# SECTION 034220 PRECAST CONCRETE VAULTS

## PART 1 - GENERAL

A. Description

This section includes materials, design, and installation of precast concrete vaults.

B. Related Work Specified Elsewhere

1. General Concrete Construction: 030500
2. Access Hatches: 055300.
3. Painting and Coating: 099000.
4. Trenching, Backfilling, and Compaction: 312316.
5. Gravel and Crushed Rock Base for Structures: 312323.

C. Submittals

1. Submit shop drawings in accordance with the General Conditions and Section 013300.
2. Submit manufacturer's catalog data on precast concrete items. Show dimensions of vaults and thicknesses of walls, floors, and top slabs. Show reinforcing wire and steel. Show materials of construction by ASTM reference and grade.
3. Submit manufacturer's design calculations and certification signed and sealed by a professional civil or structural engineer registered in the state of California that vault design and construction comply with the specified design load conditions and the referenced ASTM specifications (e.g., ASTM C857 and C858).

## PART 2 - MATERIALS

A. Manufacturers

Precast concrete vaults shall be manufactured by Brooks Products Inc., Utility Vault Company, Midstate Concrete Products, or equal.

B. Precast Concrete Vaults

1. Precast concrete vaults shall comply with ASTM C858 except as modified herein.

2. Design loads shall be in accordance with ASTM C857, except as modified herein. Traffic loads, unless otherwise stated, shall conform to Load Designation A-16 per Table 1. Soil lateral loads shall be as determined by ASTM C857 or loadings specified in the project soils report, whichever is greater. Alternate design by the strength design method shall include a load factor of 1.7 times the lateral earth or hydrostatic pressures.

3. Include the following load conditions in the design:

   a. Vault roof removed while structure is backfilled to grade and subject to live and dead loads.

   b. Vault roof in place and walls subject to simultaneous vertical and horizontal application of all live, impact, and dead loads. Include the case of an A-16 designated load placed directly above the wall.

4. Design shall also comply with the following restrictions:

   a. The maximum reinforcement ratio allowed is one-half the reinforcement ratio that would produce a balanced strain condition.

   b. Earth pressure shall be converted to a horizontal pressure using a coefficient of earth pressure at rest of 0.5 and not a coefficient of active earth pressure.

   c. Include a live load surcharge in the design of the walls.

5. Design all vaults to receive the specified traffic loading.

6. Precast vault construction shall be in the form of monolithic walls or horizontal wall sections; do not use panel walls.

7. Minimum wall thickness shall be 6 inches. Design knockout wall panels to accommodate loading pressures defined above.

8. Design vault roof with removable and resealable panels for equipment access.

9. Floor slab shall be precast concrete. Calculations for the floor slab design shall be included in the vault design submittal.

10. Design joints using a butyl rubber sealant per ASTM C990.

C. Sealants and Mortar

Butyl rubber sealing compound shall comply with ASTM C990. Mortar shall comply with ASTM C387, Type S or use grout complying with Section 030500.

D. Ladders

Provide aluminum and steel-reinforced copolymer polypropylene ladders per as specified in Section 055300 and in the drawings.

E. Access Hatches

1. Provide traffic-rated access hatches per Section 055300.

F. Sump Covers

Steel, minimum 1/4-inch thick, galvanized per ASTM A123, unless otherwise indicated in the drawings.

G. Cement

Cement shall be ASTM C150, Type II.

H. Admixtures

Provide concrete admixtures as specified in Section 030500.

I. Crushed Rock Base

Crushed rock base material shall comply with Section 312323.

PART 3 - EXECUTION

A. Vault Base

1. Excavate for the vault and install a crushed rock base wrapped in filter fabric as indicated in Specification Sections 312323 and 312316, and the drawings.

B. Sealing and Grouting

Fill joints between precast sections with either a butyl rubber sealing compound or mortar.

C. Installing Vaults

1. Set each precast concrete vault section plumb on a bed of sealant or cement mortar at least 1/2-inch thick to make a watertight joint with the

concrete base and with the preceding unit. Point the inside joint and wipe off the excess mortar or sealant.

2. Install the concrete roof such that it slopes at least 1/8 inch per foot toward the outer edge of the roof.

D. Backfill Around Vaults

Backfill and compact around the vault using fill as specified in Section 312316. Compact to 95% relative compaction.

END OF SECTION