SPECIFICATION FOR GRANULAR SUB BASE BELOW FLOOR

Granular Sub-base.

This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these specifications. The material shall be laid in one or more layers are sub-base or lower sub-base and upper sub-base (termed as sub-base hereinafter) as necessary according to lines, grades and cross-sections shown on the drawings or as directed by the Engineer.

Materials:

The material to be used for the work shall be natural sand, moorum, gravel, crushed stone or combination thereof depending upon the grading required. Materials like crushed slag, crushed concrete, brick metal and kankar may be allowed only with the specific approval of the Engineer. The material shall be free from organic or other deleterious constituents and conform to one of the three gradings given in Table 400-1.

While the gradings in Table 400-1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75 mm, 53mm and 26.5mm, the corresponding gradings for the coarse graded materials for each of the three maximum particle sizes are given at Table 400-2. **The grading to be adopted for a project shall be as specified in the contract. However if requisite CBR is not met with, the garding & proportion need to be suitably revised.**

Physical requirements.

The material shall have a 10 percent fines value of 50 kN or more (for example in soaked condition) when tested in compliance with BS:812 (Part 111) . The water absorption value of the coarse aggregate shall be determined as per IS: 2386 (Part 3) if this value is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS:383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 percent.

Table 400-1 GRADING FOR CLOSE GRADED GRANULAR SUB BASE MATERIALS

IS Sieve	Per cent by weight passing the IS sieve		
Designation	Grading	Grading II	Grading III
75.00mm	100	-	-
53.0	80-100	100	-
26.5mm	55.90	70-100	100
9.50mm	35-65	50-80	55-95
4.75mm	25-55	40-65	50-80
2.36mm	20-40	30-50	40-65
0.425mm	10-25	15-25	20.35
0.075mm	3-10	3-10	3-10
CBR value (Minimum)	30	25	20

TABLE 400.2 GRDING FOR COARSE GRADED GRANULAR SUB-BASE MATERIALS

IS Sieve Designation	Per cent by weight passing the IS sieve		
Designation	Grading	Grading II	Grading III
75.0mm	100	-	-
53.0mm	-	100	-
26.5mm	55-75	50-80	100
9.50			
4.75	10-30	15-35	25-45
2.36			
0.425			
0.075	<10	<10	<10
CBR Value (Minimum)	30	25	20

Note; The material passing 425micron (0.425mm) sieve for all the three gradings when tested according to IS: 2720 (Part 5) shall have liquid limit and plasticity index not more than 25 and 6 percent respectively.

Keeping in view the site condition following mixing ratio shall be applicable for the present work, **however if requisite CBR is not met with, the garding & proportion need to be suitably revised.**

MIXING RATIO OF GRADED GRANULAR SUB BASE MATERIALS

IS Sive	Percentage mixing of materials		
Designation	Grading I	Grading II	Grading III
75.00mm	40%	-	-
53.0	-	30%	-
26.5mm	30%	35%	-
9.50mm	-	-	-
4.75mm	25%	30%	-
2.36mm	5%	5%	-

Strength of sub-base.

It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished.

When directed by the Engineer this shall be verified by performing CBR tests in the laboratory as required on specimens re-moulded at field dry density and moisture content and any other tests for the "quality" of materials, as may be necessary.

Construction Operations

Preparation of sub-grade:

Immediately prior to the laying of sub-base, the sub-grade already finished to clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and **compacted with surface vibratos. In case of highbay areas 12 passes of 8 to 10 kN roller moving at a speed of 5 kilometre per hour is recommended.**

Spreading and compacting: The sub-base material of grading specified in the contract shall be spread on the prepared subgrade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned in Clause 401.2.1 mixing shall be done mechanically by the mix-in-place method.

Manual mixing shall be permitted **only as a very special case in a compulsive situation** where the width of laying is not adequate for mechanical operations, as in small sized single room. The equipment used for mix-in-place construction shall be a rotator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out to establish its suitability for the work.

Moisture content of the loose material shall be checked in accordance with IS:2720(Part 2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 percent above to 2 percent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotators until the layer is uniformly wet.

Immediately thereafter, **compaction with surface vibratos** shall start. If the thickness of the compacted layer does not exceed 100mm, heavy weight hammer weight may be used. In case of large thickness laying shall be carried out for thickness of 175 mm compacted to 150 mm using **surface vibratos to** achieve the required compaction. Compaction shall commence at the lower edge and proceed towards the upper edge longitudinally for potions having unidirectional cross fall and shall commence at the edges and progress towards the centre for portions having cross fall on both sides.

Each process of compaction shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and cross slopes shall be checked and any high spots or depressions which become apparent, corrected by removing or adding fresh material.

Compaction shall be continued till the density achieved is at least 98 per cent of the maximum dry density for the material determined as per IS 2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or

loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

Surface finish and quality control of work:

The surface finish of construction shall conform to the requirements of clause 902.

Control on the quality of materials and works shall be exercised by the Engineer in accordance with section 900.

Measurements for payment.

Granular sub base shall be measured as finished work in position in cubic metre.

The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub base and as such no extra payment shall be made for the same.

Rate:

The contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including full compensation for:

(i) making arrangements for initial treatment to verges, shoulders and construction of diversions,
(ii) furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts.
(iii) All labour, tools, equipment and incidentals to complete the work to the specifications.
(iv) Carrying out the work in part areas as directed.
(v) Carrying out the required tests for quality control.
(vi) All taxes, insurance etc shall be borne by the contractor.

LIME TREATED SOIL FOR IMPROVED SUB-GRADE/SUB-BASE.

In case of very weak soil, this treatment shall be carried under separate item. This work shall consist of laying and compacting an improved subgrade/lower sub-base of soil treated with line on prepared sub-grade in accordance with the requirements of these specifications and in conformity with the lines, grades and cross-sections shown on the drawings or as directed by the Engineer. Lime treatment is generally effective soils which contain a relatively high percentage of clay and silty clay.

Materials:

Soil: Except when otherwise specified, the soil, used for stabilization shall the locally available soil having a plasticity index greater than 8.

Lime: Lime for lime-soil stabilization work shall be commercial dry lime slaked at site or pre-slaked lime delivered to the site in suitable packing. Unless otherwise permitted by the Engineer, the lime shall have purity of not less than 70 percent by weight of Quick-lime (CaO) when tested in accordance with IS: 1514. Lime shall be properly stored to avoid prolonged exposure to the atmosphere and consequent carbonation which would reduce its binding properties.

Quality of lime in stabilized mix: Quantity of lime to be added as percentage by weight of the dry soil as specified by EIC.