

## ITEM WISE TECHNICAL SPECIFICATIONS

### **Bid Documents for Re-surfacing of Roads at various places in various area in Mundra-Baroi Municipality Area at Mundra.**

#### **(SCHEDULE – “B”)**

##### **ITEM NO. 1**

**Box cutting the road surface to proper slope and camber for making a base for road work including removing the excavated stuff and depositing on the road side slope as directed upto 50Mt.lead.**

**And**

##### **ITEM NO.1/A**

**Extra lead up to 1.0 km**

- Cutting shall be done in proper grade & camber as per measurement given. Care must be taken that all slopes are evenly and truly dressed. Cutting shall be done to the exact depth required and shall be as per formation level in proper grade and the camber. If extra depth of cuttings done due to negligence of contractor the same shall be refilled with approved quality of materials duly consolidated to the satisfaction of the Engineer-in-charge (without extra cost) Box cutting for soling and metal ling in required width the depth shall be done.
- The stuff received from the cutting shall be utilized for filling cuts and correcting side slopes of bank with all lead and lifts as directed. Useful stuff shall be carefully stacked separately as directed.
- The measurement shall be taken as per cross section measurement of the cutting based on length, breadth, depth measured with tape at every 25m interval.
- The payment shall be made on cubic meter basis.

##### **ITEM NO. 2**

**Providing and laying controlled cement concrete M.200 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base of columns and Mass concrete.(RA)**

**And**

##### **ITEM NO. 3**

**Compaction and finishing of cement concrete road by trimix process providing extra labour charges for the trimix vacuum dewatering service process on cement concrete road surface by using vacuum dewatering pump floater surface vibrator including making groves and rough finish to surface as per in including levelling the complete.**

In case of ordinary concrete, mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in table below for different four grade designated as ordinary M: 100, M:150, M:200 and M: 250.

In the designation of a concrete min letter 'M' refers to the mix and the number to the specified 28 days works cube compressive strength of that min on 150mm cube, expressed in kg/cm.

The ordinary concrete mix shall generally be specified by volume. For cement, which normally comes in bags and is used by weight, volume shall be worked out taking 50kg of cement as 0.035 cubic meter in volume. Whole measuring aggregate by volume, shaking, ramming or hammering shall not be done, proportioning of sand be as per its dry volume. In case it is damp allowance for bulking shall be made as per IS 2386 (part-III).

In gredients required for ordinary concrete containing one 50 kg bag of cement for different proportion of mix shall be as given in table below.

Grade of Concrete	Mix by Volume	Total Qty. of dry agg. Volume per 50kg cement to be taken as sum of individual volume of fine % course agg. Max.(1cu.m=1000 liters)	Proportion of fine agg. To coarse agg.	Qty. of water per 50kg of cement max.
M100	1:3:6	300	Generally 1:2 for fine agg. To course agg. By volume but to a upper limit of 1:1.5 and lower limit of 1:3	34
M150	1:2:4	220		32
M200	1:1.5:3	160		30
M250	1:1:2	100		27

Note: The proportions of the aggregates shall be adjusted from upper limit to lower limit progressively as the grading of the final aggregate becomes finer and the maximum size of coarse aggregate becomes larger.

A mix leaner than M 100(1:3:6) may be used for non-structural part, if provided in the contract. In such cases grading of aggregates shall be by volume. Other requirements for mixing, placing and curing shall be the same.

Following shall be the maximum size of coarse aggregate for the different items of work.

Items	Size in mm
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Plain R.C.C	63
Solid type piers, abutment and wing walls	40
R.C.C wearing coat M150	20

Fine aggregate shall be clean, hard coarse sand. It shall be free from dust and such other substance. The sand shall be got approved by the Engineer-in-charge.

All materials shall be stored as to prevent their deterioration or intrusion of their quality and fitness for the work. Any material, which has deteriorated or has been damaged or is otherwise considered defective by the Engineer-in-charge, shall not be used in the work.

Cement shall be stored above ground level in perfectly dry and watertight sheds shall be stocked not more than eight bags high. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirement at the site and should be cleaned at once every 3 to 4 months. Cement more than 3 to 4 months old shall invariably be tested to ascertain that it satisfies the acceptability requirements. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different sizes of fine or coarse aggregate shall be stored in separate stockpiles sufficiently removed from each other to prevent inter mixing the materials at edges of the pipes.

The water for mixing shall be potable water to the satisfaction of the Engineer-in-charge. The quantity of water shall be just sufficient to produce dense concrete of required workability for the job.

For all work, concrete shall be mixed in a mechanical mixer along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Mixing shall be continued till materials are uniformly distributed and an uniform colour of the entire mass is obtained and each individual particles of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

The method of transporting and placing concrete shall be approved by the Engineer-in-charge concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work and reinforcement contained in it shall be cleaned and made free from standing water, dust snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

If concreting is not started with 24 hours of the approval being given, it shall have to be obtained again from Engineer-in-charge. Concreting then shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete, which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly designed agitators, operating continuously, when this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise agreed to by the Engineer-in-charge, concrete shall be disposed in horizontal layer to a compacted depth of not more than 0.45 m when internal vibrators are used and not exceeding 0.30 m in all other cases.

Unless otherwise agreed by the Engineer-in-charge, concrete shall not be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept clean and used in such way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and cleaned with a 13mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened; all laitance shall be removed by scrubbing the new surface with wire or bristle brushed. Care being taken to avoid dislodgment of particulars of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness, and shall be well rammed against old work particular attention being given to corner and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional case, such as concreting under water, where vibrator cannot be used. Sufficient vibrator in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Immediately after compaction, concrete shall be protected against harmful effect of weather, including rain, running water, shocks, vibrations due to traffic, rapid temperature changes, fast drying put process. It shall be covered with wet sacking hessian or other similar absorbent material approved by Engineer-in-charge soon after the initial set. It shall be kept continuously wet for a period of not less than 14 days from the date of placement.

Form work shall include all temporary or permanent forms required for forming the concrete, to gather with all temporary construction required for their support. Forms for concrete shall be constructed of metal or timber suitably lined and be of substantial and rigid construction true to shape and dimension shown on the drawing. Where metal forms are used, all bolts and rivets shall be counter sunk and well ground to provided a smooth, plain surface where timber is used it shall be well seasoned, free from loose knots, projecting nails, splits or other defect that may mark the cement surface of concrete. For exposed concrete faces, timber for shuttering shall be wrought on all faces in contact with concrete.

Forms shall be mortar tight and shall be made sufficient rigid by the use of ties and bracing to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming

and vibration, without deflection from the prescribed lines occurring during and after placing the concrete. Screw jacks or hardwood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete. Suitable camber shall be provided in horizontal members of surface especially in long span to counteract the effect of any deflection. The framework shall be so fixed as to provide for such camber. Forms shall be so constructed as to be removed in section in the desired sequence, without damaging the surface of concrete or disturbing other sections. Unless otherwise specified or directed chamfers or fillets of size 25mmx25mm shall be provided at all angles of framework to avoid sharp corners.

In the case of reinforced concrete work, workability shall be such that the concrete surrounds and properly grips all reinforcement. The degree of consistency, which must depend upon the nature of work and methods of vibration of concrete, shall be determined by regular slumps test.

In reinforced concrete, the volume occupied by reinforcement shall not be deducted.

The unit rate for concrete shall include the cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing as per directed of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown in the drawing and according to these specification. The rates shall also include the cost of making, fixing and removing of all centering and forms required for the work centering.

The payment will be made on cubic meter basis of the finished work.

**Trimix :-**

Tre-mix process in cement concrete Road done after laying of cement concrete in Road surface Tre-mix process start by surface Vibrator using on concrete surface for compaction of cement concrete including process of C.C Road surface by sucking vacuum dewatering pump floor surface vibrator and there after Tre-mix machine is used up to 2 to 3 hours in concrete for smooth surface on concrete road & cement slurry layer show on concrete Road and after completion of Tre-mix Process make making grooves and rough finished to surface in Road by using of wire brush.

**Mode of Measurement and Payment:**

The payment shall be made on cubic meter basis.

**ITEM NO. 4**

**Providing and laying cement concrete 1:4:8 (1-Cement : 4- coarse sand : 8- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth.**

**Material**

Water, cement, fine aggregate or sand and coarse aggregate shall be as specified.

**Cement:**

Cement shall be ordinary Portland slag cement as per IS 269-1976 or IS 455-1976

**Sand:**

Sand shall be natural sand, clean, well graded free from dust, clay, kanker etc. If necessary the sand shall be washed to make it clean.

**Coarse Aggregate**

General: Aggregate most of which is retained on 4.75 mm IS Sieve and contains only as much fine material as is permitted in IS: 383 for various sizes and grading is known as coarse aggregate. Coarse aggregate shall be specified as stone aggregate, gravel or and it shall be obtained from authorized sources.

**Water:**

Water shall no be salty or brackish and shall be clean.

**Workmanship:**

Before starting concrete bed of foundation trenches shall be cleaned of all loose materials, leveled \watered and rammed as directed.

**Proportion of Mix:**

The proportion of cement, sand and coarse aggregate shall be one part of cement, 4 parts on sand and 8 parts of stone aggregate and shall so measured by volume.

**Mixing:**

All components of controlled concrete shall be proportioned by weight using weight batchers for each grade. Mixing shall be carried out in mechanical mixers and preferably a batch mixing plant shall be used. Volumetric mixing shall not be adopted unless specifically permitted by the Consultant. The mechanical mixer shall be equipped with automatic devices for control of speed, gauging of water and timing the mixing period. Clean potable water only will be added. Batches shall not exceed the capacity which can be mixed efficiently as determined by the mixer efficiency test and peripheral speed shall conform to manufacture's recommended rate but shall not vary more than + 10% nor exceed 30m/minute. Net minimum mixing time shall begin when all water is in the mixer and shall be approximately 2 (two) minutes for a 3 cum mixer and 3 (three) minutes for larger mixers. Excessive mixing shall be avoided. Weigh batchers shall be placed level during use and the hoppers shall be loaded evenly. The equipment shall be checked frequently to verify their accuracy.

When hand mixing is permitted it shall be carried out on a clean hard and water -tight platform. The proportion of the cement in case of hand mixing shall always be increased by ten percent. The cement, sand and coarse aggregates shall be carefully measured in their correct proportion and shall be thoroughly mixed till the mass is uniform in colour before water is added. Only sufficient water to make the mix worktable shall be used and

the water shall be sprayed from a watering can be fitted with a rose and mixing shall be continued till the mass is uniform in consistency.

#### MEASUREMENT:

The contractor shall be measured for its length, breadth and depth, limiting dimension to those specification on plan or as directed.

The rates shall be for a unit of one cubic meter

#### ITEM NO. 5

**Spreading the stone aggregate for rolling and W.B.M. including filling the interstices to required camber and gradient (excluding spreading of Blind age) (ii) 40mm to 63mm size aggregates (H.B.)**

- The stone metal shall be obtained from quarries approved by the Executive Engineer prior to collection. The metal shall be of approved quality with all leads and lift. The metal shall be obtained from hard tough, sound durable, stone of close texture as is locally available and reasonably free from decay and weathering. Pieces of the stone shall be angular and roughly cubical in shape and round belonged or flaky materials shall be rejected. No round or oblong pebbles or angular chips large or smaller then specified size should be allowed. The size of metal shall be 40mm to 63mm and shall be hand broken. All unsound weathered or disintegrated stone obtained from the upper surface layer or other layers of bounders shall be rejected.
- The samples of metal collected from approved quarries shall be got tested at Government recognized laboratory as may be directed to the contractor. The test result shall conform to the standard requirements laid down for metal to be used for W.B.M work.
- The physical requirements for standard size B.T. metal shall conform to the test result indicated in the Table below:

Type of Construction	Test	Test Method	Requirement
Base (a) OR Sub Base	Los Angeles Abrasion Value Aggregate impact Value Flakiness index	I.S. 2386 Part IV I.S. 2386 Part IV or I.S. 2386 Part I	50 percent Max. 40 percent Max. 15 percent Max.

- The grading requirements of the metal to be used for W.B.M shall be as under:

Sr. No.	Size Range	Sieve Designation	Percentage by weight Passing thought the sieve
1.	40mm to 63mm & 25mm to 40mm	80 mm 63 mm 50 mm 40 mm 20 mm	100-100 90-100 35-70 00-15 00-05

The size of metal for W.B.M shall be 20mm to 50mm wherein tolerance limit for oversize shall be up to 10% and that for lower size should be up to 10%.

- Whenever any doubt exists as to where the above requirements are satisfied, whole or any part of the collection of metal shall be got screened by the contractor at his own cost, if so ordered by Engineer-in-Charge.
- Stacking shall be done by filling in the standard steel boxes of 2m X 1.5m X 0.5m size which shall be supplied by the Department if available on rent otherwise shall make his own arrangement and no deduction for voids shall be made from the gross measurements. Where any doubt exists as to whether the quantity of Stacks of metal in an hectometer is not conforming with the cubical content of the standard pharas (2 X 1.5 X 0.5m) shall be got corrected by the contractor if so ordered by the Engineer-in-Charge for which no extra payment shall be claimed by the Contractor. If the quantity of metal in any stacks in particular Hectometer found to be less than the standard measurements viz. 1.5 centimeters the entire collection in the Hectometer shall be paid on the basis of the quantity so found. Regular stacks shall be done by the Engineer-in-Charge. Collection of metal shall be completed in two hectometer wise as per the final requirement and measurement shall be recorded two hectometer-wise. If the quantity of metal as per the final requirement is not collected in any two consecutive. H. M and std. boxes are not filled in completely in two hectometers, measurements shall not be recorded and payments shall not be done.
- For roadwork complete stacking of metal as per requirement shall be carried out in 2km length before spreading. Other Deputy Engineer as per rules shall be crosschecked the metal stacks before spreading. The collection shall always, commence at one end of the km and be carried continuously towards the other end unless the Engineer-in-Charge shall direct otherwise.
- The payment shall be on cubic meter basis without deduction of voids. The contractor shall maintain all Departments. The spreading of materials shall not be allowed till the materials are fully stacked and completed kilometer wise.
- The rate includes cost of collection, conveyance to the site with all lead and lift and filling the boxes including all labour, tools, equipment and other incidental expenses. The rates quoted are inclusive of all such tools duties, fees, royalties, taxes etc.

The grading requirements of the metal to be used for W.B.M shall be as under:

Sr. No.	Size Range	Sieve Designation	Percentage by weight Passing thought the sieve
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1.	40mm to 63mm & 25mm to 40mm	80 mm 63 mm 50 mm 40 mm 20 mm	100-100 90-100 35-70 00-15 00-05
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The size of metal for W.B.M shall be 40mm. To 63mm. where in tolerance limit for oversize shall be 10percent and that for lower size should be up to 15 percent and below 25mm it shall be up to 5 percent

**Standard for acceptance at reduced rate and rejection shall be as under:**

**(a) Retained on 63mm square mesh sieve:**

Not more than 30%

**(b) Retained on 75mm square mesh sieve:**

Nothing will be retained & 100% metal shall pass through the sieve. For the oversize metal, payment at reduce Rate should be made as under:

**(A)** 90% of accepted tender rates for the metal retained between 10% and 20% on square mesh sieve of 63mm gauge.

**(B)** 75% of accepted tender rates for the metal retained between 20% and 30% on square mesh sieve of 63mm gauge.

If more than 30% of metal is retained on specified sieve, (i.e. 63mm square size) the stack shall be rejected.

Also if any stone aggregate retained on 75mm sieve, the stack shall be rejected.

The quantity for which reduced rate will be applicable is the quantity retained on the above-mentioned square mesh sieve and not the whole quantity.

For example in a stack of 1.5 Cu. m. metal if 18% is retained on square mesh sieve of the prescribed size (i.e. 63 mm) the reduced rate of 90% will be applicable to 0.27 Cu. m. only and the balance quantity of 1.23 Cu. m. shall be paid for at the accepted rates for standard size metal.

Before any secured advance for metal is paid to the contractor, the metal shall have to be tested for its quality in the laboratory. Contractors' request for such secured advance will be considered only after test results of metals are received and results are satisfactory.

[As per Government circular No. SSR 1070-1B-191-22-S of 5-3-92]

**Supplying of murrum/binding material.**

- Materials for the purpose shall be of approved quality. Any material, which is found inferior, shall be rejected and the contractor shall remove such rejected materials from the site at his own cost. The material shall be collected from quarries approved by the Executive Engineer. The material shall be granular and gritty.
- The Executive Engineer prior to collection on site shall be approved the material. It shall be free from all rubbish, dust and any organic materials as well as clod of black cotton soils. Materials shall not be allowed to be collected from within the road boundary. Material to be used as crust and for side shoulders shall be as per C.B.R. report and that to be use bind age in W.B.M road construction shall have P.I. value of less than 6 as determined in accordance with IS 2720 (Part-V) The material to be used should be got tested prior to its use in construction. Testing charges shall be borne by the contractor.
- River or nala or sea sand required for the work shall be clear, sound, property, graded, free from organic materials silt clay etc. and shall be got approved by the Engineer-in-charge. The sand shall be obtained and brought from the source approved by the Engineer-in-charge. The sand shall be well graded. The payment shall be made on Cubic Meter basis.
- Stacking shall be done by filling in the standard steel boxes of 2m X 1.5 X 0.5m size, which shall be supplied by the Authority if available on rent. Otherwise contractor shall make his own arrangement. No deduction for voids shall be made from the grade measurements. Where any doubt exists as to whether the quantity of stacks of murrum in a hectometer is not confirming with the cubic content of the standard pharas (2 X 1.5 X 0.5 M) the same shall be got corrected by the contractor if so ordered by the Engineer-in-charge for which no extra payment shall be claimed by the contractor. If the quantity of murrum in any stack in a particular hectometer is found to be less than the standard measurements viz., 1.5 centimeters. The entire collection in the hectometer shall be paid on the basis of the quantity so found. The Contractor in a fairly level ground shall do regular stacks. Stacking of the murrum shall be done in a manner as directed by the Engineer-in-charge.
- For road work completed stacking of murrum as per requirement shall be carried out in 2-kilometre length before spreading. The collection shall always, be commenced at one end of the K.M and be carried continuously towards the other end unless the Engineer-in-charge shall direct otherwise.
- The payment shall be made on cubic meter basis without deduction for voids. The contractor shall maintain all stacks in regular and proper size till the whole materials are collected, measured and finally accepted by the authority. The spreading of materials shall not be allowed till the materials are fully stacked and completed kilometer wise.
- The rate includes cost of collection, conveyance to the site with all leads and lifts and filling the boxes including all labour, tools, equipment and other incidental expense. The rate quoted is inclusive of all shall such tools, duties, fees, royalties, taxes etc. The payment shall be made on cubic meter basis.

**Spreading of stone aggregate:**

- Metal shall not be spread without permission of the Engineer-in-charge. Metal should be spread under careful supervision by trained coolies. Contractor shall see that uniform spreading as per collection of metal is done.

The contractor shall spread the metal fully from the stacks without keeping any balance unless directed by the Engineer-in-charge to keep some stack in balance for making good unevenness or depressions during rolling works. To ensure that the material is spread to the required thickness, the road surface shall be marked out into length over which the contents of heaps are to be spread. The bounds of earth or murrum (one on either side) shall be laid with a distance between them equal to the width of road to be medaled and shall be enough to prevent the loose metal from spreading during consolidation as well as to retain water used for consolidation. Payment for bunds will be made in the respective item.

- The metal (including old metal) shall be screened and rubbish, dust, grass shall be removed and spread evenly on the prepared surface in grade and camber by using camber board etc. so as to ensure that the surface is true to camber and grade. At least two cambers by using camber boards shall be in use at site. The surface shall be checked at every 50 ft. by means of template while the correctness of the camber in between shall be tested by string and corrected as required. Between the straight lengths and the curves in camber of road to super elevation shall be made very gradually as may be directed by the Engineer-in-charge.
- The spreading of metal shall precede only 200-meter (max.) advance of the rolling operations the collection and spreading of the metal shall not be carried out in one and the same kilometer.

At the time of rolling all surface irregularities, hollow, depressions, humps etc. shall be straight height. The contractor shall do the spreading of metal in required layer. The rate for this item shall be paid on cm basis and includes all the above operations with all lead and lift except consolidation.

The payment shall be made on cubic meter basis.

#### **Spreading blind age:**

Spreading of materials shall be started after the full supply in a particular K.M is collected, measured and recorded in the measurement books. Permission of the Engineer-in-charge shall be obtained before spreading. It shall be seen that the formation is dressed to the required camber and grade. If the murrum is to be spread over the medaled surface then the spreading shall be uniform and as its has to act as binding surface, it shall be used for filling the interstices for metal and forming a smooth running surface as far as possible. Murrum blind age shall be specified, as blind age shall be speared evenly with a twisting motion of the baskets. No more murrum shall be used then specified as blind age. The rate is for gross measurements and no deductions of voids shall be made. The murrum is to be speared over earthen embankment as a sub base or for side shoulders or as blindange; it shall be spread in a manner as directed by the Engineer-in-charge and as per required width and thickness. The contractor shall make good all unevenness, depression, projections etc., during consolidation work. Rate of this item includes all these operation except consolidation. The payment shall be made on cubic meter basis.

#### **ITEM NO. 6**

##### **Providing Pre-moulded asphalt filler joints as per drawings. (A) 12mm.**

Open joints shall b constructed at the location as directed by engineer-in-charge using a wood strip metal plate or other suitable material, which is subsequently removed. When removing the material, care shall be exercised to avoid chipping or breaking the corners of the concrete. The edge of the concrete, at the joints, shall be well finished. Reinforcement shall not extend across an open joint.

When preformed filler is to be provided, the filler shall be placed in correct position before concrete is placed against the filler. The filler material shall form part of the joint and while concreting the slab. Care shall be taken to prevent the former form being displaced. After the work is completed, the exposed face of the joint shall be cleaned of all loose materials sticking to it.

The material used for filling expansion joint shall be bitumen-impregnated felt. Impregnated felt shall conform to the requirement of IS: 1838, and shall be got approved from the Engineer-in-charge. The joints shall consist of larger pieces and assembly of small places to make up the required size shall be avoided.

The expansion joint shall be measured in square meter. Thickness of the expansion joint will be 20 to 25 mm. Width of expansion joint shall be equal to full depth of the slab.

The rates shall include the cost of all material, labour, equipment incidental charges for fixing the joints complete in all respects as per these specification and shown on the drawing.

The payment shall be made on sq.meter basis.

**Item No. – 7 Providing and fixing pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M250 pneumatic compressed by mechanically pressed and as per approved design including 75mm Sand layer for levelling and filling the joint with sand in proper line and level etc complete.**

The scope of work includes manufacturing, supplying of pre-cast Rubber mould reflective paver Blocks. The work includes:

Manufacturing of Rubber mould reflective paver blocks in your plant as per Requirements of 's technical specification.

Supplying of Rubber mould reflective paver blocks at site, including handling at both ends.  
Testing of Rubber mould reflective paver blocks through reputed Govt./Non Govt. Test House and submission of test results as per requirements in Technical Specifications. AMC Reserves the right to carryout test at random. Cost for such tests to be borne by party incl. Carting of materials.

**TECHNICAL SPECIFICATIONS:**

I) Rubber mould reflective Paver Block Manufacturing Facilities:

The Rubber mould reflective Paver Block shall be made in factory with following minimum facilities & shall be got approved before carting materials to site.

1.1 Concrete Block making Machines :

The machine should be capable of producing high quality Rubber mould reflective Paver Blocks by obtaining high level of compaction by application of hydraulic compaction and also by high intensity vibration to the moulds. The machine should have automatic control panel for uniformity in strength.

1.2 Concrete Batching & Mixing

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

1.3. Curing:

The factory should have well designed curing area to ensure adequate curing of paver blocks.

1.4 Laboratory (Desirable but not essential):

The factory should have the following:

(i) Compression testing machine of adequate capacity.

(ii) Other tools and equipment for testing raw materials and paver blocks.

(1) Systematic record of test results of various Rubber mould reflective paver blocks manufactured in the factory.

(2). Concrete Mix Design for various grade of concrete used for making of Rubber mould reflective paver blocks.

II) SPECIFICATIONS FOR COLOURED RUBBER MOULD REFLECTIVE PAVER BLOCKS:

Coloured concrete Rubber mould reflective paver blocks shall be manufactured as per specifications using approved colour Pigment of "BAYER" Make "BAYFERROX IRONOXIDE PIGMENTS" with minimum colour pigment of 3% by weight of cement. The colour shade shall be as selected by AMC before commencement of the work. White cement shall be used for coloured pavers to obtain the desired colour shade.

The colour of the Rubber mould reflective paver block shall be guaranteed against fading of colour for period of 3 months from the date of completion. Otherwise contractor shall have to replace it without any cost.

All other technical specifications & Procedure for testing & sampling of coloured Rubber mould reflective pavers shall be as per attachment.

III) RUBBER MOULD REFLECTIVE PAVER BLOCKS CHARACTERISTICS:

The concrete Rubber mould reflective pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be reasonably smooth and of anti skid and anti glare type.

The Rubber mould reflective paver should have uniform chamfers to facilitate easy drainage surface run off.

The Rubber mould reflective pavers should have uniform interlocking space of 2mm to 3mm to ensure compacted sand filling after vibration on the paver Surface.

The Rubber mould reflective pavers shall be manufactured in single layer only.

The Rubber mould reflective pavers shall be of cement gray colour without any pigment & for coloured Rubber mould reflective pavers refer "specifications for coloured Rubber mould reflective pavers."

IV) Rubber mould reflective Paver Block Dimensions :

Thickness 60mm

Shape Uniregular (Uniform Shape with no Hollow

Or Creacks) Uni, I shape, tri hex or directed

by Addl .C.E.

Chamfer 4mm to 6mm along top edges

Colour a. Natural cement grey colour without use of any pigment.

b. For coloured Rubber mould  
reflective pavers refer "specifications for  
coloured pavers"

Dimensional Tolerance (+/-) 2mm for length & width,  
(+/-) 3mm for Height (Thickness)

V) Testing of Rubber mould reflective Paver Blocks :  
Sr.

No

TEST SPECIFICATION Average Values

(Average of Minimum Five Samples/Site)

Compressive Strength Min. 20 N/Sqmm for 60mm thick

Flexural Strength Minimum 4.5 N/Sqmm

Abrasion Resistance Maximum 1.5

Water Absorption Maximum 5.80%

Sampling and Testing procedure as per enclosed specifications

**SAMPLING AND TESTING PROCEDURES FOR RUBBER MOULD REFLECTIVE PAVER BLOCKS.**

Sample Size :

INTERNAL – Average of minimum 3 samples per 5000 Blocks.

Essential – Minimum 2 Blocks per 10000 blocks. Average of minimum 8 blocks per site.

1. Sampling For Testing Sampling for testing of paver blocks shall be done in accordance with Appendix-A.

2. Compressive Strength

Testing for compressive strength shall be undertaken in accordance with standard test as suggested by  
AMC.

3. Abrasion Resistance

Testing for abrasion shall be in accordance with IS 1237 (Specifications for Cement Concrete Floor Tiles)

4. Flexural Strength

Testing for flexural shall be in accordance with IS 1237 (Specifications for Cement Concrete Floor Tiles)

5. Water Absorption

Testing for water absorption shall be in accordance with IS 2185:1979 : Part I (Specifications for Concrete Masonry  
Units)

Appendix – A

Sampling of Rubber mould reflective Paver blocks.

1. Method of sampling :

Before laying Rubber mould reflective paver blocks, each designated section comprising not more than 50000  
blocks, shall be divided into ten approximately equal groups. Three blocks shall be drawn  
from each group.

The mode of measurement shall be on Smt. basis. (As laid on site)

Item No :- 8 Providing and fixing pre-cast Rubber Dye / steel Dye inter locking concrete block 60mm thick with grade  
of concrete M300 pneumatic compressed / vibrated mechanically and as per approved design Confirming to IS 15658 :  
2006 including 35 mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of  
IRC : SP 63-2018 etc. Complete.

Scope

This work shall consist of constructing cement concrete kerbs and kerbs with channel in the central median and/or  
along the footpaths or separators in conformity with the lines, levels and dimensions as specified in the drawings or as  
directed by the Engineer.

**Materials**

Kerbs and kerb with channel shall be provided in cement concrete of Grade M 20 or as specified in the  
drawing in accordance with Section 1700 of these Specifications.

**Type of Construction**

These shall be precast concrete blocks as per approved drawing.

**Construction Operations**

Kerb shall be laid on firm foundation of minimum 100 mm thickness of cement concrete of M 15 grade cast in-  
situ or on extended width of pavement. The foundation shall have a projection of 50 mm beyond the kerb  
stone. Before laying the foundation of lean concrete, the base shall be leveled and slightly watered to make it  
damp. In the median portions in the straight reaches, the kerb shall be cast in continuous lengths. In the  
portions where footpath is provided and/or the slope of the carriageway is towards median (as in case of  
super elevated portion), there shall be sufficient gap/recess left in the kerb to facilitate drainage openings



kerb on the drainage ends such as along the footpath or the median in super elevated portions, shall be cast with monolithic concrete channels as indicated in drawings- The slope of the channel towards drainage pipes shall be ensured for efficient drainage of the road surface.

Vertical and horizontal tolerances with respect to true line and level shall be  $\pm 6$  mm.

#### Measurements for Payment

Cement concrete kerb/kerb with channel including foundation shall be measured in linear meter for the complete item of work.

#### Rate

The Contract unit rates for cement concrete kerb/kerb with channel including foundation for kerb shall be payment in full compensation for furnishing all materials, labour, tools, equipment for construction and other incidental cost necessary to complete the work.

Chief Officer,  
Mundra-Baroi Municipality

### APPENDIX

#### APPENDIX – I

Details of plants and machinery immediately available with the tenderer for use in this work.

Sr. No.	Name of Equipment	No. of Units	Kind or Name	Capacity	Age And Condition	Present Location	Remark
	To be attached separately						

DATE:

SIGNATURE OF CONTRACTOR

#### APPENDIX - II

##### LIST OF WORKS ALREADY COMPLETED BY TENDERER

Sr. No.	Name of work	Place	Cost on completion	Time taken in months To complete the work	Remarks
	To be attached separately				

\* Necessary certificate from the officer concerned shall be attached with the tender.

SIGNATURE OF CONTRACTOR

AUTHORITY

# APPENDIX - III

## DECLARATION REGARDING WORKS ON HAND WITH TENDERER

Sr. No.	Name of Work	Place	Tender cost	Works on Hand		Estimated cost	Date when decision is expected	Stipulated date and period of completion	Remarks
				Cost of remaining to be executed	Anticipated date of completion				
	To be Attach separately								

SIGNATURE OF CONTRACTOR

AUTHORITY