READ THIS FIRST

Notice to the Design Engineer, please refer to the Port of Seattle, Facilities and Infrastructure standards for reference before editing this specification.

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Shift) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of “Electrical House Power Distribution Center (EHPDC)” Work is shown in the Contract Documents. This Section includes general requirements for accomplishing one factory built, pre-assembled, all steel, noncombustible building to include the building, and pre-installed electrical and HVAC as required. BUILDING MANUFACTURER will provide all building anchor bolts and plates.
         1. The enclosures shall be thermally insulated per code and shall be outfitted for HVAC, wall perforations, equipment and personnel access doors, ventilation openings, etc. The EHPDC units shall arrive with Gold Seal Certification or equivalent permitting documentation allowing for installation in the State of Washington.
   2. GOVERNING CODES, STANDARDS AND REFERENCES
      1. Design Loads
         1. City of Seattle Building Code
         2. ASCE 7 – Minimum Design Loads for Buildings and Other Structures
      2. Structural Steel
         1. ANSI/AISC 360 – Specification for Structural Steel Buildings
         2. ANSI/AISC 341 – Seismic Provisions for Structural Steel Buildings
         3. ASTM A36/A36M – 2008: Standard Specification for Carbon Structural Steel
         4. ASTM A992/A992M – 2006: Standard Specification for Structural Steel Shapes
         5. AWS D1.1 – Structural Welding Code – Steel
         6. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members
         7. ASTM A653/A653M – 2009: Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
         8. ASTM C955 – Standard Specification for Cold-Formed Steel Structural Framing Members
         9. ASTM A1003/A1003M – 2009: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
      3. Structure shall bear Gold Seal Certification certifying that it meets the Washington State Building Code and AHJ.
      4. Structure shall meet the current requirements of local energy codes
      5. Electrical Requirements
         1. ANSI C80.1 – Electrical Rigid Steel Conduit (ERSC).
         2. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
         3. NFPA 496 – Standard for Purged and Pressurized Enclosures for Electrical Equipment.
         4. UL 1598 (R2010) – UL Standard for Safety, Luminaires.
         5. UL) 50 – UL Standard for Safety, Enclosures for Electrical Equipment, Non- Environmental Considerations.
         6. UL 508 (R2010) – UL Standard for Safety, Industrial Control Equipment.
         7. Battery Exhaust System Design Code references if system is needed
            1. IMC 502.8 – Hazardous Materials – Mechanical Exhaust Ventilation
            2. IMC 510.2 – Hazardous Exhaust Systems
            3. NFPA 497
            4. IFC 608.5, IFC 2702.1
         8. International Building Code and ASCE 7-10
         9. NFPA 70: National Electrical Code (NEC)
         10. Underwriters Laboratories, Inc.
   3. SUBMITTALS
      1. Submit materials data in accordance with of Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, and installation instructions for all products.
      2. Submittals shall include the following:
         1. Product Data: Include rated capacities, operating characteristics, and furnished specialties, and accessories.
         2. Final EHPDC dimensions and detailed interior and exterior layouts for approval prior to start of fabrication, including equipment layout with all electrical clearances
         3. Providing and terminating all interconnecting power, control, instrument, and alarm wiring between housed equipment within the EHPDC
         4. Coordinating, assembling, pre-wiring, and testing the prefabricated EHPDC for integrity of structure and functionality of equipment
         5. Providing all material and labor required to fabricate and ship the EHPDC
         6. Structural, electrical, and mechanical approval design package for the EHPDC, including:
            1. Structural, electrical and mechanical design drawings
            2. Recommended foundation setting plan with structural reactions. Plan to include:

Bolt locations

Bolt attachment reactions such as, but not limited to, Dead, Live, Seismic, Wind, etc.

* + - * 1. Weight and center of gravity for offloading at jobsite
        2. Structural calculations sealed by a registered Professional Engineer in the State of Washington for the design of the EHPDC.
        3. Thermal envelope calculations sealed by a registered Professional Engineer in the State of Washigton
        4. Shop detail drawings for fabrication
        5. HVAC load calculations
        6. As-built structural, electrical and mechanical AutoCAD drawings of the completed EHPDC unit
      1. Gold Seal Certification (permitting documentation) in State of Washigton.
      2. Equipment Manufacturer Seismic Qualification Certification: Submit certification that all equipment housed in the EHPDC will withstand seismic forces defined in Section 26 05 48 - Seismic Controls for Electrical and Communication Work. Include the following:
         1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

The term “withstand” means the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.

* + - * 1. Dimensioned Outline Drawings of Equipment Units: Identify center of gravity and locate and describe mounting and anchorage provisions.
        2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
      1. Operation and Maintenance Data: For EHPDC to include in maintenance manuals specified in Division 1 General Requirements. In addition to requirements specified in Section 01 78 23.13b - Seaport Operations and Maintenance Data include the following:
         1. Field modifications and field-assigned wiring identification incorporated during construction.
  1. QUALITY ASSURANCE
     1. The Manufacturer's comprehensive compliance control program follows the building through all phases of production.
     2. Building shall be manufactured to satisfy current City of Seattle Building Code (SBC), manufactured building program rules, regulations and codes and the NEC (National Electric Code).
        1. Architectural Design Criteria:
           1. The Prefabricated EHPDC is designed to be un-occupied electrical enclosures, Occupancy Group S-2, Construction Type 1-B or 2-B with a 0-hour fire rating.
        2. Structural Design Criteria:
           1. The structural grid base and floor system are designed for the EHPDC to be lifted and transported with the interior equipment installed.
           2. Building components are designed to withstand external loading as prescribed by the applicable code minimums with additional design criteria as laid out below.
           3. Base and floor system are designed to withstand dead and live loads as applicable with a minimum live load of 250 lb/SF over the entire floor area.
           4. Maximum deflection of base members is L/240 with applicable dead and live loads applied
           5. Roof loading:

20 lb/SF roof live load

25 lb/SF flat roof snow load

20 lb/sf roof load for conduit and electrical support

* + - * 1. Wind loading:

Basic wind speed, V = 97 mph

Exposure Category: B

* + - * 1. Seismic loading:

Refer to Section 26 05 48 - Seismic Controls for Electrical and Communication Work for Seismic Design parameters.

* + - * 1. Interior walls are capable of mounting and supporting equipment to the wall studs that distributes a maximum of 400 lb/lf and 200 ft-lbs of moment to any place along the perimeter wall space.
        2. The Prefabricated EHPDC is designed to be transported whole with no shipping splits. If larger units are needed shipping splits will occur.
        3. EHPDC bolt-on lifting lugs are provided and located along the base perimeter members at approximate 10 feet intervals
      1. Weld Connections shall adhere to current AWS D1.1 and D1.3 Structural Welding Codes
  1. DELIVERY, STORAGE, AND HANDLING
     1. Deliver in shipping split as required that can be moved past obstructions in delivery path.
     2. Coordinate delivery of EHPDC to allow movement into designated space.
     3. Handle EHPDC according to manufacturer’s written instructions. Use factory-installed lifting provisions.
     4. Provide removable lifting eyes suitable for crane handling of equipment.
  2. COORDINATION
     1. Coordinate layout and installation of EHPDC with other construction that penetrates floors and ceilings, or is supported by them, including light fixtures, HVAC equipment, and fire-suppression-system components.
     2. Coordinate size and location of concrete or mounting bases. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 - Cast-in-Place Concrete. Cast anchor-bolt inserts into bases.
  3. WARRANTY
     1. EHPDC guarantees the complete building from defects in materials and workmanship for a period of Two (2) Years, except as limited by the original equipment manufacturer(s) of component parts.

1. PRODUCTS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. BASE MATERIALS
     1. Perimeter and main framing members shall be ASTM A992 wide flange beams 12 inches deep
     2. Joist shall be ASTM A36 channel joists
     3. Framing and floor will form a self-supporting grid
     4. EHPDC base in contact with slab foundation shall receive a high build epoxy coating with zinc
  2. FLOOR MATERIALS
     1. 1/4-inch minimum thickness flat ASTM A36 or 304S.S steel plate stitch-welded to longitudinal and transverse base members to create a stiff floor diaphragm.
     2. Floor plate seams are continuously welded at joints and ground smooth to minimize seam visibility
     3. Floor plate welds are staggered to produce a flat and ripple-free surface
     4. Floor plate will be finished with a non-skid coating
     5. Dimension from finished floor elevation to bottom of base members and exterior grade shall not exceed code allowable for two steps at entry doors (step design is not included in scope)
  3. WALLS MATERIALS
     1. Wall studs are Steel Stud Manufacturers Association (SSMA) 400S200-68 or 600S200-68 meeting ASTM C955 and A1003 with Fy = 50 ksi and 16 inch center-to-center spacing to create a light- framed bearing-type shear wall system
     2. Interior of wall is finished with 18-gauge minimum G90 galvanized sheet steel firmly attached to wall studs with ASTM shear and pull out rated self-tapping screws 4 inches on center around the edges and 12 inches on center in the field.
     3. Exterior wall siding is minimum 24-gauge TLC-1 concealed fastener interlocking wall panels with 12 inch panel coverage, 1-1/2 inch rib height, and finish coating per Section 09 97 00 – Special Coatings, or ASTM A167 Type 304 S.S 12-gauge thickness.
     4. Each exterior seam will be caulked using a high-modulus, silicone-based product
     5. Siding will come with all standard trim, fascia, and flashing members
     6. Wall insulation shall be as required to meet energy and fire codes.
     7. Wall penetrations will be framed with steel studs and provided as needed by purchaser.
  4. ROOF MATERIALS
     1. Monosloped roof rafters range from SSMA 600S200-68 to 1200S200-68 meeting ASTM C955 and A1003 with Fy = 50 ksi and 16 inch center-to-center spacing or gabled type construction depending on specific site requirements
     2. Interior of roof is finished with 18-gauge minimum G90 galvanized sheet steel firmly attached to rafters with ASTM shear and pull out rated self-tapping screws 4 inches on center around the edges and 12 inches on center in the field to create a stiff roof diaphragm
     3. Exterior roofing panels to be minimum 24-gauge Snap-Loc 24 concealed fastener interlocking standing seam roof panels with 24 inch panel coverage, 3 inch vertical standing ribs, S-5! Clamps, and a polyvinylidene fluoride (PVDF) finish coating or 12-gauge 304 S.S depending on specific site requirements
     4. Monosloped roof minimum slope is 1:12
     5. Each exterior seam will be caulked using a high-modulus, silicone-based product
     6. Roofing will come with all standard trim, fascia, and flashing members
     7. Roof insulation shall be as required to meet energy and fire codes
     8. Gutter and down spout are provided to splash block
  5. PERSONNEL DOOR
     1. One personnel door, 36 inches wide by 84 inches high, single leaf, double wall, honeycomb reinforced, galvanized, 18-gauge, 1 3/4 inches thick, R2.4 thermal resistance rating
     2. Door frame will be steel, fully welded
     3. Ingress via keyed-cylinder lock
     4. Panic hardware
     5. Closer with stopping arm and wind safety chain
     6. Drip shield
     7. Aluminum threshold
     8. Weather stripping
     9. Stainless steel hinges
     10. Provide one exterior light fixture above door
  6. EQUIPMENT ACCESS DOOR
     1. Equipment access door, 96 inches wide by 108 inches high, double leaf, double wall, honeycomb reinforced, galvanized, 18-gauge, 1 3/4 inches thick, R2.4 thermal resistance rating
     2. Door frame will be steel, fully welded
     3. Ingress via keyed-cylinder lock
     4. Panic hardware
     5. Closer with stopping arm and wind safety chain
     6. Drip shield
     7. Aluminum threshold
     8. Weather stripping
     9. Stainless steel hinges
     10. Provide stairs as needed (ADA required). Stair bo be 4’ wide centered with onpen space between railing and building. Continouse guardrail and handrail to be provided around landing and along length of stair. Landing is required at each doorway. All galvanized material shall be painted.
     11. Provide one exterior light fixture above door
  7. SWITCHGEAR REAR ACCESS DOOR
     1. Switchgear rear access door will be sized in accordance with switchgear sizing requirements
     2. Door frame will be steel, fully welded
     3. Drip shield
     4. Aluminum threshold
     5. Weather stripping
     6. Steel hinges
  8. CONDUIT AND CABLING
     1. Conduit and Low-Voltage Electrical Power Conductors and Cables used will align with site specific specifications.
     2. Cable trays
        1. Cable tray will be installed inside EHPDC where applicable and will be sized appropriately to the wire fill.
        2. Trays must be supported every 10 feet of vertical or horizontal run
  9. WIRING
     1. Terminate the control and interlock wiring in their respective interface panels and junction boxes
     2. Follow ICEA Method 4 for color-coding of all wiring
     3. Wiring for use in interior building facilities (e.g., lights, receptacles, fans) will be in EMT conduits and segregated from all other wiring
     4. All lighting, power, control, and alarm wiring must be:
        1. 600-volt stranded copper
        2. 75 °C rated
        3. Moisture- and heat-resistant
        4. Dual-rated for THHN/THWN
     5. Minimum wire sizes must be as follows:
        1. No. 12 AWG for lighting and power
        2. No. 14 AWG for control and alarm
        3. No. 16 AWG shielded for instrumentation
     6. Wire splicing is not allowed.
  10. GROUNDING SYSTEMS
      1. Two separate grounding systems must be provided for the building per the following
         1. The first grounding system consists of a ground bar loop provided for all building and equipment chassis grounding, meeting the following
            1. Transformers’ secondary neutral is grounded and connected to the station grounding system
            2. Each corner of the EHPDC has a ground pad for field connection to the station grounding system
            3. Power grounding between the distribution panels,and other equipment are each separately connected to the equipment chassis ground bar in accordance with the National Electric Code (NEC)
         2. The second grounding system is an isolation clean instrument ground loop that is provided for electronic equipment and instrument grounding, meeting the following
            1. Others connect the instrument ground loop and isolated ground bars to an isolated instrument ground loop at the station
            2. The instrument ground loop is not connected to the equipment chassis-grounding loop
  11. INTERCONNECTING WIRING
      1. The contractor is responsible for supplying, installing, and terminating all interconnecting wiring between EHPDC and outside equipment. Contractor is responsible for installing interconnecting wiring between equipment inside EHPDC walls.
      2. Interconnecting wiring must be neatly bundled, tied, and anchored
      3. Both ends of each interconnecting wire must have a permanently labeled, heat-shrink type sleeve marked with its appropriate wire number
      4. Both ends of each wire must be terminated with a ring-tongue type insulated crimp terminal, where possible, that is properly sized for both the wire and the terminals to which it connects
      5. All interconnecting cabling and terminations within the EHPDC will be completed prior to shipment to the site
      6. Interconnections between all equipment and panels within the building will be per specific project and site requirements
  12. INTERIOR LIGHTING
      1. EHPDC will contain sufficient lighting and lumen count per IES.Grid or support system for interior lighting to be installed inside EHPDC
      2. Basic lighting control system to be supplied
  13. EXTERIOR LIGHTING
      1. Exterior flood-lighting will be installed above EHPDC door entrances
  14. EMERGENCY LIGHTING
      1. EHPDC to include primary and backup lighting internally to the EHPDC
  15. HVAC SYSTEM
      1. The EHPDC shall feature an all-electric HVAC system.
      2. The HVAC system shall use an exterior wall-mounted heat pump to proivde cooling and the first stage of heating. The heat pump shall use electric resistance heating coils as a back up heat source and/or as a second stage of heating.
         1. The heat pump shall feature an economizer to provide free cooling to the EHPDC.
      3. The HVAC system shall feature a control system to provide the necessary heating, cooling, economizer, and ventilation functions.
      4. The HVAC system shall provide heating, cooling, and ventilation in compliance with local codes.
      5. The HVAC system shall be sized to handle the heating and cooling loads of the EHPDC in the Seattle climate.
      6. The EHPDC HVAC system shall feature a phenolic epoxy semi-gloss coating or an approved equal coating, that covers the interior and exterior of the unit. The coating shall additionally cover the condenser and evaporator coils, the copper tubing, motor mout, sheet metal parts, filter/drier, compressor housing, fan assembly, and the ventilation equipment.

Fire Alarm System required for enclosed Medium Voltage gear only.

* 1. FIRE ALARM SYSTEM
     1. The contractor shall determine the ESS system size during the delegated design process. If the ESS system size exceeds the threshold quantities stated in Seattle Fire Code Table 1207.1.3, the fire alarm system and central monitoring is required per code. If the ESS system does not exceed the threshold value, this fire alarm system is optional and shall not be provided.
     2. If a Fire Alarm system is deemed necessary, provide the components to comply with NFPA 72, NFPA 70, and Port of Seattle Fire Department (POSFD):
        1. Provide Fire Alarm System by SimplexGrinnell; Division of Tyco International.
        2. Provide Fire Alarm Control Panel by SimplexGrinnell Fire Protection Systems, Obtain Port of Seattle Fire Department approval prior to procurement.
           1. The Fire Alarm Control Panel (FACP) shall function as a complete, non-coded, analog addressable, microprocessor-based fire alarm and detection system with manual and automatic alarm initiation. The system shall analyze signals from fire sensors, provide audible and visual information to the POSFD, initiate automatic alarm response sequences and provide the means by which the user interacts with the system.
           2. The FACP power supply shall receive 120Vac power from a dedicated branch circuit with overcurrent protection.
           3. There shall be sufficient battery capacity to operate the entire system for 24 hours during normal standby conditions and 5 minutes during alarm at the end of the standby period. The power supply battery charger shall be rated for fully charging completely discharged batteries within 48 hours.
        3. Provide wireless radio communication device for reporting to central monitoring station. Provide wireless transceiver by AES, Model #7788. Central Monitoring System is through Guardian Security. Coordinate with POSFD for programming and connection.
        4. Provide initiating devices and notification devices as shown on the drawings and as required by NFPA 72 for the building type.
  2. FABRICATION
     1. All EHPDCs are fully fabricated and weather proofed
     2. Fabricator shall be AISC certified (Advanced Bridge, or equal) with a Fracture Critical Endorsement
     3. Fabrication tolerances
        1. General orientation to ± 1 degree
        2. General dimensions
           1. To ± 1/2 inch (30 to 100 feet)
     4. All steel detailing, fabrication, erection and identification shall conform to the latest edition of the American Institute of Steel Construction (AISC) Specifications and all welding shall be in accordance with the latest edition of the American Welding Society (AWS) Specifications D1.1
     5. Permanent coatings and finishes are applied inside a dedicated paint booth with ventilation and filtration provisions in compliance with coating manufacturer's requirements
     6. Any shop coatings shall be applied by an AISC P1 endorsed facility
  3. ACCESSORIES
     1. Removable lifting lugs bolted at perimeter floor beam and spaced along base length at approximate 10-feet centers (lifting design is not in scope)
  4. FINISHES
     1. Apply coatings using an electrostatic application process
     2. Thoroughly clean exterior and interior surfaces prior to coating application per the coating manufacturer's recommended practice
     3. All steel shall be primed with a zinc primer
     4. Exterior Surfaces:
     5. Roof will be coated in a polyvinylidene fluoride (PVDF) finish as provided by the roofing manufacturer
     6. Walls exteriors (siding) will be coated in a polyvinylidene fluoride (PVDF) finish as provided by the roofing manufacturer
     7. Interior Surfaces:
        1. Walls will have a G90 galvanized finish
        2. Ceiling will have a G90 galvanized finish
     8. Floor, Top Side:
        1. Cleaning:
           1. Clean surfaces to SSPC SP 1.
        2. Primer:
           1. Apply epoxy mastic primer 1.5 mils DFT
     9. Finish
        1. Manufacturer’s standard non-slip finish
        2. Field Touch-Up Paint shipped inside structure along with MSDS
     10. Base and Floor, Underside
         1. Cleaning:
            1. Clean surfaces to SSPC SP 3
            2. Clean to remove oil, dirt, water, and loose rust
         2. Primer:
            1. Apply epoxy mastic primer 1.5 mils DFT
         3. Finish:
            1. High-build epoxy with zinc
            2. Field Touch-Up Paint shipped inside structure along with MSDS

1. EXECUTION
   1. EQUIPMENT
      1. All EHPDC equipment shall be received and installed at the fabricator’s facility.
   2. INSPECTION
      1. The foundation supporting the EHPDC must be properly prepared and inspected by others prior to install
   3. PREPARATION
      1. Utility services and structural supports shall be located and verified prior to installation
      2. Supports shall be prepared using the methods recommended by the manufacturer
   4. INSTALLATION
      1. The install site must be prepared by others for EHPDC installation prior to delivery, including mat slab foundation, conduit and electrical terminations, utilities, etc.
      2. Spreader bars, cables, shackles, and other lifting and rigging equipment are by others and are not provided with the EHPDC
      3. EHPDC is to be supported during handling, transportation and setting at only removable lift lug locations
   5. FIELD QUALITY CONTROL
      1. Damaged products will be touched-up, repaired or replaced
      2. Final cleaning of interior and exterior enclosure along with all electrical equipment will be performed prior to the Operational Acceptance Test Report
   6. OPERATIONAL ACCEPTANCE TEST REPORT (OAT)
      1. Use the OAT form at the end of this section to record progress and results of installation for completing the Operational Acceptance Test for each unit
2. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

10/06/2025 New Guide Specification Section