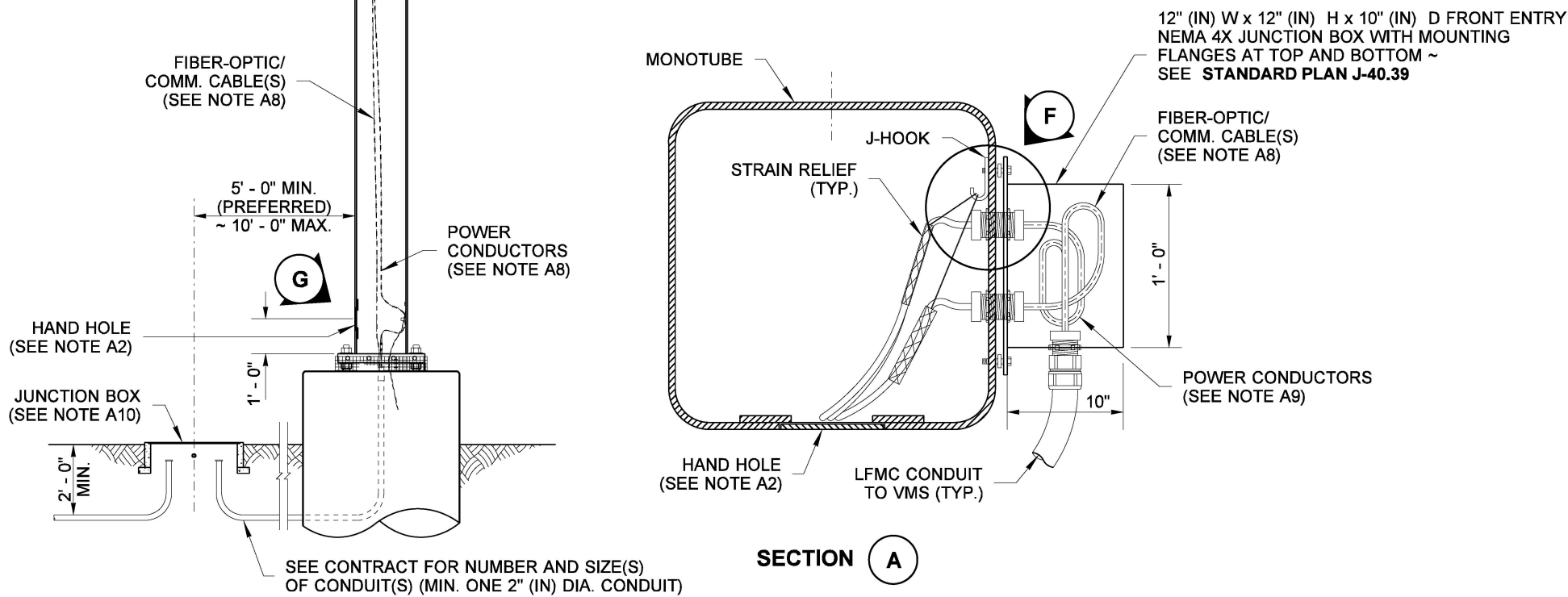


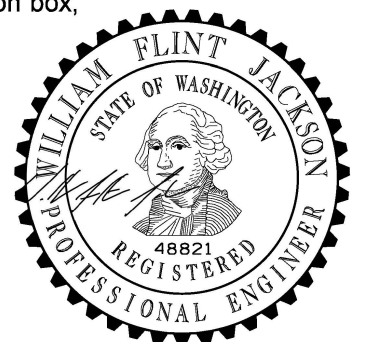
BOLTS, NUTS, AND WASHERS SHALL BE **ASTM F593 OR A193, TYPE 304 OR TYPE 316 STAINLESS STEEL (S. S.)** ~ NUTS AND BOLTS SHALL BE LIBERALLY COATED WITH ANTI-SEIZE COMPOUND.



**ELEVATION  
VMS SIGN BRIDGE INSTALLATION**

**NOTES**

- A1. See **Standard Plan G-90.29** for Monotube sign structure details for details not shown here.
- A2. Hand holes shall be installed at time of fabrication; Only conduit and terminal cabinet mounting holes may be field installed. Proper repairs shall be made to the structure for any field drilling performed. A hand hole shown on this plan may be omitted if there is another hand hole within **18" (in)** of the location shown here. Hand holes shown here shall be **6" (in)** in diameter with gasket and reinforcing ring.
- A3. Hand holes shall be installed on the bottom or rear of the beam and in line with any NEMA enclosure.
- A4. Hand holes at the top of the column shall be installed at the locations shown, with the outside hand hole centered on the horizontal centerline of the beam.
- A5. NEMA box shall be located between the last two w-beam supports on the structure (may be for VMS or walkway). NEMA box must be located at least **12" (in)** away from the hand hole for any bolted splice connection to provide clearance for bolted connection tools.
- A6. Conduit crossing two or more w-beams shall be RGS, with LFMC end segments no more than **24" (in)** in length. Conduits crossing one or fewer w-beams shall be LFMC. LFMC conduit crossing a w-beam shall still be supported with a conduit clamp. LFMC shall use straight end fittings except for a VMS connection located behind the monotube, where a **45 degree** end fitting may be used.
- A7. Secure conduit to sign support w-beam using two hole clamps. Clamps may be bolted directly to w-beam or secured with stainless steel straps and conduit supporting hardware (channel steel or similar mount). Bolts shall not disturb web of w-beam. All hardware shall be stainless steel.
- A8. Where required in the contract, fiber-optic cables, communications cables, and power conductors for the VMS shall be installed inside **2" (in)** liquid-tight flexible metal conduit (LFMC). Power conductors shall be installed in a separate conduit from the fiber-optic and low voltage communications cables. the LFMC shall be installed inside the monotube and routed up the column and across the cross-beam to the NEMA box.
- A9. Provide a minimum of one full loop of slack of each cable and conductor in the NEMA box.
- A10. Conduits from foundation may terminate in a junction box, vault, or cabinet, as shown in the plans. Conduit entering foundation shall be sealed at both ends with foam sealant and copper mesh. Copper mesh shall extend out of the conduit and be installed before placing foam sealant, such that pulling on the copper mesh will remove the foam sealant. Where LFMC is used inside the sign structure, do not place foam sealant in conduit end inside sign structure.
- A11. All conduits shall include a pull tape in accordance with **Standard Specification Section 8-20.3(5)A**.



Aug 30, 2022

**OVERHEAD SIGN STRUCTURE  
VARIABLE MESSAGE SIGN (VMS)  
INSTALLATION DETAILS  
STANDARD PLAN J-75.55-00**

SHEET 1 OF 5 SHEETS

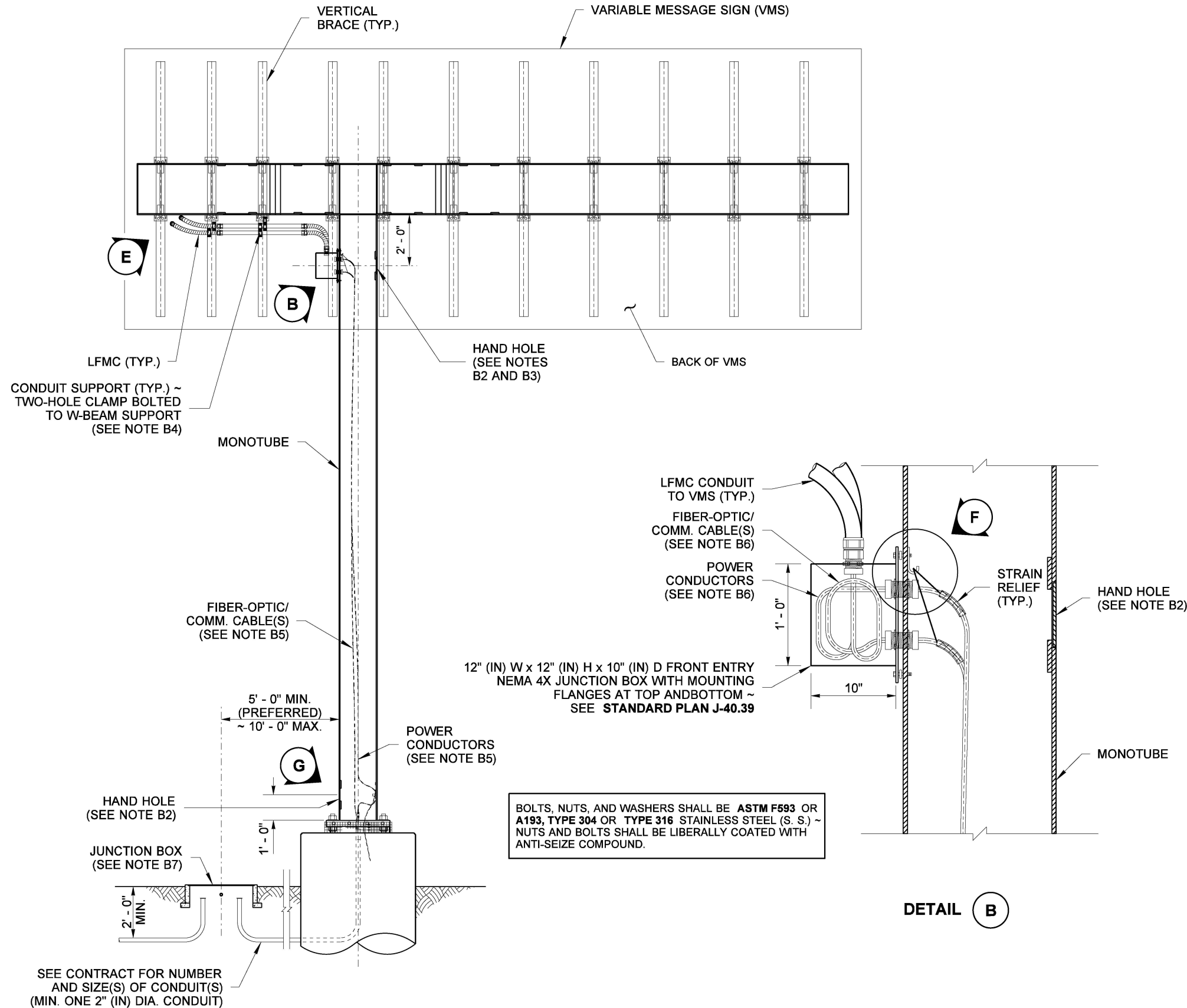
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*Mark Gaines*  
Mark Gaines (Aug 30, 2022 11:29 PDT)

Aug 30, 2022

STATE DESIGN ENGINEER

Washington State Department of Transportation



ELEVATION  
VMS BALANCED CANTILEVER INSTALLATION

DETAIL B

NOTES

- B1. See **Standard Plan G-90.20** and Monotube Sign Structure details for details not shown here.
- B2. Hand holes installed at time of fabrication; only conduit and terminal cabinet mounting holes may be field installed. Proper repairs shall be made to the structure for any field drilling performed. A hand hole shown on this plan may be omitted if there is another hand hole within **18" (in)** of the location shown here. Hand holes shown here shall be **6" (in)** in diameter with gasket and reinforcing ring.
- B3. Hand hole shall be installed at the top of the column opposite the NEMA box.
- B4. Secure conduit to sign support w beam using two-hole clamps. Clamps may be bolted directly to w-beam or secured with stainless steel straps and conduit supporting hardware (channel steel or similar mount). Bolts shall not disturb web of w-beam. All hardware shall be stainless steel.
- B5. Where required in the contract, fiber-optic cables, communications cables, and power conductors for the VMS shall be installed inside **2" (in)** liquid-tight flexible metal conduit (LFMC). Power conductors shall be installed in a separate conduit from the fiber-optic and low voltage communications cables. The LFMC shall be installed inside the monotube and routed up the column to the NEMA box.
- B6. Provide a minimum of one full loop of slack of each cable and conductor in the NEMA box.
- B7. Conduits from foundation may terminate in a junction box, vault, or cabinet, as shown in the plans. Conduit entering foundation shall be sealed at both ends with foam sealant and copper mesh. Copper mesh shall extend out of the conduit and be installed before placing foam sealant, such that pulling on the copper mesh will remove the foam sealant. Where LFMC is used inside the sign structure, do not place foam sealant in conduit end inside sign structure.
- B8. All conduits shall include a pull tape in accordance with **Standard Specification Section 8-20.3(5)A**.

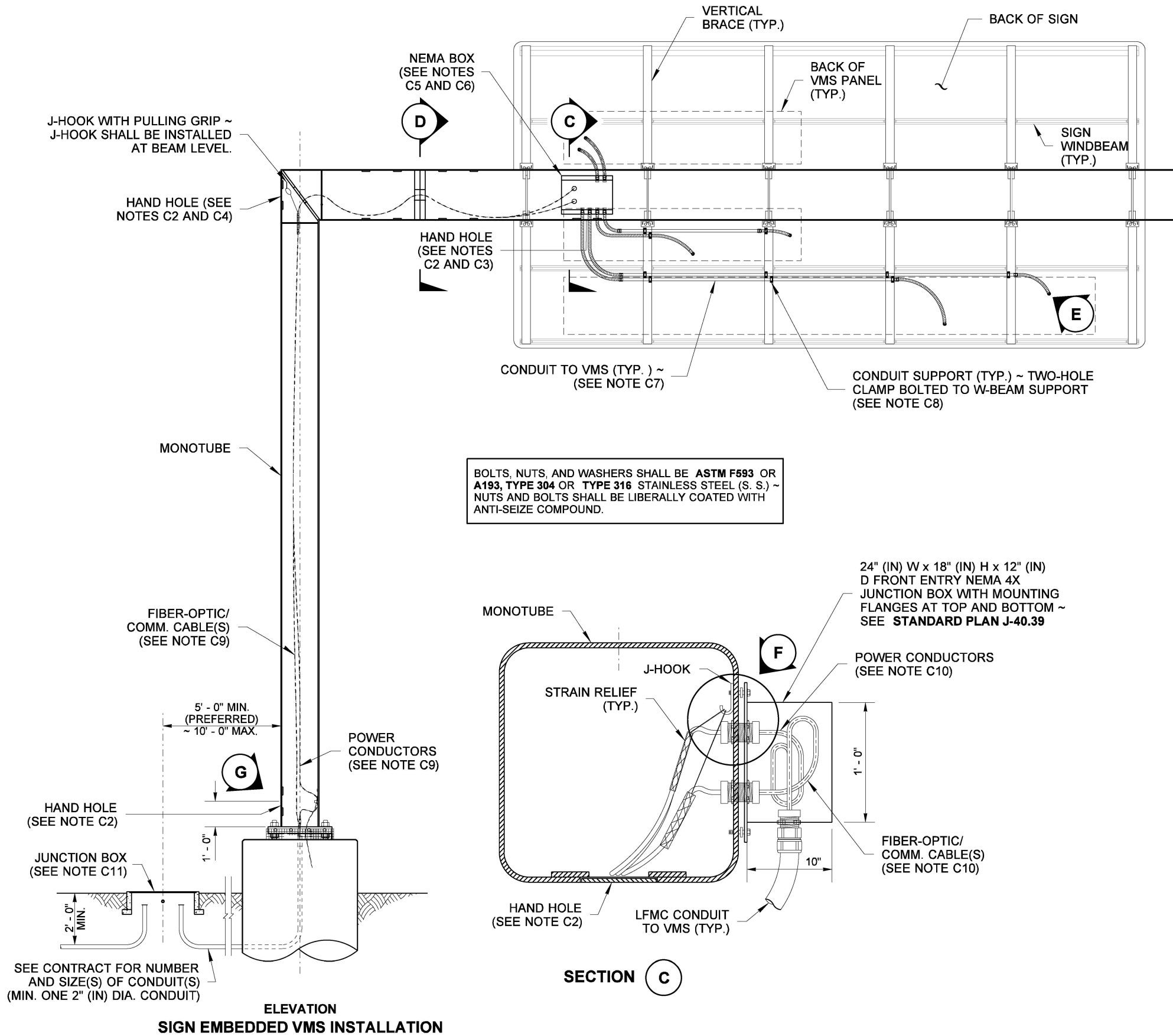


Aug 30, 2022

**OVERHEAD SIGN STRUCTURE  
VARIABLE MESSAGE SIGN (VMS)  
INSTALLATION DETAILS  
STANDARD PLAN J-75.55-00**

SHEET 2 OF 5 SHEETS

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**NOTES**

- C1. See **Standard Plan G-90.20** and Monotube Sign Structure details for details not shown here.
- C2. Hand holes shall be installed at time of fabrication; only conduit and terminal cabinet mounting holes may be field installed. Proper repairs shall be made to the structure for any field drilling performed. A hand hole shown on this plan may be omitted if there is another hand hole within **18" (in)** of the location shown here. Hand holes shown here shall be **6" (in)** in diameter with gasket and reinforcing ring.
- C3. Hand holes shall be installed on the bottom or rear of the beam and in line with any NEMA enclosure.
- C4. Hand holes at the top of the column shall be installed at the locations shown, with the outside hand hole centered on the horizontal centerline of the beam.
- C5. NEMA box shall be located between the last two w-beam supports on the structure (may be for sign or walkway). Nema box must be located at least **12" (in)** away from the hand hole for any bolted splice connection to provide clearance for bolted connection tools.
- C6. Install copper/fiber transceiver equipment in Nema box when required.
- C7. Conduit crossing two or more w-beams shall be RGS, with LFMC end segments no more than **24" (in)** in length. Conduits crossing one or fewer w-beams shall be LFMC. LFMC conduit crossing a w-beam shall still be supported with a conduit clamp. LFMC shall use straight end fittings except for a VMS connection located behind the monotube, where a **45 degree** end fitting may be used.
- C8. Secure conduit to sign support w-beam using two hole clamps. Clamps may be bolted directly to w-beam or secured with stainless steel straps and conduit supporting hardware (channel steel or similar mount). Bolts shall not disturb web of w-beam. All hardware shall be stainless steel.
- C9. Where required in the contract, fiber-optic cables, communications cables, and power conductors for the VMS shall be installed inside **2" (in)** liquid-tight flexible metal conduit (LFMC). Power conductors shall be installed in a separate conduit from the fiber-optic and low voltage communications cables. The LFMC shall be installed inside the monotube and routed up the column and across the cross-beam to the NEMA box.
- C10. Provide a minimum of one full loop of slack of each cable and conductor in them NEMA box.
- C11. Conduits from foundation may terminate in a junction box, vault, or cabinet, as shown in the plans. Conduit entering foundation shall be sealed at both ends with foam sealant and copper mesh. Copper mesh shall extend out of the conduit and be installed before placing foam sealant, such that pulling on the copper mesh will remove the foam sealant. Where LFMC is used inside the sign structure, do not place foam sealant in conduit end inside sign structure.
- C12. All conduits shall include a pull tape in accordance with **Standard Specification Section 8-20.3(5)A**.

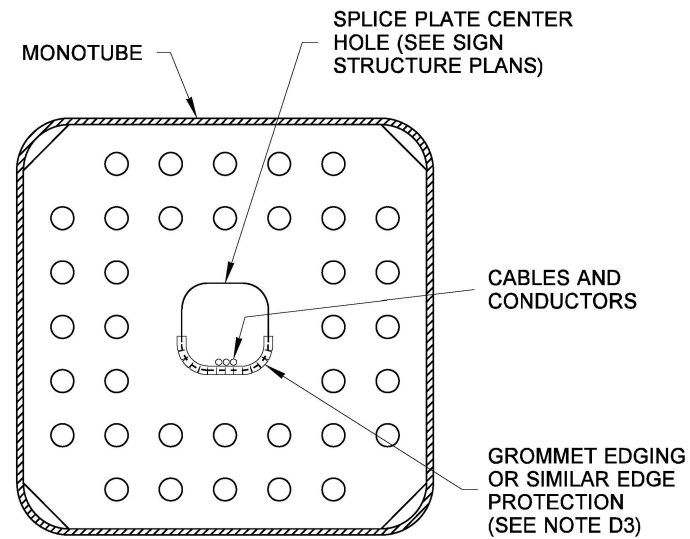


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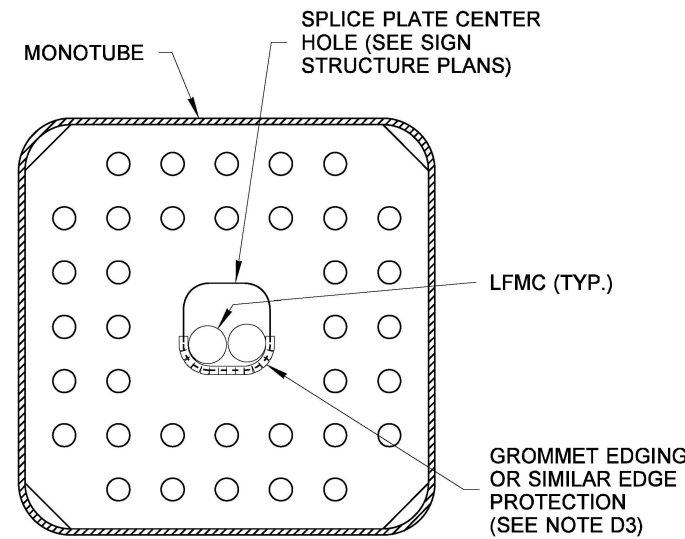
**OVERHEAD SIGN STRUCTURE  
VARIABLE MESSAGE SIGN (VMS)  
INSTALLATION DETAILS  
STANDARD PLAN J-75.55-00**

SHEET 3 OF 5 SHEETS

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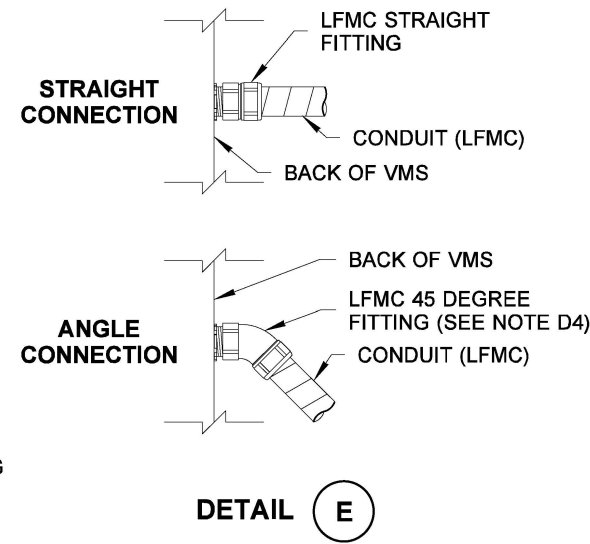


**BOLTED SPLICE PLATE SHOWN WITHOUT INTERNAL LFM (STIFFENER PLATE SIMILAR)**



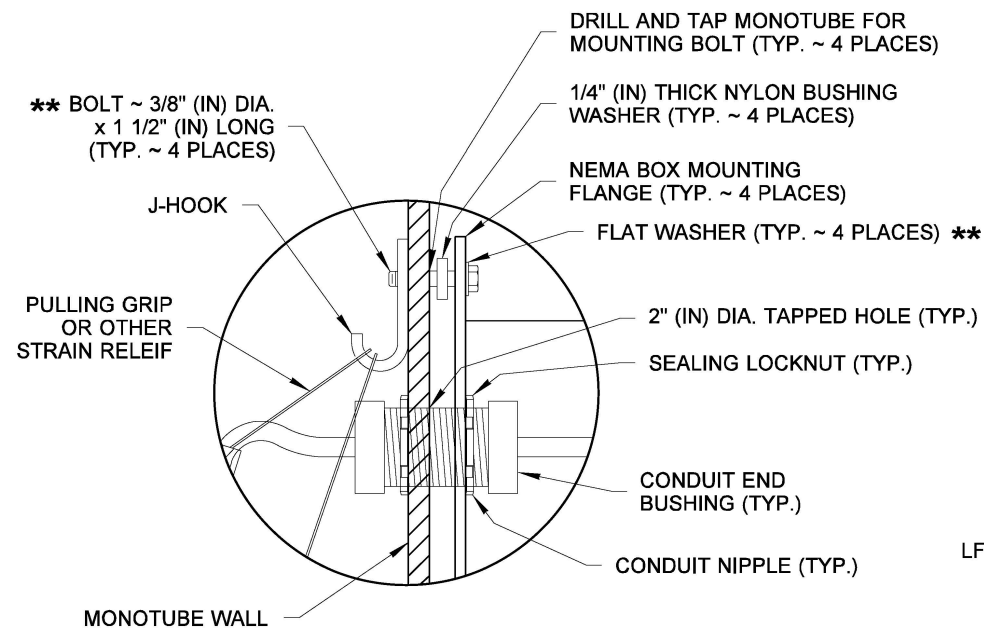
**BOLTED SPLICE PLATE SHOWN WITH INTERNAL LFM (STIFFENER PLATE SIMILAR)**

**SECTION D**

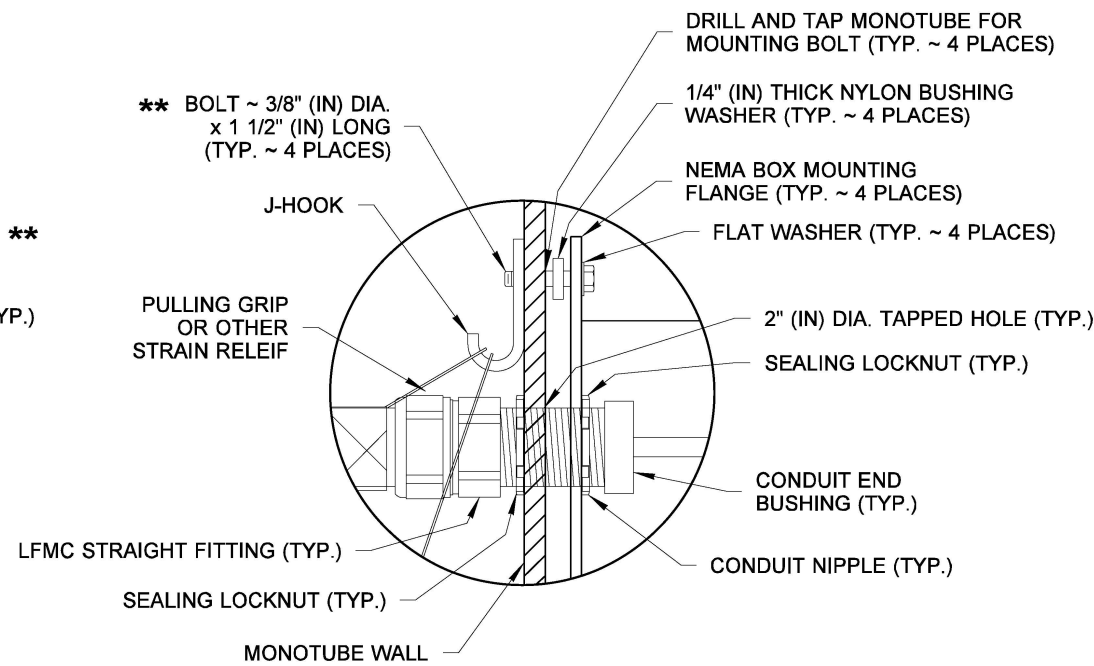


**DETAIL E**

BOLTS, NUTS, AND WASHERS SHALL BE **ASTM F593** OR **A193, TYPE 304** OR **TYPE 316** STAINLESS STEEL (S. S.) ~ NUTS AND BOLTS SHALL BE LIBERALLY COATED WITH ANTI-SEIZE COMPOUND.



**NEMA BOX CONNECTIONS WITHOUT INTERNAL LFM**



**NEMA BOX CONNECTIONS WITH INTERNAL LFM**

**DETAIL F**

**NOTES**

- D1. See Monotube Sign Structure details for details not shown here.
- D2. Hand holes installed at time of fabrication. Hand hole shown on this plan may be omitted if there is another hand hole within **18" (in)** of the location shown here. Hand holes shown here shall be **6" (in)** in diameter with gasket and reinforcing ring.
- D3. Bolted connection plates and stiffener plates shall have edge protection (grommet edging or similar) installed. Plates in columns shall have edge protection installed for the full surface of the center opening. Plates in crossbeams shall have edge protection installed along the bottom edge and one third of the way up the side edges of the center opening. May be omitted from any plate that cannot be reached from a hand hole with approval from the engineer.
- D4. LFMC fittings shall be straight, with the exception of fittings for VMS connections located behind the monotube crossbeam, which may be **45 degree** fittings.
- D5. Conduits shall be sealed in the NEMA box with mechanical duct plugs and seals (Jackmoon, Wedge-Seal/Kwikie, or similar).



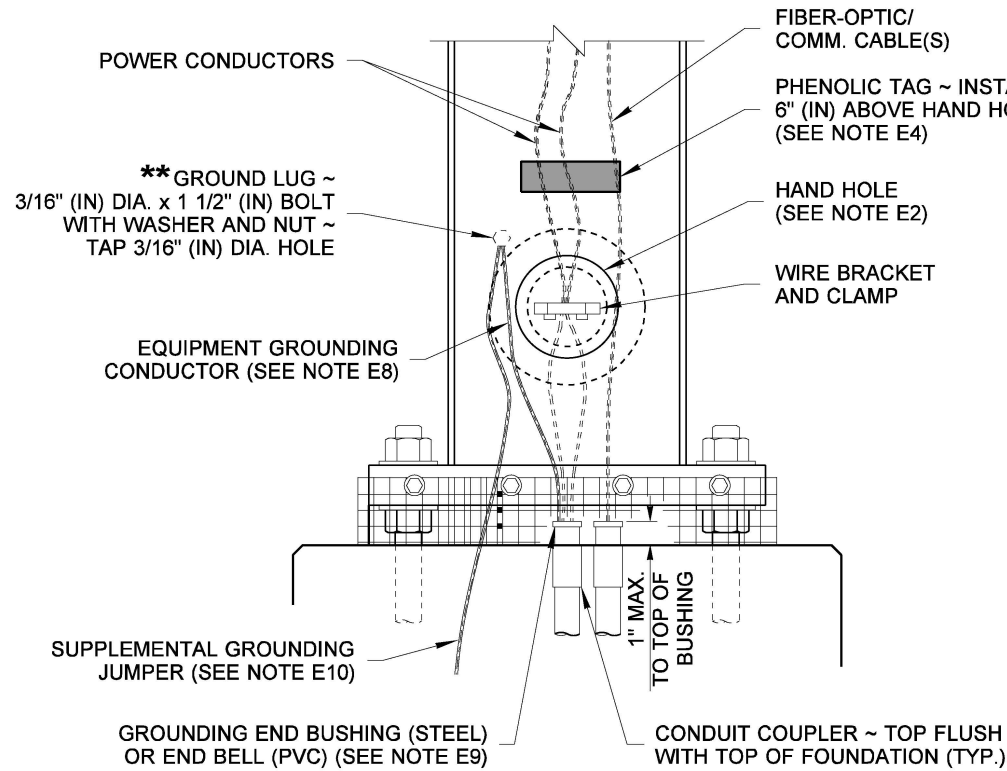
Aug 30, 2022

**OVERHEAD SIGN STRUCTURE  
VARIABLE MESSAGE SIGN (VMS)  
INSTALLATION DETAILS  
STANDARD PLAN J-75.55-00**

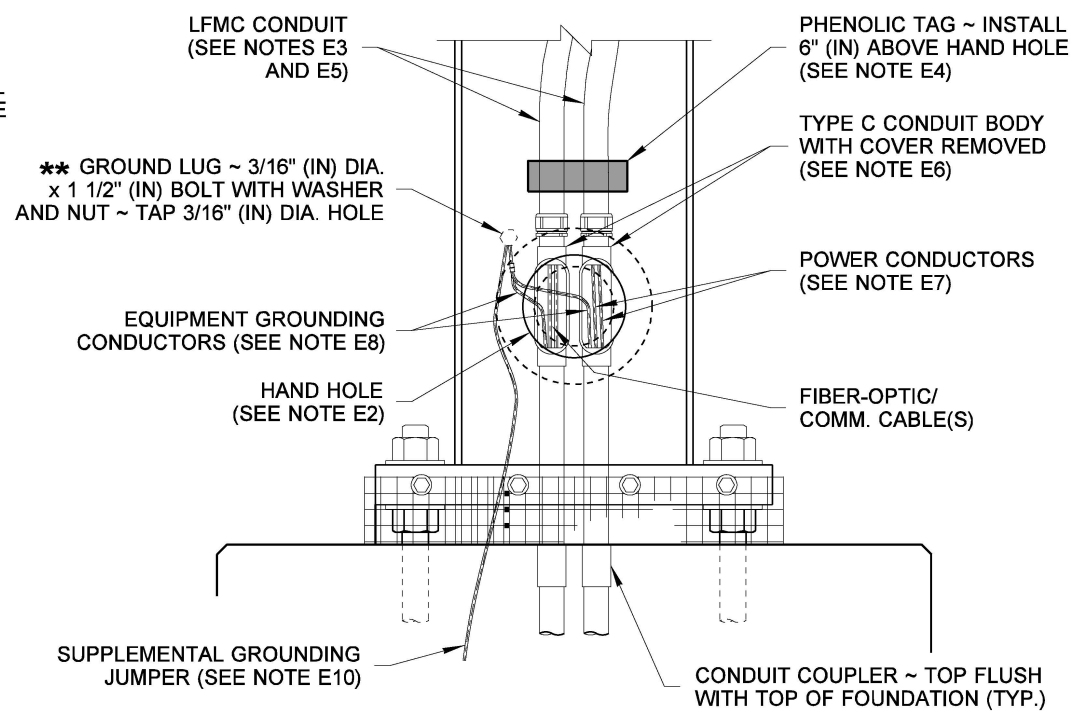
SHEET 4 OF 5 SHEETS

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 Aug 30, 2022  
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BOLTS, NUTS, AND WASHERS SHALL BE **ASTM F593** OR **A193, TYPE 304** OR **TYPE 316** STAINLESS STEEL (S. S.) ~ NUTS AND BOLTS SHALL BE LIBERALLY COATED WITH ANTI-SEIZE COMPOUND.



**FOUNDATION DETAIL WITHOUT INTERNAL LFMC**

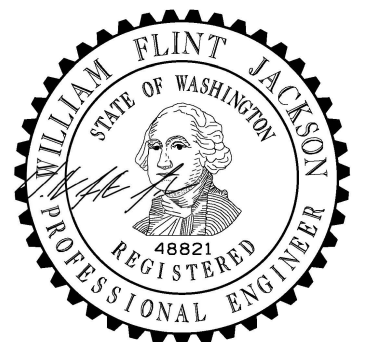


**FOUNDATION DETAIL WITH INTERNAL LFMC**

DETAIL **G**

**NOTES**

- E1. See Monotube Sign Structure details for details not shown here.
- E2. Hand holes installed at time of fabrication. Hand hole shown on this plan may be omitted if there is another hand hole within **18" (in)** of the location shown here. Hand holes shown here shall be **6" (in)** in diameter with gasket and reinforcing ring.
- E3. LFMC fittings shall be straight.
- E4. Phenolic tag shall include highest operating voltage and identification number of supplying cabinet. This tag is separate from the sign structure id tag.
- E5. Where required in the contract, fiber-optic cables, communications cables, and power conductors for the VMS shall be installed inside **2" (in)** liquid-tight flexible metal conduit (LFMC). Power conductors shall be installed in a separate conduit from the fiber-optic and low voltage communications cables. The LFMC shall be installed inside the monotube and routed up the column and across the crossbeam to the NEMA box.
- E6. Where LFMC is used, extend conduits from couplers at top of foundation and provide Type C conduit body centered at same height as hand hole. Do not install cover for power conductors to accommodate fuse kit.
- E7. Install quick disconnect fuses for all power conductors (see **Standard Specification Section 9-29.7**) outside of conduit body and inside of sign structure. Fuses shall be sized at 200% of total circuit load. Provide minimum of **12" (in)** of slack on each side of fuse kit to allow for fuse kit to be pulled outside of hand hole.
- E8. Terminate equipment grounding conductors at sign structure ground lug. Equipment conductors from each conduit may be connected directly to ground lug or may be spliced together before termination.
- E9. All conduits embedded in foundation shall be terminated with a grounding end bushing (RMC) or end bell (PVC) as appropriate for the type of conduit. Grounding end bushings shall be bonded to the sign structure ground lug.
- E10. Supplemental grounding jumper shall be #4 AWG non-insulated copper with **3" (in)** (min.) of slack. Clamp to vertical reinforcing steel in foundation using a listed connector suitable for use embedded in concrete.
- E11. All conduits shall include a pull tape in accordance with **Standard Specification Section 8-20.3(5)A**.



Aug 30, 2022

**OVERHEAD SIGN STRUCTURE VARIABLE MESSAGE SIGN (VMS) INSTALLATION DETAILS**  
**STANDARD PLAN J-75.55-00**

SHEET 5 OF 5 SHEETS

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