

SECTION 31 60 00 PRECAST CONCRETE ELECTRIC VEHICLE CHARGER FOUNDATION UNITS

PART 1 GENERAL

1.1 SUMMARY

- A. This work pertains to furnishing and installing precast concrete electric vehicle (EV) charger foundation units, as special foundations supporting EV charger pedestals, in accordance with the Project Drawings and this Specification. Each precast foundation unit shall be installed at the elevation and location shown on the Project Drawings.
- B. Related Sections:
 - 1. Section 31 23 33 Trenching, Backfilling and Compacting
 - 2. Section 31 23 00 Excavation and Fill

1.2 REFERENCES

- A. Design:
 - 1. ACI 318 Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute, as referenced by the applicable edition of the IBC
 - 2. ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures, American Society of Civil Engineers / Structural Engineering Institute, as referenced by the applicable edition of the IBC
 - 3. International Building Code, International Code Council, Inc., edition adopted by the Authority Having Jurisdiction
- B. Reference Standards:
 - 1. ANSI/SCTE 77 Specifications for Underground Enclosure Integrity
 - 2. ASTM C31 Practice for Make and Curing Concrete Test Specimens in the Field
 - 3. ASTM C33 Specification for Concrete Aggregates
 - 4. ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - 5. ASTM C94 Specification for Ready-Mixed Concrete
 - 6. ASTM C125 Standard Terminology Relating to Concrete and Concrete Aggregates
 - 7. ASTM C138 Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
 - 8. ASTM C143 Test Method for Slump of Hydraulic-Cement Concrete
 - 9. ASTM C150 Specification for Portland Cement
 - 10. ASTM C173 Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete
 - 11. ASTM C192 Practice for Making and Curing Concrete Test Specimens in the Laboratory
 - 12. ASTM C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 - 13. ASTM C260 Specification for Air-Entraining Admixtures for Concrete
 - 14. ASTM C494 Specification for Chemical Admixtures for Concrete
 - 15. ASTM C989 Specification for Slag Cement for Use in Concrete and Mortars
 - 16. ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Surfaces
 - 17. ASTM C1107 Packaged Dry, Hydraulic Cement Grout (Non-Shrink)
 - 18. ASTM C1610 Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique
 - 19. ASTM C1611 Test Method for Slump Flow of Self-Consolidating Concrete
 - 20. ASTM C1712 Test Method for Rapid Assessment of Static Segregation of Self-Consolidating Concrete Using Penetration Test
 - 21. ASTM C1758 Practice for Fabricating Test Specimens with Self-Consolidating Concrete
 - 22. ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
 - 23. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
 - 24. ASTM D1241 Standard Specification for Materials for Soil-Aggregate Subbase, Base and Surface Courses

25. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 26. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 27. ASTM D3080 Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
 28. ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 29. ASTM D4767 Test Method for Consolidated-Undrained Triaxial Compression Test for Cohesive Soils
 30. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- C. Additional References:
1. EV Block Reference Manual – Compact Installation – Current Version - www.evblocks.com/us
 2. EV Block Compact Product Drawings – www.evblocks.com/us

1.3 DEFINITIONS

- A. EV Charger Foundation: A structural element designed to support and anchor EV charging equipment, sized and configured to meet applicable load, stability, and environmental requirements. The foundation shall accommodate conduit access and anchorage as required for secure installation.
- B. EV Block Compact: A precast concrete EV Charger Foundation unit, at least 16 inches in height, consisting of four sides and an upper surface that is generally square or rectangular in shape. At least two sides shall include one or more openings leading to an internal vertical conduit pathway. The upper surface shall include a recessed area designed to accept a single electric vehicle (EV) charger pedestal, allowing it to be mounted flush with the surface via embedded anchor points. The unit shall be manufactured by an authorized producer under license by Recon Wall Systems, Inc. dba EV Blocks.
- C. EV Charger Pedestal: A pedestal constructed of steel, aluminum, or other durable material, featuring a baseplate that may be square, rectangular, round, or of another shape, with a maximum dimension not exceeding 9-3/4 inches. The baseplate shall include mounting holes located near its perimeter to facilitate secure attachment to the EV Block Compact unit using 1/2-inch diameter bolts. The overall height of the pedestal shall not exceed 54 inches.
- D. Securing Hardware: Four, 1/2-inch diameter by 3-inch long, stainless steel, button head and tamper-resistant bolts used for securing the EV Charger Pedestal to the EV Block Compact.
- E. Crushed Stone Foundation: Clean, crushed rock located directly beneath the EV Block Compact unit to provide adequate drainage and leveling.

1.4 SUBMITTALS

- A. Contractor shall submit to the Owner the EV Block Compact product data and installation instructions for approval.
- B. Contractor shall submit to the Owner the EV Block Producer's test reports certifying that the EV Block Compact units manufactured at their production facility meet the requirements of this Specification and the requirements of the Project Drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall inspect all EV Block Compact units at delivery to determine that the proper size and type have been delivered and are usable. Damaged material shall not be incorporated into the work.
- B. All EV Block Compact units shall be stored in a location and manner that protects against excessive weathering and damage.
- C. During storage, Contractor shall prevent the EV Block Compact units from coming in contact with substances which may stain or adhere to the finished visual surfaces of the unit. Provide proper dunnage between the EV Block Compact units as well as the ground surface. EV Block Compact units shall not be stacked in direct contact with other units.
- D. For the portions of the EV Block Compact units which shall be exposed above grade, the finished surface shall be free of excessive chipping, cracking and stains.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. EV Block Compact units furnished to the project shall be produced by a manufacturer that has been authorized and licensed, by the licensor listed below, to produce the EV Block Compact units:
 - 1. Recon Wall Systems, Inc. dba EV Blocks
Coon Rapids, MN
(612) 474-0089
www.evblocks.com/us

2.2 DESCRIPTION

- A. The precast concrete EV Charger Foundation unit shall be manufactured:
 - 1. As a single pour unit that is cast monolithically, containing no cold joints,
 - 2. With a recess in the upper surface that allows for the flush mounting of an EV Charger Pedestal that can be secured to the concrete,
 - 3. Containing at least four embedded threaded inserts, located within the recess in the upper surface,
 - 4. With at least two openings in the side surfaces of the unit, leading to a central vertical pathway, that allows for the installation of electrical wiring conduits,
 - 5. With a bullnose, round-over, or chamfer profile around the upper surface.

2.3 MATERIALS

- A. Concrete:
 - 1. All concrete used shall be first-purpose. No returned or waste concrete shall be permitted for use in production.
 - 2. The EV Charger Foundation unit shall consist of concrete with a minimum 28-day compressive strength of 4,000 psi.
 - 3. Air Entrainment: Total air content of the concrete shall conform to ACI 318 for the freezing-and-thawing (F) exposure class applicable to the Project. Where the Project documents do not establish an exposure class, the concrete shall be air-entrained to a total air content of 5.5 to 8.5 percent by volume, or in conformance with ASTM C94 Table 1 and Section 7, latest revision. Air content shall be measured in the plastic state in accordance with ASTM C231 (conventional concrete) or ASTM C173 (self-consolidating concrete).
 - 4. Consistency shall be in accordance with the producer's qualified mix design, measured per ASTM C143 (conventional concrete) or ASTM C1611 (self-consolidating concrete).
- B. Securing Hardware:
 - 1. Securing hardware shall be stainless steel, meeting the requirements of ASTM F593, and contain tamper resistant button head such as hex-pin or torx-pin.
- C. Crushed Stone Foundation:
 - 1. The foundation material shall consist of clean, 1-inch minus, crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM D422:

<u>Sieve Size</u>	<u>Percent Passing</u>
1-inch	100
3/4-inch	75 – 100
No. 4	0 – 10
No. 50	0 – 5

2.4 FINISH

- A. The exposed surfaces of the EV Charger Foundation unit shall have a smooth finish and the upper surface shall have a profiled edge that is either bullnose, a round-over, or chamfer.

2.5 UNIT BACKFILL

- A. Crushed Stone Backfill: A backfill material consisting of clean, 1-inch minus, crushed stone or crushed gravel, meeting the gradation shown in Section 2.3.D.1, may be used as unit backfill material.
- B. Granular Backfill: Granular soils meeting the following gradation, tested in accordance with ASTM D422, may be used as unit backfill:

<u>Sieve Size</u>	<u>Percent Passing</u>
1-inch	100
No. 4	20 – 100
No. 40	0 – 60
No. 200	0 – 10

The USCS soil types, per ASTM D2487, generally meeting the gradation shown are: well-graded and poorly graded gravels (GW and GP), well-graded and poorly graded sands (SW and SP), as well as poorly graded gravels and sands containing silt (GP-GM and SP-SM). On-site soils meeting the above requirements may be used as unit backfill.

2.6 QUALITY CONTROL

- A. Concrete Finish:
 - 1. The upper portion of the unit shall have a smooth, hard, uniform texture on the concrete.
 - 2. Within the upper exposed portion of the unit, any air-voids greater than 3/4-inch and deeper than 1/4-inch shall be filled with patching mortar.
 - 3. Minor chips, form joint lines and typical concrete color variation are all acceptable.
- B. Cracks:
 - 1. Cracks that are greater than 6-inches in length and 1/32-inch in width shall not be permitted.

2.7 DESIGN

- A. Prior to furnishing EV Block Compact units to the project site, a Registered Professional Engineer shall review all applicable product data and shall consider the actual site soil and EV Charger Pedestal loading conditions that will be present to determine if the EV Block Compact unit is suitable for the proposed application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify locations of utilities and existing structures prior to excavation.
- B. Examine the Project site and evaluate the condition of the locations in which the EV Block Compact units will be installed. Notify the proper supervising authority in writing of any conditions that may interfere with the proper installation of the EV Block Compact units or delay completion.
- C. Promptly notify the design engineer of site conditions which may affect performance, soil conditions observed other than those assumed, or other conditions that may require a reevaluation.

3.2 EXCAVATION

- A. Contractor shall excavate to the lines and grades shown on the construction drawings. Excavation may be completed using auger drilling or typical open-cut excavation. The contractor shall be careful to minimize over-excavation (unless required) or disturbance of the surrounding soils. Excavation limits around the units shall be 6 to 12-inches beyond the edges of the EV Block Compact unit.
- B. The bottom limits of the excavation should extend at least 6-inches beyond the height of the EV Block Compact unit or regional frost depth requirement, whichever is greater (over-excavation). The bottom limits should be well compacted and flat to allow for installation of at least a 6-inch-thick crushed stone

foundation. Greater amounts of crushed stone will be needed in areas where over-excavation is required. The crushed stone foundation shall be compacted so as to provide a smooth, hard surface on which to place the EV Block Compact unit.

3.3 EV BLOCK COMPACT UNIT INSTALLATION

- A. The EV Block Compact unit shall be lifted and placed into the prepared excavation. Lifting may be accomplished via the side-embedded cable lifters or by threading one or more eyelets into the top-surface anchors and lifting with appropriately rated nylon straps, cables, or chains.
- B. Lower the EV Block Compact unit into the excavated hole, ensuring that the side conduit openings are properly aligned per site and installation requirements. The unit may be lowered over pre-installed conduit or conduit may be installed after the unit is in place.
- C. Once the EV Block Compact unit is in place, ensure that it level in both directions and that the upper surface elevation is set to the project requirements within +/- 1/2-inch.
- D. Brace the EV Block Compact unit as required to maintain the location and level until the unit can be backfilled.
- E. Once the unit and all conduit has been installed, backfill around the EV Block Compact using crushed stone or granular material. Backfill shall be placed in maximum 6-inch lifts. If granular material is used, compact to 95% of Standard Proctor density per ASTM D698. Backfill elevation shall match that shown in the Project Plans, accounting for any paving or landscaping materials to be installed.
- F. Install paving or landscaping materials around the EV Block Compact as specified in the Project Plans.
- G. For additional information on the EV Block Compact unit installation process, refer to the EV Block Reference Manual – Compact Installation.

3.4 MOUNTING THE EV CHARGER PEDESTAL

- A. Obtain a pedestal bolting diagram from the EV charger manufacturer to confirm compatibility with the embedded anchor layout in the EV Block Compact. If unavailable, the pedestal base may be used to verify alignment.
- B. Position the EV charger pedestal over the recessed area on the top surface of the EV Block Compact, aligning the mounting holes with the embedded anchors.
- C. Secure the pedestal to the EV Block Compact using 1/2-inch diameter stainless steel bolts and washers threaded into the embedded inserts. It is recommended to use the tamper-resistant stainless-steel hardware supplied with the unit. Lock washers may be used but are not required.
- D. Complete wiring of the EV charger in accordance with the charger manufacturer's installation instructions. Coordinate with the site electrical contractor as necessary.

3.5 FIELD QUALITY CONTROL

- A. Contractor shall be responsible for proper installation and quality control of all EV Block Compact units, the components, and materials.
- B. Owner shall, at their expense, retain a qualified professional to monitor and perform quality assurance checks of the Contractor's work.
- C. Quality Assurance should include soil inspection, frequent backfill compaction testing, verification of geotechnical design parameters and compliance with Project Plans.

3.6 CLEANING AND REPAIRING

- A. After completing the installation of the EV Block Compact units, remove construction debris and restore any adjacent finished areas affected by the installation to their pre-construction state.
- B. Wash and remove any soiling and stains from the upper exposed portions of the EV Block Compact units. Do not use acid or detergents that may "burn" or discolor face.
- C. Repair any bug holes or chips in the upper exposed portions of the EV Block Compact units not meeting this Specification.

END OF SECTION