### General Notes

**Reinforced Concrete Pipe**

1. Adequate cover shall be provided during construction to protect the pipe from damage. The minimum cover shall be as shown on these tables or conform to AASHTO requirements, whichever is greater. The minimum cover for reinforced concrete pipe is measured from the top of the pipe to the bottom of the pipe (VMA or PCP).

2. Fill heights shall be greater than maximum allowed in the height of fill tables on this sheet, requiring special design of structure.

3. Pipe design is based on safety factor of 1.53 on ultimate strength.

4. The heights of fill over top of pipe are based on unit weight of soil at 120 lb. per cubic ft.

5. Pipe class is determined from 0.01 in. crack d-load.

6. Concrete is classified to avoid cracking for reinforced concrete pipe construction using settlement ratio R = 600/ (O.D.)

7. Changes in design factors may require adjusting designs in pipe design.

8. Minimum wall thicknesses are based on design weight W = 170 (WHD) for circular pipe and equal to 200 for elliptical pipe.

9. Spacing for multiple pipe installations shall conform to the details shown on the standard plan M-003-1.

10. When a pipe is to be extended, the same pipe material and size as in the original pipe installation shall be used.

**Nonreinforced Concrete Pipe**

1. At the option of the contractor, nonreinforced concrete pipe conformance to AASHTO M 5 may be used in lieu of reinforced concrete pipe for all sizes 36 inches in diameter and smaller. The nonreinforced concrete pipe shall meet the same 0.01 in. crack d-load under the unit weight bending strength method as specified for reinforced concrete pipe in accordance with AASHTO M 5. The contractor shall provide written certification of conformance. The wall thickness of the nonreinforced concrete pipe may be increased as required to meet 0.01 in. crack d-load requirements.

2. All requirements for reinforced concrete pipe, except those referring to reinforcement, shall apply to nonreinforced concrete pipe.

---

### Dimensions for Reinforced Concrete Pipe

**Detailed Information Only**

**Concrete Pipe with End Sections**

- **H** = Maximum height of fill over top of pipe, excluding pavement thickness.
- **L1** = Length of pipe to be measured when placed in accordance with section 617 or 624.
- **L2** = Length of pipe to be measured when placed in accordance with section 603.

**Concrete Pipe without End Sections**

- **H** = Maximum height of fill over top of pipe, excluding pavement thickness.