

**06080 Concrete Curb and Sidewalk Repairs****Index**

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**06080-1     Scope**

The Contractor shall supply all labour, plant, equipment and materials for the construction of sidewalks, and curbs complete as shown and detailed on the drawings and as described in these Specifications.

**06080-2     Method of Removing Sidewalk and Curb**

Concrete will be removed to the nearest control joint or saw cut. Unless a clean, straight break already exists along a joint, the ends of the concrete to be removed shall be cut with a concrete saw. The cut shall be of sufficient depth to permit removal without damage to the remaining structure.

**06080-3     Asphalt, Concrete and Rubble Disposal**

Concrete asphalt and rubble may be disposed at the City of Saskatoon disposal site as specified by the Engineer or as written in the contract.

**06080-4     Subgrade Preparation**

150mm of material shall be removed and base shall be placed to a depth not less than 150mm below the bottom of the concrete structure and extending 125mm beyond each side of the proposed concrete structure. The material shall be mixed, wetted or dried as required.

The subgrade shall be compacted to a minimum of 98% Standard Proctor Density by means of approved mechanical compaction equipment. Sheepsfoot rollers may be required by the Engineer in locations with cohesive soil.

Transverse or longitudinal service trenches that have not thoroughly settled shall be excavated and backfilled with approved material and compacted to a minimum 98% Standard Proctor Density. The type of mechanical compactor to be used shall be approved by the Engineer.

Where concrete is hand poured final grade preparation and compaction shall be carried out after the forms are placed. The subgrade elevation shall be checked to ensure adequate thickness of the granular base. When the subgrade preparation is approved, the Contractor will be permitted to place and compact the levelling which will give the required sidewalk thickness.

The surface of the subgrade after final trimming and rolling shall be within +10mm of the design cross section and staked elevations.

**06080-5      Granular Base Course**

The Contractor shall supply the base course material.

The base aggregate shall be composed of fragments of durable rock free from undesirable quantities of soft or flaky particles, loam, organic or other deleterious material.

Specifications for base course aggregate are contained in Aggregates Specifications Section 03001-3.2.2.

**06080-6      Templates**

Templates shall be supplied and used by the Contractor to check the subgrade finish prior to placing of the concrete and to check the shape of completed work. Templates shall be full scale and represent the true cross section of the concrete for the type of curb or curb and walk being constructed.

If other templates are required, they shall be constructed and used by the Contractor to control the work.

Templates shall be of rigid construction with suitable handles. Damaged or worn templates shall not be used and all templates shall be checked and approved by the Engineer.

No concrete shall be placed until the Engineer has checked and approved subgrade and base course.

**06080-7      Forms**

The forms used for each type of construction shall be the same as the dimensions on the drawing.

They shall be free from warps or other defects and shall have smooth, clean surface adjacent to the concrete. The forms shall be thoroughly cleaned and oiled before any concrete is deposited within them.

The forms shall be well staked, braced and held rigidly to the established line and grade to enable the use of mechanical concrete vibrators and vibrator screeds when placing concrete.

**06080-8      Placing Concrete**

Concrete shall be placed in a continuous operation. The interval between placing successive batches shall not exceed 30 minutes unless the last load completed the work to an expansion joint. Maximum mixing time of concrete after water has been added shall be 60 minutes.

Concrete shall be placed as close as possible to but no further than one metre from its final position in the forms. Rehandling of concrete shall not be permitted.

It shall be deposited in such a manner that segregation of the aggregates shall not occur.

After placing, the concrete shall be tamped, vibrated or otherwise consolidated to eliminate all voids and honeycombing. Vibrating screeds, shall be operated in accordance with the manufacturer's instructions. Over vibration resulting in bleeding shall not be allowed.

In combined rolled curb and sidewalk areas, a steel vibrating screed shall be used in such a manner as to obtain dense concrete and the required cross section continuously.

Where combined curb and sidewalks are poured, concrete shall be placed by hand in the curb excavation in advance of placing the sidewalk concrete so that subgrade material will not be forced into it from beneath the sidewalk section.

Concrete shall not be placed when the ground temperature is less than 2°C.

Concrete shall be covered and heated, if necessary, to maintain a temperature of 5°C for at least 36 hours. Covering shall not be removed for 72 hours. Cost of heating and covering shall be borne by the Contractor.

Concrete damaged due to freezing shall be replaced by the Contractor at his expense.

During hot weather, an approved set retarder may be used. Sidewalk and curb shall be poured at a rate such that finishing as specified can be accomplished. Surface wetting

shall not be permitted during finishing. The Engineer may terminate the work temporarily if, in his opinion, the work cannot be properly finished.

**06080-9      Concrete**

Concrete materials, method of concrete handling and construction shall conform to the latest edition of CAN3-A23.1 as published by the Canadian Standards Association.

Minimum compressive strength of the concrete at 28 days shall be 32MPa.

Aggregates shall comply with Section 5, CAN3-A23.1.

Nominal aggregate size shall be 30mm.

Cement shall be Type 10 Normal Portland Cement complying with Section 3, CAN3-A23.1. A minimum of 300kg of cement per cubic metre of mixed concrete shall be used.

Slump shall not exceed 70mm or be less than 25mm.

An approved air entraining agent complying with Section 6, CAN3-A23.1 shall be used. Air entrainment shall be 5 to 8 percent by volume.

Water cement ratio shall not exceed 0.38 by weight.

Reinforcing steel shall conform with CSA G30.12-M77 and CSA G30.6.

Calcium chloride may be used as an accelerating agent on the approval of the Engineer. It shall conform to ASTM D-98. Maximum amount of calcium chloride in the mix shall not exceed 2% of cement by weight.

**06080-10      Concrete Tests**

Ready mixed and transit mixed concrete should conform to CSA A23.1.13.

After the award of the work, the Contractor shall submit the following information in writing relating to the ready mix concrete supplier.

- a) Name, address and contact person.

- b) Recent concrete mix design on results of six concrete test cylinders of the same concrete which will be used for the work.

During the progress of the work, the Contractor shall hire an approved materials testing laboratory and take one set of three concrete test cylinders for each concrete pour. One cylinder will be tested after 7 days of curing and two cylinders will be tested after 28 days of curing. No more than one test in five nor two consecutive tests shall be below the specified concrete strength.

Once copy of the test results shall be submitted to the Owner.

**06080-11    Finish of Sidewalk, Curb and Gutter**

Concrete shall be deposited in a manner to prevent segregation of the aggregate. Special care shall be taken in placing concrete to prevent voids, pockets, rough areas and honeycombing. The concrete shall be consolidated by using mechanical concrete vibrators or vibrator screed in such a manner as to work the coarse aggregate away from the forms and exposed surfaces.

After the concrete has sufficiently set to permit further finishing without concrete bleeding, the surface shall be brought to a true surface with a wood float. The surface shall be marked and finished as shown on drawings using approved tools. After marking, the surface shall be trowelled smooth with a steel trowel and a uniform brush finish applied with a soft bristled push broom to the satisfaction of the Engineer.

After the initial concrete set, the curb form shall be removed and the exposed surface of the curb shall be worked to a true surface, trowelled smooth and then given a uniform brush finish

Substandard work or finished surfaces which are marred or damaged prior to setting shall be replaced by the Contractor at his expense.

Each block or portion of block of sidewalk constructed shall be marked at the end with a suitable tool showing the name of the Contractor and the year of construction.

All curb box locations shall be marked at right angles to the back line of the sidewalk and 200mm from the back of the walk with an imprinted "C.C." with an arrow pointing to the curb box.

Curb returns shall be smooth, continuous curves and shall be tangent where they join the straight sections or another curve.

**06080-12    Curing Compound**

Apply a curing compound to all exposed surfaces. Curing compound shall comply with ASTM C309, Liquid Membrane - Forming Compounds for Curing Concrete.

The rate of application shall be as recommended by the manufacturer or as directed by the Engineer. The pressure spray distributor shall be such that a continuous even coating is applied.

Concrete placed after September 30 will be cured with an application of a penetrating sealer to prevent de-icing agents from spalling the concrete.

The cost of supplying and applying curing compound is to be included in the respective sidewalk and curb unit prices.

**06080-13    Tolerances**

All exposed concrete surfaces shall not deviate in line or grade more than 5mm in 4 metres.

Sidewalk elevation shall not vary more than 6mm from that established by the Engineer's grade stakes and the maximum variation from the given elevation between two consecutive stakes shall not exceed 6mm.

Deviation in alignment shall not exceed 10mm in 10 metres from that established by the survey stakes in one direction only.

Crossfall shall not vary more than 4mm per metre from that specified or shown on the drawings, unless approved by the Engineer.

In no case shall the thickness of the concrete be more than 8mm less than the specified thickness.



**06080-14    Protection**

Pedestrian traffic shall not be allowed on the walks for 24 hours after the concrete is poured. Lane and driveway crossings shall be barricaded and not used for a period of 5 days after the concrete is poured.

**06080-15    Pavement Removal and Repairs**

To facilitate the removal and construction of the sidewalk, curb and curb and gutter, the Contractor shall saw cut the adjacent pavement. The cut should be clean and have no jagged edges. Extent of removal shall be 200mm. Refer to City of Saskatoon Standard Drawing 102-0002-049 available on the City's web site.

Payment for patch paving will be made on the Contract bid price either included in the curb unit price or on a square metre basis.

**06080-16    Sidewalk Support Adjacent to Buildings**

At concrete foundations, steps, or sidewalks on property the new sidewalk needs to be dowelled in to the existing concrete structure. The Contractor shall install 250 x 10 rebar spaced at 300mm, into the concrete building foundation. Rebar to be installed 100mm into the foundation, 50mm from the bottom of the sidewalk.

This work is included in the unit price payment for the sidewalk.

**06080-17    Sidewalk, Curb and Gutter Construction**

All work performed shall meet the current standards as outlined for concrete sidewalk, curb and gutter construction, Specification 06010 and as shown on cross section drawings.

**End of Specification 06080**