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SPECIAL PROVISIONS

DIVISION "SS"

SPECIAL REQUIREMENTS

SS-1 (2565) TRAFFIC CONTROL SIGNALS

- A. This work shall consist of furnishing and installing materials and electrical equipment to provide a revised semi traffic actuated, traffic control signal system at System A - Lyndale Avenue S & Minnehaha Parkway.

The Contractor shall salvage and reinstall the signal/lighting service cabinet in a new location. The proposed location is as shown on the plans and can be adjusted by the Engineer. The Contractor shall provide a new concrete foundation for the relocated service cabinet.

The Contractor shall also provide new conduit, wiring, fittings, and any other necessary materials from the source of power to the signal/lighting service cabinet.

The Contractor shall furnish and install new conduit from the relocated signal/lighting service cabinet to the new handhole. The wiring from the existing service cabinet location to the existing handhole location and beyond the handhole shall be coiled up and stored in a manner to prevent damage and vermin from damaging the wiring. The wiring shall be reinstalled once the new handhole has been installed and the service cabinet has been installed in its new location. The service cabinet and handhole shall be located so the existing wiring is long enough to extend between the new location of the handhole and service cabinet. Reinstalling the existing wiring shall be incidental.

The Contractor shall also provide a temporary signal/lighting service cabinet and power to the existing lighting along Lyndale Avenue north of WB Minnehaha Parkway at all times. The Contractor shall work with the City of Minneapolis and the power company to provide power to the existing lighting system. The Contractor is responsible to provide all materials, installation and coordination to maintain power to the existing lighting system. This work shall be considered part of the Revised Signal System A pay item.

The Contractor is responsible for coordinating electrical service with the power company for relocated and temporary metered location. This includes paying for all electrical service connections and power consumption charges up until the new lighting system is

turned over to the city after final inspection. This work shall be considered incidental to the project with no direct compensation paid for.

Removal and disposal of conduit and handholes with asbestos containing conduits (Transit) shall be paid for under separate bid item, see lighting specifications.

- B. This Contract also includes work which consists of furnishing and installing an interconnect system between traffic control systems and removing interconnect as shown on the plans.

This work shall be done in accordance with the applicable Minnesota Department of Transportation “Standard Specifications for Construction,” 2005 Edition.

SS-1.1 General

- A. All applicable provisions of the current edition of the National Electrical Code shall apply in constructing the traffic control signal systems.
- B. Reference to “the City” or “the City of Minneapolis” in these Special Provisions shall be interpreted to mean “the City of Minneapolis Traffic and Parking Services” or its designated representative.
- C. City forces shall make all field lead connections in the City of Minneapolis furnished traffic signal cabinet at each System. The Contractor for this Contract shall label all cables and conductors.
- D. The Contractor for this contract shall be responsible for locating all Contractor installed underground facilities within or outside the project limits until acceptance of the completed project by the City.
- E. The City shall review and approve all work performed by the Contractor prior to the Contractor requesting acceptance by the Engineer.
- F. The Contractor’s attention is specifically directed to the requirements of 2565.2A5 regarding the required in service warranty period for workmanship and materials.

SS-1.2 Materials

- A. Metal Conduit
Metal conduit shall be Rigid Steel Conduit (R.S.C.) and conduit fittings per Mn/DOT 3801 Intermediate Metal Conduit (I.M.C.) and conduit fittings are not permitted.
- B. Non-Metallic Conduit

Non-metallic conduit (N.M.C.) and conduit fittings shall be Type II heavy-wall rigid PVC Schedule 40 plastic conduit and conduit fittings per Mn/DOT 3803.

C. Handholes

New handholes shall be Minneapolis Electrical Handholes with metal frames and covers as shown in the details in the Plans (Minneapolis Detail No. 3776) and shall conform to the City of Minneapolis standards. A drain field shall be provided with each handhole. Concrete for supporting the metal frames and covers in non-sidewalk areas shall be Mix No. 3A32 or equal.

Handhole rings and covers shall be constructed from Class 30 Grey Iron, primed and finish painted.

Relocated handhole rings and covers shall be cleaned and primed and finish painted.

D. Traffic Signal Electrical Cables And Conductors

The provisions for electric cables and conductors of Mn/DOT 2565.3J and Mn/DOT 3815 are modified as follows. The required electrical cables to Xcel's feed points shall be furnished and installed by the Contractor and shall be the size as required by the power company.

1. Signal Control Cable: The multiple conductor control cables for traffic control signals shall meet the following specification. This specification describes multi-conductor Type TC Tray Cable insulated with FR-XLP flame-retardant cross-linked polyethylene and PVC jacketed overall, for use on circuits rated 600 volts at 90 degrees C maximum continuous conductor temperature in wet or dry locations. The cables shall be approved for installation in cable trays in accordance with Article 340 of the NEC and also for use in Class 1 remote control and signaling circuits per Article 725-11(b) of the Code. Cable shall be approved for installation in open air, in ducts or conduits, in tray or trough, and be suitable for direct burial.

Applicable Standards

- a. The following standards shall form a part of this specification to the extent specified herein:
 - Underwriters Laboratories Standard 1277 for Type TC Power and Control Tray Cables.

- Underwriters Laboratories Standard 44 for Rubber Insulated Wires and Cables.
- ICEA Pub. No. S-66-524, NEMA Pub. No. WC7, Cross-linked-polyethylene-insulated Wire and Cable.
- ICEA Pub. No. S-73-532, NEMA Pub. No. WC57, Control Cables
- IEEE Standard 1202 - Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies.

b. Conductors

Conductors shall be Class B stranded uncoated soft copper conforming to Part 2 of ICEA. Conductor sizes shall be 12 AWG. A nonhygroscopic separator may be used over the conductors at the option of the manufacturer.

c. Insulation

- Compound: Each conductor shall be insulated with FR-XLP flame-retardant chemically cross-linked polyethylene, meeting the requirements of ICEA S-66-524, Par. 3.6, ICEA S-73-532, Table 3-2 (Type I-XLPE) and Type XHHW-2, VW-1 requirements of Underwriter's Laboratories.
- Thickness: The average thickness of insulation shall be 30 mils. The minimum thickness at any point shall be not less than 90 percent of the specified average thickness.

d. Circuit Identification

Circuit identification shall consist of Method 1 color coding for National Electrical Code applications in accordance with ICEA S-73-532, Appendix E, Table E-2. Cables shall contain the following color coding for individual conductors: 1-Black, 2-White, 3-Green, 4-Red, 5-Blue, 6-Orange, 7-Yellow, 8-Red w/Black tracer, 9-Blue w/Black tracer, 10-Orange w/Black tracer, 11-Yellow w/Black tracer, 12-Black w/White tracer. Tracers

shall be either spiral bands or hash marks on opposite sides of each conductor.

e. Assembly

The insulated color-coded conductors shall be cabled together with non hygroscopic fillers, when necessary to make round. The cable assembly shall be covered with a suitable tape applied with a 10 percent minimum lap.

f. Overall Jacket

- Compound: Each cable shall have a PVC protective jacket applied over the assembly. The jacket shall meet the requirements of Part 4 of ICEA S-73-532, Table 4-2, and the Sunlight Resistant requirements of UL Standard 1277.
- Thickness: The average jacket thickness shall be in accordance with UL Standard 1277. The minimum thickness at any point shall be not less than 80 percent of the specified average thickness.

g. Surface Marking

Cables shall be clearly identified by means of surface ink printing indicating: Manufacturer, Type TC, (UL), 600V, 12 conductors, #12, XHHW-2 (or 90 degrees C) Conductors, Sunlight Resistant, Direct Burial, E57349, and have length markings approximately every meter.

h. Tests

- Individual conductors and completed cables shall be tested in accordance with UL requirements for Type TC Power and Control Tray Cables having XHHW-2 VW-1 insulated conductors.
- Cables shall be capable of passing the ribbon burner cable tray flame test requirements of UL and IEEE Standard 1202.

2. Single Conductor Wires: The single conductor feeder wires, and control wires shall have Class B stranded annealed uncoated copper conductors and be listed by UL

as Type RHW-2/USE-2, 90 degree C, crosslinked polyethylene insulation rated 600 volts in accordance with Article 338 of the National Electrical Code. Cable shall meet the requirements of ICEA Publication No. S-66-524, NEMA Pub. No. WC7 for Crosslinked Polyethylene-Insulated Wire and Cable, and UL Standard 854 for Service Entrance Cables. Wires shall bear UL label for Type USE-2, have footage markings approximately every meter, and surface marking indicating manufacturer's ID, conductor size and metal, voltage rating, UL symbol and type designations. **The insulation on each conductor shall be colored red, black, green, or white in accordance with the color-coding shown in the construction plan and/or details.**

E. Service Equipment For Signal System

The electrical service point for the signal system is shown on the Plans. The service point shown is approximate; the exact location will be determined in the field by the Power Company and the City. See Equipment Pad details for specific service cabinet requirements at the service point.

1. Pad Mount Signal/Lighting Service Cabinet

The relocated and temporary service cabinet shall be the City of Minneapolis standard street light and signal service cabinet. The Contractor shall salvage and reinstall the existing service cabinet. The service cabinet shall be relocated and pad-mounted on a new concrete foundation. Location and mounting of the relocated service cabinet shall be as shown on the plans and as directed by the Engineer. The wiring diagrams for the service cabinets are shown in detail on the Plans on the City of Minneapolis Standard Plate Nos. 3750M. For reference, the City of Minneapolis Standard Plate Nos. 3760M and 3750M have been provided in the plans. The relocated and temporary service cabinets shall conform to the following:

- a. The service cabinets shall be in accordance with detail drawings 3760M and 3750 M.
- b. The cabinet enclosure (physical enclosure only) shall be UL listed with the UL label affixed to the inside of the cabinet, and shall carry a NEMA 3R rating to provide a degree of protection against rain, sleet, snow, and dripping water.

- c. Each cabinet shall be free of flaws, cracks, dents and other imperfections.
- d. All surfaces shall be smooth and clean.
- e. All seams and joints shall be smooth and even, without cracks, air leaks or pinholes with no sharp or jagged edges.
- f. All interior attachments to the cabinet exterior sheet metal shall be welded (i.e. no through bolts).
- g. There shall not be any sheet metal attached externally to the cabinet shell.
- h. The design, workmanship and attachment of the one-piece panel boards and dead fronts shall be a secure and aligned containment for the circuit breakers. The one-piece panel board and dead fronts shall be stamped with easily removable blank breaker cutouts to match the full capacity of the breaker panel. The panel board breaker cutouts shall precisely match the containment provisions of the breakers.
- i. The screws for attaching the cabinet dead fronts shall be of a permanent capture design to prevent lost and misplaced screws. Attachment of the dead fronts to the cabinet shall be accomplished using threaded inserts and offset cam cylinder latches.
- j. Contactors shall be normally open, NEMA rated, AC lighting contactors rated 277/480 volts with a 120-volt, 60 Hz coil, and contacts rated for 60 ampere tungsten filament load. Contactors shall be double lugged with the double lugs on the contactors installed such that field wires shall be connectable on the front lugs of the contactor. Contactors shall be installed vertically in the cabinet. Contactors shall have a positive gravity release. Contactors shall have an (off or on) condition display mechanism.
- k. The service cabinet has a one 100 amp two-pole thermo-magnetic circuit breaker as a main breaker and single pole thermo-magnetic circuit breakers as branch breakers. Two additional breakers shall be added if necessary at no additional cost.
- l. The Vendor shall furnish and install the following in each service cabinet:
 - Two (2) **200 amp meter sockets** with disconnect.

- One (1) bracket mounted single pole test switch rated 15 amperes at 125 volts.
 - Two (2) 60 amp two pole contactors.
 - 15 amp and 60 amp circuit breakers as indicated on details.
 - One (1) photoelectric cell.
 - One (1) single pole 40 amp circuit breaker for powering a traffic signal system.
- m. The photoelectric cell shall have normally open contacts rated 15 amperes. The photo control shall be installed within the lighting service cabinet. It shall be bracket mounted immediately behind a Plexiglas covered hole. The hole shall be located on the side of the cabinet. The hole size and location shall be as shown on the service cabinet detail. Mounting shall be as directed by the Engineer. The photoelectric control shall be in accordance with the MN/DOT 3812 and have a minimum 30-second time delay capability.
- n. The electric meters shall be installed within the service cabinet as shown in the details. The electric meter sockets shall be suitable for single phase, 3 wire, 120/240 volt service with a utility approved manual bypass switch. The Utility Company will provide the electric meters. Sockets shall be provided and installed by the vendor. The placement of the meter socket and meter, door lock, and the viewing window shall permit the door to be closed, and the meter to be read electronically from outside the cabinet.
- o. Locks shall be furnished and installed by vendor. Locks shall be keyed for a standard No. 2 traffic signal key.
- p. No company logo's and/or advertising shall be placed on any part of the cabinet exterior.
- q. The Contractor shall provide an anodic finish to the cabinet after verification of the exact color with the City of Minneapolis Transportation and Parking Services Office.

2. Service Lateral

Service laterals shall be as shown on City of Minneapolis Standard Plate No. 3770C. Conduit type & size shall be as shown on the plans.

In addition to the above the following requirements for electrical service connections to each signal system as detailed below shall apply:

3. Power shall be obtained from a relocated power company wood pole as shown in the Plans (Contractor shall field verify power source). Existing source of power location is shown in the plans.
4. Service equipment, conduit, and power conductor wiring shall be replaced with new by the Contractor with the exception of the signal/lighting service cabinet.

F. Concrete Foundations/Bases

Concrete for all foundations shall be Mix No. 3Y43 free of chloride additives, placed and consolidated using vibratory equipment and be finished all in accordance with the provisions of Mn/DOT 2565.3F except that edges **shall not** be chamfered or beveled, but shall be neat and straight. Concrete shall be allowed to cure for a minimum of seven (7) days before being placed into use unless otherwise permitted by the Engineer.

1. Equipment Pad (Service Cabinet Foundations)

Anchor rods, nuts and washers in each lighting service cabinet concrete foundation shall be Type A Anchor Rods in accordance with Mn/DOT 3385; shall be galvanized full length in accordance with MN/DOT 3392; and shall be four (4) sets in quantity for each cabinet (anchor rod, two hex head nuts, and washer). Each anchor rod shall be $\frac{3}{4}$ inch diameter by 20 inches long before bending a 2-inch "L" on one end and the other end shall be threaded a minimum of 8 inches. Each anchor shall be provided with two (2) galvanized nuts and one galvanized washer. Service cabinet foundations shall be constructed in accordance with City of Minneapolis Standard Plate No. 3728L.

SS-1.3

Construction Requirements

A. Staging

The Contractor shall review the roadway construction phasing plan and shall plan his work accordingly.

B. Conduit Placement

Where N.M.C. conduits are required to be placed underground below roadway surface areas that are to be reconstructed with bituminous or concrete pavement, the N.M.C. conduit shall be placed and backfilled (if trenching method used) and compacted to

the satisfaction of the Engineer before any new pavement is placed.

Exposing existing utilities and surface restoration shall be considered incidental to the work required to provide a complete conduit system installation.

The Contractor shall install red City of Minneapolis Traffic and Parking Services marking tape for marking underground transportation utilities at a distance of 6 inches above all new conduit placed by the trenching method. The required marking tape shall be purchased by the Contractor at the City of Minneapolis Traffic and Parking Services Office, 300 Border Avenue North. Provision and installation of the marking tape by the Contractor shall be considered incidental work to furnishing and installing the conduit.

Existing conduit to be reused as part of a revised permanent signal system (as shown in the Plans) shall be reused in accordance with the provisions of Mn/DOT 2565.3D5.

1. Extension of Conduits: The Contractor shall provide a continuous length of conduit of size and type noted on the Plans between the specified terminal points.
2. Installation of Conduit into Handhole: Conduits shall be installed into handholes by use of a hole saw to cut through the handhole wall. Areas surrounding conduit entrances shall be sealed by filling them with mortar. Conduits shall be installed entering handholes through the sidewalls of the handholes, not through the bottom gravel foundation. Conduits shall extend a minimum of 2 inches and no more than 3 inches into the handhole.
3. Connection to Existing Conduits: The Contractor shall locate the ends of existing conduit as shown on the Plans and extend the conduit to handhole, cabinet, signal base, etc., which is to be built by the Contractor. Existing conduit shall be cut perpendicular to conduit and exterior surface cleaned to form secure connection to extension.
4. Installation of Conduits: The conduits shall be installed a maximum of 12 inches from the back of the curb, as shown in the Plans or as directed by the Engineer. Except as required to bypass foundations, the base on which the curb is placed shall not be disturbed. All conduits installed across newly surfaced streets shall be installed at a minimum depth of 24 inches or as directed by the Engineer.

Where existing sidewalks, pavement, or streets are opened, the opening shall be refilled to the original thickness using material equal to that removed, and the surface restored. In sidewalk areas whole panels shall be removed and replaced unless a utility joint exists in which case only the portion of the walk above the installation up to the joint need be removed and replaced.

In general, all conduits shall be straight and true, and all offsets and bends shall be uniform and symmetrical. Field bends of conduit shall only be accomplished with the use of an approved conduit heating/bending mechanism designed for that purpose. The Contractor shall adjust the elevations of the conduit assembly for its full length to approximately the same gradient as the finished roadway, and shall furnish and install, in the trench such suitable spacers and framing as may be necessary to maintain the correct grade and alignment. The cover material shall be firmly tamped into place in 6-inch lifts to minimize uneven settlement above or below the conduit.

5. Installation of Conduits Under Driving Surface and Sidewalk: All conduits that are to be placed under driveways, streets and sidewalk that are not scheduled for removal shall be directional bored, or installed by another method approved by Engineer that will not damage or disturb the integrity of the driveway, street or sidewalk. All conduits that are to be placed under driveways, alleys, streets, or sidewalk that are scheduled for removal must be placed during the time between the removal of the existing surface and the commencement of pavement operations. The Contractor is responsible for coordination with the paving Contractor.
6. Installation of Conduits Under Driving Surface and Sidewalk Outside Paving Limits: All conduits that are placed under driveways, streets and sidewalk that are not scheduled for removal as part of the street or sidewalk paving shall be placed either by directional boring, surface removal or other approved methods. Any required surface removal and restoration shall be considered incidental to the work required to provide a complete conduit system installation. Damage to pavement or sidewalk shall be remedied at the Contractor's expense.
7. Conduit Attached to Wood Poles (Service): All conduits terminating near the top of a wood pole shall utilize a metal

weatherhead service entrance type fitting with knockouts (knockouts shall not be opened if not used). Conduit shall be attached to a wood pole by galvanized RSC straps spaced 3 feet apart, or as directed by the Engineer.

8. Duct Seal: Duct seal or other Engineer approved material shall be furnished and installed to seal all controller cabinet and service cabinet conduit entrances as necessary in accordance with Mn/DOT 2565.3D2b.
9. Conduit Ends in Handholes: All ends of non-metallic conduit entering a handhole shall be trimmed by the Contractor, on the inside and outside of cut ends to remove rough edges. Conduits shall extend a minimum of 2 inches and no more than 3 inches into the handhole.

C. Handholes

Frames and covers for new or relocated handholes shall be prepared for grounding prior to installation. Grounding shall be accomplished by exothermically welding a 30 inch long #6 solid copper ground wire to the underside of the handhole ring and a 12 inch long #2 braided ground cable between the underside of the handhole ring and the underside of the handhole cover. Handhole frame shall be connected with a ground clamp to a 1/2 inch by 8 ft ground rod sunk inside of the handhole.

Frames and covers shall be set in a bed of mortar and leveled to the finished surrounding grade. Cast-iron frame covers constructed in accordance with City of Minneapolis Details No. 3711 and 3776 shall be furnished and installed by the Contractor.

Conduits shall be installed by the use of a hole saw to cut through the handhole wall. The area surrounding the conduit entrance shall be sealed with a mortar filling. Conduits shall extend a minimum of 2 inches and not more than 3 inches into the handhole.

Signal interconnect conduit runs passing through handholes shall have both entering conduits placed in direct horizontal alignment.

Painting of the cast-iron frames and covers shall be as specified elsewhere in these Special Provisions.

The Contractor shall remove to the bottom of the handhole, any excess material inside of existing handholes that are to be reused.

The Contractor shall remove in place handholes not reused as part of a revised permanent signal system unless otherwise directed by the Engineer.

Frames and covers shall be painted and then pretreated prior to concrete placement such that the concrete does not adhere to exposed surfaces. Frames and covers shall be cleaned free of adhering concrete after placement.

D. Signal Out Requirements

During the period when the existing signal system is de-energized, traffic signs will be required to inform motorists that the signal indications are not operating. The Contractor shall furnish, erect, and maintain "Stop Ahead" and "Stop" signs and barricades. The quantity and size of the temporary signs and barricades as well as their placement in the field shall be as directed by the Engineer. The Contractor shall furnish and install materials to keep these signs upright and stationary. The signs, barricades, etc., shall remain the property of the Contractor. The Contractor shall notify the Engineer five (5) days in advance of de-energizing the system. The Engineer shall approve the day and time and duration of these events.

E. Placing Traffic Control Signals In Operation

All vehicle signal faces and pedestrian indications shall be bagged or turned away from traffic immediately after erection to clearly indicate that the signal is not in operation. All bagging shall be gunnysacks or other like material approved by the Engineer and shall be maintained by the Contractor to the satisfaction of the Engineer. Bagging shall be of a grey or light brown color so as to clearly indicate that the signal face is not in use. Orange, red, or black bagging will not be permitted.

When the signal system is to be placed in operation, all vehicle signal faces and pedestrian indications shall be unbagged and aimed as directed by the Engineer.

At the time of turn on, the Contractor shall have on hand and available at the location: spare lamps of each size, workers and equipment to reach overhead indications, and shall perform such work as may be required to correct such incidents as may be revealed in the connection and/or energization process. Only the City shall place the signal system in operation.

F. Completed Intersection Installation Testing

After successful installation of all items required in the Plans and Special Provisions, the City shall inspect and test each intersection prior to acceptance of the completed installation.

The completed intersection installation shall function to the satisfaction of the Engineer and in accordance with the intent of the Plans and Special Provisions.

G. Painting

The Contractor shall furnish all paint required after verification of the exact paints and colors with the City of Minneapolis Traffic and Parking Services.

At the signal system, all painting shall be in accordance with the provisions of Mn/DOT 2565.3T, except that finish coat paint for all traffic signal system items shall be two (2) manufacturers shop coats as modified below.

Traffic signal handhole frames and covers shall be finish painted with Exterior Enamel, Signal Green, conforming to the City of Minneapolis Specifications.

Handhole rings and covers shall be primed with a red oxide primer and finished with a City-approved Green Exterior Enamel. If field painting is required, it shall be approved in advance and be accepted by approval of the Engineer.

H. Wiring of Service Cabinets (Temporary and Relocated)

The Contractor shall establish a 25-ohm ground at the relocated service cabinet by the use of copper clad ground rods.

A No. 6 AWG bare copper wire shall be extended from the ground rods and be bonded to the pad mounted service cabinet. The ground rods shall be cast into the service cabinet pad and be inside the service cabinet frame.

Two (2) No. 2 AWG lighting conductors and one No. 2 AWG neutral conductor shall be extended underground from the pad mounted service cabinet in 2 inch RSC conduit to the utility company pole, service vault, or transformer.

The ground conductor shall be terminated in and be bonded to the pad mounted control cabinet. The neutral conductor shall be bonded to the ground conductor in the pad mounted control cabinet.

Feeder conductors shall be color-coded in the control cabinet and at the service vault.

The utility will make the final service connections after the Contractor has filed a Certificate-Affidavit of Inspection, with the utility.

SS-1.4 Removing, Salvaging, and Stockpiling Existing Materials and Electrical Equipment

This work shall consist of the removal of all or portions of existing traffic signal control systems.

A. Removing And Salvaging Existing Systems

1. When directed by the Engineer, the Contractor shall remove and salvage for the City all items of the existing traffic control signal systems, interconnect cable, foundations, handholes and service equipment in accordance with the applicable provisions of Mn/DOT 2104; with the applicable provisions of Mn/DOT 2565.3U; and the following:
2. Underground conduit and handholes shall be removed, unless otherwise directed by the Engineer.
3. Salvaged items shall be disassembled as directed by the Engineer and shall be delivered to the City of Minneapolis Traffic and Parking Services Division at 300 Border Avenue North, Minneapolis.

The Contractor shall contact the City Traffic and Parking Services office 24 hours in advance of delivery as follows:

Traffic Stores

Telephone: 612-673-5750

4. Salvaged items shall be disassembled before being delivered to the City of Minneapolis as follows:
 - All signal and communication cables and conductors salvaged shall be neatly coiled and tagged with correct footage.
 - Service equipment, conduit risers, power conductors, etc., shall be removed from service wood poles and conduits disconnected from enclosures.
 - All other salvable items shall be removed and disassembled as directed by the Engineer.
 - Existing handhole frames and covers that are not to be reused shall be salvaged and delivered to the City.
5. Concrete cabinet and pole foundations, conduit, and items deemed non-salvageable by the Engineer of each existing traffic control signal system shall be removed and disposed

of outside the right-of-way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3 and as noted elsewhere in these Special Provisions.

6. The concrete cabinet and pole foundations, and the underground signal conduits may include asbestos containing electrical conduits (Transite). The 3' x 18" vertical pipe in handholes may also contain asbestos, Transite pipe. Underground signal conduits that contain asbestos will have been encased in concrete at the time of installation. For the procedure for handling and disposal of these asbestos-containing materials See the "Technical Specifications for the Excavation of Asbestos-Containing Electrical Conduit" located in the appendix of these Special Provisions.
7. Removing underground signal conduits containing asbestos shall be paid under 2104.601. The removal of traffic signal handholes, signal conduits and foundations containing asbestos shall be paid for as part of the lump sum cost for Salvage Signal System "A."
8. All removal, disposal, and salvaging of materials of the existing traffic control signal systems, as required by the Plans and Special Provisions shall be paid for as part of the lump sum cost for Salvage Signal System "A."

SS-1.5 Method of Measurement and Payment

A. Purpose

This section shall define the bid items and the manner in which payment will be made to the Contractor.

B. Miscellaneous Work, Equipment, and Material

Items of miscellaneous work, equipment and material will be required to construct each system including such items as flagmen and traffic control personnel, traffic cones, markers, flashers, barricades, bolts, nuts, washers, electrical wire, etc. In each case where these items or similar miscellaneous items are necessary to the completion of the project in a safe and reliable fashion, their provision, use and installation by the Contractor shall be considered included in the various associated items of work and no direct payment will be made therefor.

C. Measurement

1. Furnishing and installing all materials and electrical equipment all to provide complete fully operational

Revised Signal System “A” in Minneapolis as contained in these Special Provisions and in the Plans will be measured as an integral unit complete in place and operating.

Removal of conduit with asbestos containing electrical conduits (transite) shall be paid for under 2104.601

D. Basis of Payment

1. Payment for traffic control signal system installation shall be in accordance with Mn/DOT 2565.4 and Mn/DOT 2565.5 respectively for a Fully Operational Signal System. Payment shall be compensation in full for all costs of furnishing and installing foundations, conduit, handholes, cable, signal service and equipment, and all incidentals in accordance with the following schedule at the appropriate contract bid price for the specified unit of measure.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNITS</u>
2565.616	Revise Signal System “A”	Signal System

2. Payment for traffic control signal system salvage and removal shall be in accordance with Mn/DOT 2104. Payment shall be compensation in full for all costs of salvaging and removing foundations, conduit, handholes, cable, signal service and equipment, hauling salvaged material and all incidentals in accordance with the following schedule at the appropriate contract bid price for the specified unit of measure.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNITS</u>
2104.601	Salvage Signal System “A”	Lump Sum

3. Payment for removing and disposing of conduit with asbestos containing electrical conduits (transite) shall be as stated in the City of Minneapolis Asbestos Abatement sheet and shall be compensation in full for all costs of removing and disposing of this material and all incidentals. Removing and disposing of traffic signal foundations and handholes containing asbestos shall **not** be paid for separately but included in the lump sum price per system.

SS-2

(2565) TRAFFIC CONTROL INTERCONNECTION

This work shall consist of installing all materials and equipment as shown on the Plans, to provide a complete communication line.

New conduit for interconnect shall be installed from the existing handhole located in the southeast corner of the Lyndale Avenue/Westbound Minnehaha Parkway intersection to the project limits south of the bridge. New interconnect wiring will be installed under a different contract.

The interconnect system shall comprise all of the work shown in the Plans including, but not limited to, furnishing and installing the conduit and handholes, miscellaneous work, equipment and material all in accordance with the Specifications, except as shown or noted in the Plans and modified in these Special Provisions.

Removal and disposal of the existing interconnect conduit, cable and handholes shall be paid for under separate bid item (Remove Conduit System).

SS-2.1 Electrical (Communications) System

The in-place and new communication system within the project area shall be located in in-place or new conduit as noted in the Plans. In-place communication cable shall remain in-place and in operation until such time as the in-place traffic signal systems are turned off, a roadway is closed and the various interconnect functions are no longer necessary.

A. Removal of In-place Communications Cable

Prior to removal of the existing communications system, the City of Minneapolis shall be notified so that appropriate steps may be taken to disconnect communications equipment at adjacent traffic signal installations. The communications cables shall be disconnected at each control cabinet by City forces, and with the approval of the City may then be removed by the Contractor.

B. Fiber Optic Handholes

New handholes shall be Minneapolis Fiber Optic Handholes constructed with monolithic HDPC (High Density Polymer Concrete) with cover and box meeting a Tier 22 rating (AUSI/SCTE 77-2007) as shown in the details in the Plans (Minneapolis Detail No. 3776B) and shall conform to the City of Minneapolis standards. The handhole shall be of a straight wall design and have an open bottom. A drain field shall be provided with each handhole. Concrete for supporting the frame and cover in non-sidewalk areas shall be Mix No. 3A32 or equal. The design of the handhole shall be such that units are stackable.

Handhole covers shall not be secured with bolts and shall weigh at least 110 pounds. Stainless steel lifting eyes shall be cast into the cover and 5 lifting tools shall be provided at no additional cost with the project. Handhole covers shall be embossed with the label "MPLS FIBER OPTIC" in 2" high lettering.

Frames and covers shall be set in a bed of mortar and leveled to the finished surrounding grade. Handhole frames and covers shall be installed such that the lid and frame are flush with surrounding surfaces. This may require that the handhole be installed at an angle in some cases. Handholes shall be supported by an aggregate base and a concrete collar installed in accordance with that shown in the Standard Plate 3711B.

Frames and covers shall be pretreated prior to concrete placement such that the concrete does not adhere to exposed surfaces. Frames and covers shall be cleaned free of adhering concrete after placement.

In some installations, the contractor will have to excavate around an existing conduit and cut a slot into the vertical panels of the fiber optic handhole to allow the box to fit over the existing conduits. Prior to cutting the slot, the contractor shall measure the location of the conduit entry point on the handhole wall and, with a hole saw, cut an entry hole into the box wall matching the conduit size. Using a saw, the contractor shall cut an inverted narrow V slot from the bottom up to the sawed hole.

After the box is satisfactorily prepared, the contractor shall complete the leveling process on the fiber optic handhole so it is flush with the surface. The gravel under the box shall be tamped firm and the box shall rest firmly on the gravel. All burrs shall be removed from conduits. Conduit ends shall have pre-formed conduit end bells attached.

Once the box is installed over the conduits, the cut out piece fitting the slot shall be epoxied into the wall of the box, filling the hole so that the horizontal conduit enters the box and is a snug fit in the handhole wall. The epoxy shall be one recommended by the manufacturer of the fiber optic handhole box for repairing its boxes. The area surrounding the conduit entrance shall be sealed with a mortar filling. Conduits shall extend a minimum of 2 inches and not more than 3 inches into the handhole.

If the fiber optic handhole contains existing cables, the cables shall be neatly ordered in the new handhole. If the handhole intercepts an existing conduit the conduit shall be cut from around the existing cables without damaging the cables.

New conduit runs passing through handholes shall have both entering conduits placed in direct horizontal alignment.

The Contractor shall salvage in place handholes not reused as part of the project unless otherwise directed by the Engineer.

C. Non-Metallic Conduit

Non-metallic conduit (N.M.C.) and conduit fittings shall be Type II heavy-wall rigid PVC Schedule 40 plastic conduit and conduit fittings per Mn/DOT 3803. The Contractor shall furnish and install a nylon pull rope inside the NMC. The nylon pull rope shall be incidental to the NMC pay item.

SS-2.2 Method of Measurement and Payment

A. Measurement

Furnishing and installing all materials to provide a complete, useable interconnect system as contained in these Special Provisions and in the Plans will be measured as described below.

B. Payment

Payment at the contract unit price shall be compensation in full for all costs of furnishing and installing all materials and incidentals required to provide the system as specified and as shown in the Plans.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNITS</u>
2565.602	Fiber Optic Handhole	Each
2565.603	3" Non Metallic Conduit-Interconnect	Lin Ft