

Document Control

Issue Date	Comments	Revisions	Revision #
2/23/99	Draft		
7/23/99			
12/29/99	Delete metric equivalents. Add Contractor responsibility for electrical service until Contract Final Acceptance.	797.5	1
1/12/00	Project: CM-00TS(10) Ct. 1 Fulton County P.I. No. 713155 Project: CM-00TS(10) Ct. 2 DeKalb And Fulton County P.I. No. 713157		
2/3/00	Project: CM-056-1(57) Fulton County P.I. No. 721950		
12/8/00	Revised inside height of hub, per SCR # 67	797.3.04	2
12/8/00	Project: CM-285-1(360) DeKalb County P.I. No. 713410		
2/9/01	Document Control No. NAV01-050		1.0
2/14/01	Entered into CM Document Control		1.0
7/30/02	Inclusion of metric equivalent units. SCR # 331	797.2.B.1; 797.2.B.2; 797.3.04; 797.3.05.A.2; 797.3.05.B.1; 797.3.05.B.2; 797.3.05.C; 797.3.05.D; 797.3.05.G.2; 797.3.05.H.1; 797.3.05.H.2a; 797.3.05.H.3; 797.3.05.H.5b; 797.3.05.J; 797.3.05.K; 797.3.06.A; 797.3.06.B	1.1
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10/30/02	Revised the term "cable racks" to "cable runways." Added the term "equipment frame," per SCR # 362	797.3.05.H.1; 797.3.05.H.3; 797.3.05.H.5c; 797.3.05.I	2.1
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6/19/03	Revised per SCR #96	Revise Sections: 797.1; 797.1.02.B; 797.3.05.A; 797.3.05.C; 797.3.05.D; 797.3.05.G; 797.3.05.H.1; 797.3.05.H.2; 797.3.05.H.3; 797.3.05.H.4; 797.3.05.H.5; 797.3.05.I; 797.3.05.J; 797.3.05.K; 797.3.05.L; 797.3.06.A; 797.3.06.B; 797.4; 797.5	4.1

Document Control

Issue Date	Comments	Revisions	Revision #
		Add Sections: 797.3.05.H6; 797.3.05.M; 797.3.05.N; 797.3.05.O	
6/20/03	Published to server		5.0

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SPECIAL PROVISION

**PROJECT: [INSERT PROJECT NUMBER(S)]
[INSERT COUNTY NAME(S)] COUNTIES
P.I. NO. [INSERT P.I. NUMBER(S)]**

SECTION-797 HUB BUILDING

Section 797 - Hub Building

The text included herein is written in the imperative mood (sentences often begin with commands). All commands and references in, or in connection with, the text in this document are written to imply **Contractor responsibility for action** unless otherwise specified.

797.1 General Description

This work includes site preparation, procurement, transportation, and installation of a Hub Building with conduit connections to the size and number of conduits specified in the Plans. Major elements of the hub building include the building components, HVAC, interior electrical distribution system, lighting, fire extinguisher, hub camera, lightning protection system, interior and exterior grounding, and paving and fencing around the hub building. Provide electrical utility connections as needed to provide service to the building. Provide a hub building that meets all local building codes, with electrical installation and wiring conforming to the latest edition of the National Electric Code.

Design the building for the explicit use of housing electronic equipment, fiber optics equipment, measuring devices and other related system components.

797.1.01 Definitions

Not applicable

797.1.02 Related References

A. Georgia Specifications

Section 310 – Graded Aggregate Construction

Section 402 – Hot Mix Recycled Asphaltic Concrete

Section 500 – Concrete Structure (with exceptions as noted in Subsection 737.3.05.A)

Section 643 – Fence

Section 833 – Joint Fillers and Sealers

B. Referenced Documents

National Electric Code, (current edition)

National Fire Protection Association, NFPA 780 – Standard for the Installation of Lightning Protection Systems

Underwriter’s Laboratory, UL 96A – Standard for Lightning Protection Components

Underwriter’s Laboratory, UL 752

ASTM, Designation C33, C330

ACI 318-89

ASCE 7-95

ASCE 7-88

797.1.03 Submittals

Provide six copies of complete and thorough submittal data to the Engineer for all components of the hub building within 30 calendar days of the Contract Notice-to-Proceed. Include in the submittal data complete technical and performance specifications for all components, materials, wiring, and construction methods. Neatly organize each package of submittal data and separate by hardware item. Include an index of all submittal data documents included in the package. In the index, name each submittal data document, the applicable component (including the associated 797.X subsection), and the specific manufacturer model and part number of the item exactly as that item is proposed to be provided. Any submittal data document or documentary item that is not listed in the index will not be accepted for review.

797.2 Materials

A. Type

Install a building that is precast, pre-assembled concrete. Manufacture of the precast concrete building inside an enclosed plant building in a controlled environment.

B. Concrete

Use only concrete that is in accordance with Section 500 of the Standard Specifications with the following exceptions:

- Compressive strength shall be 4000 psi (30 MPa) at 28 days.
- Mix design shall be 114-118 lb./ft³ (1830 – 1890 kg/m³) structural light weight concrete using expanded shale or expanded clay aggregation in accordance with ASTM Designation: C33 or C330. Use a homogeneous mix.

797.2.01 Delivery, Storage and Handling

Not applicable

797.3 Construction Requirements

797.3.01 Personnel

Not applicable

797.3.02 Equipment

Not applicable

797.3.03 Preparation

Survey the building site and perform any necessary grading to facilitate installation. Place the building in a level position. Ensure positive drainage away from the building.

797.3.04 Fabrication

Install a building with dimensions as specified in the Plans. The width and length of the building is specified to the outside of the finished walls. Measurements are either 16' x 24' (4.9 m x 7.3 m) or 32' x 24' (9.8 m x 7.3 m).

Maintain an interior building height of 9'-6" (2.9 m) minimum from finished floor to finished ceiling.

797.3.05 Construction

A. Structural

Ensure that structural design and manufacturing conform to the requirements of ACI 318-89.

Design the shelter for the following loading:

- Floor - uniform distributed load of 140 psf (680 kg/m²) per ASCE 7-95
- Roof - roof snow specifications of 50 psf (240 kg/m²) per ASCE 7-95
- Wind - basic wind speed specifications of 115 mph (185 km/h) per ASCE 7-95
- Earthquake - Seismic Zone 2A, per ASCE 7-88

B. Floor Section

Include an 8" (200 mm) waffled structural precast concrete floor section. Use ribs that are 2'-0" (0.61 m) O.C. longitudinal and make all surfaces smooth.

Cover the interior surface with 1/8" (3.175 mm) vinyl floor covering (sheet or squares), bonded with a waterproof contact adhesive.

C. Roof Section

Use a concrete roof section with 96:1 drainage slope that slopes in two directions. Install a layer of impervious, UV resistant, non-corrosive, non-degradable material on top of the roof deck.

Install ceiling insulation and interior finish of R-9 foam insulation covered with minimum 0.7" (18 mm) thick plywood laminated with white vinyl or fiberglass reinforced plastic. Install plastic joint or corner trim at all panel joints.

Provide a 1.5 in. to 3 in. (40 mm to 80 mm) overhang on all sides of the roof section. Cap the roof over the walls, leaving no exposed roof to wall joint.

D. Wall Sections

Use solid concrete wall sections that are cast in one piece to minimize joints, with an exterior wood float finish followed by steel troweling leaving a uniform surface free of depressions or ridges. Install on the exterior wall an aggregate tan pebble rock finish in accordance with the building manufacturer's specifications.

Install wall insulation and interior finish of R-9 foam insulation covered with minimum 0.7" (18 mm) thick plywood laminated with white fiberglass reinforced plastic. Install plastic joints or corner trim at all panel joints.

Finish the floor/wall intersection with 4" (100 mm) vinyl baseboard.

Extend the walls a minimum of 7" (200 mm) below the top of floor surface. Ensure that there is no exposed wall to floor joint.

E. Joints

Seal all joints with a sealant in accordance with Section 833 of the Standard Specifications.

Do not expose roof to wall or wall to floor joints.

F. Exterior Walls and Roof

Seal exterior surfaces of walls and roof with two coats of thorglazed H Sealer, or acceptable equal in strict conformance with manufacturer’s instructions, unless otherwise noted.

G. Door

Install a door frame(s) that is (are) 18 gauge galvanized steel, primed, painted brown and cast into the wall panel.

Install a door(s) that is (are) 3'x 7'x 1-3/4" (900 mm x 2100 mm x 45 mm) 18 gauge galvanized steel, insulated, primed, painted brown, and installed flush with door check. Include door stop, weather-stripping, hydraulic door closer, mortise lockset with deadbolt and stainless steel ball bearing hinges.

Provide three (3) sets of hub building keys to the Project Engineer no more than 18 hours after hub building installation.

H. Electrical System

1. Distribution

From the hub electrical power service assembly install 200 A 120/240 V main service entrance with exterior auxiliary disconnect and 42 position load center. From the Type 2 pull box outside the hub to the auxiliary disconnect, install 2 in. (50 mm) galvanized rigid steel conduit for the electrical service cable. Install an auxiliary disconnect enclosure that is UL-listed, rated for outdoor use, and does not have external handles or switches. Include a hinged door on the enclosure that has provisions for locking by means of a padlock. Mount the auxiliary disconnect on the exterior hub building wall directly opposite of the load center. Install a power distribution system that provides two 120 VAC, 20 A dedicated circuits to the vertical power strips on each of the fifteen (15) proposed and future equipment racks and frames. Mount two twist-lock receptacles (one per circuit) in boxes on the ceiling directly above each of the fifteen (15) proposed and future equipment rack and frame installation locations. Provide a dedicated 240 VAC circuit for each HVAC unit.

Install one grounded duplex outlet with GFCI breaker every 6.0 ft. (1.8 m) on each hub building interior wall, and install one grounded duplex outlet with GFCI breaker that is rated for outdoor use on an exterior hub building wall. Provide one dedicated 20 A circuit for interior convenience outlets and one for the exterior convenience outlet.

Install eight 4 ft. (1 m) fluorescent lights (two bulb fixtures) per 384 ft² (35.7 m²) with one inside switch that is labeled for the interior lights. Install two lights behind each row of proposed equipment frames and racks, no more than 2.5 ft. (0.76 m) from the interior hub walls. Refer to the details for equipment frame/rack layout. Install the remaining four lights in front of the rows of proposed equipment frames and racks. Install all lights to provide lighting throughout the hub building. Install lights such that overhead cables, cable runways, or equipment frames and racks do not block the light. Provide a dedicated circuit for the hub interior lighting.

Install a lightning/surge arrester at the load center for 120/240V, single phase, 3 wire plus ground that meets the following minimum requirements:

- Mounted in a metal enclosure with LED module status indicators on the enclosure cover
- Connected in parallel
- Rated for a service entrance or distribution panel
- Permanently connected
- Internal overcurrent protection 200 kAIC
- Protection modes L-N, L-G, N-G
- Suppression voltage, L-N, L-G, N-G 400 V

- Surge energy capability, 10/1000 μ s, total 5000 joules
- Component response time 1 ns
- Operating temperature -25 to 170°F (-32 to +77°C)

Install alarm circuit wiring (as specified in 797.3.05.H.2), HVAC control wiring and electrical wiring separately in individual surface mounted EMT conduits.

2. Alarm Equipment

Install an alarm terminal panel, wall mounted 12 in. (H) x 8 in. (W) x 4 in. (D) [300 mm (H) x 200 mm (W) x 100 mm (D)] equipped with 50 pair type 66 punch down terminal blocks. Terminate the surge arrestor alarm circuit and each alarm circuit individually for the open door, high temp., low temp., and smoke alarms on type 66 blocks within the alarm terminal cabinet. Label each alarm terminated on the punch down blocks.

Install open door alarm, high temp alarm, low temp alarm, and smoke alarm with dry relay contacts for normally closed or normally open alarm conditions. (This will interface to communication alarm system; by others).

The building manufacturer shall furnish alarm equipment of a quality equal to or greater than the following examples:

Open Door Alarm:	Rohn Commercial Products ESSWITCK Southeast Precast DTX MS2049FS
High Temp. Alarm:	Rohn Commercial Products ES ALARM AC Southeast Precast Dayton 2E 206
Low Temp. Alarm:	Rohn Commercial Products ES ALARM AC Southeast Precast Dayton 2E 206
Smoke Alarm:	Rohn Commercial Products ES SMOKE DET Southeast Precast ESL 320

3. Cable Runway

Install minimum 24 in. (0.61 m) wide cable runways that are electroplated gold chromate. Cap bare ends of each cable runway with a rubber or plastic cap provided by the cable runway manufacturer. Bond all horizontal and vertical cable runways together at each rigid connection point with copper bonding wires, and bond the four corners of the horizontal cable runway system to the halo bonding wire.

Install horizontal cable runways at 8.5 ft. (2.6 m) above finished floor and as shown in the details. Rigidly mount horizontal cable runways directly from the ceiling using mounting hardware capable of supporting the weight of the horizontal cable runways and cables on the runways. Include with the horizontal cable runways a system of 2 in. (50 mm) ducts designed specifically for the management and protection of fiber optic jumpers as shown in the details.

Install vertical cable runways 10 in. to 14 in. (250 mm to 360 mm) above finished floor at the fiber optic cable/conduit entry point to the height of the horizontal cable runways and as shown in the details. Do not install vertical cable runways directly above the conduits. Rigidly fasten vertical cable runway(s) to the wall and to the horizontal cable runway. Rigidly mount vertical cable runways directly from the ceiling using mounting hardware capable of supporting the weight of the vertical cable runways and fiber optic cables. Do not attach vertical cable runways to the floor.

4. Exterior Lighting

Install an exterior floodlight controlled by an adjustable motion detector with a switch, labeled for the exterior light, located inside the hub building near the door.

5. Grounding System

Install a halo bonding wire consisting of a continuous run of #2 AWG green insulated stranded copper wire mounted around the perimeter of the interior walls just below the ceiling, as shown in the details. Mount the halo with insulators, maximum 3 ft. (1 m) on center.

Install two (2) halo buss bars and two (2) interior main ground buss bars as shown in the details. Use 0.25 in. x 4 in. x 20 in. (6.4 mm x 100 mm x 500 mm) buss bars fabricated from a copper alloy material compatible with copper wire. Only use buss bars for termination of ground or neutral conductors. Install buss bars to the hub building walls with insulating standoffs. Install each halo buss bar directly above each interior main ground buss bar. If a hub building is constructed as two rooms without a door between them, install two (2) halo and two (2) interior main ground buss bars in each room.

Terminate the ends of the halo bonding wires on the halo buss bars, such that there are two terminations on each halo buss bar. Do not splice the halo bonding wires between halo buss bars. Connect each halo buss bar to the interior main ground buss bar directly below it with a #2 AWG stranded copper bonding wire. Mount the bonding wire to the interior hub building wall with insulators, maximum 2 ft. (0.6 m) on center.

Use minimum #12 AWG stranded copper bonding wire and copper compression lugs or clamps to individually bond all metallic items inside the hub building to the halo bonding wire, including but not limited to metal conduits, cable runways, and door frame. Do not daisy-chain or splice bonding wires, unless specified otherwise. Inside the hub building, bond the hub door to the door frame 6 in. (150 mm) from the top of the door frame with a #6 AWG flexible copper wire or braid of sufficient length to not hinder door movement. Ground equipment racks and frames installed in the hub building by installing a #12 AWG copper bonding wire across the top of all frames and racks. Bond the wire to the top of each frame and rack, and bond the ends of the wire to the halo.

6. HVAC

For each 384 ft² (35.7 m²), install two 36,000 BTU (38 MJ) wall mounted air conditioners with dehumidifying capability and 4 kW heat strip all controlled from a single thermostat with automatic change over from heating to cooling. The units are to be operated by an air conditioner LEAD/LAG controller.

I. Fire Extinguisher

Provide a wall mounted CO₂ fire extinguisher rated for electrical fires. Install the fire extinguisher inside the hub building at the location shown in the details.

J. Fencing

Install an 8 ft. (2.4 m) high, 9 gauge zinc coated chain link fence with double 8 ft. (2.4 m) wide gates. Install 3-strand barbed wire with extension arms on the fence and gates. Provide fencing in accordance with Section 643 of the Georgia Specifications. Install the fence and gates as shown in the details.

Secure the double gates with a padlock at the time of fence installation. Provide three (3) sets of padlock keys to the Project Engineer no more than 18 hours after padlock installation.

K. Foundation

Place and compact 6 in (150 mm) of graded aggregate base to the limits shown in the details in accordance with Section 310. Place asphaltic concrete of the depth and type specified in the details to the limits noted in the details, and in accordance with Section 402.

Place a concrete foundation in accordance with the hub manufacturer's recommendations. All aspects of the final site-specific foundation design are the Contractor's responsibility, including but not limited to soil analysis and determination of allowable soil bearing strength, all footing and slab dimensions, requirement and design for inner footings, and steel reinforcing members. Design the concrete foundation as a monolithic cast-in-place slab with cast footings at the hub exterior walls as a minimum and a footprint with dimensions equal to the hub building. Use concrete with a minimum strength of 3000 psi (21 MPa) at 28 days. Build the concrete foundation with a minimum thickness of 6 in. (150 mm) in any section.

In the entire upper slab, embed a minimum 6 in. by 6 in. (150 mm by 150 mm) #10 welded steel wire mesh a minimum of 2 in. (50 mm) from upper or lower slab surfaces.

Install footings at a minimum depth of 18 in. (460 mm) below finish grade with a lower horizontal bearing surface no less than 15 in. (380 mm) wide at any point. For all footings, use a minimum of four #4 steel reinforcing bars along the entire footing length with a minimum 3 in. (75 mm) concrete cover in any direction. Connect all steel reinforcing members directly to the exterior ground ring with a minimum #6 AWG solid copper ground wire at each of the four corners of the slab. Do not connect the slab ground wires to any other ground wire. Provide a minimum 20 mil PVC or polyethylene sheet vapor barrier under the slab and under all footing side and bottom surfaces, except for the side footing surface at the exterior edge of the foundation.

If concrete piers are required by the Plans, construct them to the diameter, depth and number as specified in the building manufacturer's specifications. Install prefabricated concrete steps to building's entrance if the ground is a foot or more lower than the entrance.

Securely anchor the building in accordance with the manufacturer's specifications.

L. Outside Grounding

Install an exterior earth-ground ring as shown in the details, consisting of a system of ground rods connected to a ring of a #2 AWG, stranded bare copper ground wire. Install the ground rods and ground wire at a depth of 1 ft. (0.3 m). Do not splice the ground wire between ground rods. Terminate the ground wires only at ground rods. Install a ground system with measured and documented resistance of no more than five ohms. An active electrolytic system is permissible if soil conditions require this additional level of grounding.

Use exothermic welds or two-bolt ground rod clamps with preset break-off bolt heads (Electric Motion Company Part #EM2301-01 or approved equivalent) for making all connections from copper ground wires to the ground rods.

Ground each building interior main ground buss bar and the hub electrical distribution system through the load center and/or auxiliary disconnect to the nearest ground rod. Use buss bar ground wires that are #2 AWG, stranded bare copper ground wire. For the buss bar ground wires and hub electrical distribution system ground wires, core the hub building wall with maximum 1 in. (30 mm) hole for each ground wire entry. Install the ground wires for the buss bar and hub electrical distribution system connections to the exterior earth ground ring in individual rigid metal conduits inside and outside the hub, not including underground installation. Seal around the rigid conduit connections to the inside and outside hub building walls with masonry grouting on the outside wall and waterproof silicone caulk on the interior wall. Do not use expanding foam or caulk products. Install underground ground wires at a depth of 1 ft. (0.3 m).

Bond the metallic portion of each air conditioner housing that is on the hub building exterior to the nearest ground rod with #2 AWG stranded bare copper ground wire. Terminate the wire to the bottom of the air conditioner housing with copper compression lugs and use insulators to fasten along the hub building wall to the ground level. Bury the remainder of the ground wire underground at a depth of 1 ft. (0.3 m) to the ground rod connection.

Install a #6 AWG stranded bare copper wire along the entire length of the fence, ending at the gate support posts, by weaving the wire through the chain links. Bond or clamp the wire to each fence support post. Make any splices of the copper wire at a fence or gate support post. Weave a #6 AWG stranded bare copper wire through the chain links of both gates of the double gate. Bond or clamp both wires at the gate ends. Bond each of the four fence corner posts and the two gate support posts to the nearest ground rod of the exterior earth ground ring with #6 AWG copper wire that is installed underground at a depth of 1 ft. (0.3 m). Alternately, bond the fence to the ground ring by clamping the earth ground ring copper wires to the fence copper wires at the six fence posts. Bond each gate to a gate support post with a #6 AWG flexible copper braid of sufficient length to not hinder gate movement. Install braid at a height 6 in. (150 mm) from the bottom of the gate.

Install one air terminal on each of the four roof corners, not more than 1 ft. (0.3 m) from the edge of the roof. Use 0.5 in. (12.7 mm) diameter, solid copper air terminals that are 2 ft. (0.6 m) in length with a rounded point. Install air terminals with lag bolts or through bolts. Bond air terminals to the nearest roof and down conductors. Do not use cast or stamped crimp type fittings. Install a No. 1/0 AWG copper cable roof conductor along the perimeter of the roof. Exothermically weld roof conductors to air terminals. Make roof conductor splices only by welding to an air terminal. Install two (2) No. 1/0 AWG copper cables down conductors at diagonally opposite corners of the hub building. Exothermically weld down conductors to air terminals and ground rods. The maximum bend for roof and down conductor cables is 90 degrees with a maximum bend radius of 8 in. (200 mm). Fasten roof and down conductors to the hub building at intervals not exceeding 3 ft. (0.9 m). Use fasteners fabricated of the same material as the conductor being fastened. Attach fasteners with bolts, screws, nails, or adhesive that can withstand a 200 lb (890 N) pull without loosening. Install underground portions of the down conductors at a depth of 1 ft. (0.3 m).

M. Hub Camera

Provide a black and white fixed-position security camera that meets or exceeds the following requirements:

- Camera Enclosure: Install the camera body with camera lens in a surface mount enclosure with maximum dimensions of 6 in x 6 in x 6 in (150 mm x 150 mm x 150 mm)
- Lens: Equip the camera with auto-iris function and a 4.0 – 8.0 mm manually driven variable focal length lens that is compatible with the CCD image sensor. Effective CCD and lens combination minimum of 0.08 lux at f1.4.
- Video Output: NTSC output with a minimum of 460 horizontal TV lines
- Power: Provide a camera powered from a 120VAC NEMA 5-15 or 5-20 receptacle. If the camera receives power through an external plug in transformer unit, provide a transformer unit that is rated for continuous duty and that is equipped with a mounting screw to secure the transformer unit to the receptacle faceplate mounting screw position.
- Cabling: Provide interconnection cabling as shown in the Plans and in accordance with the requirements for coaxial video patch cords in Section 939.2.A. Provide the camera with coaxial BNC or RCA connector. If the camera uses an RCA connector, provide an RCA-BNC adapter at the camera with gold-plated center pin sockets and shield connection.

Install the camera near the intersection of the wall and ceiling, in a position affording the maximum view of the hub interior and without visual obstruction from cable runways or other materials. Refer to the details for additional installation requirements. Configure the camera mounting and positioning and the lens focal length to maximize the view of the hub interior.

Install a 120VAC 5-15 or 5-20 wall-mount receptacle within 1.0 ft. (0.30 m) of the camera mounting location. Use a branch circuit for the camera receptacle that is separate from any circuit supplying equipment racks and frames.

Neatly dress all wiring.

N. Canopy

Mount a fiberglass canopy above the hub building door that is a minimum of 3.5 ft. (1.1 m) wide and extending 3.5 ft. to 4.5 ft. (1.1 m to 1.4 m) out from the hub building.

O. Electrical Power Service Assembly

Furnish and install electrical cables, conduit and power service necessary to make the hub building electrical system fully operational and in accordance with the Standard Specifications for Electrical Wire and Cable, Electrical Conduit, and Miscellaneous Electrical Materials. Include the underground or aerial power service feed from the electrical service provider's power source to the electrical power service assembly location.

Furnish and install all items required for a functional electrical power service assembly, including but not limited to a Class 3, 30 ft. (9 m) timber pole, main power service disconnect, power meter (if required), surge arrestor, ground wire, ground rod, rigid vertical conduit, wiring, and hardware. Install a main power service disconnect that is sized according to the hub building power service requirements specified in the Electrical System Distribution section of 797.3.05. Install a main disconnect enclosure that is UL-listed, rated for outdoor use, and does not have external handles or switches. Include a hinged door on the enclosure that has provisions for locking by means of a padlock. Install a surge arrestor that is rated for a maximum permissible line to ground voltage of 175 RMS and that conforms with the NEMA standards for surge arrestors. Mount the surge arrestor on the main disconnect enclosure. Install a ground wire in a ½ in. (12.5 mm) galvanized rigid steel conduit from the main power service disconnect to a ground rod installed at the base of the pole. From the Type 2 pull box at the base of the pole to the main disconnect, install a 2 in. (50 mm) galvanized rigid steel conduit for the electrical service cable. Furnish and install a service metering base where required by the local utility, electrical codes, or the Plans. Refer to the electrical power service assembly details for additional installation and material requirements.

Install an electrical service Type 2 pull box at the base of the electrical power service assembly pole and adjacent to the hub building. Between these pull boxes, install nonmetal, Type 2, 2 in. (50 mm) conduit for electrical service cable installation. Where the distance between these pull boxes is greater than 500 ft. (150 m), install a minimum of one electrical service Type 2 pull box for every 500 ft. (150 m) of uninterrupted conduit length. Install electrical service cable from the main disconnect at the electrical power service assembly to the auxiliary disconnect at the hub in the conduits and pull boxes specified within this section and the Electrical System Distribution section of 797.3.05. Provide an electrical service cable that includes

ground conductor that connects between the main disconnect buss bar at the electrical power service assembly and the buss bar of the auxiliary disconnect buss at the hub. Do not use electrical service conduit in place of the ground conductor.

Use rigid metal for all aboveground electrical conduit and conduits bodies. For each hub building power service drop, dedicate an electrical service conduit from the electrical utility drop point through the meter base and main disconnect and to the hub building. Do not install any other wiring in the electrical service conduit. Do not splice any cable, shield or conductor used for power service.

797.3.06 Quality Acceptance

A. Operating Environment

Seal the shelter to resist dust and water infiltration.

B. Exterior

Install a building that can withstand 7.62 mm round fired from a rifle at a distance of 15 ft. (4.6 m) per UL 752 standards.

Install a canopy that can withstand wind loading of 115 mph (185 km/h).

C. Testing

Test the grounding system in the presence of the Engineer.

797.3.07 Contractor Warranty and Maintenance

Provide a one-year warranty on the building structure, as well as usual and customary O.E.M. warranties on all equipment installed in the building.

797.4 Measurement

Hub Buildings are measured for payment by the number installed, complete functional, and accepted, including the building components, HVAC, interior electrical distribution system, interior and exterior lighting, fire extinguisher, hub camera, lightning protection system, interior and exterior grounding, foundation, electrical power service assembly, power service feed from the power source to asphalt paving, graded aggregate base, and fencing around the hub building, and any miscellaneous incidental items necessary to complete the work..

797.4.01 Limits

Not applicable

797.5 Payment

Hub Buildings, complete and in place according to this Specification and accepted by the Department, are paid for at the Contract Unit Price. Payment is full compensation for procurement, transportation, site preparation, grading, installation, fees, permits, and electrical service until Contract Final Acceptance. Payment for horizontal runs of conduit and copper cable outside the hub building, pull boxes, and directional boring that are associated with the power service assembly for the hub building are included in the bid price of nonmetal conduit, type 2, 2 in.

Payment will be made under:

Item No. 797	Hub Building	Per Each
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797.5.01 Adjustments

Not applicable

OFFICE OF TRAFFIC SAFETY AND DESIGN