1 bars shall be incidental to the contract unit price per pound for "Reinforcing Steel"

Plans quantity payment will be full compensation for this item regardless of the quantity actually broken out, unless measurement is ordered by the Engineer. If the Engineer orders breakout beyond the limits shown, this additional breakout will be paid for at the contract unit price per cubic yard for Breakout Structural Concrete. If additional breakout is caused by the Contractor's operations, no additional payment will be made.

Breakout Structural Concrete will be paid for at the contract unit price per cubic yard. This payment shall be full compensation for furnishing all materials, labor, tools and equipment necessary or incidental to breaking out the structural concrete. Payment includes, but is not limited to, excavation required to perform the required breakout, saw cutting, breaking out concrete, cleaning, and sandblasting reinforcing steel and concrete surfaces, and removing and disposing of all waste materials to satisfactorily complete the work.

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/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 Engineer.

WASTE DISPOSAL SITE (CONTINUED)

1.

2.

- 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.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC 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 no artifacts have been found on the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

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

> Construction/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/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".

> 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

HISTORICAL PRESERVATION OFFICE CLEARANCES (CONTINUED)

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to the DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3268). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

GENERAL

Pole footing pedestal modification shall be constructed in accordance with Section 635 of the South Dakota Standard Specifications.

All reinforcing steel shall conform to ASTM A615 Grade 60.

Design Material Strengths:

- Concrete f'c = 4500 p.s.i.
- Reinforcing Steel fy = 60000 p.s.i.

Match existing chamfers.

DESIGN MIX OF CONCRETE

All structural concrete shall be Class A45 unless otherwise indicated.

Type II cement is required.

Coarse aggregate to be used in concrete shall consist of either crushed guartzite or other crushed ledge rock. If crushed ledge rock other than quartzite is to be used, it shall be from a source approved by the Engineer.

150' LIGHT TOWER WITH LOWERING DEVICE

The new light tower shall be installed at the location of the removed existing light tower T1. The new light tower shall be galvanized steel. The new pole and anchor rods/bolts shall be in accordance with the 2004 SDDOT Standard Specifications for Roads and Bridges, Section 985, except that the new tower shall have a minimum base plate thickness of 3", the bottom section of the tower shall have a minimum thickness of 3/8", and a minimum of 12 anchor rods/bolts shall be used.

Lowering Device shall meet requirements for the following:

Nonlatching Type

The lowering system shall be a two-cable hoisting system consisting of a stainless steel head assembly, stainless steel luminaire ring and junction box, stainless steel winch drums and corrosion-resistant winching system, and a portable power unit.

The power cord shall be Type W, with four #8 conductors and a 30 amp, 600 volt twist-lock weatherproof male connector. The power cable shall be tethered between the hoisting cables with a stainless steel harness.

150' LIGHT TOWER WITH LOWERING DEVICE (CONTINUED)

The head assembly shall be manufactured of stainless steel and shall consist of a formed channel bolted to the top of the pole shaft with four stainless steel bolts, nuts, and lock washers. The channel shall support four cable sheaves 6 inches in diameter with a special cable keeper to ensure proper cable guidance and two pilot guides to secure the horizontal position of the luminaire ring. The power cable sheave shall be made of cast aluminum with a minimum diameter of 16 inches. All sheaves shall have permanently lubricated bronze bearings and stainless steel axle pins. A cable keeper shall be provided to prevent the power cable from working out of the sheave.

The luminaire ring assembly shall be fabricated of stainless steel and consist of the luminaire ring, hoisting cable terminator tubes, and a weather proof junction box. The inner portion of the ring shall be equipped with a PVC shock absorbing tube protecting the pole and luminaires during the raising-lowering operation. The ring shall be supplied with stainless steel tenons for the required number of luminaires. The power cord shall terminate into the luminaire ring by a deluxe Kellems grip. The luminaire ring shall be a totally enclosed wire way.

The ring shall be raised, supported, and lowered by two 1/4 inch stainless steel 7x19 strand cables, each with a hoisting strength of 6000 pounds. The two hoisting cables shall be continuous from the luminaire ring to the winch drum and of sufficient length to be two times the length of the pole shaft plus 20 feet.

The luminaire assembly shall be held firmly to the masthead assembly by two compression springs at the end of the hoisting cables and within the stainless steel support cable terminal tubes. The springs shall compress to hold the weight of the luminaire ring assembly and the luminaires plus 300 pounds.

The winch assembly shall consist of a worm gear speed reducer with a ratio of 72:1. The worm gear housing shall be of cast aluminum or other corrosion resistant material. The assembly shall also consist of a double output shaft and two stainless steel drums with calibrated adjustable clutches which compensate for the cable winding of both drums. The double output shaft shall be supported by two stainless steel outboard bearing assemblies. The input or drive pulley shall be equipped with a double brake shoe to serve as a safety brake when either the motor drive belt or the motor is removed. Raising speed of the luminaire ring shall be a minimum of 12 feet per minute.

The portable motor power unit shall consist of a TEFC NEMA 56 C face motor, 240 volt reversible with a magnetic brake attached. It shall be mounted to the winch with an internal bracket and a V-drive belt.

The motor shall be equipped with a power cord and a weatherproof connector to mate with the power supply cord connector. The motor shall be operated by a push button control on a 20 foot long extension cord.

Two stainless steel chains and grippers shall secure the hoisting cables to the base of the pole while in the static load position. The ultimate support of the luminaire ring shall not be dependent upon the winch assembly, nor shall there be latches at the top of the pole or in the masthead assembly.

150' LIGHT TOWER WITH LOWERING DEVICE (CONTINUED)

Latching Type

The luminaire ring shall latch to the head frame assembly to eliminate strain on hoisting cables when the lowering device is not in operation. Latches shall be of a cam-action type, with no moving parts or springs attached to the head frame assembly. The luminaire ring shall not move laterally or rotate during the latching or unlatching process, imparting lateral g forces on the luminaire.

The power cable shall be guided over a roller assembly when lowering or raising the luminaire ring.

The luminaire ring shall employ roller contact, spring loaded centering arms to keep the ring concentric with the pole in winds up to 30 MPH. The arms shall be interconnected and loaded with stainless steel springs to uniformly apply equal centering force when any one has been actuated.

the drum.

The portable power unit shall be a heavy duty reversing type with a stalling torque at least twice that required to operate the device, and shall be controlled by a reversing switch with a 20 foot cord.

The Manufacturer shall furnish a factory representative to assist the Contractor with the assembly of the lowering system into the pole assembly, and they shall furnish the Contractor with written installation and operational instructions.

The warranty time period for the light tower and lowering device shall be 12 months. One month prior to the end of the warranty time period the Contractor shall notify the Rapid City Region Traffic Engineer to establish a time and date for inspection of the light tower and lowering device. The inspection is necessary for making sure the light tower and lowering device is working properly. The inspection includes, but is not limited to, operating the lowering device, engaging the luminaires, checking anchor bolt torque, and re-tensioning the lowering device cables. If the Contractor fails to establish an inspection with the Region Traffic Engineer, the warranty time period will be extended until the light tower and lowering device is inspected by both the Contractor and Region Traffic Engineer.

All costs to furnish and install the light tower with lowering device, including labor, materials, equipment, and making the light tower operational shall be incidental to the contract unit price per each for "150' Light Tower with Lowering Device".

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The lowering device shall consist of a head frame assembly, a luminaire ring assembly, and a winch assembly.

The winch assembly shall be prewound with 1/4 inch diameter 7x19 stainless steel aircraft cord and shall be supported at both ends. Keepers shall be provided to ensure uncoiled cable will rewrap onto

ROADWAY LUMINAIRE, 1000 WATT

The accepted design for high mast luminaires shall provide not less than 0.8 average maintained foot-candles and a uniformity ratio (avg. maint. to min. maint.) of not greater than 3:1 using the following parameters:

_amp Loss Factor (LLF):	0.80
_ighted Area:	Interchange
Nounting Height:	150 ft.
_amp:	1000W HPS
Distribution:	Type V, Medium

The luminaire photometrics shall be equal to Cooper Test No. HMX91S.

Three copies of the isofootcandle charts and utilization curves shall be furnished to the Engineer for approval. This approval must have been received by the Contractor before the luminaires may be installed.

SEQUENCE OF OPERATIONS – GENERAL NOTES

Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined as $\frac{1}{2}$ hour after sunset until $\frac{1}{2}$ hour before sunrise.

Storage of vehicles and equipment shall be as near the right-of-way as possible. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. 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.

Construction signing mounted on portable supports shall not be used for duration of more than 3 days, unless approved by the Engineer. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed location, ground mounted, breakaway supports.

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.

The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 \pm 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable.

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.

SEQUENCE OF OPERATIONS - GENERAL NOTES (CONTINUED)

A lane closure with appropriate signs and "Ramp Narrows" signs shall be used for unloading poles.

The ramp may need to be closed during pole installation. In such case, the Contractor shall notify the DOT one week in advance for use of the State's assistance with a message panel.

- Bob Smith (Maintenance Supervisor) 394.1646
- John Matthesen (Region Traffic Engineer) 394.2543

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W5-4	48" x 48"	RAMP NARROWS	1	34	34
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-5	48" x 48"	LT. OR RT. LANE CLOSED #### FT. OR AHEAD	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
			TOTA	UNITS	408

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SPEC Use : 2004 E	SIFICATION South Dakota S dition and Req	N NOTE- itandard Specifications for Roads and E ulred Provisions, Supplemental Specifica	ridges. tions	
and/or	Special Provisi	ons as included in the Proposal.		

GENERAL NOTES-

I - All exposed edges shall be chamfered $\frac{3}{4}$ " except as shown.

- 2 All reinforcing steel shall conform to A.S.T.M.: A6I5 Grade 60.
- 3 Unit Stresses: Concrete fc = 1800 p.s.i.

Reinforcing Steel fs = 24000 p.s.i.

- 4 Design Specifications: AASHTO Specifications for Highway Bridges, 1992 Edition with 1993 Interims and AASHTO Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1985 Edition with 1986 - 1993 Interims.
- 5 The cost of Furnishing and Installing the Conduits embedded in the Footings shall be absorbed in the Unit Price Bid for Class A45 Concrete, Miscellaneous.
- 6 Prior to fabrication, details of the Tower Anchorage Assembly (including anchor bolts) shall be submitted to the Office of Bridge Design for approval. Any modifications of the footings to accommodate the Tower Anchorage Assembly must be submitted to and approved by the Office of Bridge Design. Additional quantities of materials resulting from modifications to accommodate the Tower Anchorage Assembly will not be measured for payment.
- 7 Structure Excavation, Light Tower shall be in accordance with the applicable sections of Section 420 of the Standard Specification. The Light Tower Footing shall be backfilled to existing groundline. Care shall be taken during backfilling to ensure that drainage will be away from the Tower Pedestal.
- 8 After excavation and backfill, excess material shall be disposed of on a site obtained by the Contractor and approved by the Engineer.

DESIGN MIX OF CONCRETE-

- I Mix shall produce a concrete having a minimum compressive strength of 4500 p.s.i. at 28 days.
- 2 Type II Cement is required.

REINFORCING SCHEDULE (For One Footing)							
Mk.	No.	Size	Length	Туре	Bending Details		
h	20	10	10'- 2''	17A			
<i>j</i>	7	4	/5′ - 5″	TI			
k/	38	8	13' - 6"	Str.			
k2	32	6	13' - 6"	Str.	š m l		
All di	All dimensions are out to out of bars.						

ORIGINAL CONSTRUCTION PLANS

DETAILS FOR 150' LIGHT TOWER FOOTINGS (SITES TI AND T4) I-90 AT DEADWOOD AVE. IM-BRF 90-1(106)52 - (ORIGINAL) PCEMS NO. 5589 - (ORIGINAL) PENNINGTON COUNTY S. D. DEPT. OF TRANSPORTATION (I) OF (I)

DECEMBER 2003

			-
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED / / / / /
DC/RH	LM	DC/RH	John C. Cole
PENN5589	5589MA0I		BRIDGE ENGINEER



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