

SECTION 330510 – UTILITY STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Precast Structures.
 - 2. Utility Structure Accessories.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Accessories for structures.
- B. Shop Drawings for Precast or Factory-Fabricated Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:
 - 1. Reinforcement details.
 - 2. Frame and cover design and structure frame support rings.
 - 3. Ladder details.
 - 4. Grounding details.
 - 5. Dimensioned locations and sizes of all openings and sumps.
 - 6. Joint details.
- C. Product Certificates: For concrete and steel used in precast concrete structures, comply with ASTM C 858.
- D. Qualification Data: For qualified professional engineer and testing agency.
- E. Source quality-control reports.
- F. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Comply with IEEE C2.
- B. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store precast concrete underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.
- B. Lift and support precast concrete units only at designated lifting or supporting points.

1.6 COORDINATION

- A. Coordinate layout and installation of structures with final arrangement of other utilities, site grading, and surface features as determined in the field.
- B. Coordinate elevations of pipe and conduit entrances into structures with final locations and profiles of those utilities as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that pipe and conduit runs drain to structures, and as approved by Architect.

PART 2 - PRODUCTS

2.1 PRECAST STRUCTURES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, **or approved equal**:
 - 1. Christy Concrete Products.
 - 2. Cretex Concrete Products West, Inc.; Riverton Division.
 - 3. Oldcastle Precast Group.
 - 4. Oldcastle Precast Inc.; Utility Vault Division.
 - 5. Utility Concrete Products, LLC.
 - 6. Retain-It.
 - 7. ACO StormBrixx (Geocellular Tanks)
 - 8. Nyloplast Storm Structures
- B. Comply with ASTM C 858, with structural design loading as specified on the drawings, and with interlocking mating sections, complete with accessories, hardware, and features.
 - 1. Openings: Precast openings in walls, arranged to match dimensions and elevations of approaching pipes and conduits with the manufacturer's standard allowance, vertically and horizontally, to accommodate alignment variations.
 - a. Openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.
- C. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

2.2 PVC STRUCTURES

- A. Fabricated PVC structures in compliance with ASTM F3778.
- B. Ductile iron frames and grates meeting ASTM A536 suitable for H-20 loading.
- C. Water-tight connections meeting ASTM D3212 for corrugated and smooth plastic pipe systems.

2.3 UTILITY STRUCTURE ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:
 - 1. Bilco Company (The).
 - 2. Campbell Foundry Company.
 - 3. McKinley Iron Works.
 - 4. Neenah Foundry Company.
 - 5. Oldcastle Precast Group.
 - 6. Oldcastle Precast Inc.; Utility Vault Division.
- B. Ferrous metal hardware, where indicated, shall be hot-dip galvanized complying with ASTM A 153 and A 123.
- C. Structure Frames, Covers, and Chimney Components: Comply with structural design loading specified for structure.
 - 1. Frame and Cover: Weatherproof, gray cast iron complying with ASTM A 48/A 48M, Class 30B with milled cover-to-frame bearing surfaces; diameter as indicated on the drawings.
 - a. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - 2. Cover Legend: Cast in. Retained to suit system.
 - 3. Structure Chimney Components: Precast concrete rings with dimensions matched to those of roof opening.
 - a. Mortar for Chimney Ring and Frame and Cover Joints: Comply with ASTM C 270, Type M, except for quantities less than 2.0 cu. ft. where packaged mix complying with ASTM C 387/C 387M, Type M, may be used.
- D. Expansion Anchors for Installation after Concrete Is Cast: Zinc-plated, carbon-steel-wedge type with stainless-steel expander clip with 1/2-inch bolt, 5300-lbf rated pullout strength, and minimum 6800-lbf rated shear strength.
- E. Sealing Compound: Non-hardening, safe for contact with human skin, and workable at temperatures as low as 35 deg F. Capable of withstanding temperature of 300 deg F without slump and adhering to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.
- F. Fixed Structure Ladders: Arranged for attachment to wall and floor of structure. Ladder and mounting brackets and braces shall be fabricated from hot-dip galvanized steel.

- G. Cover Hooks: Heavy duty, designed for lifts 60 lbf required.

2.4 SOURCE QUALITY CONTROL

- A. Test and inspect precast concrete utility structures according to ASTM C 1037.

PART 3 - EXECUTION

3.1 CORROSION PROTECTION

- A. Aluminum shall not be installed in contact with earth or concrete.

3.2 UNDERGROUND ENCLOSURE APPLICATION

- A. Structures: Precast concrete.
 - 1. Units Located in Roadways and Other Deliberate Traffic Paths by Heavy or Medium Vehicles: H-20 structural load rating according to AASHTO HB 17.
 - 2. Units Not Located in Deliberate Traffic Paths by Heavy or Medium Vehicles: H-10 load rating according to AASHTO HB 17.

3.3 EARTHWORK

- A. Excavation and Backfill: Comply with Division 31 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restore surface features at areas disturbed by excavation and reestablish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Division 32 Sections "Turfs and Grasses" and "Plants."
- D. Cut and patch existing pavement in the path of underground ducts and utility structures according to State and Local requirements.

3.4 INSTALLATION OF CONCRETE STRUCTURES

- A. Precast Concrete Handhole and Structure Installation:
 - 1. Comply with ASTM C 891 unless otherwise indicated.
 - 2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
 - 3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

- B. Elevations:
 - 1. Structure Roof: Install with rooftop at least 15 inches below finished grade.
 - 2. Structure Frame: In paved areas and trafficways, set frames flush with finished grade. Set other structure frames 1 inch above finished grade.
- C. Drainage: Install drains in bottom of structures where indicated. Coordinate with drainage provisions indicated.
- D. Structure Access: Circular opening in structure roof; sized to match cover size.
 - 1. Structures with Fixed Ladders: Offset access opening from structure centerlines to align with ladder.
 - 2. Install chimney, constructed of precast concrete collars and rings to support frame and cover and to connect cover with structure roof opening. Provide moisture-tight masonry joints and waterproof grouting for cast-iron frame to chimney.
- E. Fixed Structure Ladders: Arrange to provide for safe entry with maximum clearance from other items in structures.
- F. Field-Installed Bolting Anchors in Structures: Do not drill deeper than 3-7/8 inches for anchor bolts installed in the field.
- G. Warning Sign: Install "Confined Space Hazard" warning sign on the inside surface of each structure cover.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground utility structures.
 - 2. Test structure grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding for Electrical Systems"
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

3.6 CLEANING

- A. Clean internal surfaces of structures, including sump. Remove foreign material.

END OF SECTION 330510