SECTION 916

ROCK EMBEDDED CONCRETE GUTTER

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916.01 SCOPE

This specification covers the requirements for the construction of rock embedded concrete gutters on a prepared bed of granular base course.

The width, length and cross section of the gutter shall be as shown on the drawings.

916.02 MATERIALS

916.02.01 Concrete

Concrete shall meet all requirements of “Curb, Gutter, Sidewalks, Catch Basins & Weir Baffles” concrete, in accordance with Section 904.

Where gutter is to be placed on slopes it may be necessary for the concrete to have a slump of 20 millimetres in order for the wet concrete to stay in the forms while the concrete is setting.

916.02.02 Concrete Reinforcement

Concrete reinforcement shall be Black Steel Reinforcement unless Galvanized or Stainless Steel is used in the project, in which case it shall match those. In the event that multiple types are used, the steel type which has the greater quantity in the remainder of the project shall be used.

Additional testing for stainless steel originating from outside Canada is not required for steel in rock embedded concrete gutters.

916.02.03 Rock

Stones for embedding in the gutter shall consist of slab shaped, clean, hard durable rock, free of cracks. Rock subject to marked deterioration by water or weather will not be accepted.

The thickness of the individual stones shall not be less than 70 millimetres or greater than 130 millimetres and the maximum dimension shall not exceed 250 millimetres.

916.02.04 Joints

Material for forming isolation joints shall be 12 millimetre thick bituminous fibre material of depth equal to the depth of the gutter.

Material for forming control joints shall be 12 millimetre thick bituminous fibre material for the set-in-place type, or a bituminous filler material for the groove or saw-cut type.

All materials including formwork shall be supplied by the Contractor.

916.02.01 Gabions

Gabions shall be as specified in Section 601.

916.03 PREPARATION WORK

Should excavation be required prior to placing the bed for the gutter, then such work shall be carried out and paid for in accordance with Section 403.

When fill is required prior to placing the bed for the gutter, then this work shall be carried out in accordance with Section 204.

After the site has been graded, as described above, a bed shall be laid composed of Selected Granular Base Course Granular "A". The bed shall be laid by the Contractor and accepted by the Owner's Representative prior to construction.

The compacted depth of the bed should not be less than 100 millimetres. The bed shall be compacted to not less than 95% of the Standard Proctor Density (ASTM D698).

916.04 FORMWORK

Formwork shall conform to the requirements of Section 907.

Forms shall be set to provide a gutter with the dimensions indicated on the drawings and to the grades and lines accepted by the Owner's Representative prior to construction.

916.05 PLACEMENT OF CONCRETE REINFORCEMENT

Minimum cover to concrete reinforcement shall be 50mm.

Dowels shall be 1500 millimetres long and spaced at 2 metre intervals.

Placement including chairs and supports shall be as specified in Section 905.

916.06 PLACING THE CONCRETE AND ROCKS

Concrete shall be placed in accordance with the requirements of Section 904.

Reinforcing steel shall be placed in accordance with the requirements of Section 905.

As soon as the concrete has been placed and consolidated, it shall be struck off true to grade and required cross section by an oscillating movement of a template.

The surface shall then be floated with a wooden float until the mortar flushes to the top, and the entire surface presents a tight and compact appearance and the divisions between each block shall be marked, rounded and tooled with proper finishing tools in

the neatest possible manner to the satisfaction of the Owner's Representative. The jointing tool shall have a radius of 12 millimetres.

Immediately following finishing, the stones shall be moistened in water and placed in the concrete. The stones shall be placed in the concrete leaving about 20 millimetres of stone exposed. When the stones are pushed into the concrete, any resulting depression in the surface of the concrete next to the sides of the stones shall be filled and trimmed by means of hand work with a trowel, or other suitable tool.

Should the Contractor choose to use the groove or saw-cut type of control joint, as opposed to the bituminous fibre type, then at those places where control joints are to be made, care shall be taken to ensure that no stones are placed in the path of a joint.

The Contractor shall take care in placing the stones in the concrete to ensure that the exposed parts of the stones are not smeared with concrete. Should stones become smeared during placing, they shall be immediately removed, thoroughly washed and then placed back in the concrete before it sets.

Concrete at the top of the gutter shall be formed and sloped so that runoff from the road and adjacent curbs flow into the gutter without ponding.

916.07 JOINTS

When the rock embedded concrete gutter is to be constructed abutting another structure such as concrete pavement, concrete sidewalk, concrete retaining wall, or catch basin frame, then the Contractor shall construct a full length isolation joint, of depth equal to the depth of the gutter. When abutting asphaltic pavement no joint is necessary.

Isolation joints shall consist of a 12 millimetre thick bituminous fibre panel cut to such size so as to provide a full depth joint extending for the full width. The bituminous fibre panels shall be set vertical in the forms before the concrete is poured.

Panels shall be pre-cut to the shape of the joint so as to provide a 6 millimetre recess on the exposed surface. The Contractor has the option of either providing a 6 millimetre deep, 12 millimetre wide cap strip, to be removed after the concrete has hardened and not edging the joints, or carefully removing all concrete immediately above the filler material to form a 6 millimetre deep, 12 millimetre wide recess then finishing both edges of each joint to a 6 millimetres radius with a suitable short edging tool.

Control joints shall be placed at intervals of not greater than 6 metres.

Control joints may be formed using a 12 millimetre thick bituminous fibre panel cut to such size so as to provide a joint extending not less than one quarter the depth of the gutter for the full width. The bituminous fibre panel control joints shall be set vertical in the forms before the concrete is poured.

Panels shall be pre-cut to the shape of the joint so as to provide a 6 millimetre recess on the exposed surface. The methods of obtaining these 6 millimetre recesses shall be as previously stipulated for isolation joints.

Alternatively control joints may be formed by the use of a "guillotine" knife in fresh concrete or saw cutting the hardened concrete with a sufficient time of placing to prevent uncontrolled cracking. Groove or saw-cut control joints shall be of thickness between 3 and 5 millimetres, depth not less than one quarter the depth of the gutter, and width the full width of the gutter. When the concrete is dry the control joints shall be completely filled with a bituminous filler material. Immediately prior to the filling, the joint shall be thoroughly cleansed of all dust, and particles of foreign matter.

Construction joints shall be built at convenient stopping places in the placement of the concrete. They may be either butt type or isolation joints and they shall be the full depth and width of the gutter. They shall be built at the end of each day's construction or when there is a delay in the supply of concrete and cold joints might develop.

916.08 CURING THE CONCRETE

Concrete shall be cured in conformity with the requirements of Section 904. Consideration will be given to the use of white pigmented curing compounds applied in accordance with the manufacturer’s recommendations.

916.09 TRIMMING

After the removal of the forms and after the initial curing of the concrete, the Contractor shall grade and tamp adjacent other material against the exposed edges of the gutter to form stable shoulders for the gutter. These shoulders shall be made trim to sightly proportions.

916.10 GRADING OF ADJACENT GROUND

Ground adjacent to the gutter within 10 metres of the end of the expansion joint or approach slabs, if present, shall be graded so that the water drains into the gutter. Failure to properly grade the ground to the satisfaction of the Owner’s Representative shall be corrected at the Contractor’s expense.

916.11 GABIONS AND END TREATMENTS

When shown on the drawings, rock filled gabions shall be placed at the bottom of the gutter to prevent erosion from the flowing water. Gabions shall be Type 'G' unless other wise specified.

In the event that gabions are not indicated on the drawings, Class I Hydraulic Rip Rap meeting the requirements of Section 917 shall be placed. The area covered with rip rap shall be 0.5 metres thick and cover an area of approximately 1 metre by 1 metre centered in front of the end of the gutter.

916.12 MEASUREMENT FOR PAYMENT

Measurement for payment will be by the length laid, according to the instructions of the Owner's Representative in linear metres, rounded to one decimal place.

916.13 BASIS OF PAYMENT

Payment at the contract price for "Supply and Install Rock Embedded Concrete Gutter" in the Unit Price Table shall be full compensation for all labour, materials and equipment to prepare the ground and install the rock embedded gutter. This includes, but is not limited to, the supply and installation of form work, reinforcing steel, concrete, granular base course, stones, gabions, joints, joint filler, landscaping, rip rap and any other items to install the gutter.