JOE # 26
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NHU-4-002(131)906

Ward County
City of Minot
Burdick Expwy / US 2B - 1st St SW to Valley Street
HMA, Milling, ADA Curb Ramps
Signals & Lighting

Traffic

| Current 2020 | Pass: 15,875 | Trucks: 310 | Total: 16,185 |
| Forecast 2040 | Pass: 19,370 | Trucks: 425 | Total: 19,796 |

Minimum Sight Dist. for Stopping: N/A
Minimum Sight Dist. for No Passing Zone: N/A
Pavement Design Life: N/A
Design Accumulated One-way flexible ESALs: N/A

Design Speed: N/A
Bridges: N/A

Section 23, T155N, R83W
Section 24, T155N, R83W

STATE COUNTY MAP

Apex Engineering Group, Inc.
This document was originally issued and sealed by Matthew T. Kinsella, Registration Number PE - 5492 on 8/25/2020 and the original document is stored at the North Dakota Department of Transportation.

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Approval Name: Chad M. Grunow
Date Signed: 8/31/2020

Apex Engineering Group
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Scope of Work
US 2 Business / Burdick Expy
NOTES

100-P01 TIED PROJECT: This project is tied to project NH-4-002(125)905 PCN 22216 – Burdick Expwy from 16th St SW to US 83 (Broadway) and 16th St SE to 27th St SE. Coordinate traffic control between the two projects where appropriate.

100-P02 COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2021 construction season. This project is replacing watermain for the City of Minot along Burdick from 1st St SW to Main St. This project is scheduled to be complete prior to July 23rd.

100-P03 PROJECT SCHEDULE: No work is to take place on the project until after July 31st, the last day of the North Dakota State Fair, unless approved by the Engineer.

100-P04 TRINITY HOSPITAL EMERGENCY TRAUMA CENTER: Trinity Hospital Emergency / Trauma Center parking is located near the SW ramp quadrant of S Main St. Burdick Expressway is a main corridor that is used by the hospital for emergency response. Trinity Hospital will need to be notified of construction phasing due to the impact of emergency response for the duration of this project. Emergency entrance along Burdick to remain open at all times for the duration of the project.

100-P05 CONTRACTOR PARKING/STAGING AREA RESTRICTIONS: Parking of personal vehicles, construction equipment, storage of construction materials, or work area on private property is prohibited without written permission by the property owner.

Staging of construction materials, storing of personal vehicles or construction equipment in the City’s right of way outside of the construction work zone is prohibited.

105-200 UTILITY COORDINATION: A utility coordination meeting is required.

107-500 PAVEMENT SWEETING: Sweep the roadway adjacent to the construction area at the end of each day. Utilize a vacuum or pickup type sweeper.

107-P01 ACCESS FOR BUSINESSES: Provide an access plan that maintains access to all businesses for review by the Engineer and the City of Minot at least one week prior to the preconstruction meeting. This plan is subject to approval by the Engineer and the City.

107-P02 UTILITIES: Notify all utility owners of the project schedule as specified in Section 105.03, "Cooperation with Utility Owners".

108-P01 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required. Provide a suitable meeting facility. Have a room approved by the Engineer.

Organize a biweekly meeting with the business owners and residents along Burdick Expressway corridor including side streets. The meeting will follow the same requirements of the weekly planning meeting.

202-P01 REMOVAL OF CONCRETE: Concrete roadway, concrete sidewalk, curb, and curb and gutter designated for removal may vary in thickness. There will be no additional compensation for the removal of extra thickness. Include the removal of aggregate or embankment beneath the roadway, sidewalk, curb and curb and gutter in the costs of "Removal of Concrete Pavement" or "Removal of Curb & Gutter" bid items.

202-P02 REMOVAL OF BITUMINOUS SURFACING: Bituminous surfacing designated for full depth removal may vary in thickness. There will be no additional compensation for the removal of extra thickness. Include any costs for the removal of aggregate or embankment beneath the pavement in the "Removal of Bituminous Surfacing" bid item.

202-P03 REMOVE AND RESET CONCRETE PARKING BLOCKS: Remove and reset existing concrete parking blocks to their original position. Include all labor and equipment to remove and reset concrete parking blocks in the costs of "Removal of Concrete Pavement" or "Removal of Bituminous Surfacing".

411-P01 TEMPORARY ASPHALT WEDGES: After milling, place temporary asphalt wedges at drop off locations open to traffic.

411-P02 MILLING: Remove surfacing to form a straight vertical line at intersecting streets. Place the pavement overlay within 4 working days of milling the pavement surface.

430-P01 CONTRACTOR CORING: Before placing bituminous material into core holes, apply a tack coat on all sides of the core holes as specified in Section 401.

430-P02 PATCHING: Submit a mix design that meets FAA 43 for approval. The Hot Mix Asphalt used for patching will be accepted by one random aggregate and mix sample representing the plan quantity for the project.

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.
TRAFFIC CONTROL PHASING: The traffic control details, as indicated on the plans, have been developed on the basis that this project will be constructed in phases as described below. The work zone traffic control summary lists include the required number of devices for each phase of work. Devices will be moved as required for each phase. The following traffic control phasing for the construction of pedestrian ramps, new curb and gutter, signals, lighting, and mill & overlay has been developed for this project:

Phase 1: Construct proposed ADA Ramps on South Side of Burdick Expressway.
- Work area is restricted to a maximum of two quadrants of an intersection at one time. Multiple intersections can be worked on concurrently, no more than three intersections can be worked on concurrently. No two consecutive signalized intersections can be worked on concurrently.
- (1) Lane closure adjacent to the curb and gutter.
- Maintain two lanes of traffic at all times.
- Provide temporary curb ramps, pedestrian channelization, and temporary pedestrian surfacing.
- Construct proposed pedestrian ADA ramps at all intersections, including new curb and gutter, ramps, landings (upper and lower landings), signal foundations (where applicable), and full depth pavement replacement (where applicable).
- Provide temporary pedestrian surfacing to transition proposed sidewalk into existing sidewalk. If the cross slope of the existing sidewalk exceeds 2%, transition the temporary pedestrian surfacing at a maximum rate of 0.5% per 1 linear foot of surfacing.

Phase 2: Construct proposed ADA Ramps on North Side of Burdick Expressway using the same requirements as Phase 1.

Phase 3: Mill and overlay pavement on Burdick Expressway, install permanent pavement markings, signals, and lighting utilizing lane closures and flagging.
- Complete Phase 1 & 2 prior to starting Phase 3.
- Work area limited to exterior lanes adjacent to curbs.
- Two lanes closures are provided in this phase.

Phase 4: Mill and overlay pavement on Burdick Expressway and install permanent pavement markings utilizing lane closures and flagging.
- Work area limited to interior (2) middle lanes.
- Two lanes closures are provided in this phase.

TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the layouts shown in the plans and the following layouts shown on the Standard Drawings:
- D-704-25 Type X,
- D-704-34 Lane closure

TRAFFIC CONTROL DEVICES: Traffic control devices have been provided for a single full lane closure of 3 separate sites simultaneously. A site is defined as a work zone of half of an intersection. Closure of the outside driving lane will be permitted during daylight hours while construction within the intersection is active. Remove temporary lane closures at the end of each working day if possible. Lane closures must remain at all times if there are drop offs within the work zone. If ordinary operation is not restored, provide 24-hour flagger operations until normal traffic operation can be restored. No additional payments will be made for flagging if ordinary traffic operation is not restored at the end of each working day.

The following devices remain in place for the duration a construction site is active:
1. W20-1-48 – Road Work Ahead
2. G20-2-48 – End Road Work
3. All pedestrian signing devices – See Section 100
4. All lane narrowing devices
5. Temporary safety fence and devices adjacent to active work zones
6. Pedestrian temporary railings and curb ramps – See Section 100

Supply and maintain temporary ramps and pedestrian rail system as shown in the plans. Include all costs associated with supplying and maintaining devices in the price bid for “Traffic Control Signs”.

LABORATORY: Supply a copy machine, with reduction capabilities, and toner for the Bituminous Laboratory. Include the cost for these items in the contract unit price bid for “Bituminous Laboratory”.

INLET PROTECTION: Furnish, install and maintain (clean) drainage inlet filter assemblies to collect sediment in surface storm water runoff. Dispose of debris or silt that has accumulated in the bag. Periodic cleaning of the filter is needed as necessary. Remove drainage inlet filter when vegetation has established.

Provide Wimco, Lange IPD, Flexstorm, Danady Curbsack, or an approved equal.

Keep filter in place until after the gradient surfaces are stabilized and the surrounding street is clean of debris. Include all costs related to the material, installation, maintenance, replacement and removal in the price bid for “Inlet Protection-Special”.

NOTES

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Keep filter in place until after the gradient surfaces are stabilized and the surrounding street is clean of debris. Include all costs related to the material, installation, maintenance, replacement and removal in the price bid for “Inlet Protection-Special”.

This document was originally issued and sealed by Derek Anderson, Registration Number PE-7107, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
722-P01 ADJUST GATE VALVE: Install debris plugs into all gate valve boxes when they are adjusted. Include all labor, equipment and materials required to install the plugs in the price bid for “Adjust Gate Valve”.

722-P02 INLET CASTING TYPE 1: All costs associated with the removal of the existing castings and installation of new Neenah R-3065 Type L, EJ 7010 Type M4, or approved equal casting and grates and including a 2 inch radius curb box will be included in the price bid for “Inlet Casting Type-1”.

722-P03 INLET CASTING TYPE 2: All costs associated with the removal of the existing castings and installation of new Neenah R-3067 Type L, EJ 7030 Type M6, or approved equal casting and grates and including a 2 inch radius curb box will be included in the price bid for “Inlet Casting Type-2”.

748-P01 CURB & GUTTER: The standard curb and gutter will be 6 inches; however, the height may need to be adjusted to match the height of the existing curb and gutter (up to 9”). The height adjustment and all other costs when matching the existing curb height will be included in the costs of “Curb & Gutter”.

748-P02 CURB-TYPE 1: The height of the “Curb-Type 1” will vary depending on the existing locations and will need to match the existing elevations at tie in locations.

750-P01 DETECTABLE WARNING PANELS: Panels may need to be cut or modified in the field to fit the proposed design.

750-P02 DETECTABLE WARNING PANELS: Install unpainted, cast iron plates manufactured by East Jordan Iron Works, Neenah Foundry, or approved equal.

750-P03 PIGMENTED IMPRINTED CONCRETE: The concrete boulevard will be a colored and stamped 4” sidewalk with a brick running bond pattern and colored release agent/color hardener. Include an integral concrete color mix, either dry or liquid and include a colored stamp release agent to be selected upon approved color choice below. Develop a mix design using any size coarse aggregate specified in Section 802.01 C.2, “Coarse Aggregate” and with a 60-40 fine aggregate-coarse aggregate ratio. Provide a dark gray pigmentation that meets the requirements of ASTM C 979 and that matches the adjacent pigmented imprinted concrete.

Use the same supplier for all colored concrete placed under contract. The color is to be uniform throughout the project.

Cure and seal concrete using a curing compound that meets the requirements of ASTM C 309, Type 1 and include slip resistant additive. Include all costs in the price bid for “Pigmented Imprinted Concrete”.

750-P04 SIDEWALK AGGREGATE: Provide aggregate needed to grade sidewalk meeting specifications of “Aggregate Base Course CL 5”. Include all costs associated with aggregate in the price bid for “Sidewalk Concrete 4in.”

750-P05 ADA RAMPS AND LANDINGS: Dimensions shown in Section 80 are approximate. Adjustments may be required so maximum grades are not exceeded. Flatter grades or slopes may be used as directed by the Engineer.

The designated ADA turning spaces as designated in Section 80 per the legend as “Landing Area” are to be placed separately and installed prior to adjacent ADA ramps and/or sidewalks allowing for a minimum of 24 hours of cure time.

754-P01 PEDESTRIAN/SCHOOL CROSSING SIGNS: The pedestrian, school crossing sign, and associated auxiliary signs shall have a fluorescent yellow green background with black letters and border.

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.

970-P01 LANDSCAPE PREPARATION: Minimal grading will be required adjacent to the locations designated for sidewalk and curb & gutter replacement. Blend the existing topsoil adjacent to the sidewalk and or curb & gutter to eliminate any steep slopes or vertical edges. Any excess topsoil will become property of the Contractor and must be removed from the project site. Any needed topsoil must be imported to the project if necessary. Include all costs associated with topsoil in the contract price for “Landscape Preparation”.

There are existing wood timbers adjacent to the sidewalk in the SE quadrant of 2nd St SE and Burdick Expressway. Replace disturbed timbers with like new timbers. Replace topsoil in this quadrant, no seeding is required in flower bed areas. Include all costs associated with the timbers and topsoil in the contract price for “Landscape Preparation”.

Use sod as specified in Section 252 of the NDDOT Standard Specifications for all grass areas.

Areas sodded after September 15 will not be accepted until they show evidence of established growth after May 15 of the following year. Water sodded areas a minimum of 4 weeks after placement in order to provide sufficient moisture for growth. Prevent runoff or puddling. Do not drive water trucks over turf areas.

Perform maintenance on sodded areas for 4 weeks after completion of sodding over the entire disturbed area. Maintenance of the sodded areas includes eradicating weeds, maintaining erosion control devices, protecting installed areas from traffic, mowing, watering & post fertilization. Repair and re-establish areas that are rutted, damaged or destroyed at the Contractor’s expense. Mow sodded areas 24 hours prior to final inspection. Sodded areas will be rejected if they contain weeds or bald spots larger than 3” in diameter. Include the cost for materials, equipment, labor, maintenance and incidentals in the contract price for “Landscape Preparation”.

This document was originally issued and sealed by Derek Anderson, Registration Number PE-7107, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
SECTION 140

770-P01 LIGHT STANDARD 6FT MA 40FT MT HT FESTOON BREAKAWAY: The light standard is of the davit type constructed of galvanized steel. Festoon GFCI receptacle with in-use weatherproof cover. Contractor to verify receptacle mounting orientation and height to match existing during shop drawing submittals. Provide breakaway transformer base.

770-P02 LED LUMINAIRE: Provide LED luminaires with the following specifications:

- Light Output: Minimum of 23,037 delivered lumens.
- Color Temperature: 3000K.
- Wattage: 177 watts maximum.
- Voltage: Multi-voltage operation from 120 to 277 volts. Project voltage: 240V.
- Housing: Diecast aluminum with tool-less entry. Gray finish.
- Surge Suppression Rating: ANSI/IEEE C62.41 Cat C
- Operating Range: -40°C to 40°C

LED Luminaire basis of design and approved for use on this project is American Electric Lighting, Model ATB2 80BLED70 MVOLT R2 3K NR.
772-009 PADLOCKS: Obtain padlocks for feed points from the City of Minot.

772-P01 TRAFFIC SIGNAL SYSTEM: Include in the price bid for “Traffic Signal System – Site _” all labor and equipment necessary for the signal system to be fully operational as shown in the plans upon construction completion. This includes but is not limited to, the installation of the following features where applicable: traffic signal standards and foundation, vehicular heads, video detection system, traffic signal controller and all ancillary hardware (conflict monitor, load switch, flasher, etc.), controller cabinet and foundation, and all cable, conduit, junction boxes, and appurtenances to install the traffic signal system completely.

772-P02 SIGNAL POLES AND COMBINATION LIGHT AND SIGNAL STANDARDS: Provide signal poles with rotatable mast arms.

772-P03 TRAFFIC SIGNAL STANDARDS BASE: Provide traffic signal standards with “T” transformer base type standards. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for “Traffic Signal System – Site _”.

772-P04 TRAFFIC SIGNAL CONTROLLER: Provide Econolite ATC Cobalt G controllers for all intersections. The controllers will be NEMA Standard ATC volume density controllers with the traffic counting capability operational. This also includes any programming and data entry (i.e. signal timing plans) necessary to provide fully functional traffic signal controllers. Coordinate with the City of Minot Traffic Engineer, Stephen Joersz, at 701-857-4100 for signal timing plans to be programmed into the controllers. Include all costs, labor, materials and equipment necessary for programming and installing this item in the price bid for “Traffic Signal System – Site _”.

772-P05 TRAFFIC SIGNAL CABINET: Provide Econolite Super R 65 cabinet for all intersections. Provide all equipment required to install a fully functioning operational cabinet. This includes but is not limited to the cabinet, battery back-up, detector amplifiers (furnished and installed), other ancillary signal components (such as load switches, conflict monitors, etc.), concrete foundation, and controller cabinet components connected as required to make the new controller equipment operational with the proposed signal equipment. Provide a GFCl receptacle in each controller cabinet. Include all costs, labor, materials and equipment necessary for programming and installing this item in the price bid for “Traffic Signal System – Site _”.

772-P06 BATTERY BACK-UP: Equip the traffic signal cabinets with an “on-line” type Uninterruptible Power Supply (UPS) that provides power conditioning in both normal and backup mode. Provide UPS that are ethernet capable. Size the UPS to provide backup power to the system for a minimum of 8 hours in full signalized operation with a 450-watt load. Provide aux contacts to put the system into flash operation. The UPS will incorporate full power management and diagnostic function.

The UPS will automatically provide battery back-up power to the controller system with no interruption when the electric utility power supply de-energizes. The UPS will operate such that it does not provide power to the de-energized incoming electric utility service conductors.

Install the UPS in a temperature and humidity controlled environment. Install the UPS in a separate enclosure on the same pad as the signal controller cabinet. Include all materials, labor and equipment necessary to furnish and install the battery back-up in the price bid for “Traffic Signal System – Site _”.

772-P07 TRAFFIC SIGNAL CABINET FOUNDATION: Construct a concrete foundation as shown on standard drawing D770-1 along with three spare 2” conduit sweeps. Extend the controller cabinet pad mount foundation so there is a minimum of 3’ of clearance from the outside edge of the cabinets to the outside edge of the foundation on any side.

When setting traffic signal cabinet enclosures directly on the concrete foundation, sealant is to be placed on the concrete foundation prior to setting the enclosure. Also, caulk the concrete/enclosure interface both inside and outside of the enclosure.

Furnishing and installing the cabinet foundation is included in the price bid for “Traffic Signal System – Site _”.

772-P08 CONTROLLER WORKING SLAB: Install 4” thick controller working slabs that are 6 feet wide and extend a minimum of 4 feet from the face of the controller foundations. Reinforce the slabs with 6” x 6” x 10 GA welded wire fabric and tie the slabs to the controller foundations with 18-inch long #3 rebar spaced 18 inches on center. Provide a slope of .25 inches per foot away from the controller cabinet foundations. Install the slabs to be 2” higher than the closest point of the top of the slab to finished grade.

Furnishing and installing the working slabs is included in the price bid for “Traffic Signal System – Site _”.

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
772-P09 SIGNAL EQUIPMENT:
A. Provide steel signal plumbizer and pedestal adapters/collars.
B. Provide 12-inch vehicle heads comprised of polycarbonate, colored black.
C. Provide stainless steel
D. Fasteners and use anti-seize lubricant on all threaded components.
E. Provide signal visors comprised of polycarbonate, colored black, tunnel.
F. Provide 5-inch backplate with 1-inch wide yellow retroreflective Type IX border. Material is to aluminum and backplate to be louvered.
G. Provide two-point mounting system such as Astro Brackets, Sky Brackets or approved equal for all mast arm mounted signals. Colored black.
H. Provide 16-inch pedestrian heads with countdown displays, constructed of aluminum alloy die cast, 16-inch tunnel visor. Provide stainless steel fasteners and use anti-seize lubricant on all threaded components.
I. Provide LED indications on all new signal heads.

Furnishing and installing signal equipment is included in the price bid for “Traffic Signal System – Site _”.

772-P10 SIGNAL COMPONENT COLOR: Paint all traffic signal system components black.

772-P11 EMERGENCY VEHICLE PRE-EMPTION: Notify the Fire Chief, 701-857-4740, when the EVP systems are tested and operable. Provide Opticom EVP equipment that is fully compatible the current City of Minot system. The City of Minot Fire Department will set the range of the system.

772-P12 WIFI PANEL: Provide a Wi-Fi Panel as shown in Section 150. Install the Wi-Fi Panel in the traffic signal cabinet at the intersection of Site 1 - Burdick Expwy and Main St S, Site 2 - E Burdick Expwy at 3rd St SE, and Site 3 - E Burdick Expwy and Valley St. Include all costs for the Wi-Fi Panel in the price bid for “Traffic Signal System – Site _”.

772-P13 VIDEO DETECTION SYSTEM: Provide Autoscope Vision Video Detection Equipment for each signalized intersection. Provide all cable connections, camera aiming and system set-up, including programming detection zones and verification of reliable operation by the manufacturer’s representative. The location of cameras in the plans are for reference only. Include an extra camera / processor, interface panel and detector port master for each Video Detection System. Provide a supplier warranty for the video detection system that is for a minimum of three years after final inspection and acceptance. Provide ongoing software support by the supplier and include updates of the MVP sensor and application software. Provide these updates free of charge for one year after final inspection and acceptance.

Provide all labor and equipment necessary for the video detection system to be fully operational. Include all costs, labor, materials and equipment necessary for furnishing and installing the video detection systems in the price bid for “Traffic Signal System – Site _”.

772-P14 CONDUIT: Seal all conduits with duct seal at the controller cabinet and at the traffic signal standard foundations. Install three spare 2” conduit sweeps in the controller cabinet foundation and one spare 2” conduit sweep in each traffic signal standard base. Cap spare conduits with an oil-tight plug with wing nut and labeled as to which direction they face.

772-P15 LABEL ALL FIELD CABLES: Provide labeling materials as approved by the City. Install the labels so they are readable without moving the cables. Label all field cables with the cable designations:

<table>
<thead>
<tr>
<th>Type</th>
<th>Label</th>
<th>Label Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Card</td>
<td>Comm./address of other end</td>
<td>Within 12” of</td>
</tr>
<tr>
<td>Pedestrian Pushbutton</td>
<td>Phase/Location (i.e. NW, SW, etc.)</td>
<td>Within 6” of</td>
</tr>
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<td>Video Detection Cable</td>
<td>Approach Detection (i.e. NW, SW, etc.)</td>
<td>Within 6” of</td>
</tr>
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<td>Control Cable</td>
<td>Cable Number &amp; Location (i.e. NW, SW, etc.)</td>
<td>Within 12” of</td>
</tr>
<tr>
<td>EVP Cable</td>
<td>Pre-Empt Number/Location (i.e. NW, SW, etc.)</td>
<td>Within 6” of</td>
</tr>
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</table>

Cost to be included in the price bid for “Traffic Signal System – Site _”.

772-P16 CONTROLLER CABINET WIRING DIAGRAM: Label the following items on the cabinet wiring diagram, in addition to information required by NDDOT Standard Specification.
A. The camera number (i.e., D2-1) from the plan shall be labeled on the detector panel drawing adjacent to the point for termination.
B. The field wire terminals for the vehicle/pedestrian head control cables shall be labeled with the phase number and direction (i.e., Ø2, SB).
C. The field wire terminals for the Opticom cable shall be labeled with the pre-empt number (i.e., Ø2, SB).
D. The field wire terminals for the Opticom cable shall be labeled with the pre-empt indicator lamps shall be labeled with the pre-empt number and direction (i.e., Ø2, SB).
E. The field wire terminals for the pedestrian push-button cables shall be labeled with the phase number (i.e., Ø2 PED).
F. Provide an intersection diagram on cabinet door showing phasing of intersection and camera numbering and detection zone numbering.
G. Provide a CAD drawing file of the as-built cabinet wiring diagram.

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
772-P17 TRAFFIC SIGNAL PULL BOXES: Provide polymer concrete type pull boxes for the traffic signal systems. Clearly mark the cover as "Signal" as required. See standard drawing D770-3 for details. Duct seal all conduits entering and exiting pull boxes. Provide the style as shown on the standard drawings and include the stackable bottom extension with knockouts. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for "Traffic Signal System – Site _".

772-P18 ACCESSIBLE PEDESTRIAN SIGNALS (APS) PUSHBUTTON AND SIGN: Shall include the features, installation procedures, and be compliant with the following:

A. Features:
   1. Rapid tick WALK indication, no more than 2-5dBA above ambient sound
   2. Vibrotactile WALK indication
   3. Speaker and vibrotactile indication located at pushbutton
   4. Pushbutton locator tone
   5. Tactile arrow on each device aligned in direction of travel on the crosswalk

B. Installation Procedures
   1. APS should be reachable from the level landing of the curb ramp for the crossing or from a level surface with an accessible path to the ramp (MUTCD Section 4E.08 and Proposed and Draft PROWAG).
   2. APS should be within 5 feet of the crosswalk line furthest from the center of the intersection and within 10 feet of the curb (MUTCD Section 4E.08).
   3. Tactile arrow shall be aligned with parallel to the direction of travel on the crosswalk (MUTCD Section 4E.12, P1).
   4. Pushbutton required to be located within reach range for wheelchair users (Proposed PROWAG, R406).

C. Code Compliance:
   1. Functionality: MUTCD 2009 - 4E
   2. Temperature and Humidity: NEMA TS 2
   3. Transient Voltage Protection: NEMA TS 2
   4. Transient Suppression: IEC 61000-4-4, IEC 61000-4-5
   5. Electronic Noise: FCC Title 47, Part 15, Class A
   6. Mechanical Shock and Vibration: NEMA TS 2
   7. EN4 PBS Enclosure: NEMA 250 - Type 4X
   8. Electrical Reliability: NEMA TS 4

The cost for the accessible pedestrian signals pushbutton and sign shall not be bid separately but shall be included in the item "Traffic Signal System – Site _".

772-P19 REMOVE TRAFFIC SIGNAL SYSTEM: Remove the existing traffic signal systems and deliver to the City of Minot Traffic Department all the items in which the City deems salvageable. Contact Dave Rodman in Minot Traffic Division at 701-857-4100 a minimum of 24 hours prior to delivery. The remaining items become the property of the Contractor. Include all costs for removal of the traffic signal systems in the price bid for "Traffic Signal System – Site _".

772-P20 REPAINT TRAFFIC SIGNAL STANDARDS PROCESS: For "TRAFFIC SIGNAL SYSTEM - SITE 1", the Contractor shall repaint the northwest (NW) and southeast (SE) existing traffic signal standards. The Contractor shall complete the following, but not limited, steps to provide traffic signal standards up to date with the most current City of Minot Specifications.

A. Signal standards (post, mast arm, luminaire and luminaire extension) are to be taken down and coated off site. Remove all mounting material, signs, signals and pedestrian pushbuttons.
   1. For areas that are currently painted, solvent clean and remove all contaminants using SSPC-SP-1 (Solvent Cleaning) measures.
   2. Solvent Cleaning (SSPC-SP1) refers to surface preparation to remove soluble substances from steel. Before a paint or other protective coating is applied, a solvent is used to remove all visible oil, grease, dirt, drawing or cutting compounds or other soluble contaminants. Solvents may include steam, emulsifying agents or other cleaning compounds.
      A. Painted locations only: Additionally, abrasive brush blast to remove loosely adhered coating, provide a uniform 1.5 mil profile across existing tightly adhered coating and galvanizing.
      B. Galvanized locations only: surfaces are to be prepared in accordance to ASTM D6386. Surfaces shall be clean, dry and free of contamination.
   3. Before the primers and paint are applied, the signal standards are to be inspected by the City of Minot to ensure that the signal standards are properly solvent cleaned and free of contaminates. Signal standards may need additional cleaning at the Engineer's discretion.
   5. Apply Tie-Coat/ Primer: Series 161 Tnemec-Fascure between 3.0 mils to 5.0 mils DFT as per manufactures recommendations. Tnemec color code is to be 35GR. Tnemec color code 35GR is a match to the code is to be 35GR. Tnemec color code 35GR is a match to the
   6. Apply Finish Coat: Series 740 UVX between 3.0 mils to 5.0 mils DFT as per manufactures recommendations. Tnemec color code is to be 35GR. Tnemec color code 35GR is a match to the
   7. Application of all materials shall follow the manufacturer's directions for use.
   8. Clean all debris off terminal boards with compressed air or still bristle broom. Apply coating of approved red insulation varnish to terminal block.

B. The Contractor shall guarantee all materials, work, and equipment for a period of at least five years from the date of final acceptance. Contractor is required to get a certified warranty from the paint applicator to the City of Minot covering all labor and materials if the paint fails. Cost of warranty shall be included with the price bid for "Traffic Signal System-Site 1".

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
772-P21 FATIGUE CATEGORY: The contractor is to provide traffic signal standards that meet or exceed the fatigue categories listed below for each traffic signal standard. Include all costs associated with fatigue categories in the price bid for “Traffic Signal System – Site _”.

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<tr>
<th>Location of Signal Standard</th>
<th>Fatigue Category</th>
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<tr>
<td>Site 1 – Burdick Expwy and S Main St</td>
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<tr>
<td>- Northeast Signal</td>
<td>Category I</td>
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<tr>
<td>- Southwest Signal</td>
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<tr>
<td>Site 2 – E Burdick Expwy and 3rd St SE</td>
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<td>Site 3 – E Burdick Expwy and Valley St/Front St</td>
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772-P22 PROTECTIVE BOLLARDS: The contractor is to provide and install hour (4) protective bollards near the E Burdick and 3rd Street SE traffic signal cabinet. The protective bollard is to follow the detail shown on Section 150 Sheet 11. Include all labor and materials associated with the protective bollards in the price bid for “Traffic Signal System – Site 2”.

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
772-P23 FLASHING BEACON-MA MOUNTED: Provide all components for a complete and functioning Rectangular Rapid Flashing Beacon (RRFB) warning system meeting the conditions set by FHWA for MUTCD interim approval IA-21 as well as all current FHWA interpretations.

The system will be 120VAC wired, not wireless, and include all foundations, poles, cables, conduit, LED light bars, pedestrian pushbuttons, controller, cabinet, power supply, mounting hardware, and any other equipment required for operation. Mount and wire all equipment according to the manufacturers’ recommendations.

Reuse the existing flashing beacon electrical service. Disconnect and remove the existing flasher cabinet including timer used to operate the existing flashing beacons. Keep the existing meter socket in place. Provide a new 30 amp fused main disconnect switch rated for service entrance. Provide new grounding as required by the NEC and State Electrical Code. Provide in-line fuseholder, fused at 10 amps at base of pole. Use enclosures and equipment that are outdoor rated with a minimum NEMA 3R rating.

Provide RRFB light bars with the following features:
- Black powder coated aluminum housings
- Each light bar containing two SAE J595 class 1 certified, rectangular array, yellow LED light sources with side-mounted LEDs for indication to pedestrians
- Auto-dimming capable. Dimming to be turned off for initial programming
- Adjustable flashing duration. Set the light bars to flash for 20 seconds when activated for initial programming

Provide pedestrian pushbuttons and signs according to 772-P18.

Paint the RRFB signal standards, mast arms, and pushbutton housings black to match traffic signal system components. Use only steel plumbizer and adapters/collars.

Include all costs associated with supplying and installing a complete and functioning system in the bid item “FLASHING BEACON-MA MOUNTED”

772-P24 PROTECTIVE BOLLARDS: The contractor is to provide and install hour (4) protective bollards near the E Burdick and 3rd Street SE traffic signal cabinet. The protective bollard is to follow the detail shown on Section 150 Sheet 11. Include all labor and materials associated with the protective bollards in the price bid for “Traffic Signal System – Site 2”.

This document was originally issued and sealed by Brent Muscha, Registration Number PE-7123, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
ENVIRONMENTAL NOTES (EN): There were no environmental commitments required to secure approval of this project.
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<td>EA</td>
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<td>LANDSCAPE PREPARATION</td>
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</table>
MATERIALS
Superpave FAA 45 @ 2.0 Ton/CY
PG 58H-28 Asphalt Cement @ 6.0%
Tack Coat @ 0.05 Gal/SY
Patching (FAA 45) @ 2.0 Ton/CY
Includes: PG 58S-28 Asphalt Cement @ 6.0%
Tack Coat @ 0.05 Gal/SY

SHORT TERM 4IN LINE_TYPE NR
1 Application of 4 inch line at skip and double barrier locations. 5,285 LF

Coring

<table>
<thead>
<tr>
<th>430 1000: CORED SAMPLE</th>
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<tr>
<td>Specification Section</td>
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<td>430.0412.133 (Other)</td>
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<td>SSP 4 (Longitudinal Joint Density)</td>
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<td>Total</td>
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</table>

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Weighted Fiber Roll Detail

Notes:
1. Provide materials that meet the following specifications:
   - Netting tube filled with wood curled excelsior and weighted inner core.
   - Roll Diameter: 6 inches
   - Weight: 8.33 Pounds per Linear Foot
2. Place weighted fiber rolls down slope from unprotected downstream areas, tight against and along the curb and gutters, to provide complete protection.
3. Remove and properly dispose of accumulated silt and debris to allow for proper function of device after every rain event, or as necessary for proper function.
4. Price includes weighted fiber roll, placement, and maintenance after each rain event. All cost related to this work shall be included in the price bid for "Weighted Fiber Rolls".
5. Removal of weighted fiber rolls shall be done after the up gradient surfaces are stabilized and surrounding streets and gutters are clean of debris.
6. Fiber Roll should be placed to avoid being in driving lane.
Pavement Patching Areas (Parking Lots) (Locations Vary)

Depth Varies

Existing Base

Existing Pavement

4" (Min.) Asphalt Patching

24"

Pavement Patching Areas (Against Curb) (Locations Vary)

Vertical Edge

2" (to allow for overlay)

Existing Base

Existing Pavement (8" Approx.)

2" Mill and Overlay

Vertical Edge

2" Mill and Overlay

Patching Detail

US 2 Business / Burdick Expy
Curb-Type I Adjacent to Landscape

Notes:

1. All Curb-Type I contraction joints to match concrete walk joints.
2. End tapers at transition section to match inplace sidewalk grades.
3. All Curb-Type I to match bottom of adjacent walk.

See curb ramp details of Curb-Type I.

Curb-Type I Intersection
Notes:
1. Existing cross-slope greater than 2%.
2. When PAR width is greater than 6' or the running slope is greater than 5% double the calculated transition length.

LEGEND
1. Transition panel(s) - To be used for transitioning the cross-slope of a ramp to the existing walk cross-slope. Rate of transition should be 0.5% per 1 linear foot of walk.

2. Existing Sidewalk
3. Transition Panel
4. Ramp
5. Landing
6. Length
7. 2.0% Max.
8. (VAR.)
9. Inset A

EXISTING WALK CROSS-SLOPE. RATE OF TRANSITION SHOULD BE 0.5% PER 1 LINEAR FOOT OF WALK.

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Hydrant Replacement
US 2 Business / Burdick Expwy
3rd St SE

Notes:
1. Include costs for ductile iron fittings in bid price for "Gate Valve & Box 6IN" and "6IN Hydrant".
2. Use MJ x MJ gate valve.
3. Include costs for 6" PVC Watermain in bid price for "Gate Valve & Box 6IN" and "6IN Hydrant".
4. Include costs for removing the existing cast iron pipe in bid price for "Remove Gate Valve & Box" and "Remove Hydrant".
5. Contractor is responsible for removing/repairing embankment as needed for the gate valve and hydrant replacement. Include all costs in bid price for "Gate Valve & Box 6IN" and "6IN Hydrant".

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Removal Limits

Removal of Bituminous Surfacing

Removal of Curb & Gutter

Removal of Concrete Pavement

<table>
<thead>
<tr>
<th>SPEC CODE</th>
<th>BID ITEM</th>
<th>REMOVAL OF CONCRETE PAVEMENT</th>
<th>QTY</th>
<th>UNIT</th>
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<td>202 014</td>
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<td>NE Quad</td>
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<td>31</td>
<td>SY</td>
</tr>
<tr>
<td>SW Quad</td>
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<table>
<thead>
<tr>
<th>SPEC CODE</th>
<th>BID ITEM</th>
<th>REMOVAL OF CURB &amp; GUTTER</th>
<th>QTY</th>
<th>UNIT</th>
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<td>SW Quad</td>
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<tr>
<td>NE Quad</td>
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<td>SE Quad</td>
<td>LF</td>
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Note: There is concrete underneath the asphalt wear course in the 3rd St SE intersection.

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<table>
<thead>
<tr>
<th>SPEC CODE</th>
<th>BID ITEM</th>
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<tr>
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<tr>
<td><strong>Removal of Concrete Pavement</strong></td>
<td><strong>Removal of Curb &amp; Gutter</strong></td>
<td><strong>Removal of Bituminous Surfacing</strong></td>
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</table>

**Legend**

- Removal Limits
- Removal of Bituminous Surfacing
- Removal of Curb & Gutter
- Removal of Concrete Pavement

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Removals
US 2 Business / Burdick Expy
Valley St

Legend
Removal Limits
- Removal of Bituminous Surfacing
- Removal of Curb & Gutter
- Removal of Concrete Pavement

Removal of Concrete Pavement

BID ITEM
REMOVAL OF CONCRETE PAVEMENT

UNIT
QTY
SY

SW Quad
8 SY

NE Quad
18 SY

NW Quad
64 SY

SE Quad

SPEC CODE
REMOVAL OF CURB & GUTTER

UNIT
QTY
LF

SW Quad
13 LF

NE Quad
55 LF

NW Quad
10 LF

SE Quad
44 LF

SPEC CODE
REMOVAL OF BITUMINOUS SURFACING

UNIT
QTY
SY

SW Quad
13 SY

NE Quad
18 SY

NW Quad
9 SY

SE Quad

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<table>
<thead>
<tr>
<th>STATE</th>
<th>PROJECT NO.</th>
<th>SHEET NO.</th>
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<th>BID ITEM</th>
<th>UNIT</th>
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**Legend**

- Inlet Protection Special
- Weighted Fiber Rolls

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Temporary Erosion Control
US 2 Business / Burdick Expy
1st St SW
<table>
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<td>LSF</td>
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**LEGEND**
- Inlet Protection Special
- Weighted Fiber Rolls

**Temporary Erosion Control**
US 2 Business / Burdick Expy
3rd St SE
Landscape Preparation

LEGEND

Note: No Work between 1st St NE and 1st St SE

Burdick Expy E I US 2 B

Burdick Expy E I US 2 B
LANDSCAPE PREPARATION

STATE: ND
PROJECT NO: NHU-4-002(131)906
SECTION NO: 77
SHEET NO: 2

0008
SY: SW Quad, NW Quad, SE Quad
970
2
7
9

Timber Wall
Existing Wood
Permanent Erosion Control

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<table>
<thead>
<tr>
<th>LEGEND</th>
<th>BID ITEM</th>
<th>UNIT</th>
<th>QTY</th>
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<tbody>
<tr>
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<td>Landscape Preparation</td>
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Permanent Erosion Control
US 2 Business / Burdick Expy
3rd St SE
NOTE: There is existing rock in place in the SW quadrant of 4th St SE. Salvage existing rock and relay rock after completion of concrete work. Install landscape fabric underneath relayed rock. Include all costs in bid item "Landscape Preparation".
NOTICE OF PROPOSED CONTRACT

STATE: ND
PROJECT NO.: NHU-4-002(131)906

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Legend:
- Steep Ramp: Running Slope Between 5.5% & 9.5% Max / 7.7% Preferred
- Flat Ramp: Running Slope Less Than 5.0%
- Transition Panel Slope, PAR width, and Cross Slope Will Vary
- Pigmented Imprinted Concrete
- Landing Area
- Detectable Warning Panel
- Pavement Patching
- 8” Reinforced Concrete Pavement - 2’ x 2’ Grid

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
3. See Curb - Type I detail in section 20.

Contact:
Alex E. Ausk, PE
North Dakota Department of Transportation
700 State Street
Bismarck, ND 58502-0609
701-328-1900

Alex.E.Ausk@nd.gov

8/11/2020
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Alex E. Aukil,
Registration Number
PE-10915,
on 8/11/2020 and the original document is stored at the
North Dakota Department
of Transportation

ADA Curb Ramp Improvements
US 2 Business / Burdick Expwy
Main St

LEGEND
Sleepy Ramps
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detectable Warning Panel

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred

State of North Dakota
Department of Transportation
Registration Number PE-10915

NO. 80
QTY
UNIT
SHEET NO.
2

SPEC. CODE
748
748
624
750
750
430

DETECTABLE WARNING PANELS
PIGMENTED IMPRINTED CONCRETE
CURB & GUTTER
RESET PEDESTRIAN RAILING
PATCHING
SW Quad
NE Quad
NW Quad
SE Quad

Burndick Expwy W I US 2 B
Burndick Expwy E I US 2 B
Burndick Expwy W I US 2 B
Burndick Expwy E I US 2 B

Figured Imprinted Concrete

Detachable Warning Panel
Pavement Patching

North Dakota Department

Project No. 030
5.7'
2115
LF

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
2. See Standard Drawing C-750-3 for more details.
3. See Curb - Type I dated in section 20.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.

Flare Slope Maximum of 10:1

Steep Ramp
-Running Slope Between 5.5% & 8.5% Max / 7.7% Preferred
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Flat Ramps
-Running Slope Less Than 5.0%
-Cross Slope Maximum of 2.0% / 1.5% Preferred

Transition Panel Slope, PAR width, and Cross Slope Will Vary

Landing Area
-2% Max in All Directions

Detachable Warning Panel
Pavement Patching

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
3. See Curb - Type I detail in section 20.
LEGEND
- Slope Will Vary
- Transition Panel Slope, PAR width, and Cross Detectable Warning Panel
- Flare Slope Maximum of 10:1
- Cross Slope Maximum of 2.0% / 1.5% Preferred
- Running Slope Less Than 5.0%
- Flat Ramp
- All Directions
- Slope Maximum of 2.0% / 1.5% Preferred
- Landing Area
- Cross Slope Maximum of 2.0% / 1.5% Preferred
- Running Slope Between 5.0% & 8.3% Max / 7.7% Preferred
- Steep Ramp

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
3. See Curb - Type 1 dated in section 20.

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Alex E. Ausk, PE
Registration Number 16915,
on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
2. See Standard Drawing C-790-3 for more details.
3. See Curb - Type I detail in section 20.
Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
3. See Curb - Type I detail in section 20.

100% City Participation

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ADA Curb Ramp Improvements
US 2 Business / Burdick Expwy

Notes:
1. Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
3. See Curb - Type I detail in section 20.
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\begin{itemize}
  \item Notes:
  \begin{enumerate}
    \item Any ramp found to be in noncompliance will be removed and replaced by the contractor at their own expense.
    \item See Standard Drawing C-700-3 for more details.
  \end{enumerate}
\end{itemize}
Preliminary Survey Coordinate and Curve Data - Minot Burdick Expwy and Valley St.

### Horizontal Alignment

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### Curve Data

#### 2001
- Radius: 103+52.63
- Offset: 103+52.63

#### 2002
- Radius: 103+52.63
- Offset: 103+52.63

### US Public Land Survey Data

### Survey Control Points

#### Primary Control
- GPS 2-1: 450693.03 1774752.12
- GPS 2-2: 450693.03 1777560.97

#### Secondary Control
- GPS 2-1: 450693.03 1774752.12
- GPS 2-2: 450693.03 1777560.97

### Notes
- Sheet 1 of 1
- Data Survey Completed 07/30/2019
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Survey Data Layout
US 2 Business / Burdick Expy
Main St

Legend
- Pigmented Imprinted Concrete
- Lawnline Area
- Detectable Warning Panel
- Pavement Marking

Notes:
1. Unless otherwise noted, all elevations are to top of sidewalk or top back of curb.

This document is stored at the

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Survey Data Layout
US 2 Business / Burdick Expy
Main St
Notes:
1. Unless otherwise noted, all elevations are to top of sidewalk or top back of curb.

LEGEND
Pigmented Impervious Concrete
Landing Area
Detectable Warning Panel
Pavement Marking

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Notes:
1. Unless otherwise noted, all elevations are to top of sidewalk or top back of curb.

LEGEND

- Pigmented Imprinted Concrete
- Lining Area
- Detectable Warning Panel
- Pavement Marking

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Survey Data Layout
US 2 Business / Burdick Expy
Valley St
TEMP PED RAMP DETAIL: 1

Pertinent Intersections & Quadrants
Main St S: NW, NE, SW, SE (Signalized)
1st St SE: SE
3rd St SE: NW, NE, SW, SE (Signalized)
Valley St: NW, NE, SW, SE (Signalized)

Burdick Expressway

Existing Boulevard
Ramp landing area
Temporary curb ramp
Surface covering
Temporary walkway

Existing Sidewalk
Ramp landing area
Surface covering
Temporary walkway

Pedestrian Walkway*

TEMP PED RAMP DETAIL: 2

Pedestrian Walkway
Pedestrian Channelization
Temporary curb ramp
Delineator Drum

Existing Boulevard
Ramp landing area
Temporary curb ramp
Surface covering
Temporary walkway

Existing Sidewalk
Ramp landing area
Surface covering
Temporary walkway

Pedestrian Walkway
Pedestrian Channelization

Traffic Control Devices (Quantities per Quadrant)
Temporary Curb Ramps: 2 EA
Delineator Drums: 25 EA
Pedestrian Walkway*: 75 LF
*Includes Pedestrian Channelization (Both Sides)

Burdick Expressway

Existing Boulevard
Ramp landing area
Temporary curb ramp
Surface covering
Temporary walkway

Pedestrian Walkway
Pedestrian Channelization
Temporary curb ramp
Delineator Drum

Existing Sidewalk
Ramp landing area
Surface covering
Temporary walkway

Pedestrian Walkway
Pedestrian Channelization

US 2 Business / Burdick Exp

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Sign Summary Perforated Tube
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Sub Total

|                      | Total | 97.4 | Total | 40.0 | 9 | 1 | 0 |

Grand Total

|                      | Total | 97.4 | Total | 40.0 | 9 | 1 | 0 |

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Sign Summary

Perforated Tube

US 2 Business / Burdick Exp'y

8/11/20 8:32:25AM
This document was originally issued and sealed by
Dawn L. Michel,
Registration Number PE-8029,
on 8/11/2020 and the original
document is stored at the
North Dakota Department
of Transportation

Signing
US 2 Business / Burdick Expy
Sta 101+00 to 105+00
Special Assembly A
Area = 4.5 SF
Pavement Marking
US 2 Business / Burdick Expy
Sta 101+00 to 105+00
This document was originally issued and sealed by Derek Anderson, Registration Number PE-7107, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.

Pavement Marking
US 2 Business / Burdick Expy
Sta 105+00 to 109+00
This document was originally issued and sealed by Derek Anderson, Registration Number PE-7107, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.

Pavement Marking
US 2 Business / Burdick Expy
Sta 117+00 to 121+00

8/11/2020 8:30:57 AM Derek Anderson T:\Projects\2019\19.101.0024 NDDOT - Minot Burdick Expy & Valley St\40002906.131\Traffic\120\120MK_005.dgn
Pavement Marking
US 2 Business / Burdick Expy

Sta 121+00 to 125+00
Pavement Marking
US 2 Business / Burdick Expwy
Sta 125+50 to 128+20
Notes:
1. Existing conduit to remain and be modified for new light standard locations. Remove existing conductors and provide new conductors as indicated.

Legend

Existing Light Standard To Remain
Sta 106+12 - 26' UT

Existing Light Standard To Remain
Sta 107+12 - 36' UT

Existing 2" Diameter Rigid Conduit

Lighting System A

Lighting Layout

US 2 Business / Burdick Expwy

Sta 106+00 to 110+00

8/11/2020

Derek Anderson
1. Existing conduit to remain and be modified for new light standard locations. Remove existing conductors and provide new conductors as indicated.

2. Modify/extend existing 2" conduits to new light standard and provide new conductors as indicated.

Removal of existing conductors and installation of new conductors as indicated.

Legend:
- Existing 2" Diameter Rigid Conduit
- #4 RHW
- #6 THW

Notes:
1. Existing conduct to remain and be modified for new light standard locations. Remove existing conductors and provide new conductors as indicated.
2. Modify/extend existing 2" conduits to new light standard location. Provide new conductors as indicated.
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</table>

(A) Do not bid items separately, but include all items in the bid item "Revise Lighting System"

### Light Standard Foundation Table

<table>
<thead>
<tr>
<th>Description</th>
<th>Footing Depth &quot;D&quot; 24&quot; &amp; 30&quot; Diameter</th>
<th>Footing Depth &quot;D&quot; 36&quot; &amp; 42&quot; Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>40' Pole</td>
<td>6'-0&quot;</td>
<td>5'-0&quot;</td>
</tr>
</tbody>
</table>

### Light Standards

<table>
<thead>
<tr>
<th>No.</th>
<th>Station</th>
<th>Luminaire</th>
<th>Circuit</th>
<th>IES - Type</th>
<th>Pole Height</th>
<th>Mast Arm</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Sta 110+73 - 30' Rl</td>
<td>23,037 lumens, 3000K LED</td>
<td>A-1</td>
<td>II</td>
<td>40'</td>
<td>6'</td>
<td>New Light Standard, Foundation, and LED Luminaires</td>
</tr>
<tr>
<td>L2</td>
<td>Sta 110+73 - 30' Rl</td>
<td>23,037 lumens, 3000K LED</td>
<td>A-3</td>
<td>II</td>
<td>40'</td>
<td>6'</td>
<td>Install on Combination Pedestrian Signal &amp; Light Standard</td>
</tr>
</tbody>
</table>

### Conduit / Conductor Run Tabulation

<table>
<thead>
<tr>
<th>Station</th>
<th>Length</th>
<th>Cond.</th>
<th>Cable Trench</th>
<th>Cable Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sta 107+70 - 36' Rl</td>
<td>--</td>
<td>2&quot;</td>
<td>--</td>
<td>700</td>
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<tr>
<td>Sta 110+00 - 30' Rl</td>
<td>--</td>
<td>2&quot;</td>
<td>--</td>
<td>231</td>
</tr>
<tr>
<td>Sta 110+73 - 30' Rl</td>
<td>--</td>
<td>2&quot;</td>
<td>--</td>
<td>891</td>
</tr>
</tbody>
</table>

This document was originally issued and sealed by Wesley Gullicks, Registration Number PE-698, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation

Lighting System A
Tabulation & Quantities
US 2 Business / Burdick Expwy
1. All existing conduit shall be abandoned in place, unless otherwise noted.

Notes:

- Repaint Existing Signal Standard
  See Plan Note 772-P20

- Existing Signal Standard to be removed

- Existing Signal Cabinet to be removed

- Existing Signal Standard to be removed

- Repaint Existing Signal Standard
  See Plan Note 772-P20

- Repaint Existing Signal Standard
  See Plan Note 772-P20

- Existing Signal Standard

- Existing Signal Standard

- Existing Signal Standard
**Traffic Signal Layout**

**Legend**
- Signal Pole/Foundation
- Signal Controller
- Signal Head
- Pedestrian Signal Head

**Pedestrian Pushbutton Schedule**

<table>
<thead>
<tr>
<th>Location</th>
<th>Pushbutton &amp; Sign Location on Pole</th>
<th>Direction of Arrow on Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pushbutton 1</td>
<td>East</td>
<td>Right</td>
</tr>
<tr>
<td>Pushbutton 2</td>
<td>North</td>
<td>Left</td>
</tr>
<tr>
<td>Pushbutton 3</td>
<td>South</td>
<td>Right</td>
</tr>
<tr>
<td>Pushbutton 4</td>
<td>East</td>
<td>Left</td>
</tr>
<tr>
<td>Pushbutton 5</td>
<td>West</td>
<td>Left</td>
</tr>
<tr>
<td>Pushbutton 6</td>
<td>South</td>
<td>Left</td>
</tr>
<tr>
<td>Pushbutton 7</td>
<td>North</td>
<td>Right</td>
</tr>
<tr>
<td>Pushbutton 8</td>
<td>West</td>
<td>Right</td>
</tr>
</tbody>
</table>

**Sta 107+03.2 - 35.2' LT**
- Repaint Existing Signal Pole
  - (See Note 772-P20)
  - Pushbutton 3
  - Pushbutton 4

**Sta 107+01.5 - 33.9' RT**
- SW Combo Type C Signal w/36' MA
  - Pushbutton 1
  - Pushbutton 2

**Sta 107+03.8 - 42.3' RT**
- New Traffic Signal Controller (A)

**Sta 107+03.8 - 42.3' RT**
- New Traffic Signal Controller (A)

**Sta 107+69.6 - 36.5' RT**
- NE Combo Type C Signal w/33' MA
  - Pushbutton 5
  - Pushbutton 6

**Sta 107+70.4 - 34.5' LT**
- NE Combo Type C Signal w/33' MA
  - Pushbutton 5
  - Pushbutton 6

**Notes:**
- Sign R10-3e
  - (A) Face Cabinet door East
1. The final size of all detection zones shall be as recommended by the video detection manufacturer.
Street Name Sign: SN 1 (BURDICK EXPWY)

North Video Detection Unit on 6-foot Riser

Northbound

Note: Install Wi-fi equipment at 40' mounting height on the light standard.
Blank Spaces Denote a 'Red' Indication
G = Green Ball Indication
Y = Yellow Ball Indication
YL = Yellow Left Arrow Indication
YLFA = Flashing Yellow Left Arrow Indication
YR = Yellow Right Arrow Indication

N = Continue to Display Right-of-Way Indication.
When any phase is on alone, any non-conflicting phase may start timing without a clearance interval.

Do not allow Flashing Yellow Arrow (YFA) during Emergency Vehicle Preemption
for Phases 2, 4, 6 and 8.
### Internal Mast Arm/Standard Signal Head Cable

<table>
<thead>
<tr>
<th>Origin</th>
<th>Destination</th>
<th># of Cables</th>
<th>SIZE/TYPE</th>
<th>Total LF</th>
</tr>
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<tbody>
<tr>
<td><strong>Southwest Combo Signal Std</strong></td>
<td>Vehicle Head 1</td>
<td>1</td>
<td>14 AWG 7 CONDUCTOR CABLE</td>
<td>66</td>
</tr>
<tr>
<td>Transformer Base</td>
<td>Vehicle Head 2</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>55</td>
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<tr>
<td></td>
<td>Vehicle Head 3</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>20</td>
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<tr>
<td></td>
<td>Vehicle Head 4</td>
<td>1</td>
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<td>20</td>
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<tr>
<td></td>
<td>Pedestrian Head 1</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Pedestrian Head 2</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>17</td>
</tr>
<tr>
<td><strong>Northwest Combo Signal Std</strong></td>
<td>Vehicle Head 5</td>
<td>1</td>
<td>14 AWG 7 CONDUCTOR CABLE</td>
<td>58</td>
</tr>
<tr>
<td>Transformer Base</td>
<td>Vehicle Head 6</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Vehicle Head 7</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>20</td>
</tr>
<tr>
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<td>Pedestrian Head 3</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
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<td>Pedestrian Head 4</td>
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<tr>
<td><strong>Northeast Combo Signal Std</strong></td>
<td>Vehicle Head 8</td>
<td>1</td>
<td>14 AWG 7 CONDUCTOR CABLE</td>
<td>20</td>
</tr>
<tr>
<td>Transformer Base</td>
<td>Vehicle Head 9</td>
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<td>Vehicle Head 10</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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<td>Vehicle Head 11</td>
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<td>14 AWG 7 CONDUCTOR CABLE</td>
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</tr>
<tr>
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<td>Pedestrian Head 5</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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</tr>
<tr>
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<td>Pedestrian Head 6</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
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</tr>
<tr>
<td><strong>Southeast Combo Signal Std</strong></td>
<td>Vehicle Head 12</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>20</td>
</tr>
<tr>
<td>Transformer Base</td>
<td>Vehicle Head 13</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>57</td>
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<td>Vehicle Head 14</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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<tr>
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<td>Pedestrian Head 8</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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</table>

### Conductor

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Cable NES1</th>
<th>Cable NES2</th>
<th>Cable SES1</th>
<th>Cable SES2</th>
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</thead>
<tbody>
<tr>
<td>Base Trace</td>
<td>Northeast Combo Signal</td>
<td>No. 12 14 AWG</td>
<td>No. 12 14 AWG</td>
<td>No. 12 14 AWG</td>
</tr>
<tr>
<td>1 Black</td>
<td>P6</td>
<td>Ø2 Walk</td>
<td>P7</td>
<td>Ø2 Walk</td>
</tr>
<tr>
<td>2 White</td>
<td>Neutral</td>
<td>Ø5 Walk</td>
<td>Neutral</td>
<td>Ø4 Walk</td>
</tr>
<tr>
<td>3 Red</td>
<td>10, 11</td>
<td>Ø2 Red</td>
<td>12, 13, 15</td>
<td>Ø4 Red</td>
</tr>
<tr>
<td>4 Green</td>
<td>Ground</td>
<td>Spare</td>
<td>Ground</td>
<td>Spare</td>
</tr>
<tr>
<td>5 Orange</td>
<td>10, 11</td>
<td>Ø2 Yellow</td>
<td>12, 13, 15</td>
<td>Ø4 Yellow</td>
</tr>
<tr>
<td>6 Blue</td>
<td>10, 11</td>
<td>Ø2 Green</td>
<td>12, 13, 15</td>
<td>Ø4 Green</td>
</tr>
<tr>
<td>7 White</td>
<td>9</td>
<td>Ø6 Don't Walk</td>
<td>P7, Ø2 Don't Walk</td>
<td>Spare</td>
</tr>
<tr>
<td>8 Red</td>
<td>9</td>
<td>Ø6 Red</td>
<td>16, Ø1 Red</td>
<td>Spare</td>
</tr>
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<td>9</td>
<td>Ø6 Green</td>
<td>16, Ø1 Green</td>
<td>Spare</td>
</tr>
<tr>
<td>10 Orange</td>
<td>9</td>
<td>Ø6 FYA</td>
<td>16, Ø2 FYA</td>
<td>Spare</td>
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</tbody>
</table>

### Conductor

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Cable SWS1</th>
<th>Cable SWS2</th>
<th>Cable NWS1</th>
<th>Cable NWS2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Trace</td>
<td>Southwest Combo Signal</td>
<td>No. 12 14 AWG</td>
<td>No. 12 14 AWG</td>
<td>No. 12 14 AWG</td>
</tr>
<tr>
<td>1 Black</td>
<td>P1</td>
<td>Ø4 Walk</td>
<td>P2</td>
<td>Ø6 Walk</td>
</tr>
<tr>
<td>2 White</td>
<td>Neutral</td>
<td>Ø6 Don't Walk</td>
<td>P3, Ø6 Walk</td>
<td>P4, Ø6 Walk</td>
</tr>
<tr>
<td>3 Red</td>
<td>2, 3</td>
<td>Ø6 Red</td>
<td>4</td>
<td>5, 6, 7</td>
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<td>Ground</td>
<td>Spare</td>
<td>Ground</td>
<td>Spare</td>
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<tr>
<td>5 Orange</td>
<td>2, 3</td>
<td>Ø6 Yellow</td>
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<td>5, 6, 7</td>
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<td>2, 3</td>
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<td>P3, Ø6 Don't Walk</td>
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<td>Ø6 Red</td>
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<tr>
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<td>9</td>
<td>Ø6 Green</td>
<td>16, Ø5 Green</td>
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<td>Ø6 FYA</td>
<td>16, Ø5 FYA</td>
<td>Spare</td>
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<td>11 Blue</td>
<td>9</td>
<td>Ø6 FYA</td>
<td>16, Ø5 FYA</td>
<td>Spare</td>
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<td>12 Black</td>
<td>9</td>
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<td>16, Ø5 FYA</td>
<td>Spare</td>
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<tr>
<td>RUN</td>
<td>ITEM</td>
<td>SIZE (RB)</td>
<td>LF</td>
<td>Origin Destination</td>
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<td>-------------------</td>
</tr>
<tr>
<td>1</td>
<td>Origin Destination</td>
<td>Feed Point: Traffic Signal Controller</td>
<td>Existing</td>
<td>Feed Point: Traffic Signal Controller</td>
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<td>Origin Destination</td>
<td>Pull Box 1</td>
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<td>Origin Destination</td>
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<td>Pull Box 1</td>
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<td>Traffic Signal Controller</td>
</tr>
</tbody>
</table>
Burdick Expwy & Valley Street

Notes:
1. All existing conduit shall be abandoned in place, unless otherwise noted.
TRAFFIC SIGNAL LAYOUT

**Sta 118+09.5 - 34.6' LT**
NW Combo Type C Signal w/36' MA

**Sta 118+01.3 - 34.3' LT**
New Traffic Signal Cabinet (A) w/ 4 Bollards
(See Below)

**Sta 118+19.8 - 35.9' LT**
NW Ped. Pushbutton Post
PushButton 7
PushButton 8

**Sta 118+84.2 - 38.4' LT**
NE Ped. Pushbutton Post
PushButton 1

**Sta 118+95.0 - 31.2' LT**
NE Type IV Signal w/44' MA
PushButton 2

**Sta 118+15.0 - 31.3' RT**
SW Combo Type C Signal w/40' MA
PushButton 5
PushButton 6

**Sta 118+09.5 - 34.6' LT**
NW Ped. Pushbutton Post
PushButton 3
PushButton 4

**Sta 118+15.0 - 31.3' RT**
SW Combo Type C Signal w/40' MA
PushButton 5
PushButton 6

**Sta 119+08.9 - 33.2' RT**
SE Combo Type C Signal w/34' MA
PushButton 3
PushButton 4

**Sta 118+91.2 - 30.9' RT**
SE Ped. Pushbutton Post
PushButton 3
PushButton 4

**Sta 119+08.9 - 33.2' RT**
SE Type IV Signal w/44' MA
PushButton 2

**Sta 118+84.2 - 38.4' LT**
NE Ped. Pushbutton Post
PushButton 1

**Sta 118+95.0 - 31.2' LT**
NE Type IV Signal w/44' MA
PushButton 2

**Sta 118+15.0 - 31.3' RT**
SW Combo Type C Signal w/40' MA
PushButton 5
PushButton 6

**Sta 119+08.9 - 33.2' RT**
SE Combo Type C Signal w/34' MA
PushButton 3
PushButton 4

**Sta 118+91.2 - 30.9' RT**
SE Ped. Pushbutton Post
PushButton 3
PushButton 4

**24" Dia. filled with concrete**

**6" Dia. Smooth Steel pipe filled w/ 3000 PSI concrete. Covered with yellow polyethylene cover.**

**Legend**
- **Bollard**
- **Signal Pole/Foundation**
- **Signal Controller**
- **Signal Head**
- **Pedestrian Signal Head**

**New Traffic Signal Cabinet**
Foundation (33" x 65" min.)
Location to be determined by engineer
Gore Area 8' x 21'

**New Traffic Signal Cabinet Surrounding Area**

**Bollard Post Detail**

**City of Minot Engineering Dept**

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8-11-2020 and the original document is stored at the North Dakota Department of Transportation.
Notes: 1. The final size of all detection zones shall be as recommended by the video detection manufacturer.
BURDICK EXPY & VALLEY STREET
SITE 2
BURDICK EXPY & 3RD ST SE
SIGNAL STANDARDS & HEAD LOCATIONS

Street Name Sign: SN 7 (E BURDICK EXPWY)
11' 14' 14' Thru 9 10 11 10' Min. 12 17' 19'

Video Detection Unit on 6-foot Riser
Ø2 EVP Light
Ø6 EVP Detector

NE Type IV Std
8' Min. (typ.) 10' Min. (typ.)

Left
Southbound
Northbound

Street Name Sign: SN 7 (E BURDICK EXPWY)
37.5' 1 2 4 3 17' 19'

Video Detection Unit on 6-foot Riser
Ø6 EVP Light
Ø2 EVP Detector

NE Type IV Std
8' Min. (typ.) 10' Min. (typ.)

Right
Southbound
Northbound

Video Detection Camera
Traffic Signal Head w/associated phase
Traffic Signal Head w/associated phase

Signal Head Number
EVP Light
EVP Detector

Pedestrian Pushbutton #1 and Post

LEGEND

This document was originally issued and sealed by Stephen R. Joensz
Registration Number PE-27822,
on 8-11-2020 and the original document is stored at the
North Dakota Department of Transportation

City of Minot
Engineering Dept

City of Minot
Engineering Dept

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Note: Install Wi-fi equipment at 40' mounting height on the light standard.
Blank Squares Denote a "Red" Indication

G = Green Ball Indication
Y = Yellow Ball Indication
GL = Green Left Arrow Indication
YL = Yellow Left Arrow Indication
GR = Green Right Arrow Indication
YL = Yellow Right Arrow Indication
FY = Flashing Yellow Arrow Indication
FYA = Flashing Yellow Left Arrow Indication

N = Continue to Display Right-of-Way Indication
When any phase is on alone, any non-conflicting phase may start timing without a clearance interval.
See Chart A.

Do not allow Flashing Yellow Arrow (FYA) during Emergency Vehicle Preemption for Phases 2, 4, 6 and 8.

Emergency Vehicle Preemption Controller Settings:

<table>
<thead>
<tr>
<th>Phase 2</th>
<th>Phase 4</th>
<th>Phase 6</th>
<th>Phase 8</th>
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<tr>
<td>Northbound</td>
<td>Eastbound</td>
<td>Southbound</td>
<td>Westbound</td>
</tr>
<tr>
<td>Head Number</td>
<td>R</td>
<td>Clear to Phase</td>
<td>R</td>
</tr>
<tr>
<td>1</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6</td>
<td>G</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>Y</td>
<td>N</td>
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Chart A

<table>
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<tr>
<th>Phase</th>
<th>Non-Conflicting Phase Allowed to Time Concurrently</th>
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<tbody>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
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<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
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## INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE

### North East Type IV Signal Std Transformer Base

<table>
<thead>
<tr>
<th>Origin</th>
<th>Destination</th>
<th># of Cables</th>
<th>SIZE/TYP</th>
<th>Total LF</th>
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<tbody>
<tr>
<td>Vehicle Head 1</td>
<td>1</td>
<td>14 AWG 7 CONDUCTOR CABLE</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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<td>Vehicle Head 4</td>
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<tr>
<td>Pedestrian Head 1</td>
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<td>14 AWG 5 CONDUCTOR CABLE</td>
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<tr>
<td>Pedestrian Head 2</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
<td>17</td>
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<tr>
<td>Vehicle Head 5</td>
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<th>Conductor</th>
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<th>Cable SES2</th>
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<td>12 No. 14 AWG</td>
<td>7 No. 14 AWG</td>
<td>12 No. 14 AWG</td>
<td>12 No. 14 AWG</td>
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<tr>
<td>Black</td>
<td>P2</td>
<td>Ø2 Walk</td>
<td>P1</td>
<td>Ø8 Walk</td>
</tr>
<tr>
<td>Red</td>
<td>1, 2, 3</td>
<td>Ø2 Red</td>
<td>4</td>
<td>Ø4 Red</td>
</tr>
<tr>
<td>Orange</td>
<td>1, 2, 3</td>
<td>Ø2 Yellow</td>
<td>4</td>
<td>Ø4 Yellow</td>
</tr>
<tr>
<td>Blue</td>
<td>1, 2, 3</td>
<td>Ø2 Green</td>
<td>4</td>
<td>Ø4 Green</td>
</tr>
<tr>
<td>White</td>
<td>P2</td>
<td>Ø2 Don't Walk</td>
<td>P1</td>
<td>Ø8 Don't Walk</td>
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<tr>
<td>Spicer</td>
<td>Spare</td>
<td>Spare</td>
<td>Spare</td>
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<table>
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<td>12 No. 14 AWG</td>
<td>12 No. 14 AWG</td>
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<td>Ø6 Walk</td>
<td>P5</td>
<td>Ø4 Walk</td>
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<td>Red</td>
<td>9, 10, 11</td>
<td>Ø6 Red</td>
<td>12</td>
<td>Ø8 Red</td>
</tr>
<tr>
<td>Orange</td>
<td>9, 10, 11</td>
<td>Ø6 Yellow</td>
<td>12</td>
<td>Ø8 Yellow</td>
</tr>
<tr>
<td>Blue</td>
<td>9, 10, 11</td>
<td>Ø6 Green</td>
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<td>Ø8 Green</td>
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<tr>
<td>Spicer</td>
<td>Spare</td>
<td>Spare</td>
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### Northeast Combo Signal Std Transformer Base

<table>
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<th>Destination</th>
<th># of Cables</th>
<th>SIZE/TYP</th>
<th>Total LF</th>
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<td>Pull Box 4</td>
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<td>Traffic Signal Controller</td>
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<td>Traffic Signal Controller</td>
<td>Pull Box 4</td>
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</tbody>
</table>

**City of Minot**

This document was originally issued and sealed by Stephen R. Joersz, Registration Number PE-27822, on 8-11-2020 and the original document is stored at the North Dakota Department of Transportation.
Sta 126+57.1 - 44.4' LT
NW Combo Type C Signal w/47' MA
Pushbutton 7
Pushbutton 8

Sta 126+53.7 - 32.7' LT
NW Ped. Pushbutton Post
Pushbutton 1

Sta 126+51.6 - 35.3' RT
SW Combo Type C Signal w/53' MA
Pushbutton 6

Sta 126+57.1 - 44.4' LT
NW Combo Type C Signal w/47' MA
Pushbutton 7
Pushbutton 8

Sta 127+24.5 - 42.3' LT
NE Combo Type C Signal w/35' MA
Pushbutton 1

Sta 127+36.0 - 44.0 LT
New Traffic Signal Cabinet (A)

Sta 127+40.9 - 33.4' LT
NE Ped. Pushbutton Post
Pushbutton 2

Sta 127+47.5 - 41.0' RT
SE Combo Type C Signal w/40' MA
Pushbutton 4

Sta 127+55.8 - 34.3' RT
SE Ped. Pushbutton Post
Pushbutton 3

Sta 127+56.8 - 34.3' RT
SE Ped. Pushbutton Post
Pushbutton 3

Sta 127+47.5 - 41.0' RT
SE Combo Type C Signal w/40' MA
Pushbutton 4

Sta 127+40.9 - 33.4' LT
NE Ped. Pushbutton Post
Pushbutton 2

Sta 127+36.0 - 44.0 LT
New Traffic Signal Cabinet (A)

Sta 127+24.5 - 42.3' LT
NE Combo Type C Signal w/35' MA
Pushbutton 1

Sta 126+53.7 - 32.7' LT
NW Ped. Pushbutton Post
Pushbutton 1

Sta 126+51.6 - 35.3' RT
SW Combo Type C Signal w/53' MA
Pushbutton 6

Sta 126+57.1 - 44.4' LT
NW Combo Type C Signal w/47' MA
Pushbutton 7
Pushbutton 8

Sta 127+24.5 - 42.3' LT
NE Combo Type C Signal w/35' MA
Pushbutton 1

Sta 127+36.0 - 44.0 LT
New Traffic Signal Cabinet (A)

Sta 127+40.9 - 33.4' LT
NE Ped. Pushbutton Post
Pushbutton 2

Sta 127+47.5 - 41.0' RT
SE Combo Type C Signal w/40' MA
Pushbutton 4

Sta 127+55.8 - 34.3' RT
SE Ped. Pushbutton Post
Pushbutton 3

Sta 127+40.9 - 33.4' LT
NE Ped. Pushbutton Post
Pushbutton 2

Sta 127+36.0 - 44.0 LT
New Traffic Signal Cabinet (A)

Sta 127+24.5 - 42.3' LT
NE Combo Type C Signal w/35' MA
Pushbutton 1

Sta 126+53.7 - 32.7' LT
NW Ped. Pushbutton Post
Pushbutton 1

Sta 126+51.6 - 35.3' RT
SW Combo Type C Signal w/53' MA
Pushbutton 6
Sta 126+46.3 - 47.7' LT
New Pull Box 5

Sta 126+57.4 - 44.4' LT
NW Combo Type C Signal w/47' MA

Sta 126+53.9 - 32.8' LT
NW Ped. Pushbutton Post

SWS1, SWS2, SWV, ED25, EL16, PB5, PB6

126+15.6 - 35.3' RT
SW Combo Type C Signal w/53' MA

Sta 127+24.5 - 42.3' LT
NE Combo Type C Signal w/35' MA

NWS1, NWS2, SWS1, SWS2, NWV, SWV, ED4, ED26, EL8, EL16, PB7, PB8, PB5, PB6

Sta 127+30.2 - 48.1' LT
New Pull Box 1

Sta 127+39.2 - 36.7' LT
New Pull Box 2

Sta 127+49.0 - 33.4' LT
NE Ped. Pushbutton Post

NE Combo Type C Signal w/40' MA

ED16 = Ø1 Ø6 EVP Detection Unit
ED26 = Ø2 Ø5 EVP Detection Unit
ED4 = Ø4 EVP Detection Unit
ED6 = Ø6 EVP Detection Unit
EL16 = Ø1 Ø6 EVP Light
EL25 = Ø2 Ø5 EVP Light
EL4 = Ø4 EVP Light
EL8 = Ø6 EVP Light
PB1 = Pushbutton 1
PB2 = Pushbutton 2
PB3 = Pushbutton 3
PB4 = Pushbutton 4
PB5 = Pushbutton 5
PB6 = Pushbutton 6
PB7 = Pushbutton 7
PB8 = Pushbutton 8
AC = Antenna Cable

PB7

PB5

PB3

PB1

PB2

PB4

PB5

PB6

PB7

PB8

AC

PB7

PB5

PB3

PB1

PB2

PB4

PB5

PB6

PB7

PB8

AC

PB7

PB5

PB3

PB1

PB2

PB4

PB5

PB6

PB7

PB8

AC

PB7

PB5

PB3

PB1

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AC

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PB5

PB6

PB7

PB8

AC

PB7

PB5

PB3

PB1

PB2

PB4

PB5

PB6

PB7

PB8

AC
### Notes:

1. The final size of all detection zones shall be as recommended by the video detection manufacturer.

### Table: Video Detection Zone Layout

<table>
<thead>
<tr>
<th>Phase Number</th>
<th>Distance from Stop Bar (Feet)</th>
<th>Length (Feet)</th>
<th>Presence/Counting</th>
<th>Passage/Counting</th>
<th>Queue/Counting</th>
<th>Locking Memory</th>
<th>Non-Locking Memory</th>
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LEGEND

- Wi-fi Antenna
- Video Detection Camera
- Traffic Signal Head w/associated phase
- Traffic Signal Head w/o associated phase
- Signal Head Number
- EVP Light
- EVP Detector

Note: Install Wi-fi equipment at 40’ mounting height on the light standard.
BURDICK EXPY & VALLEY STREET
SITE 3
BURDICK EXPY & VALLEY ST
SIGNAL STANDARDS & HEAD LOCATIONS

LEGEND

Video Detection Camera
Traffic Signal Head w/associated phase
Traffic Signal Head w/associated phase
Signal Head Number
Ø EVP Light
Ø EVP Detector

Street Name Sign:
SN 8 (Valley St SE/Front St SE)
SE Combo Type C Std
Ø4 EVP Light
Ø8 EVP Detector
8' Min. (typ.)
10' Min. (typ.)
10' Min.

Video Detection Unit on 6-foot Riser
Ø8 EVP Light
Ø4 EVP Detector
40'
3.5'

Pedestrian Pushbutton 3 and Post
3.5'

3.5'

Pedestrian Pushbuttons and Post

Department of Transportation

North Dakota Department of Transportation

Stephen R. Joersz
Registration Number PE-27822,
on 8-11-2020 and the original
document is stored at the

City of Minot
Engineering Dept

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<th>Phase 1</th>
<th>Phase 2</th>
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<td>Fya</td>
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Blank Spaces Denote a "Red" indication
G = Green Ball Indication
Y = Yellow Ball Indication
CL = Green Left Arrow Indication
YL = Yellow Left Arrow Indication
GR = Green Right Arrow Indication
YR = Yellow Right Arrow Indication
FYA = Flashing Yellow Left Arrow Indication
N = Continue to Display Right-of-Way Indication
When any phase is on alone, any non-conflicting phase may start timing without a clearance interval.
See Chart A.

Do not allow Flashing Yellow Arrow (FYA) during Emergency Vehicle Preemption for Phases 2, 4, 6 and 8.

---

**Chart A**

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<th>Phase</th>
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</tr>
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<td>7</td>
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**Emergency Vehicle Preemption Controller Settings**

- **Northbound**
  - Phase 2: Gl, Y L N N Y L
  - Phase 4: G Y N Y Y
  - Phase 6: Gl, Y L N N Y L
  - Phase 8: Gl, Y L N N Y L

- **Eastbound**
  - Phase 2: Gl, Y L N N Y L
  - Phase 4: G Y N Y Y
  - Phase 6: Gl, Y L N N Y L
  - Phase 8: Gl, Y L N N Y L

City of Minot
Engineering Dept

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## INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE

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<th>Destination</th>
<th># of Cables</th>
<th>SIZE/TYPE</th>
<th>Total LF</th>
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<td>Vehicle Head 4</td>
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<tr>
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<td>Pedestrian Head 2</td>
<td>1</td>
<td>14 AWG 5 CONDUCTOR CABLE</td>
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<td><strong>Southwest Type IV Signal Std Transformer Base</strong></td>
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</table>

### Cable Specifications

**Cable NES1**
- **Northeast Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P2: Ø2 Walk, Indication: Ø2 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø4 Walk, Ø4 Walk, Ø2 Walk
    - **Red**
      - Ø2 Red, Indication: Ø6 Walk, Ø4 Walk, Ø4 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø6 Walk, Ø4 Walk, Ø4 Walk
    - **Orange**
      - Ø2 Yellow, Indication: Ø4 Walk, Ø4 Walk, Ø4 Walk
    - **Blue**
      - Ø2 Green, Indication: Ø4 Walk, Ø4 Walk, Ø4 Walk
    - **White**
      - Ø2 Don't Walk, Indication: Ø4 Walk, Ø4 Walk, Ø4 Walk
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable NES2**
- **Northeast Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable SES1**
- **Southeast Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable SES2**
- **Southeast Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable SWS1**
- **Southwest Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable SWS2**
- **Southwest Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable NW1**
- **Northwest Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
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- **10 Orange**
- **11 Blue**
- **12 Black**

**Cable NW2**
- **Northwest Combo Signal**
- **12 No. 14 AWG**
- **Base**
  - **Tracer**
  - **Head**
    - **Black**
      - P6: Ø6 Walk, Indication: Ø6 Walk
    - **White**
      - Neutral: Signal Head 1, Indication: Ø6 Walk, Ø6 Walk
    - **Red**
      - Ø6 Red, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Green**
      - Ground: Signal Head 2, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Orange**
      - Ø6 Yellow, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
    - **Blue**
      - Ø6 Green, Indication: Ø8 Walk, Ø8 Walk, Ø8 Walk
- **7 White**
- **8 Red**
- **9 Green**
- **10 Orange**
- **11 Blue**
- **12 Black**

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City of Minot
Engineering Dept

This document was originally issued and sealed by Stephen R. Joersz Registration Number PE-27822, on 8-11-2020 and the original document is stored at the North Dakota Department of Transportation

BURDICK EXPY & VALLEY STREET
SITE 3
BURDICK EXPY & VALLEY ST
CABLE SCHEDULE
# QUANTITY SUMMARY

<table>
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<tr>
<th>Item Description</th>
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(A) Includes cameras, video monitor, access point and all other equipment required for a fully operational video detection system.

(B) Includes cabinet, working slab, conflict monitor, load switches, flashers, bus interface units and all other equipment required for a fully operational traffic signal controller.

(C) Includes detectors, lights and all other equipment required for a fully operation preemption system.

Items shown above are for informational purposes, contractor shall provide all labor and equipment necessary for the signal systems to be fully operational as shown in the plans.

Items shall be included in the corresponding price bid "TRAFFIC SIGNAL SYSTEM - SITE ()"
1. Verify the location of all existing conduit. The approximate locations are shown.

Notes:

1. Verify the location of all existing conduit. The approximate locations are shown.

FLASHING BEACON REMOVALS (A)

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(A) Do not bill items separately but include in the item "772 3150 REMOVE FLASHING BEACON SYSTEM"
**Signal Standards and Head Locations**

**US 2 Business / Burdick Expwy**

1st St SE

Refer to Section 140 Lighting Plans

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This document was originally issued and sealed by Brent Muscha, Registration Number PE-7123, on 8/11/2020 and the original document is stored at the North Dakota Department of Transportation.
NOTE: STAINLESS STEEL ENCLOSURE TO BE USED FOR OUTDOOR LOCATIONS

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STANDARD DETAILS

WiFi Panel 5 GHz
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| B
c                    | Steer                                             |
| BFD                  | Fire Department                                     |
| BR                   | Black River                                         |
| BRK                  | Black Kevin                                         |
| BRT                  | Broad River                                         |
| BTC                  | Benton County                                       |
| Bldg                 | Building                                            |
| C                   | City, county, corporation                           |
| Cen                  | Center                                              |
| CO                   | Colorado                                            |
| Cnty                 | County                                              |
| D                   | Department                                          |
| Dist                  | District                                            |
| DR                   | Development Region                                  |
| E                   | East                                               |
| E Co                  | Eastern Counties                                    |
| Etc                  | Etc.                                               |
| F                   | Frontier                                            |
| Fld                  | Field, fields, football                             |
| Ft                  | Foot                                               |
| G                   | Government, general                                 |
| Gr                   | Group, groups, group                                |
| H                   | Highway                                             |
| Hdr                  | Header, header, headlines                           |
| Hq                   | Headquarters                                        |
| Intern                 | International                                    |
| J                  | Junction, junctions, junctions, joint              |
| K                   | Knight                                             |
| L                   | Lane                                               |
| LG                   | Lane guidance                                       |
| LGD                  | Lane guide                                          |
| Loc                  | Location                                           |
| M                   | Mountain, mountains, mile                          |
| Mtg                  | Meeting                                            |
| Mtr                  | Minter                                            |
| N                   | North                                              |
| Ntwk                 | Network                                            |
| O                   | Office                                             |
| P                   | Public                                              |
| Pk                   | Park, parks, parkway                               |
| Pkwy                 | Parkway                                            |
| Pntd                 | Paved                                              |
| Pt                   | Point, points, points, point                       |
| R                   | Rural                                              |
| Rly                  | Railway, rail, railroad                             |
| Rnd                  | Round, rounds, rounds                              |
| Rd                   | Road, roads                                         |
| Rv                   | Railroad                                            |
| S                   | South                                              |
| Sd                   | Supervisor                                         |
| Sch                  | School                                             |
| Sc                   | Section, sections                                   |
| Sec                  | Section                                            |
| Sr                   | Sergeant                                           |
| Sq                   | Square                                             |
| Sth                  | Southern                                           |
| Sw                   | Southwest                                          |
| T                   | Town, towns, town, towns                           |
| Tpk                  | Turnpike                                           |
| W                   | West                                               |
| Wld                  | Woodland                                            |
| Wk                   | Week                                               |
| Y                   | Year                                               |
| Z                   | Zone, zones, zones, zone                           |

**NOTE:** This list is not exhaustive and is provided as a general reference. Additional abbreviations may be used in specific contexts.
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<th>Erosion Control</th>
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</tr>
<tr>
<td></td>
<td>Sheet Piling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Line Styles**

**Right Of Way**
- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Renewed
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Sight Distance Triangle Line
- Dimension Leader
- Boundary Control
- Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centeline
- Tangent Line

**Cross Sections and Typicals**
- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed)
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Geotextile Fabric Type D
- Geotextile Fabric Type H
- Geotextile Fabric Type R1
- Geotextile Fabric Type RR
- Geotextile Fabric Type S

**Striping**
- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Strip 4 IN Dotted Extension White
- Strip 8 IN Dotted Extension White
- Strip 8 IN Lane Drop
- Excavation Units
- Fiber Rolls
- Downward joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Tie Bar at Random Spacing
- Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline
- Existing Ground (Details)
- Existing Conditions
- Sheet Piling

**Environmental**
- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland

**Bridge Details**
- Tree Row

**Organized by Functional Groups**
- Added and Revised Items, 09-23-16
**EROSION CONTROL**

**FIBER ROLL PLACEMENT DETAILS**

*Optional Weir: Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

**12 OR 20 INCH FIBER ROLL - DITCH BOTTOM**

- Ends overlapped 12" minimum
- Stake 4" to 6" from end of roll

**PLAN VIEW FOR DITCH APPLICATION**

- Overlap fiber rolls 12" min.
- Place stake at each toe of ditch slope

**TRENCH DEPTH**

<table>
<thead>
<tr>
<th>FIBER ROLL DIAMETER</th>
<th>NOMINAL STAKE SIZE</th>
<th>MINIMUM STAKE LENGTH</th>
<th>MINIMUM TRENCH DEPTH</th>
<th>MAXIMUM TRENCH DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>2&quot; x 2&quot;</td>
<td>18&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2&quot; x 2&quot;</td>
<td>24&quot;</td>
<td>2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>2&quot; x 2&quot;</td>
<td>36&quot;</td>
<td>3&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

**NOTE:** Runoff must not be allowed to run under or around roll.
Two Lane, Two Way Roadways

- Work vehicle
  - Flashing or rotating beacons

- Flagger

- Typical Protection Vehicle
  - Flashing or rotating beacons
  - High intensity flashing lights
  - Truck mounted attenuator - optional

Notes:
1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
3. Use these layouts during daylight hours and in areas of good visibility only.
4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

Multilane Roadways

- Work vehicle
  - Flashing or rotating beacons

- Protection vehicle
  - Flashing or rotating beacons
  - High intensity flashing lights

- Sequencing Arrow Panel
  - Type C - Chevron Mode

Notes:
1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
3. Use these layouts during daylight hours and in areas of good visibility only.
4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.
DEPARTMENT OF TRANSPORTATION

North Dakota Department of Transportation

This document was originally issued and sealed by Kirk J. Hoff.
Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation.
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

U-Channel Post

Install a maximum of 2 posts within 7'.

Alternate A Steps of Installation:

1. Drive anchor unit to within 12" of ground level.
2. Alternate proper assembly by lining up a bottom hole of retainer strap with 5th hole from the top of the anchor unit.
3. Assemble strap to bank of anchor unit using 1/4" x 2" bolt, lock washer and nut.
4. Rotate strap 30° to vertical.
5. Drive anchor unit to 4” above ground.
6. Alternate tightens two connector bolts.

Alternate A Beam of Installation

1. Drive anchor unit to within 12" of ground level.
2. Alternate proper assembly by lining up a bottom hole of retainer strap with 5th hole from the top of the anchor unit.
3. Assemble strap to bank of anchor unit using 1/4" x 2" bolt, lock washer and nut.
4. Rotate strap 30° to vertical.
5. Drive anchor unit to 4” above ground.
6. Alternate tightens two connector bolts.

Alternate B Breakaway U-Channel Splice Detail

Install a maximum of 3 posts within 7'.

Alternate C Breakaway U-Channel Splice Detail

Install a maximum of 3 posts within 7'.

REVISIONS

DATE
CHANGE
DEPARTMENT OF TRANSPORTATION
NORTH DAKOTA

This document was originally issued and sealed by Kirk J. Hoff,
Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation.
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

ROAD WORK
NEXT XX MILES
G20-1-60
Legend: black (non-ref)
Background: orange

NO WORK IN PROGRESS
G20-1b-60
Legend: black (non-ref)
Background: orange

END ROAD WORK
G20-2-48
Legend: black (non-ref)
Background: orange

SPEED LIMIT ENFORCED
MINIMUM FEE $80
WHEN WORKERS PRESENT
G20-65-96
Legend: black (non-ref)
Background: orange

WAIT FOR PILOT CAR
G20-4b-36
Legend: black (non-ref)
Background: orange

EXIT
G20-50a-72
Legend: white
Background: green (orange optional)

END ROAD WORK
G20-52a-72
G20-50a-72

DETOUR
M4-9(L or R)-30 & M4-9-30
Legend: black (non-ref)
Background: orange

NOTES:
A. Arrow may be right or left of the legend to indicate construction to the right or left.

ARROW DETAILS

HERE TO
ANT
BACK
RIGHT
M4-9(L or R)-30
Advanced Right or Left

Advanced Right or Left
M4-9-30
Straight

This document was originally issued and sealed by Kirk J Hoff,
Registration Number PE-4683,
on 10/03/19 and the original document is stored at the North Dakota Department of Transportation.
**SHOULDER CLOSURE TAPERS**

**SHOULDER CLOSURE WITH LANE CLOSURE**

(when shoulder is 8' or wider)

1. Portable Traffic Signal or Changeable Message Sign

**PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER**

**SHOULDER CLOSURE USED WITH LANE CLOSURE**

(when shoulder is less than 8' wide)

**KEY**

- Delineator Drum
- Message Display

**NOTES**

1. $L = \frac{W}{S}$ (45 mph or more)
   
   $L = \frac{W}{0.0086}$ (40 mph or less)

2. If a shoulder taper is used, use a length of approximately $\frac{1}{3}L$. If a shoulder is used as a travel lane, use a normal merging or shifting taper.

3. When paved shoulders of 8 feet wide or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

1. Sign Supports: Galvanized or paint supported. Minimum post size and 2.5" x 2.5" aluminum or 2.5" x 12 gauge steel perforated tube, except where noted. When installing signs on centerline, minimum post size is 12 gauge perforated 3.5" x 3.5" tube. Post sizes based on a wind speed of 65 MPH. Place signs over full-scale feet at 2" x 2" perforated tube supports as a minimum.

2. Vertical Clearance: Install and remove alternate message signs with a vertical clearance of 7'-0" from the top of the sign. Alternate messages are "STOP" and "YIELD" messages on the same sign.

3. Route Marker Assemblies: Provide route marker assemblies with the following dimensions: 30" x 30" (main sign) and 18" x 18" (secondary sign). Provide a minimum clearance of 7'-0" from the ground to the top of the assembly when necessary to place signs on the roadway.

4. Portal Signs: Provide portal signs that meet the dimensions stated in the typical section. Provide a minimum clearance of 7'-0" from the top of the sign to ensure visibility.

5. Portal Sign Supports: Provide steel perforated tube supports as a minimum. Place supports at a distance of 2'-0" from the curb or edge of the driving lane. In areas where parking or pedestrian movement are likely or if the sign may be obstructed by trees or other obstructions, provide a minimum clearance of 7'-0" from the top of the sign to ensure visibility.

6. Ballast: Provide ballast as required to ensure stability of the sign. Ballast should be placed at least 12" below the bottom of the sign panel.

MINIMUM BALLAST

<table>
<thead>
<tr>
<th>Sign Panel Mounting Height (ft)</th>
<th>Number of 25 lb Sandbags for 4' x 4' Sign Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: The number of sandbags is based on a wind speed of 53 MPH. Place sandbags at least 12" below the bottom of the sign panel.

This document was originally issued and sealed by Kirk J. Hoff, Registration Number PE-4683 on 11/11/19 and the original document is stored at the North Dakota Department of Transportation.
**ROAD CLOSURE LAYOUTS**

**TYPE A**
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.

**TYPE B**
ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use an overbridge and curb cut installation with ½ mile or less closure.

**TYPE C**
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane divided highway with half the roadway closed.

---

Notes:

1. Variables:
   - \( S \): Numerical value of speed limit or 85th percentile.
   - \( W \): The width of taper in feet.
   - \( L \): Minimum length of taper. \( L \) is \( S \) \( \times \) \( 6 \) for freeways, expressways, and other roads with speeds of 45 mph or greater, or \( W + 600 \) for urban, residential, and other streets with speeds of 40 mph or less.

2. Place breakbands or movable assemblies and signs on portable assemblies when located on roadway.

3. Place delineator drums, barricades or cones for tapering traffic at dimension "C" and for tangents at distance "B" as conditions warrant.

4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.

5. Type C on roadways with slow moving traffic speeds and low volumes (25 mph or less and 750 AADT or less).

6. Type C on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 AADT or less).

7. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not exceeding 30 mph). Place the second speed limit sign at "B".

8. Where necessary, engineer will determine safe speed.

9. As an option, use portable sign supports in lieu of post mounted signs in urban, residential, and other streets with speeds of 45 mph or greater, or \( W \times S \times \sqrt{60} \) for freeways, expressways, and other roads with speeds of 45 mph or greater.

10. Recommended using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

**NOTES:**

- This document was originally issued and sealed by Kirk J. Hoff, Registration Number PE-4693 on 11/01/19 and the original document is stored at the North Dakota Department of Transportation.
LANE CLOSURES ON URBAN STREETS LAYOUTS

Note:
1. For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
2. When placing flags, place flags so they are visible, while above parked vehicles or at the edge of the
   parking area so they are visible to oncoming traffic. Please sign on portable mount when located on roadway.
3. In zones for angered right or 3-lane areas and zones for tangents or on curves, be dimension "D".
4. Re-establish speed limits in zones, depending on location and conditions.
5. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed
   reductions are above 30 mph, install a second speed limit sign with the reduced speed limit (not to exceed
   30 mph). Place the second speed limit sign at 1/16.
6. Place flags on warning signs in urban areas where signs are not portable. Mount 24 inches square flags
   perpendicular to the edges of the sign, and at least 100 feet above the edge of the sign, below sign when limp.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches square flags
   perpendicular to the edges of the sign, and at least 100 feet above the edge of the sign, below sign when limp.
8. Engineering to determine safe speed, when necessary.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard
10. Signs Q20-05-46 and R2-1aP-24 are not required for urban projects.

ADVANCE WARNING SIGN SPACING

<table>
<thead>
<tr>
<th>Work Type</th>
<th>Minimum Distance Between Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor - Slow Speed 20 to 30 mph</td>
<td>155</td>
</tr>
<tr>
<td>Minor - High Speed 30 to 55 mph</td>
<td>265</td>
</tr>
<tr>
<td>Minor - High Speed 55 to 70 mph</td>
<td>350</td>
</tr>
<tr>
<td>Urban Expressway and Freeway</td>
<td>650</td>
</tr>
</tbody>
</table>

Flagger
- Place flags on warning signs in urban areas where signs are not portable. Mount 24 inches square flags
  perpendicular to the edges of the sign, and at least 100 feet above the edge of the sign, below sign when limp.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches square flags
  perpendicular to the edges of the sign, and at least 100 feet above the edge of the sign, below sign when limp.
- Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "D".
- Cover existing speed limit signs within reduced speed zones.
- Engineering to determine safe speed, when necessary.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard
- Signs Q20-05-46 and R2-1aP-24 are not required for urban projects.

Key:
- Sign
- Flags
- Work area
- Cones

This document was originally issued and sealed by Kirk J Hoff, PE, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation.
Notes:
1. Reestablish speed limit. Determine new speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph). Place the second speed limit sign at 1/2C.
3. Install flags on existing signs in certain areas when signs are not post mounted. Mount 34-inch square flags removable in the sight of the sign, and in such a manner above the edge that the flag does not touch the sign.
4. Close existing speed limit signs with reduced speed zone.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-26.
6. 85th percentile speed is required if this standard is part of other traffic control layouts, or work is less than 1/2B.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within the pilot car control area.
8. Recommended 40 mph speed limit for visibility of workers, unless location and conditions dictate otherwise.
9. Lane signs shown for any direction only.

Signs shown for one direction only.

**TABLE**

### Road Type

<table>
<thead>
<tr>
<th>Distance Between Signs (ft)</th>
<th>Type</th>
<th>Sign Location</th>
<th>Speed Limit (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>High Speed</td>
<td>High Speed</td>
<td>70</td>
</tr>
<tr>
<td>200</td>
<td>High Speed</td>
<td>High Speed</td>
<td>65</td>
</tr>
<tr>
<td>150</td>
<td>Low Speed</td>
<td>Low Speed</td>
<td>45</td>
</tr>
<tr>
<td>100</td>
<td>Low Speed</td>
<td>Low Speed</td>
<td>35</td>
</tr>
</tbody>
</table>

### Notes

- **Speed** = Numerical value of speed limit or 85th percentile.
1. Install advance signs for flagging when flaggers are flagging.

2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/4 in advance of the flagger sign and move the 50 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee $50 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.

3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable flagger station so the work area is visible. Place the 40 mph speed limit sign at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the flagger as necessary in work area.

4. Variables:
- L: Numerical value of speed limit or 85th percentile
- W: Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or minimum length of taper, or SxW for urban, residential, and other streets with speeds of 40 mph or less.
- S: Numerical value of speed limit or 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".

6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.

7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.

8. Cover existing speed limit signs within a reduced speed zone.

9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.

10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph). Place the second speed limit sign at 1/8.

11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDOT Standard Drawing D-706-14.

12. Sign G20-55-48 is not required if this standard is part of other traffic control layouts or the work is less than 15 days.
PORTABLE SIGN SUPPORT ASSEMBLY

Notes:
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

- 2000 lb Capacity Spindle and Hub (Each End)
- 4 Corners of Hub
- 2" Ball Coupler
- 4 Places on Coupler
- 3" x 1 1/2 x 12" Square Tube
- 1 1/2" x 1/2 x 12" PL
- 1" Dia x 3" Pipe at 10 Degrees Offset
- Channel, One Side
- " Dia Outside Edges of Angles (Typ)

Top:
- 13 1/2"
- L 2" x 2" x 1/2 x 30"
- L 2" x 2" x 1/2 x 30"
- 2 1/2" x 1/2 x 30"
- Square Tube

Right:
- 1 1/2" Dia (Typ)
- 3" x 1/4 x 60" Square Tube
- 3" x 1/4 x 36" Square Tube
- 1 1/2" x 1/4 x 12" PL
- Typ

Front:
- 3" x 3" x 4 1/2" Channel
- Tubes
- 1 1/2" x 1/2 x 12" PL

TRAILER:
- Channel, One Side
Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.

2. Double compartment stainless steel sink, with each compartment a minimum of 10"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of 3/8 inch.

3. An exhaust fan capable of removing inside air at a rate of 400 CFM.

4. Fresh air vent hinged to open or close manually.

5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.

6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.

7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.

8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.

9. The steel cable tie downs and ground anchors at each corner of the lab.

10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.
1. Use of other castings, similar in dimension, is allowed if the casting conforms to the rear section and has a grate style specified in the plans, meeting or exceeding the waterway area listed. Modifications to the inlet to facilitate similar castings are only allowed with written approval from the Engineer.

2. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35 B in the manufacture of castings.

3. Use class AC-3 concrete precast or cast-in-place bases constructed in accordance with NDOT Standard Specifications.

4. Construct precast concrete risers in accordance with AASHTO M199.

5. On projects with PCC pavement, construct inlet risers 4 to 5 inches below final elevation and adjust to final grade with adjusting rings or cast-in-place concrete after paving. Include all costs for this adjustment in the price bid for the inlet.

6. Use Grade 60 reinforcing steel.

7. Use curb plates in lieu of curb boxes when curb height at inlet is 4” or less.

NOTES:

ISOMETRIC (Grate Style “D” & “L”)

ISOMETRIC (Grate Style “V”)

GRATE STYLE “D” (Waterway Area = 1.1 SF)

GRATE STYLE “L” (Waterway Area = 0.9 SF)

GRATE STYLE “V” (Waterway Area = 1.3 SF)

CURB BOX (Grate Style “D” & “L”)

CURB BOX (Grate Style “V”)

CURB PLATE (Grate Style “D” & “L”)

CURB PLATE (Grate Style “V”)

Slope to drain

Mortar inlet base

3" Dia Holes

4" Dia Holes

3" Dia Hole

2" Dia Hole

Pitch: 1" 2" M in

Elevation

Plan

Section A-A

Plan

Top

Curb Elevation

Face of Curb

No. 4 Rebar (4’ Long)

No. 4 Rebar (4’ Long)

No. 3 Bars (each way)

No. 3 Bars (each way)

Face of Curb

Precast riser

Mold intal base

Riser I.D.

Riser O.D.

需Wo a u k

6 sps @ 6” each

(See Insert & Manhole Summary Sheets)

(See Insert & Manhole Summary Sheets)

Holes for 3/8 Eye Bolts

Holes for 3/8 Eye Bolts

(Grate Style “V”)

(Grate Style “D” & “L”)

(Grate Style “D” & “L”)

(Grate Style “V”)

ON PROJECTS WITH PCC PAVEMENT, CONSTRUCT INLET RISERS 4 TO 5 INCHES BELOW FINAL ELEVATION AND ADJUST TO FINAL GRADE WITH ADJUSTING RINGS OR CAST-IN-PLACE CONCRETE AFTER PAVING. INCLUDE ALL COSTS FOR THIS ADJUSTMENT IN THE PRICE BID FOR THE INLET.

USE GRADE 60 REINFORCING STEEL.

USE CURB PLATES IN LIEU OF CURB BOXES WHEN CURB HEIGHT AT INLET IS 4” OR LESS.

NOTES:

1. Use of other castings, similar in dimension, is allowed if the casting conforms to the rear section and has a grate style specified in the plans, meeting or exceeding the waterway area listed. Modifications to the inlet to facilitate similar castings are only allowed with written approval from the Engineer.

2. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35 B in the manufacture of castings.

3. Use class AC-3 concrete precast or cast-in-place bases constructed in accordance with NDOT Standard Specifications.

4. Construct precast concrete risers in accordance with AASHTO M199.

5. On projects with PCC pavement, construct inlet risers 4 to 5 inches below final elevation and adjust to final grade with adjusting rings or cast-in-place concrete after paving. Include all costs for this adjustment in the price bid for the inlet.

6. Use Grade 60 reinforcing steel.

7. Use curb plates in lieu of curb boxes when curb height at inlet is 4” or less.

NOTES:

1. Use of other castings, similar in dimension, is allowed if the casting conforms to the rear section and has a grate style specified in the plans, meeting or exceeding the waterway area listed. Modifications to the inlet to facilitate similar castings are only allowed with written approval from the Engineer.

2. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35 B in the manufacture of castings.

3. Use class AC-3 concrete precast or cast-in-place bases constructed in accordance with NDOT Standard Specifications.

4. Construct precast concrete risers in accordance with AASHTO M199.

5. On projects with PCC pavement, construct inlet risers 4 to 5 inches below final elevation and adjust to final grade with adjusting rings or cast-in-place concrete after paving. Include all costs for this adjustment in the price bid for the inlet.

6. Use Grade 60 reinforcing steel.

7. Use curb plates in lieu of curb boxes when curb height at inlet is 4” or less.
1. Drainage structure castings shall be manufactured in accordance with AASHTO M31. Metal used in the manufacture of castings shall conform to AASHTO M186 Class 355.

2. Other castings, similar in dimension, may be used if they comply with the requirements of Section 722 of the Standard Specifications.

3. Continuous No. 4 rebar shall be used through both castings. Extending for center frame ends is required to accommodate air/castings, the contractor must receive written approval from the Engineer.

4. Precast risers shall be constructed in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

5. On projects with P.C.C. pavement, all inlet risers or barrels shall be cast-in-place concrete. All costs for this adjustment shall be included in the price bid for the inlet.

6. The deformed reinforcing steel shall conform to AASHTO M31. Grade 65. Welded wire reinforcing fabric shall conform to AASHTO M55 as specified in the plans.

7. Cast in place concrete shall be Class AE-3. Precast risers shall be manufactured in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

8. The deformed reinforcing steel shall conform to AASHTO M31. Grade 65. Welded wire reinforcing fabric shall conform to AASHTO M55 as specified in the plans.

9. Cast in place concrete shall be Class AE-3. Precast risers shall be manufactured in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

10. Continuous No. 4 rebar shall be used through both castings. Extending for center frame ends is required to accommodate air/castings, the contractor must receive written approval from the Engineer.

11. Precast risers shall be constructed in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

12. Drainage structure castings shall be manufactured in accordance with AASHTO M31. Metal used in the manufacture of castings shall conform to AASHTO M186 Class 355.

13. Other castings, similar in dimension, may be used if they comply with the requirements of Section 722 of the Standard Specifications.

14. Continuous No. 4 rebar shall be used through both castings. Extending for center frame ends is required to accommodate air/castings, the contractor must receive written approval from the Engineer.

15. Precast risers shall be constructed in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.


17. Cast in place concrete shall be Class AE-3. Precast risers shall be manufactured in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

18. Continuous No. 4 rebar shall be used through both castings. Extending for center frame ends is required to accommodate air/castings, the contractor must receive written approval from the Engineer.

19. Precast risers shall be constructed in accordance with ASTM C858. This document was originally issued and sealed by TERENCE R. UDLAND Registration Number PE-2694 on 07/07/14 and the original document is stored at the North Dakota Department of Transportation.

20. Drainage structure castings shall be manufactured in accordance with AASHTO M31. Metal used in the manufacture of castings shall conform to AASHTO M186 Class 355.
HYDRANT MARKER (mechanical joint plug only) when branch is plugged (mechanical or plug only)

No blocking necessary at this point, except for those areas where hydrant is plugged (mechanical or plug only)

Notes: 
1. Service clamp not required where small size service line connects to large cast iron or ductile iron pipe and three threads of the corporation stop make contact with the wall.
2. Gravel backfill trench from water main to back of curb line and under sidewalk areas or backfill 18" with standard compaction where specified.

Notes:
1. Place concrete blocking against undisturbed earth and plywood. Keep bels and bolts free of concrete. Include placed conrete in price bid for water main.
2. Use solid concrete blocks for blocking on 8" Dia. and below, if approved by the Engineer. Place concrete, as shown above, for 10" Dia. pipe and larger.

Notes:
1. Place concrete blocking against undisturbed earth and plywood. Keep bels and bolts free of concrete. Include placed concrete in price bid for water main.
2. Use solid concrete blocks for blocking on 8" Dia. and below, if approved by the Engineer. Place concrete, as shown above, for 10" Dia. pipe and larger.

Notes:
1. Place concrete thrust block against undisturbed earth and plywood. Keep bels and bolts free of concrete. Include placed concrete in price bid for water main.
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2. Use solid concrete blocks for blocking on 8" Dia. and below, if approved by the Engineer. Place concrete, as shown above, for 10" Dia. pipe and larger.
1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.

2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.

3. Isolation Joints: Use 1/2" expansion joint filler for isolation joint material. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.

4. Joint Spacing: For hot bituminous pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)

5. Joint sealing: Seal contraction and isolation joints as shown in the details. Use joint sealant for contraction joints that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.

6. Face of Gutter Depth: For hot bituminous pavement use 7" gutter depth as shown. For PCC pavements, match the gutter depth to the depth of adjacent PCC pavement or to construct a 7" depth as shown.

7. Tie curb and gutter to abutting PCC pavement with No. 3 bars, 1'-6" in length, spaced at 4" centers.

8. On street returns and other locations where new curb and gutter ends and does not exist use expanding and contracting joint filler. Install the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint, the same shape as the curb and gutter just ahead of the taper. Install an 18" tie bar across the joint.

9. Valley Gutter Joints: Form, saw, or score 3/4" min. to 3/8" max. wide contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.
Sidewalk Width and Grade

- Minimum width: 4' (See Note 6)
- Maximum width: 8'
- Grade: 2% max running slope established by adjacent street or highway

Sidewalk Detail (Installed adjacent to curb and gutter)

- Min. 3/4" isolation joint
- 2" ledge
- 4" base
- Earth fill

Concrete Median Detail

- Min. 3/4" isolation joint
- 2" ledge
- 4" base
- Earth fill

Utility Blockout

- Utility dia plus 8"
- 1/2" isolation joint

Typical Joint Layouts

- Joint width (3/4" or as shown on detail)
- Top of sidewalk or curb
- Joint filler

Joint Spacing

- Vary transverse contraction joint spacing from 4' to 6'
- Use longitudinal contraction joints when sidewalk width is 8' or greater
- See or groove contraction joints to a depth of 1/3 the depth of the concrete

Isolation joint on each side of driveways, at street intersections, and at 150' maximum spacing.

Utility dia. plus 8"

Sidewalk to be replaced

4" Base

Min. 3/4" isolation joint when abutting concrete or asphalt

Min. 3/4" isolation joint when abutting concrete or asphalt

Sidewalk with Curb Detail

(Adjacent property application)

- Min. 3/4" isolation joint when abutting concrete or asphalt
- 2" Curb (See Note 5)
- 24"

Sidewalk with Curb Detail

(Building face application)

- Min. 3/4" isolation joint when abutting concrete or asphalt
- 24"

Sidewalk Width & Grade: Provide a continuous 4' min clear width for "Curb - Type I" per lineal foot.

Vertical Discontinuities

(As needed for utility covers, vaults, grating, etc.)

- Top of sidewalk or curb
- Hot poured bituminous joint filler

Pre-molded expansion material (full depth below filler)

This document was originally issued and sealed by Kirk J Hoff, PE, Registration Number 4683 on 08/27/19 and the original document is stored at the North Dakota Department of Transportation.
**CURB RAMP DETAILS**

**Type 1A**
- Flare: 4:1 Flares back to back
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths with Curb and Gutter

**Type 1B**
- Flare: 10:1 Flares
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths without Curb and Gutter

**Type 2**
- Flare: 4:1 Flares
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths with Curb and Gutter

**Type 3**
- Flare: 4:1 Flares
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths without Curb and Gutter

**Type 4**
- Flare: 8.3% Max
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths with Curb and Gutter

**Type B**
- Flare: 8.3% Max
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths without Curb and Gutter

**Median Refuge Islands (Cut-Through)**
- Flare: 8.3% Max
- Curb Ramp (typ.) 5' or less
- Top of curb 5' 0" 2'
- Face of curb 0" 4:1
- Concrete Apron for Shared Use Paths with Curb and Gutter

**Concrete Apron for Shared Use Paths with Curb and Gutter**
- Top of curb: 2% 3" to 6"
- Curb height varies (Approx. 10:1)

**Concrete Apron for Shared Use Paths without Curb and Gutter**
- Top of curb: 2% 3" to 6"
- Curb height varies (Approx. 10:1)
Notes:
1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited. Use a minimum 2' clearance. Increases the horizontal clearance if required to maintain a minimum roadbed width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Provide at least 7' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 9' in the bottom of the sign, where parking or pedestrian movements occur. Install signs on expressways a minimum of 7'. Install stop-and-go signs on Freeways at least 7' above the edge of the driving lane. Maximum vertical clearance is 9' greater than the minimum vertical clearance.

3. Offset signs: Use a vertical clearance of 9' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.

4. Provide a horizontal clearance from the edge of the shared use path to the edge of the sign of 3', except where width is limited. Provide a minimum clearance of 2'.

Use layout for the placement of "Stop" signs.

Radius Y-max ft. Y-min ft.
20 10 8
20 10 8
20 10 8
20 10 8
20 10 8
20 10 8
50 10 8
50 10 8
50 10 8
50 10 8
50 10 8
50 10 8
80 10 8
80 10 8
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80 10 8

Mounting Details Perforated Tube

<table>
<thead>
<tr>
<th>Telescoping Perforated Tube</th>
<th>Properties of Telescoping Perforated Tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Posts</td>
<td>Tube Size (in.)</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;-13 x 3-3/4&quot;</td>
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**NOTE**

1. Vertical clearance of anchor or breakaway base is 4" and 60° above and below post location, and any overhang of post.
2. Provide 1 1/8"-16 #8 HDG. commercial quality ASTM A325 grade 50, 1/4" x 10 ga. x 3" minimum length external sleeve. Hot dip galvanized anchor per ASTM A792/792/274. Tolerances on anchor and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. Use a minimum 10 gauge material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanized anchor per ASTM A325/792/274. Tolerances on anchor and slip base bottom assembly are +/- 0.005" unless otherwise noted.
4. Use a minimum grade 8 concrete bolt with proper shim. Shimming agent to reduce tolerance between 3" anchor and 4" gauge plate - 1" x 3" x 7 ga. plate - 1" thick teflon coated, hardened slip washer and 1 x 1 ga.
5. Use a minimum 10" diameter x 4" grade 8 concrete bolt for surface mount breakaway base.
Street Name Signs and One Way Signs

Single Post Assembly

One Stringer or Back to Back Mounting

Properties of Telescoping Perforated Tubes

<table>
<thead>
<tr>
<th>Tube Size</th>
<th>In.</th>
<th>Gauge</th>
<th>Material</th>
<th># Ø</th>
<th>Wall Thickness</th>
<th>Weight Per Foot</th>
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<tbody>
<tr>
<td>1 1/2 x 1 1/2</td>
<td>10</td>
<td>12</td>
<td>Galv. steel</td>
<td>0.105</td>
<td>0.135</td>
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<td>Galv. steel</td>
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Note:
1. Horizontal stringers - Use perforated tubes or 1 1/2" x 1/4" thick, 1.08 lbs/ft aluminum or 0.56 lbs/ft 1/16" steel stringers.
2. Use minimum outside diameter 1/4" x 1/4" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angle is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. Vertical clearance of anchor or breakaway base. The 4" x 80" measurement is above and below post location and also back and ahead of post.

North Dakota Department of Transportation

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/09 and the original document is stored at the North Dakota Department of Transportation.
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

Notes:
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1/2" x 1/2" perforated square tube stringers.
3. Punch holes round for 3/8" bolt.

Assembly No. 1
1 Post
2 Posts

Assembly No. 2
1 Post
2 Posts
3 Posts

Assembly No. 3
1 Post
2 Posts
3 Posts

Assembly No. 4
1 Post
2 Posts

Assembly No. 5
1 Post
2 Posts
3 Posts

Notes:
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1/2" x 1/2" perforated square tube stringers.
3. Punch holes round for 3/8" bolt.
Notes:
1. Use 0.750 in. minimum thickness sign backing material.
2. Use 1 1/2" x 1 1/2" perforated square tube stringers.
3. Punch holes round for 6" post.

Assembly No. 6

Assembly No. 7

Assembly No. 8

Assembly No. 9

Assembly No. 10

Assembly No. 11
Supports
Stringers
Perforated square tube stringers.

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1/16 x 1/8" perforated square tube stringers.
3. Punch holes round for 3/8" bolt.
LIGHT STANDARD, SIGNAL STANDARD, AND SPAN WIRE MOUNTED SIGN ASSEMBLY DETAIL

**Section A-A**

Signal or light standard washers (E): metal washer, and nylon washer.

1 1/4" x 3/8" dia. hex. head bolt, hex. nut, lock washer, metal washer, and nylon washer.

Center sign between top span wire and stability wire.

See Detail B

**Section B-B**

Span Wire Mounted Sign Bracket Detail

2" x 3 7/8" dia. bolt

**Light Standard Mounted Sign Bracket Detail**

Max. 24" x 30" signs (D)

Alternate clamp mounting (Use 2 clamps per sign)

Horizontal Mounting: alternate clamp mounting (Use 2 clamps per sign)

Vertical Mounting: (Use 2 clamps per sign)

Stability and span wire

1/2" x 4" dia. hex. head bolt, hex. nut, lock washer, metal washer, and nylon washer.

**Mast Arm Mounted Street Name Sign Detail**

Elevation

1/4" x 1" dia. hex. nut, lock washer, and nylon washer.

Sign Mounted Beyond End of Mast Arm Detail

Perforated tube (C)

**Mast Arm Mounted Regulatory Sign Detail**

1/2" x 4" dia. hex. head bolt, hex. nut, lock washer, metal washer, and nylon washer.

**Signal Standard Mounted Sign Attachment Detail**

Notes:

(A) Use 1 1/4" x 1" dia. 1.08 lb/ft aluminum alloy Z-bar. In place of Z-bar, use two 1 1/4" x 1" dia. angle bars bolted together or a 1 1/2" x 1 1/2" I-beam channel.

(B) 5/8" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

(C) 2" 1/2" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

Maximum perforated tube lengths for mounting signs beyond end of mast arm:

- 2" x 2" maximum support length 9.9'
- 3" x 3" maximum support length 12.6'
- 4" x 4" maximum support length 15.7'

(D) Use metal washers and lock nuts with minimum outside dia. of 1 1/4" and 10 gauge thickness on sign face.

10/05/19

This document was originally issued and sealed by Kirk J. Hoff, Registration Number PE-4693, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation.
### 911 Sign Support Information and Sign Details

#### Post Information for Various Sign Configurations

<table>
<thead>
<tr>
<th>Street Name Size</th>
<th>Minimum Sleeve Length (A)</th>
<th>Sleeve Size</th>
<th>Number</th>
<th>Length</th>
<th>Size</th>
<th>Anchor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2.25 x 2.25</td>
<td>4.0</td>
<td>2.5 x 2.5</td>
<td>10 ga</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.25 x 2.25</td>
<td>4.0</td>
<td>2.5 x 2.5</td>
<td>12 ga</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- The sleeve length shown is for the maximum post length. The required sleeve length is the "sleeve length" minus the difference between the "maximum post length" and the post length required in the field.

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**Diagram:**

- **11th St W**
- **11th St W**
- **11th St W**

**Notes:**

- Low 6 inch legged excitors on multilane divided roads with speeds of 40 mph or greater.
- Oil drained multilane roadways do not place signs on top of street signs.
- Measure maximum post length from ground to top of street name sign.
- Support length greater than maximum post length shown, relocate support legs.

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**Sign Details:**

- **North Dakota Department of Transportation**
- **Registration Number:** PE: 4863
- **Issued and sealed by:** Kirk J. Hoff
- **This document was originally issued on:** 9/05/19
- **5-10-13**
- **8-30-18**
- **7-18-14**

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**Revision:**

- **07/03/13**
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- **09/29/14**
- **07/19/19**
- **03/29/19**
- **10/01/19**
- **10/05/19**
- **05/06/20**
- **06/25/20**
- **09/30/20**
- **07/08/21**
- **07/13/21**
- **09/21/21**