

NOTES

105-030 UNDERGROUND UTILITIES: The contractor shall notify the local utility companies prior to the beginning of construction, so they may determine the location of all utilities in the project area. Subcutting or scarifying over utility lines may be eliminated if, in the opinion of the utility, a hazardous situation exists. Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the contractor, upon request to the engineer.

The wires leading to the luminaire receptacle shall be disconnected. The luminaire shall be removed from the light standard and reinstalled on the light standard extension. The necessary connection shall be made to provide continuity.

704-P01 The traffic control shall be signed using the following layouts on the Standard Drawings:

Std D-704-24 Layout Type T for Pull Box and Conduit Installation
Std D-704-25 Layout Type W for Signal Standard Installation
Std D-704-25 Layout Type V and Type X for Loop Placement

The item "Relocate Luminaire" will be measured by the number of each luminaire relocated and accepted. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment, and materials necessary to complete the installation.

772-230

MICROLOOP PROBE: The item Microloop (single or double) probe set shall consist of furnishing and installing the microloop probes at the locations shown in the plans.

754-050 SIGN SUPPORTS: The sign supports "Steel Galvanized Posts - Square Tube Perforated" were designed using a minimum yield strength of 55,000 psi and the design requirements of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals." The wind speed of 75 mph was used. The square telescoping steel posts shall have all holes punched completely. All metal shall be removed from the punched holes.

The microloop probe shall be a small, cylindrical, passive transducer of earth's vertical magnetic field intensity into inductance. It transforms changes in magnetic field intensity into inductance changes which can be sensed by loop detector units. Probes shall fit vertically in 1" holes and lead-in cable in 3/8" saw slot or in sand in the roadway base. Microloop probes can be connected in series with other microloop probes or conventional wire loops. The microloop probe shall operate under the following parameters: Earth's Vertical Magnetic Field (0.2 to 1.0 oersted), Inductance (20 microhenries to 25 microhenries per probe plus 20 microhenries per 100' of wire), DC Resistance (0.5 ohms per probe plus 3.2 ohms per 100' of wire) Transducer Gain (typically 3.5 microhenries per oersted at 0.4 OE ambient vertical field intensity), and Sensitivity with 2 probes (7.0 microhenries per oersted at 0.4 OE ambient vertical field intensity). The microloop probes shall operate at a temperature range of -35°F to +165°F (-37°C to +74°C) and at humidity of 0 to 100%. The microloop probes shall detect all motorized vehicles.

770-001 OVERHEAD LINES CLEARANCE: Minimum horizontal and vertical clearance between light and/or signal standards and power lines shall be as shown for the following power line voltages:

<u>Power Line Voltage</u>	<u>Horizontal Clearance</u>	<u>Vertical Clearance</u>
0-15,000	5'	6'
15,000-50,000	5'	7'
50,000 Plus	5'+0.033' per KV Over 50 KV	7'+0.033' per KV Over 50 KV

The item microloop (single-double) probes shall be measured by the number of single or double probes sets installed. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment, saw slot, conductors from probe to pull box, and materials to complete the installation of the microloops.

770-P01 RELOCATE LUMINAIRE: The item "Relocate Luminaire" shall consist of removing the existing luminaire from the removed light standard and installing it on the new light standard extension at the location shown on the plans.

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8	N.D.	HEU-1-806(032)069	4

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772-349 CONTROLLER MONITORING UNIT AND/OR COMMUNICATION MODULE:
The volume density controller shall be provided with a communication hookup which provides a duplex data link with a central control computer. The communications hookup shall be IBM PC compatible.

A controller monitoring unit and/or communication module shall be installed in the controller. The monitor unit shall be installed and connected to the controller and conflict monitor so as to monitor conflict monitor flash, pre-emption status, cabinet door open, intersection display, and detector diagnostics. The unit shall be capable of providing a traffic map and of up loading and down loading information into the controller from a PC, central control computer or a laptop in the field, or a telephone line.

The controller monitoring unit and/or communications module shall be capable of initiating contact by dial-up telephone line, either directly from a PC, central control computer or a laptop, or through a system master controller with a PC central control computer to report failure conditions when they occur with computer in the monitor mode. Other events shall be logged and reported at preset intervals or on command from a central control computer or laptop computer.

The controller monitoring unit and/or communications module shall be capable of operating at an isolated intersection with an interconnect cable or a telephone link to a central control computer or a laptop computer. In the future, the unit shall be operated through a systems master controller by interconnect cable or telephone link from a central control computer.

The contractor shall notify the local telephone company to have the telephone lines installed and all necessary connections made, when the controller is ready to be placed into operation.

The cost of furnishing and installing the communications module and/or the controller monitoring unit, the telephone line, and connections shall not be bid separately, but shall be included in the price bid for the volume density controller. The contractor shall be responsible for the telephone service until final acceptance of the traffic signal system.

772-P01 PAINT: The traffic signal system components shall be painted in accordance with the following:

- Transformer base - green
- Mast arm - green
- Signal head mounting hardware - green
- Shaft - green
- Signal housing - green
- Pedestrian pushbutton post - green
- Pedestrian pushbutton housing - green

The color green shall be 14066 of Federal Standard No. 595.

772-P02 REMOVE INTERIM TRAFFIC SIGNALS: The removed interim traffic signals shall become the property of the state and shall be delivered to the Bismarck District storage yard.