DIVISION 10: LANDSCAPING WORK

SECTION 10.01: Landscaping Work

10.01.1 SCOPE
These specifications in this section cover *Landscaping works* intended to be implemented in this project in accordance with Bill of Quantities and / or as instructed in writing by the Engineer.

10.02 Agricultural Topsoil

PART 1 PRODUCT

A- MATERIAL

- Agricultural Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0; organic matter to exceed 1.5%, magnesium to exceed 100 units; phosphorus to exceed 150 units; potassium to exceed 120 units; soluble salts/conductivity not to exceed 900 ppm/0.9 mmhos/cm in soil.

PART 2 EXECUTION

A- EXAMINATION

- Verify substrate base has been contoured and compacted.

B- PREPARATION

- Protect existing structures, fences, sidewalks, utilities, paving and curbs (if any).

C- SUBSTRATE PREPARATION

- Eliminate uneven areas and low spots.
- Remove debris, roots, branches, stones, in excess of 13 mm in size. Remove contaminated subsoil.
- Scarify surface to depth of 150 mm where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

D- PLACING TOPSOIL

- Place topsoil in areas where seeding, sodding and planting is required and to the required thickness. Place topsoil during dry weather.
- Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- Remove roots, weeds, rocks and foreign material while spreading.
- Manually spread topsoil close to plant material or to building to prevent damage.

- Lightly compact or roll placed topsoil as required.
- Remove surplus subsoil and topsoil from site.
- Leave stockpile area and site clean and raked, ready to receive landscaping.

E- PROTECTION OF INSTALLED WORK

- General Requirements: Execution requirements for protecting finished Work.
- Prohibit construction traffic over topsoil.

10.03 GRASS AND FLOWER PLANTES

PART 1 PRODUCTS

A- GRASS AND LANTANA

- Previously established grades shall be on the areas to be treated in a true and even condition, and necessary repairs shall be made to previously graded areas. All surfaces shall be left in a smooth condition to prevent formation of depressions. Areas having inadequate drainage as indicated by the pounding of water near foundations, walks, driveways, or on other areas shall be filled or graded to drain as directed by the Engineer. Ruts, deep tracks, dead furrows, and ridges shall be eliminated and the necessary replanting accomplished prior to acceptance of the completed work. The finished grade shall be such that after sodding operations, the sodded grade will be level with the adjacent surface grade of walks, drives and curbs. All debris and stones larger than 25mm remaining on the surface after grading and tillage operations shall be removed.
- After the areas have been brought to the previously established grades, tillage shall be accomplished in such manner as to prepare an acceptable sod bed. Contractor shall utilize a tractor-mounted or walk behind root-tiller type machine capable of tilling the soil and incorporating the soil amendments to the specified depth. After completion of tillage, lawn areas shall be raked smooth and stone and debris removed.
- Prior to commencing tillage operation, Contractor shall spread organic matter to a uniform depth of 25mm. Organic matter shall then be incorporated into the top 15cm of the turf bed to establish a uniform planting soil consisting of 5 parts existing topsoil and 1 part organic matter.
- Prior to tillage for planting NPK fertilizer shall be applied at the rate of 560 kg per hectare. Fertilizer shall be distributed with a fertilizer distributor equipped with baffle plates to prevent downward movement of fertilizer when operated on a slope. Fertilizer shall be uniformly distributed.
- Installation of sod shall be done by experienced staff. Each sod-roll will be hand held till laid down; no sod-rolls shall be accepted when thrown to the ground from truck or wheel barrow. When rolls are laid out, they shall be “tucked in” close, no gaps (space) to be left between rows of sod. A “walk-behind” water-filled metal roller shall be utilized to press the sod firmly down on the soil, to the Engineer’s approval.

- The sodded areas shall be fertilized three weeks after commencement of maintenance operations and thereafter at four week intervals throughout the growing season. Fertilizer for fertilizing shall be applied at the rate of 280kg of 16-16-16 per hectare. Fertilizer shall be applied only when vegetation is dry. The fertilized areas shall be irrigated within 4 hours following fertilizing operation.

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10.04 CURBSTONE AND CONCRETE TILES

This item shall consist of the construction of concrete curbs and concrete tiles of the type and dimensions required in the Bill of quantities, furnished and placed at the locations and areas as indicated on the drawings or required by the Engineer, in accordance with this specification.

PART 1 PPRODUCTS

A. Mortar

Portland cement mortar used for placing curbstones on the base shall be mixed in a ratio of 1 part by volume of cement to 3 parts by volume of sand. The mortar shall be of the desired consistency. Mortar which is not used within 45 minutes after water has been added shall be discarded.

B. Curbstones

B.1 Curbstones shall be precast and shall be of the size as listed in the bill of quantities or as directed by the Engineer. The curbs shall be manufactured in steel molds and machine vibrated and shall be provided with mating ends.

B.2 Curbs for radius work shall be purpose made to the required internal and external radii. For radii less than 6 m, the curb stone shall be 400 mm long. For radii in excess of 6 m up to 15 m, the curbstone shall be 600 mm long. For radii in excess of 15 m up to 30 m, the length shall be 1 m. For radii in excess of 30 m, straight curbs may be used.

B.3 After casting, they shall be lightly rubbed over with a carborundum stone and water to a smooth finish, but they shall not be slurred over with cement.

B.4 Curbstones showing honey combing are not acceptable. Precast curbs shall be cured for a period of 14 days by protection from the direct rays of the sun or from drying winds, and for the first 7 days after manufacturer they shall be thoroughly saturated with water. Curbs shall not be incorporated into the works until they are at least 28 days old.

B.5 One of every 100 precast curbstones shall be tested with an apparatus similar to the testing machine as defined in ASTM C-293 (test for flexural strength of concrete using simple beam with center point loading).

B.6 Full contact between the specimen and supports or load applying block shall be essential.

B.7 The modules of rupture shall be at least 500 N/cm² (50 kgf/cm²).

B.8 Curbs of irregular form or end pieces may be cast in place.

D. Pavement Tiles

D.1 Concrete pavement tiles shall be precast and shall be of size 30x30x4 cm as indicated in the bill of quantities or as directed by the Engineer. The following quality tests shall be conducted to assure the quality of tiles.

i)	Impact resistance test	0.4 kg/m² minimum
ii)	Modulus of rupture	30 kg/cm² minimum
iii)	Abrasion coefficient	12 mm maximum.

E. Sand

Sand for sand fill below pavement tiles shall be in accordance with the requirements of fine aggregates or as directed by the engineer.

PART 2 CONSTRUCTION AND INSTALLATION

A. Precast – Curbstones

The curbstone is to be set on a layer of mortar and carefully tamped in place to the exact lines, grades, and elevations. After installation curbstone shall be marked with Acrylic paint as required by the engineer.

B. Laying Pavement Tiles

The pavement tile shall be laid and bedded on approved compacted sand fill and mortar bed, to the correct level, grade and cross fall in accordance with the engineer, so that when tested with a 3 m straightedge placed in any direction on the paving, the maximum deviation shall not exceed 5 mm.

PART 3 Method of Measurement

A. Curbs shall be measured by linear meters of curbstone constructed, installed, completed and accepted. And shall include but not limited to the mortar and the lean concrete supports.

C. Concrete tilling shall be measured by square meters of tiling furnished, installed, completed and accepted. And shall include but not limited to excavation, backfilling, sand bedding, mortar bedding, construction in and around obstacles, poles, manholes, cutting and shaping of tiles on curves, and joining.

10.05 STELL BOLLARDS

A. Steel Bollards: Steel bollard shall be as existing, 100 cm height and 10 cm diameter round steel hollow tube 2.5 mm thick with end cap and 2 side hooks for steel chain. The new bollards shall be inserted in 25x25x20 cm concrete (25MPA) foundation at maximum 2 meters length. Steel chains shall be hooked on steel bollards as existing on site. Spacing between steel bollards is 2m length.

B. Steel bollard shall be painted with corrosion resistant and primer coating as required by the engineer.