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## Electrical

Standard Specifications and Standard Drawings

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## **CP 601.01 Electrical Work – General Specifications**

OPSS.PROV 106, November 2008 shall apply.

OPSS.106.07.02 has been amended and extended as follows:

The contractor shall obtain unique permits for all proposed electrical services, temporary traffic signal systems and new traffic signal systems.

The Contractor is required to notify the Contract Administrator a minimum of three (3) business days prior to scheduled testing/inspection in accordance with CP 601.02.

A copy of all permits, inspection reports and certificates shall be submitted to the Contract Administrator prior to the commencement of work and/or the energizing of systems. ESA Certificate of Inspection for Hydro service and ESA Certificate of Inspection for new Traffic Signals and /or Beacons shall be submitted to the Contract Administrator three (3) business days prior to scheduled turn-on.

No additional payment above and beyond the items in Schedule of Unit Prices will be made for Permits or Connection Fees.

### **Contractor Supplied Equipment:**

Contractor shall supply the type of equipment as specified in the Contract Documents and the City of Peterborough Electrical Specifications. Where noted “or approved equivalent”, the contractor may submit a request to the Contract Administrator to substitute the specified equipment with a different brand, make or model. By making this request it is the sole responsibility of the contractor to provide detailed justification to deviate from the specified equipment, relevant product specifications, independent test results, and sample product for the City’s review.

If the City of Peterborough has no experience with the proposed product or has any concerns with the products performance or longevity, the City will decline the request and the Contractor shall provide the equipment as specified. If the City of Peterborough can easily satisfy themselves that the proposed substitute product is equivalent, the request may be approved. The City of Peterborough hereby reserves the right to accept or reject a request to substitute without dispute.

The Contractor shall at no time supply and install equipment that has not been specified or approved by the City of Peterborough or delay the progress of work based on a request to substitute.

## **CP 601.02 Quality Control**

The price identified in the Schedule of Unit Prices shall be full compensation for the contractor to employ or retain one or more Professional Engineers to provide services of a Quality Verification Engineer (QVE), selected from the Ministry of Transportation's RAQ system.

The QVE shall inspect all aspects of the construction of the traffic signal electrical systems ensuring all testing and inspection are complete and passed prior to activation in accordance with OPSS and City of Peterborough Quality Control Plan - Electrical.

The inspection and testing results shall be approved and certified by the QVE Engineer.

The QVE Engineer shall issue Proof of Performance Certificates for specific electrical items as they are installed as well as a Certificates of Conformance for all the traffic signal works and equipment. The Certificate of Conformance shall indicate that all the works have been completed, inspected, tested and that the materials and installation meet the requirements of the contract, the City of Peterborough Electrical Specifications and industry standards.

The Certificate of Conformance shall also certify that the new traffic signal systems are approved for turn-on. This Certificate must be provided to the Contract Administrator prior to activation.

## **CP 601.03 Supply/Install Temporary Traffic Signals**

OPSS.PROV 106, November 2008 shall apply.

The unit price identified in the Schedule of Unit Prices shall include all labour, equipment and material necessary to construct and maintain temporary traffic signals as shown on the contract drawings.

This item shall include but not limited to permits, messenger cable, traffic signal conductors, power supply, signal heads and inserts, optical detection equipment, traffic signal controller assembly, poles, guys, pedestrian heads and inserts, conduit, overhead signs, pedestrian push buttons, vehicle detectors, arms and brackets. The unit price bid also includes the removal of the temporary signals including all necessary restoration.

Temporary aerial traffic signal installation shall be in accordance with OPSD-2540.01. The contractor is responsible to contact Peterborough Utilities Services Incorporated to co-ordinate the service layout and the installation of steel messenger cable within the vicinity of existing overhead hydro utilities.

Temporary traffic signal controller shall be 8-phase NEMA Type "M" controller cabinet assembly for pole mount and shall be in accordance with the minimum requirements as specified in CP 622.01.

Temporary poles shall be 12.5 m, Class 4, wood pole direct buried (OPSD 2238.01).

Sub-section 615.05.03 is amended by the additional of the following clause:

Pedestrian head and push button stand shall be constructed as specified in the contract drawings.

The contractor shall request from the Contract Administrator, traffic signal timing plans a minimum of five (5) business days in advance of signal activation or the implementation of a construction stage. In addition to this, the contractor is responsible to adjust the traffic signal head locations for each stage of construction in accordance with the contract and to maintain legal signal head position at all times. No additional payment will be made for relocating traffic signal /pedestrian heads or making adjustments to the traffic signal timing plan or detection equipment as directed by the Contract Administrator.

The unit price bid shall also include all costs associated with providing a Pay Duty Police Officer to control / manage traffic within the intersection during the construction of the temporary signals and when relocating signal heads when implementing a change in construction staging.

A copy of all permits, inspection reports and certificates shall be submitted to the Contract Administrator prior to the commencement of work and/or the energizing of systems. ESA Certificate of Inspection for Hydro service and ESA Certificate of Inspection for new Traffic Signals and /or Beacons shall be submitted to the Contract Administrator three (3) business days prior to scheduled turn-on.

The Contractor is hereby advised that pre-marked pavement marking must be installed prior to turn-on of temporary traffic signals and pavement markings must be installed prior to signal activation/turn-on.

**Reference:**

OPSS 604  
OPSS 610  
OPSS 615  
OPSS 622  
CP601.01  
CP601.02  
CP603.01  
CP604.02  
CP604.03  
CP609.01  
CP609.02  
CP620.03

CP620.04  
CP620.05  
CP621.01

## **CP 602.01 Supply and Install Precast Concrete Electrical Handwell and Cover**

OPSS 602, November 2008 shall apply except as amended and extended herein.

All unused knockout holes shall be grouted.

OPSS 602.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install 460 mm, 600 mm, 675 mm diameter and 600 mm x 600 mm Pre-cast Electrical Handwell and Covers as shown on the Contract Drawings including backfill and covers set to proposed finished grade.

Frames and Covers:

Frame and Cover for 600 mm x 600 mm Pre-cast Electrical Handwell shall be in accordance with (OPSD 401.010 Type A) (OPSS 407).

In addition, one 3/8" ground lug for #6 AWG stranded copper shall be attached to frame. (OPSD 2117.02)

Minimum of one (1) and a maximum of three (3) pre-cast adjustment units shall be installed. (OPSS 407.07.15) (OPSD 704.010)

OPSD 2123.03 has been amended and extended as follows:

Duct entry holes are to be filled flush with a cement mortar mix to provide a smooth watertight finish.

### **Reference:**

OPSD 401.010  
OPSD 704.010  
OPSD 2112.020  
OPSD 2112.030  
OPSD 2112.040  
OPSD 2117.02  
OPSD 2123.01

**CP 603.01 Supply and Install Rigid PVC Conduit Direct Buried**

OPSS 603, November 2008 shall apply except as amended and extended herein.

OPSS 603.05.08 has been amended and extended as follows:

All ducts shall be PVC Rigid Duct in accordance with CSA C22.2 No. 211.2.

PVC DB2 type duct will not be accepted.

Where unshrinkable backfill is required, backfill material shall be in accordance with OPSS 1359 and shall be placed to the underside of base asphalt.

OPSS 603.09.01.01 has been amended and extended as follows:

Measurement for payment of duct shall be per lineal metre of duct bank.

OPSS 603.10 has been amended and extended as follows:

Payment at the Contract price shall be full compensation for all labour, equipment and material necessary to Supply and Install Direct Buried Rigid PVC Duct as shown on the Contract Drawings: including excavation of trenches, removal and disposal of materials, bedding, backfill and compaction, supply and installation of the duct, fish line, all bends, risers, caps, spacers, connection structures and 1/C #12 AWG copper tracer wire in all empty and spare ducts.

All sections of pipe that fail testing under City of Peterborough Electrical Quality Control Specifications shall be repaired and retested to the satisfaction of the Contract Administrator.

OPSS 604.05.11 has been amended and extended as follows:

Fish line shall be Polyester Mule tape installed one (1) length free of joints or knots.

OPSD 2123.03 has been amended and extended as follows:

Duct entry holes are to be filled flush with a cement mortar mix to provide a smooth watertight finish. Proposed ducts within the roadway shall be installed prior to the placement of Granular 'B'.

**Reference:**

OPSD 2101.01

OPSD 2103.02

OPSD 2103.03

OPSD 2103.04

OPSD 2103.05

OPSD 2123.01

OPSD 2123.03



## **CP 604.01 Supply and Install Extra Low Voltage Cables**

OPSS 604, April 2009 shall apply except as amended and extended herein.

All cables entering the traffic signal controller cabinet shall be labeled using a permanent marking system to the satisfaction of the Contract Administrator.

604.07.13 has been amended and extended as follows:

Extra low voltage cable splices underground shall be completed using a cable splicing kit (Raychem GEL pack enclosure or 3M Scotch splice kit) for the connection of the loop wire to the home run cable in a Handwell and/or pole base, in the location shown on the contract drawings. The installation of each splice kit shall be in accordance with the manufacturer's requirements.

The unit price identified in the schedule of the unit prices shall include all labour, equipment and material necessary to install and connect Duplex, Simple and Diamond loop detectors using insulated crimped spade connectors to the controller.

Extra-low voltage cables for use of traffic signal actuation devices shall meet or exceed the OPSS 2410 and "3M" Traffic Control System Specification for Model #30003 cable.

**No Substitution for this Cable Is Permitted.**

### **Reference:**

OPSD 2530.01

## **CP 604.02 Supply and Install Low Voltage Cable**

OPSS 604, April 2009 shall apply except as amended and extended herein.

All cables entering the traffic signal controller cabinet shall be labeled using a permanent marking system to the satisfaction of the Contract Administrator. Low Voltage runner cables shall be labeled by group at all splicing or termination points.

OPSS 604.07.06 has been amended and extended as follows:

A minimum of 300 mm length of lighting, traffic signal and power cables shall be left at all accessible pulling points, splicing points, or cable termination points. A coil length of low-voltage traffic signal cable and extra low-voltage cables shall be left at all electrical maintenance hole/hand-hole and underground junction boxes so that a minimum of 1.0 m total length of cable may be pulled out above finished grade.

The unit price identified in the schedule of the unit prices shall include all labour, equipment and material necessary to install and connect low voltage cable including all connectors.

All traffic signal cable shall meet or exceed OPSS 2409.

IMSA type cable will not be accepted.

**Reference:**

OPSD 2242.01  
OPSD 2242.02  
OPSD 2245.01  
OPSD 2245.020  
OPSD 2530.01  
OPSD 2545.01

### **CP 604.03 Supply and Install Optical Pre-Emption Detector Cable and Optical Detector Equipment**

OPSS 604, April 2009 shall apply except as amended and extended herein.

The unit price identified in the schedule of the unit prices shall include full compensation to supply and install 3/C STROBCOM II optical pre-emption detector cable (TOMAR Model M913), mast arm detector mount (TOMAR Model 2090M-1), TOMAR STROBECOM II optical pre-emption detectors (MODEL 2091-SD), 1 - Tomar model 4140 Strobecom II Optical Signal Processor – 4 channel and 1 - Tomar model 2086 Aux. transit band output module or approved equivalent. The cable shall be installed from the controller cabinet in ducts to signal heads as shown on the contract drawings. This item shall also include installation, connection and testing of the pre-emption card. Each optical detector shall be connected independently using 3/C detector cable.

### **CP 604.04 Supply and Install Pedestrian Pushbuttons and Cable**

OPSS 604, April 2009 shall apply except as amended and extended herein.

The unit price identified in the Schedule of Unit Prices shall include all labour, equipment and material necessary to Supply and Install Polara latching Control Unit PBPCU (NEMA Card style complete with interface cable) PBB3BY0 latching pushbutton, PXBF57Y PB Frame, PXNGSB or MUTCD R10-3B 5"x7" Pedestrian Pushbutton sign as shown on the contract drawings. Pushbutton equipment shall be installed in accordance with manufacturer's specifications. All phases are to be individually cabled. The pedestrian pushbuttons are to be installed and connected using Beldon two conductor #14 AWG extra low voltage cable.

**Reference:**

OPSD 2530.01  
OPSD 2545.01

## **CP 604.05 Supply and Install Audible Pedestrian Pushbutton and Cable**

OPSS 604, April 2009 shall apply except as amended and extended herein.

The unit price identified in the Schedule of Unit Prices shall include all labour, equipment and material necessary to Supply and Install Polara iNavigator Central Control Unit Model Number PXCCUIS complete with the interface board and cables, (CSA Approved), PBI2AAB iNavigator Audible pedestrian pushbutton (Yellow front/Black back) with the Canadian melody and PXNGSB pedestrian sign as shown on the contract drawings. Pushbutton equipment shall be installed in accordance with manufacturer's specifications. All phases are to be individually cabled. The pedestrian pushbuttons are to be installed and connected using Beldon two conductor #14 AWG extra low voltage cable.

A custom message is to be added to each unit. It is the contractor's responsibility to request the standard City of Peterborough custom message from the supplier and it is to be pre-approved by the Contract Administrator and installed prior to turn-on.

Prior to turn on, the manufacturer's representative shall be available to meet with a City of Peterborough Transportation Division representative on-site to set-up and test the equipment. It is the Contractor's responsibility to arrange for this meeting and provide the Contract Administrator a minimum of three (3) business day's notification of the meeting date.

### **Reference:**

OPSD 2530.01

OPSD 2545.01

## **CP 604.06 Supply and Install Fibre Optic Interconnect Cable in Ducts**

The unit price identified in the Schedule of Unit Prices shall include all labour, equipment and material necessary to Supply and Install Fibre optic cable with 1/C#12 AWG copper tracer wire in accordance with OPSS 604 dated November 2004;

OPSS 604 is amended as follows:

Sub-section 604.05 is amended by the addition of the following:

### **604.05.13 Fibre Optic COMM Cables**

Fibre Optic COMM Cables for inter-connect shall be 48 strand Single Mode 1310 / 1550 nm, Gel-Free non-armored underground Fibre Optic Cable. Contractor shall leave a 20 m coil in the base section of the traffic signal controller cabinet for connection by others. Measurement for payment under this item shall be per lineal metre of cable installed.

## **CP 609.01 Supply and Install Ground Plate**

OPSS 609, November 2010 shall apply except as amended and extended herein.

Ground Plates shall be in accordance with OPSS 609.05.02

Ground Connectors shall be in accordance with OPSS 609.05.05

Ground Conductor connecting Ground Plate to grounding grid shall be #6 AWG direct buried bare copper.

The unit price identified in the schedule of unit prices shall be full compensation for the supply of all necessary labour, equipment and material necessary to Supply and Install Ground Plates including bare copper conductor. OPSS 609 has been amended to allow clamp connections to the ground plate provided they meet all ESA specifications.

OPSS 609.07.14.01 has been amended and extended as follows:

All Ground Plate installations are to be inspected by the Contract Administrator prior to backfill. The Contractor is responsible to notify the Contract Administrator that the ground plates are installed and ready for inspection 24 hours prior to backfill.

OPSS 609.10 has been amended and extended as follows:

Payment at the Contract price shall be full compensation for all labour, equipment and materials necessary to Supply, Install and Connect Ground Plates as shown on the Contract Drawings.

## **CP 609.02 Supply and Install Ground Wire**

OPSS 609, November 2010 shall apply except as amended and extended herein.

Ground Connectors shall be high-pressure irreversible type copper connectors. No other type of connector will be accepted.

All grounding shall be resistance tested to ground as per OPSS 609.07.14 and certified by the Quality Verification Engineer.

Ground Conductor installed within ducts shall be insulated.

OPSS 609.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply, Install and Connect Ground Wire as shown on the Contract Drawings.

**Reference:**

OPSD 2117.01

OPSD 2117.02

OPSD 2547.01

**CP 610.01 Remove/Salvage Existing Streetlight / Traffic Signal Equipment**

OPSS 610, November 2008, shall apply except as amended and extended herein.

The unit price bid identified in the schedule of unit prices shall be full compensation to carefully remove and salvage the existing streetlight and traffic signal equipment as shown on the contract drawings including poles, footings, luminaries, signal heads, pedestrian crossing heads, arms and assemblies etc.

All traffic signal equipment is to be documented and photographed and to be delivered to the Public Works Yard or alternate location as directed by the Contract Administrator. A copy of all the documented material must be provided to the Contract Administrator.

Missing or un-documented material will result in non payment of that item. All salvaged traffic signal equipment is to be carefully and neatly stacked on wood pallets. The Contractor is responsible to notify the Contract Administrator two (2) working days in advance of delivery so that the equipment may be received by a City Transportation Division representative.

**CP 614.01 Supply and Install Power Supply Cabinet**

OPSS 614, September 1984 shall apply except as amended and extended herein.

The unit price identified in the Schedule of Unit Prices shall include the supply and installation of Model PSL421 power supply cabinet manufactured by Pedestal Solutions Inc. and Model BCP 20PED pre-cast concrete base manufactured by Brooklin Concrete or approved equivalent as shown on the Contract Drawings. The power supply cabinet shall include but not limited to circuit breakers as follows:

- 1 – 2 pole, 100A main
- 8 – 1 pole, 40A for illumination
- 1 – 1 pole, 30A for controller
- 1 – 1 pole, 15A for Bus Shelter
- 2 – 1 pole, 15A spare

The unit price identified in the Schedule of Unit Prices shall also include all fees for permits, inspections, approvals, and connections /disconnections necessary to energize the illumination and traffic signal systems. The contractor shall also supply and install a

waterproof padlock and provide two sets of keys to the Contract Administrator once the power supply cabinet has been energized.

Cabinet Paint Colour – Polyester Powder, Baked Enamel as 70 Grey

All cables entering into the power supply cabinet shall be labeled using a permanent marking system to the satisfaction of the Contract Administrator.

Pre-cast concrete base to be installed on a 300 mm granular 'A' bedding and shall have a minimum of 150 mm of granular 'A' backfill.

Power Supply Cabinet to be installed as per IPSTR-3010.02 or IPSTR-3010.04

OPSS 615.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply, Install and Connect Power Supply Cabinet as shown on the Contract Drawings including but not limited to all cabinet brackets, mountings, bands, bolts, fittings, wiring connections and aggregates.

**Reference:**

IPSTR-3010.02

IPSTR-3010.04

## **CP 615.01 Supply and Install Heavy Class Base Mounted Steel Pole**

OPSS 615, November 2008 shall apply except as amended and extended herein.

OPSS 615.05.03 has been amended and extended as follows:

Steel poles shall be Heavy Class Octagonal Tapered Steel Traffic Poles as manufactured by Valmont Industries, Inc. or Spina's Steel Workers Co., Ltd. or approved equivalent. The poles shall be octagonal, non-frangible base, hot dipped galvanized steel and are to be supplied complete with galvanized hand hole covers and pole caps. Pole heights are to be as illustrated on the contract drawings.

Where poles are perforated for cables or cut for any reason they shall be treated with a zinc rich compound and fitted with rubber grommets.

OPSS 615.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install Steel Pole Heavy Class Base Mounted as shown on the Contract Drawings.

Handhole height to be as per IPSTR-3010.03

**Reference:**

OPSD 2215.03  
OPSD 2220.01  
USDTR-3010.03

**CP 615.02 Supply and Install Direct Buried Round Class C – Heavy Duty Concrete Pole**

OPSS 615, November 2008 shall apply except as amended and extended herein.

OPSS 615.05.03 has been amended and extended as follows:

Concrete street lighter poles shall be Round Class C – Heavy Duty Poles as manufactured by StressCrete or approved equivalent. Pole heights are to be as illustrated on the contract drawings.

OPSS 615.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install Direct Buried Round Class C – Heavy Duty Concrete Pole as shown on the Contract Drawings.

**Reference:**

OPSD 2225.010  
OPSD 2410.01

**CP 615.03 Supply and Install 1.5 m Aluminium Pedestrian Pole and Concrete Footing**

OPSS 615, November 2008 shall apply except where amended and extended herein.

OPSS 616, November 2008 shall also apply.

The unit price identified in the schedule of unit prices shall include all labour, equipment and material necessary to Supply, Install and Connect 1.5 m Aluminium Pole Straight Round for Pedestrian Push Buttons as manufactured by Sentinel Pole and Traffic Equipment or approved equivalent, including 300 mm diameter x 1200 mm depth concrete footing, 19 mm galvanized bolt type NCA pre-set anchor or approved equivalent and 50 mm rigid PVC conduit.

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install 1.5 m aluminum Pedestrian Pole and Footing as shown on the Contract Drawings.

## **CP 616.01 Construct Concrete Controller Pad**

OPSS 616, November 2008 shall apply except as amended and extended herein.

The unit price identified in the schedule of the unit shall include all labour, equipment and material necessary to construct concrete controller pad for type M cabinet in accordance with IPSTR 3010.00(.01)(.02)(.04) as shown on Contract Drawings. The unit price bid shall also include the supply and installation of all ductwork between the controller pad and hand well 1 HW1, power supply, communication pole and UPS where specified. The orientation of the ductwork entering the controller pad may vary. See Contract Drawings for configuration.

OPSS 616.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Construct Concrete Controller Pad as shown on the Contract Drawings.

### **Reference:**

IPSTR-3010.00  
IPSTR-3010.01  
IPSTR-3010.02  
IPSTR-3010.04

## **CP 616.02 Supply and Install Concrete Footing for Base Mounted Pole**

OPSS 616, November 2008 shall apply except as amended and extended herein.

The unit price identified in the schedule of unit prices shall include all labour, equipment and material necessary to construct footings for base mounted poles as shown on the Contract Drawings in accordance with OPSD 2200.01 and IPSTR-E1. Anchor assemblies shall be installed in accordance with OPSD 2215.02 as amended to specify a Richmond type anchor.

Testing and sampling of concrete shall be in accordance with CP351.01.

OPSS 616.10 has been amended and extended as follows:

All pole base footings shall be augured, hydro vacuumed or hand dug. No excavator shall be used. The unit price for pole footings in grass boulevards shall also include restoration with topsoil to finish grade.

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install Concrete Footing for base mounted pole as shown on the Contract Drawings.



**Reference:**

OPSD 2200.01  
OPSD 2200.04  
OPSD 2215.02  
USDTR – E1

**CP 617.01 Supply/Install LED Roadway Lighting Luminaires, Aluminum Arm and Bracket Assemblies**

OPSS 617, November 2013 shall apply, except as amended and extended herein.

OPSS 617.07.04.01 has been amended and extended as follows:

Aluminum tapered elliptical brackets on metal or concrete poles shall be fastened as per OPSD 2250.010.

Refer to contract documents and/or contract drawings for luminaire wattage and aluminum arm length.

The unit price bid identified in the schedule of unit prices shall be full compensation to supply and install LED Roadway Lighting Luminaires, Arms and Brackets as shown on the contract drawings. The unit price bid shall also include but not limited to Cree Lighting – Street and Roadway lighting XSP Series, 60W, 100W, or 165W, full cut-off luminaire, Type II or type III distribution with spill control, die cast aluminum housing, silver colour, NEMA 7-pin photocell receptacle & field adjustable output photocell receptacle, 120VAC, CSA Listed, model number. All fixtures are to be manufactured by CREE (or approved equivalent) and that approved models include, but are not limited:

- 60W, type II distribution: BXSPR-HO-HT-(2ME or 2LG)-60W-30K-UL-SV C/W N-Q9);
- 60W, type III distribution: BXSPR-HO-HT-3ME-60W-30K-UL-SV C/W N-Q9);
- 100W, type II distribution: BXSP1-HO-HT-(2ME or 2LG)-100W-30K-UL-SV C/W N-Q9),
- 100W, type III distribution: BXSP1-HO-HT-3ME-100W-30K-UL-SV C/W N-Q9),
- 165W, type II distribution: BXSP2-HO-HT-(2ME or 2LG)-165W-30K-UL-SV C/W N-Q9),
- 165W, type III distribution: BXSP2-HO-HT-3ME-165W-30K-UL-SV C/W N-Q9),

Aluminum arm, bracket assemblies, in-line fuse holders and fuses, lamps, #12 conductors and ground from luminaire to pole base and all connections in accordance with OPS and electrical codes.

Smart photocells shall also be used to link to gateways to convey their status to the City of Peterborough's online (DIMONOFF) application. The smart photocell (Node) specification is as follows: External Controllers (RME-EA9), Compliant with ANSI c136.41 photocell receptacle \*5D26193G01. The lights must be fitted with a tilt sensor which reports back to the online application.

All luminaires shall be “Dark Sky Compliant”.

OPSS 617.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment, and materials necessary to Supply and Install LED Roadway Lighting Luminaires, aluminum arm and bracket assemblies as shown on the Contract Drawings.

Reference:

OPSD 2420.010

OPSD 2421.010

OPSD 2250.010

### **CP 620.01 Supply and Install Traffic Signal Arm and Double Arm Bracket**

OPSS 620, November 2007 shall apply except as amended and extended herein.

OPSS 620.10 has been amended and extended as follows:

Payment at the contract price shall be full compensation for all labour, equipment and materials necessary to Supply and Install Aluminum Single Member Arm, Bracket and Plumbizer Hangers as shown on the Contract Drawings.

OPSS 2460.07.05 has been amended and extended as follows:

Traffic signal hanger assemblies shall be adjustable elevator Fortran PLU555 plumbizer and Fortran PLU451 plumbizer kit or approved equivalent.

OPSS 620.07.02.01 has been amended and extended as follows:

The attachment point of the mast arm on the pole shall be set to obtain 5.0 m clearance from finished grade to the bottom of the signal head/backboard and shall be no higher than 5.15 m unless approved by Contract Administrator.

**Reference:**

OPSD 2250.01

OPSD 2500.010

OPSD 2500.020

OPSD 2501.01

OPSD 2501.02

## **CP 620.02 Supply and Install Loop Detector Including Flexible Duct**

OPSS 620, November 2007 shall apply except as amended and extended herein.

Loops may not be installed under conditions where temperatures are below 10 degrees C. Each loop shall be completed the same day the road cut is made. Road cuts are NOT to be left open over night.

OPSS 604, April 2009 shall also apply except as amended and extended herein.

Loop Detector shall be installed in the top lift of base asphalt.

The conductor shall be installed with the correct number of turns, as shown on the Contract drawings.

OPSS 604.10 has been amended and extended as follows:

Payment at the Contract price shall be full compensation for all labour, equipment and materials necessary to Supply, Install and Connect Loop Detector and Flexible Duct as shown on the Contract Drawings. The measurement shall be unit cost for each Loop Detector installation.

### **Reference:**

OPSD 2520.01

OPSD 2520.02

OPSD 2530.01

## **CP 620.03 Supply and Install Pedestrian Signal Head, Type 12” Led**

OPSS 620, November 2007 shall apply except as amended and extended herein.

The unit price identified in the schedule of unit prices shall include all labour, equipment and material necessary to Supply and Install polycarbonate single pedestrian head housing (Fortran Part # HOU800), black 12” square pedestrian signal head door complete with gasket (Fortran Part # DOO552), hinge pins (Fortran Part # PIN006) and yellow visor (Fortran Part # VIS305) as shown on the contract drawings. The unit price shall also include but not limited to Excellence Opto. Inc. 300 mm X 300 mm LED signal TRP-C30DD2C3 or approved equivalent including double arm bracket, grounding, 5/C #14 AWG conductor riser with minimum 19 strands to pole base including all connections in accordance with OPS and electrical codes.

OPSS 620.07.02.07 has been amended and extended as follows:

Riser cables shall be connected to LED modules with insulated wing nut vibration connectors.

Contractor is required to supply serial #'s on the City of Peterborough LED Serial No. Log Sheet provided by the Contract Administrator, typed in Excel format and a letter assigning the five (5) year manufacturers warranty for all LED inserts to the Contract Administrator prior to turn-on. Contractor is advised that the double arm brackets may vary in length as specified on the contract drawing.

**Reference:**

OPSD 2505.01

OPSD 2524.01

### **CP 620.04 Supply and Install Traffic Signal Head, Led**

OPSS 620, November 2007 shall apply except as amended and extended herein.

OPSS 620.07.02.07 has been amended and extended as follows:

Riser cables shall be connected to LED modules with insulated wing nut vibration connectors.

The unit price identified in the schedule of unit prices shall be full compensation to Supply and Install Traffic Signal Heads as shown on contract drawings. The unit price bid shall also include but not limited to yellow polycarbonate housing and backboard, visors, Excellence Opto. Inc. LED Modules 12" Red (TRV-R12SG-D2T), 12" Amber (TRV-Y12SG-D1T), 12" Green (TRV-G12SG-D2T), 8" Amber (TRV-Y08SG-D1T), 8" Green (TRV-G08SG-D1T), 12" Bi-modal Arrow (TRA-B12DD-1W) or approved equivalent, Fortran PLU451 plumbizer kit, grounding, 7/C#14AWG conductor riser with minimum 19 strands to pole base including all connections in accordance with OPSS 2409.05.01.

Contractor is required to supply serial #'s on the City of Peterborough LED Serial No. Log Sheet provided by the Contract Administrator, typed in Excel format and a letter assigning the five (5) year manufacturers warranty for all LED inserts to the Contract Administrator prior to turn-on.

**Reference:**

OPSD 2501.01

### **CP 620.05 Supply and Install Traffic Signal Controller Including Turn-On**

OPSS 620, November 2007 shall apply except as amended and extended herein.

The unit price identified in the schedule of unit prices shall be full compensation to supply, install and connect the City of Peterborough Specification (CP 622.01 or CP 622.02 as specified in the tender documents) NEMA controller cabinet assembly onto

concrete controller pad as shown on the contract drawings. The unit price bid shall also include but not limited to all cabinet brackets, mountings, bands, bolts, fittings, wiring connections, testing, programming, traffic control (including pay duty police) and turn-on. Duct seal compound is to be used to adequately seal all duct ends inside the cabinet. All cables entering into the Controller Cabinet Assembly shall be labeled using a permanent marking system to the satisfaction of the Contract Administrator. Field testing shall be performed in accordance with OPSS and City of Peterborough Electrical Quality Control Specifications.

The contractor is required to notify the Contract Administrator a minimum of three (3) business days prior to any field testing. It is anticipated that testing should take approximately three (3) hours, if testing extends beyond three (3) hours the contractor shall be responsible for the cost of all City and police personnel in attendance. The intersection must be under the control of a pay duty police officer during field testing.

The Contractor is hereby advised that pre-marked pavement marking must be installed prior to turn-on of temporary traffic signals and pavement markings must be installed prior to signal activation/turn-on.

**Reference:**

OPSD 2514.01

### **CP 620.06 Supply and Install Uninterruptible Power Supply (Ups) Equipment**

OPSS 620, November 2007 shall apply except as amended and extended herein.

The unit price identified in the schedule of unit prices shall be full compensation to Supply, Install and Connect a Battery Backup System or UPS for the traffic signal system as shown on the Contract Drawings. The unit price bid shall also include but not limited to Alpha Pad S6 enclosure (SE48 Enclosure Grey) including 8" Riser with FXM 1100(48vdc) 120V i/o w/TBs & 5-15R, Universal Automatic Transfer Switch (UATS), Battery Temperature Probe (2mtr), Alpha Guard, four (4) Battery Heater Mats, four (4) Gel Battery 220 GXL 12v 109Ah and Battery Cable Kit with 8 ft Length. UPS equipment shall be installed in accordance with manufacturer's specifications.

Duct seal compound is to be used to adequately seal all duct ends inside the cabinet.

All cables entering into the UPS shall be labeled using a permanent marking system to the satisfaction of the Contract Administrator.

New Traffic Signal System Activation and Traffic Signal System Switchover shall be in accordance with OPSS 106.

Cabinet Paint Colour – Polyester Powder, Baked Enamel asa 70 Grey

**CP 620.07 Supply and Install Bicycle Signal Head, Led**

OPSS 620, November 2007 shall apply except as amended and extended herein.

OPSS 620.07.02.07 has been amended and extended as follows:

Riser cables shall be connected to LED modules with insulated wing nut vibration connectors.

The unit price identified in the schedule of unit prices shall be full compensation to Supply, Install and Connect Bicycle Signal Heads as shown on contract drawings. The unit price bid shall also include but not limited to all black 3 X 8 polycarbonate housing and cowl visors, Excellence Opto. Inc. LED clear lens Modules 8" Red Bicycle (TRB-R08SG-D2T-C), 8" Amber Bicycle (TRB-Y08SG-D2T-C), 8" Green Bicycle (TRB-G08SG-D2T-C) or approved equivalent, Can-Brac Universal Signal Assembly, grounding, 7/C#14AWG conductor riser with minimum 19 strands to pole base including all connections in accordance with OPSS 2409.05.01.

Contractor is required to supply serial #'s on the City of Peterborough LED Serial No. Log Sheet provided by the Contract Administrator, typed in Excel format and a letter assigning the five (5) year manufacturers warranty for all LED inserts to the Contract Administrator prior to turn-on.

**Reference:**

OPSD 2501.01

OPSD 2502.011

**CP 620.08 Supply and Install Pedestrian Countdown Signal Head, Type 12", Led**

OPSS 620, November 2007 shall apply except as amended and extended herein.

The unit price identified in the schedule of unit prices shall include all labour, equipment and material necessary to Supply, Install and Connect polycarbonate single pedestrian head housing complete with 12" square black door, yellow housing and yellow square visor (Fortran Part # P401640) including polycarbonate joiner and nut for joining traffic signals (Fortran Part # JPT100) as shown on the contract drawings.

The unit price shall also include but not limited to Excellence Opto. Inc. 300 mm X 300 mm square LED countdown signal, ETL Approved, CSA Approved (EOI Part # PR-CC0140, Fortran Part # P4KM640) including double arm bracket, grounding, 5/C#14 AWG conductor riser with minimum 19 strands to pole base including all connections in accordance with OPS and electrical codes.

This item shall include all labour, equipment and material necessary to raise the existing pedestrian signal head including the installation of a new 5/C#14 AWG conductor riser

with minimum 19 strands to pole base including all connections in accordance with OPS and electrical codes to allow for the installation of the countdown pedestrian signal head at the required height.

OPSS 620.07.02.07 has been amended and extended as follows:

Riser cables shall be connected to LED modules with insulated wing nut vibration connectors.

Contractor is required to supply serial #'s on the City of Peterborough LED Serial No. Log Sheet provided by the Contract Administrator, typed in Excel format and a letter assigning the five (5) year manufacturers warranty for all LED inserts to the Contract Administrator prior to turn-on.

Contractor is advised that the double arm brackets may vary in length as specified on the contract drawing.

**Reference:**

OPSD 2505.01

OPSD 2524.01

## **CP 620.09 Supply and Install Radar Detectors**

OPSS 620, November 2007 shall apply except as amended and extended herein.

The unit price identified in the Schedule of Unit Prices shall include all labour, equipment and material necessary to supply and install a complete Wavetronix SmartSensor Matrix detector (CSA Approved) as shown on the contract drawings.

The unit price bid shall also include but not limited to two (2) Wavetronix SmartSensor Matrix , two (2) Wavetronix Sensor Mounting Brackets, two (2) 40 ft drop cables, two (2) Wavetronix Junction Boxes, Cabinet Interface (Wavetronix CLK650), 500 ft. Wavetronix Home Run cable and Drawing / Software USB kit.

The Contractor is to install the microwave detection units as per manufacturer's recommendation and coordinate with the supplier to determine optimal mounting height, and provide onsite turn on assistance and programming from a Certified Factory Technician.

## **CP 622.01 Supply City of Peterborough Specification Nema TS1 Traffic Signal Controller Assembly**

This specification describes the minimum acceptable requirements for an 8-Phase NEMA TS2 type 2 traffic signal controller in a TS1 type M cabinet mounted on a extension base. The traffic controller assembly shall include:

- NEMA TS2 type 2 traffic controller complete with Auxiliary I/O harness (“D” Connector)
- Model 204 Flasher
- 10 Position Detector rack
  - Able to accommodate Tomar model 4140 Strobecom II Optical Signal Processor - 4 channel card
  - One 24vdc Rack Mounted Power Supply,
  - Four (4) – 2 Channel EDI Oracle 2E Detector Cards
- One 12 channel NEMA CMU complete with event logging and LCD, monitor must be capable of recognizing Canadian “Fast Flash” signal operation.
- One Cabinet Power Supply Assembly (Hydro Service Panel).
- One 12 Position Load Bay; complete with 12 Load Switches (Model 200).
- Cabinet shall be terminated to include all harnesses required for connection to a T2000 RCCU.

City of Peterborough pre-approved suppliers for an 8-Phase NEMA TS2 type 2 traffic signal controller assembly in a TS1 type M cabinet are as follows:

- Econolite Canada Inc.
- Fortan Traffic Systems Limited.

## **CP 622.02 Supply City of Peterborough Specification Nema TS2 Traffic Signal Controller Assembly**

This specification describes the minimum acceptable requirements for an 8-phase Nema TS2 Type 1 traffic signal controller in an Econolite TS2 type M cabinet mounted on a 24” extension base. The traffic controller assembly shall include:

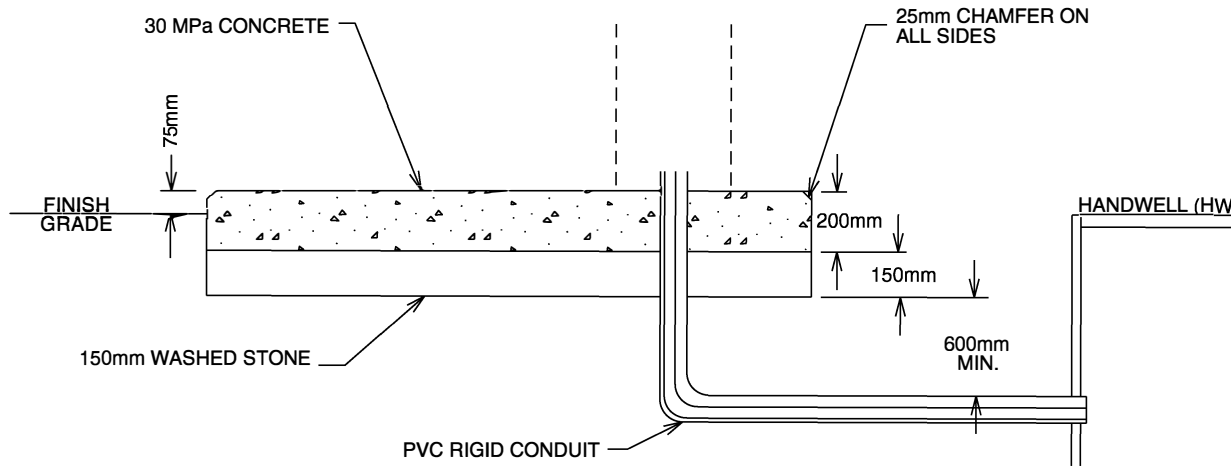
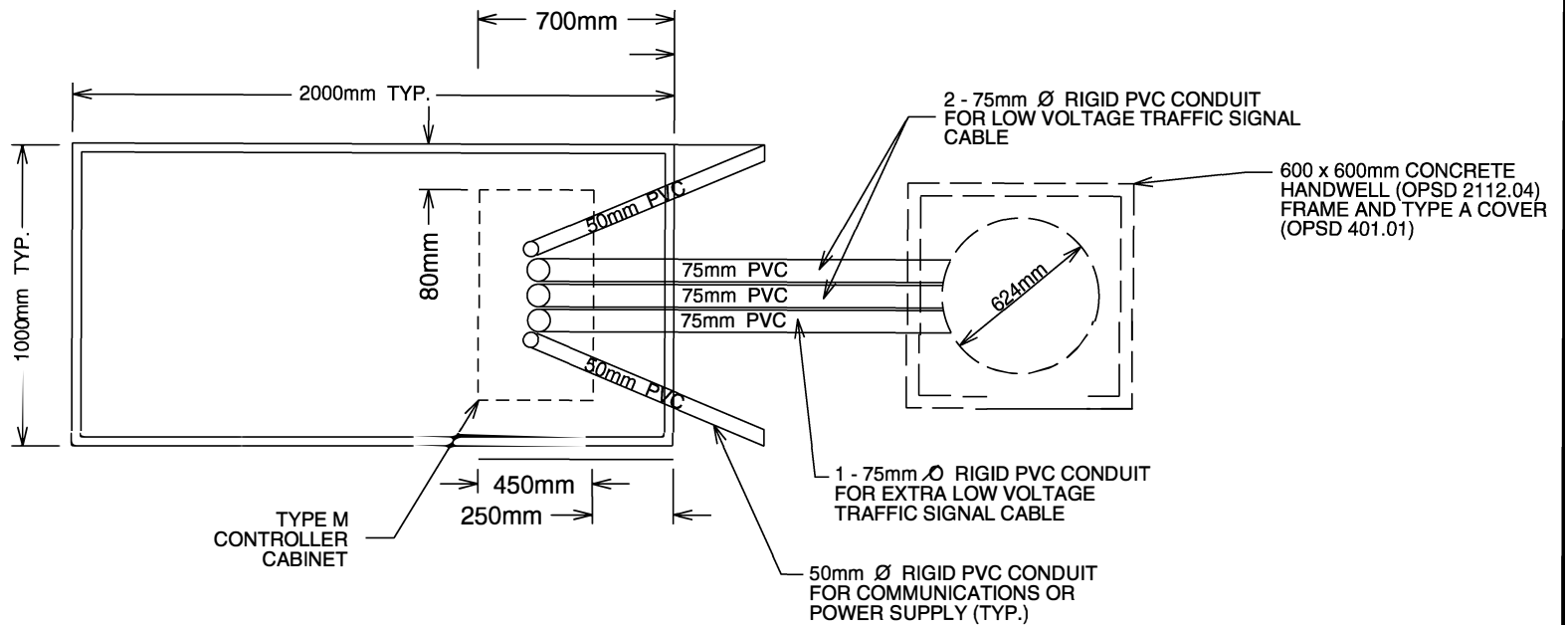
- NEMA Cobalt TS2 Type 1 traffic controller
- Model 204 Flasher
- 10 Position Detector Card Rack complete with Bus Interface Unit
  - Able to accommodate Tomar model 4140 Strobecom II Optical Signal Processor – 4 Channel Card
  - One 24vdc Rack Mounted Power Supply
  - Four (4) – 2 Channel EDI Oracle 2E Detector Cards
- One 16 channel malfunction management unit with event logging and LCD display
- Four flash transfer relays



- 
- One Cabinet Power Supply Assembly (Hydro Service Panel) and cabinet auxiliary power supply
  - One 12 Position Load Bay complete with two bus interface units and 12 Load Switches (Model 200)
  - Cabinet shall be terminated to include all harnesses required for connection to a T2000 RCCU.
  - Cabinet Paint Colour – Polyester Powder, Baked Enamel as 70 Grey

City of Peterborough pre-approved suppliers for an 8-Phase NEMA TS2 type 1 traffic signal controller assembly in a TS2 type M cabinet are as follows:

- Econolite Canada Inc.



NOTES:

1. CONCRETE TO HAVE CLASS 'A' FINISH
2. ALL CONDUITS TO BE ENCASED IN 75mm SAND WITH CAUTION TAPE
3. CONTROLLER LOCATION AS PER CONTRACT DOCUMENTS

CITY OF PETERBOROUGH  
INFRASTRUCTURE & PLANNING SERVICES

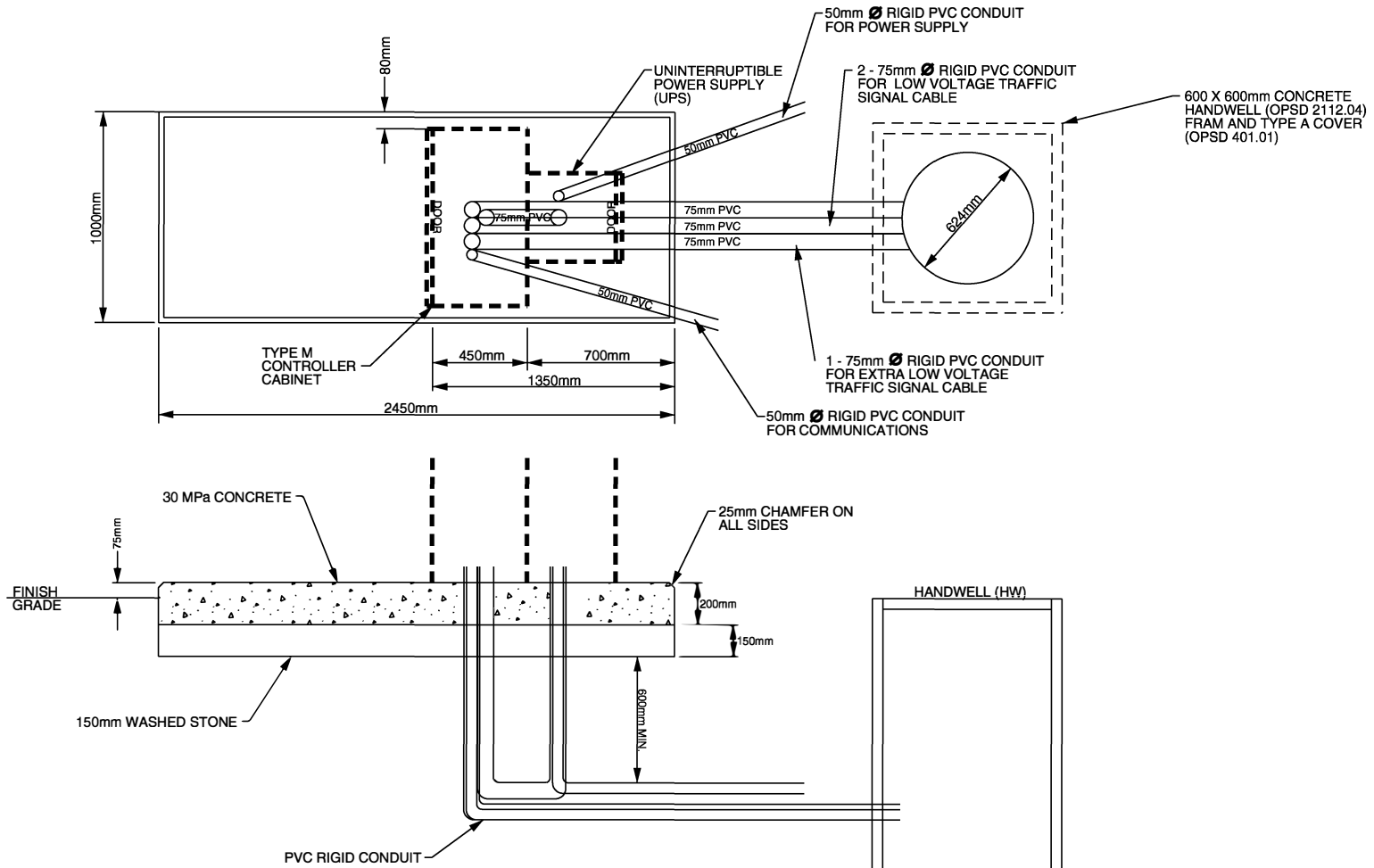
TRAFFIC SIGNAL  
CONCRETE CONTROLLER PAD DETAIL  
(TYPE M CABINET)

DATE DEC. 20, 2018 REV. 1

APPROVED

N.T.S.

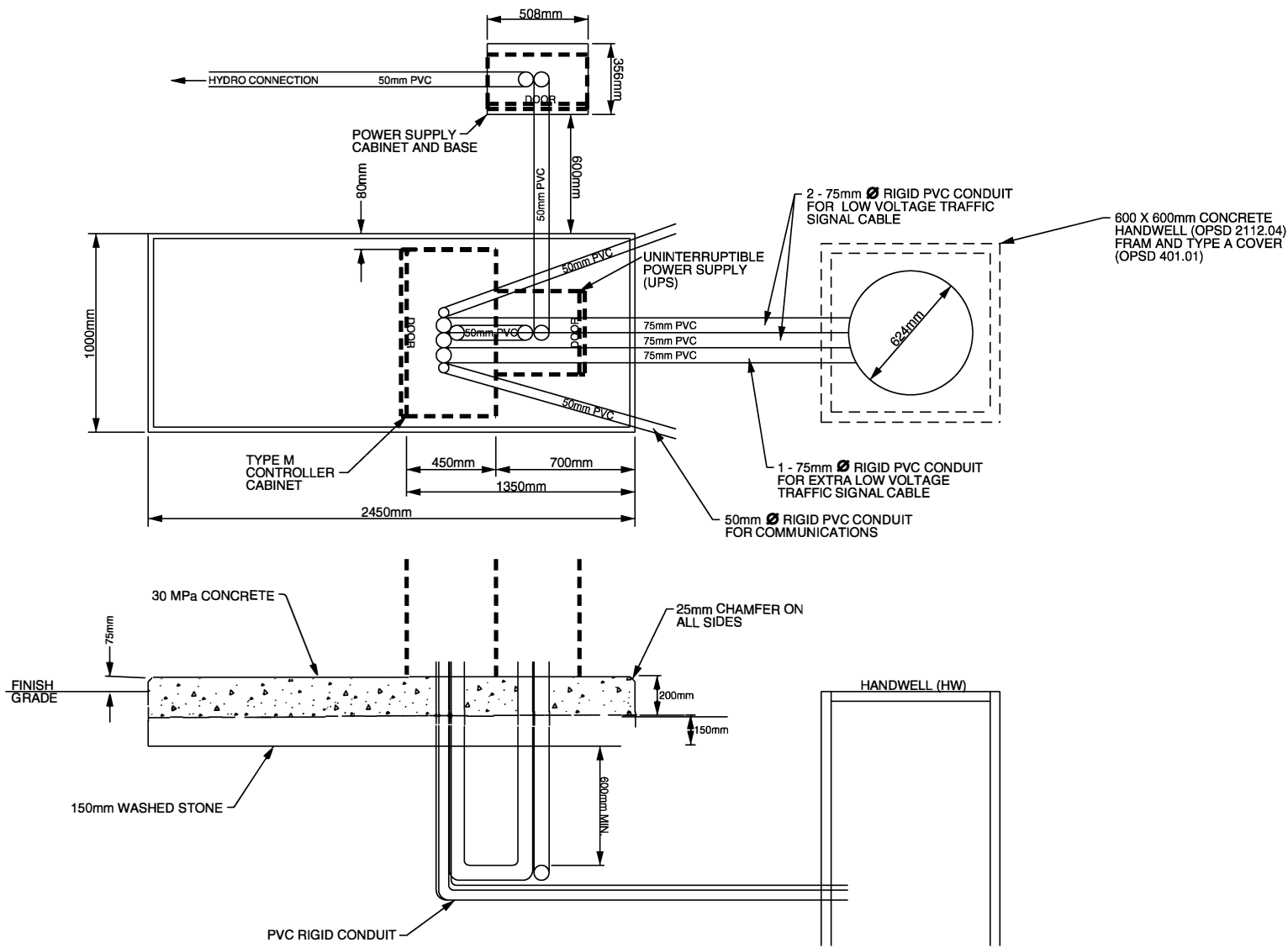
IPSTR - 3010.00



NOTES:

1. CONCRETE TO HAVE CLASS 'A' FINISH
2. ALL CONDUITS TO BE ENCASED IN 75mm SAND WITH CAUTION TAPE
3. CONTROLLER LOCATION AS PER CONTRACT DOCUMENTS

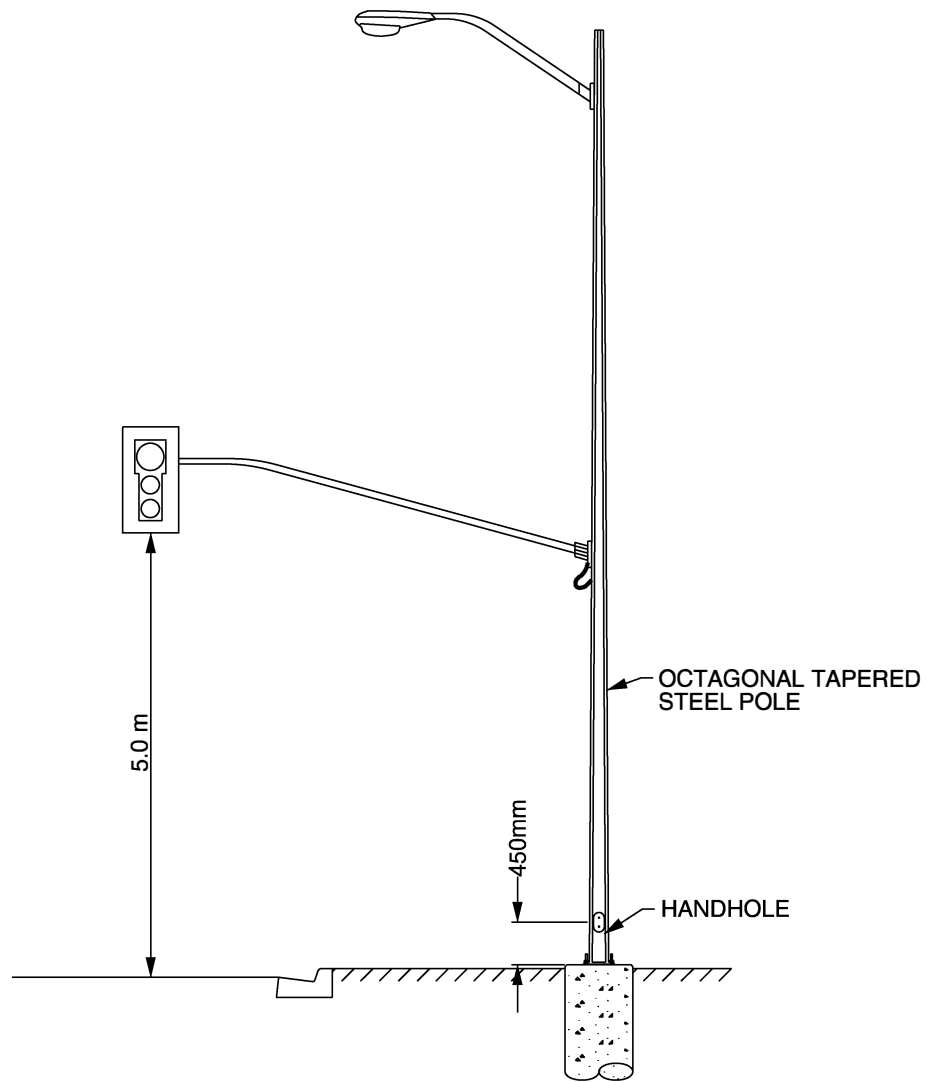
<p>CITY OF PETERBOROUGH INFRASTRUCTURE &amp; PLANNING SERVICES</p>	<p>DATE <u>DEC. 20, 2018</u> REV. <u>3</u></p>
<p>TRAFFIC SIGNAL CONCRETE CONTROLLER PAD DETAIL (TYPE M CABINET WITH UPS)</p>	<p>APPROVED</p>
	<p>N.T.S. <span style="float: right;">IPSTR-3010.01</span></p>



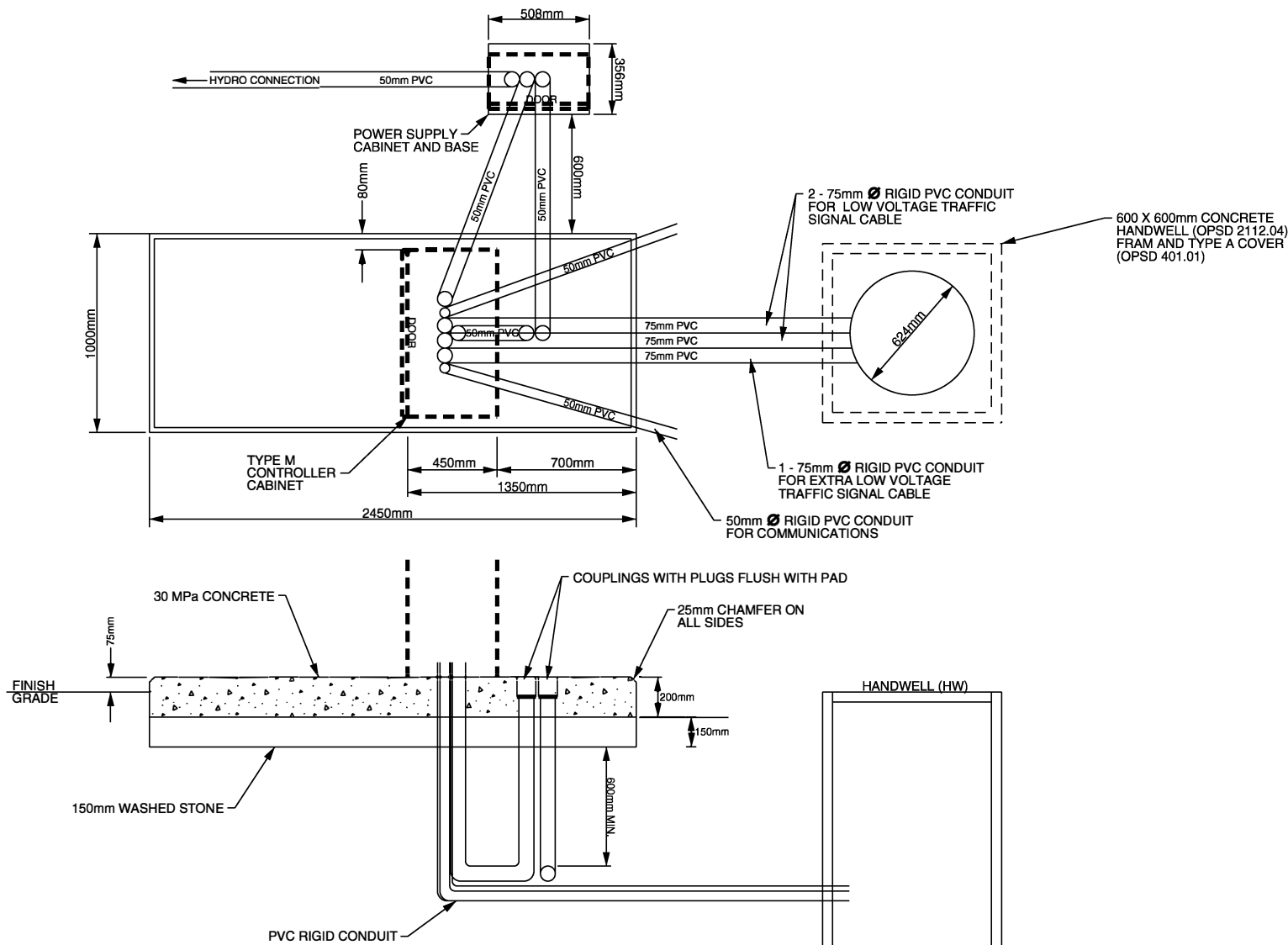
NOTES:

1. CONCRETE TO HAVE CLASS 'A' FINISH
2. ALL CONDUITS TO BE ENCASED IN 75mm SAND WITH CAUTION TAPE
3. CONTROLLER LOCATION AS PER CONTRACT DOCUMENTS

CITY OF PETERBOROUGH INFRASTRUCTURE & PLANNING SERVICES	DATE <u>DEC. 20, 2018</u> REV <u>3</u>
TRAFFIC SIGNAL CONCRETE CONTROLLER PAD DETAIL (TYPE M CABINET WITH UPS AND POWER SUPPLY CABINET)	_____ APPROVED
N.T.S.	IPSTR-3010.02



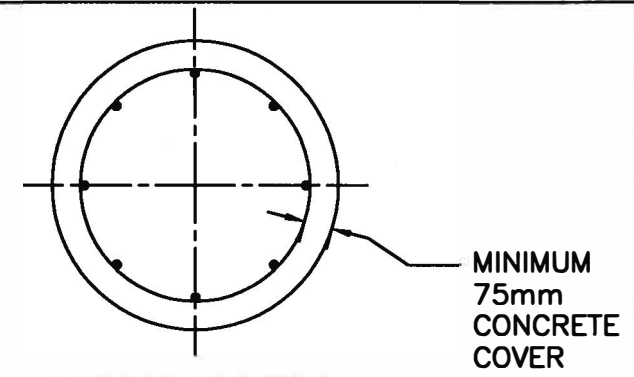
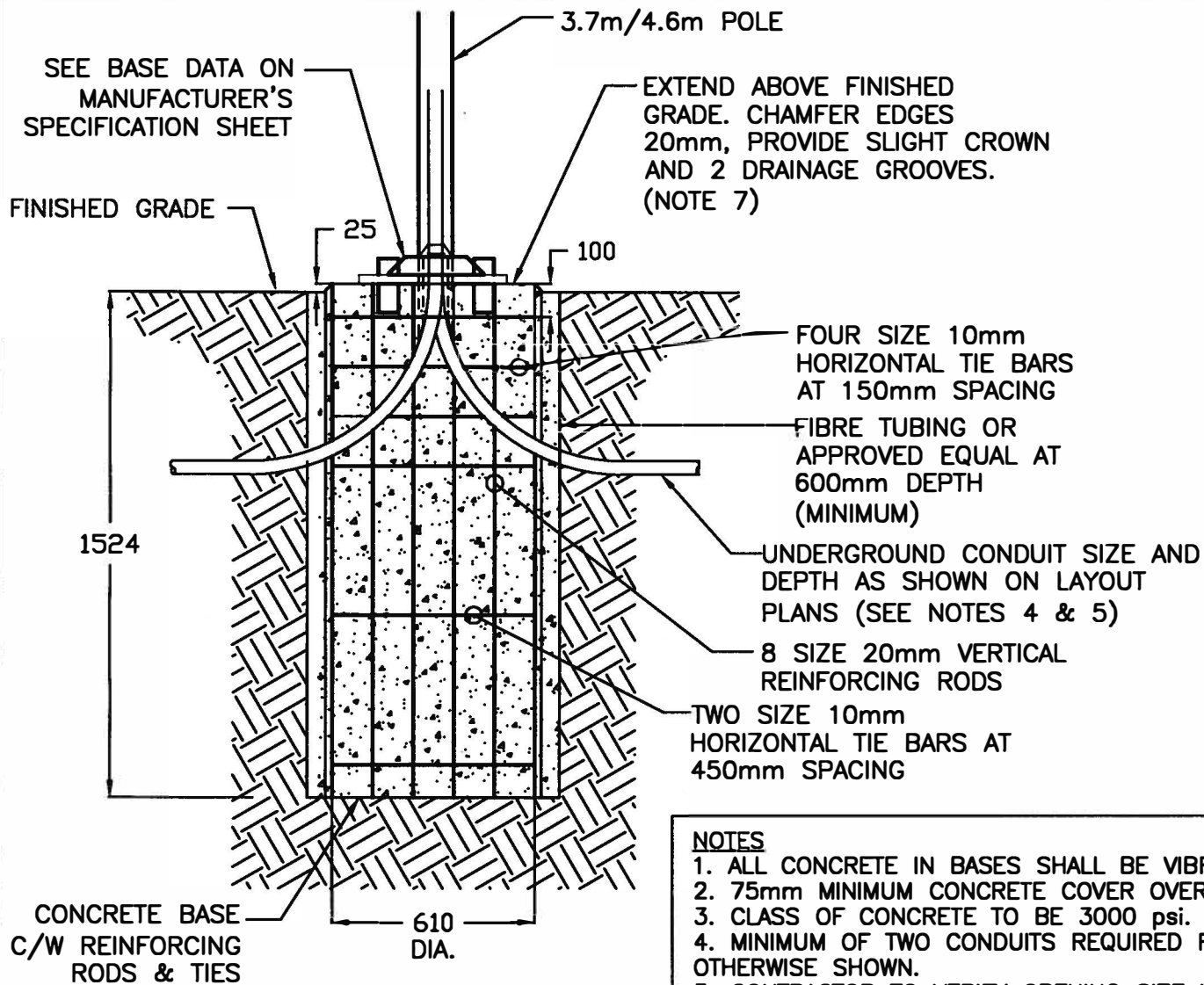
<p>CITY OF PETERBOROUGH INFRASTRUCTURE &amp; PLANNING SERVICES</p>	<p>DATE <u>DEC. 20, 2018</u> REV. <u>1</u></p>
<p>HEAVY DUTY CLASS BASE MOUNT STEEL POLE</p>	<p>_____ APPROVED</p>
	<p>N.T.S. IPSTR-3010.03</p>



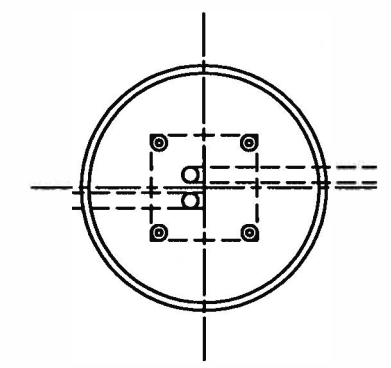
NOTES:

1. CONCRETE TO HAVE CLASS 'A' FINISH
2. ALL CONDUITS TO BE ENCASED IN 75mm SAND WITH CAUTION TAPE
3. CONTROLLER LOCATION AS PER CONTRACT DOCUMENTS
4. COMM DUCTS TO BE INSTALLED AS PER CONTRACT DRAWINGS

CITY OF PETERBOROUGH INFRASTRUCTURE & PLANNING SERVICES	DATE <u>DEC. 20, 2018</u> REV. <u>1</u>
	TRAFFIC SIGNAL CONCRETE CONTROLLER PAD DETAIL (TYPE M CABINET WITH POWER SUPPLY CABINET AND DUCTS FOR FUTURE UPS)
APPROVED	
N.T.S.	IPSTR-3010.04



**REINFORCEMENT  
RODS DETAIL**



**MOUNTING PLATE AND  
CONDUIT DETAIL**

**1**  
**E1** **POLE BASE DETAIL**  
SCALE: 1:20

- NOTES**
1. ALL CONCRETE IN BASES SHALL BE VIBRATED.
  2. 75mm MINIMUM CONCRETE COVER OVER REINFORCING.
  3. CLASS OF CONCRETE TO BE 3000 psi.
  4. MINIMUM OF TWO CONDUITS REQUIRED FOR EACH CONCRETE FOUNDATION UNLESS OTHERWISE SHOWN.
  5. CONTRACTOR TO VERIFY OPENING SIZE IN POLE BASE PLATE PRIOR TO SETTING CONDUIT SLEEVES.
  6. VERIFY BOLT CIRCLE AND BASE DIMENSIONS CORRESPOND TO ACTUAL LAMP STANDARD BASE.
  7. POLE TO DRAIN CLEAR. DO NOT BLOCK BASE OR GROUT.

PROJECT	CITY OF PETERBOROUGH		
TITLE	CONCRETE BASE DETAIL		
CAD FILE No	5003E1	DESIGN	PGB
SCALE	1:20	DRAWN	TMS
REV	1	CHECKED	PGB

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**KIRKLAND ENGINEERING LTD.**

DWG No.	<b>E1</b>
PROJECT: 5003	