# APPENDIX F

Requirements for Design
of Closed Conduits Carrying Bulked Flow

| | Open Concrete Channel | Bulked Flow Inlet with Closed Conduit |
|---|---|---|
| **General Location** | N/A | Do not locate a closed conduit drain under homes or other permanent structures. Provide a safe secondary overflow path for water and sediment. |
| **Horizontal Alignment** | N/A | The horizontal alignment of the storm drain shall be straight.[1] |
| **Trash Barrier** | N/A | A trash rack per LACDPW 3089-0 is required at the inlet. Trash posts spaced at 2/3 the diameter of the conduit or 4 feet, whichever is smaller, are also required. |
| **Access Roads** | Provide a vehicular access road of at least 12-feet wide within a 15-f oot easement, paved with 3 inches of asphalt concrete (A.C.) over 4 inches of crushed aggregate base (C.A.B.) on both sides of the channel. | Provide a vehicular access road of at least 12-feet wide within a 15-foot easement, paved with 3 inches of asphalt concrete (A.C.) over 4 inches of crushed aggregate base (C.A.B.). |
| **Hydraulic Design** | Refer to the Department's Hydraulic Design Manual. | Refer to the Department's Hydraulic Design Manual. Pressure flow is not permitted in closed conduits. |
| **Ponding** | N/A | Ponding is not allowed at the inlet. |
| **Freeboard** | Refer to the Department's Hydraulic Design Manual. | Minimum freeboard at the inlet is 2-feet above maximum water surface elevation. Minimum freeboard to the soffit of the conduit is 1-foot. |
| **Design Capacity** | Channel or inlet and drain must be sized to pass the burned and bulked flow rate or the fully developed watershed flow rate whichever is higher. | |
| **Drain Size** | N/A | Minimum drain size is 36-inch RCP. |
| **Drain Slope** | N/A | The minimum drain slope shall be 5 percent. The slope shall be uniform to maintain uniform velocities.[2] |
| **Structural Design** | Refer to the Department's Structural Design Manual requirements for sediment carrying channels and conduits in regard to additional cover over the reinforcing steel. | |
| **Minimum and Maximum Velocities** | Peak flow velocity shall be greater than the limiting deposit velocity for the size of material to be transported (see Appendix C-11) but shall not exceed 40 fps. | |
| **Junctioning** | Angle of confluence shall not exceed 5°45'. | Drains carrying less than 250 cubic yards of sediment may be allowed to junction with the mainline provided the total cumulative sediment is less than 1,000 cubic yards. The design concept must be approved by the Department prior to proceeding to final plans. |
| **Inlet Design** | Design the inlet to the concrete channel or conduit to accelerate flows into the drain. Provide a minimum slope of 2% for the invert slab. | |

[1] If bends are unavoidable, the radius of curvature shall be at least 30 times the width of pipe. The central angle shall not exceed 45 degrees. The maximum deviation computed by the ratio: actual length from inlet to outlet/junction over straight line distance from inlet to outlet/junction, shall be less than 1.1.

[2] A drain slope of 3 to 5 percent may be permitted provided the velocity is greater than the limiting deposit velocity ($V_l$).