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Design Standards

Section 7

Curb, Gutter and Sidewalk

SECTION VII

CURB, GUTTER, AND SIDEWALK

7-1 GENERAL

This section of the specifications defines materials, practices and designs to be used in the construction of all curb and gutter, and sidewalk within the Kanab City.

All curb and gutter, and sidewalk shall consist of air-entrained Portland Cement concrete constructed on a prepared sub-grade in accordance with these specifications. This work shall be in reasonably close conformity with the lines and grades, thickness and typical cross sections shown on the plans or established by the Engineer.

Concrete to be used shall conform to the specification outlined in Section IV, "Portland Cement Concrete," of these specifications.

Certified copies, in triplicate, of the mill test of cement shall be furnished to the City upon request of the Engineer.

Minimum curb and gutter grade shall be 0.005 ft./ft.

7-2 SUB-GRADE

The sub-grade shall be excavated or filled with suitable material to the required grades and lines. All soft, yielding, and otherwise unsuitable material shall be removed and replaced with suitable material. Filled sections shall be compacted and extend a minimum of one foot outside the form lines. The sub-grade shall be reasonably dense, firm, trimmed to a uniform smooth surface, and in a moist condition when the concrete is placed.

A 3/4-inch maximum crushed gravel base shall be placed six inches thick under all curb and gutter and four inches under sidewalk unless specifically waived in writing by the Engineer. Where the foundation material is found to be unstable, the Owner shall furnish and place sufficient gravel fill as directed by the Engineer to firm up the soil upon which the curb and gutter is to be placed. On driveway approaches, the concrete shall be six inches thick with 3/4 inch maximum crushed gravel underneath.

7-3 CONSTRUCTION STANDARDS

7-3.1 CONCRETE PLACEMENT. The concrete shall be placed either by an approved slipform/extrusion machine, by the formed method, or by a combination of these methods.

7-3.1.1 MACHINE PLACEMENT. The slipform/extrusion machine shall be so designed as to place, spread, consolidate, screed, and finish the concrete in one complete pass in such a manner that a minimum of hand finishing will be necessary to provide a dense and homogenous concrete section. The machine shall shape, vibrate, and/or extrude the concrete for the full width and depth of the concrete section being placed. It shall be operated with nearly a continuous forward movement as possible. All operations of mixing, delivery, and spreading concrete shall be so coordinated as the provide uniform progress, with stopping and starting of the machine held to a minimum.

7-3.1.2 FORMED METHOD. The forms shall be of wood, metal, or other suitable material that is straight and free from warp, having sufficient strength to resist the pressure of the concrete without displacement and sufficient tightness to prevent the leakage of mortar. Flexible or rigid forms of proper curvature may be used for curves having a radius of 100 feet or less. Division plates shall be metal.

The front and back forms shall extend for the full depth of the concrete. All of the

forms shall be braced and staked so that they remain in both horizontal and vertical alignment until their removal. They shall be cleaned and coated with an approved form-release agent before concrete is placed against them.

The concrete shall be deposited into the forms without segregation and then it shall be tamped and spaded or mechanically vibrated for thorough consolidation. Low roll or mountable curbs may be formed without the use of a face form by using a straightedge and templet to form the curb face. When used, face forms shall be removed as soon as possible to permit finishing. Front and back forms shall be removed without damage to the concrete after it has set.

7-3.2 FINISHING. The plastic concrete shall be finished smooth, if necessary, by means of a wood float and then it shall be given a final surface texture using a light broom or burlap drag. Concrete that is adjacent to forms and formed joints shall be edged with a standard jointer or edging tool to the dimensions shown on the plans. The top, face, and flowline of the curb and also the top of the apron on combined curb and gutter must be finished true to line and grade and without any irregularities of surface noticeable to the eye. The gutter shall not pond water nor shall any portion of the surface of the curb and gutter depart more than 1/4 of an inch from a straight edge, ten feet in F6/H2 length, placed on the curb parallel to the center line of the street nor shall any part of the exposed surface present a wavy appearance.

7-3.3 JOINTING

7-3.3.1 CONTRACTION JOINTS. Transverse weakened-plane contraction joints shall be constructed at right angles to the curb line at intervals not to exceed sidewalk width for sidewalk. Joint depth shall be at least 1/3 of the cross section of the concrete. Generally, surface areas shall not exceed fifty square feet without contraction joints.

Contraction joints may be sawed, hand-formed, or made by 1/8-inch thick division plates in the formwork. Sawing shall be done early after the concrete has set to prevent the formation of uncontrolled cracking. The joints may be hand-formed either by (1) using a narrow or triangular jointing tool or a thin metal blade to impress a plane of weakness into the plastic concrete temporarily or (2) inserting 1/8" thick steel strips into the plastic concrete temporarily. Steel strips shall be withdrawn before final finishing of the concrete. Where division plates are used to make contraction joints, the plates shall be removed after the concrete has set and while the forms are still in place.

7-3.3.2 EXPANSION JOINTS. Expansion joints shall be constructed at right angles to the curb line at no greater than 150-foot intervals for curb and gutter, at immovable structures and at points of curvature for short-radius curves. Spacing for sidewalk shall not exceed twenty feet. Filler material for expansion joints shall conform to requirements of ASTM D994, D1752 and shall be furnished in a single 1/2-inch thick piece for the full depth and width of the joint. Expansion joints in a slipformed curb or curb and gutter shall be constructed with an appropriate hand tool by raking or sawing through partially set concrete for the full depth and width of the section. The cut shall be only wide enough to permit a snug fit for the joint filler. After the filler is placed, open areas adjacent to the filler shall be filled with concrete and then troweled and edged.

Alternately, an expansion joint may be installed by removing a short section of freshly extruded curb and gutter immediately, installing temporary holding forms, placing the expansion joint filler, and replacing and reconsolidating the concrete that was removed. Contaminated concrete shall be discarded.

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7-3.3.3 OTHER JOINTING. Construction joints may be either but or expansion-type joints. Curbs or combined curbs and gutters constructed adjacent to existing concrete shall have the same type of joints as in existing concrete, with similar spacing; however, contraction joint spacing shall not exceed twelve feet.

A silicone joint sealer as defined in ASTM standards shall be applied to all formplace expansion joints. The silicone joint sealer shall be applied under pressure to a depth of

not less than two inches from the face of the curb.

7-3.4 PROTECTION. The contractor shall always have materials available to protect the surface of the plastic concrete against rain. These materials shall consist of waterproof paper or plastic sheeting. For slipform construction, materials such as wood planks or forms to protect the edges shall also be required.

When concrete is being placed in cold weather and the temperature may be expected to drop below 35 F, suitable protection shall be provided to keep the concrete from freezing until it is at least ten days old. Concrete injured by frost action shall be removed and replaced at the Contractor's expense.

7-3.5 CURING. Concrete shall be cured for at least three days after placement to protect it against loss of moisture, rapid temperature change, and mechanical injury. Moist burlap, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used as the curing material membrane curing shall not be permitted in frost-affected areas when the concrete will be exposed to deicing chemicals within thirty days after completion of the curing period.

7-3.6 BACKFILLING. After the forms have been removed from the gutter, the contractor shall backfill to at least the property line paralleling the curb, and to the elevation of the finished concrete, and shall backfill from the lip of the gutter to the edge of the existing oil surface, as required by the City Engineer.

7-4 APPLICATIONS

Curb and gutter type HB 30-7 may be used on any street except where irrigation water will be carried in the curb (any street fifty feet or less in width shall not carry irrigation water in its curb).

7-5 REPAIRS

Where determined by the Engineer, rather than removing and replacing concrete with minor cracks, they may be repaired by sawing, cleaning and sealing with silicone crack sealer.

Where modifications are made to existing concrete, edges to be poured against shall be sawed and edged with a standard edging tool.

[Top of Page](#)

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