PART 1 - INTRODUCTION

1.1 PURPOSE

A. This section is intended to provide design guidelines for Utility Tunnel Systems.

PART 2 - GENERAL DESIGN REQUIREMENTS

A. GENERAL

1. Forbidden Utilities

Utilities that are not allowed in tunnels under any circumstance include: natural gas, and electric greater than 480VAC. No pipes shall be routed through tunnels that will reduce access through the tunnel. No pipes shall be routed perpendicular through a tunnel that will require somebody to duck or walk over the pipe.

2. Minimum Size
   a. The minimal width of a tunnel shall be 3 feet of clear walk space plus the maximum width of the pipe racking system. The minimum clear height for the walking space aisle shall be 6 ½ feet.

3. Egress
   a. Egress/access points/shafts shall be placed at a maximum of 300 feet or less where required by code.
   b. Provide ladders. Provide landings as required by vertical length in accordance to OSHA requirements.
   c. Provide security and locks on doors per Yale Utilities. The position of doors shall be monitored electronically.

4. Ventilation System
   a. Ventilation shall be forced mechanical system with supply and exhaust fans.
   b. Ventilation fans shall run continuously, regardless of space temperature.

5. Minimum Cover
a. The minimum cover on top of tunnels shall be in accordance to the following areas:

1) Paved areas (parking lots, driveways, roadways, sidewalks, etc.): 18 inches
2) Landscape areas (lawn/grassed areas, planting beds, etc.): 3 feet

6. Drains
a. Drains: Floor drains shall not be included in tunnels. Provide a trench in the edge of the tunnel to allow water to collect and be directed to the sump.

7. Duplex Sump Pumps
a. Refer to Manholes Paragraph A.8 for sump pumps. Note: Duplex sump pumps only required at low elevations.

8. Simplex Sump Pump
a. If water can overflow the sump and flow down to another lower elevation where there is a sump and no flooding or damage is caused by that water overflowing to the building, tunnel, etc., then a single pump will suffice in that higher elevation sump.
b. Sump pump GFCI receptacle shall be located a minimum of 4 Feet above finished floor.
c. General Pump Specifications
   1) Refer to Manholes Paragraph A.8.f.1) through 4) and 6).
   2) Submersible Motor: 115VAC, 1-phase, 60 Hz oil filled for rapid heat dissipation with 15-foot, 3-conductor SOOW type cord and plug.
   3) Control panel and remote overflow alarm not required for single pump applications.

d. Provide 20A, 120/277VAC, Marine Grade, single-pole or three-way toggle switch with lighted handle. Handle shall illuminate when the switch is on. Manufacturer shall be Hubbell (Catalog No. HBL1221PL for single-pole and Catalog No. HBL1223PL for three-way). Alternate manufacturers are not allowed.

e. Provide silicone rubber weatherproof switch plate for use with above light switch. Manufacturer shall be Hubbell (Catalog No. HBL1795). Alternate manufacturers are not allowed.
f. Light switches shall be mounted near tunnel entry and exit points and intermediate locations as needed.

10. Emergency Lighting and Exit Signs
   a. Provide Simkar emergency light fixture (Catalog No. SWLEM) or approved equal.
   b. Location of emergency light fixtures to be per NFPA 101 Life Safety Code.
   c. Provide Simkar exit sign (Catalog No. SWLED) or approved equal.
   d. Location of exit signs to be per NFPA 101 Life Safety Code.

11. Receptacles
   c. Receptacles in tunnel shall be mounted 4 feet above finished floor and approximate every 25 feet.

12. Wire and Cable - Steam and Condensate Tunnels

13. Wire and Cable - Chilled Water Tunnels

14. Conduit and Accessories

15. Identification

16. Structural Requirements

B. WATERPROOFING MATERIALS

C. WATERPROOFING METHODS