

**County of Sacramento**  
**Standard Construction Specifications**  
**January 1, 2008**

**TECHNICAL PROVISIONS**

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## **SECTION 27 CURBS, GUTTERS, SIDEWALKS, AND DRAINAGE STRUCTURES**

### **27-1 GENERAL**

Concrete curbs, gutters, sidewalks, and drainage structures shall be constructed as shown on the Plans and as specified in these Specifications.

### **27-2 FORMS**

Forms shall conform to the requirements in Section 24, "Side Forms and Headers", and this Section (Section 27), of these Specifications.

Forms for curb and gutter shall be wood with a smooth upper edge, having a width equal to the full depth of the curb and gutter and a nominal thickness of two inches (2"). Warped forms and forms not having a straight upper edge shall not be used. Benders, or thin plank forms, rigidly placed, may be used for returns and other curves. All forms shall be carefully set to proper alignment and grades and shall be rigidly held in place by the use of not less than five (5) pairs of stakes to every twenty-foot (20') section, and other sections in proportion. Clamps, spreaders, and braces shall be used where required or as directed by the Agency.

Sidewalk forms shall be surfaced wood with a smooth upper edge, having a width equal to the full depth of the finished sidewalk and a nominal thickness of two inches (2"). Warped forms and forms not having a straight upper edge shall not be used. Sidewalk forms shall be set with the upper edge true to line and grade and shall be rigidly held in place by stakes placed on the outside of the forms and set flush with the top edge of the form. The side forms shall not be removed for at least twelve (12) hours after the finishing has been completed.

Curbs, gutters, and sidewalks may be placed by using an extrusion machine as provided in Section 27-7, "Extruded Construction", in this Section of these Specifications in lieu of using forms.

### **27-3 CONCRETE IN CURBS, GUTTERS, AND SIDEWALKS**

Concrete in curbs, gutters, and sidewalks shall be Class "B-2", as specified in Section 50-5, "Portland Cement Concrete", of these Specifications.

Subgrade shall be prepared as specified in Section 18-2.05, "Subgrade Preparation", of these Specifications. Relative compaction of not less than ninety-five percent (95%) shall be obtained for a minimum depth of one-half foot (0.5') below the subgrade grading plane for driveways, V-ditches, cross gutters, or as directed by Agency. A six-inch (6") thick Class 2 aggregate base section shall be required under all curbs, gutters, and sidewalks. The requirement to excavate for and place the six-inch (6") thick Class II aggregate base section shall apply to both construction of new curbs, gutters, and sidewalks, and to the replacement of existing curbs, gutters, and sidewalks.

Before placing concrete, the subgrade shall be well dampened. A joint shall be constructed at the end of concrete placement, each day, or whenever the concrete placement work is terminated. The joint shall be vertical and square ended, and shall be placed at the point of an expansion joint, as defined in the following Section (27-3.01).

#### **27-3.01 Expansion Joints, Weakened Plane Joints, and Score Marks**

In curbs, gutters, and sidewalks, an expansion joint shall be placed at the end of round corners and at major structures such as utility vaults, at portions of sidewalk that include a manhole, and at other as shown on the Plans or as directed by the Agency. In addition, expansion joints shall be placed at sixty-foot (60') intervals of all curbs, including median curbs,

gutters, sidewalks, and concrete median pavement.. At all expansion joints, dowels shall be placed as shown on Standard Drawing 4-43. For expansion joints in curbing that has longitudinal reinforcing such as Type 4 curbs, Type 6 curbs and curbs along bus stops, the curb reinforcing shall be discontinuous at the expansion joint with the curb reinforcing held back two inches from the expansion joint and the curb reinforcing shall overlap the expansion joint dowels. Expansion joint material shall be one-half inch (1/2") thick, be shaped to fit the geometry of the curbs, gutters, and/or sidewalks and extend for the full depth of the curbs, gutters and/or sidewalks. Expansion joint material shall conform to Section 50-4, "Premoulded Expansion Joint Filler", of these Specifications. Expansion joints shall be at right angles to the line of the work. Sealant shall be placed over the expansion joint material if directed by the Agency.

All four-foot (4') wide sidewalks shall be scored at four-foot (4') intervals. In lieu of every third score mark, at twelve foot (12') intervals, weakened plane joints shall be constructed. In lieu of every fifth weakened plane joint, at sixty-foot (60') intervals, expansion joints shall be constructed as detailed above.

All six-foot (6') sidewalks shall be scored at five-foot (5') intervals. In lieu of every other score mark, at ten-foot (10') intervals, weakened plane joints shall be constructed. In lieu of every sixth weakened plane joint, at sixty-foot (60') intervals, expansion joints shall be constructed as detailed above.

Weakened plane joints shall extend through both the sidewalk and the curb and gutter when constructed at the same time and monolithically. Curb and gutter constructed without monolithic sidewalk construction shall be constructed with weakened plane joints at ten-foot (10') intervals and expansion joints at sixty-foot (60') intervals.

### **27-3.02 Finishing Concrete Surfaces**

The top and exposed surface of the concrete curb shall be finished as follows:

- A direct finishing method, whereby the curb concrete shall be placed to exact form, double screeded, floated, troweled and smoothly finished, after which it shall be broomed with a fine hair push broom drawn over the surface transverse to the line of work. Water may be applied to the surface immediately in advance of brooming.
- Surfaces of sidewalks shall be finished by double screeding, which shall include working the concrete until the coarse aggregate is forced down into the body of the concrete and a layer of mortar is thus forced to the top for floating, and troweling. The surface shall then be marked as directed by the Agency, and broomed as described above.

All exposed surfaces of sidewalks, curbs, and gutters shall be free from rock pockets, discoloration, graffiti, and blemishes. Surfaces shall have a uniform texture and appearance free of bulges, depressions, or other imperfections. Surfaces shall not vary by more than one-quarter of an inch (1/4") from a ten-foot (10') straight edge except at grade changes.

### **27-3.03 Curing of Concrete**

Curing of concrete in curbs, gutters, and sidewalks shall be with pigmented compound as specified in Section 50-6, "Curing Compounds for Concrete", of these Specifications. The curing compound shall be applied as recommended by the manufacturer. Curing compound is to be completely and uniformly applied to the exposed surfaces of the concrete such that the compound leaves a neat appearance. Median islands shall have white-pigmented compound. The Contractor shall take care that the pigmented compound is contained within the intended area of work and does not discolor asphalt concrete or other adjoining improvements.

**27-3.04 Median Openings and Allowance for Sign Placement on Ends of Medians and Traffic Islands**

Gaps in medians shall be provided where called for on the plans to allow for roadway surface drainage and for the installation of pull boxes as shown on Standard Drawing 4-44. For the purposes of measurement and payment for medians, no deduction in the length of the median shall be made at median openings of less than four feet in length.

At each end of all new medians and traffic islands the cross slope of the final two feet of the median or island shall be 1.0%, as shown on Standard Drawing 4-44 and as required by these Specifications. For these final two feet the height of the lower of the two curbs on either side of the median or island shall be increased as needed to achieve the required cross slope. Conforms from the revised height for the curb on the lower side of the median or island shall be achieved in a distance of one foot (1'), from two feet (2') from the end of the curb to three feet (3') from the end of the curb. For purposes of measurement and payment, the modification in the curb height for the final three feet (3') of the median or traffic island shall be considered incidental and included in the bid price paid for the various items of work.

**27-3.05 Minor Curb and Gutter and Sidewalk Replacement**

For minor curb and gutter and sidewalk replacement (single location only), the Contractor may use a portable concrete mixer, or a one (1) yard transit-mix truck. Pre-mixed "buggy" concrete is not acceptable. The amount of concrete placed by this method shall not exceed twelve (12) cubic feet. A 50-50 mixture of concrete mix (fine and coarse aggregate) may be used. The mix shall be proportioned (aggregate and cement approximately 4:1) such that an equivalent five (5) sack mix is obtained. The County inspector may make concrete test cylinders in order to verify the mix. Test cylinders should attain strength of twenty-five hundred (2500) psi in twenty-eight (28) days.

Minor concrete that does not attain twenty-five hundred (2500) psi in twenty-eight (28) days shall be removed and replaced with transit mix concrete at the Contractor's expense.

This method of mixing and placing concrete applies only to minor curb and gutter and sidewalk replacement.

**27-4 DAMAGE REPAIRS**

All damage done or openings cut in concrete walks, curbs, or gutters during the progress of the Work shall be repaired by the Contractor to the satisfaction of the Agency. Patching of damaged areas shall not be allowed. Partial removal and replacement of flags of sidewalk or portions of curbs and/or gutters less than four feet (4') in length will not be allowed. All removal of damaged sidewalk and/or curbing and gutter sections shall extend to the nearest score mark, weakened plane joint, construction joint or expansion joint if within four feet (4') of the limit of damaged concrete. A dowelled joint shall be used as shown on Standard Drawing 4-43 at all connections of new sidewalk to existing sidewalk, new sidewalk to existing curbing, new curbing to existing curbing, and new curb and gutter to existing curb and gutter. Damaged areas shall be removed per detail and replaced to the satisfaction of the Agency without additional cost to the Agency.

## **27-5 SIDEWALKS**

### **27-5.01 Widening of Existing Sidewalk**

If the Work includes widening an existing sidewalk, the existing sidewalk shall be removed and replaced. A dowelled joint shall be used as shown on Standard Drawing 4-43 at the connection of new sidewalk to existing curb and to existing sidewalk.

Payment for sidewalk removal shall be made per square foot and shall include saw cutting of the existing sidewalk, removal, disposal and all incidentals, providing all labor, tools and equipment required to remove the existing sidewalk and no additional payment will be allowed. Should there be no bid item for sidewalk removal, the saw cutting, removal and disposal of the existing sidewalk in the area of sidewalk widening shall be considered incidental and included in the bid prices for the various items of work and no additional compensation shall be made. Payment for sidewalk construction shall be made per square foot of sidewalk installed as specified in Sections 27-14 and 27-15 of these Specifications and shall include the supply and installation of dowels for the connection of the new sidewalk to existing curb and sidewalk.

### **27-5.02 Slope of Sidewalks**

Unless otherwise shown or specified in the Contract, sidewalks and planting strips between curb and sidewalk shall slope uniformly toward the street at a rate of 1.5%. At no place shall the cross slope of sidewalk be greater than two percent (2.0%). The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.01 foot are present when tested with a ten-foot (10') straightedge laid in a direction transverse to the centerline and extending across the width of the sidewalk.

## **27-6 CURB DOWELS AND REINFORCEMENT**

Curb dowels and reinforcement shall be installed as shown on Standard Drawings 4-21, 4-22, 4-25, 4-26 and 4-43, and as shown or specified in the Contract,

## **27-7 EXTRUDED CONSTRUCTION**

At the Contractor's option, subject to the Agency's approval, curbs, gutters, and sidewalks may be constructed using an approved extrusion or slipform machine and method. The Contractor shall provide the Agency with a written proposal and a test section if requested by the Agency. Except as noted otherwise, all extruded construction must comply with all requirements of this Section 27 and Standard Drawings 4-25, and 4-43. Curb, gutter and sidewalk may be constructed monolithically if approved by the Agency.

Concrete for extruded construction shall be Class "B-2", as specified in Section 50-1, "Portland Cement Concrete", of these Specifications. The grading limits shall be restricted if necessary to produce concrete that, after extrusion, has well defined web marks of water on the surface and is free from surface pits larger than three-sixteenths-inch (3/16") in diameter.

The consistency of the concrete shall be such that it will maintain the shape of the section without support after extrusion.

Except as noted otherwise in the Contract documents, extruded concrete curbs shall be anchored to existing pavement either by placing dowels or by using an approved adhesive. If an adhesive is used, in advance of placing the curbs on the existing pavement, the surface of the pavement shall be thoroughly cleaned and the adhesive shall be applied. The pavement shall be cleaned either by wire brushing or by blast cleaning. The cleaned surface shall be free from dust, loose material, or oil.

The adhesive shall be an epoxy resin adhesive conforming to Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete", of the State Specifications. Such adhesive may also be used for bonding new Portland cement concrete to existing asphalt concrete.

The top and face of the finished curbs shall be true and straight and the top surface of curbs shall be of uniform width, free from humps, sags, or other irregularities. Grade tolerance of the gutter flowline, back of curb and gutter, and back of sidewalk shall not exceed  $\pm 0.05$  foot in any twenty-five-foot (25') length.

Concrete shall be fed to the machine at a uniform rate. The machine shall be operated under sufficient uniform restraint to forward motion to produce a well compacted mass of concrete free from surface pits and requiring no further finishing, other than light brooming with a broom filled with water only. Finishing with a brush application of grout will not be permitted.

### **27-8 CURB RAMPS AND DRIVEWAYS**

Curb ramps and driveways shall be constructed to the dimensions, lines, grades, and details shown or specified in the Contract. Curb ramps and driveways shall conform to all requirements in these Specifications, including the requirement for excavating for and placing the six-inch (6") thick Class II aggregate base section. No utility pull box, utility pole, traffic signal pull box, traffic signal pole foundation, or any other facility that is visible on or above the surface of a curb ramp may be located within the area of a curb ramp. For the purpose of this Section, the area of the curb ramp shall be the area including and bounded by the one-foot (1') wide tactile strip on either side of the inclined portion of the ramp, the gutter section and the curb along the back of sidewalk.

### **27-9 RECONSTRUCTION OF CURBS, GUTTER, AND SIDEWALK TO ACCOMMODATE DRIVEWAYS**

Where curb and gutter and/or sidewalk are to be removed for the purpose of constructing a driveway, a sidewalk ramp, utility relocation or construction of utility facilities, or to replace cracked, broken, heaved or otherwise unacceptable concrete, the entire curb and gutter and/or sidewalk shall be removed and reconstructed. Actual limit of concrete removal shall extend to nearest score mark or joint, if nearest score mark or joint is within four feet (4') of limit of removal as indicated on the Plans. Adjacent to all areas of removal of curb and gutter, a two-foot (2') minimum width, four-inch (4") minimum depth bank of existing roadway pavement shall be saw cut and removed and replaced with permanent asphalt concrete pavement. A dowelled joint shall be used as shown on standard drawing 4-43 at the connection of new driveway construction to existing sidewalk and curb and gutter. Removed materials shall be disposed by the Contractor outside of the road right-of-way. Unless otherwise directed in the Special Provisions, payment for removals shall be considered to be included in the price paid for clearing and grubbing and no additional payment shall be allowed.

### **27-10 RECONSTRUCTION OF CURBS, GUTTER, AND CURB AND GUTTER TO ACCOMMODATE SEWER AND STORM DRAIN SERVICE INSTALLATION**

Where curbs, gutters, or curb and gutter are to be removed for the purpose of constructing a sewer service or storm drain service, the entire curb, gutter, or curb and gutter shall be removed and reconstructed. Actual limit of concrete removal shall extend to nearest score mark or joint, if nearest score mark or joint is within three feet (3') of limit of removal as indicated on the Plans. A dowelled joint shall be used as shown on standard drawing 4-43 at the connection of

new sidewalk, and curb and gutter to existing sidewalk, and curb and gutter. Adjacent to all areas of removal of curb and gutter, a two-foot (2') minimum width, six-inch (6") minimum depth bank of existing roadway pavement shall be saw cut and removed. Removed materials shall be disposed of by the Contractor. Portland cement concrete for the replacement shall be Class "A-2" in accordance with Section 50-5, "Portland Cement Concrete", of these Specifications.

### **27-11 CURB AND GUTTER TESTING AND TOLERANCE**

The finished surface of curb and gutter shall be free from humps, sags, or other irregularities. The surface shall be uniform to a degree such that no depressions greater than 0.02 foot are present when tested with a ten-foot (10') straightedge, except at grade changes. Curb and gutter shall be tested by the application of water in the presence of the Agency. No standing water will be permitted.

### **27-12 EXISTING INLET DESIGNS, DISCONTINUED FOR USE IN NEW CONSTRUCTION**

The following previous inlet designs are no longer approved for use in new construction for public use unless approved by the Agency:

- Type A, Standard Drawing 9-13A
- Type D, Standard Drawing 9-13D
- Type E, Standard Drawing 9-13E
- Gutter Drain, Standard Drawing 9-13GD

These drawings are provided in these Specifications for identification, repair, analysis, and construction when approved by the Agency. Other inlet designs not shown in these Specifications may be identified as Types 1, 2, 3, 4, 5, 5A, and 6 by reference to the Construction Specifications as amended January 19, 1970 and prior.

### **27-13 DROP INLETS AND CATCH BASINS**

Drop inlets, catch basins, grates, and frame types shall conform to the Standard Drawings and Section 50-34, "Sewer and Storm Drain Castings", of these Specifications.

Concrete for drop inlets and/or catch basins shall be either Class "A" or "B", and shall conform to Section 50-5, "Portland Cement Concrete", of these Specifications. The concrete box portion of the drop inlet and/or catch basin shall be cast to the proper grade in a maximum of two (2) placements of concrete. Use of grout to adjust the drop inlet and/or catch basin frame to the proper grade will not be permitted without written approval of the Agency.

Grate and frame materials and method of placement shall conform to the requirements in Section 75-1.02, "Miscellaneous Iron and Steel", of the State Specifications. Reinforcing bar supports or other approved means shall be used to hold the frame at proper grade during final placement of concrete. Broken pieces of concrete, or other debris, shall not be used for this purpose.

At the option of the Contractor, drop inlets and/or catch basins may be furnished and installed as precast units, or the units may be combined precast and cast-in-place structures, provided the structures in place substantially conform to cast-in-place construction as specified in these Specifications.

All drop inlet and catch basin installations, whether new or reconstructions, shall include a permanent stormwater quality marking per the County of Sacramento Improvement Standards, or as directed by Agency.

Unless otherwise specified, exposed surfaces of the grates, frames and hoods with the parts assembled and disassembled shall be painted with commercial quality asphaltum paint after testing and assembly.

#### **27-14 MEASUREMENT**

Curb, gutter, and curb and gutter will be measured and paid for by the linear foot for the type of curb, gutter, or curb and gutter designated in the Contract.

Sidewalks will be measured and paid for by the square foot for the type of sidewalk designated in the Contract.

Curb ramps will be measured and paid for by the unit, as designated in the Contract. If curb ramps are not included as a separate pay item in the Contract, the curb and gutter portion of the curb ramp shall be measured and paid for by the linear foot as curb and gutter, and the sidewalk portion of the curb ramp shall be measured and paid for by the square foot as sidewalk.

Driveways will be measured and paid for by the square foot or by the unit, as designated in the Contract. If driveways are not included as a separate pay item in the Contract, the curb and gutter portion of the driveway shall be measured and paid for by the linear foot as curb and gutter, and the sidewalk portion of the driveway shall be measured and paid for by the square foot as sidewalk.

Removal of sidewalk, curbs, gutters, or curb and gutters will be measured and paid for by the linear foot as designated in the Contract. If removal of sidewalks, curbs, gutters, or curb and gutters are not designated as separate pay items in the Contract, the removal of said facilities is included in the various items of work and no additional payment will be made.

Gutter drains, drop inlets, and/or catch basins will be measured and paid for by the unit for the types of gutter drains, drop inlets, and/or catch basins designated in the Contract.

#### **27-15 PAYMENT**

The price paid per linear foot for curb, gutter, or curb and gutter includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing curb, gutter, or curb and gutter, complete in place, including preparing the subgrade, all form work, finishing and curing the concrete, furnishing and placing expansion joint material, furnishing and placing dowels and reinforcement, curb and gutter testing, and repairing any damage, as shown on the Plans, as specified in these Specifications and the Special Provisions, and as directed by the Agency.

The price paid per square foot for sidewalk includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing sidewalk complete in place, including all form work, finishing and curing the concrete, furnishing and placing expansion joint material, and repairing any damage, as shown on the Plans, as specified in these Specifications and the Special Provisions, and as directed by the Agency.

The unit price paid for curb ramps includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing curb ramps complete in place, including all form work, finishing and curing the concrete, furnishing and placing expansion joint material, and repairing any damage, as shown on the Plans, as specified in these Specifications and the Special Provisions, and as directed by the Agency.

The unit price paid for driveways includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in constructing



driveway complete in place, including all form work, finishing and curing the concrete, furnishing and placing expansion joint material, and repairing any damage, as shown on the Plans, as specified in these Specifications and the Special Provisions, and as directed by the Agency.

The price paid for drop inlets and catch basins includes full compensation for the cost of removal and replacement of adjacent curb, gutter, and sidewalk to the limits required in Section 27-10, "Reconstruction of Curbs, Gutter, and Curb and Gutter to Accommodate Sewer and Storm Drain Service Installation", of these Specifications and no additional or separate payment will be made.

The unit price paid for gutter drains includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in gutter drains, complete in place, including excavation, furnishing and installing the cast iron drain and vitrified clay or PVC elbow, and the concrete pad foundation and elbow encasement, as shown on the Plans, as specified in these Specifications and the Special Provisions, and as directed by the Agency.

Excavation for aggregate base beneath sidewalk, curb ramps, driveways, and curb and gutter sections shall be included in the bid item for roadway excavation if the Contract includes such an item. If there is no item for roadway excavation, the excavation for the aggregate base beneath sidewalk, curb ramps, driveways, and curb and gutter sections shall be considered incidental and included in the various pay items and no additional payment will be made. Supply and placement of aggregate base material shall be measured and paid for as detailed in Section 22-3, "Aggregate Base", of these Specifications.