**PORT AUTHORITY OF ALLEGHENY COUNTY**

TRANSMITTAL MEMORANDUM

TO: All Holders of Bid Documents for the Subject Contract

SUBJECT: North Shore Connector
NSC Train Systems (System Wide)
Contract No. NSC-009

DATE: September 8, 2008

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Please find enclosed the following:

- Addendum No. #6 dated September 8, 2008
- Question and Answers 136-139, 141, 144 -155

---

The following signature acknowledges the receipt of this Transmittal.

_____
Signature

_____
Name of Company

_____
Date

Please sign and return one (1) copy to:

Port Authority of Allegheny County
Purchasing and Materials Management Department
Heinz 57 Center
345 Sixth Avenue, Third Floor
Pittsburgh, PA 15222-2527
Attention: Ms. Toni Matessa

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**Port Authority of Allegheny County**

North Shore Connector

NSC Train Systems (System Wide)

Contract No. NSC-009

# ADDENDUM NO. 6

September 8, 2008

This Addendum modifies Bid Documents for the subject Contract as set forth below. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Form of Proposal, Form B.

To identify revisions on the attached Contract Drawings, an irregular line joined by a diamond symbol with a number inside it appears at the revision location; and the diamond symbol with a number inside it, date and a description appear in the Revision Block.

To identify revisions on the attached pages, a vertical bar appears in the right margin at the revision location.

## CHANGES TO TERMS AND CONDITIONS (VOLUME 1)

1. Section 00100, Bid Advertisement, Pages 00100-2 through 00100-3. Delete and replace with pages 00100-2 through 00100-3.

2. Section 00500, Agreement, Page 00500-11. Delete and replace with pages 00500-11.

3. North Shore Connector, North Side Tunnels & Station Shell (NSC-003/006), Gateway Station Shell (NSC-004 R), Aerial Structure, Retained Fill, and Demolition of Miller Printing (NSC-007), and Advanced Rail Systems Procurement – Gateway Double Crossover (Contract No. 3002) Construction Update, Page C-1. Delete and replace with page C-1.

## CHANGES TO TECHNICAL PROVISIONS (VOLUME 2)

1. Section 13574, Wayside Signal Equipment, Page 13574-10. Delete and replace with pages 13574-10.

2. Section 13593, Signal Power Distribution, Pages 13593-4 through 13593-7. Delete and replace with pages 13593-4 through 13593-9.

**CHANGES TO NSC-009 CONTRACT DRAWINGS (VOLUME 1)**
(Modified or Added Drawings are attached here to)

1. Drawing No. TN100, Sheet No. 48. Drawing Modified.
2. Drawing No. TN101, Sheet No. 49. Drawing Modified.
3. Drawing No. TP217, Sheet No. 319. Drawing Modified.
4. Drawing No. SG204, Sheet No. 427. Drawing Modified.
5. Drawing No. CR500, Sheet No. 597. Drawing Modified.
6. Drawing No. CR501, Sheet No. 598. Drawing Modified.
7. Drawing No. CR502, Sheet No. 599. Drawing Modified.
8. Drawing No. CR503, Sheet No. 600. Drawing Modified.
9. Drawing No. CR504, Sheet No. 601. Drawing Modified.

**CHANGES TO NSC-009 ALSO PLANS (REF DWGS) (VOLUME 2)**
(Modified or Added Drawings are attached here to)

1. Drawing No. GN003A. Drawing Modified.
2. Drawing No. GN006A. Drawing Modified.
3. Drawing TS010-0. Drawing Added.
4. Drawing TS012-0. Drawing Added.
5. Drawing TS030-1. Drawing Added.

**ARTICLE 1 – ADVERTISEMENT**

PORT AUTHORITY OF ALLEGHENY COUNTY

ADVERTISEMENT

Separate sealed Bids for the Work as listed hereinafter will be received at the Purchasing and Materials Management Department of Port Authority of Allegheny County, Heinz 57 Center, 345 Sixth Avenue, Third Floor, Pittsburgh, Pennsylvania, 15222-2527 until 1:30 p.m. on October 8, 2008 and will be publicly opened and read immediately thereafter at the same address.

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEMS (SYSTEM WIDE)
CONTRACT NO. NSC-009

The Work of this project includes, but is not limited to, the furnishing of all labor, materials, tools, equipment, and incidentals necessary for the construction of the North Shore Connector train systems for the entire length of the light rail system extension. The Work will also include trackwork; high voltage electrical service; signal systems; prefabricated-type outdoor traction power substation and site amenities; overhead contact systems; communications systems; modifications and additions to Authority's Operations Control Center and Pitt Tower facilities; tunnel fire/life safety systems; tunnel ventilation; tunnel emergency walkway facilities; tunnel lighting; and system testing and certification prior to revenue service. In addition, the Work includes the decommissioning of the existing Gateway Station and installation of a double crossover at Wood Street Station.

Bid Documents will be available for public inspection and may be obtained on or after June 27, 2008 at the Port Authority office at the following address:

Port Authority of Allegheny County
Purchasing and Materials Management Department
Heinz 57 Center
345 Sixth Avenue, Third Floor
Pittsburgh, Pennsylvania 15222-2527

Bid Documents are available for purchase as follows: Bid Documents in hard copy form, with half size drawings, upon payment of $600 per set; and Bid Documents in electronic form on compact disk upon payment of $15 per set. Payments shall be by Check or Money Order (NO CASH), payable to Port Authority of Allegheny County. Documents will be mailed upon receipt of payment in full. No refunds of payment will be made. Should the purchaser wish to have the Bid Documents delivered via special delivery, such as UPS or FedEx, the purchaser shall provide appropriate account numbers for such special delivery methods.

This Project is subject to financial assistance contracts between Port Authority of Allegheny County and County of Allegheny, Commonwealth of Pennsylvania and the Federal Transit Administration (FTA) of the U. S. Department of Transportation (DOT).

Port Authority, in compliance with 49 C.F.R., Part 26, as amended, implements positive affirmative action procedures to ensure that all Disadvantaged Business Enterprises have the maximum opportunity to participate in the performance of contracts and subcontracts financed, in whole or in part, with federal funds provided for this Project. In this regard, all Bidders shall take all necessary and reasonable steps in accordance with 49 C.F.R., Part 26, to ensure that DBEs have the maximum opportunity to compete for and perform contracts. Bidders shall not discriminate on the basis of race, color, national origin or sex in the award and performance of DOT-assisted contracts. It is a condition of this Contract that all Bidders shall follow the DBE required procedures as set forth in the Bid Documents. If aid is required to involve DBEs in the Work, Bidders are to contact the Port Authority DBE Representative, Edward Greene at (412) 566-5257.

The Bidder's attention is directed to the following contacts for Bidder's questions:

Procedural Questions Regarding Bidding:

Toni Matessa - Port Authority
(412) 566-5148

All other questions relating to the Bid Documents must be submitted by mail or facsimile to:

Port Authority of Allegheny County
Heinz 57 Center
345 Sixth Avenue, Third Floor
Pittsburgh, PA 15222-2527
Attn: Toni Matessa
Fax: (412) 566-5359

In addition, the Bidder's attention is directed to the following schedule of activities for preparation of its Bid:

| | |
|---|---|
| 9:00 a.m.<br>July 15, 2008 | Pre-Bid Conference<br>Port Authority of Allegheny County<br>Heinz 57 Center<br>Fifth Floor, Board Room<br>345 Sixth Avenue<br>Pittsburgh, PA 15222-2527<br>(Attendance is not mandatory, but strongly recommended) |
| 10:45 a.m.-4:00 p.m.<br>July 15, 2008 | Pre-Bid Site Tour of Pitt Tower Facility (10:45 a.m. – 12:00 p.m.) &<br>South Hills Village Operations Control Center (12:45 p.m. – 4:00 p.m.)<br>[immediately following the Pre-Bid Conference]<br>Participants should wear a safety vest<br>Transportation to each facility will be provided by Authority<br>Details available at Pre-Bid Conference |
| 1:30 a.m. to 4:00 a.m.<br>July 16, 2008 | Authority Stage I Tunnel (Gateway and Wood Street Stations and<br>Gateway Tunnel Loop) Site Tour. NOTE: This is a night-time tour.<br>Meeting Place: Gateway Station entrance located on the corner of Liberty Ave. and Stanwix Street, Pittsburgh, PA<br>Participants should wear a Hard Hat and Safety Vest and bring a flashlight |
| 10:30 a.m.-12:30 p.m.<br>August 8, 2008 | Site Tour of NSC-003/006 Worksite<br>Participants are required to wear a safety vest, hard hat, and boots. Participants will be required to walk up/down stair access into and out of the excavation pits. Participants are required to attend tunnel safety training which will be provided and will begin at 10:30 a.m..<br>Meeting Place: Mazeroski Way/ West General Robinson Street Intersection (Launch Pit located on the North Shore) |
| 10:30 a.m.-12:30 p.m.<br>August 26, 2008 | Site Tour of NSC-003/006 Worksite<br>Participants are required to wear a safety vest, hard hat, and boots. Participants will be required to walk up/down stair access into and out of the excavation pits. Participants are required to attend tunnel safety training which will be provided and will begin at 10:30 a.m..<br>Meeting Place: Mazeroski Way/ West General Robinson Street Intersection (Launch Pit located on the North Shore) |
| August 14, 2008 | Bidders shall submit Potential Areas of<br>Subcontracting (Form GV) to Port Authority. |
| 1:30 a.m. to 4:00 a.m.<br>September 19, 2008 | Authority Stage I Tunnel (Plinth replacement Site Tour)<br>NOTE: This is a night-time tour. Meeting Place: Wood Street Station entrance located on the corner of Liberty Ave. and Sixth Ave., Pittsburgh, PA<br>Participants should wear a Hard Hat and Safety Vest and bring a flashlight |
| 1:30 p.m.<br>October 8, 2008 | Bids Due<br>Purchasing and Materials Management Department |

**The Board of Port Authority of Allegheny County reserves the right to reject any or all Bids**

| | | | |
|---|---|---|---|
| NSC-007 Aerial Structure Retained fill to Pier 3 and Laydown Area no. 1 | Sta. R 6051+94 (interface with NSC-006) to Sta. R 6074+47 | 331 calendar days from NTP | 392 calendar days from NTP |
| NSC-007 Aerial Structure Pier 3 to Pier 14 | Sta. R 6074+47 to Sta. R 6079+73 | 483 calendar days from NTP | 544 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes Gateway Station (NSC-010) New Ancillary Rooms located within Existing Gateway Loop and New Gateway Station | Sta. 1004+50 to Sta. 1009+00 (Stage I Stationing within Existing Loop) and Sta. L 6010+00 to Sta. L 6011+75 (New Gateway Station Ancillary Rooms) | 717 calendar days from NTP | 747 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes Gateway Station (NSC-010) Facilities Including Elevators and Escalators | Sta. R 6010+16 to Sta. 6014+50 | 830 calendar days from NTP | 860 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes North Side Station (NSC-011) Ancillary Rooms | Sta. R 6040+00 to Sta. R 6044+03 | 405 calendar days from NTP | 466 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes North Side Station (NSC-011) including Elevators and Escalators, Station Concourse, and Headhouses | Sta. R 6040+00 to Sta. R 6044+03 | 705 calendar days from NTP | 766 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes Allegheny Station (NSC-012) Ancillary Rooms and Station Power | Sta. L 6082+60 to Sta. L 6083+92 (Allegheny Station Building Area) | 681 calendar days from NTP | 742 calendar days from NTP |
| NSC-010/011/012 North Shore Station Finishes Allegheny Station (NSC-012) including Elevators and Escalators | Sta. L 6080+64 to Sta. L 6083+92 (Allegheny Station Building and Platform Areas) | 803 calendar days from NTP | 834 calendar days from NTP |
| Existing Stage I Tunnel from Steel Plaza Station to Gateway Station and Loop | 1669+50 (Steel Plaza Station) to Existing Gateway Loop | 83 calendar days from NTP | 113 calendar days from NTP |
| Wood Street #6 Direct Fixation Double Crossover and switch machine materials. (Contract #3002) | PS 1204+85 to PS 1206+02 (Stage I Tunnel Between Wood Street and Steel Plaza Stations) | 83 calendar days from NTP | 113 calendar days from NTP |

North Shore Connector, North Side Tunnels & Station Shell (NSC-003/006), Gateway Station Shell (NSC-004 R), Aerial Structure, Retained Fill, and Demolition of Miller Printing (NSC-007), and Advanced Rail Systems Procurement – Gateway Double Crossover (Contract No. 3002) Construction Update, as of September 8, 2008

Contract NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 are currently under construction and will interface with the NSC-009 Work. As a result of the NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 construction activities, changes to the NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 Contract Documents have occurred. Known changes include, but are not limited to, utility installations, temporary facility design and installation, cut and cover and bored tunnel design and construction, maintenance and protection of traffic and detour installation and phasing, and Double Crossover Shop Drawings and submittals. The Contractor shall coordinate with the NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 contractors and the Engineer to obtain current information before Contractor begins work which could be affected by the NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 construction activities.

Table C-1 provides a list of North Shore Connector, North Side Tunnels & Station Shell (NSC-003/006), Gateway Station Shell (NSC-004 R), Aerial Structure, Retained Fill, and Demolition of Miller Printing (NSC-007), and Advanced Rail Systems Procurement – Gateway Double Crossover (Contract No. 3002) Construction Submittals. Submittals and/or portions of Submittals reflecting NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 contractor design elements having impact on the NSC-009 Bid are bold and attached as part of Appendix C. Further information on the progress of the NSC-003/006, NSC-004 R, NSC-007, and Contract No. 3002 construction is contained in Table C-1 and available for purchase in accordance with Section 00200, Article 2.6.

Table C-1

| Submittal Number | Description | Contract |
|---|---|---|
| S-001 | Early Procurement Contract IJ Location Drawings | Contract No. 3002 |
| **S-040.1** | **Precast Concrete Segmental Tunnel Lining – Shop Drawings** | **NSC-003/006** |
| **S 349.6** | **Precast Segment Reinforce Steel Erection Drawing** | **NSC-003/006** |
| **S467** | **Precast Segment Concrete Repair Procedures** | **NSC-003/006** |
| **N/A** | **Temporary Facilities To Be left In Place By NSC 003/006 Contractor** | **NSC-003/006** |
| | | |
| | | |
| | | |
| | | |

# TEMPORARY FACILITIES TO BE LEFT IN PLACE BY NSC 003/006 CONTRACTOR

## TUNNEL

### *VENTILATION*

1. Ventilation system shall be installed in the tunnel in compliance with OSHA requirements for a finished tunnel. One jet fan per tunnel (50 HP) capable of providing a minimum of 10,000 CFM of air per tunnel (See Sketch)

### *LIGHTING*

1. Lighting system to remain in the tunnel e.g. 480V light stringers with molded drops and light fixtures installed as required the length of the tunnel. Metal, Halide (300 Watts) light fixtures with appropriate stringers/cable will be at a minimum of 50' on centers along the tunnel capable of providing sufficient light to meet or exceed OSHA lighting requirements (See Sketch)

### *PUMPING SYSTEM*

1. Temporary automatic pumping system, a submersible 7.5 HP Tsurumi Pump (3-Phase 480V) shall be installed at the mid point of each tunnel; discharge will be via 2" - Schedule 40 pipe to the launch pit. (See Cut Sheet)

### *FIRE PROTECTION*

1. Fire extinguishers: combination ABC shall be installed at 300-ft intervals.

### *POWER AND BACK-UP POWER*

1. A used 800-amp, 3-phase, 480V, combination meter main, distribution center, out-door (NEMA 3R) will replace the existing 23kV substation. The metered Duquesne Light service shall be transferred to the NSC-009 Contractor. A used 250 kW diesel generator shall remain connected to operate critical systems (e.g. dewatering) in the event of a power outage. (See Sketch)

## CUT AND COVER SECTIONS

### *VENTILATION*

1. Ventilation system shall be installed in compliance with OSHA requirements for a finished cut and cover structure. One jet fan (50 HP) capable of providing a minimum of 10,000 CFM of air. Ventilation for cut and cover structure only; ventilation not provided for ancillary rooms.

### *LIGHTING*

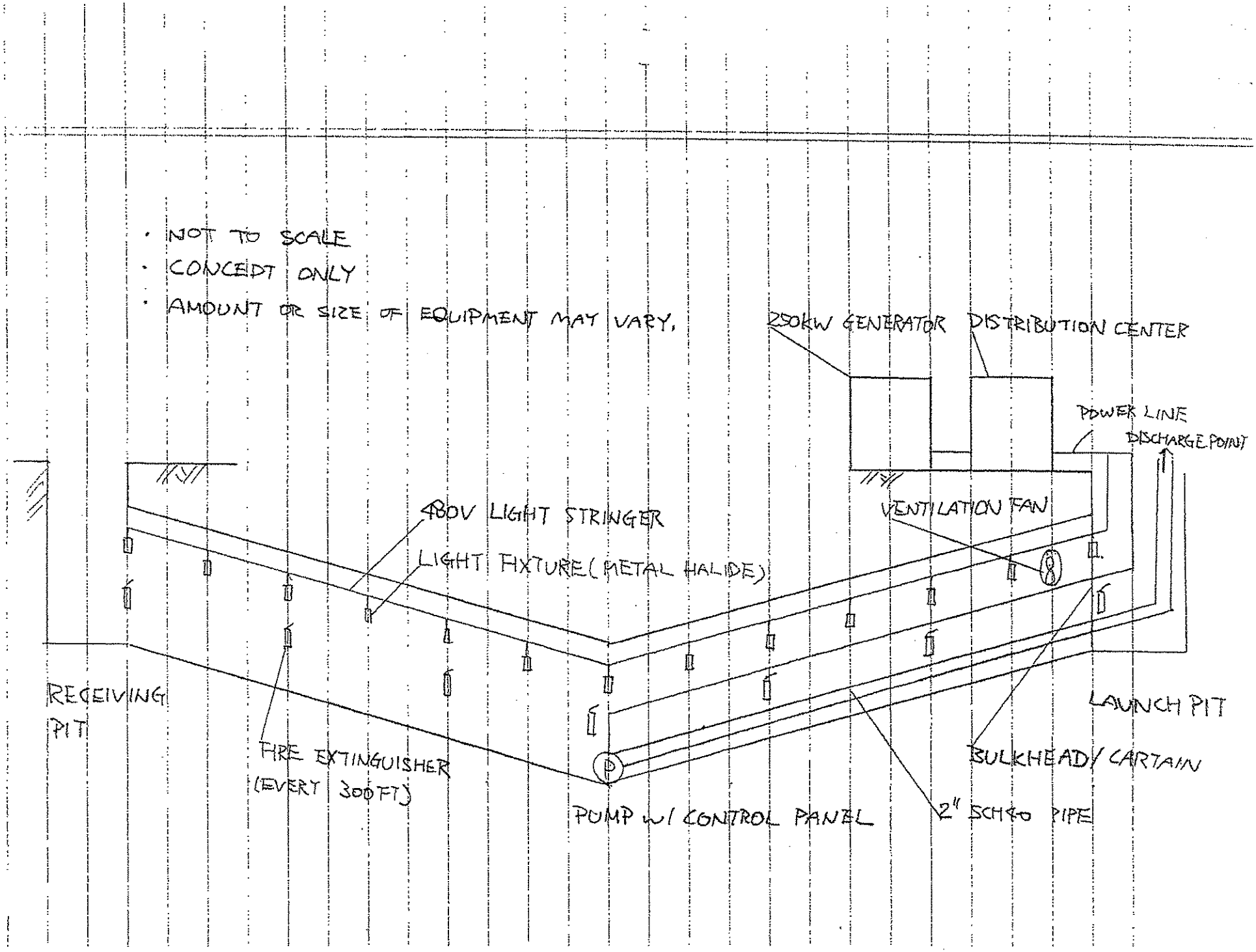
1. Lighting system shall remain within the cut and cover structure and station shell e.g. 480V light stringers with molded drops and light fixtures installed as required the length of the tunnel. Metal Halide (Approx.300 Watts) light fixtures with appropriate stringers/cable will be at a minimum of 50' on centers along the tunnel capable of providing sufficient light to meet or exceed OSHA lighting requirements.

## PROTECTION AT PORTAL OPENINGS AND ACCESS AREAS

1. Portable 6' chain link fence or better; or a similar barricade will be installed.

## PUMPING SYSTEM

1. Temporary automated pumping system, a submersible 7.5 HP Tsurumi Pump (3-Phase 480V) shall be installed at the low point of the cut and cover structure; discharge will be via 2" - Schedule 40 pipe to the launch pit. (See Cut Sheet)


• NOT TO SCALE
• CONCEPT ONLY
• AMOUNT OR SIZE OF EQUIPMENT MAY VARY.
250KW GENERATOR
DISTRIBUTION CENTER
POWER LINE
DISCHARGE POINT
480V LIGHT STRINGER
LIGHT FIXTURE (METAL HALIDE)
VENTILATION FAN
RECEIVING PIT
FIRE EXTINGUISHER (EVERY 300 FT)
LAUNCH PIT
BULKHEAD/ CARTAIN
P
PUMP W/ CONTROL PANEL
2" SCH40 PIPE

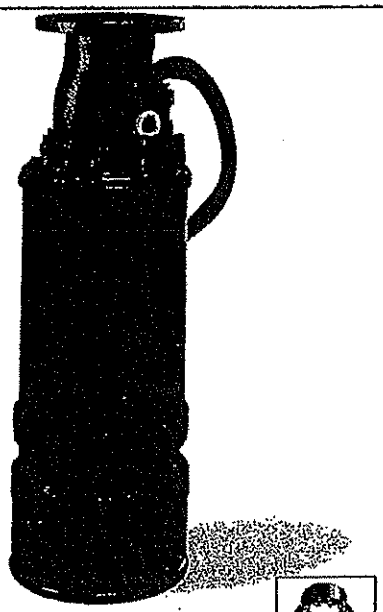
| TSURUMI PUMP | LH-W SERIES HIGH HEAD-DEWATERING PUMPS | SPECIFICATIONS |
|---|---|---|

## ■ FEATURES

1. Enclosed, high chrome iron impellers, with replaceable / adjustable high chrome iron Wear rings increases wear resistance when pumpage contains abrasive particles.
2. Double inside mechanical seals with silicon carbide faces, running in an oil filled chamber and further protected by a lip seal running against a replaceable, 403 stainless steel shaft sleeve, provides for the most durable seal design available.
3. Highly efficient, continuous duty air filled, copper wound motor with class B or F insulation, minimizes the cost of operation.
4. Built in thermal & amperage sensing, protector prevents motor failure due to overloading or accidental run - dry conditions.
5. Double shielded, permanently lubricated, high temperature C3 ball bearings rated for a B-10 life of 60,000 hours, extend operational life.
6. Top discharge, flow-thru design enables operation at low water levels for extended periods.

## ■ APPLICATIONS

1. Residential, commercial, industrial wastewater and construction site drainage.
2. Effluent transfer.
3. Decorative waterfalls and fountains.
4. Raw water supply from rivers or lakes.



OIL LIFTER

## ■ SPECIFICATIONS

| | ■ STANDARD | ■ OPTIONS |
|---|---|---|
| Discharge Size | 2" ~ 4" Npt (50 ~ 100 mm) | |
| Horsepower Range | 7.5 Hp. ~ 40 Hp. (5.5 ~ 30 kW) | |
| Performance Range Capacity | 30 ~ 364 Gpm. (.11 ~ 1.37 $m^3$/min) | |
| Head | 70 Ft. ~ 400 Ft. (21. ~ 122 m) | |
| Maximum water temperature | 104 °F. (40 °C.) | |
| Materials of Construction | | |
| Casing | Cast Iron | |
| Impeller | High Chrome Iron Casting | |
| Shaft | 420 Stainless Steel | |
| Motor Frame | Cast Iron | |
| Fasteners | 304 Stainless Steel | |
| Mechanical Seal | With seal pressure relief ports | |
| Upper Seal | Silicon Carbide/Carbon | |
| Lower Seal | Silicon Carbide/Silicon Carbide | |
| Elastomers | NBR (Nitrile Rubber) | |
| Impeller Type | Enclosed, two-stages | |
| Solids Handling Capability | Double stages<br>1/3" (8.5 mm), 1/4" (6 mm, 7.5 HP) | |
| Bearings | Prelubricated, Double Shielded | |
| Motor Nomenclature | | |
| Type, Speed, Hz | Air Filled, 3600 Rpm, 60 Hz. | |
| Voltage, Phase | 208/230/460/575 V., 3 Phase | |
| Insulation | Class B, F (40 Hp.) | |
| Accessories | Submersible Power Cable 50' (15 m) | Length as Required |
| Operational Mode | Manual | |

F. Hardware Requirements
   1. Track devices
      a. Contractor shall provide and install insulated joints that are required for its design.
      b. Such insulated joints shall be installed in accordance with Section 02456, "Track Appurtenances and Other Track Material"
   2. Track leads: Contractor shall provide relay and transformer leads for connections to the rails, and all other material and apparatus including track and jumper bonds, as required for a complete track circuit installation in accordance with these Contract Documents.
   3. Negative rail connections: Separate negative rail connections shall be provided for track relays and transformers, and shall be located opposite the insulated joint.

2.07 IMPEDANCE BONDS

A. Contractor shall provide, install, and test all impedance bonds required for the signal system. Include all mounting hardware, connectors, cables and other appurtenances.
   1. The bonds shall operate properly with a continuous capacity of 1500 amperes per rail, and an intermittent rating of three times continuously for one minute, repeated every ten minutes.
   2. The bonds shall have a minimum impedance of 0.5ohms at 60Hz.
   3. The impedance bonds shall not require tuning (untuned).
   4. The bonds shall have a minimum traction power current unbalance of 10 percent.
   5. Rail-to-rail DC resistance of the bond and its cable and connector assembly shall not exceed 0.00057 ohms.
   6. The bonds shall be interchangeable with the existing US&S bonds.

2.08 RAIL CONNECTIONS AND BONDS

A. Power Bonds
   1. All non-insulated joints in single or double rail track circuit territory including guard-rail joints in curved track areas shall use 250 kcmil size, 10 inches long bonds, two for each joint, as manufactured by Erico Products, Inc., Dwight and Wilson Co., United States Steel, or an approved equal.
   2. Power bonds for frog and switch fouling connections and expansion joints shall be two 500 kcmil extra flexible.

B. Signal Rail Bonds
   1. Signal bonds in single rail negative return areas shall be railhead type manufactured bonds prepared for welding. The bonds shall be 7/32 inches by 6 1/2 inches and of necessary length, as shown in the Contract Drawings , two (2) for each joint, as manufactured by Erico Products, Inc., Dwight and Wilson Co., United States Steel, or approved equal.
   2. These bonds shall be manufacturer bonds prepared for welding by the exothermic process. Bonds, bonding materials, and types of molds shall be as approved by the Engineer.
   3. Frog and switch jumpers and end of storage track cross bonds shall be installed and welded to the base of the rail as approved by the Engineer. The cable for frog and switch jumpers and end of storage track cross bonds shall be 500 kcmil extra flexible.

2.09 SNOW MELTERS

A. General: Contractor shall provide switch heater assemblies to keep the switch layouts at Allegheny Interlocking free and clear of snow and ice and permit operation under all adverse weather conditions. Switch Heaters shall be of the Calrod type, or approved equivalent, designed to operate from a nominal 650 VDC plus spikes with 150 watts per 1 foot uniform heating throughout the length of the heater. Snowmelter point heaters, crib heaters, contactors, contactor enclosures, controllers and miscellaneous snowmelter components shall be provided and shall be as manufactured by the Rails Co., Unitrac System, Mineral Insulated Component Systems, Inc., Chromolox Co., Fabricated Metals Corporation or approved equal.

B. Point Heaters
   1. The heater shall be composed of an active heating element as shown on the Contract Drawings.

a. Manufacturer's name.
b. Part or model number.
c. Serial number.
d. Input rating.
e. Output rating (continuous or intermittent).

11. Components and Wiring
    a. Electrical and electronic components used on DC power supplies shall be as specified in Section 13589, "Electrical and Electronic Components."
    b. Power supplies, which are designed to be repaired in the rack, shall have all components in modular assemblies, which do not require soldering to replace.

B. DC Filtered Power Supplies and Rectifiers

1. The Contractor shall furnish 12 VDC battery chargers as required in these Specifications and in accordance with the Contract Drawings. 12 volt battery chargers shall be National Railway supply Model ELC series, 12 Volt or approved equal. Chargers shall be sized by the Contractor. The minimum size allowable shall be 12 Volt, 20 Amp. Battery chargers shall be temperature compensated, automatic current limiting, constant potential chargers. Chargers shall be current limiting to prevent damage during overload conditions. Chargers shall be compatible with the ultra-low-maintenance NICAD batteries per this Specification.
2. The battery chargers shall withstand 600 volts, 60 Hz applied for one minute between both input leads connected together and the case; between both output leads connected together and the case; between both output leads connected together, and both input leads connected together.
3. Input voltage shall be 115 VAC plus or minus 15 percent, dual frequency, 60 and 100 Hz, single-phase, two wire.
4. The capacity of the charger and power supply shall be determined by the Contractor and furnished with a minimum of 125 percent over the calculated capacity.
5. The chargers and power supplies shall be designed so that the filter capacitors can be replaced without removing the supply from the rack on which it is mounted.
6. The chargers and power supplies shall be designed for continuous operation.
7. The current rating of each battery charger to be supplied shall be adequate to fully charge a completely discharged set of batteries within six (6) hours while carrying the full current requirement.
8. Low voltage and power off alarms and indication shall be provided to the non-vital microprocessor equipment and field event recorder.
9. All semiconductors shall be silicon type with JEDEC numbers.
10. Each 12 volt battery charger shall be supplied with a National Railway Supply Inc., external DC current monitor, Part Number 16775-00 or approved equal, which shall provide a form C contact for indication of charging operation to the code system.
11. Output voltage shall be rated output voltage plus or minus one percent from no load to full load with AC input variation of plus or minus one percent at a temperature of 50 degrees C. The output voltage shall be adjustable within a plus or minus 0.5V DC range of nominal by means of an adjustment control within the supply.
12. The charger and power supply shall be filtered to one percent or less.
13. The charger and power supply shall have automatic current limiting protection.
14. The charger and power supply shall have fused AC input and DC output.
15. All external wiring for the power supplies and battery chargers shall be terminated on AREMA style terminal posts.
16. Protection Requirements
    a. The power supply shall be so designed that it will not be damaged by an input voltage range between zero and 140 VAC.
    b. A separate output filter and high frequency bypass capacitor shall be located on the load side of the isolating diode.
    c. Reverse output current protection shall be provided to prevent shorting or sagging of tandem power supplies in the event of filter capacitor failure.

d. The power supply output terminal shall contain a non-conducting device or insulated safety shield to protect personnel from electrical hazards. The device shall protect and be rated not less than 600 volts.

17. Mechanical Requirements
    a. The charger and power supply shall be a panel-chassis combination with a perforated protective cover. The design shall be such as to provide natural convection cooling. Fans for cooling shall not be permitted.
        1) The charger and power supply front panel shall contain one output ammeter. Meter accuracy shall be plus or minus 2 percent with nominal voltage readings at center scale.
        2) Terminal binding posts for input and output shall be provided. Each terminal shall be insulated from the frame of the unit.
        3) All chargers and power supplies shall be clearly and permanently labeled with the manufacturer's name, serial number, part or model number, and the input and output rating, in such a fashion so that it is legible after mounting.
        4) The Contractor shall supply all fuses, resistors, surge arresters and circuit breakers necessary to adjust voltages and protect the battery chargers and power supply and equipment. Dummy fuse holders for ten percent (10%) spare fuses with a minimum of one of each type and size of fuse shall be provided. Fuses shall be of the replaceable link cartridge design and shall be submitted to the Engineer for approval.
    b. Secondary Surge Protectors
        1) Secondary surge protectors intended for application in vital signal circuits shall be designated with terminal posts spaced on 2-3/8 inch centers. Binding posts, nuts, and washers, if provided, shall conform to AREMA Manual Part 14.1.11, Recommended Design Criteria for Binding Posts, Nuts and Washers.
        2) Secondary signal surge protector shall have a dielectric breakdown voltage from any circuit component to metal housing or mounting surface in accordance with AREMA Manual Part 14.2.50, Recommendations for Dielectric Requirements for Signal Equipment.
        3) Secondary signal surge protector assembly, covers, and accessories shall not ignite or melt, nor cause ignition of adjacent surfaces, when surge protector is used within rated operating and surge conditions.
        4) Exposed metal parts of secondary signal surge protectors shall be suitably protected against corrosion to maintain design electrical and leakage parameters.
        5) Secondary signal surge protector shall meet all above requirements over a temperature range of -40° C to +70° C, and relative humidity of 0 to 100 percent, non-condensing within a signal housing.

C. STORAGE BATTERIES FOR 12-VOLT SUPPLIES

1. The Contractor shall furnish ultra-low-maintenance Nickel-Cadmium Alkaline Storage Batteries and accessories for 12 volt supply, as required. Batteries shall be Saft Ultra Low Maintenance NICAD or approved equal, as specified here-in. All batteries proposed for this application shall have a satisfactory record of continuous service in similar operating railroad environments for a minimum of 8 (eight) years, reliably providing the originally specified standby capacity under actual and/or test circumstances throughout this period. The batteries proposed shall have a design service life in excess of 20 years at 20° C in stand-by float application, and 15 years (minimum) operating in the anticipated actual temperature environment. Batteries, racks, accessories and covers shall be submitted to the Engineer for approval.
2. The Batteries shall consist of open (vented) ultra-low-maintenance nickel-cadmium cells, and shall be certified as fully compliant with the requirements of IEC 623, 1990 edition including amendments 1 & 2. The positive and negative electrodes of the cells shall be of the pocket-plate type. The active materials shall be retained in pockets formed from double-perforated nickel-plated steel strips. The required Storage Battery shall be made of single cells, connected in series. Battery wires shall be terminated directly on the Battery buses.
3. The Batteries shall operate in ambient temperature from -40° C (-40° F) to +70° C (+160° F), and shall withstand prolonged float operations at 1.42 V/cell at 20° C without any loss of capacity.

4. Batteries shall be sized to provide a minimum of eight hours of standby power at the computed normal loads. The battery capacity shall be calculated at the 8-hour discharge rate to 1.10 volts per cell at a temperature of +25° C (+77° F) when tested in accordance with IEEE Standard 1106-1987, Recommended Practice for Maintenance, Testing, and Replacement of Nickel-Cadmium Storage Batteries for Generating Stations and Sub-Stations.
5. Each ultra-low-maintenance Nickel-Cadmium cell shall include the following parts:
   a. One positive plate group assembled with connecting strap and terminal post or posts.
   b. One negative plate group assembled with connecting strap and terminal post or posts.
   c. A cell separator, which shall separate the plates from each other.
   d. A container and cover, which shall be made of translucent polypropylene plastic.
   e. One connecting bolt and nut for each terminal post.
   f. One inter-cell connector for each pair of terminal posts.
   g. One set of hard PVC plastic connector insulators.
   h. Necessary potassium hydroxide/lithium hydroxide electrolyte.
6. Plates (Electrodes)
   a. Positive plates shall be of double-perforated nickel-plated sheet steel pockets with nickel hydrate active material. The plates shall be welded securely to a connecting plate. The pockets shall be mounted in a suitable steel frame.
   b. Negative plates shall be of double-perforated nickel-plated sheet steel pockets with cadmium active material. The plates shall be welded securely to a connecting plate. The pockets shall be mounted in a suitable steel frame.
   c. The positive and negative plates shall be connected in correct numbers for each size and type of battery. Each group shall be securely fastened to their terminal posts.
   d. These positive and negative plate groups, together with the separators, shall constitute the elements.
7. Terminals
   a. The terminal posts shall be nickel plated and shall be of a sufficient size to withstand the maximum discharge current without overheating. The terminals of each cell shall be clearly marked by color coded washers to indicate polarity. Red washers shall be utilized for the positive pole and blue washers shall be utilized for the negative pole.
   b. The terminal post shall extend through the cell container cover. They shall be so arranged that they will not turn in the cell. The assembly of the cell container cover and terminal post shall be designed to provide a tight, leak-proof unit. An effective seal shall prevent any seepage or leakage of the electrolyte, or gas release, between the cover and the terminal post.
8. Cell Separators
   a. The cell separator shall consist of a woven fiber mat, which shall separate the plates from each other, allow free circulation of electrolyte between the plates, and promote recombination in order to reduce water consumption. The cell separator shall be alkaline-resistant and free of all impurities, which may injure the cell.
   b. The cell separators shall be of such quality, material and design as to minimize any degradation in the dielectric, absorption, and porosity characteristics during the life of the elements.
   c. The cell separators shall be of sufficient thickness and of a design to avoid the possibility of inter-plate short circuits.

9. Containers and Covers
   a. The cell container shall be made of translucent polypropylene plastic. The electrolyte level of the cells shall be visible through the side walls. The plastic cell containers shall have two lines, indicating the maximum and minimum electrolyte levels, displayed on at least one side of the container.
   b. The cell containers shall be of such quality and thickness as to provide strength in excess of that necessary to support the plate elements, contain the electrolyte and withstand handling in the railroad environment without deformation. The material shall be free from cracks, crazing, burrs, scratches and other flaws of a detrimental nature.

c. Containers shall be so constructed that they will rest evenly on any manufacturer's recommended mounting plane without rocking.
d. The container and cover materials shall meet the fire resistance rating of UL94 V-O, and have an oxygen index of at least 28%.

10. Vents
    a. Each cell container cover shall be provided with a low-pressure filling vent with a cap or plug, removable for cell top-up.
    b. The filling vents shall be of the flame arresting type that does not allow an external gas explosion to ignite the charging gases inside the cell container.
11. Connectors
    a. The inter-cell connectors shall properly fit the terminal posts and be corrosion-resisting, and may be of either flexible or solid construction.
    b. The inter-cell connectors shall be appropriately sized to have sufficient capacity to deliver the discharge rate for which the cell is designed, without heating.
    c. All internal cell connectors shall be welded together in order to achieve high mechanical strength and low internal electrical resistance. Pressing or bolting of internal cell connectors is not acceptable.
    d. In order to protect the battery terminals from external accidental short-circuits resulting from any metallic item falling on top of the battery, insulating plastic connecting covers shall be provided. These covers shall be made of hard PVC plastic.
12. Electrolyte: The electrolyte shall be an aqueous solution of potassium hydroxide (KOH), in distilled or approved water for cold weather operation, approximately 1.190-1.250 specific gravity or as otherwise recommended by the manufacturer. The potassium hydroxide solution may also include a small amount of lithium hydroxide (LiOH), not less than 1.5% nor greater than 3.5% by weight.
13. Assembly and Charge
    a. Each cell shall be completely assembled, sealed and charged ready for service.
    b. Charging shall be accommodated in the following ways:
        1) A single-level charge, by applying a minimum constant voltage of 1.43 V/cell at 20° C with a current limitation of 0.25 A.
        2) A two-level charge, by applying two consecutive voltage levels as follows:
            (a) A high-rate charge, achieved by applying a minimum constant voltage of 1.45/cell at 20° C, with a current limitation of 0.25 A.
            (b) Followed by a permanent trickle charge (float charge), by applying a minimum constant voltage of 1.42 V/cell at 20° C.
14. Watering Maintenance Intervals:Watering Intervals shall not be less than once every year, for a battery under float conditions at 1.42 V/cell at 20° C. Watering intervals shall be approximately 5 times that of a standard "conventional" pocket plate nickel-cadmium battery.
15. Identification: Each cell shall contain permanent legible markings indicating the Manufacturer, Manufacturer's type number and serial number, capacity and date of manufacture or an equivalent accepted date code to identify the date of manufacture.
16. Mounting: Batteries shall be installed in floor-mounted steel racks.

2.02 OTHER POWER DEVICES

A. Fuses provided by Contractor shall meet the following requirements:
    1. Non-renewable, fiber-cased, time lag, fusion type.
    2. Correct size and rating to protect the electrical equipment form overload.
    3. Fuses installed in equipment racks: indicating type with fuse alarm circuits provided to alarm individual fuse failure. Switch actuating indicating fuses shall not be allowed. Fuses shall provide an electrical connection directly to the alarm circuit.
    4. In DC branch circuits, where fusing is impractical, a protective resistance unit shall be provided.
    5. All fuses shall be centrally located on power distribution panels or racks.

B. Circuit Interrupters (Breakers) provided by Contractor shall meet the following requirements:

1. Equipment intended to break current at fault levels shall have interrupting rating sufficient for the system voltage and the current with is available at the line terminals of the equipment.
2. Equipment intended to break current at other that fault levels shall have an interrupting rating at system voltage sufficient for the current to be interrupted.
3. Circuit interrupters may be required in lieu of fuses at the discretion of the Engineer.
4. Breakers shall be of single, double or triple pole, molded case type and shall be rated for the voltages as indicated on the Contract Drawings.
5. Breakers shall have an interrupting current rating of 14,000 amperes symmetrical.
6. Breakers with inverse-time characteristics shall be secured through use of bimetallic tripping elements supplemented by instantaneous magnetic trip.
7. Breakers shall be UL and CSA listed, IEC 157-1 rated, meet NEMA standard AB1-latest edition and Federal Specification W-C-375B/GEN, when applicable.
8. Breakers shall have over center toggle-type mechanisms, providing quick-make, quick-break action.
9. Breakers shall be calibrated for operation in an ambient temperature of 40 degrees C.
10. Each breaker shall have trip indication by handle position and shall be trip free.
11. Two and three pole breakers shall be common trip.
12. Each breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
13. Breakers shall have removable lugs. Lugs shall be UL listed for copper conductors only. Breakers shall be UL listed for installation of mechanical type lugs.

C. Transfer Switches (Automatic and Manual):
1. The automatic and manual transfer switches shall be of air break design and shall be three phase, 3-pole type as indicated in the Contract Drawings suitable for 60 Hz application.
2. Automatic and manual transfer switches shall be rated for 120 volts. The switches shall be designed for a maximum system voltage of 600 volts.
3. The automatic and manual transfer switches shall be of a double throw design that is inherently mechanically interlocked to prevent simultaneous connection of both power sources.
4. The main contacts shall be mechanically held and electrically operated for the automatic transfer switch.
5. The contact shall be capable of making or breaking any load within the rating of the switch.
6. The automatic and manual transfer switches shall be compatible for use with an emergency generator or an alternate source of power.
7. The control device of the automatic transfer switch shall provide for a complete automatic test and operation.
8. The control device of the automatic transfer switch shall sense the voltage in the phase(s) of both sources and initiate a transfer immediately when the voltage of the normal source drops below 90% of the nominal voltage, and the secondary source is energized.
9. The automatic retransfer shall occur when the normal source is restored to the nominal voltage and after a user adjustable time delay of 0.5 to 30 minutes.
10. Internal wiring shall be complete so that only service and load termination are required for field installation.
11. The transfer switches shall meet or exceed all requirements of Underwriter's Laboratories Standards.
12. The manufacturer shall conduct a complete test on each transfer switch to verify proper operation prior to shipment. Test reports shall be furnished with the shipments of the switches.

D. Power Distribution Panels:
1. Panelboards shall be metal-enclosed with dead-front distribution.
2. Three phase power distribution panels shall be rated at 208/120 volt, four wire, 60 Hz, and single phase signal power distribution panels shall be rated for 120 volt, ungrounded two wire, 60 Hz service; however, panels shall be designed for maximum system voltage of 600 volts.
3. Panelboards shall be complete with circuit breakers, copper buses, connections for incoming and outgoing cables, wiring and nameplates.
4. Electrical connections shall be bolted, with lock washers and ring tongue type, solderless connectors.

5. Distribution panel bus structure and main breakers shall have suitable current ratings. Such ratings shall be established by heat rise tests, conducted in accordance with UL standard 67.
6. Panelboard bus assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL standard 50 for cabinets. Wiring gutter space shall be in accordance with UL standard 67 for panelboards. The box shall be fabricated from galvanized steel or equivalent rust resistant steel. Each front shall include a door and have a flush, cylinder tumbler-type lock with catch and spring-loaded stainless steel door pull. Fronts shall not be removable with door in the locked position. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door.

## ARTICLE 3 EXECUTION

### 3.01 POWER EQUIPMENT

A. Power Supplies
   1. Wall mount all power supplies.

B. Transformers
   1. Install transformers in accordance with manufacturer's instructions.
   2. Conduit Connections: Use flexible metal conduit not less than 18 inches or more than 36 inches in length unless otherwise approved.
   3. Comply with NFPA 70, Article 450, and ANSI C2, Section 15.
   4. Verify all circuits are connected as indicated.
   5. Perform insulation and circuit continuity test prior to connecting primary service.

C. Grounding shall be as specified in Sections 13585, "Installation Requirements," and 13590, "Housings and Housing Equipment.

### 3.02 POWER SUPPLIES

A. Mounting height of power supplies, battery charges, and rectifiers shall be restricted to an area between 1.5 feet and 5.5 feet above the finished floor.

B. An approved method shall be used to mount a typed or machine printed nametag for each power supply, battery charger, rectifier and other power-related devices, on the front plate of the equipment. The nametag shall be easily replaceable, but not come off during normal service.

C. All power supplies, battery chargers, rectifiers and other power-related devices shall be tested in accordance with the manufacturer's recommendations.

## ARTICLE 4 MEASUREMENT AND PAYMENT

### 4.01 MEASUREMENT

A. No separate measurement shall be made for the work of this Section.

### 4.02 PAYMENT

A. No separate payment will be made for the work of this Section. Payment for the work shall be included in the payment for related portions of the Work.

END OF SECTION

**PORT AUTHORITY OF ALLEGHENY COUNTY**
**NORTH SHORE CONNECTOR PROJECT**

**CONTRACT NO. NSC-009**

**The following Questions and Answers Summary shall not be construed to modify or change the Bid Documents. The Bidder shall submit its Bid based upon the Bid Documents. The Bid Documents may only be changed through the use of explicitly identified changes to the Bid Document, and any necessary change to the Bid Documents will be explicitly identified as such in an Addendum that would be issued by Port Authority.**

Question 136: Addendum #3, Response 46 states the trip for 12S signal at Wood Street (which was being added for this job) shall not be added, but the cable plan for Wood Street in Addendum #3 still shows the trip and new cable being required Please clarify.

Response 136: Section 13574, Paragraph 2.03.A has been revised in Addendum 6.

Question 137: 'The circuits (sh.388) show two 12volt/240AH batteries but do not specify what type of battery, (NICad, Lead Acid etc) or charger is required. Please specify the battery types and battery charger requirements.

Response 137: Section 13593-2.01 has been revised, see Addendum 6.

Question 138: Section 13574, 2.03.A.1. ATS will be compatible with existing inductive train-stop equipment now in service.

There is no mention in the spec. of Manufacturer and/or Model of train-stops in service. Can you please, provide this information

Response 138: Part # for ATS is WABCO 2/305312 Type L7.

Question 139: Section 13574, 2.03.B The wayside coils will be active at all times, unless the signal governing movements over the coils displays a permissive aspect.

Existing Wood Interlocking circuits, as well as typical ATS control logic, show coils to be energized only when a signal displays a permissive aspect Please clarify.

Response 139: Energizing the ATS coil deactivates the ATS equipment.

Question 141: We request clarification to Note # 2 as to how it applies to the 6 Fiber Cable and Power Cables shown. Is the NSC-009 contractor to install the cable as shown or only provide the conduit rough-in for future cable installation?

Response 141: See revised drawings CR500 thru CR504 in Addendum 6.

Question 144: Section 13585 Item 3.03 C. infers that on elevated structures NSC-009 furnish covers of a specific size however Dwg. SG204 indicates the covers are by others.

Response 144: See Drawing SG-204 in Addendum 6.

Question 145: Section 13574 Item 2.09 A specifies rail heater to be 300 watts per foot but Dwg. SG134 load calculations chart specifies 150 watts per foot. What is the correct wattage?

Response 145: 150 watts/foot. See Addendum 6.

Question 146: Addendum #4 added a bid item to replace DF track. If need be, will someone from the Authority be able to take us in the tunnel to see this area of work?

Response 146: See Addendum 6.

Question 147: Specification Section 01783 "Temporary Facilities" requires that the NSC-009 Contractor 'accept transfer, operate, and maintain for the duration of Work' the temporary tunnel ventilation and lighting systems. Please provide information as to the make-up of these temporary systems so that adequate usage rates can be accounted for as well as the removal cost of such items at the completion of the Work.

Response 147: See Appendix C in Addendum 6.

Question 148: Specification Sections 16060 "Grounding and Bonding" references requirements for OCS bonding and states that no separate measurement or payment shall be made for the OCS work of this section. However, Specification Section 16602 "General Requirements Overhead Contact System" references measurement and payment for Bid Item 16602.015 "OCS Grounding". Please confirm that ALL grounding and bonding shall be measured and paid under Bid Item 16060.001 "Ground and Bonding" and that no cost should be allocated to Bid Item 16602.015 "OCS Grounding" and will be deleted.

Response 148: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 149: Contract Drawing TP013 shows manholes ACMH 1 and ACMH 2. No dimensions manhole details are given. Please confirm that the furnish and install of these manholes is included in the NSC-009 contract and provided details on each of the manholes.

Response 149: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 150: Contract Drawing TP217 list conduits AC6, AC7, AC8, and AC9 to be installed under this contract. Please provide physical location of the Fire Alarm panel, EF-I, EF-2, and Air Conditioner that are being powered from Panel PNP in the Tie Breaker room. Please note that the panel schedule on Drawing TP202 does not list these devices being fed from the PNP electrical panel.

Response 150: See Addendum 6.

Question 151: Contract Specification 02220 "Demolition", Section 3.20 "Demolition of Station Suspended Ceiling" requires the Contractor to remove suspended ceiling near the Gateway Station platform. Reference to this demo cannot be found on the Contract Drawings. Please indicate the removal limits on a drawing.

Response 151: See Addendum 6

Question 152: Contract Specification 02220 "Demolition", Section 2.08 "Signal System" requires the Contractor to remove tunnel signals 16N, 18S,

20S and Electric Switch Machine #3. Please provide information as to the location of this equipment.

Response 152: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 153: Reference Bid Item #05520.001 - Misc. Fabricated Steel Items. Please provide information as to what materials this bid item is referencing.

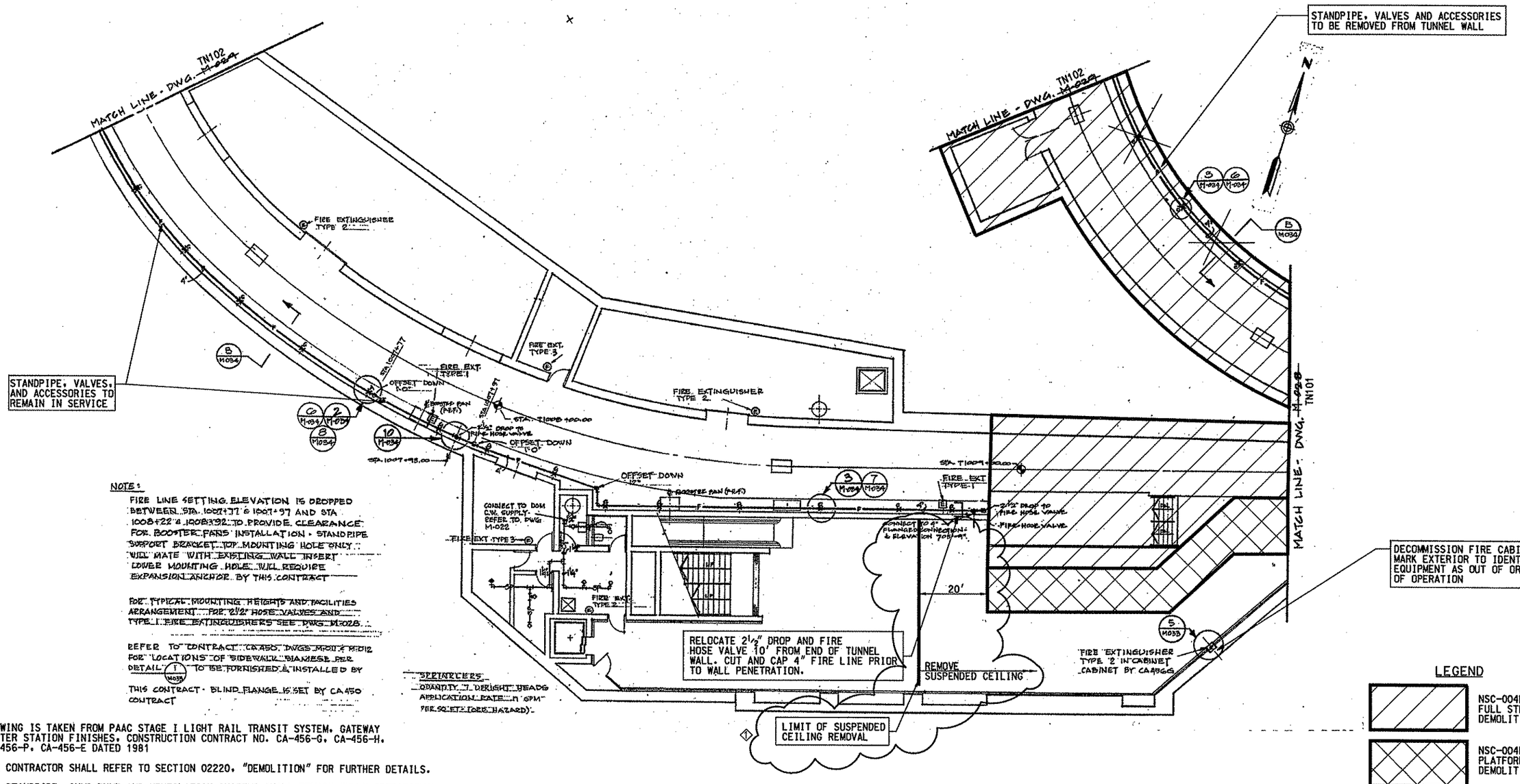
Response 153: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 154: Please provide details of the existing #6 crossover at Wood Street Station.

Response 154: See existing #6 crossover plans added to Volume 3 (ALSO Plans).

Question 155: We would like to request an extension to the September 24, 2008 bid date for the NSC-009 project.

Response 155: See Addendum 6




NOTE:

FIRE LINE SETTING ELEVATION IS DROPPED BETWEEN STA. 1007+77 & 1007+97 AND STA 1008+22 & 1008+32 TO PROVIDE CLEARANCE FOR BOOSTER FANS INSTALLATION. STANDPIPE SUPPORT BRACKET TOP MOUNTING HOLE ONLY WILL MATE WITH EXISTING WALL INSERT LOWER MOUNTING HOLE WILL REQUIRE EXPANSION ANCHOR BY THIS CONTRACT

FOR TYPICAL MOUNTING HEIGHTS AND FACILITIES ARRANGEMENT FOR 2½" HOSE VALVES AND TYPE I FIRE EXTINGUISHERS SEE PWG. M-028.

REFER TO CONTRACT CA450 DWGS M-011 & M-012 FOR LOCATIONS OF SIDEWALK SIAMESE PER DETAIL 1/M035 TO BE FURNISHED & INSTALLED BY THIS CONTRACT. BLIND FLANGE IS SET BY CA450 CONTRACT

NOTES

① DRAWING IS TAKEN FROM PAAC STAGE I LIGHT RAIL TRANSIT SYSTEM, GATEWAY CENTER STATION FINISHES, CONSTRUCTION CONTRACT NO. CA-456-G, CA-456-H, CA-456-P, CA-456-E DATED 1981

② THE CONTRACTOR SHALL REFER TO SECTION 02220, "DEMOLITION" FOR FURTHER DETAILS.

③ ALL STANDPIPE, SUMP PUMP AND VENTILATION SYSTEMS SHALL REMAIN FULLY OPERATIONAL UNTIL TRAIN OPERATIONS ARE CONVERTED TO TURN BACK OPERATIONS AT WOOD STREET STATION AND A TUNNEL CLOSURE WALL IS CONSTRUCTED TO SEPARATE THE DEMOLITION ZONE.

④ THE CONTRACTORS SHALL BE RESPONSIBLE FOR ALL TEMPORARY VENTILATION DURING ALL STAGES OF DEMOLITION AND CONSTRUCTION.

⑤ ANY ALTERATIONS TO THE STANDPIPE SYSTEM SHALL BE IN ACCORDANCE WITH NFPA.

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 9/8/08 | ADDENDUM 6 – DRAWING MODIFIED |

REVISIONS

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER DAVID P. HANES

SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

| | |
|---|---|
| DESIGNED | CM |
| DRAWN | DPH |
| CHECKED | DH |
| IN CHARGE | DPH |
| DATE | APR 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEMS (SYSTEM WIDE)
STANDPIPE DEMOLITION PLAN
1 OF 3

Port Authority connecting people to life

CONTRACT NO. NSC-009
DWG. NO. TN100 SHT. 48

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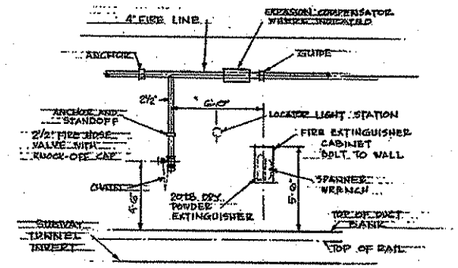
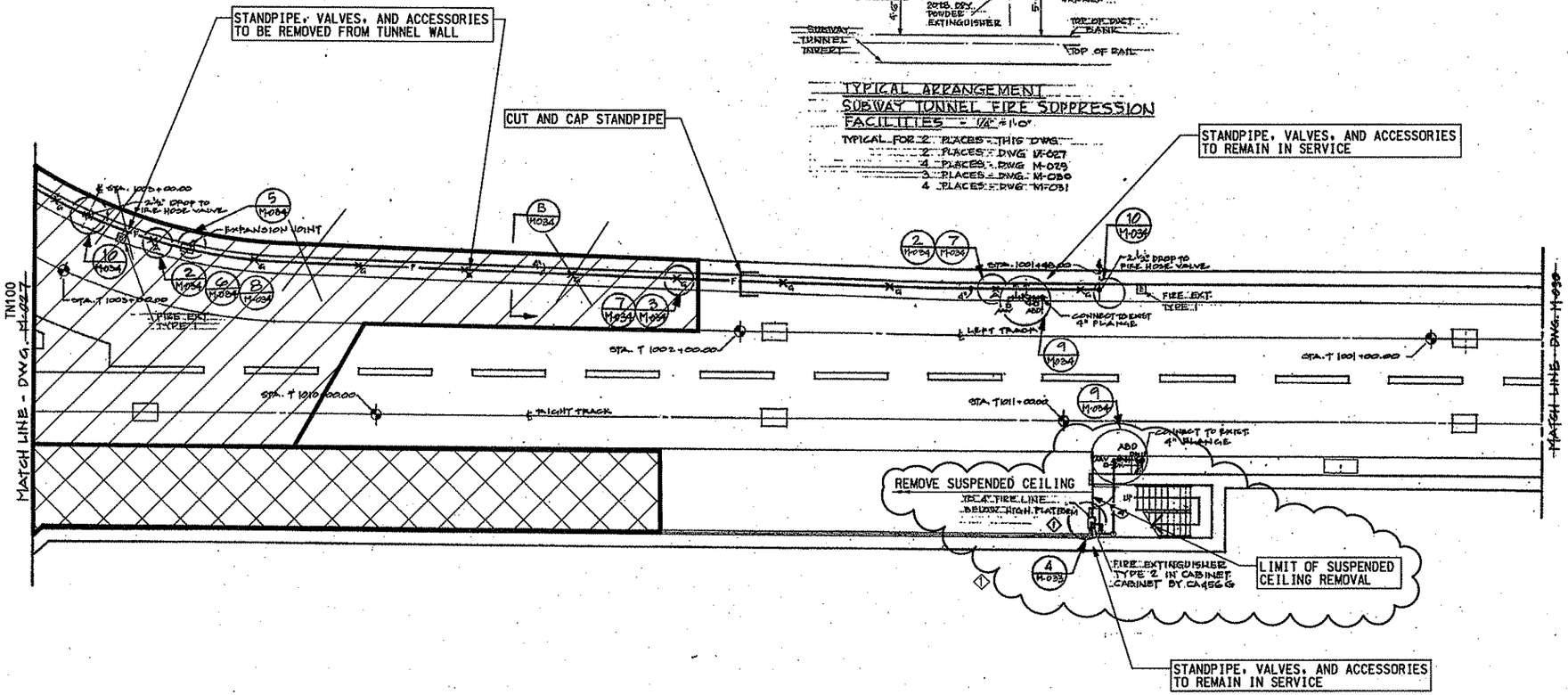



TYPICAL ARRANGEMENT
SUBWAY TUNNEL FIRE SUPPRESSION FACILITIES - 1/4" = 1'-0"

TYPICAL FOR 2 PLACES - THIS DWG.
2 PLACES - DWG. M-027
4 PLACES - DWG. M-029
3 PLACES - DWG. M-030
4 PLACES - DWG. M-031




LEGEND

NSC-004R FULL STRUCTURE DEMOLITION

NSC-004R PLATFORM DEMOLITION ONLY

NOTES
① DRAWING IS TAKEN FROM PAAC STAGE I LIGHT RAIL TRANSIT SYSTEM, GATEWAY CENTER STATION FINISHES, CONSTRUCTION CONTRACT NO. CA-456-G, CA-456-H, CA-456-P, CA-456-E DATED 1981

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④ THE CONTRACTORS SHALL BE RESPONSIBLE FOR ALL TEMPORARY VENTILATION DURING ALL STAGES OF DEMOLITION AND CONSTRUCTION.

⑤ ANY ALTERATIONS TO THE STANDPIPE SYSTEM SHALL BE IN ACCORDANCE WITH NFPA.

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 9/8/08 | ADDENDUM 6 - DRAWING MODIFIED |

REVISIONS

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL DAVID P. HANES ENGINEER 059578-E

SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

| | |
|---|---|
| DESIGNED | CM |
| DRAWN | DPH |
| CHECKED | DH |
| IN CHARGE | DPH |
| DATE | APR 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEMS (SYSTEM WIDE)
STANDPIPE DEMOLITION PLAN
2 OF 3

Port Authority

CONTRACT NO. NSC-009
DWG. NO. TN101 SHT. 4-9

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| CABLE | | | | | | CIRCUIT | | ROUTING | | | | CONDUIT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NO. | CONSTRUCTION | | SIZE AWG | INSULATION VOLTAGE | INSULATION TYPE | VOLTAGE | AC DC | FROM | VIA | TO | FUNCTION | NO. | SIZE & MATERIAL |
| DP1 | 1 | 1/C | 1000 | 2KV | EPR | 650 | DC | BREAKER 7F05 | CONDUIT | OCS 6088+85 | TIE BREAKER | 1 | 3"C-PVC |
| DP2 | 1 | 1/C | 1000 | 2KV | EPR | 650 | DC | BREAKER 7F05 | CONDUIT | OCS 6088+85 | TIE BREAKER | 1 | 3"C-PVC |
| DP3 | 1 | 1/C | 1000 | 2KV | EPR | 650 | DC | BREAKER 7F05 | CONDUIT | OCS 6088+86 | TIE BREAKER | 1 | 3"C-PVC |
| DP4 | 1 | 1/C | 1000 | 2KV | EPR | 650 | DC | BREAKER 7F05 | CONDUIT | OCS 6088+86 | TIE BREAKER | 1 | 3"C-PVC |
| DP5 | – | – | – | – | – | – | – | – | – | – | SPARE | 1 | 3"C-PVC |
| | | | | | | | | | | | | | |
| DN1 | 2 | 1/C | #6 | 2KV | EPR | 650 | DC | NEGATIVE REF. CABINET | CONDUIT | RAIL | NEGATIVE RETURN REF. | 1 | 3"C-PVC |
| DN2 | 1 | 1/C | #6 | 2KV | EPR | 650 | DC | NEGATIVE REF. CABINET | CONDUIT | BREAKER 7F05 | VOLT TRANSDUCER | 1 | 1"C-PVC |
| | | | | | | | | | | | | | |
| AC1 | 4/1 | 1/C | #6/10 | 600 | 90°C | 208 | AC | ELECTRICAL ROOM | CONDUIT | PANEL PNP | SERVICE POWER | 1 | 1"C-RGS |
| AC2 | 2/1 | 1/C | #6/10 | 600 | 90°C | 208 | AC | PANEL PNP | CONDUIT | BATTERY CHARGER | DC POWER | 1 | 1"C-RGS |
| AC3 | 2 | 1/C | #10 | 600 | 90°C | 120 | AC | PANEL PNP | CONDUIT | BREAKER 7F05 | CONTROL POWER | 1 | 3/4"C-RGS |
| AC4 | 2 | 1/C | #12 | 600 | 90°C | 120 | AC | PANEL PNP | CONDUIT | RTU CABINET | CONTROL POWER | 1 | 3/4"C-RGS |
| AC5 | 2 | 1/C | #12 | 600 | 90°C | 120 | AC | PANEL PNP | CONDUIT | INTRUSION ALARM | CONTROL POWER | 1 | 3/4"C-RGS |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| DC1 | 2 | 1/C | #6 | 600 | 90°C | 125 | DC | BATT. CHARGER | CONDUIT | DC PB | DC POWER | 1 | 1"C-RGS |
| DC2 | 2 | 1/C | #2 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | DC-DS1 | DC POWER | 1 | 1"C-RGS |
| DC3 | 2 | 1/C | #2 | 600 | 90°C | 125 | DC | DC-DS1 | CONDUIT | BATTERY | DC POWER | 1 | 1"C-RGS |
| DC4 | 2 | 1/C | #12 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | RTU CABINET | DC POWER | 1 | 3/4"C-RGS |
| DC5 | 2 | 1/C | #12 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | ANNUNICATOR | DC POWER | 1 | 3/4"C-RGS |
| DC6 | 2 | 1/C | #8 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | BREAKER TEST CABINET | DC POWER | 1 | 1"C-RGS |
| DC7 | 2 | 1/C | #12 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | ETR | DC POWER | 1 | 3/4"C-RGS |
| DC8 | 2 | 1/C | #10 | 600 | 90°C | 125 | DC | DC PB | CONDUIT | BREAKER 7F05 | DC POWER | 1 | 1"C-PVC |

| CABLE | | | | | | CIRCUIT | | ROUTING | | | | CONDUIT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NO. | CONSTRUCTION | | SIZE AWG | INSULATION VOLTAGE | INSULATION TYPE | VOLTAGE | AC DC | FROM | VIA | TO | FUNCTION | NO. | SIZE & MATERIAL | |
| SC1 | 6 | 1/C | 12 | 600 | 90°C | 120 | AC | BATT. CHARGER | CONDUIT | RTU CABINET | INDICATION | 1 | 3/4"C-RGS | |
| SC2 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | INTRUSION ALARM | CONDUIT | RTU CABINET | ALARM | 1 | 3/4"C-RGS | |
| SC3 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | ETR | CONDUIT | RTU CABINET | ALARM | 1 | 3/4"C-RGS | |
| SC4 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | FIRE ALARM | CONDUIT | RTU CABINET | ALARM | 1 | 3/4"C-RGS | |
| SC5 | 4 | 1/C | 12 | 600 | 90°C | 120 | AC | ANNUNICATOR | CONDUIT | RTU CABINET | INDICATION ANALOG | 1 | 3/4"C-RGS | |
| SC6 | 30 | 1/C | 12 | 600 | 90°C | 120 | AC | DC SWGR | CONDUIT | RTU CABINET | INDICATION | 1 | 2"C-PVC | |
| | | | | | | | | | | | | | | |
| AN1 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | ETR | CONDUIT | ANNUNICATOR | ALARM | 1 | 3/4"C-RGS | |
| AN2 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | FIRE ALARM | CONDUIT | ANNUNICATOR | ALARM | 1 | 3/4"C-RGS | |
| AN3 | 4 | 1/C | 12 | 600 | 90°C | 120 | AC | BATT. CHARGER | CONDUIT | ANNUNICATOR | ALARM | 1 | 3/4"C-RGS | |
| AN4 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | BATTERY ROOM VENT. | CONDUIT | ANNUNICATOR | ALARM | 1 | 3/4"C-RGS | |
| AN5 | 2 | 1/C | 12 | 600 | 90°C | 120 | AC | PNP | CONDUIT | ANNUNICATOR | LOSS OF POWER | 1 | 3/4"C-RGS | |
| AN6 | 12 | 1/C | 12 | 600 | 90°C | 120 | AC | 7F05 | CONDUIT | ANNUNICATOR | ALARM | 1 | 1"C-PVC | |
| | | | | | | | | | | | | | | |
| CM1 | 18 | PR. | 22 | 300 | 90°C | 48 | DC | RTU CABINET | CONDUIT | COMM. ROOM | SCADA | 1 | 1"C-RGS | SEE NOTE 5 |

H-A.C. PRIMARY VOLTAGE CABLE
DP-D.C. POSITIVE POWER CABLE
DN-D.C. NEGATIVE POWER CABLE
AN- ANNUNCIATOR CABLE
SC- SCADA CONTROL CABLE
CN- CONTROL CABLE
MA- MISCELLANEOUS CIRCUITS
AC-A.C. LOW VOLTAGE POWER CIRCUITS
DC-D.C. CONTROL POWER CIRCUITS
CI- CATENARY INDICATION
CM- COMMUNICATION CABLE

NOTES:

1. CONDUIT AND CABLE SCHEDULE IS TYPICAL AND PROVIDED FOR INFORMATION AND GUIDANCE ONLY. THE CONTRACTOR SHALL VERIFY THE SCHEDULE AND MAKE CHANGES/ADDITIONS AS REQUIRED FOR COMPLETE WORKING SYSTEM AT NO ADDITIONAL COST TO PORT AUTHORITY.
2. CONTRACTOR TO UTILIZE CABLE TRAY WHENEVER POSSIBLE TO MINIMIZE USE OF CONDUITS INSIDE SUBSTATION.
3. CONTRACTOR IS TO ENSURE THAT DC SWITCHGEAR /RECTIFIER IS ISOLATED FROM CONDUITS, CABLE TRAY AND ALL EQUIPMENT THAT COULD PROVIDE STRAY GROUNDS.
4. CONDUITS ARE ALLOCATED ON CIVIL DRAWINGS.
5. SEE SPEC. 16742.

Gannett Fleming
Transit & Rail Systems

| NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 09/08/08 | ADDENDUM 6 – DRAWING MODIFIED |

REVISIONS

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL MICHAEL T. MCNAMARA ENGINEER No. 37038-E

SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

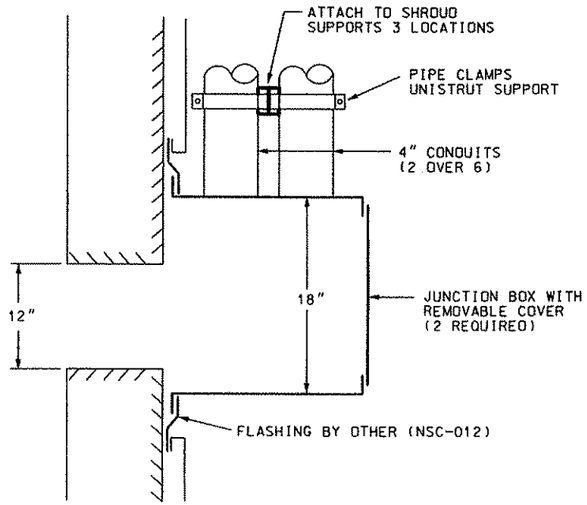
| | |
|---|---|
| DESIGNED | H SOROKIN |
| DRAWN | HT TRAN |
| CHECKED | M INSOGNA |
| IN CHARGE | CD JONES |
| DATE | APR. 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

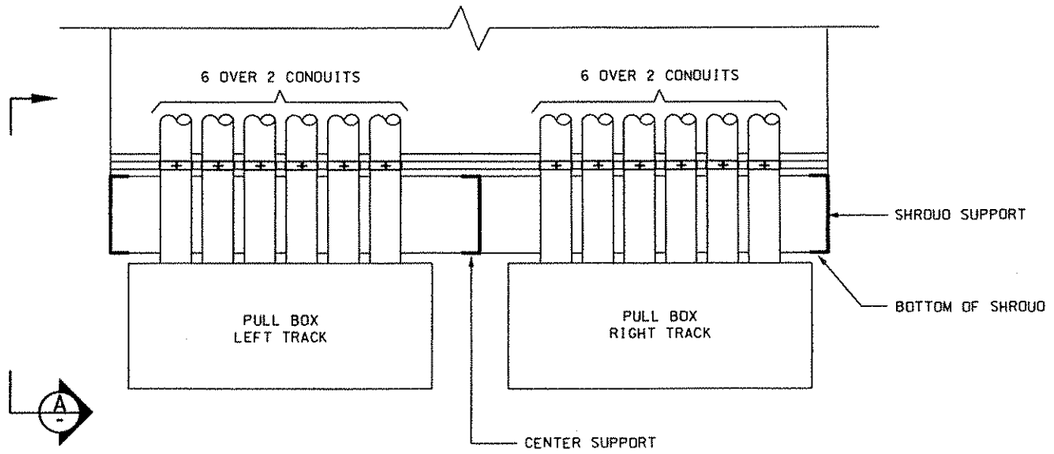
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ALLEGHENY CIRCUIT BREAKER ROOM
CONDUIT AND CABLE SCHEDULE

Port Authority

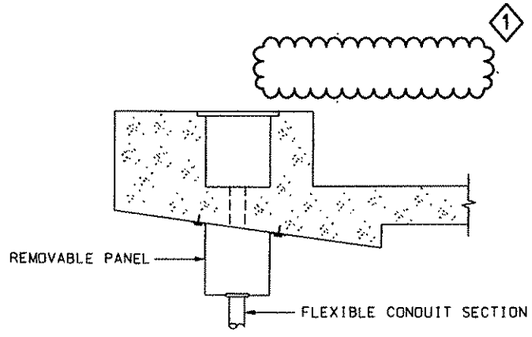
CONTRACT NO. NSC-009
DWG. NO. TP217 SHT. 319



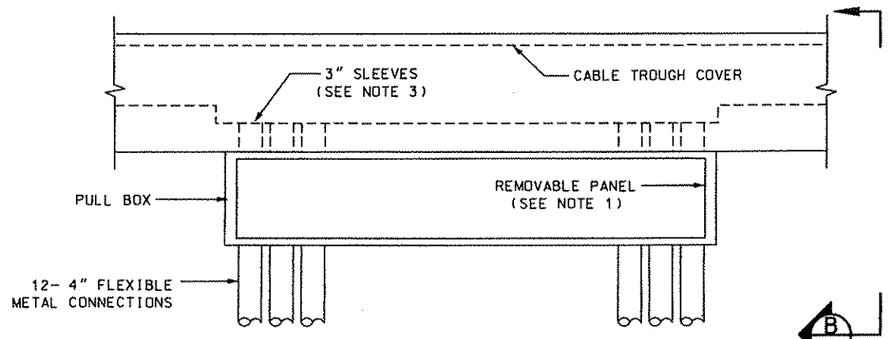

SECTION A




DETAIL A SG203




SECTION B




PULL BOX - DETAIL B SG203

LEFT TRACK SHOWN
RIGHT TRACK SIMILAR

NOTES:

1. PULL BOX TO BE PROVIDED WITH ACCESS PANEL TOWARDS OUTSIDE OF STRUCTURE.
2. ALL PULL BOXES TO BE PROVIDED WITH WEEP HOLES IN BOTTOM.
3. 3" SLEEVES IN CABLE TROUGH PROVIDED BY OTHERS (NSC-007) THESE ARE CENTERED AT 6083+83.61 ON RIGHT TRACK AND AT 6083+81.35 ON LEFT TRACK.

Gannett Fleming
Transit & Rail Systems

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COMMONWEALTH OF PENNSYLVANIA — INTENTIONAL — PROFESSIONAL — MICHAEL T. MCNAMARA — ENGINEER — No. 37126-E

SIGNATURE

DMJM HARRIS | AECOM
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PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

| | |
|---|---|
| DESIGNED | H LAY |
| DRAWN | HT TRAN |
| CHECKED | JF SAMEAN |
| IN CHARGE | CD JONES |
| DATE | APR. 28, 2008 |
| SCALE | NONE |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ALLEGHENY CONDUIT LAYOUT
SHEET 2 OF 2

Port Authority

CONTRACT NO. NSC-009
DWG. NO. SG204 SHT. 427

LEGENDS:

- CONDUIT
- EMBEDDED CONDUIT
- CABLE TROUGH
- CCTV CAMERA
- PORTAL SURVEILLANCE CAMERA
- INTRUSION DETECTOR
- JUNCTION BOX (JB)
- PULL BOX (PB)

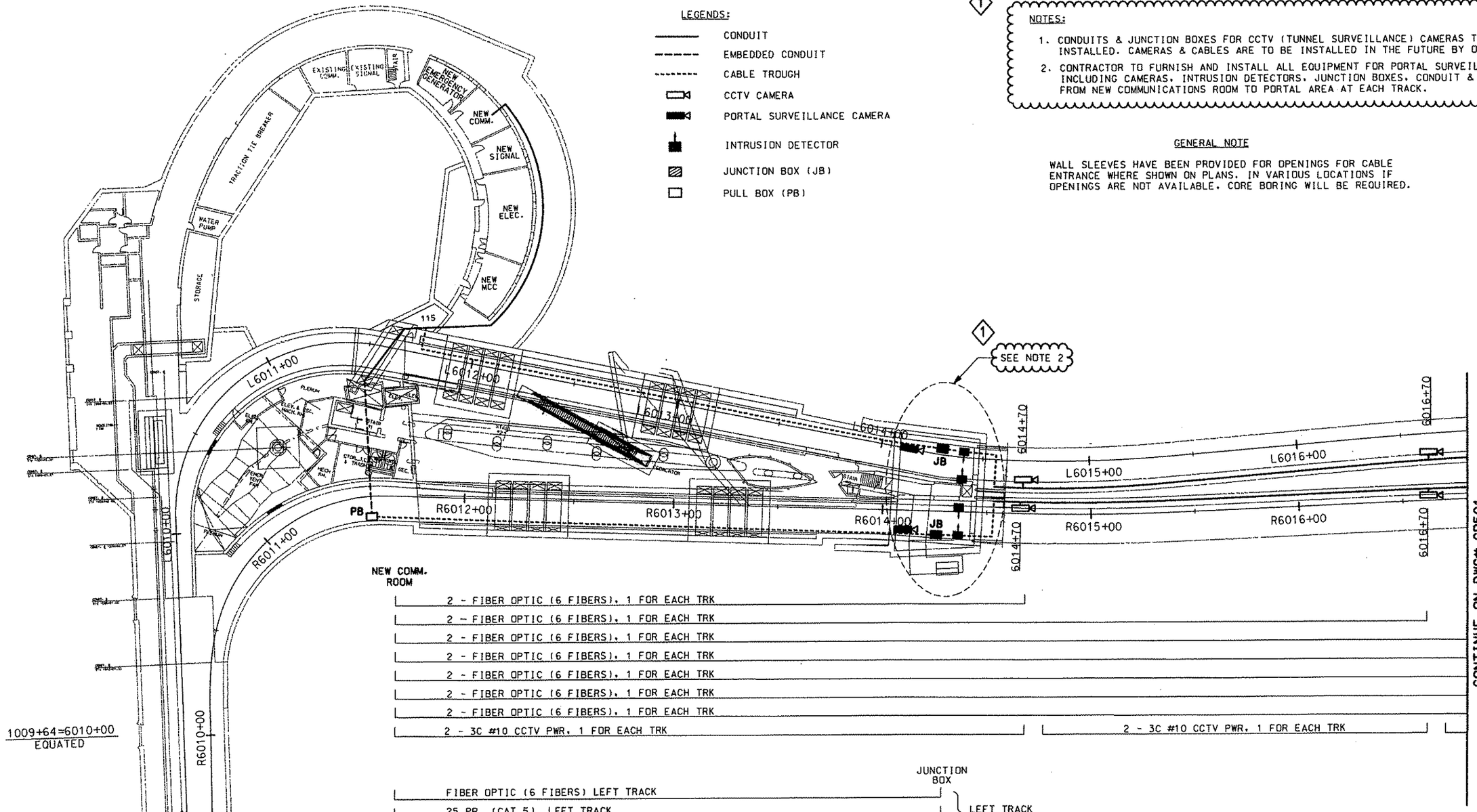
1

NOTES:

1. CONDUITS & JUNCTION BOXES FOR CCTV (TUNNEL SURVEILLANCE) CAMERAS TO BE INSTALLED. CAMERAS & CABLES ARE TO BE INSTALLED IN THE FUTURE BY OTHER.
2. CONTRACTOR TO FURNISH AND INSTALL ALL EQUIPMENT FOR PORTAL SURVEILLANCE INCLUDING CAMERAS, INTRUSION DETECTORS, JUNCTION BOXES, CONDUIT & CABLES FROM NEW COMMUNICATIONS ROOM TO PORTAL AREA AT EACH TRACK.

GENERAL NOTE

WALL SLEEVES HAVE BEEN PROVIDED FOR OPENINGS FOR CABLE ENTRANCE WHERE SHOWN ON PLANS. IN VARIOUS LOCATIONS IF OPENINGS ARE NOT AVAILABLE, CORE BORING WILL BE REQUIRED.




2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - FIBER OPTIC (6 FIBERS), 1 FOR EACH TRK
2 - 3C #10 CCTV PWR, 1 FOR EACH TRK — 2 - 3C #10 CCTV PWR, 1 FOR EACH TRK

JUNCTION BOX

- FIBER OPTIC (6 FIBERS) LEFT TRACK
- 25 PR. (CAT 5) LEFT TRACK
- 2C #14 POWER LEFT TRACK

} LEFT TRACK PORTAL SURVEILLANCE

- FIBER OPTIC (6 FIBERS) RIGHT TRACK
- 25 PR. (CAT 5) LEFT TRACK
- 2C #14 POWER LEFT TRACK

} RIGHT TRACK PORTAL SURVEILLANCE

Gannett Fleming
Transit & Rail Systems

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL MICHAEL T. MCNAMARA ENGINEER No. 37124-E

SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED — 9/8/08 DATE

| | |
|---|---|
| DESIGNED | H LAY |
| DRAWN | HT TRAN |
| CHECKED | R WEIDNER |
| IN CHARGE | CD JONES |
| DATE | APR. 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
TUNNEL SURVEILLANCE SYSTEM
GATEWAY STATION TO TUNNEL

Port Authority

CONTRACT NO. NSC-009
DWG. NO. CR500 SHT. 597

LEGENDS:

CONDUIT

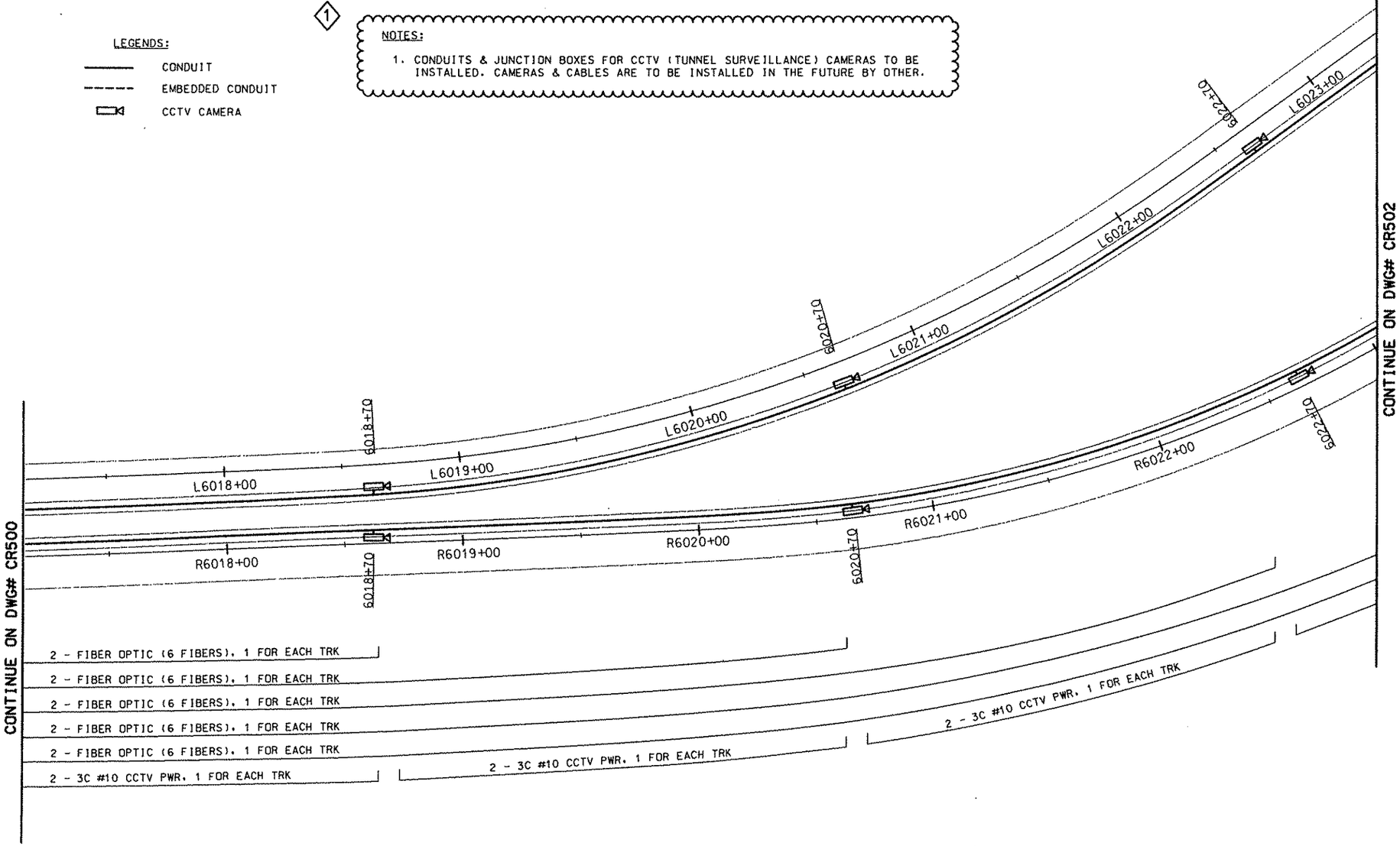
EMBEDDED CONDUIT

CCTV CAMERA

1

NOTES:

1. CONDUITS & JUNCTION BOXES FOR CCTV (TUNNEL SURVEILLANCE) CAMERAS TO BE INSTALLED. CAMERAS & CABLES ARE TO BE INSTALLED IN THE FUTURE BY OTHER.




Gannett Fleming
Transit & Rail Systems

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COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MICHAEL T. MCNAMARA
ENGINEER
SIGNATURE

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PITTSBURGH, PA. 15222

APPROVED

9/8/08
DATE

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|---|---|
| DESIGNED | H LAY |
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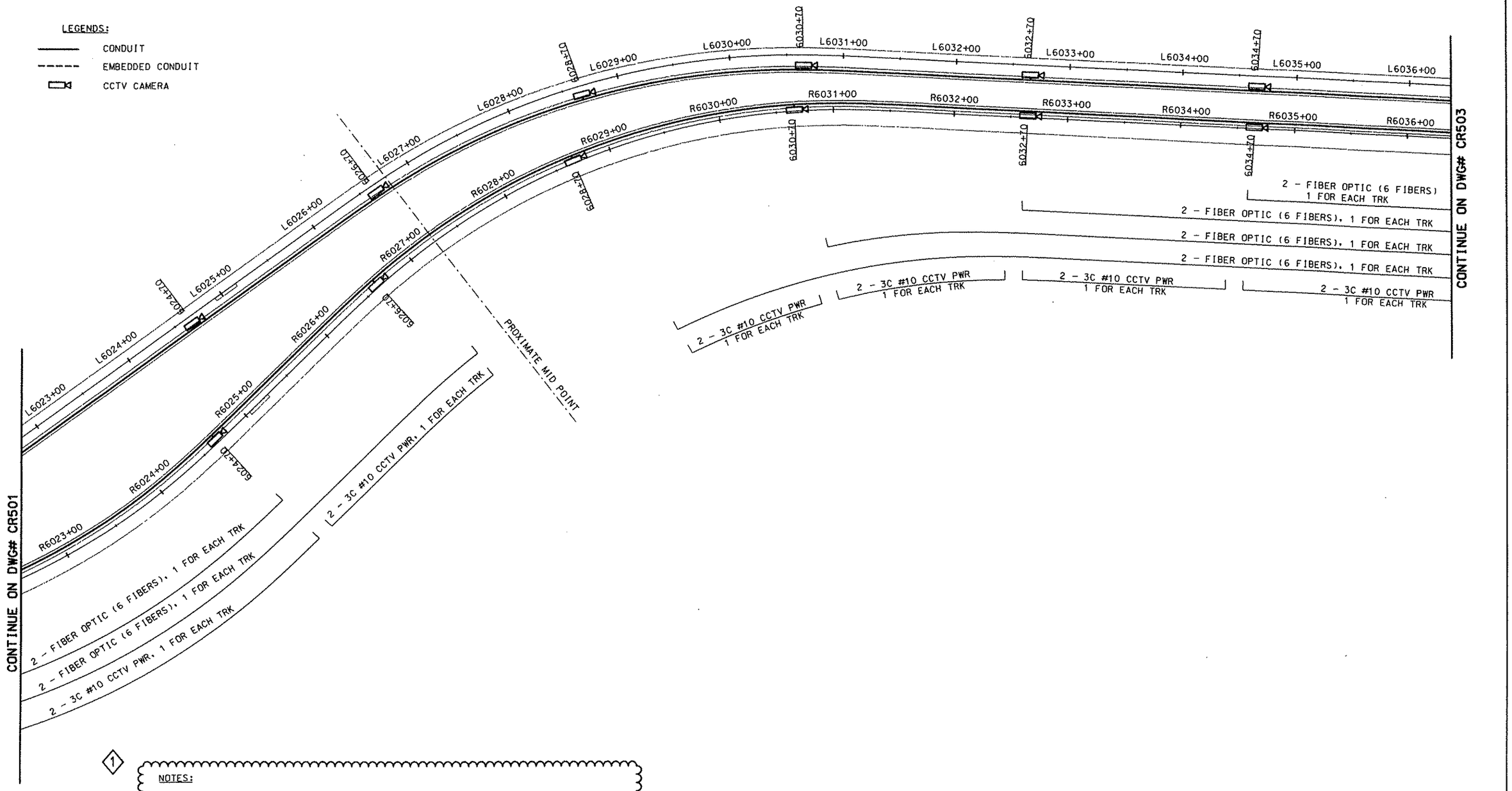
| IN CHARGE | CD JONES |
| DATE | APR. 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
TUNNEL SURVEILLANCE SYSTEM
TUNNEL SECTION

Port Authority

CONTRACT NO. NSC-009
DWG. NO. CR501 SHT. 598




1

NOTES:

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Transit & Rail Systems

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL MICHAEL T. MCNAMARA ENGINEER PA. 37030-E

SIGNATURE

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PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

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PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
TUNNEL SURVEILLANCE SYSTEM
TUNNEL SECTION

Port Authority

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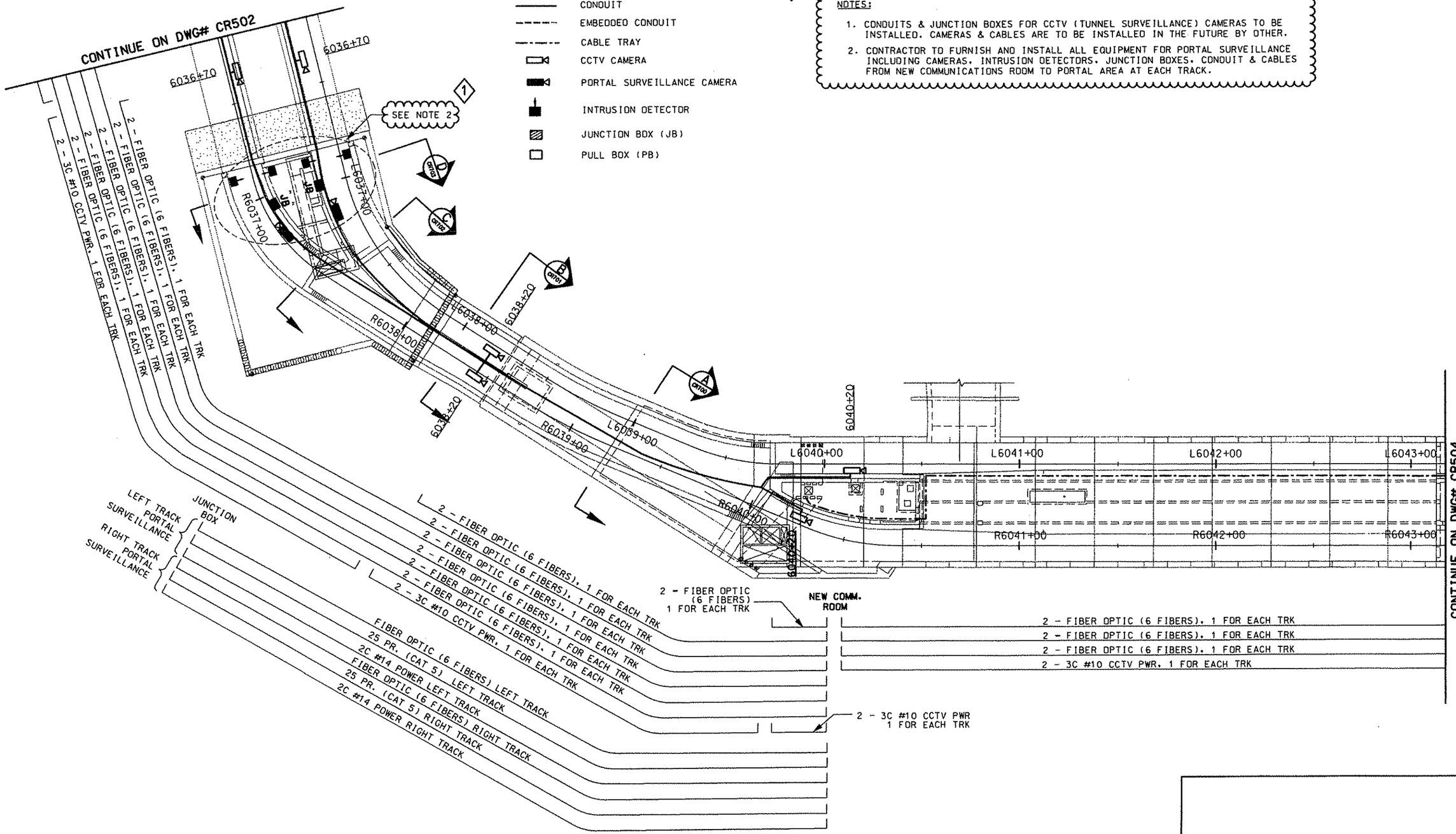
|---|---|
| CONTRACT NO. | NSC-009 |
| DWG. NO. | CR502 |
| SHT. | 509 |

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Transit & Rail Systems

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COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — MICHAEL T. MCNAMARA — ENGINEER — No. 37354

SIGNATURE

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PITTSBURGH, PA. 15222

APPROVED

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DATE

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**PORT AUTHORITY OF ALLEGHENY COUNTY**
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
TUNNEL SURVEILLANCE SYSTEM
NORTH SIDE STATION

Port Authority

| | | |
|---|---|---|
| CONTRACT NO. | NSC-009 | |
| DWG. NO. | CR503 | SHT. 600 |

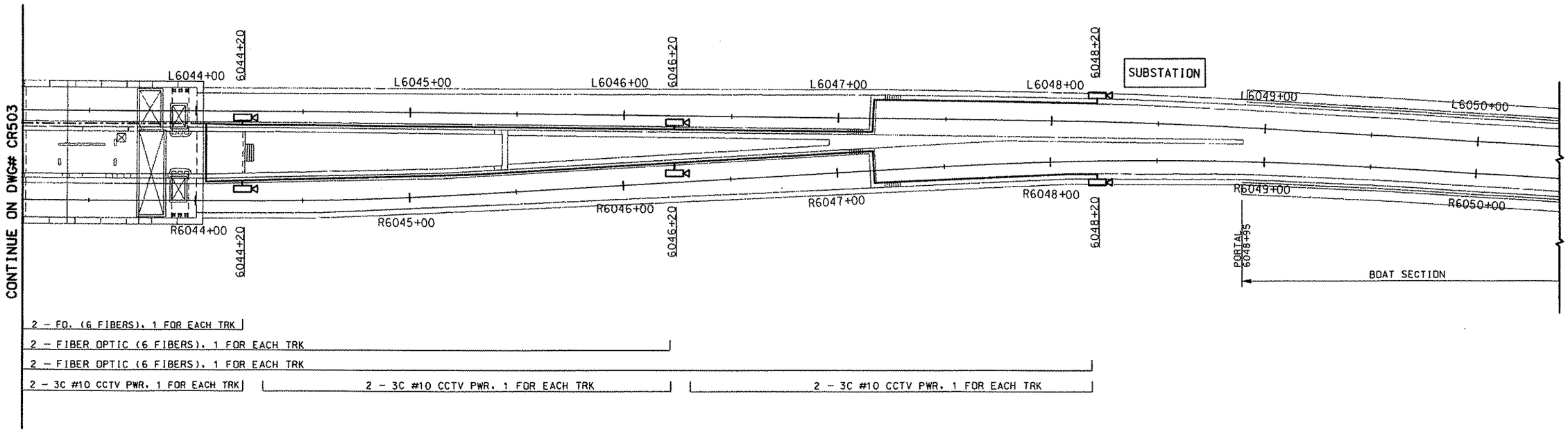
LEGENDS:

- CONDUIT
- EMBEDDED CONDUIT
- CABLE TRAY
- CCTV CAMERA

1

NOTES:

1. CONDUITS & JUNCTION BOXES FOR CCTV (TUNNEL SURVEILLANCE) CAMERAS TO BE INSTALLED. CAMERAS & CABLES ARE TO BE INSTALLED IN THE FUTURE BY OTHER.

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER MICHAEL T. MCNAMARA No. 37036-E

SIGNATURE

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APPROVED 9/8/08 DATE

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| SCALE | NTS |

**PORT AUTHORITY OF ALLEGHENY COUNTY**
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
TUNNEL SURVEILLANCE SYSTEM
NORTH SIDE STATION TO ALLEGHENY STATION

Port Authority

CONTRACT NO. NSC-009
DWG. NO. CR504 SHT. 601

# INDEX OF ALSO DRAWINGS

## GATEWAY STATION SHELL

| CONTRACT NO. | DRAWING NO. | DRAWING TITLE |
|---|---|---|
| NSC-004R | TN104 | BASE SLAB PROFILE AND LONGITUDINAL SECTION THRU PLINTH |
| NSC-004R | TN105 | MISCELLANEOUS INTERIOR WALL DETAILS |
| NSC-004R | TN106 | MISCELLANEOUS PLATFORM DETAILS |
| NSC-004R | TN107 | EMERGENCY EGRESS HATCH DETAIL |
| NSC-004R | TN108 | EMERGENCY EGRESS STAIRWAY MISCELLANEOUS DETAILS |
| NSC-004R | TN109 | PENN AVE PLACE EMERGENCY EGRESS GENERAL PLAN AND ELEVATION |
| NSC-004R | TN110 | PENN AVE PLACE EMERGENCY EGRESS VAULT DEMOLITION DETAILS |
| NSC-004R | TN405 | EXISTING GATEWAY STATION DEMOLITION PLAN |
| NSC-004R | TN406 | EXISTING GATEWAY STATION DEMOLITION CROSS SECTIONS |
| NSC-004R | TN411 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 2 OF 7 |
| NSC-004R | TN412 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 3 OF 7 |
| NSC-004R | TN413 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 4 OF 7 |
| NSC-004R | TN414 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 5 OF 7 |
| NSC-004R | TN415 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 6 OF 7 |
| NSC-004R | TN416 | GATEWAY STATION PLAN @ TRACK LEVEL SHEET 7 OF 7 |
| NSC-004R | TN418 | GATEWAY STATION PLAN @ PLATFROM LEVEL SHEET 1 OF 3 |
| NSC-004R | TN419 | GATEWAY STATION PLAN @ PLATFROM LEVEL SHEET 2 OF 3 |
| NSC-004R | TN420 | GATEWAY STATION PLAN @ PLATFROM LEVEL SHEET 3 OF 3 |
| NSC-004R | TN422 | GATEWAY STATION PLAN @ ROOF LEVEL SHEET 2 OF 4 |
| NSC-004R | TN426 | PARTIAL PLAN AT SOUTH EMERGENCY EGRESS STAIR @ TRACK LEVEL SHEET 1 OF 3 |
| NSC-004R | TN427 | PARTIAL PLAN AT SOUTH EMERGENCY EGRESS STAIR @ PLATFORM LEVEL SHEET 2 OF 3 |
| NSC-004R | TN428 | PARTIAL PLAN AT SOUTH EMERGENCY EGRESS STAIR @ ROOF LEVEL SHEET 3 OF 3 |
| NSC-004R | TN429 | PARTIAL PLAN AT VENT CHASE @ TRACK LEVEL SHEET 1 OF 2 |
| NSC-004R | TN430 | PARTIAL PLAN AT VENT CHASE @ PLATFORM LEVEL SHEET 2 OF 2 |
| NSC-004R | TN431 | PARTIAL PLAN AT NORTH EMERGENCY EGRESS STAIR @ TRACK LEVEL SHEET 1 OF 3 |
| NSC-004R | TN432 | PARTIAL PLAN AT NORTH EMERGENCY EGRESS STAIR @ PLATFORM LEVEL SHEET 2 OF 3 |
| NSC-004R | TN433 | PARTIAL PLAN AT NORTH EMERGENCY EGRESS STAIR @ ROOF LEVEL SHEET 3 OF 3 |
| NSC-004R | TN435 | LONGITUDINAL ELEVATION STA L6016+00 TO STA L6014+00 |
| NSC-004R | TN436 | LONGITUDINAL ELEVATION STA L6014+00 TO STA L6012+00 |
| NSC-004R | TN437 | LONGITUDINAL ELEVATION STA L6012+00 TO STA L6009+65 |
| NSC-004R | TN438 | LONGITUDINAL ELEVATION STA R6009+70 TO STA R6012+00 |
| NSC-004R | TN439 | LONGITUDINAL ELEVATION STA R6012+00 TO STA R6014+00 |
| NSC-004R | TN440 | LONGITUDINAL ELEVATION STA R6014+00 TO STA R6016+00 |
| NSC-004R | TN442 | CROSS SECTION AT TIE-IN TO EXISTING STA 1009+51 TO STA 1010+24 |
| NSC-004R | TN443 | CROSS SECTION AT TIE-IN TO EXISTING STA 1008+96 TO STA 1009+51 |
| NSC-004R | TN444 | CROSS SECTION STA L6010+50 TO L6010+64 |
| NSC-004R | TN445 | CROSS SECTION STA L6010+64 TO L6011+18.69 |
| NSC-004R | TN446 | CROSS SECTION STA L6011+18.69 TO L6011+75 |
| NSC-004R | TN448 | CROSS SECTION STA L6011+75 TO L6012+25 |
| NSC-004R | TN449 | CROSS SECTION STA L6012+25 TO L6012+75 |
| NSC-004R | TN450 | CROSS SECTION STA L6012+75 TO L6013+24 |
| NSC-004R | TN451 | CROSS SECTION STA L6013+24 TO L6013+51 |
| NSC-004R | TN452 | CROSS SECTION STA L6013+51 TO L6013+75 |
| NSC-004R | TN453 | CROSS SECTION STA L6013+75 TO L6014+18 |
| NSC-004R | TN454 | CROSS SECTION STA L6014+18 TO L6014+35 |
| NSC-004R | TN455 | CROSS SECTION STA L6014+35 TO L6014+49.57 |
| NSC-004R | TN540 | RECEIVING PIT HEAD WALL REINFORCEMENT @ BORED TUNNEL SHEET 1 OF 2 |
| NSC-004R | TN581 | GATEWAY STATION PLAN @ TRACK LEVEL - CONDUIT ROUTING PLAN SHEET 1 OF 6 |
| NSC-004R | TN582 | GATEWAY STATION PLAN @ TRACK LEVEL - CONDUIT ROUTING PLAN SHEET 2 OF 6 |
| NSC-004R | TN583 | GATEWAY STATION PLAN @ TRACK LEVEL - CONDUIT ROUTING PLAN SHEET 3 OF 6 |
| NSC-004R | TN584 | GATEWAY STATION PLAN @ PLATFORM LEVEL - CONDUIT ROUTING PLAN SHEET 4 OF 6 |
| NSC-004R | TN585 | GATEWAY STATION PLAN @ PLATFORM LEVEL - CONDUIT ROUTING PLAN SHEET 5 OF 6 |
| NSC-004R | TN586 | GATEWAY STATION PLAN @ PLATFORM LEVEL - CONDUIT ROUTING PLAN SHEET 6 OF 6 |
| NSC-004R | TN587 | CONDUIT EMBEDMENTS AND PULL BOX SCHEMATIC |
| NSC-004R | TN588 | GATEWAY STATION PLAN - CONDUIT ROUTING PLAN DETAILS ( 1 OF 3) |
| NSC-004R | TN589 | GATEWAY STATION PLAN - CONDUIT ROUTING PLAN DETAILS ( 2 OF 3) |
| NSC-004R | TN589A | GATEWAY STATION PLAN - CONDUIT ROUTING PLAN DETAILS ( 3 OF 3) |
| NSC-004R | TN590 | CONDUIT SCHEDULE (1 OF 2) |
| NSC-004R | TN591 | CONDUIT SCHEDULE (2 OF 2) |
| NSC-004R | TN592 | ELECTRICAL BLOCKOUT LOCATION PLAN PLATFORM LEVEL |

## NORTHSIDE STATION AND CUT & COVER TUNNEL WEST

| CONTRACT NO. | DRAWING NO. | DRAWING TITLE |
|---|---|---|
| NSC-006 | CV107 | ROADWAY PLAN STA 6046+00 TO STA 6051+50 LEFT TRACK |
| NSC-006 | TN600-1 | NORTH SHORE GENERAL PLAN STA L6039+55 TO STA L6044+10 |
| NSC-006 | TN601 | NORTH SHORE GENERAL PLAN STA L6044+10 TO STA L6049+00 |
| NSC-006 | TN602 | NORTH SHORE GENERAL PLAN STA L6049+00 TO STA L6051+94.00 |
| NSC-006 | TN610-3 | PLAN @ TRACK LEVEL STA L6039+55 TO STA L6041+00 |
| NSC-006 | TN611-1 | PLAN @ TRACK LEVEL STA L6041+00 TO STA L6043+00 |
| NSC-006 | TN612-1 | PLAN @ TRACK LEVEL STA L6043+00 TO STA L6045+00 |
| NSC-006 | TN613 | PLAN @ TRACK LEVEL STA L6045+00 TO STA L6046+80 |
| NSC-006 | TN614 | PLAN @ TRACK LEVEL STA L6046+80 TO STA L6048+85 |
| NSC-006 | TN615-1 | PLAN @ TRACK LEVEL STA L6048+85 TO STA L6051+00 |
| NSC-006 | TN616 | PLAN @ TRACK LEVEL STA L6051+00 TO STA L6051+94.00 |
| NSC-006 | TN618-3 | CONCOURSE PLAN STA L6039+55.00 TO STA L6040+93.86 |
| NSC-006 | TN620-3 | CONCOURSE LEVEL PLAN STA L6043+17.54 TO STA L6044+07.77 |
| NSC-006 | TN621-1 | CONCOURSE PLAN STATION ENTRY CONCOURSE |
| NSC-006 | TN624-1 | ROOF PLAN STA L6043+00 TO STA L6044+07.77 |
| NSC-006 | TN630-2 | LONGITUDINAL ELEVATION STA R6039+80.58 TO R6041+00 |
| NSC-006 | TN631-1 | LONGITUDINAL ELEVATION STA R6041+00 TO R6043+00 |
| NSC-006 | TN632-3 | LONGITUDINAL ELEVATION STA R6043+00 TO R6045+00 |
| NSC-006 | TN633 | LONGITUDINAL ELEVATION STA R6045+00 TO R6047+00 |
| NSC-006 | TN634 | LONGITUDINAL ELEVATION STA R6047+00 TO R6049+00 |
| NSC-006 | TN635-1 | LONGITUDINAL ELEVATION STA R6049+00 TO R6051+94.00 |
| NSC-006 | TN636-2 | RIGHT BOAT WALL LONGITUDINAL ELEVATION STA R6048+95 TO R6051+94.00 |
| NSC-006 | TN643 | LEFT TRACK SLURRY WALL ELEVATION STA L6042+00 TO STA L6044+07.77 |
| NSC-006 | TN644 | RIGHT TRACK SLURRY WALL ELEVATION STA R6042+00 TO STA R6044+07.77 |
| NSC-006 | TN650-1 ◇1 | TUNNEL CROSS SECTION GEOMETRY STA L6039+77.31 TO STA L6040+32.85 |
| NSC-006 | TN651-2 | STATION CROSS SECTION GEOMETRY STA L6040+32.85 TO STA L6040+53.42 |
| NSC-006 | TN652-3 ◇1 | STATION CROSS SECTION GEOMETRY STA L6040+53.42 TO STA L6041+12.50 |
| NSC-006 | TN653-2 | STATION CROSS SECTION GEOMETRY STA L6041+12.50 TO STA L6043+17.54 |
| NSC-006 | TN654-1 | STATION SECTION GEOEMETRY STA L6043+17.54 TO STA L6044+07.77 |
| NSC-006 | TN655-2 | TUNNEL CROSS SECTION GEOMETRY STA L6044+07.77 TO STA L6045+50.00 |
| NSC-006 | TN656 | TUNNEL CROSS SECTION GEOMETRY STA L6045+50.00 TO STA L6047+00 |
| NSC-006 | TN657-1 | TUNNEL CROSS SECTION GEOMETRY STA L6047+00 TO STA L6048+95.00 |
| NSC-006 | TN658-2 | PLAN AND SECTION AT EAST ANCILLARY AREA |
| NSC-006 | TN659-3 ◇1 | WEST ANCILLARY AREA WALL ELEVATIONS |
| NSC-006 | TN660 | BOAT CROSS SECTION GEOMETRY STA L6048+95.00 TO STA L6051+94.00 |
| NSC-006 | TN661-2 | EAST ANCILLARY AREA WALL ELEVATION |
| NSC-006 | TN669-2 | DRY STANDPIPE NICHE DETAILS |
| NSC-006 | TN678-1 ◇1 | REINFORCING SECTIONS - STA L6039+55 TO STA L6040+53.42 SHEET 6 OF 6 |
| NSC-006 | TN697-1 | REINFORCING TUNNEL CROSS SECTIONS - STA L6047+00 TO STA L6048+95.00 SHEET 131-1 ◇2 |
| NSC-006 | TN703-1 | SUMP CHAMBER IN BOAT SECTION |
| NSC-006 | TN712 | CATENARY ANCHOR BOLT LAYOUT AND DETAILS |
| NSC-006 | TN713-1 | NORTHSIDE STATION GROUND GRID |
| NSC-006 | PL600 | TUNNEL DRAINAGE PLAN STA L6039+55 TO STA L6041+40 |
| NSC-006 | PL601 | TUNNEL DRAINAGE PLAN STA L6041+40 TO STA L6046+60 |
| NSC-006 | PL602 | TUNNEL DRAINAGE PLAN STA L6046+60 TO STA L6051+94 |
| NSC-006 | PL610 | TUNNEL DRAINAGE DETAILS SHEET 1 OF 1 |

Gannett Fleming
Transit & Rail Systems

| NO. | DATE | DESCRIPTION |
|---|---|---|
| ◇4 | 09/08/08 | ADDENDUM 6 - DRAWING MODIFIED |
| ◇3 | 09/03/08 | ADDENDUM 4 - DRAWING MODIFIED |

REVISIONS

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JOSEPH C. TRAUM JR. ENGINEER

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

| | |
|---|---|
| DESIGNED | JC TRAUM |
| DRAWN | JC TRAUM |
| CHECKED | CD JONES |
| IN CHARGE | CD JONES |
| DATE | APR. 28. 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
INDEX OF ALSO DRAWINGS FOR NSC CONTRACT INTERFACES
SHEET 2 OF 4

Port Authority

CONTRACT NO. NSC-009
DWG. NO. GN003A SHT.

# INDEX OF ALSO DRAWINGS

## OPERATION CONTROL CENTER (OCC)

| CONTRACT NO. | DRAWING NO. | DRAWING TITLE |
|---|---|---|
| LRS-98-05 | CC0010 | OCC Block Diagram |
| LRS-98-05-R | CC0208 | PAAC OCC Network Diagram, Rack 4 Terminal Server Connections |
| LRS-98-05-R | CC0209 | PAAC OCC Network Diagram, Rack 5 Terminal Server Connections |
| LRS-98-05 | CC321 | IDF 1st Floor to 2nd Floor Wiring (1 of 8) |
| LRS-98-05 | CC322 | IDF 1st Floor to 2nd Floor Wiring (2 of 8) |
| LRS-98-05 | CC323 | IDF 1st Floor to 2nd Floor Wiring (3 of 8) |
| LRS-98-05 | CC324 | IDF 1st Floor to 2nd Floor Wiring (4 of 8) |
| LRS-98-05 | CC325 | IDF 1st Floor to 2nd Floor Wiring (5 of 8) |
| LRS-98-05 | CC326 | IDF 1st Floor to 2nd Floor Wiring (6 of 8) |
| LRS-98-05 | CC327 | IDF 1st Floor to 2nd Floor Wiring (7 of 8) |
| LRS-98-05 | CC328 | IDF 1st Floor to 2nd Floor Wiring (8 of 8) |
| LRS-98-05 | CC330 | Terminal Server Wiring (1 of 4) |
| LRS-98-05 | CC331 | Terminal Server Wiring (2 of 4) |
| LRS-98-05 | CC332 | Terminal Server Wiring (3 of 4) |
| LRS-98-05 | CC333 | Terminal Server Wiring (4of 4) |
| LRS-98-05 | CC340 | Modem IDF Wiring (1 of 6) |
| LRS-98-05 | CC341 | Modem IDF Wiring (2 of 6) |
| LRS-98-05 | CC342 | Modem IDF Wiring (3 of 6) |
| LRS-98-05 | CC343 | Modem IDF Wiring (4 of 6) |
| LRS-98-05 | CC344 | Modem IDF Wiring (5 of 6) |
| LRS-98-05 | CC345 | Modem IDF Wiring (6 of 6) |
| LRS-98-05 | CC350 | Data IDF Wiring (1 of 7) |
| LRS-98-05 | CC351 | Data IDF Wiring (2 of 7) |
| LRS-98-05 | CC352 | Data IDF Wiring (3 of 7) |
| LRS-98-05 | CC353 | Data IDF Wiring (4 of 7) |
| LRS-98-05 | CC354 | Data IDF Wiring (5 of 7) |
| LRS-98-05 | CC355 | Data IDF Wiring (6 of 7) |
| LRS-98-05 | CC356 | Data IDF Wiring (7 of 7) |
| LRS-98-05 | CC360 | VCS IDF Wiring (1 of 8) |
| LRS-98-05 | CC361 | VCS IDF Wiring (2 of 8) |
| LRS-98-05 | CC362 | VCS IDF Wiring (3 of 8) |
| LRS-98-05 | CC363 | VCS IDF Wiring (4 of 8) |
| LRS-98-05 | CC364 | VCS IDF Wiring (5 of 8) |
| LRS-98-05 | CC365 | VCS IDF Wiring (6 of 8) |
| LRS-98-05 | CC366 | VCS IDF Wiring (7 of 8) |
| LRS-98-05 | CC367 | VCS IDF Wiring (8 of 8) |
| LRS-98-02-E | EL901 | Ground Floor Power/Systems & Lighting Plan |
| LRS-98-02-E | EL902 | Second Floor Power/Systems & Lighting Plan |
| LRS-98-02-E | EL903 | Third Floor Power/Systems & Lighting Plan |
| LRS-98-02-E | EL905 | Enlarged Plans & Details |
| LRS-98-02-E | EL906 | Enlarged Plans & Details |
| LRS-98-02-E | EL907 | Riser Diagrams, Notes and Schedules |
| LRS-98-02-E | EL908 | Panelboard Schedules |
| LRS-98-02-E | EL909 | Panelboard Schedules |
| LRS-98-02-E | EL910 | Existing Panelboard Schedules |

## STAGE 2 LIGHT RAIL TRANSIT SYSTEM FIBER NODES

| | | |
|---|---|---|
| LRT-006 | FM-06-EC-119 | System Design (Fiber Optic) By Node Locations. |

| CONTRACT NO. | DRAWING NO. | SHEET NO. | DRAWING TITLE |
|---|---|---|---|
| **MIDTOWN INTERLOCKING (STAGE 1)** | | | ◇1 |
| CY-111 | T1373 | 668-2 | CABLE PLAN |
| CY-111 | T1373 | 668-76 | TRAIN TO WAYSIDE COILS #47, #48 |
| CY-111 | T1373 | 668-W3 | RACK 1 TERMINAL BOARDS A, B, & C |
| **STAGE 1 - TRACKWORK DRAWING** | | | |
| | TRKWRK-18 | | TRACKWORK DRAWING AT STA. 645+00 TO 675+00 ◇2 |
| | TRKWRK-20 | | TRACKWORK DRAWING AT STA. 1031+00 TO 1001+00 (REVERSED) |
| CY 810 | TS 010-0 | | TRACKWORK STANDARD - DIRECT FIXATION NO. 6 TURNOUT & CROSSOVER ◇3 |
| CY 810 | TS 012-0 | | TRACKWORK STANDARD - NO. 6 SOLID MANGANESE FLANGE BEARING FROG |
| CY 810 | TS 030-1 | | SUBWAY-DIRECT FIXATION DETAILS |

Gannett Fleming
Transit & Rail Systems

| NO. | DATE | DESCRIPTION |
|---|---|---|
| ◇4 | 09/08/08 | ADDENDUM 6 - DRAWING MODIFIED |
| ◇3 | 09/03/08 | ADDENDUM 4 - DRAWING MODIFIED |
| ◇2 | 08/20/08 | ADDENDUM 3 - DRAWING MODIFIED |

REVISIONS

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JOSEPH C. TRAUM JR. No. PE072388

SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED 9/8/08 DATE

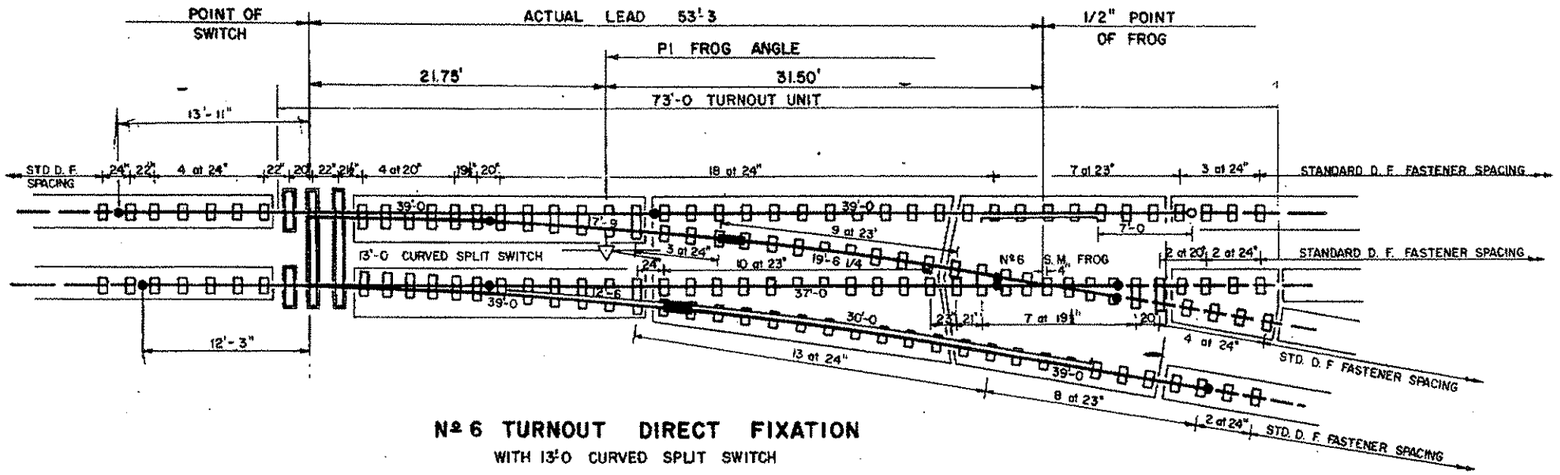
| | |
|---|---|
| DESIGNED | JC TRAUM |
| DRAWN | JC TRAUM |
| CHECKED | CD JONES |
| IN CHARGE | CD JONES |
| DATE | APR. 28, 2008 |
| SCALE | NTS |

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
INDEX OF ALSO DRAWINGS FOR NSC CONTRACT INTERFACES
SHEET 1 OF 5

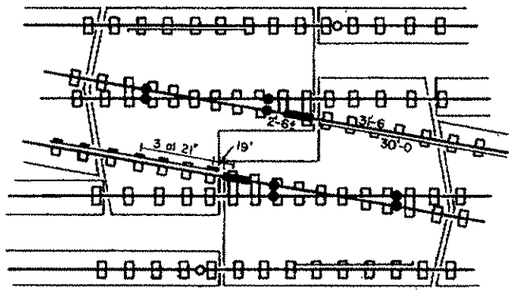
Port Authority

CONTRACT NO. NSC-009
DWG. NO. GN006A SHT.




## N° 6 TURNOUT DIRECT FIXATION

WITH 13'0 CURVED SPLIT SWITCH




## N° 6 CROSSOVER DIRECT FIXATION

12'-6 TRACK CENTERS

JOINT TO BE WELDED

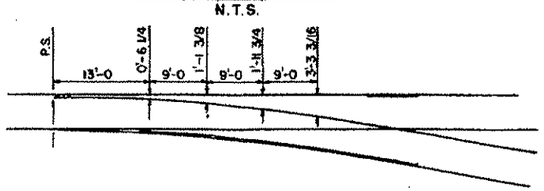
STANDARD JOINT

INSULATED JOINT

GUARDED CONSTRUCTION

OFFSET DIAGRAM

N.T.S.




### NOTES

1.) SWITCH MACHINE PADS TO BE LOCATED IN ACCORDANCE WITH MANUFACTURERS DRAWINGS

2.) RIGHT HAND TURNOUT SHOWN LEFT HAND TURNOUT IS OPPOSITE HAND.

3.) TURNOUT GEOMETRY IS PERTINANT ONLY TO DIRECT FIXATION CONSTRUCTION. FOR BALLASTED OR EMBEDDED TURNOUTS SEE DRAWINGS TS 009 & TS011 RESPECTIVELY

4.) RAILS SHOWN IN DASHED LINES ARE NOT PROVIDED AS PART OF SPECIAL TRACKWORK PACKAGE.

| BILL OF TRACK MATERIAL | | |
|---|---|---|
| QUANTITY TURNOUT | QUANTITY CROSSOVER | DESCRIPTION |
| 1 | 2 | 13'-0 CURVED SWITCH POINT, COMPLETE WITH HEEL JOINT, PER DWG. TS016. |
| 1 | 2 | 13'-0 STRAIGHT SWITCH POINT, COMPLETE WITH HEEL JOINT, PER DWG. TS016. |
| 1 | 2 | N°6 SOLID MANGANESE FROG WITH HEEL & TOE JOINTS COMPLETE PER DWG. TS012. |
| 1 | 2 | 39'-0 STRAIGHT UNDERCUT STOCK RAIL PER DWG. TS016 |
| 1 | 2 | 39'-0 SHOP CURVED UNDERCUT STOCK RAIL PER DWG. TS016 |
| 1 | 2 | 17'-9 SHOP CURVED RAIL |
| 1 | 2 | 19'-6 1/4 SHOP CURVED RAIL |
| 1 | – | 39'-0 SHOP CURVED RAIL |
| – | 2 | 31'-6 SHOP CURVED RAIL |
| – | 2 | 2'-6± RAIL TO BE FIELD CUT |
| 1 | 2 | 39'-0 RAIL |
| 1 | 2 | 37'-0 RAIL |
| 1 | 2 | 8'-5 7/8 STRAP GUARD COMPLETE |
| 1 | 2 | 12'-6 STRAP GUARD COMPLETE |
| 1 | 2 | 30'-0 STRAP GUARD COMPLETE |
| 1 | 2 | INSULATED STRAP GUARD JOINTS, COMPLETE |
| 1 | 4 | INSULATED JOINTS, COMPLETE |
| 4 | 6 | STANDARD JOINTS, COMPLETE |
| 92 | 184 | STANDARD DIRECT FIXATION FASTENERS |
| 9 | 18 | SPECIAL DIRECT FIXATION FASTENERS - FROG |
| 26 | 52 | SPECIAL DIRECT FIXATION FASTENERS-SWITCH |
| 2 | 4 | DIRECT FIXATION GAUGE PLATES |

| TURNOUT DATA | | |
|---|---|---|
| FROG | NUMBER | 6 |
| | ANGLE | 9° 31' 38" |
| | TOE LENGTH | 3'-3 |
| | HEEL LENGTH | 5'-8 |
| | TOE SPREAD | 0'-6 |
| | HEEL SPREAD | 0'-11-3/4 |
| SWITCH | STRAIGHT POINT DETAIL | 6100 |
| | CURVED POINT DETAIL | 5100 |
| | LENGTH OF POINT | 13'-0 |
| | HEEL ANGLE | 2°54' 00" |
| | HEEL SPREAD | 0'-6-1/4 |
| ACTUAL LEAD | | 53'-3 |
| STRAIGHT CLOSURE LENGTH | | 37'-0 |
| CURVED CLOSURE LENGTH | | 37'-3-3/4 |
| CENTERLINE RADIUS | | 296.716' |
| DEGREE OF CURVE (ARC DEF.) | | 19° 18' 36" |
| TANGENT ADJACENT TO TOE OF FROG | | 1.50' |

PROJECT RECORD COPY

| | |
|---|---|
| TS016 | 13'-0 CURVED SPLIT SWITCH |
| TS012 | N°6 SOLID MANGANESE FROG |
| TS027 | STRAP GUARD |

| NO. | DATE | DESCRIPTION |
|---|---|---|

DESIGNED: L.G.L.
DRAWN: D.J.B.
CHECKED: H.L.H.
IN CHARGE: L.G.L.
DATE: APRIL 8, 1983
SCALE: 3/16"= 1'-0

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED, IN PART, THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED

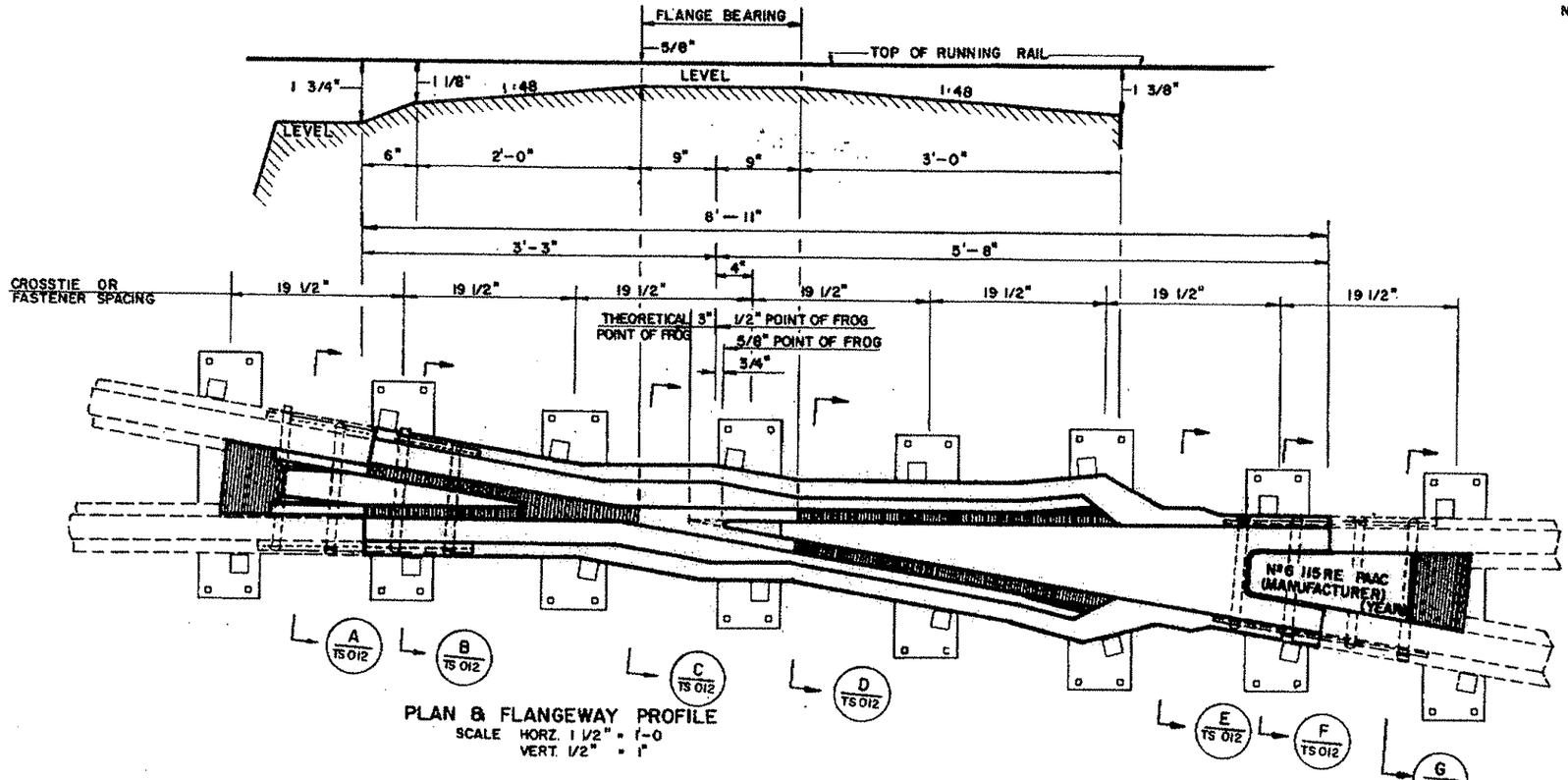
SUBMITTED

PARSONS BRINCKERHOFF - GIBBS & HILL
APPROVED
APR 8 1983

PORT AUTHORITY OF ALLEGHENY COUN
PITTSBURGH PENNSYLV.

STAGE 1 LIGHT RAIL TRANSIT SYSTEM
TRACKWORK STANDARD
DIRECT FIXATION N° 6 TURNOUT & CROSSOV

PARSONS BRINCKERHOFF - GIBBS & HILL A JOINT VENTURE
CONTRACT No. CY 810
DWG. No. TS-810-G




PLAN & FLANGEWAY PROFILE
SCALE HORZ. 1 1/2" = 1'-0
VERT. 1/2" = 1"

NOTES:

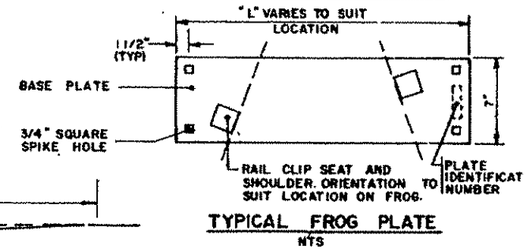
1.) RAIL AND OTHER TRACK MATERIAL SHALL CONFORM TO 115RE SECTION TOE AND HEEL JOINT DRILLING AND BARS SHALL MATCH STANDARD AREA 4 HOLE DRILLING.

2.) FOR ADDITIONAL DETAIL OF SOLID MANGANESE FROGS REFER TO AREA PLAN BASIC NUMBER 671.

3.) FROG PLATES SHOWN ASSUME A 7"x 15" STANDARD RAIL FASTENING. QUANTITIES SHOWN IN BILL OF MATERIALS SUBJECT TO CHANGE.

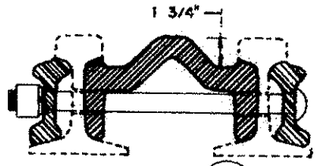
4.) FROG NUMBER, CONNECTING RAIL SECTION, PAAC, MANUFACTURER'S NA AND YEAR OF MANUFACTURE SHALL BE CAST ON HEEL EXTENSION AS SHOWN.

| BILL OF MATERIAL | | | |
|---|---|---|---|
| BALLASTED | EMBEDDED | DIRECT FIXATION | DESCRIPTION |
| 1 | 1 | 1 | SOLID MANGANESE STEEL FROG |
| 2 | 2 | 2 | PAIR 4 HOLE JOINT BARS WITH LONG BOLTS |
| 8 | — | — | FROG PLATES WITH RAIL FASTENINGS |
| | | | |

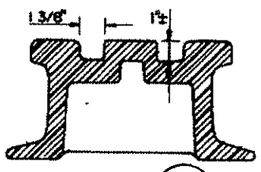



TYPICAL FROG PLATE
NTS

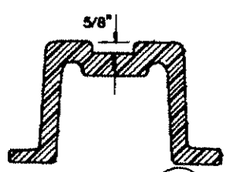
SECTIONS
SCALE 3" = 1'-0



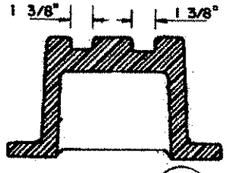

SECTION A TS 012



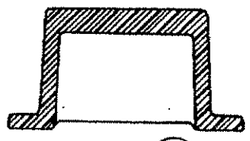

SECTION B TS 012



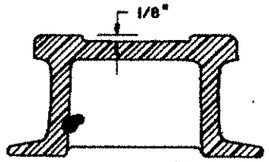

SECTION C TS 012



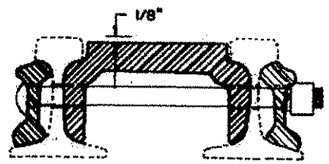

SECTION D TS 012



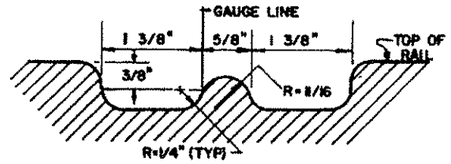
SECTION E TS 012



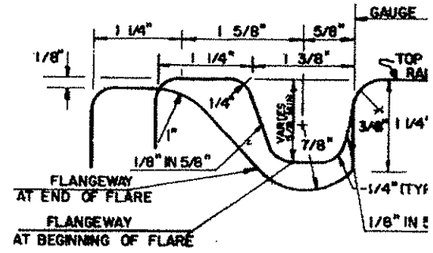

SECTION F TS 012




SECTION G TS 012




SECTION & ELEVATION
AT POINT OF FROG
SCALE: FULL SIZE




FLANGEWAY SECTION
NORMAL & FLARED
SCALE: FULL SIZE

PROJECT RECORD COPY

| DWG. No. | REFERENCE | No. | DATE | DESCRIPTION | SUB. | APP. |
|---|---|---|---|---|---|---|
| | | | | REVISIONS | | |

DESIGNED: LGL
DRAWN: LGL/BMW
CHECKED: CES
IN CHARGE: LGL
DATE: APRIL 8, 1983
SCALE: AS NOTED

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED, IN PART, THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED

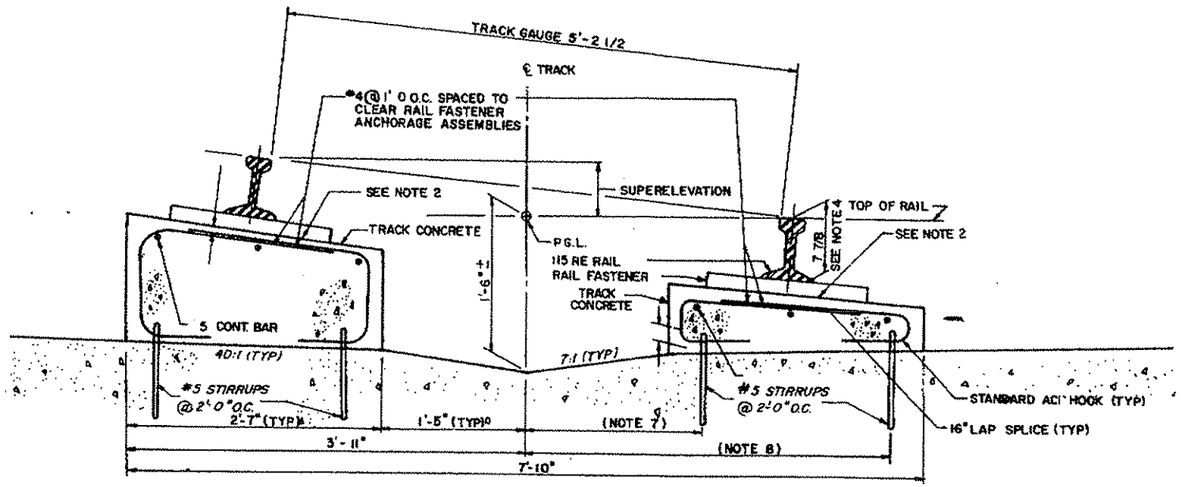
SUBMITTED
DATE

Parsons Brinckerhoff Consulting Engineers
PARSONS BRINCKERHOFF - QUADE & HILL
APPROVED
APR 8 1983
DATE

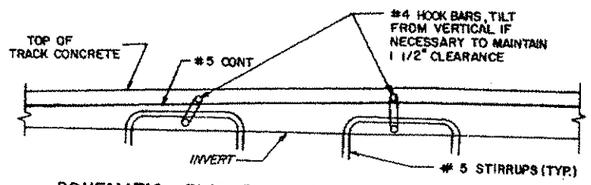
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA
STAGE I LIGHT RAIL TRANSIT SYSTEM
TRACKWORK STANDARD
No. 6 SOLID MANGANESE FLANGE BEARING FROG
PARSONS BRINCKERHOFF - QUADE & HILL A JOINT VENTURE PITTSBURGH, PENNSYLVANIA
CONTRACT NO. CY-810
DWG. NO. TS 012-0
SHT.

NOTES:

1. VARIATIONS IN THE INVERT PROFILE SHALL BE COMPENSATED FOR IN THE TRACK CONCRETE.
2. THE CANT OF THE TRACK CONCRETE SHALL BE A 40:1 INWARD SLOPE IN RELATION TO THE TOP OF RAIL PLANE.
3. A 6" WIDE DRAINAGE CHASE AT 50' SHALL BE LOCATED MIDWAY BETWEEN ADJACENT RAIL FASTENERS.
4. DIMENSION BASED ON 6 5/8" RAIL AND 1 1/4" THICK RAIL FASTENER.
5. PROVIDE 12" CROSS BONDING CABLE BLOCK-OUT AT LOCATION INDICATED ON TRACK CHARTS.
6. PROVIDE 1 1/2" MIN. COVER ON ALL REINFORCING STEEL.
7. DIMENSION VARIES 1'-8" MINIMUM TO 2'-0 MAXIMUM.
8. DIMENSION VARIES 3'-0" MINIMUM TO 3'-9" MAXIMUM.
9. SLOPE OF INVERT SLAB WILL VARY, USUAL PRACTICE SHOWN. REFER TO INFORMATION DRAWINGS FOR DETAILS IN PARTICULAR CONTRACT AREAS.

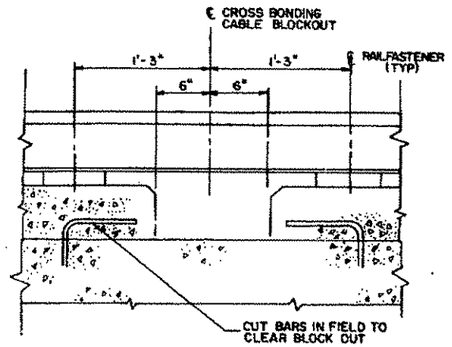



CURVED TRACK

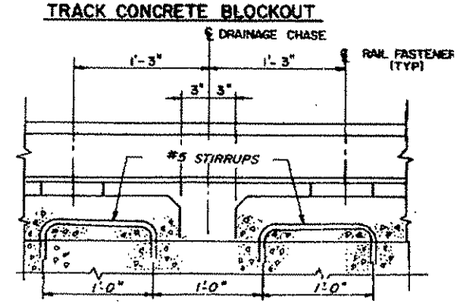



SCHEMATIC ELEVATION OF BENT BARS IN TRACK CONCRETE

N.T.S.

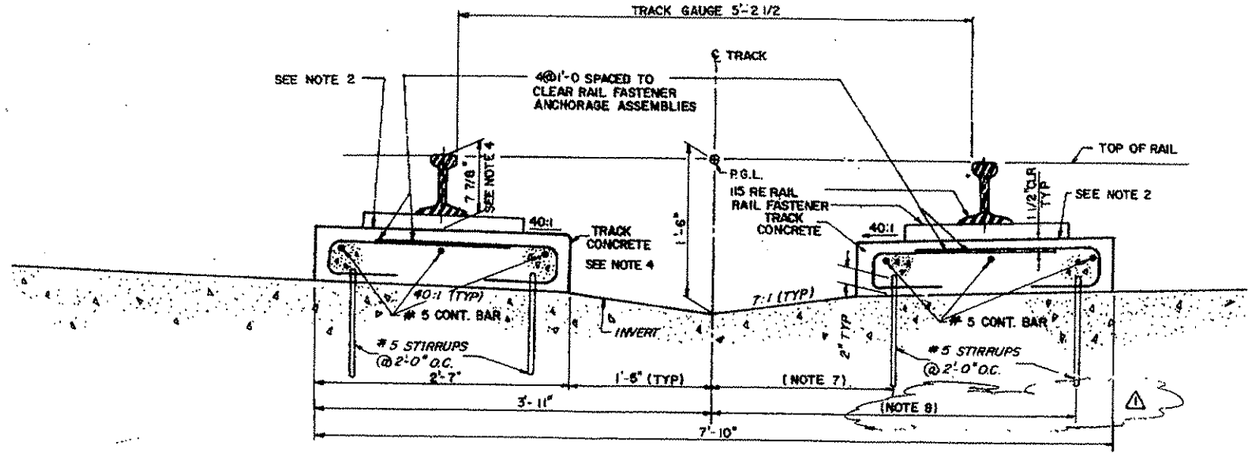



TYPICAL ELEVATION OF TRACK CONCRETE BLOCKOUT




LOCATE DRAINAGE CHASE BETWEEN #5 STIRRUP PAIRS OR CUT BARS IN FIELD TO CLEAR DRAINAGE CHASE BY 1 1/2" MIN.

TYPICAL ELEVATION OF TRACK CONCRETE DRAINAGE CHASE




TANGENT TRACK

# PROJECT RECORD COPY

| No. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 4/18/83 | CORRECTED DIMENSIONS ADD NO.1 |

DESIGNED: L.G.L.
DRAWN: R.J.K.
CHECKED: C.E.B.
IN CHARGE: L.G.L.
DATE: J.C.Q.
SCALE: NONE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED, IN PART, THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED

ROSARIO A. RIZZO
REGISTERED PROFESSIONAL ENGINEER
SR 19567-E

SUBMITTED

pbgh Consulting Engineers
PARSONS BRINCKERHOFF - GIBBS & HILL
APPROVED
APR 8 1983

PORT AUTHORITY OF ALLEGHENY COUN
PITTSBURGH PENNSYLV
STAGE I LIGHT RAIL TRANSIT SYSTEM
SUBWAY - DIRECT FIXATION DETAILS
PARSONS BRINCKERHOFF - GIBBS & HILL A JOINT VENTURE
CONTRACT NO. CY 810
DRAWING NO. TS-030-1

T80-030-0
1-80-030-020
00-19-0