GENERAL
These specifications, together with the accompanying plans, are intended to describe the type, size, and location of the products and materials to be provided and installed under various bid items related to traffic control and highway lighting. The Contractor shall furnish and install traffic control and highway lighting devices and related materials in compliance with these plans and specifications, as well as the 2016 Ohio Department of Transportation Construction and Material Specifications, the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways, and the Standard Construction Drawings issued by the Ohio Department of Transportation. These specifications set forth the minimum performance and operating requirements of the traffic control and highway lighting items referred to herein.

TRAFFIC SIGNAL INSTALLATION
The work outlined within consists of furnishing and installing traffic signal equipment, complete and ready for service. Any excavation, backfill, disposal of discarded materials, restoration of disturbed facilities/surfaces to a condition equal to that existing before the work started, and electrical testing as specified shall be considered incidental to the various bid items within.

Pull boxes, conduits, ground rods, and cable splicing kits required for traffic signal equipment installations shall be per Item 625.

Before any work is started on the traffic signal at the Stringtown Road/I-71 NB Ramps intersection, the District Six Traffic Engineer (740-833-8198) and the Contractor shall review and resolve any potential problems at the location where the new signal will be constructed.

All of the required permanent signs shall be erected and the required permanent pavement markings shall be in place prior to the final acceptance of the traffic signal.

Prior to the final acceptance of the completed traffic signal, the District Six Roadway Services Representative and the Contractors representative, shall inspect and resolve any existing problems prior to the acceptance of each new signal by the Ohio department of Transportation.

UNDERGROUND UTILITIES
The location of the underground utilities shown on these plans are as obtained from the owners of the utility as required by Ohio Revised Code section 153.64

The Ohio Department of Transportation, City of Grove City and the Engineer assume no responsibility for the accuracy of the location or the depths of the underground facilities shown on these plans. Support, protection, and restoration of all existing utilities and appurtenances shall be the Contractor's responsibility. The cost of this work shall be included in the bid price for the various items of work. It shall be the Contractor's responsibility to notify the Ohio Utilities Protection Service (OUPS) and the utilities listed in the General notes so their respective facilities can be marked prior to construction.

PLAN AND SPECIFICATION COMPLIANCE
The Contractor shall furnish and install traffic signal devices in compliance with these plans and specifications, the 2016 ODOT Construction and Material Specifications including all supplemental specifications, the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways, and the "TC" and "HL" standard construction drawings issued by ODOT. These specifications set forth the minimum design and operating requirements for traffic signal and highway lighting equipment.

Traffic signal control and highway lighting equipment shall meet or exceed the standards specified in the following documents:
a)Specifications listed in this plan.
b)NEMA Standards Publication No. TS1-1989 and/or TS2 (current NEMA issue).
c)2016 ODOT Construction and Material Specifications 625, 632, 633, 725, 732, 733, 815, 816, 906 and 907.

In case of a conflicting specification statement, the specification document hierarchy shall be in the order listed from (A), highest, to (C), lowest.

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATION
The Contractor shall be responsible for maintaining traffic signal installations within the project under the following circumstances:

1. Existing signal installation which the plans require the Contractor to adjust, modify, add onto or remove or which the Contractor actually adjusts, modifies, or otherwise disturbs. The Contractor shall be responsible for the entire installation (at an intersection) from the time the Contractor's operations first disturb the installation until the installation has been subsequently removed or modified and the work is accepted.

2. New signal installation or device, installed by the Contractor: the Contractor shall be responsible for maintenance of this from the time of installation until the work is accepted.

The Contractor shall correct as quickly as possible all outages or malfunctions and provide the maintaining agency and the Engineer such with the name(s) and phone number(s) of the Contractors representative(s) to receive all calls and dispatch the necessary maintenance forces to correct outages. Such a person or persons must give prompt attention to these calls and be readily available continuously 24 hours a day, 7 days a week. All lamp outages, cable outages, electrical failures, equipment malfunctions and misaligned signal heads shall be corrected to the satisfaction of the Engineer with the signal back in service within four hours after the Contractor has been notified of an outage.

In the event new signals are damaged prior to acceptance, all damaged equipment except poles and control equipment shall be replaced by the Contractor to the satisfaction of the Engineer with the new signal back in service within 8 hours after the Contractor has been notified of the outage. The Contractor shall arrange for full traffic control until the signal is back in operation.

If poles and/or controllers are damaged and must be replaced, the Contractor shall make temporary repairs as necessary to bring the signal back into operation within the allowed 8 hour time period, and shall make permanent repairs or replacement as soon thereafter as possible.

None of the above shall be construed as collective or consecutive outage time periods at any one location. That is, where more than one outage occurs at any one location then the allotted time limit shall be for the worst single outage.

Where outages are the direct result of a vehicle accident the response of the Contractor shall be as outlined above. The Contractor shall be responsible for the collection of any compensation for this work from those parties responsible for the damage.

Where the Contractor has failed or cannot respond to an outage or signal equipment malfunction, at these locations within his responsibility, within periods as specified above, the Engineer may invoke the provisions of section 105.15 and any subsequent billings to the state for police services and maintenance services by the providing agency forces shall be deducted from monies due or to become due the Contractor in accordance with provisions of section 105.15.

Any vehicular traffic signal head either new or existing that will be out of operation shall be covered in the manner described in 632.25.

The Contractor shall maintain complete records of malfunctions including:
1. Time of notification of malfunction;
2. Time of work crews arrival to correct the malfunction;
3. Actions taken to correct the malfunction, including a list of parts repaired and replaced;
4. A diagnosis or reason for the malfunction and probability of reoccurrence;
5. Time of completion of the repair and system restored to full service.

A copy of these records shall be provided to the Engineer within three (3) working days following completion of each repair.

All costs resulting from the above requirements shall be considered incidental to Item 614 Maintaining Traffic, As Per Plan.

PAINT CHIP SUBMITTAL
Prior to any painting, the Contractor shall submit paint samples to both the Engineer and Grove City officials. Paint samples shall be representative of the color, type and manufacture that will be used for finishing the various items. The Engineer and Grove City officials shall review the paint samples prior to the commencement of the finishing process.

Paint samples shall be submitted for all proposed traffic signal items called for in this plan set, including, signal supports, signal heads, pedestrian heads, pushbuttons, signs, bracket arms, luminaires and controller cabinets. Any cost associated with providing paint samples shall be incidental to the individual items to be painted.

GROUNDING AND BONDING
The requirements of the Construction and Material Specifications (C&MS) and the TC series of Standard Construction Drawings are modified as follows:
1. All metallic parts containing electrical conductors shall be permanently joined to form an Effective Ground Fault Current Path back to the grounded conductor in the power service disconnect switch.
   a. Provide an equipment grounding conductor in metallic conduits (725.04) in addition to the conductors specified and bond the conduit to this grounding conductor.
   b. When an equipment grounding conductor is required in plastic conduit (725.05), the installation shall include a separate equipment grounding conductor in addition to the conductors specified.
   c. Metallic conduit carrying the loop wires from in the pavement to the pull box splice location will only be bonded at the pull box end, and will not contain an equipment grounding conductor.
   d. If multiple conduit runs begin and end at the same points, only one equipment grounding conductor is required.
   e. If an equipment grounding conductor is needed in conduit between signalized intersections for underground interconnect cable, the grounding system for each signalized intersection will be separated about midway between the intersections.
   f. The messenger wire at signalized intersections will be used as the conductive path from corner to corner if conduit is not provided under the roadway. When conduit connects the corners of an intersection, an equipment grounding conductor shall be used in the conduit.
2. Conduits.
   a. The 725.04 conduit shall have grounding bushings installed at all termination points. The bushing material shall be compatible with galvanized steel conduit and the grounding lug material shall be compatible for use with copper wire. Threaded or compression type bushings may be used.
   b. The 725.05 conduit shall have the inside and outside diameters of the conduit deburred at all termination points.
   c. Both ends of metallic conduit shall be bonded to the equipment grounding conductor.
   d. Metallic conduit may be bonded to metallic boxes through the use of conduit fittings UL approved for this type of connection, with the box bonded to the equipment grounding conductor.
3. Wire for grounding and bonding.
   a. Use insulated, copper wire for the equipment grounding conductor. Bonding jumpers in boxes and enclosures may be bare or insulated copper wire. Wire size shall be as follows:
   i. Use 4 AWG between the power service and supports, poles, pedestals, controller or flasher cabinets.
   ii. Use a minimum 8 AWG between loop detector pull boxes and the first conduit that requires a larger size as specified in 3.a.i above.
   iii. Use a minimum 8 AWG between the "Prepare to Stop When Flashing" installation (including support) and the first conduit that requires a larger size as specified in 3.a.i above.
   iv. The insulation shall be green or green with yellow stripe(s). For 4 AWG or larger, insulation may also be black with green tape/labels installed at all access points.
   b. In a highway lighting system, the equipment grounding conductor shall be the same wire size as the duct cable or distribution cable circuit conductors, with the minimum conductor size of 4 AWG. Bonding jumpers will be minimum size 4 AWG.
4. Ground rod.
   a. A 3/4 inch Schedule 40 PVC conduit will be used in foundations and concrete walls for the grounding conductor (ground wire) raceway to the ground rod. Should metallic conduit be used, both ends of the conduit shall be bonded to the grounding conductor.
   b. The typical grounding conductor (ground wire) shall be 4 AWG insulated, copper.
5. The green conductor in signal cables (conductor #4) shall not be used to supply power to a signal indication. It will be connected to the signal body as an equipment ground in aluminum heads and it will be unused in plastic heads. Unused conductors shall be grounded in the cabinet. Typical use of conductors is as follows:

COND. NO.	COLOR	VEHICLE SIGNAL	PEDESTRIAN SIGNAL
1	Black	Green Ball	#1 Walk
2	White	AC Neutral	AC Neutral
3	Red	Red Ball	#1 DW/FDW
4	Green	Equipment Ground	Equipment Ground
5	Orange	Yellow Ball	#2 DW/FDW
6	Blue	Green Arrow	#2 Walk
7	White/Black Stripe	Yellow Arrow	Not Used

6. Power Service and Disconnect Switch.
   a. At the power service location, the grounding conductor (ground wire) from the disconnect switch neutral (AC-) bar to the ground rod shall be a continuous, unspliced conductor. If spliced, it shall be an exothermic weld butt splice.
   b. The service neutral (AC-) shall only be connected to ground at the primary power service disconnect switch.
1. NEMA controller cabinets: If a power service disconnect switch is located before the controller cabinet, the neutral (AC-) and the grounding bars in the controller cabinet shall not be connected together as shown in NEMA TS-2, Figure 5-4.
2. If secondary disconnect switches are connected after the primary disconnect switch, the neutral (AC-) shall only be grounded at the primary switch. Equipment grounding conductors shall be brought to the primary switch, but shall be grounded at both secondary and primary switches.
7. Payment - All materials and work required to complete the Effective Ground Fault Current Path system are incidental to the conductors installed by contract.

ITEM 614 - SPECIAL - WORK ZONE TRAFFIC SIGNAL
Under this item of work the contractor shall furnish, install, relocate, modify and remove: signal supports (wood poles), down guys, ground rods, signal cable, power cable, service cable, conduit risers, messenger wire, signal heads, covering of vehicular signal heads and miscellaneous materials.

As detailed within, temporary traffic signal modifications shall be implemented to accommodate the planned improvements at the Stringtown Road/Buckeye Parkway intersection.

All temporary traffic signal equipment shall comply with the specifications specified for the permanent signal installation including grounding and bonding. All methods of traffic control shall be approved by the Engineer and shall be in place and operating prior to the deactivation and removal and/or relocation of any signal equipment. Reference is made to the requirements of Item 614, Maintaining Traffic, As Per Plan. All modifications to signalization shall be done under the protection of a low enforcement officer.

All traffic signal elements shall conform to the "Traffic Signal Plan and Specification Compliance" requirements outlined under the permanent traffic signal installation plan.

Any vehicular traffic signal head that will be out of operation shall be covered in accordance with ODOT Construction and Material Specification Item 632.24. If plastic bags are used, only heavy-duty plastic bags shall be permitted. Two bags per head shall be used. The bags shall be securely lashed down so the wind does not rip them from the signal head. Any existing vehicular or pedestrian head that is not functional shall be removed immediately or covered. Any pedestrian buttons not in use shall also be covered. All heads while covered shall be dark either by removing, unscrewing, or disconnecting the power to the bulbs.

Vehicular signal heads supplied for the temporary signal installation do not need to conform to the painting requirements outlined within for permanent traffic signal heads, but shall be uniform in appearance and shall conform to the requirements outlined in the Ohio Manual Of Uniform Traffic Control Devices. All temporary traffic signal heads shall be a minimum of 16'-18' above the roadway surface.

General head placement has been illustrated, however should unforeseen modifications arise the general placement of the vehicular signal heads shall be centered on the approach lane or aligned with the channelizing or edge line as approved by the Engineer. This item shall consist of adjusting the location of the temporary traffic signal heads and all wiring as needed. All temporary aerial wiring shall be a minimum of 21 feet above the roadway surface.

Vehicular detection shall be maintained at all times and during all phases of construction using either existing loop detectors, proposed loop detector or temporary video detection.

Where new temporary traffic signal equipment is installed for use in temporary or modified traffic signal installations, all temporary signal items shall remain the property of the Contractor.

Two down guys shall be installed on each wood pole.

This item of work shall include all labor, equipment and material necessary to provide power to the existing traffic signal controllers from the power sources as identified on the temporary traffic signal plans.

Payment
This item of work shall include all labor, equipment and materials necessary to furnish, install, modify, remove, store, erect, relocate, adjust and repair the temporary traffic signals items as described above. All costs for the above work shall be included in the price bid and shall be per intersection.

ITEM 625 PULL BOX, (BY TYPE), (BY SIZE), AS PER PLAN
Pull boxes shall have the word "Traffic" on the lid. All pull boxes within or adjacent to sidewalk shall be flush with the walk.

Payment shall be as per Item 625.

ITEM 625 BRACKET ARM, (BY SIZE), AS PER PLAN
Bracket arms shall be furnished as per 625 except that the bracket arms shall be painted to match the signal supports. Bracket arms shall be monotube, tapered elliptical arms. The rise of the bracket arm shall not exceed 30", measured from the vertical center of the arm at the attachment end to the vertical center of the arm at the opposite end.

Payment shall be as per Item 625.

ITEM 625 LUMINAIRE, LED, 120 VOLT, AS PER PLAN
The Contractor shall furnish and install Cooper NVN-AE-04-E-U-T3R, GE ERS2025G1X40EGRAYXXX, LEOTEK EC7-24M-MV-NW-3-GY-700-RPB-WL, or approved equal. Luminaires shall operate on 120 volt/60 hertz circuits.

Luminaires shall be as per item 625 except that the luminaires at each intersection shall run off a single photoelectric cell. The luminaire and all mounting hardware shall be painted to match the signal support.

Measurement and payment shall be as per Item 625.

ITEM 625 REUSE OF LUMINAIRE, AS PER PLAN
ITEM 630 REUSE OF ILLUMINATED STREET NAME SIGN, AS PER PLAN
ITEM 632 REUSE OF VEHICULAR SIGNAL HEAD, AS PER PLAN
ITEM 632 REUSE OF PEDESTRIAN SIGNAL HEAD, AS PER PLAN
Under this item of work the Contractor remove the specified item and reinstall as detailed within. The Contractor and the Engineer shall inspect the item prior to the relocation process for the purpose of documenting any existing damage. Any dents, scratches or other damage identified after the relocation process and not document prior will be presumed to have been caused by the Contractor. The Contractor will be required to repair or replace the equipment at the option of the engineer.

This item of work shall include relamping the existing item. All mounting hardware required for mounting to the new signal support shall be furnished and installed under this item of work.

Payment shall be measured as each complete item, relocated. All labor equipment and materials necessary to remove, erect, adjust and repair the item shall be included in this item of work.

ITEM 630 SIGN, FLAT SHEET, AS PER PLAN
ITEM 630 SIGN HANGER ASSEMBLY, MAST ARM MOUNTED, AS PER PLAN
ITEM 630 SIGN SUPPORT ASSEMBLY, POLE MOUNTED, AS PER PLAN
The requirements of the specification including painting, apply to all permanent signs whether they are ground mounted on posts or pole supports, or overhead mounted on mast arms. This specification shall not apply to temporary signs.

All visible elements of sign mounting systems, e.g. sign backing assemblies, support posts, stainless steel banding, back of all signs etc., shall be painted similar to Federal Specification 595-B Color #27040, BLACK whenever payment for those items is made under this item of work. Nuts and bolts need not be painted.

All painting shall be performed under controlled environmental conditions.

REVISIONS		
MARK	DATE	DESCRIPTION

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL GENERAL NOTES

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

DATE: November, 2016
SCALE: None
JOB NO.: 2013-1289
SHEET: 25/44

and in accordance with all manufacturer's recommendations pertaining to surface preparation, material handling, and application. Prior to painting, paint sample shall be submitted for review.

All regulatory and traffic control signs shall comply with Ohio Manual of Uniform Traffic Control Devices for Streets and Highways, state requirements and local requirements.

Payment shall be as per item 630.

ITEM 630 SIGNS, AS PER PLAN
The Contractor shall install W3-H10-30 "Signal Operation Changed" sign just prior to activating the change in signal operation. The "Signal Operation Changed" sign shall be covered until the signal operation change is in effect at which time the Contractor shall uncover it. In order to install the "Signal Operation Changed" signs as shown in the plans, the Contractor shall shift an adjacent permanent sign, when necessary, to create enough space to install the "Signal Operation Changed" sign in the location shown in the plans.

The Contractor shall remove these items 3 weeks after they are uncovered. At the same time, the Contractor shall return any permanent sign, which has been temporarily shifted in order to accommodate the "Signal Operation Changed" sign, to the location specified in the plans. Failure to remove these items and relocate permanent signs shall result in ODOT removing them, along with relocating permanent signs, and billing the Contractor for all costs involved. All removed material shall be considered forfeited.

Payment shall be lump sum for all signs installed and removed at one intersection.

ITEM 632 POWER SERVICE, AS PER PLAN
ITEM 632 POWER CABLE, 3 CONDUCTOR, (BY SIZE), AS PER PLAN
The Contractor shall contact the meter section of the American Electric Power Company (AEP) for information regarding the meter base installation prior to ordering poles. The Contractor will be responsible for requesting and scheduling any inspections the Power Company may require for the power service hook up. The Contractor shall be responsible to contact the Power Company for the electrical service connection. Under no circumstances shall the Contractor splice power cable into the Power Company's circuits.

STRINGTOWN ROAD/I-71 NB RAMPS INTERSECTION
A common photo electric relay and contactor with HAND/OFF/AUTO switch shall control all street lighting mounted on signal supports. Photo electric relay shall be located within signal cabinet. The voltage supplied shall be 120. Power cable conductors shall be copper. The neutral of the power cable shall only be grounded in the main power service disconnect switch.

Power cable from the source shall be routed in a separate conduit to the disconnect switch on the signal support closest to the controller. Flexible conduit shall be used inside the signal support keep the power cable separated from other traffic signal cables. Flexible conduit shall be considered incidental to Item 632 Power Service, As Per Plan.

Provide available fault current sign on the outside of the front door of the power service disconnect switch at the controller cabinet in accordance with the 2014 National Electrical Code paragraph 110.24.

The Contractor is responsible for obtaining any necessary permits and the paying of all fees with the exception of normal monthly energy charges. Where there is an existing traffic signal that is being replaced, the Contractor shall coordinate with the Power Company to continue billing on the existing District 6 account. Where a new signal is being installed, the Contractor shall establish the account in the District's name from the onset.

I-71 RAMP METER
Power service for ITS devices shall be obtained from American Electric Power at the locations as shown on the plans or an alternative location as determined by AEP. The Contractor shall coordinate with AEP for the final location of power sources. Power supplied shall be 120/240 volts and shall be metered. Service equipment shall be installed per ODOT Standard Construction Drawing ITS-15.10.

STRINGTOWN ROAD/BUCKEYE PARKWAY
The Contractor is responsible for modifying/relocating the existing power service, including disconnect switch and photocell, as specified herein and obtaining any necessary permits and the paying of all fees with the exception of normal monthly energy charges. The Contractor shall coordinate with the Power Company to continue billing on the existing Grove City account and add a meter if required by the power company.

Payment shall be per Item 623.

ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN
In addition to the requirements of 632.09 and 732.06, the pushbuttons shall include a confirmation tone when pressed.

The exterior pushbutton housing shall be black to match the signal supports.

A clear bead of silicone sealant shall be applied to the top of the pushbutton housing (1 inch each side of top center) against the pole to prevent water from entering the back of the pushbutton housing. One aluminum sign shall be supplied with each pushbutton. The bottom of the sign shall be mounted just above the top of the pushbutton. Mount the center of the pushbutton 42" above the pedestrian pathway surface.

The back of all signs, mounting hardware, and support assemblies mounted on either signal supports or pedestal supports shall be coated to match its respective support. Finish requirements shall be in accordance with that listed for the support, pedestal, or light pole used for attachment.

Payment shall be as per Item 632.

ITEM 632 VEHICULAR SIGNAL HEAD, (LED), BLACK, (BY TYPE), 12" LENS, 1-WAY, POLYCARBONATE, (WITH BACKPLATE), AS PER PLAN
In addition to the requirements of CMS 632 and 732, the following shall apply:
1. Signal heads and visors shall be constructed of black polycarbonate plastic with visors as specified and meet ITE specifications.
2. Proper exterior colors shall be obtained by use of colored plastic material rather than painting.
3. All upper signal support hardware and piping up to and including the wire inlet fitting shall be ferrous metal.
4. The entrance fitting shall be of the tri-stud design with serrated rings in order to achieve positive locking.
5. All signal heads shall be rigidly mounted to the mast arm with the yellow lens located in front of the mast arm.
6. Aluminum backplates shall be in accordance with the C&MS
   a. A fluorescent yellow reflective border shall be included for signal heads at the Stringtown Road/I-71 NB Ramps intersection.
   b. A fluorescent yellow reflective border shall NOT be included for signal heads at the Stringtown Road/Buckeye Parkway intersection.
7. The light emitting diode (LED) signal lamp units shall meet the requirements of CMS 732.04-C. The Contractor shall provide ODOT, in writing, with the LED manufacturer name, serial number, part number, description of lamp, and date of manufacture for all LED units that are to be used in the signal head prior to installation, for acceptance and warranty purposes.
8. Signal heads shall have a minimum wall thickness of 0.117 inches.
9. Signal heads shall include cutaway type visors unless otherwise specified in the plans.
10. Apply a bead of silicone to the signal head, washer, and entrance adapter serrations to prevent water intrusion. Also, fill the space between concentric serration rings on the top of the signal head to completely exclude water from the space between the concentric rings.
11. Balance adjusters shall not be used on one-way heads or tethered heads.

Payment for Item 632 vehicular signal head, (LED), black, (by type), 12" lens, 1-way, polycarbonate, with backplate, as per plan shall be made for complete signal head furnished and installed, including all labor, equipment, materials, and new attachment hardware.

ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
In addition to the requirements of CMS 632 and 732 the following shall apply:
1. Signal heads and visors shall be constructed of black polycarbonate plastic and meet ITE specifications.
2. Proper exterior colors shall be obtained by use of colored plastic material rather than painting.
3. Pipe, spacers and fittings constructed of polycarbonate plastic may be used in lieu of galvanized steel or aluminum.
   a. Banding will not be permitted.
   b. All mounting hardware shall be coated to match the signal supports.
4. The pedestrian signal head shall be of the LED countdown type.
5. New attachment hardware and fittings shall used.
6. The light emitting diode (LED) signal lamp units shall meet the requirements of CMS 732.04-C. The Contractor shall provide ODOT, in writing, with the LED manufacturer name, serial number, part number, description of lamp, and date of manufacture for all LED units that are to be used in the signal head prior to installation, for acceptance and warranty purposes.

Payment shall be per Item 632 for pedestrian signal head (LED), (countdown), Type D2, as per plan and shall be made for the number of complete pedestrian signal heads furnished and installed, including all labor, equipment, materials and new attachment hardware.

ITEM 632 (COMBINATION) SIGNAL SUPPORT, COC TYPE 4120, (BY SIZE), AS PER PLAN
ITEM 632 (COMBINATION) SIGNAL SUPPORT, TYPE TC-81.21, (BY SIZE), AS PER PLAN
Traffic signal supports shall be as per Item 632 except that the support poles and arms shall have a circular cross section and shall be tapered tubes having a true and continuous taper. Multi-sided or fluted poles and poles having a tapered effect accomplished with the use of reducers will not be accepted. Arm length shall be as specified but arms forty feet in length or less shall be of one piece construction. Arms more than forty feet long may be constructed in no more than two pieces.

Bolt covers shall be provided. Anchor bolts shall be oriented as required by the plans however the formed top of the support foundation shall be oriented square to the adjacent sidewalk where applicable.

All signal cables shall be run inside the poles. Standard Drawing TC-83.10 is hereby modified to prohibit the use of external conduit risers for signal cabling, or any other use.

The Contractor shall provide all necessary attachments or connections to the poles. Additional wiring holes in the pole shall be drilled, reamed, or hole sawed. Flame cutting (oxyacetylene or electrical arc) will not be accepted. All cut edges or other defects in the zinc coating shall be cleaned and covered with two coats of zinc rich repair paint matching the factory finish. Brackets and appurtenances shall be securely attached with stainless steel screws of sufficient size for the intended loading. Stainless steel banding shall not be used unless specifically authorized by these plans and specifications or directed by the Engineer. All banding, where used, shall be factory painted to match the signal supports.

Design Criteria
In addition to the requirements of Item 632, signal support structures shall be designed and constructed by the supplier to support the loads caused by the signs, signals, and other equipment that the plan requires the Contractor to install. The use of standard ODOT design designations such as those described on Standard Drawing TC-81.21, and any details provided in this plan, are intended to promote uniformity of design and are not warranted to be structurally adequate. To the maximum extent practicable, the Contractor and supplier shall provide a structurally adequate support that utilizes standard ODOT anchor bolt sizing and spacing.

The mast arm support pole assembly, and the mast arm assembly shall be made by the same manufacturer and designed and sold as a unit.

All pre-drilled holes for all items shall be deburred and free of all sharp edges. All outside welds shall be rolled or ground smooth. All inside welds shall be void of sharp edges. Any structural fastener (3/4" or greater) shall be galvanized per ASTM 153 and shall be made of high strength carbon steel. Any other fastener (less than 3/4") shall be stainless steel. All visible fasteners shall match the coating of the structure.

Finish
Poles and arms, including base and flange plates, bolt covers, handholes, and wire entrances, shall be hot dipped galvanized after fabrication in accordance with 711.02. All visible elements of the signal support, and any other parts required to be coated, shall be galvanized and then powder-coated. All painting shall be performed under controlled environmental conditions, and in accordance with the paint manufacturer's recommendations pertaining to surface preparation, material handling, and application. The top finish coat of paint shall be similar to Federal Specification 595-B Color #27040, BLACK. Paint samples shall be submitted with the signal support shop drawings for review.

The inside of each signal support pole assembly, each mast arm assembly, and other signal support accessories shall be coated with galvanizing material. The inside area formed by the gussets, pole, and pole flange plate shall be coated to protect the area from corrosion. It is to be noted that some type of opening shall be required to coat the gusset area. This opening shall not hamper the structural integrity of the flange assembly.

All exterior surfaces of the signal support pole shaft assembly, mast arm assembly, all bolt covers, all clamps, clevis-to-clevis universal, wire entrance, all handhole covers, luminaire and video brackets, pole and arm caps, signal head hangers and weatherheads shall have a coating properly applied to them. Exterior surfaces of all fastener bolts/screws, washers, nuts, and other attachment hardware shall have a coating applied to them. Fastener threads shall not be clogged with coating material.

All coated items shall be shipped in a manner to minimize damage in transit. Surfaces should be protected by foam padding, by wrapping in cardboard, by spiral wrapping with wax paper, by crating, by a combination of methods, or by any other method selected by the manufacturer which will insure delivery of undamaged materials. Materials damaged in transit caused by improper packaging or improper transit handling shall be rejected. The Contractor shall be responsible for obtaining matching paint coating material for touch-up work identical to the original coating placed on the structure.

Each coating layer shall be properly cured before the application of the next coat. The application procedure shall be such to guarantee a finish that will not scale, flake or peel, and will retain its color brightness and fresh, attractive appearance for 10 years without dulling or fading.

Payment
This item of work shall be measured as each complete signal support, in place in essentially a vertical position under full plan loading. All labor, equipment, and materials necessary to pickup, transport, store, erect, adjust, and repair the signal support and anchor bolts shall be included for payment in the bid item.

Payment shall be as per item 632.

ITEM 632 PEDESTAL, 10.7', TRANSFORMER BASE, AS PER PLAN
ITEM 632 PEDESTAL, 12.7', TRANSFORMER BASE, AS PER PLAN
Pedestals shall be as per the details in this plan. All exterior surfaces shall be coated in accordance with the finish section requirements of Item 632 (Combination) Signal Support, Type TC-81.21 (BY SIZE), As Per Plan.

All signal cables shall be run inside the poles. Standard Drawing TC-83.10 is hereby modified to prohibit the use of external conduit risers for signal cabling, or any other use.

Payment shall be as per Item 632.

ITEM 632 PEDESTAL FOUNDATION, AS PER PLAN
ITEM 632 SIGNAL SUPPORT FOUNDATION, AS PER PLAN
The formed top of the pole foundation shall be oriented parallel to the sidewalk or back-of-curb or edge-of-pavement as shown on the signal plans. The top of the foundation shall be flush with any adjacent sidewalk or concrete area. A minimum of two conduit ells, used or unused, shall be installed in each pole foundation.

Additional foundation depth shall be furnished and installed when specified.

All affected reinforcing steel shall be lengthened to correspond with the additional depth.

Payment shall be as per Item 632.

ITEM 632 REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN
The existing traffic signal installations shall be removed as identified below:
- Stringtown Road/I-71 NB Ramps Intersection (Maintaining Agency ODOT District):
  - Entire existing traffic signal shall be removed.
- Stringtown Road/Buckeye Parkway (Maintaining Agency – City of Grove City):
  - Only items specified for removal shall be removed. All other components shall remain in place and operational.

Alternate methods of traffic control shall be approved by the Engineer and in place and operating prior to the deactivation and removal of any existing equipment. Reference is made to the requirements of Item 614 Maintaining Traffic, As Per Plan. Law enforcement officers shall be hired by the Contractor to Control traffic during any period of time that the traffic signal is not cycling and the intersection is open to traffic.

All removed items shall remain the property of the maintaining agency with the exception of signal supports, foundations, signal cable and conduit. The Contractor shall properly dispose of those items only and deliver the other removed items to the maintaining agency. The Contractor shall contact the maintaining agency twenty-four (24) hours, not including Saturday and Sunday, in advance to schedule delivery. Items delivered shall include:

- Controller, cabinet and all internal components
- Luminaire bracket arms
- Opticom emergency vehicle preemption system
- Disconnect switch

Removed conduit, foundations, signal cable and messenger wire shall be disposed of by the Contractor in accordance with Item 632. All existing unused signal cable shall be removed from underground conduits. Entire foundation shall be removed, when in conflict with proposed improvements.

Payment shall be per each intersection as per item 632.

ITEM 633 CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS2, AS PER PLAN
The electrical traffic control equipment provided shall meet the following specifications and be manufactured by Eagle Traffic control Systems. The equipment provided as part of this contract shall be the latest model, currently under production and new. The controller cabinet and accessories shall meet the NEMA TS-2, 1992 standard for actuated controller units. The catalog number for the ground mounted P cabinet shall be EL 720 Size 7 (Size R). The cabinet shall be aluminum with the natural aluminum finish inside. The load bay shall be the TF5016 or newer, with 16 load switch positions. Provide only the exact number of load switches required. Each load switch shall have light emitting diodes (LEDS) for the controller output and load switch output. Also provide 8 flash relay positions (but only supply the exact number of relays needed for each specific intersection), 1 NEMA 2 circuit flasher, and an MMU monitor. Each cabinet shall come equipped with two 16-channel cabinet detector racks (CDR) including bus interface units (BIU). The loop detector termination panel for the second detector rack shall be omitted. Where loop detectors are specified, the cabinet shall include the exact number of four channel detector cards with software required for each intersection. The cabinet shall be equipped with a cabinet power supply (CPS). The police panel on the outside of the cabinet door shall have a flash switch, a switch for automatic/manual operation, signal on/off switch and a manual pushbutton with a minimum cord length of 10 feet. The technician panel on the inside of the cabinet door shall include a flash switch, a stop time switch, and an equipment on/off switch. A cabinet door open switch and a cabinet light on / off switch shall also be supplied.

The controller cabinet shall also include:
- A slide-out laptop shelf
- Interior, undershelf LED cabinet lighting, including a minimum of 2 panels of 6 high-intensity LED's each and a door-activated switch. The LED panels shall be mounted in locations to maximize light on the cabinet equipment.
- A gooseneck/adjustable light fixture with an LED lamp. The adjustable light fixture shall be mounted on the lower right side of the controller cabinet.
- A minimum of two (2) GFCI protected receptacles
- A minimum of six (6) surge protected (NON-GFCI)receptacles

Controller cabinet labeling to identify the wiring and function
1. Detector lead-in cable:
   Phase number service, direction, movement type, and loop plan number.

2. Signal head field wiring:
   Phase number, direction, movement type, and color (red, yellow, green, yellow arrow, green arrow) or pedestrian movement.

The controller timer shall be the Siemens M52 (or most current model) NEMA TS-2 Type 2 and come equipped with all internal components to make it fully system ready for the TACTICS system, including an internal modem. Each controller timer shall have 6 modes of coordination, adaptive traffic control, reports, preemption / priority, diagnostics and internal time base control. The controller shall include a "Port 3 Module" and an Ethernet port.

REVISIONS		
MARK	DATE	DESCRIPTION

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL GENERAL NOTES

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
emht.com

DATE: November, 2016
SCALE:
JOB NO.: 2013-1259
SHEET: 26/44

For future expansion and system compatibility, the controller unit shall be programmed to allow for master (SEMARC), local (SEPAC), or dual-boot (SEMARC/SEPAC) operation. It shall also be provided with all programming and equipment needed to communicate with the existing coordinated system on Stringtown Road.

Each conduit entrance to the cabinet shall be sealed with a rubber pipe/conduit seal gasket. The seal shall be of a material and type tightly fitting and able to seal out water, insects, rodents, and dirt. The seal shall be easily removed for service installations or cable replacements.
All street lights installed on the combination signal supports shall be wired to a 120 volt circuit controlled at the signal controller cabinet at each intersection. This item shall also include the following:

1) Install in the controller cabinet a third circuit breaker (30 amp), and a 2-pole lighting contactor on the cabinet side panel (electrically held, open style);

2) Photocell and 3 position; on-off-auto switch rated as per ODOT specifications. Photocell shall be installed on the signal support proximate to the signal controller and include all wiring to the controller; and

3) All wiring for lighting to be controlled by a single disconnect switch for the signal. (two 30 amp fuses-one for lighting, one for signal.)

The Contractor shall provide the cabinet wiring diagram/plans in PDF format to ODOT District 6 traffic.

The ground mounted control cabinet shall be furnished with a powder coated finish to match the signal supports.

Provide an Arc Flash Hazard Warning sign on the outside front door of the enclosure in accordance with the 2014 National Electrical Code paragraph 110.16.

Payment for item 633 Controller Unit, TYPE TS2/A2, With Cabinet, Type TS2, As Per Plan, will be at the contract bid price complete and in place and connections tested and accepted.

ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
In addition to the requirements of CMS 633 and 733, a cabinet riser (12 inch) and anchor bolts shall be provided with the base mounted cabinet. Before performing the work, the Contractor, District Traffic Engineer and Project Engineer shall perform a site inspection to establish the location of the UPS cabinet and foundation.

The UPS cabinet shall include a generator power panel with a heavy duty power relay versus the line voltage generator switch. The generator inlet shall be a recessed panel with a door that is flush with the external side of the UPS cabinet. It shall include a recessed plug, automatic transfer switch, a door that securely closes over the power cord, and an LED light that indicates line power is available.

The UPS output notifications for on battery, battery 2 hour timer, and low battery shall be wired into the traffic signal cabinet back panel to provide special status alarms for each output into the signal controller. Special status alarms shall be programmed into the controller.

This item shall include a red LED status indicator lamp to allow maintenance personnel and law enforcement to quickly assess whether a traffic signal cabinet is being powered by a UPS. The LED housing shall be NEMA 4X, IP65 OR IP66, rated for outdoor use and be tamper/shatter resistant. It shall be a domed enclosure containing a red lens with LED that is visible from 100 feet minimum. The enclosure and LED lamp unit shall be placed on the street-side of the cabinet or centered on the top surface of the UPS cabinet and sealed from water intrusion. It should be wired using minimum 20GA stranded, insulated hookup wire to the status relay outputs of the UPS. The wires shall be terminated by lugs at the display end and permanently labeled "backup power status display," with wire polarity indicated. The red LED shall only illuminate to indicate the cabinet is operating under UPS backup power (the "backup" operating condition). This item also includes programming the UPS status relay outputs to produce the lamp status displays. These status displays will be solid 100% duty cycle (not flashing) displays. The operating voltage of the LED lamp shall be 120V AC unless otherwise indicated.

A battery balancer shall be furnished and installed with the system.

This item shall include the installation of the Alpha Power Agent remote battery management system furnished with all equipment and software to bring the system to full operating capabilities. The software provided shall be the "no software" option using the site controller's internal web interface and the "Lookout" software.

The cabinet shall be furnished and installed with the Alpha Battery slider shelves.

The cabinet's exterior finish shall match the color of the main traffic signal controller cabinet. This item of work shall also include furnishing and installing a foundation and work pad of appropriate size to accommodate the UPS cabinet.

Payment shall be per item 633 and include all connections, wiring, and miscellaneous materials needed for full operation of the UPS system.

ITEM 633 CONTROLLER ITEM, MISC.: CABINET/CONTROLLER MODIFICATION
The existing traffic signal cabinet and controller located at the Stringtown Road/Buckeye Parkway intersection shall be modified to accommodate the proposed intersection improvements. All wiring, programming, accessories, controller/cabinet equipment and modifications needed to accommodate the planned improvements shall be considered incidental to this item of work.

Prior to deactivation or modification of any signal equipment, alternate means of traffic control shall be in place and approved by the Engineer. The intersection shall operate under full signalized control between the hours of 7:00 AM to 9:00 AM and 4:30 PM to 6:00 PM Monday through Friday. Law Enforcement officers shall be hired by the Contractor to control traffic during any period of time that the traffic signal is not cycling.

This item of work shall be measured per intersection and include all the material and work needed to accommodate the planned improvements.

ITEM 633 CABINET FOUNDATION, AS PER PLAN
ITEM 633 CONTROLLER WORK PAD, AS PER PLAN
The cabinet foundation and controller work pad shall be as detailed within and sized to accommodate the UPS cabinet.

Payment shall be per item 633.

ITEM 809 ADVANCE RADAR DETECTION
This item of work shall consist of furnishing and installing a Wavetronix SmartSensor Advance detection unit (Model SS-200E). The detection unit shall include the following:

- Power shall be provided from the traffic cabinet.
- All required inputs cards shall be included in the traffic cabinet and shall be compatible with CalTrans, NEMA TS1 and NEMA TS2 detector racks. The cards shall provide true presence detector calls or contact closure to the traffic controller.
- The unit shall be mounted directly to a pole or mast arm, as recommended by the manufacturer. Cable(s) shall be provided as required and recommended by the manufacturer.
- Surge protection devices, as recommended by the manufacturer shall be included both at the pole where the unit is located to protect the unit and in the traffic cabinet to protect the cabinet electronics.
- The manufacturer's representative shall be on site during installation and testing and shall provide onsite training on the setup, operation and maintenance of the unit.
- A Serial to Ethernet communications module and Ethernet cable(min. 7 feet)
- The power supply and communication modules shall be secured to a single panel that can be mounted interior to the traffic cabinet. The panel shall include modular-plug style connections for a up to four (4) sensor cables. Additional sensors may be hard-wired to the communication modules, as necessary.
- Prior to programming, the Contractor shall contact the ODOT District 6 District Traffic Engineer at 740-833-8198. A District 6 Traffic Department representative shall be present during the programming of the system.

Payment for item 809 Advance Radar Detection shall be made at the contract unit price for each unit, complete and in place including all required cabinet hardware, mounting brackets, cables, conduit, connections tested and accepted, and any other necessary hardware to establish a fully functional detection system.

ITEM 809 STOP-BAR RADAR DETECTION
This item of work shall consist of furnishing and installing a Wavetronix SmartSensor Matrix detection unit. The detection unit shall include the following:

- Power shall be provided from the traffic cabinet.
- All required inputs cards shall be included in the traffic cabinet and shall be compatible with CalTrans, NEMA TS1 and NEMA TS2 detector racks. The cards shall provide true presence detector calls or contact closure to the traffic controller.
- The unit shall be mounted directly to a pole or mast arm, as recommended by the manufacturer. Cable(s) shall be provided as required and recommended by the manufacturer.
- Surge protection devices, as recommended by the manufacturer shall be included both at the pole where the unit is located to protect the unit and in the traffic cabinet to protect the cabinet electronics.
- The manufacturer's representative shall be on site during installation and testing and shall provide onsite training on the setup, operation and maintenance of the unit.
- A Serial to Ethernet communications module and Ethernet cable (min. 7 feet)
- The power supply and communication modules shall be secured to a single panel that can be mounted interior to the traffic cabinet. The panel shall include modular-plug style connections for up to four (4) sensor cables. Additional sensors may be hard-wired to the communication modules, as necessary.
- Prior to programming, the Contractor shall contact the ODOT District 6 District Traffic Engineer at 740-833-8198. A District 6 Traffic Department representative shall be present during the programming of the system.

Payment for item 809 Stop-Bar Radar Detection shall be made at the contract unit price for each unit, complete and in place including all required cabinet hardware, mounting brackets, cables, conduit and connections tested and accepted.

632 SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59' IN LENGTH), AS PER PLAN
This item shall consist of the Contractor installing a tuned mechanical stockbridge or mass-spring type damper on a TC-81.21 mast arm signal support to reduce the possibility of harmonic vibrations caused by wind loads. A mechanical damper shall be applied to all mast arms over 59 feet in length. The installed damper shall be capable of reducing the loaded maximum vertical movement at the tip of the arm to 8 inches measured from the highest to the lowest point of deflection at wind speeds of 5-20 mph.

All attachment hardware connections shall be stainless steel. Stockbridge-type dampers shall have a stainless steel safety chain anchored to the mast arm to prevent weights from falling should they become separated from the rest of the assembly. The damper shall be attached to the arm within 8 feet of mast arm tip. Installation shall be per the manufacturer's guidelines. Static dampers such as horizontal flat sign mountings shall not be used. Acceptable devices include the following or approved equal:

1. Union Metal Alcoa Damper Device - DWG. NO. 2C-1817-C1
2. Valmont Structures Alcoa Device - DWG. NO. OH104242P1
3. Valmont Structures Mitigator - Model TR1
4. Florida DOT Spring-Mass Damper - DRAWING INDEX NO. 17749
5. Pathmaster Damper Assembly - DWG. U2G-1817-C
6. Hubbell 607 Series Damper - Millerbernd DWG. NO. HUBBELL-6072014

Payment for item 632 "Signal Support, Mechanical Damper for TC-81.21 Mast Arm (Greater Than 59 feet in Length), As Per Plan" shall be made at the contract unit price per each complete and in place, and shall include all labor, materials, and equipment necessary to complete the work.

TRAFFIC SIGNAL ESTIMATE OF QUANTITIES

Stringtown Road at I-71 NB Ramps Improvements	Stringtown Road at Buckeye Parkway Improvement	Item	Quantity	Unit	Item Description
	1	614	1	EA	Special - Work Zone Traffic Signal, As Per Plan
235		625	235	LF	Conduit, 2", 725.04
	27	625	27	LF	Conduit, 2", 725.051
58		625	58	LF	Conduit, 3", 725.04
1481		625	1481	LF	Conduit, 8", 725.04, Jacked or Drilled
171	27	625	198	LF	Trench
6	1	625	7	EA	Pull Box, 725.08, 24", As Per Plan
1	1	625	2	EA	Pull Box, 725.06, 13"x24", As Per Plan
7	1	625	8	EA	Ground Rod
	1	625	1	EA	Reuse of Luminaire, As Per Plan
2	1	625	3	EA	Connection, Fused Pull-Apart, Type II
2	1	625	3	EA	Connection, Unfused Pull-Apart, Type III
574	84	625	658	LF	No. 8 AWG, 600 Volt Distribution Cable (Combination Lighting)
200	72	625	272	LF	Pole and Bracket Cable, No. 10 AWG, 600 Volt
	1	625	1	EA	Bracket Arm, 10', As Per Plan
2		625	2	EA	Bracket Arm, 20', As Per Plan
2		625	2	EA	Luminaire, LED, 120 Volt, As Per Plan
1	1	630	2	EA	Sign Hanger Assembly, Mast Arm Mounted, As Per Plan
6		630	6	EA	Sign Support Assembly, Pole Mounted, As Per Plan
	1	630	1	EA	Reuse of Illuminated Street Name Sign, As Per Plan
1	1	630	2	EA	Signs, As Per Plan
33	5	630	38	SF	Sign, Flat Sheet, As Per Plan
	2	632	2	EA	Vehicular Signal Head, (Led), Black, (3-Section), 12" Lens, 1-Way, Polycarbonate, As Per Plan
12	4	632	16	EA	Vehicular Signal Head, (Led), Black, (3-Section), 12" Lens, 1-Way, Polycarbonate, With Backplate, As Per Plan
1	1	632	2	EA	Vehicular Signal Head, (Led), Black, (5 Section), 12" Lens, 1-Way, Polycarbonate, With Backplate, As Per Plan
2		632	2	EA	Pedestrian Signal Head (Led), (Countdown), Type D2, As Per Plan
	2	632	2	EA	Reuse of Vehicular Signal Head, As Per Plan
	1	632	1	EA	Reuse of Pedestrian Signal Head, As Per Plan
2		632	2	EA	Pedestrian Pushbutton, As Per Plan
13	1	632	14	EA	Covering Vehicular Signal Head
2		632	2	EA	Covering Pedestrian Signal Head
	1	632	1	EA	Reuse of Pedestrian Pushbutton
1		632	1	EA	Signal Support, Type TC-81.21, Design No. 4, As Per Plan
1		632	1	EA	Combination Signal Support, Type TC-81.21, Design No. 12, As Per Plan
1		632	1	EA	Combination Signal Support, Type TC-81.21, Design No. 13, As Per Plan
	1	632	1	EA	Combination Signal Support, COC Type 4120, Design C15 As Per Plan
1		632	1	EA	Pedestal, 10.7', Transformer Base, As Per Plan
1		632	1	EA	Pedestal, 12.7', Transformer Base, As Per Plan
3	1	632	4	EA	Signal Support Foundation, As Per Plan
2		632	2	EA	Pedestal Foundation, As Per Plan
	1	632	1	EA	Signal Support, Mechanical Damper for TC-81.21 Mast Arms (Greater than 59' in length), As Per Plan
2078	775	632	2853	LF	Signal Cable, 7 Conductor, No. 14 AWG
78	246	632	324	LF	Signal Cable, 3 Conductor, No. 14 AWG
909		632	909	LF	Interconnect Cable 6 Pair No. 19 AWG, Sold REA (PE-39)
199	58	632	257	LF	Loop Detector Lead-In Cable
	1	632	1	EA	Detector Loop
362	38	632	400	LF	Power Cable, 3 Conductor, No. 6 AWG, As Per Plan
1	1	632	2	EA	Power Service, As Per Plan
1	1	632	2	EA	Removal of Traffic Signal Installation, As Per Plan
1		633	1	EA	Controller Unit, Type TS2/A2, With Cabinet, Type TS2, As Per Plan
1		633	1	EA	Cabinet Foundation, As Per plan
1		633	1	EA	Controller Work Pad, As Per Plan
1		633	1	EA	Uninterruptible Power Supply (UPS), 1000 Watt, As Per Plan
	1	633	1	EA	Controller Item, Misc.: Cabinet/Controller Modification
3		809	3	EA	Advance Radar Detection
2		809	2	EA	Stop-Bar Radar Detection

REVISIONS

MARK	DATE	DESCRIPTION

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS
TRAFFIC SIGNAL GENERAL NOTES

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
emht.com

DATE November, 2016

SCALE

JOB NO. 2013-1289

SHEET 27/44

(1)–3" CONDUIT (725.04) – EMPTY
(1)–3" CONDUIT (725.04) W/(2)–7/C & (1)–GND
JACKED OR DRILLED UNDER PAVEMENT = 102'

PULL BOX, 24"
STA. 31+27.3, 93.4' LT.

(1)–2" CONDUIT (725.04) – EMPTY
(1)–2" CONDUIT (725.04) W/(2)–7/C & (1)–GND
IN TRENCH = 30'

(1)–3" CONDUIT (725.04) W/(1)–POWER
JACKED OR DRILLED UNDER PAVEMENT = 157'

POLE N/W–1 COMBINATION SIGNAL SUPPORT
W/(1)–LUMINAIRE AND BRACKET ARM
W/(1)–EBLT STOP BAR RADAR DETECTION
W/(1)–WB ADVANCED RADAR DETECTION
STA. 30+58.8, 68.0' LT.

POLE N/E–1 SIGNAL SUPPORT
STA. 31+50.2, 74.6' LT.

Ex. Ground Mounted Controller (REMOVE)
SEE NOTE 1.
Sta. 31+42.7, 65.0' Lt.

Ex. Conduit w/Ex. Signal Wires (REMOVE)

Ex. Strain Pole Support (REMOVE)
Sta. 31+38.0, 52.8' Lt.

Ex. Pull Box (REMOVE)
Sta. 31+95.7, 42.0' Lt.

(1)–2" CONDUIT (725.04) W/(2)–RADAR CABLES
(1)–2" CONDUIT (725.04) W/(3)–7/C, (1)–LIGHTING & (1)–GND
IN TRENCH = 30'

Ex. Overhead Sign Support (REMAIN)
Overhead Signal Span Attachment (REMOVE)
Sta. 30+48.5, 50.8' Lt.

PULL BOX, 24"
STA. 30+36.7, 47.5' LT.

Matchline Sta. 429+60
See Sheet 39

I–71 NB ENTRANCE RAMP

STRINGTOWN ROAD

Matchline Sta. 33+50
See Sheet 29

SEE DETAIL A

(1)–3" CONDUIT (725.04) W/(2)–RADAR CABLES
(1)–3" CONDUIT (725.04) W/(4)–7/C,
(1)–LIGHTING & (1)–GND
JACKED OR DRILLED UNDER PAVEMENT = 103'

Ex. Pull Box (REMOVE)
Sta. 30+10.1, 28.6' Rt.

Ex. Conduit w/Ex. Signal Wires (REMOVE)

Ex. Conduit w/Ex. Interconnect (REMAIN)

Ex. Pull Box (REMAIN)
Sta. 30+37.3, 42.4' Rt.

Ex. Conduit w/Ex. Signal Wires (REMOVE)

I–71 NB EXIT RAMP

POLE S/W–1 PEDESTRIAN PEDESTAL (12.2')
W/(1)–PEDESTRIAN SIGNAL HEAD
W/(1)–PEDESTRIAN PUSHBUTTON
W/(1)–EB AUXILARY VEHICULAR SIGNAL HEAD
STA. 30+45.8, 36.9' RT.

(1)–3" CONDUIT (725.04) W/(1)–INTERCONNECT
IN TRENCH = 15'

Ex. Strain Pole Support (REMOVE)
w/(1)–Pedestrian Signal Head (REMOVE)
Sta. 30+48.5, 37.4' Rt.

(1)–2" CONDUIT (725.04) W/(1)–2/C
(1)–2" CONDUIT (725.04) W/(2)–7/C & (1)–GND
IN TRENCH = 18'

PULL BOX, 24"
STA. 30+45.7, 54.9' RT.

(1)–3" CONDUIT (725.04) W/(1)–INTERCONNECT
(1)–3" CONDUIT (725.04) W/(2)–RADAR CABLES & (1)–2/C
(1)–3" CONDUIT (725.04) W/(6)–7/C, (1)–LIGHTING & (1)–GND
JACKED OR DRILLED UNDER PAVEMENT = 85'

Ex. Pull Box (REMOVE)
Sta. 30+99.5, 66.6' Rt.

Ex. Conduit w/Ex. Signal Wires (REMOVE)

Ex. Strain Pole Support (REMOVE)
w/(1)–Pedestrian Signal Head (REMOVE)
Sta. 31+34.9, 37.6' Rt.

(1)–2" CONDUIT (725.04) W/(1)–POWER
IN TRENCH = 12'

PRELIMINARY POWER TRANSFORMER
FINAL LOCATION TO BE DETERMINED BY AMERICAN ELECTRIC POWER
STA. 31+55.7, 59.5' RT.

(1)–2" CONDUIT (725.04) W/(1)–POWER
IN TRENCH = 15'

PULL BOX (725.06),(13"x24"),(SIGNAL POWER)
STA. 31+41.1, 53.6' RT.

(1)–2" CONDUIT (725.04) W/(3)–RADAR CABLE
(1)–3" CONDUIT (725.04) W/(3)–7/C, (1)–LIGHTING, (1)–3/C & (1)–GND
IN TRENCH = 17'

(1)–2" CONDUIT (725.04) W/(1)–POWER
IN TRENCH = 21'

POLE S/E–2 PEDESTRIAN PEDESTAL, 10.7'
W/(1)–PEDESTRIAN PUSHBUTTON
W/(1)–PEDESTRIAN SIGNAL HEAD
STA. 31+31.7, 37.6' RT.

PULL BOX, 24"
STA. 31+29.8, 44.5' RT.

GROUND MOUNTED CONTROLLER
W/UNINTERRUPTIBLE POWER SUPPLY
STA. 31+29.4, 50.4' RT.

(2)–3" CONDUITS (725.04) – EMPTY
(1)–3" CONDUIT (725.04) W/(2)–INTERCONNECT
(1)–3" CONDUIT (725.04) W/(5)–RADAR CABLES & (1)–2/C
(1)–4" CONDUIT (725.04) W/(8)–7/C, (2)–LIGHTING, (1)–3/C & (1)–GND
IN TRENCH = 6'

(1)–2" CONDUIT (725.04) W/(2)–2/C
(1)–2" CONDUIT (725.04) W/(2)–7/C & (1)–GND
IN TRENCH = 7'

(1)–3" CONDUIT (725.04) W/(1)–INTERCONNECT
JACKED OR DRILLED = 675'

POLE S/E–1 COMBINATION SIGNAL SUPPORT – SEE DETAIL A
W/(1)–LUMINAIRE AND BRACKET ARM
W/(1)–EB ADVANCED RADAR DETECTION
W/(1)–NB STOP BAR RADAR DETECTION
W/(1)–NB ADVANCED RADAR DETECTION
W/(1)–NB AUXILARY VEHICULAR SIGNAL HEAD.
W/(1)–PHOTO ELECTRIC RELAY
W/(1)–METER AND DISCONNECT SWITCH
STA. 31+47.0, 43.0' RT.

NOTES:

1. The Existing traffic signal shall not be removed until the proposed signal is in place and operational.

DETAIL A
GRAPHIC SCALE
0 5 10 20
1 inch = 10 feet

PROPOSED TRAFFIC SIGNAL HEAD CONFIGURATION

PROPOSED HEADS 4,5

PROPOSED HEADS 3

PROPOSED HEADS 12, 13

EXISTING TRAFFIC SIGNAL CONFIGURATION

PROPOSED HEADS 1,2,6,7,8,9,10,11

EXISTING HEADS A,B,E,F,G,H

EXISTING HEADS C,D

PEDESTRIAN SIGNAL HEAD CONFIGURATION

S

GRAPHIC SCALE
0 10 20 40
1 inch = 20 feet

R10–3E–B

ONE SIGN PLACED W/EACH PUSHBUTTON

NO TURN ON RED EXCEPT FROM RIGHT LANE
R10–11c–30
S1

R9–3A–24
S2

EXISTING AEP ACCOUNT INFO:
ADDRESS:

1650 STRINGTOWN RD
GROVE CITY, OHIO
AEP ACCOUNT NO. 10393814208
METER NO. 97398120

PROPOSED LEGEND

Centerline of Road — 48 + — 50 +
Right–of–Way: Existing (Ex. R/W) Proposed (R/W)
Fence Line — — Fire Hydrant Catch Basin Tree
Utility Poles: Power Telephone Combination
Signs: Ground Mounted Pole Mounted Overhead
Ex. to Remain Ex. to be Removed Prop.
Signal Poles: Existing Proposed Future
w/ Mast Arm
w/ Ped Signals w/ Pushbutton
Signal Heads: Existing Proposed
Signal Controller: Existing Pole Mt'd. Proposed
Proposed w/Pad
Signal Loops: Future L–X Proposed L–X
Signal Detection: Stop Bar Detection Advance Detection Radar

REVISIONS

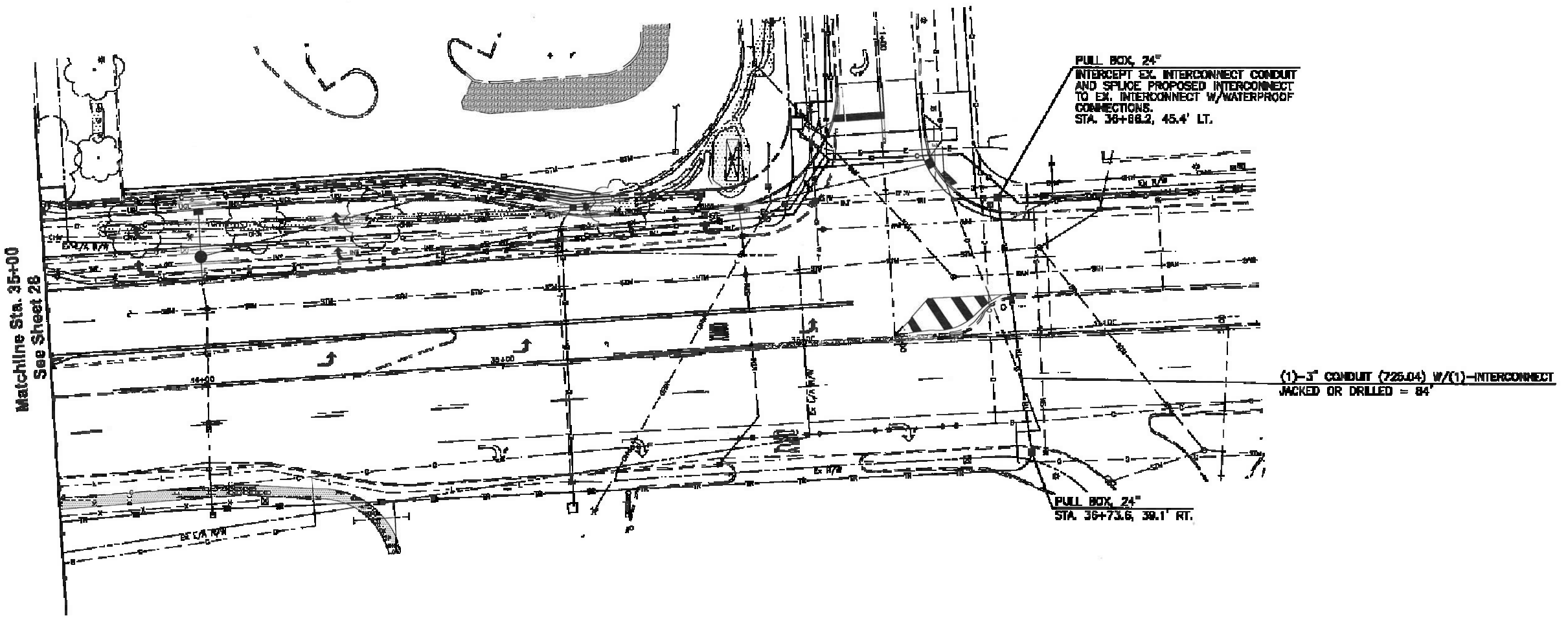
CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I–71
NORTHBOUND RAMP INTERSECTION IMPROVEMENT

TRAFFIC SIGNAL INSTALLATION PLAN

EMH&T
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: (614) 775-4500 www.emht.com

DATE: November, 2016
SCALE: 1" = 20'
JOB NO.: 2013-1289
SHEET: 28/44



PROPOSED LEGEND

Centerline of Road 49 50

Right-of-Way: Existing Ex. R/W Proposed R/W

Fence Line — — Fire Hydrant Catch Basin Tree

Utility Poles: Power Telephone Combination

Signs: Ground Mounted Pole Mounted Overhead XXX
Ex. to Remain Ex. to be Removed Prop.

Signal Poles: Existing Proposed Future
w/ Mast Arm
w/ Ped Signals w/ Pushbutton

Signal Heads: Existing Proposed

Signal Controller: Existing Pole Mt'd. Proposed
Proposed w/Pad

Signal Loops: Future L-X Proposed L-X

Signal Detection: Stop Bar Detection Advance Detection Radar

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL INSTALLATION PLAN

EMH&T

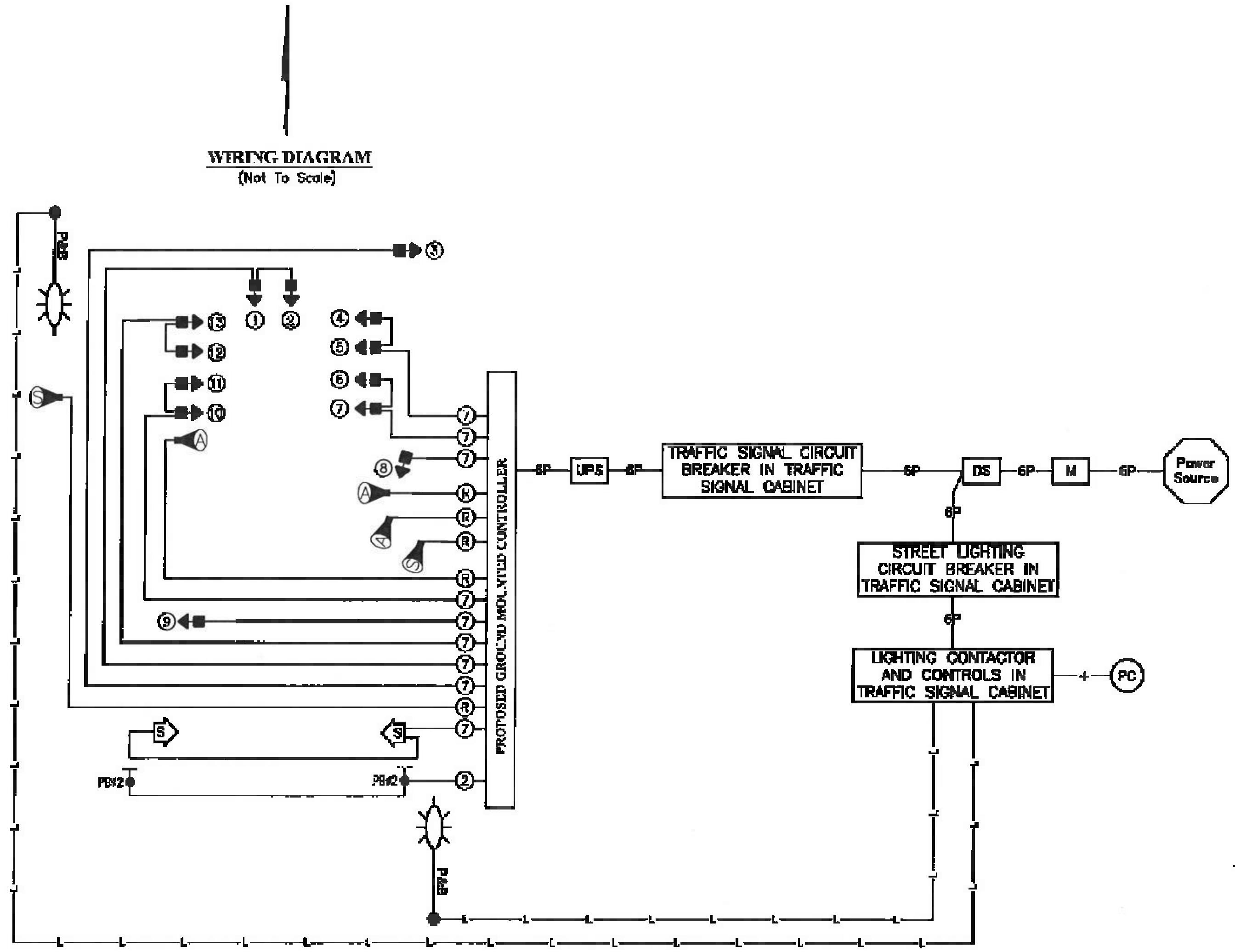
DATE: November, 2016

SCALE: 1" = 20'

JOB NO.: 2014-1219

SHEET: 29/44

WIRING DIAGRAM
(Not To Scale)



NOTE: ALL SUPPLEMENTAL SIGNAL HEADS SHALL BE WIRED TO THEIR OWN LOAD SWITCH AND NOT MONITORED.

WIRING DIAGRAM LEGEND

- Vehicular Signal Head
- Pedestrian Signal Head
- PB Pedestrian Pushbutton
- Power Source — Proposed Power Source
- 6P — 3/C #6 AWG (Power)
- Advanced Radar Detection Unit
- Stop Bar Radar Detection Unit
- DS — Power Disconnect Switch
- PC — Photo Cell
- P&B — No. 10 AWG Pole and Bracket Cable
- Connection For Lighting
- Lighting Fixture
- M — Power Meter
- 3/C No. 14 AWG Cable for Photocell
- R — Radar Detection Cable
- (2)-No. 8 AWG Distribution Cable (Lighting)
- UPS — Uninterruptible Power Supply

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
1 (NB)	R	ø8 R	R
	Y	ø8 Y	
	G	ø8 G	
2 (NB)	R	ø8 R	R
	Y	ø8 Y	
	G	ø8 G	
3 (WBRT)	R	ø6 R	R
	Y	ø6 Y	
	G	ø6 G	
	Y←	ø8 G	
	G←	ø6 G	
4 (EBLT)	←R	ø5 R	←R
	←Y	ø5 Y	
	←G	ø5 G	
5 (EBLT)	←R	ø5 R	←R
	←Y	ø5 Y	
	←G	ø5 G	
6 (EB)	R	ø2 R	R
	Y	ø2 Y	
	G	ø2 G	
7 (EB)	R	ø2 R	R
	Y	ø2 Y	
	G	ø2 G	
8 (NB)	R	ø8 R	R
	Y	ø8 Y	
	G	ø8 G	
9 (EB)	R	ø2 R	R
	Y	ø2 Y	
	G	ø2 G	
10 (WB)	R	ø6 R	R
	Y	ø6 Y	
	G	ø6 G	
11 (WB)	R	ø6 R	R
	Y	ø6 Y	
	G	ø6 G	
12 (WBRT)	R	ø6 R	R←
	Y←	ø6 Y	
	G←	ø5 G	
13 (WBRT)	R	ø8 R	R←
	Y←	ø6 Y	
	G←	ø5 G	

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
S	WALK	G(ø2-W)	OFF
	DON'T WALK	R(ø2-DW)	

NOTE: SIGNAL HEADS 3, 8, & 9 SHALL BE CONNECTED TO THEIR OWN LOAD SWITCH AND NOT MONITORED.

REVISIONS

MARK	DATE	DESCRIPTION

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL INSTALLATION DETAILS

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
emht.com

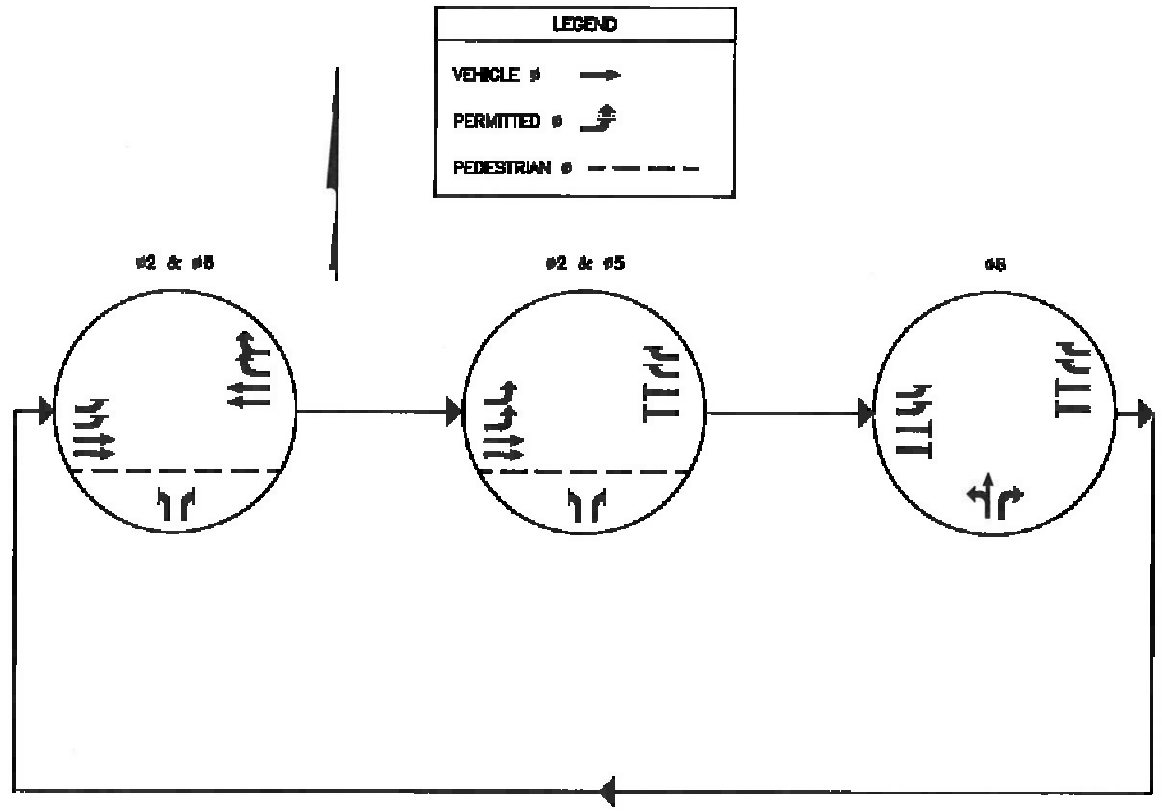
DATE: November, 2016
SCALE: None
JOB NO.: 2013-1289
SHEET: 30/44

SIGNAL TIMING CHART

INTERSECTION: STRINGTOWN ROAD AT I-71 NORTHBOUND RAMPS MAINTAINING AGENCY: ODOT – DISTRICT 6									
START UP START IN: #2 & #6 TIME FOR FLASH OR ALL RED: – FIRST PHASE(S): #2 & #6 COLOR DISPLAYED: GREEN		DUAL ENTRY: 2+6		PHASES: –					
		REST IN RED: 2+6		RING 1 –				RING 2 –	
		OVERLAP				A	B	C	D
		PHASES				–	–	–	–
INTERVAL OR FEATURE		CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)		1	2	3	4	5	6	7	8
DIRECTION		–	EB	–	–	EB LT	WB	–	NB
MINIMUM GREEN (INITIAL)	(SEC.)	–	25	–	–	10	25	–	10
ADDED INITIAL	*(SEC./ACTUATION)	–	–	–	–	–	–	–	–
MAXIMUM INITIAL	(SEC.)	–	–	–	–	–	–	–	–
PASSAGE TIME (PRESET GAP)	(SEC.)	–	2.0	–	–	2.0	2.0	–	2.0
TIME BEFORE REDUCTION	*(SEC.)	–	–	–	–	–	–	–	–
MINIMUM GAP	*(SEC.)	–	–	–	–	–	–	–	–
TIME TO REDUCE	*(SEC.)	–	–	–	–	–	–	–	–
MAXIMUM GREEN I	(SEC.)	–	60	–	–	40	60	–	30
MAXIMUM GREEN II	(SEC.)	–	60	–	–	40	60	–	30
YELLOW CHANGE	(SEC.)	–	4.0	–	–	4.0	4.0	–	4.0
ALL RED CLEARANCE	(SEC.)	–	2.5	–	–	3.0	2.5	–	2.5
WALK	(SEC.)	–	9	–	–	–	–	–	–
PEDESTRIAN CLEARANCE	(SEC.)	–	16	–	–	–	–	–	–
RECALL – MAXIMUM	(ON/OFF)	–	–	–	–	–	–	–	–
RECALL – MINIMUM	(ON/OFF)	–	ON	–	–	OFF	ON	–	OFF
RECALL – PEDESTRIAN	(ON/OFF)	–	OFF	–	–	OFF	OFF	–	OFF
MEMORY	(ON/OFF)	–	OFF	–	–	OFF	OFF	–	OFF

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM (TYPICAL)



NOTES:

1. THE CONTRACTOR SHALL TRANSFER ALL EXISTING COORDINATION DATA FROM THE EXISTING CONTROLLER TO THE PROPOSED CONTROLLER.
2. ALL MOVEMENTS SHALL BE ACTUATED. THE PRIMARY THRU MOVEMENT SHOULD HAVE MIN RECALL ACTIVE TO REST IN GREEN.
3. COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
4. RADAR DETECTION UNITS FOR DILEMMA ZONE DETECTION SHALL PLACE A CONSTANT CALL TO THE CONTROLLER WHEN VEHICLES TRAVEL TIMES TO THE STOP BAR ARE BETWEEN 2.5 AND 6 SECONDS. SPEED TRIGGER SHALL BE SET FOR VEHICLES TRAVELING 35 MPH AND GREATER.
5. RADAR SHALL HAVE QUEUE DETECTION CONFIGURED AND A ZONE PLACED AT 100-200 FEET FROM STOP BAR FOR SLOW MOVING VEHICLE EXTENSIONS. SPEED TRIGGER SHALL BE SET AT 1-35 MPH.
6. ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

RADAR DETECTION CHART

DETECTION ZONE	MOVEMENT	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY IN CONTROLLER (SEC)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT)
Z5A	EBLT (L)	PRESENCE	5	3	5	STOP BAR DETECTION	5'x30'
Z5B	EBLT (R)	PRESENCE	5	0	5	STOP BAR DETECTION	5'x30'
Z8A	NB	PRESENCE	8	0	–	STOP BAR DETECTION	5'x30'
Z8B	NBRT	PRESENCE	8	12	8	STOP BAR DETECTION	5'x30'

NOTE: DILEMMA ZONE SPEED THRESHOLD >30 MPH

REVISIONS

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CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL INSTALLATION DETAILS

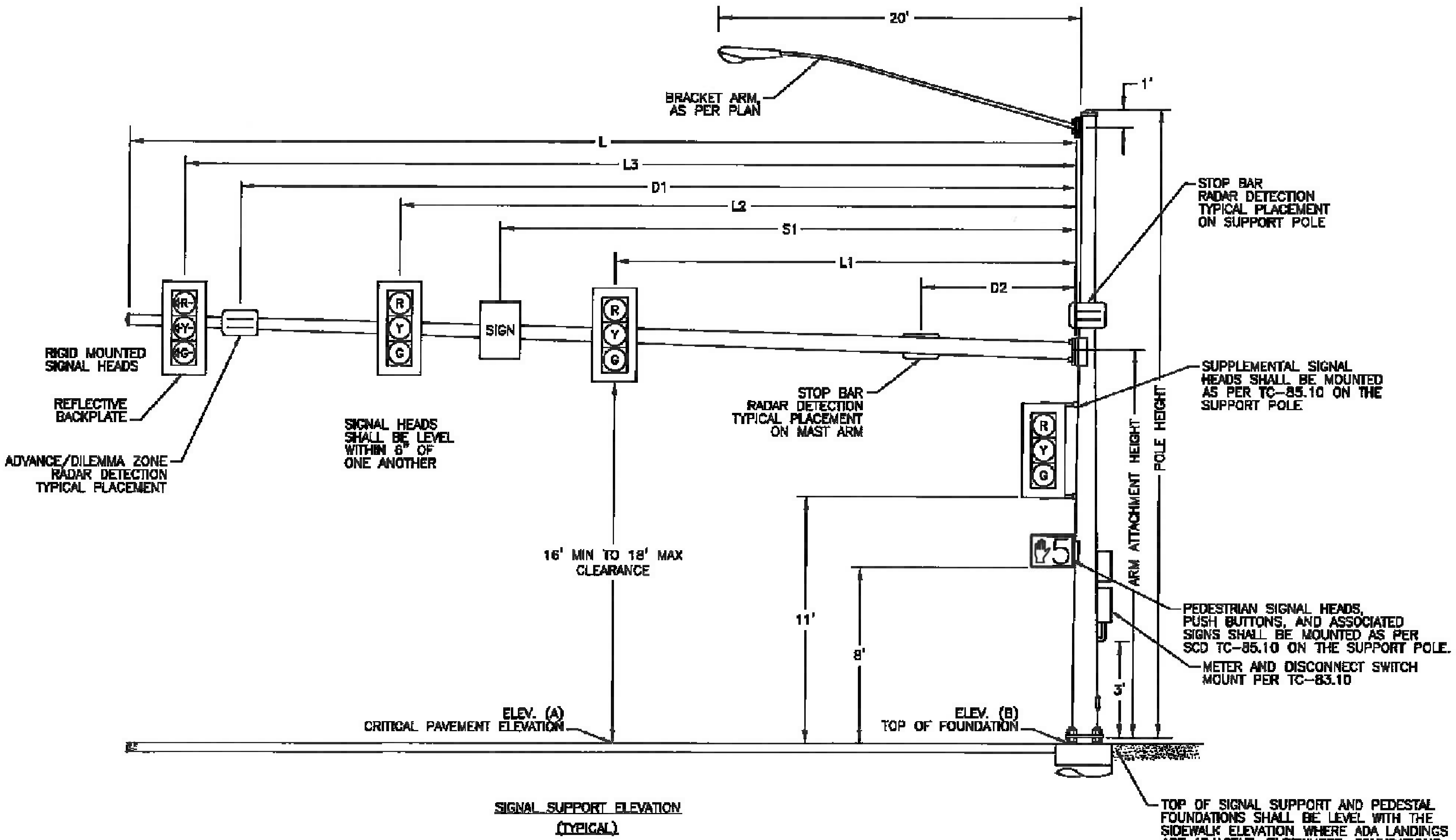
EMH&T
Environmental, Hydrological & Transportation
5500 New Albany Road, Columbus, OH 43054
(614) 775-4500 www.emht.com

DATE: November, 2015

SCALE: None

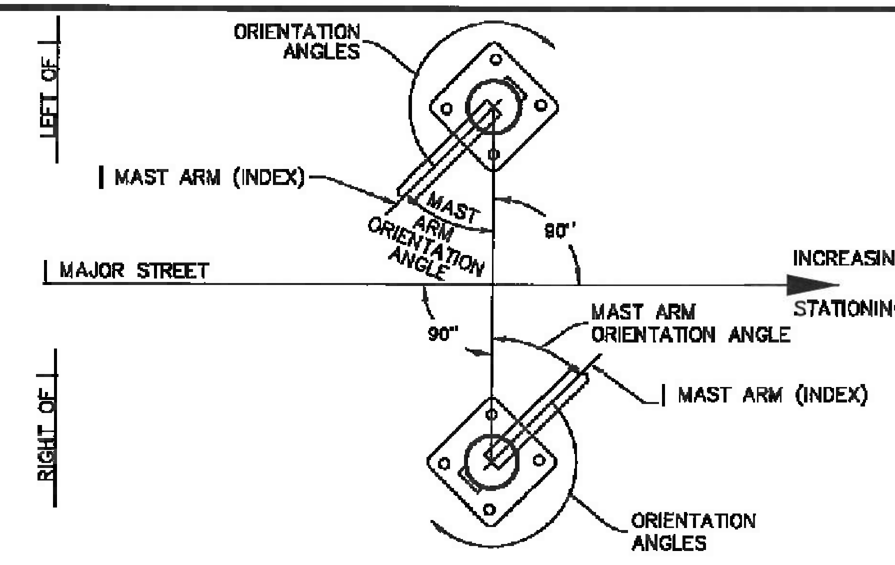
JOB NO.: 2013-1289

SHEET: 31/44

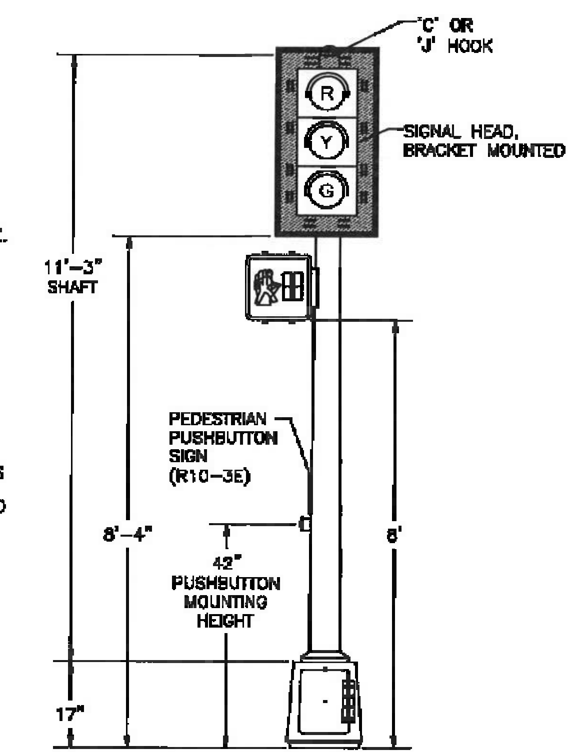


SIGNAL SUPPORT ELEVATION (TYPICAL)

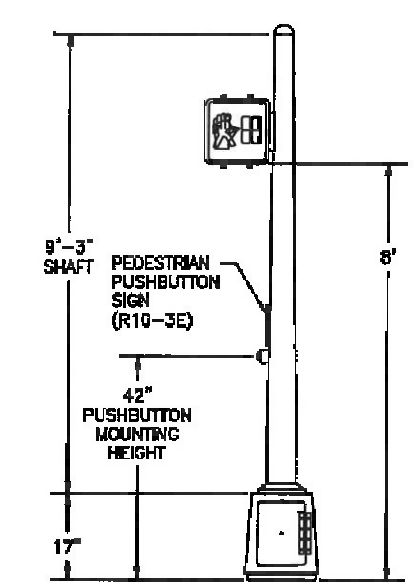
NOTE: SIGNAL HEADS MOUNTED ON N/W-1 MAST ARM SHALL BE ATTACHED WITH THE GREEN BALL CENTERED ON THE ARM.



POLE ORIENTATION



12.7' PEDESTAL DETAIL



10.7' PEDESTAL DETAIL

MAST ARM TABLE

SUPPORT NO.	ELEVATION A	ELEVATION B	DESIGN TYPE	TC-81.21 DESIGN NO.	FOUNDATION TYPE	FOUNDATION DEPTH	POLE HEIGHT	ARM ATTACHMENT HEIGHT	BRACKET ARM ATTACHMENT HEIGHT	L	S1	L1	L2	L3	L4	D1	D2	INDEX ANGLE: MAST ARM A	PEDESTRIAN SIGNAL HEAD	PEDESTRIAN PUSHBUTTON	BRACKET ARM	HANDHOLE	STOP BAR RADAR DETECTOR	DILEMMA ZONE RADAR DETECTOR	AUXILARY VEHICULAR SIGNAL HEAD	SIGN	POWER SERVICE COUPLING
							FT	FT	FT	FT	FT	FT	FT	FT	FT	FT	FT	DEG	DEG	DEG	DEG	DEG	DEG	DEG	DEG	DEG	DEG
N/E-1	779.22	777.87	TC-81.21	4	TC-21.20	12.5'	22.5	21	–	34	–	19.5	32	–	–	–	–	90	–	–	–	180	–	–	185	0/270	–
S/E-1	779.39	779.39	TC-81.21	13	TC-21.20	15'	26	19.5	25	58.5	–	23.5	34.5	45.5	56.5	29	–	0	–	–	0	180	260	220	220	0	90
S/E-2	N.A.	FLUSH WITH WALK	PEDESTAL	PEDESTAL	TC-83.20	36"	10.7	–	–	–	–	–	–	–	–	–	–	0*	0	0	–	180	–	–	–	–	–
S/W-1	N.A.	FLUSH WITH WALK	PEDESTAL	PEDESTAL	TC-83.20	36"	12.7	–	–	–	–	–	–	–	–	–	–	0*	0	0	–	180	–	–	275	0	–
N/W-1	781.83	780.07	TC-81.21	12	TC-21.20	15.5'	27	19.8	26	46.5	17	11.5	22.5	35.0	44.5	39	39	0	–	–	0	180	–	–	–	0/270	–

Column groups: ELEVATION (A, B); SIGNAL SUPPORT DETAILS (DESIGN TYPE through D2); INDEX ANGLE (MAST ARM A); ORIENTATION ANGLES FROM MAST ARM (PEDESTRIAN SIGNAL HEAD through POWER SERVICE COUPLING).

* No Arm Index Angle for Reference Only.

REVISIONS		
MARK	DATE	DESCRIPTION

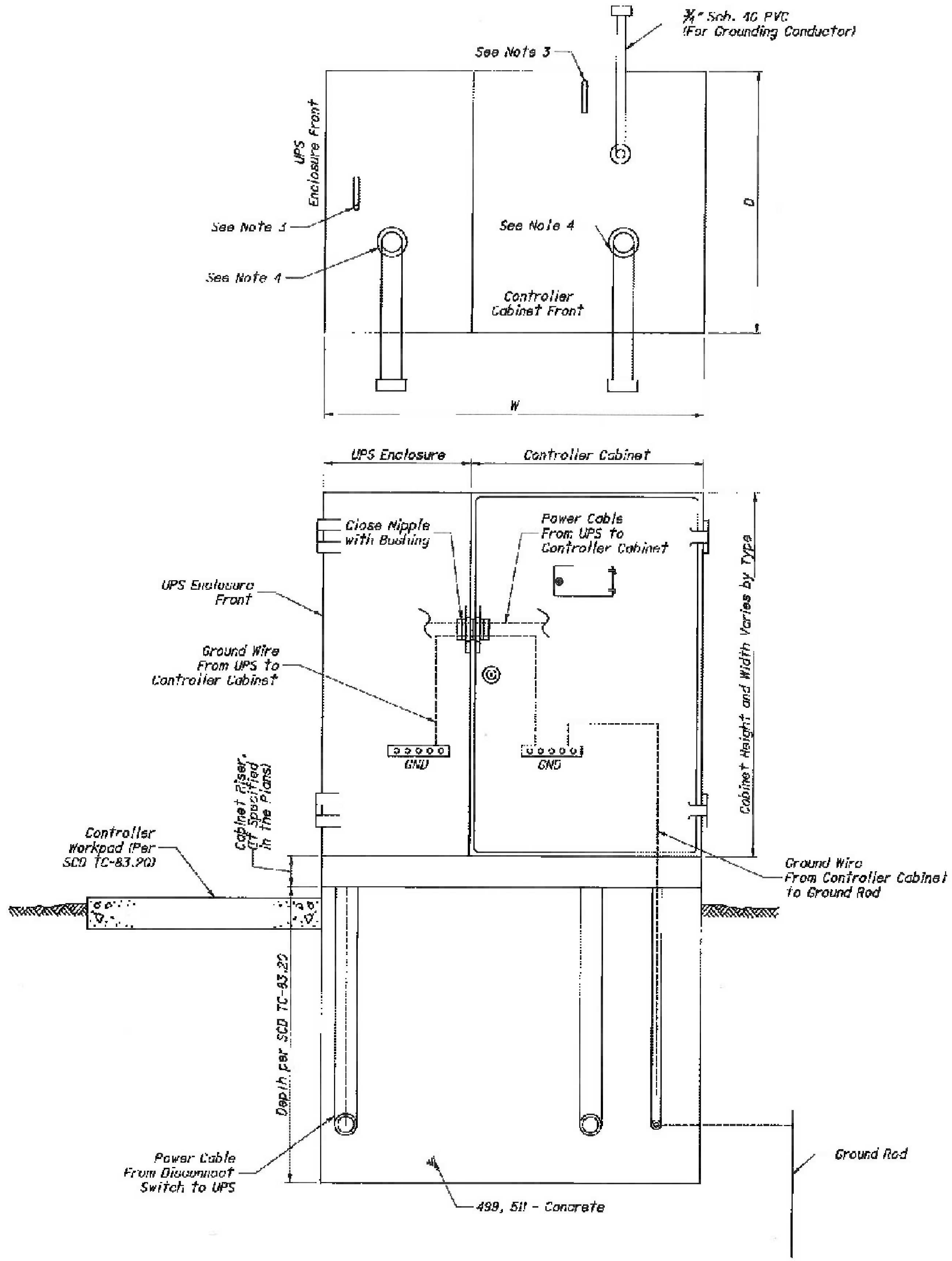
CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS

TRAFFIC SIGNAL INSTALLATION DETAILS

EMHT
Evans, Mechwart, Hambleton & Tilton, Inc.
emht.com

DATE: November, 2016
SCALE: None
JOB NO. 2013-1289
SHEET 32/44



NOTES:

1. The Uninterruptible Power Supply (UPS) enclosure shall be mounted flush up against the traffic signal cabinet and sealed with silicone. The Contractor shall be responsible for providing the necessary power cable between the UPS unit and signal cabinet.
2. The UPS should be placed on the opposite side of the pull box on a 332/336 cabinet (per Standard Construction Drawing (SCD) TC-83.20). The UPS placement for a NEMA cabinet varies, placement should provide adequate access with respect to slope, guardrail spacing, etc.
3. The size, number, and location of anchor bolts shall be in accordance with the manufacturer's recommendations.
4. The size, number, and orientation of conduit ells shall be as shown in the plan, except that a ¾" schedule 40 PVC shall be installed in each foundation.
5. 1/2" preformed joint filler as per CMS 705.03 shall be used between foundations and adjacent paved areas.
6. See SCD TC-83.20 for further details.

TYPE	W (IN.)	D (IN.)	FOUNDATION CONCRETE (CU. YD.)
TS-1	60	24	1.23
TS-2	70	36	2.16
2070/170	50	36	1.54

THIS DRAWING REPLACES PIS 208320 DATED 04-20-2012.

1/1	PIS 208320	PLAN INSERT SHEET UNINTERRUPTIBLE POWER SUPPLY (UPS) AND CONTROLLER CABINET FOUNDATION	REVISION DATE 07-18-2014 CHECKED: CHECKED	DESIGNED: XXX REVIEWED: XXX	OFFICE OF ROADWAY ENGINEERING

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENTS
UNINTERRUPTIBLE POWER SUPPLY (UPS) AND
CONTROLLER CABINET FOUNDATION - PLAN INSERT SHEET

CITY OF GROVE CITY

REVISIONS: MARK | DATE | DESCRIPTION

EMHT — Evans, Mechwart, Hambleton & Tilton, Inc.

DATE: November, 2016
SCALE: None
JOB NO.: 2013-1289
SHEET: 33/44

MATERIAL SPECIFICATIONS FOR BBS GENERATOR POWER PANEL EQUIPMENT

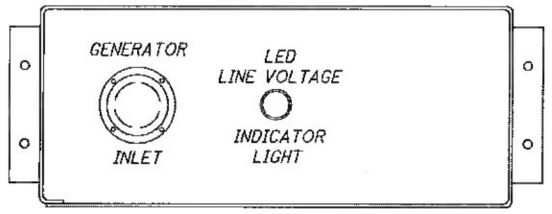
GENERATOR INLET - The inlet shall be 30 amp, 125/250V, locking, four (4) wire grounding and meet the NEMA configuration number L14-30-P 30A 125/250V specification. The inlet shall be a Hubbell catalog #2715.

LINE VOLTAGE GENERATOR SWITCH - The switch shall be 30 amp, 125/250V AC, two (2) pole, three (3) position (On, Off, On). The switch shall be a Hubbell catalog #1388.

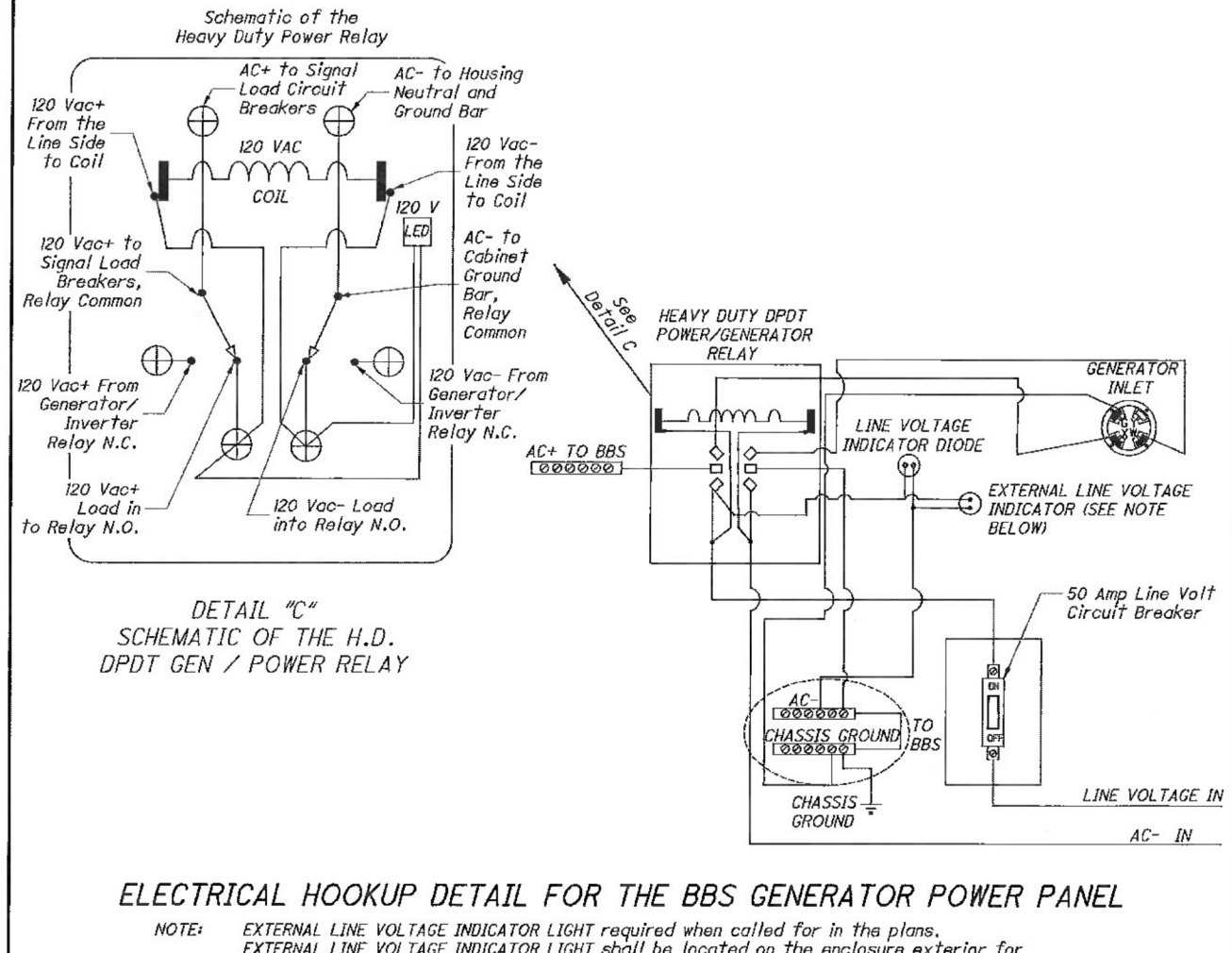
LINE VOLTAGE INDICATOR LIGHT - The indicator light shall be 125V AC light emitting diode with a red lens.

LINE VOLTAGE CIRCUIT BREAKER - The circuit breaker shall be single pole single throw and a minimum of 30 amps. The amperage shall be increased to accomodate greater loads, if necessary. The gauge of the power cable shall be of proper size per N.E.C.

EXTERNAL LINE VOLTAGE INDICATOR LIGHT - The indicator light shall be a 1" waterproof NEMA 4X or IP66 LED lamp with a green lens.



FRONT VIEW OF GENERATOR POWER PANEL

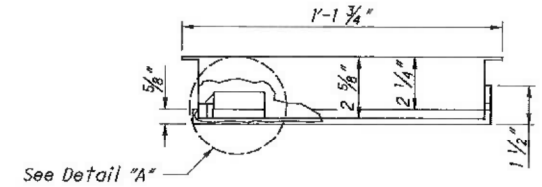


DETAIL "C"
SCHEMATIC OF THE H.D.
DPDT GEN / POWER RELAY

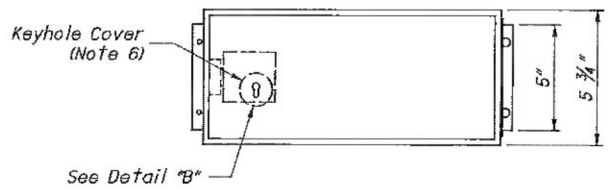
ELECTRICAL HOOKUP DETAIL FOR THE BBS GENERATOR POWER PANEL

NOTE: *EXTERNAL LINE VOLTAGE INDICATOR LIGHT required when called for in the plans. EXTERNAL LINE VOLTAGE INDICATOR LIGHT shall be located on the enclosure exterior for visibility from the adjacent roadway when all cabinet, and generator panel doors are closed.*

GENERATOR POWER PANEL ENCLOSURE



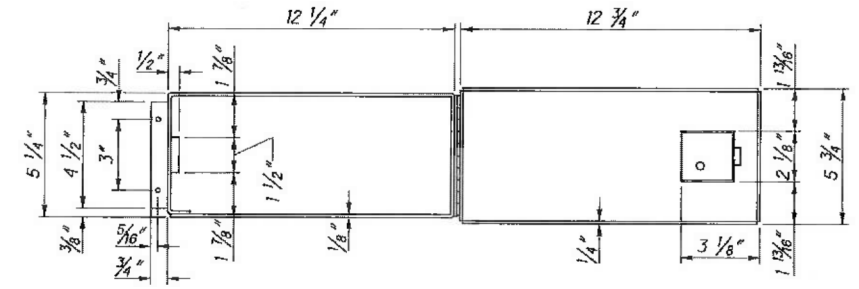
TOP VIEW



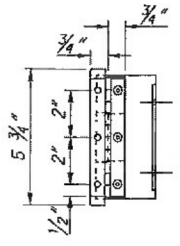
FRONT VIEW CLOSED DOOR

NOTES:

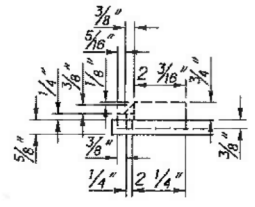
1. *The enclosure shall be constructed of 1/8" thick aluminum.*
2. *The lock shall be the standard police door type, keyed with the standard flasher door skeleton key.*
3. *The door shall be sealed with a foam rubber gasket to prevent moisture from entering the enclosure.*
4. *The enclosure shall be mounted onto the outside of the controller cabinet with non-accessible bolts and sealed with a high quality silicon caulk at all surfaces touching the cabinet.*
5. *The hinge shall be of stainless steel or equivalent corrosive-resistant material.*
6. *Keyhole shall be covered with a movable circular aluminum or brass cover with top pivot pin.*



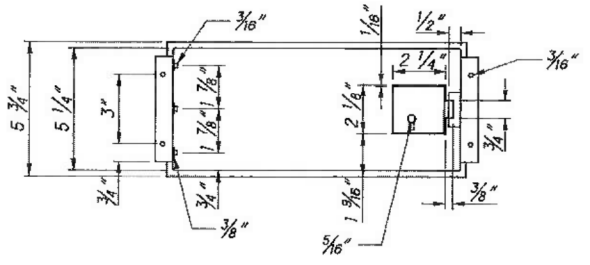
FRONT VIEW OPEN DOOR



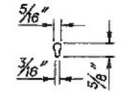
RIGHT SIDE VIEW
CLOSED DOOR



DETAIL "A"



BACK VIEW CLOSED DOOR



DETAIL "B"

THIS DRAWING REPLACES PIS 203012 DATED 04-20-2012.

PLAN INSERT SHEET

BATTERY BACKUP SYSTEM (BBS)
GENERATOR POWER PANEL

PIS 203012

1 / 1

REVISIONS		
MARK	DATE	DESCRIPTION

OFFICE OF ROADWAY ENGINEERING

REVISION DATE	DESIGNED
07-18-2014	XXX
CHECKED	REVIEWED
CHECKED	XXX

CITY OF GROVE CITY

CITY OF GROVE CITY, FRANKLIN COUNTY, OHIO
STREET IMPROVEMENTS
FOR
STRINGTOWN ROAD AND I-71
NORTHBOUND RAMP INTERSECTION IMPROVEMENT
UNINTERRUPTIBLE POWER SUPPLY (UPS) AND
CONTROLLER CABINET FOUNDATION - PLAN INSERT SHEET

EMHT
Burgess, Matchett, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Fax: 614.775.4800
emht.com

DATE: November, 2016

SCALE: None

JOB NO.: 2013-1289

SHEET: 34/44