CONTRACT NO.

GUJARAT WATERSUPPLY & SEWERAGE BOARD

GANDHINAGAR

(A WHOLLY OWNED GOVERNMENT OF GUJARAT UNDERTAKING)

Bid documents for, Construction of compound wall and wire fancing work at Lukhasan and Kahoda SHW, RCC Road and Land filling work At Lukhasan HW Under Dharoi RWSS. Ta: Siddhpur, Dist. :- Patan.

Estimated Cost: Rs. 22,66,682.18

VOLUME- II

VOLUME - IIA, Extent of Work
VOLUME - IIB, Technical Specifications - Civil Works
VOLUME - IIC, Technical Specifications and Data Sheets for Electro- mechanical works

Executive Engineer

Public Health Dharoi Project Division

Gujarat Water Supply & Sewerage Board

Mehsana

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Content

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EXTENT OF WORKS

1.0 GENERAL:

This is a single point responsibility contract comprising **"Construction of compound wall and wire fencing work at Lukhasan and Kahoda SHW, RCC Road and Land filling work At Lukhasan HW Under Dharoi RWSS. Ta: Siddhpur, Dist. :- Patan."**

~~The scope of work also includes post implementation operation and maintenance of the constructed facilities under the package for a period of 5 (five) years.~~

The Scope of Work under this Contract includes the Design, Engineering, Manufacture, Supply, Inspection and testing at works, Packing and forwarding, Delivery to site, Unloading, Handling, Safe Storage, Insurance, Erection, Installation, Testing, Trial Run, Commissioning and Demonstration of Performance Guarantee Parameters, handing over, Training of Owner's personnel, preparing "Operation & Maintenance Manual" and "As Built drawings" of …… as specified in different sections of this specification. The scope broadly comprises the work specified in different sections of this Tender Specifications.

Any item of work, for erection of material / equipment which have not been specifically mentioned in the specification but are necessary for safe and trouble-free operation and guaranteed performance of the entire system, plant and equipment offered shall be deemed to be included within scope of these specifications and shall be provided by the bidder without any extra price and time implication to the employer.

The successful bidder shall have to undertake site surveys, route surveys for ascertaining the terrain for planning and designing of the schemes in consultation with Engineer-in-charge, as Structure as to conduct geotechnical investigations for designing of foundation system of various structures. The bidders shall submit actual path of laying of transmission network based on actual site condition and shall submit hydraulic design of transmission network to Employer/Consultant for review/approval and thereafter as per approved hydraulic design pipelines should be laid.

~~Civil, Mechanical, electrical & Instrumentation works shall include design, manufacture, performance testing at manufacturer's works, painting, supply, delivery at site, storage at site, installation / erection, testing and commissioning at site, final painting and handing over followed by Operation and maintenance for 5 years.~~

The scope of work shall also include obtaining necessary statutory approvals for the components as required. The statutory approvals shall include but not limited to Load Sanction from GEB/Load Release from GEB/ No Objection Certificates from Gujarat Electricity Board (GEB) / Electrical Inspector / relevant government agencies /any other statutory authority as applicable. The same shall be in the scope of contractor.

GWSSB will be responsible to get all other statutory permissions and clearances from the concerned central / state or local statutory authorities. However, the contractor shall

have to manage the day-to-day co-ordination and follow up activities based on these clearances on site.

In the work of construction of structures, if the following condition like ground situation, SBC reports, type of strata encountered in foundation, natural rainfall drain patterns, Ground water table of locations, etc. occurs and the engineer in charge feels the necessity of consideration of ground water table, the structural design shall be incorporate necessary water uplift pressure. The decision of engineer-in-charge shall be binding to the bidder. Bidders are advised to quote the rate keeping in view this point as no extra payment shall be given for this. In case of any ambiguity, the decision of Superintending Engineer shall be final and binding to the bidder.

Before starting the actual work, the contractor has to provide and fix necessary DISPLAY BOARDS at all works site as per design, details, including writing with paints necessary details as directed by Engineer-in-charge at Contractor's own cost. No extra payment shall be made for this work. These shall be property of GWSSB / Client after completion of works.

2.0 DETAILS OF PROPOSED SCHEME

2.1 SCOPE:

The scope of this package starts from:

CIVIL WORKS

Compound Wall:-
This work included construction of compound wall and wire fencing work at Lukhasan and Kahoda sub head works under Dharoi RWSS as per tender specification and as per instruction given by Engineer in-charge. Allocation of the quantity and site for the said item should be finalised by Engineer in charge.

RCC Road & Filling work:-
This work included construction of RCC Road and land filling work at Lukhasan sub head works under Dharoi RWSS as per tender specification and as per instruction given by Engineer in-charge. Allocation of the quantity and site for the said item should be finalised by Engineer in charge.

Special Note:

The quantity and site for the said item should be finalised by Engineer in charge considering the site situation.

CONTRACT NO.

GUJARAT WATER SUPPLY & SEWERAGE BOARD

GANDHINAGAR

(A WHOLLY OWNED GOVERNMENT OF GUJARAT UNDERTAKING)

Bid documents for, Construction of compound wall and wire fancing work at Lukhasan and Kahoda SHW, RCC Road and Land filling work At Lukhasan HW Under Dharoi RWSS. Ta: Siddhpur, Dist. :- Patan.

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VOLUME – II

VOLUME – IIB, Technical Specifications – Civil Works

Executive Engineer
Public Health Dharoi Project Division
Gujarat Water Supply & Sewerage Board
Mehsana

DETAILED SPECIFICATION

Item No. 1 Excavation for foundation up to 1.5 M. depth including sorting out and stacking of useful materials and disposing of excavated stuff up to 50 M. lead.

in Loose or Soft soil

A) 0.0 to1.5Rmt Depth

1.0. General: 1.1. Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turfloam, clay, peat etc., fall under this category.

2.0 Clearing the site : 2.1 The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials shall be removed as directed:

3.0 Setting out: After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume fu; responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply labourers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them a long as required and directed.

4.0 Excavation : The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for sue precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be evelled both longitudinally and transfersely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any; other reason excavation is made deeper or wider that shwon on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 m. depth shall be measured under this item. 5.0. Disposal of the excavated stuff: 5.1. The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling the ground in layers including watering etc. 5.2. The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed within lead upto 50 M. and all lift**.**

MODE OF PAYMENT:

- The rate shall be for a unit of one cubic meter.

Item No .2 Filling available excavated earth (excluding rock) in tranches, plinths, sides of foundations etc. in layers not exceeding 20 cm in depth consolidating each deposited layers by ramming and watering.

in Loose or Soft soil Rate

- The work shall be carried out as per the description of the item and as per the description of the time and as per the specification laid down in P.W.D. Hand book Vol. I & II.
- The earth filling shall be property consolidated including necessary watering, etc, complete as directed.
- The extra earth if required shall have to be brought by the contractor from outside within lead of 3 km,. with out any extra cost and surplus earth shall be disposed off as directed outside the tow limit as per the instruction of Engineer in charge without any extra cost.

MODE OF PAYMENT:

- The rate shall be for a unit of one cubic meter.

Item No.3 P.C.C. M-10 levelling Course

Providing and casting in situ mass cement concrete in grade M-10 (approx. corresp. to prop. 1:3:6) using granite quartzite trap metal of size 12 mm to 25 mm incl. consolidation curing etc. complete.

2.2 Without Forms Work

- For all practical purpose and in absence of proportioning of concrete on base of preliminarily tests, C.C. 1:3:6 may be provided as a levelling course i.e. one part of cement three parts of sand and six parts of black trap kapachi. Specification for various ingredients of concrete such as sand, cement, kapachi, water shall be as these given in specification for C.C. M 100.

- While laying base concrete for levelling course the concrete shall not be dumped from above but shall be carried out to the bottom and gently placed from a height not exceeding 1.5 meter. If concrete is transported by chutes, then the same shall be remixed at bottom of chutes to overcome any segregation that might have occurred.

1. General

- The concrete shall be consist of one part of ordinary Portland cement confirming to IS 269-1976 Three parts of well graded angular best quality river sand free of dust and organic matter and size 1 mm. To 3 mm and Six parts of approved quality black trap kapachi of size 12 mm to 25 mm. All C.C. work shall be carried out as per I.S.S. regulations and as per standing practice and ordered prevailing in PWD. All the items are to be carried out as per details supplied and as required and directed by the engineer in charge or his authorized agencies. The work will have to be strictly as per approved design and as directed by the engineer in charge.

2. Aggregate

- The course aggregate and the fine aggregate for the concrete shall be hard, clean ,tough & durable and shall be free from all deleterious matter such as dust, lump of clay, soft & flaxy pieces, shale alkali, organic matter. The materials shall be got approved by the Engineer-In-Charge or his agent.

3. Proportion

- The proportion of course and fine aggregate shall be that one part of cement, three parts of fine aggregates & Six parts of course aggregates by volume. The proportion of cement & water of the water cement ratio shall be as specified, having regard to the nature of work & strength to be developed.

4. Mixing

- Whether the concrete is mixed by hand or in a mechanical mixture. it shall be thoroughly mixed and the concrete placed in its final position with the minimum of delay. every pieces of aggregate shall be uniformly coated by cement paste.

5. Laying & Consolidation

- The concrete must be laid gently (Not dumped) from height so as not to pent segregation of aggregates .after placing it shall be well compacted by tampl and/or mortar to cream up. In no case ramming shall be prolonged after the cement has begun to take its initial set. In no case, more water be added in order to reduce the work of completion.

6. Curing.

- As soon as the concrete has set sufficiently the surface shall be protected from rapid during by being covered with wet sand, wet gunny bags or where possible by foaming shallow pools water on the top. the setting shall be continued for at least 10 days & usually two to three weeks.

7. Workmanship

- Water stops shall be cleaned before placing them in position. Oil or grease shall be removed thoroughly using water and suitable detergents. Water stops shall be procured in long lengths as manufactured to avoid joints as far as possible. Standard L or T type of intersection pieces shall be procured for use depending on their requirement. Any nonstandard junctions shall be made by cutting the pieces to profile for jointing. Lapping of water stops shall not be permitted. All jointing shall be of fusion welded type as per manufacturer's instructions. Water stops shall be placed at the correct location/level and suitably supported at intervals with the reinforcement to ensure that it does not deviate from its intended position during concreting and vibrating. Care shall also be taken to ensure that no honey-combing occurs because of the serrations/end grips, by placing concrete with smaller size aggregates in this region. Projecting portions of the water stops embedded in concrete shall be thoroughly cleaned of all mortar/ concrete coating before resuming further concreting operations. The projecting water stop shall also be suitably supported at intervals with the reinforcement to maintain its intended position during concreting so as to ensure that it does not bend leading to formation of pockets. In addition, smaller size aggregates shall be used for concreting in this region also

8. Mode of payment

- 80% payment if necessary shall be made after laying of concrete & 20% payment shall be release after completion of curing period of exposed surface.

Mode of measurements and payment:

The rate shall be paid per cum. of completed work.

Item no.4 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:6 (1- Cement :6 -fine sand) (B) Conventional

1. Materials : Cement mortar of proporation 1 : 5 shall conform to M-11. Conventional bricks shall conform to M-15.

2. Workmanship : The relevant specifications of item No. 6.12 (A) shall be followed except that the masonry work shall be carried out by using conventional bricks.

3.0. Mode of measurements and payment: 3.1. The relevant specifications of item No. 6.12 shall be followed. 3.2. The rate shall be for a unit of one cubic metre.

6.12. (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in foundations and plinth in cement mortar 1 : 5 (1 cement: 5 fine sand) modular bricks.

1.0 Materials : Water shall conform to M-l. Cement shall conform to M-3. Sand shall conform to M-6. Brick shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship:

2.1. Proportion: 2.1.1. The proportion of the cement mortar shall be 1 : 5 (1 cement: 5 fine sand) by volume. 2.2. Wetting of bricks : 2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are welted with water is an indication of through wetting of bricks.

2.3. Laying: 2.3..I. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closers in such case shall be cut to required size and used near the ends of walls. 2.3.2. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and se: home by gently tapping with handle of trowel or wooden mallet. It side face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the verticle joints shall be fully filled from the top with mortar. 23.3. The walls shall be taken up truly in plumb. AH courses shall be laid truly horizonal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform. 2.3.4. The brick shall be laid with frog upwards. A set of tools comprising of wooden straight edges, mason's sprit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work. 2.3.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees. 23.6. All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints: 2.4.1. Bricks shall be so laid that all joints arc quite flush with mortar. Thickness of joins shall not exceed 12 mm. The face joints shall be raked out as directed by taking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done. 2.4.2. The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed,

2.5. Curing. 2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well welted at the close of the day. 2.5. Preparation of foundation bed : 2.6.1. If the foundation is to be laid directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry. If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When puccas flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

3.0. Mode of measurements and payment: 3.1. The measurements of this item shall be taken for the brick masonry fully completed in foundation upto plinth. The limiting dimensions not exceeding those shown on the plans or as directed shall be final. Battered, tappered and curved portions shall be measured net. 3.2. No deduction shall be made from the quantity of brick work, nor any extra payment made for embedding in masonry or making holes in respect of following items : (1) Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbel steps etc. where cross sectional area does not exceed 500 Sq.Cm. (2) Openings not exceeding 1000 Sq. Cm. (3) Wall plates and bed plates, bearing of slabs, chhajjas and the like whose thickness does not exceed 10 Cms. and the bearing does not extend to the full thickness of wall. (4) Drainage holes, and recesses for cement concrete blocks to embed hold fasts for doors, windows etc. (5) Iron fixtures, pipes upto 300 mm. dia; hold fasts and doors and windows built into masonry and pipes etc. for concealed wiring. (6) Forming chases of section not exceeding 350 Sq. Cm. in masonry. 3.3. Apertures for fire places shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making Arches over the aperture be paid for separately.

3.4 The rate shall be for a unit of one cubic metre.

MODE OF PAYMENT:

- The rate shall be for a unit of one cubic meter.

Item no.5 Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters

- Using T.M.T of steel confirming to ISS-1139- or ISS-1786.or IS 2502
- The work shall be carried out as per the description of the time and as per the specification laid down in PWD handbook vol. I & II.
- The M.S. T.M.T. reinforcement shall be placed as per design and drawing with proper cleaning hooking, binding, bending, etc. as directed it shall be binged with connected wire as per instruction of Engineer in charge.
- The M.S. T.M.T. shall be as per ISS and shall be tested before being use in Govt. approved laboratory.

- All instructions issued by concern Eng-in -charge for this work will be binding to contractor & he is suppose to obey these instructions.

MODE OF PAYMENT:

The rate shall be for a unit of one metric tonne.

Item no.6 Providing 15 mm. Thick cement plaster in single coat on rough (similar) side og single or half brick walls for interior plastering up to floor two level and finished even and smooth in

cement Mortar 1:3 (1 cement : 3 Sand)

1.0. Materials & Workmanship : 1.1. The relevant specifications of item No. 17.59 (I) shall be followed except that the thickness of item plaster shall be 15 mm. The plastering work shall be in single coat on rough side of half brick wall for interior plastering upto floor two level, finished even and smooth in C.M. 1:3.

2.0. Mode of measurements & payment: 2.1. The relevant specifications of item No. 17.59 (I) shall be followed. 2.2. The rate shall be for a unit of one sq. metre.

17.59.(I) 10 mm. thick cement plaster in single coat on fair side pf brick concrete walls for interior plastering upto floor two level and finished even and smooth in (i) C.M. 1:3.

1.0. Materials: 1.1. Water M-I. The cement mortar of proportion 1 : 3 shall conform to M-13.

2.0. Workmanship: 2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls. 2.2. Preparation of back-ground: 2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface. 2.2.2. Raking of joints in case of masonry where necessary shall -be allowed to dry out for sufficient period before carrying out the plaster work. 2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again. 2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work arc ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Applications of plaster : 2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically al not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly inplane of the finished plastered surface. The mortar shall then be applied in

uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All comers, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size requried. 23.2. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. 2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommending the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall arid nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invaiiably lead to leakage. No portion of the surface shall be left out initially to be packed up later on. 2.3.4. Each coat shall be kept damp continuously rill the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by handing mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment: 3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of (he thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering upto floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plasterijng on ceilings. Flowing soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. ml. each in area for ends of joits, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner:

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs,

soffits, sills etc. of these opening for finish to plaster around ends of joints, beams posts etc.

(b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings. (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only. (ii) When two faces of wall are plastered with different types of plasters or if one, faces is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case maybe.

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.

3.10. The rate shall be for a unit of one sq. metre. .

MODE OF PAYMENT:

The rate shall be for a unit of one square meter.

Item no.7 Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials etc. Complete.

As per specification of R & B booklet attached here with.

MODE OF PAYMENT:

The rate shall be for a unit of one square meter.

Item no.8 Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (D) In trussses and trussed purlins, upto 25 M. span and 15 M. ovarall height.

1.0. Materials & Workmanship : 1.1. The relevant specifications of item No. 11.2 (A) shall be followed except that the steel work shall be done by welding.

1.2. Welding shall generafly be done by electric process. Gas welding shall be resorted to using oxyacehylane flame with specific appro70val. Gas welding shall not be permitted for structural steel work.

1.3. The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, shop and site weldes as well as type of electrodes to be used. Symbol for welding on plans and shop drawing shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must

be done after improper welding that is likely to be done due to heights and difficult position on scaffoldings etc The welding work shall conform to I.S. 816-1969.

1.4. Preparation of surfaces : Surfaces which are to be welded together shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

1.5. Assembly for welding : Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. The temporary connection has to be strong enough to hold the plates accurately in place without displacement.

1.6 Precautions : All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968. The following points shall be borne in mind during the process of welding : (a) Welds shall be made in flat position wherever practicable. (b) Are length, voltage and smperage shall be suited to the thickness of material, type of groove and other circumstances of the work. (c) The segments of welding shall be such that where possible, the members which offer the greatest resistance to compression are welded first.

1.7. The defective welds which shall be considered harmful to the strength shall cut out and rewelded. 1.8. Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all stag has been removed welds and adjacent parts shall be painted after the same are approved.

1.9.All the members shall be thoroughly cleaned of rust, scales, dust etc. and given a priming coat of red lead paint before fixing them in position, ting of welding to be added in the specification I.N. 12.2.2.12. (i) to (viii).

2.0 Mode of measurements & payment: 2.1 The relevant specifications of item No. 11.2 (1) shall be followed. 2.2 The rate shall be for unit of one quintal.

MODE OF PAYMENT:

The rate shall be for a unit of one quintal.

Item no.9 Painting two coats (excluding priming coat) over new steel & other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface of all dirt, dust and other foreign matter.

As per specification of R & B booklet attached here with.

MODE OF PAYMENT:

The rate shall be for a unit of Sq.Mt.

Item no.10 Providing and casting in situ C.C. in grade M-15 (approx. corresp. to prop. 1:2:4) (proportions as per mix design or as per Table 9 of IS456 2000 in masses by weigh batching) using granite, quartzite trap metal of size 6 mm to 20 mm for RCC work, including scaffolding centering, form work, needle vibrated consolidation, curing comp. up to 6 meter depth or height (excluding cost of reinforcement and neat

finishing) with centering and shuttering/deshuttering etc. comp. for structure for other than water retaining. (a) Footong for Column or Foundation (with Form Work)

1.0. Materials

1. Water

1.1. Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil and injurious alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.

1.2. If required by the Engineer-in-Charge it shall be tested by comparison with distilled water Comparison shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I.S. 269-

1976. Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 per cent in strength, of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

1.3. Water for curing mortar, concrete or masonry should not be too acidic or too alkaline .

It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

1.4. Hard and bitter water shall not be used for curing

1.5. Potable water will generally found suitable for curing mortar or concrete.

2 . Cement

2.1 Cement snail be ordinary Portland slag cement as per I.S.269-1976 or Portland slag cement as per I.S. 455-1976

3. Sand

3.1 Sand shall be natural sand, clean, well graded hard strong, durable and gritty particles free from injurious amounts of dust, clay kankar nodules, soft or flaky particles shale, alkali salts organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-Charge. The sand shall not contain more contain more than 8 percent of silt as determined by field test, if necessary the sand shall be washed to make it clean.

3.2. Course Sand: The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed

3 0. The sieve analysis of coarse shall be as under.

I.S. Designation	Sieve passing sieve	Percentage by weight Designation	I.S. Sieve Percentage by weight passing Sieve
4.75 mm	100	600 micron	30 - 100
2.36 mm	90 to 100	300 micron	50 - 70
1.18 mm	70 to 100	150 micron	0 – 50

3.3. Fine Sand :

The fineness modulus shall not exceed 1.0 The sieve analysis of fine sand shall be as under.

I.S. Designation	Percentage by weight Sieve passing	I.S. Designation	Percentage by weight Sieve passing
4.75 mm	100	600 micron	40 - 85
2.36 mm	100	300 micron	5 - 50
1.18 mm	75 to 100	150 micron	0 - 10

4 Stone Grit

4.1 Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar Grit shall generally be cubical in shape and as far as possible flakey elongated pieces shall be avoided. It shall generally comply whit-the provisions of I.S. 383-1970. Unless special stone of particular quarries is mentioned grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious with cement.

5 Stone Coarse Aggregate For Nominal Mix Concrete

5.1. Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar

5.2 The aggregate shall generally be cubical in shape Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved Aggregate shall have no deleterious reaction with cement.

2.0. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to

1:3:6, 1.2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu

M.) for different proportions of mix shall be as under:

Grade of concrete	Total quantity of dry aggregate by volume per 50 kgs. of cement to be taken as the sum of	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kegs. of cement maximum

	individual volume of fine and coarse aggregates, maximum		
M-100 (1:3:6) M-150 (1:2:4) M-200 (1:1.1/2:3) M-250 (1:1:2)	300 Liters 220 Liters 100 Liters	Generally 1:2 for line aggregate to coarse aggregate by volume 160 but subject to an upper limit of 1:1.1/2 and lower limit	34 Liters 32 Liters 30 Liters 1:3 27 Liters

2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

3.0. Mixing :

3.1 For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. Kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.

3.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning

over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified

3. 3. Mixers which haw been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate Mixing plant shall be thoroughly cleaned before changing from one type of cement to another

4.0. Transporting and laying:

4.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust, show 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.

4.2. Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

4.3. Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a 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 covered with a 13 mm. thick layer of mortar composed of cement and sand in th same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all lateness shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles 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 corners and close spots.

4.4. 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 cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the even of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting stats i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

5. Curing:

Immediately after compaction, concrete weather including rain, running water, shocks, vibration, traffic, rapid temperature charges, frost and drying out process. It shall be covered with wet sacking has Sian or other similar absorbent material approved, soon after the initial set, and shall

be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

6.0. Centering:

6.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also he such that it woul allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

6.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

6.3.. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength,- adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

7.0. Stripping time:

7.1. In normal circumstances and where ordinary cement is used forms may be struck after expire of following

periods.

(a) Sides of walls columns and vertical faces of beams…24 to 48 hours.

(b) Beam soffits, (props, left under)…7 days.

(c) Removal of props slabs:

(i) Slabs spanning up to 4.5. m…7 days.

(ii) Spanning over 4.5 mm..14 days.

(d) Removal of props t beams and Arches:

(i) Spanning up to 6 mm..14 days.

(ii) Spanning over 6 m….21 days.

8.0. Mode of Measurement & Payment

8.1. The volume Occupied by reinforcement shall not be deducted from R.C.C. work.

8.2. The rate shall be for a unit of one cubic meter.

Item no.11 Providing and fixing 1.20 Metre high fencing with 2.0 Metre long M.S. Angle posts 40mm x 40 mm x6 mm and oil painting 3 coats fixed at 2.5 Mt,C/c. with five Horizontan lines and two diagonals of galvanised steel barbed wire weighting 9.38 Kg. per 100 Metre, strained and fixed to posts with G.I,staples including fixing the postsin ground with 0.5 M x 0.5.M x 0.5 M. block in C.C1:5:10 etc complete.

1.0. Materials: (1) Water shall conform to M-l. (2) Cement shall conform to M-3 (3) Sand shall conform to M -6. (4) Bricks bats aggregate shall conform to M-14. (5) Oil paint shall conform to M-44 (6) Barbed wire shall conform to M-78.

2.0. Workmanship: 2.1. The pits of the size 0.5 M. x 0.5 M. x 0.5 M. shall first be excavated, true to line and level to receive the post at 2.5 M. C/C. The relevant specifications of item 4.00.1 shall be followed for excavation work. 2.2.The pits shall be filled with a layer of 0.15 M. thick with lean concrete 1: 5 : 10 (1 cement: 5 sand: 10 graded brick bat aggregates 40 mm. nominal size). The M. S. angle 40 mm. x 40 mm. x 6 mm. shall be then placed over the concrete in true to line and plumb. The remaining portion of block shall be filled in with lean concrete 1: 5 :10 and rammed properly so as to form total 0.5 M. x 0.5 M. x 0.5 M. concrete block. The concrete shall be cured for 7 days to allow it to set. 2.3. The barbed wire shall be stretched and fixed in 5 horizontal rows and two diagonals. The bottom row shall be 140 mm. above ground and the rest at 125 mm. centre to centre. The diagonal shall be stretched between adjacent posts from top wire of one post to the bottom wire of 2nd post. The wires shall be fixed to posts by means of staples. 2.4. The M. S. Angle posts shall be painted with 3 coats of oil paint of approved tint and shade.

3.0. Mode of measurements & payment: 3.1. The work shall be measured for the finished work from centre to centre of the posts. 3.2. The rate shall include the cost of all labour and materials involved in the operations described above. 3.3. The rate shall be for a unit of one running metre.

Item no.12 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.

General: Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turfloam, clay, peat etc., fall under this category.

Clearing the site : The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed: The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.
The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

Setting out: After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume fu; responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply labourers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them a long as required and directed.

Excavation : The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for sue precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be evelled both longitudinally and transfersely as directed by removing and watering as required. No earth filling will be allowed for bringing it t o level, if by mistake or any; other reason excavation is made deeper or wider that shwon on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavationupto 1.5 m. depth shall be measured under this item.

Disposal of the excavated studd :
The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling the ground in layers including ramming and watering etc.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

Mode of Measurement and Payment:
The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

MODE OF PAYMENT:

- The rate shall be for a unit of one cubic meter.

Item no.13 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

- The work shall be carried out as per the description of the item and as per the specification laid down in PWD Hand book vol. I & II. The proportion of hand broken stone aggregates 40 mm nominal size cement and sand shall be as per item.
- The course aggregate shall be of hand broken stone aggregates 40mm nominal size . It shall be free from any foreign impurities such as dust, dirt stone powder etc.
- The sand shall be course, angular hard and free from any impurities such as dust, dirt or any other foreign materials.
- The cement shall be of approved quality Portland cement & shall be I.S.I marked.
- The ingredient shall be well mixed on watertight platform in dry condition and required quantity of potable water shall be added and mixed in thoroughly to get required workability. Rate including ramming curing consolidation etc. as per requirement.
- The work shall be kept wet during execution and whole work shall be curried for seven days after completion of work.

MODE OF PAYMENT:

- The rate shall be for a unit of one cubic meter.

Item no.14 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

1.0. Mode of measurement and payment: The relevant specifications shall be followed except that the grading of concrete shall he controlled concrete M 200 grades for the work as specified in item.

2.0. Mode of measurement and payment: 2.1.The relevant specifications of. shall be followed.

2 .2. The rate shall be for one cubic metre.

Providing and laying controlled concrete M-200 and curing complete excluding the cost of form work and reinforcement concrete work in: (A) Foundations, footings, base of columns, and mass concrete. (B) Walls from top of foundations/level upto floor two level. (C) Slabs, landing shelves, Balconies, lintels, beams, girders, and cantilever, upto floor two level, (D) Columns, pillars, posts, and struts upto floor two level (E) Staircase upto floor two level. (F) Vertical and horizontal fins upto floor two level.

1.0. Materials : 1.1. Water shall conform to M-l. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8 Coarse aggregate shall conform M-12 B.

2.0. General : 2.1 The relevant specifications of item No. 5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Cmt.

2.2 The porportion of cement, sand and coarse aggregates shall be determined by weight, the weight batch machine shall be used for maintaining proper control over the porportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under: In all cases, the 28 days compressive strength specified in above table above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes-as concrete belonging to the lower of the two grades between which its strength lies.

3.0. Workmanship : 3.1. The proportions for ingradients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and beingint hem in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2. In porportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted frombulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibarated tanks or weighed. All measuring equipments shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For determination of moisture, content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement used in concrete shall not be less than 220 Kg./M 3 in plain concrete and not less than 250 Kg/M3 in reinforced concrete.

4.0. Mode of measurement and payment: 4.1. The relevant specifications item No, 5.4.1. shall be followed except that the controller concrete R.C.C. work for work as specified in item shall be measured under this item. The rate excludes cost of form work.

4.1. The rate shall be for a unit of one cubic metre.

Item no.15 Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30 cm length, 30 cm ht and 15 cm thick of M-250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the join with C;M 1:3 (1 cement :3 Fine Sand) etc complete. (upto 10 Ton)

- The work shall be carried out as per the description of the item and as per the specification laid down in PWD Hand book vol. I & II.
- The pre-cast Rubber Dye inter locking concrete block(Paver Block) should be as per description of item in schedule - B
- The concrete block should of as per standard P.W.D. specification and of good quality
- it should be got approved by engineer –in-charge of work.
- the concrete block should be laid in 75mm sand layer & gap of concrete block should be filled with sand.
- All work should be in good finishing & in level

MODE OF PAYMENT:

- The rate shall be for a unit of one running meter.

Item no.16 Earthwork for embankment including breaking clods, dressing with all lead and lift (excluding watering and consolidation) (E) From Borrow area within 3.0 Km. lead

The land width on which the earth work is to be done shall be cleared of all trees having a girth of 30 cm and less, loose, stones, vegetation, bushes, stumps and all other objectionable materials. All the materials cleared will be the property of Government. Useful material shall be arranged in convenient stacks along the road boundary or as directed at places within all lead, and handed over to the department in convenient section. Unsuitable material shall be burnt or otherwise disposed off by the contractor at his own cost without causing any nuisance, inconvenience or damage to the works property or people in the neighborhood. In all cases, the materials shall be disposed off in a neat manner.

2. After clearing the site, the alignment of the road shall be properly set out true to line, curves, slopes grades and sections as shown on the plan or directed by the Engineer-in-charge. The contractor shall provide all labours and materials such as lime, strings, pegs, nails, bamboos, stone, mortar, concrete etc. required for setting out, establishing. Bench Marks and giving profiles. The contractor shall be responsible for maintaining the B.Ms, profiles alignments and other marks as long as they are required for the work in the opinion of the Engineer-in-charge. If the contractor defaults in this respect they may be restored by the department at the cost of the contractor.

3. When an existing embankment is to be widened, continuous. Horizontal benches, each at least 0.3 metre wide shall be cut into the existing slope for ensuring adequate bond with the fresh embankment materials to be added. The material obtained from the cutting of benches can be utilised in the widening of the embankment. Where the width of the widened portions if insufficient to permit the use of usual rollers, compaction shall be carried out with the help of tandem/sheeps foot rollers, hand rollers, mechanical tempers or other approved plant. The dumping of material from trucks for widening operations shall be avoided except in

difficult circumstances when the extra width is too narrow to permit the movement of any other type of hauling equipment.

4. The soil to be used for embankment shall be free from trees, stumps, roots, rubbish or any other objectionable materials. Only material considered suitable by the Engineer-in-charge shall be used for the construction and that considered unsuitable other disposed off as directed by him. The selection of the materials to be used in the construction of embankment shall be made after soil surveys and investigations are carried out by the Department. The embankment shall consist of earth available from roadside borrow pits on either side with lead and all lifts, and within land-width in the manner specified in para 12 below./The road, if any, required for the purpose of haulage of earth by men. animals or vehicles will be constructed (if not existing) and maintained by the contractor at his own cost, he material satisfying the density requirements given in the table below shall be employed for embankment construction.

Type of Work	**Laboratory Dry Density when tested as per IS : 2720 (Pt. VII)**
- Embankment up to 3 metre height	Not less than 1.44 gm/cc
- Embankment exceeding 3 metre height or embankment of any height subject to long period of inundation.	Not less than 1.52 gm/cc
- Top 0.5 metre of embankment below the subgrade level and shoulder [Where earth shoulder are specified]	Not less than 1.65 gm/cc

Field density shall be percentage of laboratory density as recommended by Gujarat Engineering Research Institute.

5. Department will extend all necessary co-operation in helping contractor to get borrow area from nearby Government or Panchayat land, if available. However, department is not responsible if no such area is made available to the contractor and in that case, contractor will have to make his own arrangement to get borrow area for borrowing earth of the approved quantify even by making temporary arrangement with the private land owners.

6. The embankment shall be constructed in uniform layers not exceeding 250mm in loose thickness. The soil shall be spread uniformly over the entire width of the embankment, unless otherwise directed by the Engineer-in-charge. The consolidation including watering and rolling of earthwork shall be carried out by the Department. The operation of laying the successive layer of earth shall have to be suitably synchronized with the consolidation work. If the soil as delivered to the road bed is too wet, it shall be dried by exposure to the sun till the moisture content is acceptable for compaction. All clods of hard lumps of earth shall be broken to have maximum size of 15cm.when being placed in the embankment and a maximum of size 5 cm when being placed in the top 45 cm ot the embankment. The work of next layer shall be allowed only after the first layer below it has been thoroughly compacted to the density specified.

7. Where an embankment is to be placed on sloping ground, the surface of the ground shall be benched in the steps of trenches or broken up in such a manner that the new material shall have perfect bond with the existing surface. Where the embankment is to be placed over an existing road surface, the surface shall be scarified to minimum depth of a 5 cm so as to provide ample bond between the old and new material. However when the embankment is to be placed over an old concrete pavement and lies within 1 metre of new subgrade level the pavement shall be broken up in pieces not to exceed o.1 m and may be left under the new embankment. If the existing road surface is of granular or bituminous type and lies within 1 ml.

of the new subgrade level, the same shall be scarified to a depth of minimum 50 mm. so as to provide sample bond between the old and the new material.

8. To avoid interference with the construction of abutment, wing walls or return walls of culverts/bridge structures, the contractor shall, at point to be determined by the Engineer-in-charge, suspend work on embankments forming approaches to such structures, until such time as the construction of the latter is sufficiently advanced to permit the completion of approaches without the risk of interference or damage to the bridge work. Unless directed otherwise, the filling ground culverts, bridges and other structures up to a distance of twice the height of the embankment from the back of the embankment shall be carried out independent of the work on the main embankment. The fill material shall not be placed against any abutment or wing wall unless permission has been given by the Engineer-in-charge but in any case not until the concrete or masonry has been in position for 14 days, the embankment shall be brought up simultaneously in equal layers on each side of the structure to avoid displacement and unequal pressure. The sequence of work in this regard shall be got approved from the Engineer-in-charge. Where the provision of any filter medium is specified behind the abutment, the same shall be laid in layers simultaneously with the laying of fill material. The material used for the filter shall conform to the requirements for filler medium and will be paid extra in the relevant item. Where it may be impracticable to use power rollers or other heavy equipment, the compaction shall be carried out by mechanical tempers or other methods approved by the Engineer-in-charge. Care shall be taken to see that the compaction plant does not hit or come too close to any structural member so as to cause any damage to them.

9. The embankment shall be finished in conformity with the alignment, levels, cross sections and dimension shown on the plans or as directed by Engineer-in-charge. Where the alignment of the road is in a curve, the top of the embankment shall be formed with the super elevation and the increased width shown on the drawings or as the Engineer-in-charge may direct. Finishing operations shall include the work of shaping and dressing the shoulders, road bed and the side slopes to conform the cross section.

10. The consolidation of earth work including rolling and watering at O.M.C as per laboratory requirements shall be carried out by the department. The field and laboratory investigations and testing of sample shall be carried out by the Department. However, the contractor shall give full co-operation and shall be the charges for labours and collection of samples for testing at authorised Government laboratory. The work of laying of earthwork in layers shall be synchronized with the field and laboratory testing. When density measurements reveal any soft area as in the embankment the Engineer-in-charge shall direct that these areas shall be compacted further If inspire of that, specified compaction is not achieved the materials in the soft areas shall be removed as directed and replaced by the approved materials.

11. The earthwork measurements shall be paid on cross sectional measurements and computing the volumes of earthwork in cubic metres by average area method. The contractor shall sign day to day leveling work and also original cross section, longitudinal section etc. in token of his acceptance. The working sections both longitudinal and cross of the ground shall be taken by the Engineer-in-charge before the actual work is started. The contractor or his authorised representative shall attend day to day leveling work and sign with date the field book daily, in token of his acceptance. If there is any disagreement the contractor shall inform of it in writing to the officer concerned with specific reference to the sectioned before starting further work. Once the work is started, no-cognizance of any complaint will be taken. Merely not signing of level book shall not be deemed as disagreement. The Executive Engineer shall also verify leveling work to the extent of 5% before commencement of earth work and on finalisation. The contractor shall maintain the embankment by tilling in ruts, rain cuts, depression due to shrinkage etc. to proper formation and grade till this item is finally measured and accepted by the Department. The measurements shall be taken on compacted earth work. No deduction for shrinkage shall' be made from gross measured quantity of compacted earth work. However the contractor shall have to bear loss of quantity due to all settlements as

well as other types of deformations etc. if any that might have taken place at the time of taking the final measurements of this item.

12. If usable approved materials is available within the land width of road, the same shall be permitted for use in the road embankment subject to the following conditions :-

(i) The borrow pits will be so excavated as to form a road side longitudinal gutter to drain the water interrupted by such gutter,

(ii) The width of the drain shall be restricted to 1.5 mts, only. The depth will be restricted to such grade so as to drain the water efficiently. All balance quantity of earth shall be brought from distant borrow areas only.

(iii) If there is top layer of black cotton or other objectionable soils, the same be removed and disposed off elsewhere and usable material found at the lower level will only be used in the earthen embankment, if the contractor chooses to utilize this material.

(iv) The drain should be aligned along the boundary of the land width of the road. No pit, other than this drain shall be dug within 5 metres of the toe to the final section of the road embankment,

(v) No borrow pits shall be allowed in the length in which earth obtained from cutting is specified to be used in embankments.

13. The rate of earthwork includes clearing jungles, dog belling, fixing profiles, erecting necessary pillars for stones for bench marks for leveling purpose, excavating earth from borrow areas, breaking clods, conveying and spreading earth in layers with all lead and Lift, finishing the entire embankment and incidentals necessary to complete the work to the specifications. The cutting stuff of cutting in ordinary soil, soft murrum, soft rock, hard murrum and hard rock shall be utilised in embankment construction under this item within the lead specified in that particular item. No payment shall be made under this item for the cutting stuff used in the embankment but labour for cutting will be paid as per specifications in that particular item, and only balance quantity of earthwork brought from borrow areas will be paid in this item.

MODE OF PAYMENT:

The rate shall be for a unit of one cubic meter.

GENERAL CONDITIONS:

(1) 10% of the gross bill amount shall be kept in deposit from each running bill till satisfactory testing in required work and commissioning the whole work.

(2) Labour cess shall be deducted as per prevailing rules.

(3) The Agency have to follow the rules prescribed by The Govt. for GST and to pay the GST as per the prevailing rules applicable as per guide line of Govt.

(4) GST Will be paid Extra as Per CE Letter No. Tech cell / GST / Revise /345, Dt.20/04/2022.

Royalty

As per Provision Laid down in Govt. of Gujarat Circular No. GEN-2010-595(6) MI Cell (K-1) det: 29th April 2011) and Notification of industries and mines Department Gandhinagar dated 18 june 2016 the royalty will be deducted from the bill of work.

Excess Payment Recovery Clause

The amount recoverable from the contractor by the GWSSB on any account shall be liable to be recovered from the amount payable to the contractor suppliers under this clause.

DECLARATION

I HERE BY DECLARE THAT I HAVE MADE MAY SELF THROUGHLY CONVENANTS WITH THE LOCAL CONSITIONS REGARDING THE AVAILABILITY OF ALL MATERIALS AND LABOUR ON BASED OF WHICH I HAVE QUOTED RATES FOR THIS WORK.

THE SPECIFICATIONS AND NATURE OF THIS WORK HAVE BEEN CAREFULLY STUDIED BY ME BEFORE SUBMITTING THE TENDER.

Signature of Contractor	Executive Engineer P.H. Dharoi Project Division Mahesana	Deputy Executive Engineer P.H.Dharoi Proj. Sub.Division Sidhpur