NOTES:

1. Mount ITS Device, Various, so that it is mounted on the correct side of pole at a height recommended by the manufacturer.

2. Support hooks should be appropriately sized for the number and size of conductors to be supported. Support electrical and communication cables with separate hooks.

3. Run all wiring inside the pole and provide strain relief and support for all control cables.

4. When installing the mounting bracket for ITS Device, various, align and angle the device to cover the zones per manufacturer's specifications.

CCTV CAMERA ASSEMBLY (TYPICAL) (NOT TO SCALE)
AIR TERMINAL DETAIL
(NOT TO SCALE)
NOTES:

1. 1/2" preformed joint filler as per C&MS 705.03 shall be used between concrete pad and adjacent concrete areas.

2. A 6" thick work pad with dimensions shown on details shall be provided unless in an otherwise paved area.

3. For areas with less severe slopes (5:1 or less), grading shall be adjusted to provide access, drainage, and safety, as approved by the Engineer.

4. In level areas, the top of the pad shall be 1" above the ground line. In steeply sloped areas (4:1 or steeper), the pad's design shall be adjusted to provide access, drainage, and safety, as approved by the Engineer.

5. Refer to TC-83.20 ITS Cabinet Foundation guidelines and SCD ITS-50.12 for Sloped Work Pads.

6. Power Conduit from 18" Pullbox shall be One (1) 2" Conduit

7. Communication Conduit shall be Two (2) 3" Conduit to the CCTV Pole

8. Handhole Typ. 32" Pullbox

9. Conduits Brought Up to 3" Below Handhole

10. Two (2) 4" Multicell Conduits

11. 3" Conduit to the CCTV Pole shall be Two (2) Conduits for Each Isolation Joint

12. Approx. 24" Approx. 16" Min. 36" Min.

13. Approx. 120"
**NOTES:**

1. Mount vehicle detector unit so that the detector is mounted on the roadway side of pole at a height recommended by the manufacturer.

2. Support hooks should be appropriately sized for the number and size of conductors to be supported. Support electrical and communication cables with separate hooks.

3. Run all wiring inside the pole and provide strain relief and support for all control cables.

4. See plan sheets for vehicle detector locations.

5. When installing the mounting brackets for vehicle detectors, align and angle the detectors to cover the detection zone(s) per manufacturer’s specifications.

---

**Vehicle Detector to CCTV Camera and Data/Power Cable(s)**

- NEC 250.60 Air Terminal
- Stainless Steel Strap to Attach the Detector Assembly to the Pole, as Recommended by the Detector Manufacturer
- (Where Required as Per Plan)
- Orientation Shall be as Needed for Locations Specified as a Repeater.
- Additional Wireless Radio
- Relief Cord Connection
- Provide Weatherproof Strain
- Handhole (4" x 8")
- based on manufacturer’s specifications.

**Vehicle Detector Unit**

- Grounding Lug Attached to Continuous No. 6 Copper Wire
- Conduit with Lowering Unit Cable
- Stainless Steel Strap to Attach the Device to the Pole (Typ.)
- Conduit and Bushing as Required
- 1 1/2" dia. SCH. 40 PVC

**Wireless Radio**

- Connection
- Through Hole in Sleeve
- Through Hole in Forged Body
- 1 1/2" Threaded Hole
- 4" x 10" Channel

**Camera**

- Stainless Steel Strap to Attach the Camera to Pole, as Recommended by Camera Manufacturer
- Camera Lowering Device
- Conduits Brought Up to 3" Below Handhole
- No. 6 Copper Wire
- Concrete Back Fill
- Steel Ground Rod Electrode
- Weatherhead

**Channel Bracket (Supplied by Detector Manufacturer)**

- (NOT TO SCALE)

---

**CCTV Camera Assembly (Typical)**

(NOT TO SCALE)
NOTES:

1. V12" preformed joint filler as per C&MS 705.03 shall be used between pole and adjacent paved areas.

2. A 6" thick work pad with dimensions shown on details shall be provided unless in otherwise paved area. In level areas, the top of the pad shall be 3" above the ground line. In steeply sloped areas (in or steeper), the pad's design shall be adjusted to provide access, drainage, and safety, as approved by the Engineer.

3. For areas with less severe slopes (5:1 or less), grading or earthwork is preferred.

4. For pole-mounted ITS cabinet, the mounting height shall result in the bottom of the cabinet to be 30" above the work pad.
NOTES:

1. If ITS cabinet is pole-mounted, it shall be oriented on side (A) of pole, above 2" couplings.

2. If communication cabinet is pole-mounted, it shall be oriented on side (B) of pole, above 2" couplings if required.

3. The tenon at the top of the pole shall be bolted so the lowering device camera arm shall be oriented on side (A) of the pole or offset angle allowable up to 80 degrees toward side (A) or (B), to avoid lowering the camera over the lowering device operator for safety reasons, or into any cabinets or devices mounted on the pole. Thus, the camera arm shall be oriented within the range of 90 degrees to 270 degrees from the large handhole, a minimum of 90 degrees from the large handhole in either direction. The camera arm shall also be oriented so the camera is capable of viewing in all roadway directions, including major routes and side streets. Therefore, the pole shall not block any roadway views from the camera, or only block a roadway view as little as possible, possibly a small portion of a ramp, approved by the Engineer.

4. The grounding system/lugs shall be integrated nearby the 4 1/2" x 30" handhole opening to allow for easy inspection and attachment of grounding wire to lug. The grounding lug shall in no way interfere with the placement/operation of the camera lowering device or winch.

5. Maximum horizontal deflection is 1" for a sustained 30 mph wind velocity with no gust.


7. All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be used between Concrete Pole and Adjacent Paved Areas. 1/2" Preformed Joint Filler as per C&MS 705.03 shall be used between Concrete Pole and Adjacent Paved Areas.

8. The camera arm shall be oriented in the range of 90 degrees to 270 degrees from the large handhole, a minimum of 90 degrees from the large handhole in either direction. The camera arm shall also be oriented so the camera is capable of viewing in all roadway directions, including major routes and side streets. Therefore, the pole shall not block any roadway views from the camera, or only block a roadway view as little as possible, possibly a small portion of a ramp, approved by the Engineer.

9. 2" Electrical Couplings

If ITS cabinet is pole-mounted, it shall be oriented on side (A) of pole, above 2" couplings.

The ground lug shall be integrated nearby the 4 1/2" x 30" handhole opening to allow for easy inspection and attachment of grounding wire to lug. The grounding lug shall in no way interfere with the placement/operation of the camera lowering device or winch.

Maximum horizontal deflection is 1" for a sustained 30 mph wind velocity with no gust.

All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be unacceptable.

12.5" Drain Hole

Plugged Butt Complete with 1/2" Drain Hole

NOTES:

1. If ITS cabinet is pole-mounted, it shall be oriented on side (A) of pole, above 2" couplings.

2. If communication cabinet is pole-mounted, it shall be oriented on side (B) of pole, above 2" couplings if required.

3. The tenon at the top of the pole shall be bolted so the lowering device camera arm shall be oriented on side (A) of the pole or offset angle allowable up to 80 degrees toward side (A) or (B), to avoid lowering the camera over the lowering device operator for safety reasons, or into any cabinets or devices mounted on the pole. Thus, the camera arm shall be oriented within the range of 90 degrees to 270 degrees from the large handhole, a minimum of 90 degrees from the large handhole in either direction. The camera arm shall also be oriented so the camera is capable of viewing in all roadway directions, including major routes and side streets. Therefore, the pole shall not block any roadway views from the camera, or only block a roadway view as little as possible, possibly a small portion of a ramp, approved by the Engineer.

4. The grounding system/lugs shall be integrated nearby the 4 1/2" x 30" handhole opening to allow for easy inspection and attachment of grounding wire to lug. The grounding lug shall in no way interfere with the placement/operation of the camera lowering device or winch.

5. Maximum horizontal deflection is 1" for a sustained 30 mph wind velocity with no gust.


7. All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be unacceptable.

12.5" Drain Hole

Plugged Butt Complete with 1/2" Drain Hole

NOTES:

1. If ITS cabinet is pole-mounted, it shall be oriented on side (A) of pole, above 2" couplings.

2. If communication cabinet is pole-mounted, it shall be oriented on side (B) of pole, above 2" couplings if required.

3. The tenon at the top of the pole shall be bolted so the lowering device camera arm shall be oriented on side (A) of the pole or offset angle allowable up to 80 degrees toward side (A) or (B), to avoid lowering the camera over the lowering device operator for safety reasons, or into any cabinets or devices mounted on the pole. Thus, the camera arm shall be oriented within the range of 90 degrees to 270 degrees from the large handhole, a minimum of 90 degrees from the large handhole in either direction. The camera arm shall also be oriented so the camera is capable of viewing in all roadway directions, including major routes and side streets. Therefore, the pole shall not block any roadway views from the camera, or only block a roadway view as little as possible, possibly a small portion of a ramp, approved by the Engineer.

4. The grounding system/lugs shall be integrated nearby the 4 1/2" x 30" handhole opening to allow for easy inspection and attachment of grounding wire to lug. The grounding lug shall in no way interfere with the placement/operation of the camera lowering device or winch.

5. Maximum horizontal deflection is 1" for a sustained 30 mph wind velocity with no gust.


7. All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be unacceptable.

12.5" Drain Hole

Plugged Butt Complete with 1/2" Drain Hole

NOTES:

1. If ITS cabinet is pole-mounted, it shall be oriented on side (A) of pole, above 2" couplings.

2. If communication cabinet is pole-mounted, it shall be oriented on side (B) of pole, above 2" couplings if required.

3. The tenon at the top of the pole shall be bolted so the lowering device camera arm shall be oriented on side (A) of the pole or offset angle allowable up to 80 degrees toward side (A) or (B), to avoid lowering the camera over the lowering device operator for safety reasons, or into any cabinets or devices mounted on the pole. Thus, the camera arm shall be oriented within the range of 90 degrees to 270 degrees from the large handhole, a minimum of 90 degrees from the large handhole in either direction. The camera arm shall also be oriented so the camera is capable of viewing in all roadway directions, including major routes and side streets. Therefore, the pole shall not block any roadway views from the camera, or only block a roadway view as little as possible, possibly a small portion of a ramp, approved by the Engineer.

4. The grounding system/lugs shall be integrated nearby the 4 1/2" x 30" handhole opening to allow for easy inspection and attachment of grounding wire to lug. The grounding lug shall in no way interfere with the placement/operation of the camera lowering device or winch.

5. Maximum horizontal deflection is 1" for a sustained 30 mph wind velocity with no gust.


7. All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be unacceptable.
**SIGNAL POLE WITH MAST ARM**

1. Shall be capable of supporting CCTV assembly units up to 75 lbs.
2. All connection points shall be properly sealed to ensure weatherproof cable pathway from signal pole into CCTV assembly unit.
3. PFTE anti-seize thread sealant shall be used on all fittings.
5. Lock and flat washers shall be used.
6. No exposed cables - all cabling shall be hidden by bracket assembly unit.
7. All hardware shall be stainless steel.
8. All screws shall be hex cap screws.
9. All unused coupling holes shall be plugged with threaded PVC plugs to prevent any kind of weather/rodent intrusion. Rubber caps shall be unacceptable.
10. Camera shall be a minimum of 10 ft above the mast arm on the support pole. If there is luminaire bracket arm, the CCTV camera shall be just below the bracket arm attachment.
**LEGEND**

**WORK BY UTILITY** -
- Aerial service entrance cable furnished and installed by electric utility, if necessary; use power service pole mounted details. 
- Communications cable furnished and installed by communication provider.

**WORK BY CONTRACTOR** -
1. Contractor furnished and installed Class IV wood pole (minimum 30' long). See table on this sheet for setting depths. It is the responsibility of the Contractor to furnish and install a wood pole that is sufficient in length to meet min. roadway clearance of 20'. Wood pole shall be furnished and installed as part of the power service for shared utility sites.
2. 2' conduit riser. See detail - Conduit Mounting Bracket for mounting details.
3. Schedule 80 PVC conduit in trench. Conduit shall be 2' minimum for communication. Terminate this conduit in pull box. Conduit installed a minimum of 30" below grade.
4. Pull box, 30" will be installed at the location shown in the plan.
5. Conduit per plan by Contractor.

**WOOD POLE SETTING DEPTH CHART**

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<th>LENGTH</th>
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<td>65</td>
<td>8'-6&quot;</td>
</tr>
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</table>

**COMMUNICATION SERVICE DETAIL**

**NOTES:**

1. Contractor must coordinate with utilities' Field Engineer. Contractor shall be responsible for scheduling and coordinating of all utilities, related work, and inspections as necessitated by the project.

**CONDUIT MOUNTING BRACKET**

- 3/8" Lag Bolt
- 5/6" Double Arm Bolt (Length to Suit)
- Multi-Use Bracket
- Strap Kit with Nuts and Lock Washers (Sized To Fit Conduit)
1. Remove and store topsoil from the evacuation. Dispose of all unsuitable material before backfilling.

2. Center the conduit in the trench and hold firmly in place while the trench is backfilled.

3. The backfill material shall conform to ODOT Item 625 - Trenching (Incidental).

4. Install a 4 mil plastic orange warning tape 6" - 8" below surface, incidental for the entire length of the trench.

5. After backfill material is placed in unpaved areas, seed and mulch over trenched areas.

6. Provide high impact conduit spacers at intervals not greater than 10'. Spacers are considered incidental to the conduit item and will not be paid for separately.
1. "A" cut out 4 wires in the area of the reduced wall section. Also include the vertical wire for removal.

2. Concrete comp. strength 4000 psi min. design.

3. Concrete air entrainment to be 6% + 1 1/2%.

4. Coating of protective acrylic is to be applied to the top of 32" of the inside face and top of inside face.

5. Lid ring load transfer is to be distributed by the use of a preformed mastic joint material.

6. Each pull box shall have a drain, 1 1/2" conduit, independently draining to a ditch or to a roadway underdrain shown in Standard Construction Drawing HL-30.11.

7. Slope the proposed 4" raceway (PVC conduit) to drain into 32" pull box on either side of the freeway shoulder, where applicable. The 4" conduit shall remain above the underdrain.

8. Minimum bend radius of 4" PVC is 24".

9. Contractor shall install a pull box pad as detailed on this page. The pull box pad shall be incidental to this pay item and will not be paid for separately.

10. Dust seal shall be placed on all conduits in pullbox which enter a cabinet.

Contractor shall make necessary provisions to ensure that the lid and ring (frame assembly) are secure before pouring concrete. Expansion material shall be placed between lid and ring (frame assembly). Contractor shall inspect the frame assembly for any deficiencies and/or voids prior to pouring concrete. All voids shall be filled prior to pouring pad. All deficiencies shall be reported to ODOT personnel on scene so that prompt corrections can be made. Workpads shall be sloped so that all sides are even with the ground. Contractor shall ensure that all debris and excess concrete is removed from the inside of the ring so that the lid can be easily removed and replaced.
One coat of water repellent sealer shall be applied to the inside and outside of the pull box.

Concrete shall have air entrainment of 8% +/- 2% and shall have 4500 psi strength of 28 days. Concrete materials shall meet ODOT specifications.

Lid ring load transfer is to be distributed by use of prestressed concrete joint material.

Cut off conduits so they extend no more than 3" beyond the pull box wall and provide bushings.

Whenever possible, conduits should enter the pull box via a knockout. When approved by the ODOT Engineer, conduits may enter the pull box through its wall only if the opening is saw cut or core drilled. Conduits shall not enter via the bottom of the pull box without approval by the ODOT Engineer.

Conduit shall enter knockout at least 30 degrees as possible.

The wedge anchor assembly shall be utilized whenever the entire area above the knockout (1/4 of the casting) is encased in either concrete or asphalt. The encasement shall be centered around the knockout.

After the conduits have been installed, any opening in the pull box wall shall be totally filled with mortar or concrete and finished flush with the inside of the pull box wall.

Pull box bearing capacity to exceed 40,000 pounds.

Enlarging the knockout area, if required, shall be done by saw cutting the concrete only after the knockout is removed. The Contractor shall replace the concrete housing, if damaged, at their expense.

Any conduit that exits a pull box, contains cable and directly enters any electronics cabinet, shall be duct-sealed in the pull box.

The Contractor shall install non-organic fiberglass pull tape with a minimum 4500 lb./ft tension strength in conduit to facilitate cable placement.

All unused conduits shall be capped and the caps secured to the conduits with tape.

Standard placement for wire mesh and rebar shall be used.

Each pull box shall have a drain, 1#4" conduit, independently draining to a ditch or to a roadway underdrain (shown in Standard Construction Drawing HL-30.11).

Slope the proposed 4" raceway (PVC conduit) to drain into 32" pull box on either side of the roadway shoulder, where applicable. The 4" conduit shall remain above the underdrain.

Minimum bend radius of 4" PVC is 24".

Contractor shall install a pull box pad as detailed on this page. The pull box pad shall be incidental to this pay item and will not be paid for separately.

Each pull box shall be easily removed and replaced.

Concrete pad shall be incidental to this pay item and will not be paid for separately.

Lid and frame assembly shall be centered around the knockout. The encasement shall be centered around the knockout.

After the conduits have been installed, any opening in the pull box wall shall be totally filled with mortar or concrete and finished flush with the inside of the pull box wall.

Pull box bearing capacity to exceed 40,000 pounds.

Enlarging the knockout area, if required, shall be done by saw cutting the concrete only after the knockout is removed. The Contractor shall replace the concrete housing, if damaged, at their expense.

Any conduit that exits a pull box, contains cable and directly enters any electronics cabinet, shall be duct-sealed in the pull box.

The Contractor shall install non-organic fiberglass pull tape with a minimum 4500 lb./ft tension strength in conduit to facilitate cable placement.

All unused conduits shall be capped and the caps secured to the conduits with tape.

Standard placement for wire mesh and rebar shall be used.

Each pull box shall have a drain, #4" conduit, independently draining to a ditch or to a roadway underdrain (shown in Standard Construction Drawing HL-30.11).

Slope the proposed 4" raceway (PVC conduit) to drain into 32" pull box on either side of the roadway shoulder, where applicable. The 4" conduit shall remain above the underdrain.

Minimum bend radius of 4" PVC is 24".

Contractor shall install a pull box pad as detailed on this page. The pull box pad shall be incidental to this pay item and will not be paid for separately.

Lid and frame assembly shall be centered around the knockout. The encasement shall be centered around the knockout.

After the conduits have been installed, any opening in the pull box wall shall be totally filled with mortar or concrete and finished flush with the inside of the pull box wall.

Pull box bearing capacity to exceed 40,000 pounds.

Enlarging the knockout area, if required, shall be done by saw cutting the concrete only after the knockout is removed. The Contractor shall replace the concrete housing, if damaged, at their expense.

Any conduit that exits a pull box, contains cable and directly enters any electronics cabinet, shall be duct-sealed in the pull box.

The Contractor shall install non-organic fiberglass pull tape with a minimum 4500 lb./ft tension strength in conduit to facilitate cable placement.

All unused conduits shall be capped and the caps secured to the conduits with tape.

Standard placement for wire mesh and rebar shall be used.

Each pull box shall have a drain, #4" conduit, independently draining to a ditch or to a roadway underdrain (shown in Standard Construction Drawing HL-30.11).

Slope the proposed 4" raceway (PVC conduit) to drain into 32" pull box on either side of the roadway shoulder, where applicable. The 4" conduit shall remain above the underdrain.

Minimum bend radius of 4" PVC is 24".

Contractor shall install a pull box pad as detailed on this page. The pull box pad shall be incidental to this pay item and will not be paid for separately.

Lid and frame assembly shall be centered around the knockout. The encasement shall be centered around the knockout.

After the conduits have been installed, any opening in the pull box wall shall be totally filled with mortar or concrete and finished flush with the inside of the pull box wall.

Pull box bearing capacity to exceed 40,000 pounds.

Enlarging the knockout area, if required, shall be done by saw cutting the concrete only after the knockout is removed. The Contractor shall replace the concrete housing, if damaged, at their expense.

Any conduit that exits a pull box, contains cable and directly enters any electronics cabinet, shall be duct-sealed in the pull box.

The Contractor shall install non-organic fiberglass pull tape with a minimum 4500 lb./ft tension strength in conduit to facilitate cable placement.

All unused conduits shall be capped and the caps secured to the conduits with tape.

Standard placement for wire mesh and rebar shall be used.

Each pull box shall have a drain, #4" conduit, independently draining to a ditch or to a roadway underdrain (shown in Standard Construction Drawing HL-30.11).

Slope the proposed 4" raceway (PVC conduit) to drain into 32" pull box on either side of the roadway shoulder, where applicable. The 4" conduit shall remain above the underdrain.

Minimum bend radius of 4" PVC is 24".
CONDUIT ON STRUCTURE

Expression Fittings for Conduit on Structure.

Each Expression Fitting shall be a Copper, Stainless Steel, or Approved Equal. Each Expression Fitting shall have an External Bonding Jumper.

TYPICAL SURVEILLANCE CONDUIT TREATMENT AT END OF BRIDGE PARAPET

TYPICAL SURVEILLANCE CONDUIT TREATMENT AT END OF BARRIER WALL

BRIDGE PIER RISER

Section A-A

ELEVATION VIEW

PLAN VIEW

END PARAPET DETAIL

Direction of Traffic

BRIDGE PARAPET

ELEVATION VIEW

PLAN VIEW

32" Pull Box 725.20, Schedule 40

2-4" Multicell Raceway, 725.04 per HL-30.11

6" Min. Agg. Base and Drain,

32" Pull Box

BRIDGE PARAPET

725.20, Schedule 40

2-4" Multicell Raceway,

Connector Conduit

725.20, Schedule 40

2-4" Multicell Raceway,

4" Lighting Raceway

TYPICAL SURVEILLANCE CONDUIT TREATMENT AT END OF BRIDGE PARAPET

TYPICAL SURVEILLANCE CONDUIT TREATMENT AT END OF BARRIER WALL

32" Pull Box 725.20, Schedule 40

2-4" Multicell Raceway,

Connector Conduit

725.20, Schedule 40

2-4" Multicell Raceway,

Median Barrier Type b1

per HL-30.11

6" Min. Agg. Base and Drain,

20'-0"

Not Shown

RM-4 for Notes and Details

High Barrier see Std. Drawings.

Upper 18" Required. For the

Optional Locations for the

Junction Box

Median
CONDUIT TRANSITION TO MEDIAN JUNCTION BOX
(Not to Scale)

Raceway and Dowel Bar Placement (Not to Scale)

Concrete Pavement
- Dowel Cover 4" Min.
- Dowel Bar (Typ.)
- Do not Place Dowels Closer than 4" to any Conduit.
- 4" Multicell ITS Conduit, 725.20, Schedule 80
- 4" Lighting Conduit, 725.051, EPC-40

Asphalt Pavement
- Dowel Cover 4" Min.
- Dowel Bar (Typ.)
- Do not Place Dowels Closer than 4" to any Conduit.
- 4" Multicell ITS Conduit, 725.20, Schedule 80
- 4" Lighting Conduit, 725.051, EPC-40

CONSTRUCTION JOINTS: BARRIER RUNS WITH ABUTTING VERTICAL SURFACES AT EITHER REQUIRED OR PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE DOWELED TO EACH OTHER BY USE OF 3/4" X 8" BY 1" LONG EPOXY COATED DEFLECTION DOWEL BARS AS PER CMS 622.02. BARS ARE TO BE PLACED AS SHOWN PROVIDE A 4" CLEARANCE TO BARRIER SURFACES AND TO ANY RACEWAYS.

RACEWAYS LOCATE AS SHOWN, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. ENSURE THAT THE ELECTRICAL RACEWAY IS CLEAR OF OBSTRUCTIONS. COST OF THE 4" POLYVINYL CHLORIDE RACEWAYS IS INCLUDED WHERE SHOWN ON THE PLANS. THE COST FOR ADDITIONAL RACEWAYS AND NO. 10 AWG COPPERCLAD OR ALUMINUM-CLAD WIRE IS ALSO INCLUDED WHERE SHOWN ON THE PLANS FOR FUTURE INSTALLATION OF CIRCUITS.

Asphalt Intermediate Course
- 4" Multicell ITS Conduit, 725.20, Schedule 80

Concrete Pavement
- Aggregate Base

Asphalt Base
- Aggregate Base

AGGREGATE BASE (CONCRETE PAVEMENT) OR ASPHALT INTERMEDIATE COURSE
**NOTES:**

1. Contractor must coordinate with utilities' field engineer. Contractor shall be responsible for scheduling and coordinating all utilities, related work, and inspections as necessitated by the project.

2. All work and materials shown on electrical service details from the electric utility pole to the disconnect is incidental to power service work (items 3 - 6).

3. Service provider power conduct systems shall be installed per NEC and local requirements.

4. Do not extend conduit above the secondary or neutral position of any flow.

5. Conduit shall maintain a minimum clearance of 6" below the secondary or neutral.

6. All proposed service types and locations are subject to approval from utility. Contractor is responsible for furnishing and installing all equipment according to Engineer's approval.

7. If power service is needed to provide 480V, the service shall be a 480/240 single phase service. The contractor shall coordinate with the power company to determine if they have any special requirements for a metered 480 volt service drop, such as but not limited to, additional enclosures or disconnect ahead of the meter, current transformers, or conduit boxes. If so, the contractor shall modify the power service as needed, as approved by the engineer.

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**LEGEND:**

**WORK BY UTILITY -**

- Aerial service entrance cable furnished and installed by utility.
- Splicing of utility's service entrance cable onto Contractor's service entrance cable by utility.
- Termination of Contractor-supplied service entrance cable onto contractor-installed wood pole/transformer.
- Existing/proposed electric utility pole installed by utility (as work).
- Existing/proposed electric utility meter base installed by utility (as work).

**WORK BY CONTRACTOR -**

1. Install 2" - 24" radius PVC bend, Schedule 80.
2. Warning ribbon 2" above service lateral.
3. Contractor furnished and installed Class V wood pole. Minimum 30' long, see Table on this sheet for setting depths. It is the responsibility of the Contractor to furnish and install a wood pole that is sufficient in length to meet min. roadway clearance of 20'.
4. Contractor-installed equipment stand per H-40.20. Channel strut attached to pole per conduit mounting bracket detail.
6. Fusible service disconnect switch. Fuse sizes & service rating shown on plan sheets.
7. Concrete pull box, 18" will be installed within 5' of every electrical service. No electrical splices permitted.
8. 5/8" x 10' copper clad steel grounding rod electrodes, app. top of ground rod installed 30" below grade and at least 1' off edge of pole or equipment foundation, see detail "Site grounding."
9. 2" weatherhead and strain relief hardware furnished & installed by Contractor.
10. 2" conduit riser. See conduit mounting bracket for mounting details.
11. Service entrance cable in conduit by Contractor. All service entrance cable shall be #4-USE-5KV for 100A services and #1/0 for 200A services, or as required by utility.
12. Threaded hub type conduit coupling between enclosures sized to accommodate conductors. See plan for wire requirements.
13. 1" schedule 40 PVC conduit for ground.
14. 1/2" #304SS ground electrode conductor in conduit to disconnect switch neutral bus.
15. Grounding electrode conductor attached to grounding electrode at least 30" below grade with ground clamp suitable for direct burial. From the disconnect switch neutral bus, the grounding electrode conductor must always be directed downward or horizontal.
16. Schedule 40 PVC conduit 6' trench. Conduit shall be 2" minimum. Terminate this conduit in pull box. Conduit installed a minimum of 30" below grade.

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**POWER SERVICE**

20/240V, 3 wire, 1 phase or 480/240V, 3 wire, 1 phase

- See Legend on Sheet for Power Service Pole Mounted.

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**NOTES:**

- See Legend on Sheet for Power Service Pole Mounted.

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**NOTES:**

- See Legend on Sheet for Power Service Pole Mounted.

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**NOTES:**

- See Legend on Sheet for Power Service Pole Mounted.
Conduit and cable per plan by Contractor. No replace permitted in pull boxes. Keep cabling back from unit duct cable and pull cable through to disconnect.

2" Conduit 725-04 conduit installed a minimum of 30" below grade. Contact for additional requirements.

Contact shall install conduit no closer than 2" from edge of utility transformer/panel. Approach to transformer will be coordinated with utility.

NEMA 40 conduit breaker enclosure with two flanges, 500V bolt-on type circuit breakers. Intrusion will be service entrance switch for field and disconnect switch鼓舞. Padlocks furnished shall be brass, agent to West Allen 5704A, and shall be keyed in accordance with Type 4. The disconnect shall be capable of being operated in both the on and off positions and shall also be capable of independently locking the door shut, one padlock shall be used to lock the disconnect switch in the appropriate position and one shall be used to lock the door shut.

If the aerial fixed distance is to be greater than 10', a guy wire anchor shall be installed to anchor the wood pole.

1/4" steel cable - eyebolt x 8' with appropriate nuts and large washer. Anchor - 3/4" x 4' with 6" plate and large washer.  Anchor - 3/4" x 4' with 6" plate and large washer. Distance from anchor to ground to the center of the wood pole shall be 10' minimum.

1. Contractor must coordinate with utilities field engineer.

2. All work and materials shown on electrical service details, service entrance cable to the disconnect in accordance to power service pay items.

3. Service entrance cable shall be installed per NEC and local requirements.

4. Do not extend conduit above the secondary or neutral position at any time.

5. Conducts shall maintain a minimum clearance of 6" below the secondary or neutral bus.

6. All proposed service types and locations are subject to approval from utility. Contractor is responsible for furnishing all conductors.

7. If power service is needed to provide 480V, the service shall be a 480/240V single-phase service. The contractor shall coordinate with the electric company to determine if they have any special requirements for a metered 480 volt service drop, such as but not limited to, an additional enclosure or disconnect switch of the meter, current transformers, or conduit boxes. If so, the contractor shall modify the power service as needed, as approved by the engineer.

NOTE:

The requirements for ground shall be 30" minimum.

Concrete pull box, 18" to be installed within 5' of every electrical service entrance, No electrical options permitted.

1/4" 200A service entrance cable shall be installed at the disconnect switch for service entrance.

1. Concrete pull box, 18" will be installed within 5' of every electrical service entrance, No electrical options permitted.

2. Complete installation of all electrical service entrance cable shall be performed by Contractor.

3. Schedule 80 PVC conduit for service entrance.

4. All service entrance conduit shall be #2-USE-5KV for 100A services and #1/0 for 200A services, as required by utility.

5. Length (auger style). Distance from anchor entering the ground to the center of the wood pole shall be 10' minimum. See Standard Construction Drawing HL-40.10 for more details.

6. 1/4" steel cable - eyebolt x 8' with appropriate nuts and large washer. Anchor - 3/4" x 4' with 6" plate and large washer.

7. Distance from anchor to ground to the center of the wood pole shall be 10' minimum.

8. All work and materials shown on electrical service details will be coordinated with the electric company.

9. Service entrance cable shall be installed per NEC and local requirements.

10. Do not extend conduit above the secondary or neutral position at any time.

11. Conducts shall maintain a minimum clearance of 6" below the secondary or neutral bus.

12. All proposed service types and locations are subject to approval from utility. Contractor is responsible for furnishing all conductors.

13. If power service is needed to provide 480V, the service shall be a 480/240V single-phase service. The contractor shall coordinate with the electric company to determine if they have any special requirements for a metered 480 volt service drop, such as but not limited to, an additional enclosure or disconnect switch of the meter, current transformers, or conduit boxes. If so, the contractor shall modify the power service as needed, as approved by the engineer.

NOTES:

1. Contractor must coordinate with utilities field engineer.

2. All work and materials shown on electrical service details will be coordinated with the electric company.

3. Service entrance cable shall be installed per NEC and local requirements.

4. Do not extend conduit above the secondary or neutral position at any time.

5. Conducts shall maintain a minimum clearance of 6" below the secondary or neutral bus.

6. All proposed service types and locations are subject to approval from utility. Contractor is responsible for furnishing all conductors.

7. If power service is needed to provide 480V, the service shall be a 480/240V single-phase service. The contractor shall coordinate with the electric company to determine if they have any special requirements for a metered 480 volt service drop, such as but not limited to, an additional enclosure or disconnect switch of the meter, current transformers, or conduit boxes. If so, the contractor shall modify the power service as needed, as approved by the engineer.
NOTES:

1. This layout should be used for all Ground-Mounted ITS Cabinet locations. If any equipment shown/listed is not to be installed by the Contractor, the dedicated space provided shall be left empty.

2. Any equipment not listed which needs to be installed by the Contractor shall have location approved by the ITS Engineer.

3. All device and equipment types shown shall utilize the dedicated rack space shown.

4. Contractor is responsible for providing all necessary 10/32 x 1/2" pan head zinc plated or stainless steel machine screws to attach devices to the rack, minimum 4 screws per device.

1. This drawing replaces ITS-18.00 dated 01-18-2019.

DMS CONTROLLER WILL BE PLACED DIRECTLY UNDER THE SHELF UNLESS THERE IS NOT A DMS CONTROLLER, THEN PLACE THE CAMERA CONTROLLER UNDER THE SHELF. IF BOTH A DMS CONTROLLER AND A CAMERA CONTROLLER ARE NEEDED, PLACE THE DMS CONTROLLER ON TOP OF THE CAMERA CONTROLLER (CLOSER TO THE SHELF). ALSO NOTE THAT NEITHER CONTROLLER MAY BE PRESENT. IF THIS IS THE CASE, THE SPACE WILL REMAIN EMPTY.
TYPICAL HAR FLASHING BEACON SIGN

TRAFFIC INFO
TUNE RADIO TO
1630 AM
TRAFFIC ALERT
WHEN FLASHING

Frequency as
Specified by Plans

Breakaway Beam Connections

SECTION A-A
NEMA ENCLOSURE WITH SURGE PROTECTION
(NOT TO SCALE)

TRIAD GROUND SYSTEM
(NOT TO SCALE)

Approx. Depth 10'-20'

Ground Lead

Ground Line

Antenna

Steel Tubing Tip

Anodized Aluminum Whip-Type Antenna with Adjustable Stainless Steel Tubing Tip

Ground Lead Cable

Ground Level

6" - 12" Below Grade

Copper Pipes Buried

2" Dia. Perforated Sweep with Duct Seal

3 - Conduit Sweeps as Per Plan
One for Power
One for Communication
Sweep with Duct Seal

2" Glu. Perforated Copper Pipes Buried
6" - 0" Below Grade

Ground Level

Wood Pole (30' Above Ground Level)

1" Rigid Metal Conduit (RMC)

Fasten as Required

NEMA Enclosure

3' 5'

6'

11'

3.6'

2" RMC Power Conduit

4" Communication Conduit

Ground Lead Cable

3" RMC Power Conduit

4" Communication Conduit

Antenna Lead Conduit

1" RMC

Ground Lead

Antenna Lead Conduit

1" RMC

Ground Lead

Antenna Lead Conduit

1" RMC

Ground Lead

2. **DESIGN DATA**:

   Loading: Walkway Live Load = 80 pounds per square foot.

3. **MATERIALS**: Structural Steel ASTM A36 minimum yield strength, 36,000 pounds per square inch. Welding Electrode Grade and Welding Processes E60XX or E70XX Carbon Steel, E70XX or E70SH, E60XX or E60SH, E70S or E70S-1. Main Connections Bolts: ASTM A325 Other Bolts: As Noted. ASTM A307 Threaded Bars, A542, A572. Steel shall be galvanized to conform to ASTM A153 after cutting, bending, and welding. Bolts, nuts, washers, and similar threaded fasteners shall be galvanized as per ASTM A153. These items may be mechanically coated in accordance to ASTM B695 Class SG.

4. **WORK DESCRIPTION**: The work shall consist of the installation of a hung catwalk structure. The host structure will be the Steel Pedestal Overhead Sign Support TC-(Modified). The Contractor shall prepare full catwalk structure installation drawings to fit the span requirements by the Project Plan of the site of interest. The Construction Drawings shall be based on the Plan, Details and Materials described. The Contractor shall determine the exact placement of the sign on the support pedestal to calculate the length of catwalk required. If the wearing surface of the proposed sign enclosure door will open out, a landing area shall be provided to allow total opening of the door.

5. **Shop Drawings** shall be submitted to the Engineer 10 days before fabrication.

6. **Payment for materials and installation of catwalk and ladder is incidental to sign pedestal.**

7. **18 ga. steel walkway shall be clipped to top flange and fastened as per manufacturer's recommendations.**

8. **The end beam is optional but preferred. The beam should go across the end of the catwalk and attach to the deck. Contact the DMS manufacturer for permission and attachment method and location. The total vertical load should not exceed 525 pounds. The additional wind load should not exceed 220 pounds. The total vertical load should not exceed 525 pounds.**

9. **Grating support rail shall be bolted to the end support rail of the overhanging catwalk.**

10. **The width of the catwalk at the door of the DMS enclosure can vary with the DMS size. It should be wide enough to open the access door outward ninety degrees from the sign housing.**

11. **See Standard Construction Drawings for pull box, conduit, and cabinet details.**
1. Saddle bars shown on details shall be bent hot.
2. Isolate aluminum from galvanized steel and use SS bolts/nuts at aluminum/steel connections.
3. Contact between aluminum and galvanized parts shall be prevented with a 1/8" aluminum chloroprene gasket or approved substitute.
4. U-bolts shall be galvanized steel.
1.  For soil density, see chart.
2.  Rod reinforcement = ASTM A615, GR. 60 (60 KSI). (Bar lengths do not include hooks or bends.)
3.  Concrete density - 150 P.C.F.
4.  Anchor bolts 6 in dia. x 1 1/2 x 48" 70K, 6 ea.
5.  Anchor bolts 6 in dia. x 1/2 x 48" 70K, 6 ea.
6.  Concrete strength - 3000 P.S.I.

NOTES:

SCD ITS-30.12 (sheet 1).

For Anchor Bolt Details See Note 5 and

THIS IS A NEW DRAWING.

OFFICE OF ROADWAY ENGINEERING
NOTES:
1. Arm plate hole diameter shall be bolt diameter plus 1/16". Threads may be retapped after galvanizing.
2. For foundation details, see ITS-30.12 or ITS-36.12 for concrete barrier installations. For reference, see TC-21.20.
3. The arm attachment plate shall be welded using a full penetration weld. The pole attachment to the base plate shall be welded using a full penetration weld.
4. Arm and pole tube are 62,000 psi.
5. Truss tubes are 38,000 psi.
6. A minimum of one bolt thread shall remain above the anchor nut. A bolt diameter of 1/2" or greater shall be used per manufacturer's engineering requirements.
7. All unused couplings shall be provided with a removable galvanized cast iron plug.
8. The design loads were developed without applying galloping fatigue loads. Also, the stress requirements of Note 8, Table 11-2 in the AASHTO code were not applied. This is a joint decision of the ODOT Engineers and the Consultants.
9. When placed on a concrete median barrier foundation, the length of the vertical support member shall be reduced by the height of the barrier wall (approx. 50%).
10. Weld 4 threaded steel 2-1/2" pipe couplings or short nipples to the arm tubes approximately 12" outboard of the first sign bracket for each sign. Remove all sharp edges inside the chord and pipe couplings.
11. Attach varmint screen with stainless steel band and minimum 2" overlap. To overlapping screen with stainless steel wire ties. Screen shall be welded wire mesh or expanded metal sheet, stainless steel or galvanized, with openings no larger than 3/8".
**NOTES:**

1. Steel shapes other than arm and pole tubes are A.S.T.M. A36.
2. Galvanized steel after fabrication per A.S.T.M. A333.
4. Steel nuts and washers A.S.T.M. A571.
5. H.S. bolts, nuts, and washers per A.S.T.M. A325.
7. When placed on a concrete median barrier foundation, the length of the vertical support member shall be reduced by the height of the barrier wall lip (approx. 50").

DMS SUPPORT FRAMING

- Platform may need extra length on arm tube for support attachment
- Type, number and location of connections specified by DMS Supplier

**NOTES**

- 4 U-Bolts per vertical member
- 8recessed holes on 2 7/8" Co.
- Stay, number and location of recessed holes (2) determined by DMS Supplier

**VERTICAL SUPPORT MEMBER**

- Holes on 2 7/8" Co.
- Stay, number and location of recessed holes (2) determined by DMS Supplier

**TYPICAL SECTION @ DMS SUPPORT**

- High Point of Roadway
- Top of concrete shall extend 3" above concrete roadway/Ground Line
- Platform may need extra length on arm tube for support attachment
- Face of DMS

**END CAP DETAIL**

- Bend to fit post to

**COLUMN END CAP DETAIL**

- End Cap Detail

**HANDHOLE AND COVER PLATE DETAIL**

- (Two Handholes Required, one at the base and one between the arms.)
NOTES:

1. 1/2" preformed joint filler as per C&MS 705.03 shall be used between concrete foundation and adjacent paved areas.

2. A 6" thick work pad with dimensions shown on details shall be provided unless in an otherwise paved area.

3. In level areas, the top of the pad shall be 1" above the ground line. In steeply sloped areas, the pad's design shall be adjusted to provide access, drainage, and safety, as approved by the Engineer.

WITH GROUND-MOUNTED CABINET

HIGHWAY SIDE

TYPICAL DMS PEDESTAL
(NOT TO SCALE)

PLAN VIEW

- 2-2" Conduits
- 1-2" Conduit
- 2-4" Multicell Conduits
- Work Pad per ODOT C&MS 633.11
- Foundation
- Pole
- Cage
- Conduit to Other Devices as per Plan
- Conduit from Power Service as per Plan
- Conduit to ITS Cabinet as per Plan
- Work Pad 84" x 84"
NOTES:

1. 1/2" preformed joint filler as per C&MS 105.03 shall be used between concrete foundation and adjacent paved areas.

2. A 6" thick work pad with dimensions shown on details shall be provided unless in an otherwise paved area.

3. In level areas, the top of the pad shall be 1" above the ground line. In steeply sloped areas, the pad's design shall be adjusted to provide access, drainage, and safety, as approved by the Engineer.

4. For pole-mounted ITS cabinets, the mounting height shall result in the bottom of the cabinet to be 50" above the work pad.

WITH POLE-MOUNTED CABINET

HIGHWAY SIDE

TYPICAL DMS PEDESTAL

(Not to scale)

PLAN VIEW
1. DESIGN SPECIFICATIONS:

2. DESIGN DATA:
Loading: Walkway Live load = 65 pounds per square foot.

3. MATERIALS:
Structural Steel ASTM A36 minimum yield strength Fy = 36000 pounds per square inch.
Welding Electrode Grade F6XX or E7XX Manual Shielded Metal-Arc, FEXXX or FTXXXX Submerged-Arc, 7018 or 7014-Gas Metal-Arc, Main Connections Bolts ASTM A325, Other Bolts (as noted) ASTM A578.
Threading Bars (stock) ASTM A36.

Steel shall be galvanized to conform to ASTM A453 after cutting bending and welding. Bolts, nuts, washers and similar threaded fasteners shall be galvanized as per ASTM A153. These items may be mechanically zinc coated in accordance to ASTM D695 Class 65.

4. WORK DESCRIPTION:
The work shall consist of the fabrication and installation of a hung catwalk structure. The host structure will be the Steel Truss Overhead Sign Support TC-15.115 (Modified).
The Contractor shall prepare full catwalk structure construction drawings to fit the span requirements by the Project Plan. The Construction Drawings shall be based on the Plan, Details and Materials described.
The Contractor shall determine the exact placement of the sign on the sign support truss to calculate the length of catwalk required.
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The Contractor shall determine the exact placement of the sign on the sign support truss to calculate the length of catwalk required.

5. SHOP DRAWINGS:
The Contractor shall submit shop drawings to the Engineer 10 days before fabrication.

6. PAYMENT:
Payment for materials and installation of catwalk and ladder is incidental to sign truss.

7. MOUNTING:
Stepladder grating for walkway shall be fastened per manufacturer recommendations.

8. DIMENSIONS:
The width of the catwalk at the door of the DMS enclosure can vary with DMS size. It should be wide enough to open the access door outward ninety degrees from the sign housing.

9. REFERENCES:
See Standard Construction Drawings for pull box, conduit, and cabinet details.
**HANDRAIL AND POST**

- C6 x 8.2
- L2 x 2 x ¾ Handrail
- ½" Gusset Plate
- C6 x 8.2

**FRAME RAIL DETAIL**

- C6 x 8.2
- L3 x 2 x ¾
- ½" Filter Plate

**TRANSVERSE BEAM DETAIL**

- C/C Space Truss Chords, 5'

**LADDER PLAN**

- End Frame Poles Adjacent to Catwalk

**CATWALK CROSS SECTION AND HANGERS**

- End Facing Proposed
- Dynamic Message Sign
- Front Hanger
- Rear Hanger

**FRAME RAIL DETAIL**

- MC6 x 12
- Catwalk Transverse Beam
- See Frame Rail Detail

**PLAN**

- MC6 x 12
- See Detail of Connection
- Space Truss End Frames
- See CATWALK PLAN on Sheet 1

**DETAIL OF CONNECTION**

- Isolate Aluminum, Steel and Use 55 Bolts/Nuts of Alum./Steel Connections

**ALL BOLTS ⅜" HS ASTM A325**

- All Bolts ⅜" HS ASTM A325

**F R O M E - B Y - E N G I N E E R I N G  O F F I C E**

**REMARKS**

- This is a new drawing.

- All Bolts ⅜" HS ASTM A325

- SS Bolts/Nuts at Alum./Steel Connections

- Isolate Alum. from Galv. Steel and Use 55 Bolts/Nuts of Alum./Steel Connections
NOTES:
1. Tie anchor bolts to rebar cage near the top and bottom of the anchor bolts.
2. Decks may be deeper as required in the plans.
3. When required by local conditions and approved by the Engineer, alternate foundation designs are acceptable.
4. Provide all anchor bolts with standard steel hex nuts, leveling nuts, and plain washers. The nuts shall be capable of developing the full strength of the anchor bolts.
5. At locations where the existing slope is 6:1 or greater, the buried depth of foundation shall apply to the low side of the slope. Set the top of the foundation 2" above the existing surface on the high side of the slope. The additional depth of foundation necessary to meet these requirements shall be added to the formed top.

<table>
<thead>
<tr>
<th>SUPPORT TYPE</th>
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<th>Dmax</th>
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CAP REINFORCEMENT FOR ALL CAPS

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<td>4</td>
<td>12&quot;</td>
<td>12&quot;</td>
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ANCHOR BOLTS

*All dimensions in inches unless otherwise noted.*
Notes:
1. For sign attachment assemblies to be furnished with this support, see Standard Construction Drawings (SCD's) TC-22.10 and TC-22.20.
2. For foundation details, see applicable foundation drawings.
3. One internal diagonal is required at each end of the truss.
4. Weld one threaded steel 2" pipe coupling to the outside of each end frame pole as shown in detail D. Remove all sharp edges inside the pole and pipe coupling.
5. Weld one threaded steel 2" pipe coupling to the front top chord of the truss approximately 12" outboard of the first sign bracket for each sign. Remove all sharp edges inside the chord and pipe coupling.
6. Camber the truss a minimum of 1" for a span of 50' or less. Increase the camber 1/4" for each 5' of span over 50'.
7. Internal diagonals only may be relocated from the top indicated position to avoid weld joint overlap. Provide a removable galvanized cast iron plug for all unused couplings and wire outlets.
8. See Catwalk Drawings for Walkway Details.
9. Steel shall be 35 ksi minimum.
NOTES:
1. For sign attachment assemblies to be furnished with this support, construction details and location of handholes and switch enclosure mounting brackets, see SCD's ITS-35.12 & ITS-36.12.
2. For foundation details, see SCD's TC-22.10 and TC-22.20.
3. One internal diagonal is required at each end of section.
4. Weld one threaded steel 2" pipe coupling to the outside of each end frame pole as shown in detail "A". Remove all sharp edges inside the pole and pipe coupling.
5. Weld one threaded steel 2" pipe coupling to the front top chord of the truss approximately 18" outside of the first sign bracket for each sign. Remove all sharp edges inside the chord and pipe coupling.
6. Camber the frame a minimum of 1" for a span of 50' or less. Increase the camber 1/4" for each 5' of span over 50'.
7. Internal diagonals only may be relocated from the top indicated position to avoid weld joint overlap.
8. Provide a removable galvanized cast iron plug for all unused couplings and wire outlets.
9. Steel shall be 35 ksi minimum.
11. Weld one threaded steel 2" pipe coupling or short nipple to the outside of each end frame pole. Remove all sharp edges inside the pole and pipe coupling.
12. Use variable panel spacing on truss.
13. Attach varmint screen with stainless steel band and minimum 2" overlap. Tie overlapping screen with stainless steel wire ties. Screen shall be welded stainless steel wire mesh or expanded metal sheet, stainless steel wire ties. Screen shall be welded with minimum 2" overlap. Tie overlapping screen with stainless steel wire ties. Screen shall be welded stainless steel wire mesh or expanded metal sheet, stainless steel wire ties.
NOTES:

1. For sign attachment assemblies to be furnished with this support, construction details and location of handhole details, see Standard Construction Drawings (SCD's) TC-22.10 and TC-22.20.
2. For foundation details, see applicable foundation drawings.
3. One internal diagonal is required at each end of section.
4. Weld one threaded steel 2" pipe coupling to the outside of each end frame pole as shown in detail B. Remove all sharp edges inside the pole and pipe coupling.
5. Weld one threaded steel 2" pipe coupling to the front top chord of the Truss approximately 10" outward of the first sign bracket for each sign. Remove all sharp edges inside the chord and pipe coupling.
6. Camber the Truss a minimum of 1" for a span of 50' or less. Increase the camber 1/4" for each 5' of span over 50'.
7. Internal diagonals only may be relocated from the top indicated position to avoid weld joint overlap.
8. Provide a removable galvanized cast iron plug for all unused couplings and wire outlets.
9. Steel shall be 35 ksi minimum.
10. These structures conform to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th edition, 2006, with any variation from the specified design or maximum loadings must be evaluated and approved by DOT and a registered Professional Engineer.
11. Weld one threaded steel 2" pipe coupling to the outside of each end frame pole. Remove all sharp edges inside the pole and pipe coupling.
12. Use variable panel spacing on truss.

Maximum of One Dynamic Message Sign

300 Sq FT Flat Panel Signs
All Signs Must be Vertically Centered
(Except Vertical and Horizontal Bracing at Outer Truss Ends Only)

Diagonal Layout is Staggered - 2 Diagonals per Joint
NOTES:

1. For sign attachment assemblies to be furnished with this support, construction details and location of
   handholes and switch enclosure mounting brackets, see SCD’s ITS-35.12 & ITS-36.12.
2. For foundation details, see SCD’s TC-22.10 and TC-22.20.
3. One internal diagonal is required at each end of section.
4. Weld one threaded steel 2" pipe coupling to the outside of each end frame pole as shown in detail "D". Remove all
   sharp edges inside the pole and pipe coupling.
5. Weld one threaded steel 2" pipe coupling to the front top chord of the truss approximately 24" outboard of
   the first sign bracket for each sign. Remove all sharp edges inside the chord and pipe coupling.
6. Camber the truss a minimum of 1/16" for a span of 50' or less. Increase the camber 1/8" for each 5' of span
   over 50'.
7. Internal diagonals only may be relocated from the top indicated position to avoid weld joint overlap.
8. Provide a removable galvanized cast iron plug for all unused couplings and wire outlets.
9. Steel shall be 35 ksi minimum.
10. These structures conform to the AASHTO Standard Specifications for Structural Supports for Highway
    Welding Society, 2006 edition. Any variation from the specified design or maximum
    loadings must be evaluated and approved by ODOT and a registered Professional Engineer.
11. Weld one threaded steel 2" pipe coupling or short nipple to the outside of each end frame pole. Remove all
    sharp edges inside the pole and pipe coupling.
12. Use variable panel spacing on truss.
13. Attach varmint screen with stainless steel cable and minimum 2" overlap. Use overlapping screen with
    stainless steel wire ties. Screen shall be welded wire mesh or expanded metal sheet, stainless steel or
    galvanized, with openings no larger than 3/8".
**NOTES:**

1. This foundation is intended for use with concrete barriers as detailed in Standard Construction Drawing (SCD) RM-4.3M.

2. If a 50" wall is required, the reinforcing steel and anchor bolts shall remain in the same position relative to the top of the wall, as in the 32" wall.

3. Refer to SCD TC-21.1b and PIS 203210 for typical dimensions with the following modifications to the reinforcement schedules:

**50" WALL**

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4. For information regarding the transition sections of the barrier, see SCD RM-4.1M.

5. Anchor bolts - 8 ea. - 1.25" x 48", F1553, Gr55

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**ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED**

**Anchor Bolts**

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<tr>
<th>SUPPORT TYPE</th>
<th>TRUSS SIZE</th>
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<th>LENGTH (IN.)</th>
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1. Actual extrusheet sign size may vary depending on
   destinations desired. Sign design template obtainable
   from ODOT Office of Traffic Operations. Email
   Bryan.comer@dot.ohio.gov.

2. The Contractor shall provide and install signs as
   specified in the plans in accordance with ODOT
   Supplemental Specification 809.

   Contractor shall also provide and install all conduits,
   wiring, and other items necessary to make the sign
   fully functional. All conduits shall enter the bottom
   of the cabinet and be attached to the steel beam. All
   connections shall be weatherproof. The contractor
   shall run all wires for power into the cabinet and wire
   in the breaker panel as required. The distribution
   cable shall have pull-apart connections located in the
   nearest pull box from the cabinet. The cabinet shall
   be mounted to one of the beam supports as shown.
   The Contractor shall also provide a concrete workpad
   at the location of the cabinet per C&MS 633.2.

   Payment for all of the above work shall be incidental
   to the price for Item 630, sign erected, extrusheet
   as per plans and shall include all labor, materials,
   and equipment necessary to construct the item.

3. The Contractor shall submit one controller unit to
   ODOT Office of Traffic Operations for testing to
   verify control from the Traffic Management Center.
   Unit shall be shipped/delivered to the below address.

   ODOT ITS Lab
   After Bryan Comer
   Project: 9065 W. Broad St.
   Columbus, OH 43223

4. The Contractor shall purchase and provide a 4G LTE
   modem, antennas, and extrusheet cable for remote
   wireless cellular communication. For network
   consistency and through proprietary agreement, LTE
   modems shall be AT&T or Verizon.

   The 4G LTE modem equipment shall be delivered to the
   ODOT ITS Lab at the above address for programming
   and installation.

   The Contractor shall also provide the modem serial
   numbers and necessary ESN numbers for ODOT to
   establish wireless service. The Contractor shall
   measure "SIGNALIZATION, MISC: LTE MODEM, FURNISH ONLY"
   by the number of complete units furnished and
   received by the ODOT ITS Lab.

5. Size beams appropriately for sign area according to
   ODOT design standards and Standard Construction
   Drawing (SCD) TC-41.10. Install with beam spacing
   as per plan and shall include all labor, materials,
   and equipment necessary for the installation.

   The Contractor shall also provide a concrete workpad
   at the location of the cabinet per C&MS 633.1.

   The Contractor shall also provide and install all conduits,
   wiring, and other items necessary to make the sign
   fully functional. All conduits shall enter the bottom
   of the cabinet and be attached to the steel beam. All
   connections shall be weatherproof. The contractor
   shall run all wires for power into the cabinet and wire
   in the breaker panel as required. The distribution
   cable shall have pull-apart connections located in the
   nearest pull box from the cabinet. The cabinet shall
   be mounted to one of the beam supports as shown.
   The Contractor shall also provide a concrete workpad
   at the location of the cabinet per C&MS 633.2.

6. Coordinate power service utility to supply
   necessary input for cabinet and sign. Install power
   service as shown on drawing provided. Size distribution
   cable based on National Electric Code standards with
   voltage drop under 5%.

7. The Contractor shall provide and install all conduits,
   wiring, and other items necessary to make the sign
   fully functional. All conduits shall enter the bottom
   of the cabinet and be attached to the steel beam. All
   connections shall be weatherproof. The contractor
   shall run all wires for power into the cabinet and wire
   in the breaker panel as required. The distribution
   cable shall have pull-apart connections located in the
   nearest pull box from the cabinet. The cabinet shall
   be mounted to one of the beam supports as shown.
   The Contractor shall also provide a concrete workpad
   at the location of the cabinet per C&MS 633.2.

   Payment for all of the above work shall be incidental
   to the price for Item 630, sign erected, extrusheet
   as per plans and shall include all labor, materials,
   and equipment necessary to construct the item.

   The Contractor shall also provide a concrete workpad
   at the location of the cabinet per C&MS 633.1.
NOTES:
1. Actual extrusheet sign size may vary depending on destinations desired. Sign design template obtainable from ODOT Office of Traffic Operations. Email Bryan.Comer@dot.ohio.gov.
2. The Contractor shall provide and install signs as specified in the plans in accordance with ODOT Supplemental Specification 809.
3. The Contractor shall also provide and install all conduits, wiring, and other items necessary to make the sign fully functional. All conduits shall enter the bottom of the cabinet and be attached to the steel beam. All connections shall be weatherproof. The Contractor shall run all wires for power into the cabinet and wire in the broader panel as required. The distribution cable shall have pull-up connections located in the nearest pull box from the cabinet, the cabinet shall be mounted to one of the beam supports as shown. The Contractor shall also provide a concrete workpad at the location of the cabinet per C&MS 633.1.1.
4. The Contractor shall purchase and provide a 4G LTE modem, antennas, and fiber cable for remote wireless service. The Department will verify control from the Traffic Management Center. Payment for all of the above work shall be incidental to the price for Item 630, sign erected, extrusheet, as per plan and shall include all labor, materials, and equipment necessary to construct the item.
5. The Contractor shall also provide complete units furnished and necessary input for cabinet and sign. The 4G LTE modem equipment shall be delivered to the ODOT ITS Lab at the above address for programming and installation.
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NOTES:

1. Additional ground rod electrodes shall be added to grounding conductor as required until resistance to ground is 5 ohms or less for device locations and 25 ohms or less of power service and pull box. If additional ground rod electrodes are required in order to achieve the required resistance they shall radiate out from existing ground rod electrodes, shall be connected with copper conductor as specified in the plans, and shall be 10' from connected ground rod. All communication equipment grounding sites shall be tested for resistance to ground using the three-point/fall-of-potential field per ANSI/IEEE Std. 81. See grounding specifications.

2. Ground rod electrodes shall not be routed through foundations.

3. Fences and other metallic structures with paths to ground shall be connected to the grounding conductor if they are located with 10' of the fence or if they are located within 10' of the grounding electrode system or any object grounded to the grounding electrode system. See Standard Construction Drawing (SCD) HL-50.10.

4. Ground rod electrodes shall be buried to a minimum depth of 36" below finished grade, where possible.

5. CCTV camera and associated pull box shall be connected to the SCD site ground ring only when either the DMS truss or the DMS control cabinet is located closer to the base of the CCTV pole than the length of the CCTV pole.

6. All equipment grounds shall be properly connected to a chassis, oil point and other conductors, including galvanization, shall be removed prior to termination of a ground. After the equipment is fastened a non-oxidizing coating shall be painted over the exposed metal surfaces.

7. Grounding electrode system connections to fencing shall be made using heavy duty threaded listed pipe clamps designed for grounding and stainless steel hardware. See SCD HL-50.10.

8. All grounding diagrams are schematic only.

9. All metallic members of the DMS truss and the DMS sign within 10' of each other shall be bonded together. Wires shall be considered as acceptable bonding method. "U"-bolt connections shall NOT be considered an acceptable bonding method.

10. The quantity of grounding electrode conductors connected to a ground rod electrode shall be limited to four.

11. Whenever possible, ground rod electrodes shall be installed no closer than 0.5' from a foundation.

12. The quantity of grounding electrode conductors connected to a ground rod electrode shall be limited to four.

13. Whenever possible, ground rod electrodes shall be installed no closer than 0.5' from a foundation.

14. Grounding electrode conductors shall be installed in one continuous length. Splicing shall be permitted only by irreversible compression-type connectors listed as grounding and bonding equipment or by exothermic welding process.

15. A ground rod shall be installed at each electric pull box location. The ground rod shall also be tied into the distribution conduit used as the ground wire to service the cabinet, in order to provide a complete grounding system.
Furnish and install a transformer and support as per the details on this sheet. This item of work includes the transformer, support and foundations, ground rods, conduit, and all incidental items drawn in the details on this sheet and required for the step-down transformer and support, complete and in service.

Payment for the above work shall be made at the contract unit bid for Item 625 - Lighting, Misc.: Step-Down Transformer and support. Each, in place, fully functional, tested and accepted.

NOTES:

1. The transformer shall be a 3KVA, 480V 3-conductor to 240V 3-conductor step-down unit. The transformer shall be socketed, epoxy-imregnated, dry type, general purpose outdoor, 85°C insulation, with 304 stainless steel enclosure (NEMA 3R minimum).

2. The transformer and related wiring shall be UL listed for indoor/outdoor applications and shall meet applicable NEMA and IEEE standards.

3. The Contractor shall submit to the Engineer, for approval, two sets of manufacturer's drawings and specifications for the transformer.

4. Orient the equipment stand such that when operating the disconnect switch, one would be facing oncoming traffic. See Standard Construction Drawing HL-40.20 for details.

5. The transformer and related wiring shall be UL listed for indoor/outdoor applications and shall meet applicable NEMA and IEEE standards.

6. Connect all conduit to the equipment stand by means of 2 hole conduit straps.

7. A separate disconnect may be needed in cases where transformer shall be watertight and shall use the two hole conduit straps.

8. Disconnect switches shall be lockable in on/off positions and door shut location and shall have 2 padlocks.

9. A separate disconnect may be needed in cases where the disconnection transformer and support is not easily accessible from cabinet/room location.

PLAN VIEW

Camera orientation may vary for views in all roadway directions, but shall be at least 30° from handhole location to accommodate lowering unit.
NOTES:

1. 1/2" preformed joint filler as per OMS 706.03 shall be used between concrete poles and adjacent paved areas.

2. Work pad per OMS 633.11.

3. Preference for work pad is to do earthwork grading around the area to avoid needing a sloped work pad, however, sloped work pad to be used in situations where slope is 4:1 or steeper.

L = Equal interior Panel Lengths. Panel Lengths are Not to Exceed 36”.

Galvanized Steel Post (Typ.) 2” Dia. x .1875” Thickness

Concrete

Panel Lengths are Not to Exceed 36”.

L = Equal Interior Panel Lengths.

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Galvanized Steel Post (Typ.) 2” Dia. x .1875” Thickness

Concrete

Panel Lengths are Not to Exceed 36”.

L = Equal Interior Panel Lengths.
Vehicle Detection Assembly to Include the Following:

1. Remote Traffic Microwave Sensor (RTMS) and Attachments
2. All Associated Cables Necessary for the Connections to Produce a Fully Functional Device
3. Cabinet

NOTES:

1. Mount RTMS so that the detector is on the roadway side of pole.
2. Support hooks should be appropriately sized for the number and size of conductors to be supported.
3. Run all wiring inside the pole and provide strain relief support for all control cables.
4. When installing the RTMS, maintain minimum clearances on roadways.
5. When installing the mounting brackets for RTMS, align and angle the detectors to cover the detection zone(s) as indicated and specified, per manufacturer recommendations.
6. Height of the cabinet shall be at a level to allow easy maintenance access while standing or 30" to the bottom of the cabinet. All conduit entrances into the cabinet shall be from the bottom side of the cabinet only.

Cabinet shall include:
- Aluminum enclosure
- Minimum dimensions: 24" x 24" x 12" (H x W x D)
- Corbin #2 keyed 10-pin type lock
- Needed power supplies and RTMS surge suppressor for serial, ethernet, and contact closure pairs.
NOTES:

1. RAMP METER SIGNAL DISPLAYS SHALL BE LOCATED AS SHOWN IN THE PLANS. THE FOUNDATION AND MAST ARM SIGNAL SUPPORT SHALL CONFORM TO STANDARD CONSTRUCTION DRAWING (SCD) TS-37.25 AND TS-37.26. SIGNAL HEADS SHALL BE 12" LED, TWO SECTION, RED OVER GREEN, BLACK POLYCARBONATE HOUSING WITH BLACK ALUMINUM VISOR, REFLECTIVE BACKPLATES, AND SHALL CONFORM TO TS-37.01. THE SIDE-MOUNTED SIGNAL HEAD SHALL BE MOUNTED FOLLOWING SCD TS-37.05.

Payment will be made at the contract unit price for each item bid separately.

2. RAMP METER SIGNS AND WARNING BEACONS SHALL BE LOCATED AS SHOWN IN THE PLANS. TWO 24" YELLOW LED WARNING BEACONS SHALL BE LOCATED ON THE RAMP METERED AREA. WHEN FLASHING, (1) SIGN AS SHOWN IN THIS DRAWING, THE SIGNS SHALL FLASH SIMULTANEOUSLY. SEE SHEET 3 FOR TYPICAL RAMP METER SIGN PLACEMENT.

Payment will be made at the contract unit price for each item bid separately, which includes the foundation excavation, foundation concrete, anchor bolts, ground rod, breakaway base, pole, sign, sign brackets, flashing, mounting hardware and all other items necessary for a complete installation.

Electrical cable will be paid as a separate item.

3. RAMP METER CONTROL EQUIPMENT SHALL BE LOCATED AS SHOWN IN THE PLANS. CONTROL EQUIPMENT, CABLE AND CABLE ITEMS SHALL CONFORM TO THE SPECIFICATIONS establish by the Office of Traffic Operations Handbook and the Construction and Material Specifications. Each ramp-meter cabinet with controller shall consist of all hardware needed to be fully functional. For full specification, see ramp meter specification in the plan set.

Payment will be made at the contract unit price for separate bid items including use of 809 ATC controller, app and 809 its cabinet - ramp meter.

4. PREFERRED RADAR DETECTION LOCATION IS ON MAST ARM. IN THE CASE THAT THE RAMP METER CONFIGURATION PREVENTS THIS LOCATION, A SEPARATE POLE AND FOUNDATION ARE TO BE USED TO ACCURATELY DETECT THE LANE.

RAMP METER ENFORCEMENT AREA

LOCATION OF ENFORCEMENT AREA SHALL BE APPROVED BY THE ENGINEER.
1. Ramp meter signal displays shall be located as shown in the plans. The foundation and mast arm signal support shall conform to standard construction drawings (SCD) 1T-76.10 and 1T-81.21. Signal heads shall be 12" LED, two section, red over green, black polycarbonate housing with black aluminum visor, reflective backplates, and shall conform to TS 732.01. The side-mounted signal head shall be mounted following SCD 1T-81.21. Payment will be made at the contract unit price for each item bid separately.

2. Ramp meter signs and warning beacons shall be located as shown in the plans. Two 12" yellow LED warning beacons shall be located on the ramp metered when flashing (1T-81.21) as shown in this drawing. The beacons shall flash simultaneously. See sheet 3 for typical ramp meter sign placement.

3. Ramp meter control equipment shall be located as shown in the plans. Control equipment, cabinet and cabinet items shall conform to the specifications established by the Office of Traffic Operations Handbook and the Construction and Material Specifications. Each ramp meter cabinet with controller shall consist of all hardware needed to be fully functional. For full specification, see ramp meter specification in the plan set.

4. Preferred radar detector location is on mast arm. In the case that the ramp configuration prevents this location, a separate pole and foundation are to be used to accurately detect the lanes.

NOTES:

- Ramp meter signal displays shall be located as shown in the plans. The foundation and mast arm signal support shall conform to standard construction drawings (SCD) 1T-76.10 and 1T-81.21. Signal heads shall be 12" LED, two section, red over green, black polycarbonate housing with black aluminum visor, reflective backplates, and shall conform to TS 732.01. The side-mounted signal head shall be mounted following SCD 1T-81.21. Payment will be made at the contract unit price for each item bid separately.

- Ramp meter signs and warning beacons shall be located as shown in the plans. Two 12" yellow LED warning beacons shall be located on the ramp metered when flashing (1T-81.21) as shown in this drawing. The beacons shall flash simultaneously. See sheet 3 for typical ramp meter sign placement.

- Ramp meter control equipment shall be located as shown in the plans. Control equipment, cabinet and cabinet items shall conform to the specifications established by the Office of Traffic Operations Handbook and the Construction and Material Specifications. Each ramp meter cabinet with controller shall consist of all hardware needed to be fully functional. For full specification, see ramp meter specification in the plan set.

- Pay will be made at the contract unit price for each item bid separately. Ramp meter sign and shall include the foundation excavation, foundation concrete, anchor bolts, ground rod, barricade base, pole, sign, sign brackets, flashers, mounting hardware and all other items necessary for a complete installation.

- Electrical cable will be paid as a separate item.

- Ramp meter control equipment shall be located as shown in the plans. Control equipment, cabinet and cabinet items shall conform to the specifications established by the Office of Traffic Operations Handbook and the Construction and Material Specifications. Each ramp meter cabinet with controller shall consist of all hardware needed to be fully functional. For full specification, see ramp meter specification in the plan set.

- Payment will be made at the contract unit price for each item bid separately. Ramp meter sign and shall include the foundation excavation, foundation concrete, anchor bolts, ground rod, barricade base, pole, sign, sign brackets, flashers, mounting hardware and all other items necessary for a complete installation.

- Ramp metered when flashing (1T-81.21) as shown in this drawing. The beacons shall flash simultaneously. See sheet 3 for typical ramp meter sign placement.

- Preferred radar detector location is on mast arm. In the case that the ramp configuration prevents this location, a separate pole and foundation are to be used to accurately detect the lanes.

- Wiring diagram with standard roadway construction drawings (SCD) 1T-76.10, 1T-81.21.

- SCD number

- Standard roadway construction drawings

- Legend:

- Traffic signal, 2 unit
- Radar detection unit
- Signal support pole
- Controller cabinet and work pad
- Traffic pull box
- Detector loop
- Meter base
- Power source
- Disconnect switch

- 12" NO. XX AWG (LEAD-IN CABLE)
- 5/C NO. XX AWG (LEAD-IN CABLE)
- Vehicle loop detector
- Signal cable, 5 conductor, No. XX AWG
- Radar detection cable
- Service cable, 3 conductor, No. XX AWG
- Power cable, 2 conductor, No. XX AWG
- Signal support pole No. XX AWG

- Wiring diagram with standard roadway construction drawings (SCD) 1T-76.10, 1T-81.21.

- SCD number

- Standard roadway construction drawings

- Legend:

- Traffic signal, 2 unit
- Radar detection unit
- Signal support pole
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- Signal cable, 5 conductor, No. XX AWG
- Radar detection cable
- Service cable, 3 conductor, No. XX AWG
- Power cable, 2 conductor, No. XX AWG
- Signal support pole No. XX AWG
1. MAST ARM SHOULD EXTEND 1' PAST THE EDGE LINE.

NOTES:

- SIDE-FIRED RADAR DETECTION
- CENTERED OVER LANE
- SIGNAL HEAD MOUNTED BACK TO BACK (TYP.)
- POLE MOUNTED SIGNAL HEAD PER SCD TC-85.10
- AIM TOWARD STOP LINE

- MAST ARM ELEVATION VIEW
- 1-LANE RAMP
- HEIGHT = 2'
- WIDTH = 8'
- 18' MIN.
- 20' MAX.
- SIDE-FIRED RADAR DETECTION
- CENTERED OVER LANE
- POLE MOUNTED SIGNAL HEAD BACK TO BACK (TYP.)
- 2" CONDUCT FROM EACH INTO SIGNAL SUPPORT/FOUNDATION

- MAST ARM ELEVATION VIEW
- 2-LANE RAMP
- POLE MOUNTED SIGNAL HEAD BACK TO BACK (TYP.)
- 2" CONDUCT FROM EACH INTO SIGNAL SUPPORT/FOUNDATION
- SEE PLANS FOR CONDUIT SIZE

- TYPICAL RAMP METER SIGN PLACEMENT
- APPLIES TO 1-LANE AND 2-LANE RAMPS
- 12" YELLOW LED
- 12" MAX.
- 1' MIN.

- LIGHT POLE/FOUNDATION
- 2" CONDUIT FROM EACH INTO CENTERED OVER LANE
- SEE PLANS FOR CONDUIT SIZE

- SIGNAL SUPPORT/FOUNDATION
- 2" CONDUIT FROM EACH INTO 18" PULL BOX & 32" PULL BOX
- SEE PLANS FOR CONDUIT SIZE