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24. SURFACE DRAINAGE

24.1 SCOPE

The work covered by this Section consists in furnishing all plant, labour equipment, appliances and materials and performing all operations in connection with the construction of Surface Drainage in accordance with the Drawings and this Section of Specifications.

24.2 RELATED WORKS/SPECIFICATIONS

i) Earthwork – Section 3 – Earthwork

ii) Concrete – Section 5 – Plain & Reinforced Concrete

iii) Block Masonry – Section 9 – Cement Concrete Block Masonry

iv) Rubble Masonry – Section 12 – Stone Masonry

v) RCC Pipes and Construction – Section 25 - Sewerage

All works shall be carried out according to the applicable provisions of the Sections referred above.

24.3 CONSTRUCTION REQUIREMENTS

24.3.1 PUNJAB STANDARD TYPE DRAINS

Punjab Standard Type Drains Types IV to VIII shall be constructed and shall be made of cement concrete 1:2:4 with 1:4:8 bedding or as specified concrete mix. The exposed surfaces of all inverts and drains including side slabs and bull noze shall be applied a thin skin of about 6 mm thick 1:1 cement sand mortar immediately after the concrete has been placed and floating the same to clean smooth finish. The slabs for the side walls shall be moulded separately and shall be laid in 1:2 cement sand mortar on the concrete backing, previously prepared, not less than 14 days after being made. All joints being carefully struck perfectly clean and flush with the faces of the slabs. Where specified the walls shall be constructed of brick masonry, concrete block masonry or rubble masonry as shown on Drawings according to the applicable Sections referred in Sub-Section 24.2 above.

The preparation of the trench, aligning and grading shall be carried out in the same manner as required for sewers.

No extra shall be payable for curves, bends, falls, junctions, inlets, outlets and all other special work in connection with the drains and the cost of all such special work shall be included in the rates as given in the schedule.

24.3.2 CROSSING OVER DRAINS

RCC slab 15 cm as specified shall be provided over the drains where shown on drawings or directed by the Engineer-in-Charge.

24.3.3 APPROACHES TO THE CROSSINGS

The approaches in the street to the crossing shall be laid in herring bone pattern either flat or on edge as directed in first class bricks. The base shall be of cement concrete as specified and the bricks shall be laid on a 6 mm layer of plaster. Any special cutting or curved work, boundary corners, curves, slopes and changes of slopes, cambers, cutting shaping and wastage of bricks to fit irregular area and all other special work is also included. The joints shall be struck flush and smooth. All profiles and strips shall be provided by the contractor at his own costs. Unless cement pointing is required by the Engineer-in-Charge, the external surface of the joints shall be struck flush as the work proceeds and left perfectly flushed and smooth.

24.3.4 CONNECTION WITH SEWERS

The surface drains shall be connected with sewers through gully gratings or as shown on drawings.

24.3.5 HOUSE OUTLET CONNECTIONS

The house outlet is connected through a khurra by means of connection drain to the main drain. The size of the khurra shall be according to the size of the outlet. The standard sizes of khurras are 30 cm x 30 cm, 30 cm x 23 cm and 23 cm x 15 cm. Khurras shall be made in the space between the house wall and the reimbursement or side wall of main drain and if there shall be no space available then khurra shall be constructed on the reimbursement. The house connection drain shall join the main drain at 45 degree to provide smooth flow.

24.3.6 TESTING OF DRAINS

After completion the drain shall be tested for flow by filling upto the full section.

24.3.7 REIMBURSEMENT

The reimbursement is bricks laid in cement mortar 1:5 on both sides of the roads sloping towards the drain (3 mm in 229 mm slope) on a 6 mm layer or mortar over specified thickness of base concrete. The work shall include any strips, sides and edging of narrow width area to be paved with dry bricks on edge or flat. The work shall also include all extra works involved in laying narrow strips I6 mm, 114 mm or 229 mm in width along sides of the drains and for all curves, bends, slopes and changes of slopes and other work involving added labor and material for irregular areas, cutting, fixing and wastage of bricks required for such works.

All joints between the bricks and along outer end and inner side of the reimbursement shall be completely filled with specified mortar.

24.3.8 TEGA

The house walls shall be protected by 76 mm or 114 mm thick Tega (i.e. brick on end) laid in cement mortar projecting to a maximum height of not more than 150 mm above the drain and the work shall include all excavation, cutting and wastage of bricks. The external surface of the joints must be flushed as the work proceeds.

24.3.9 FOUNDATION FOR REIMBURSEMENT AND TEGA

76 mm or as specified cement concrete shall be provided under reimbursement and Tega.

24.3.10 RCC PIPES

RCC pipes shall be laid as specified and shown on Drawings. The work shall be performed complying with the provisions of Sub-Section 25.3 - RC Pipes under Sewerage.

24.4 MEASUREMENT AND PAYMENT

24.4.1 COMPOSITE RATE

The measurement and payment for the items of the work of Surface Drainage hereof shall be made corresponding to the applicable CSR item as provided in Contract Agreement and shall constitute full compensation, for procurements, transportations, performance in all respect and completion of work as specified including the site clearance as approved by the Engineer-in-Charge.

24.4.2 LABOUR RATE

The measurement and payment for the items of the work of Surface Drainage hereof shall be made corresponding to applicable CSR item as provided in Contract Agreement and shall constitute full compensation for procurements transportations, performance in all respect and at designated location as defined in the Contract Agreement.

24.4.3 QUANTIFICATION

The unit of measurement shall be measured as mentioned below in accordance with corresponding CSR items.

1. For Volumetric items, the unit of measurement shall be cubic meter or cubic foot. Following items of CSR are measured in the above mentioned criteria;

   Item No.: 24-4 to 24-6 and 24-9 to 24-12

2. For surface area items, the quantity of work shall be measured by surface area. The unit of measurement shall be Square meter or Square foot. Following item of CSR are measured according to this criteria;

   Item No.: 24-2, 24-3, 24-7 and 24-8

3. For linear items, the quantity of work shall be measured linearly along centre line of structure. The unit of measurement shall be running meter or running foot. Following items of CSR are measured according to this criteria;

   Item No.: 24-1, 24-13 and 24-14