General Specification and Conditions of Contract

RAJASTHAN
India

General Specification and Conditions of Contract

Rule
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General Specification and Conditions of Contract

1. Extent of work.

- This contract provides for the manufacture, supply, delivery erection of all materials and finishing in all respects of all works required in connection with the construction of tank.

2. Limits of the Contract.

- The contract works shall be deemed to be completed when they have such successfully withstood one whole rainy season and not less than 12 months after the works enumerated under item I above are completed and handed over to the Government.

3. General Arrangement.

- The Contractor shall provide all labour and materials required for erection f bench marks and level pegs etc., in order to see out the work and shall be held responsible for its correctness and it shall be incumbent on the contractor to dismantle, remove and rebuilt at his own expenses any work not correctly set out.

4. Reinstatement of Roads, provision of temporary bridges.

- The contractor shall include in his rates for all work required to be done on the diversion of public or a private road, disturbed by the construction of the work to the entire satisfaction of the Engineer-in-Charge, the authorities concerned and the private owners.He shall also defray all

charges that may be made by the authorities concerned who may themselves construct a service road, if the one built by the contractor is not found satisfactory. The contractor shall also provide at his own cost all temporary bridges across trenches or excavations at the place considered necessary by the Engineer-in-Charge.

5. Arrangement of work.

- The contractor shall provide such pegs or plates and give such assistance in checking the setting out of the work as may be required by the Engineer-in-Charge both before and during the execution of the contract work.The contractor must work in collaboration with other contractors who may be employed from time to time execute a part of the work or supply and erect materials in conjunction with the original works.

6. Erection or checking of working.

- As each part of the collection of materials and construction of the work is completed, it will be checked over by the Engineer-in-Charge or his authorised representative. The contractor or his agent shall ascertain from the Engineer-in-Charge representative from time to time what part he wishes to check and pass over but such passing shall in no way relieve the contractor from any of his responsibilities.

7. Tests.

- During the progress of the work and after its completion the contractor shall carry out such tests as in the opinion of Engineer-in-Charge are necessary to determine that the materials supplied comply with the conditions of these specifications whether under test conditions or in ordinary use. The tests carried out shall include those tabulated in Schedule 'E'.

8. Detailed drawings.

- The detailed drawings for the works to be executed shall be supplied to the contractor at the time the work is ordered to be taken in hand. In case the contractor finds it difficult to proceed with any work for want of More details, he should apply to the Engineer-in-Charge, who will supply the necessary information. No work shall be carried out by the contractor for which full details have not been supplied to him or written instructions are not given. No excuse for delay in execution of the work will be entertained for any delay in supplying detailed drawings.

9. Date of completion.

- The date of completion shall be from the date of orders to start work as detailed under Schedule 'F'.

10. Payment of work.

- The payment for the work done shall be made in the manner set out in the general conditions and specifications hereto annexed and at the rates stated in Schedule 'G'. As regards work done in quantities, it shall be determined by the actual measurements of the work approved by the Engineer-in-Charge or his authorised representative.A supplementary Schedule 'H' (hereto annexed) must also be filled in by the contractors at the time of tendering for use as may be found applicable in regulating payment in the event of alterations in the description of the works specified and also for use in extra works and in deduction and day work when ordered and for the supply of materials if ordered as extras.The prices given for the materials enumerated in the supplementary must include the charges for the delivery at the site of the work.This supplementary schedule must not be taken as altering or interfering with the contract rates given in the Schedule 'G' annexed hereto and the prices stated in supplementary schedule must agree with the prices set forth in Schedule 'G' aforesaid.

11. Alteration to the tender.

- The contractor must tender in general with the requirements of these specifications of modifications but such alterations or modifications as may be provided must clearly set forth embody with end from part of the contract.

12. Samples.

- As the work proceeds, the contractor shall submit samples of materials required for the execution of the work for the approval of the Engineer-in-Charge. A list of such samples as are required in the first instance is given in Schedule 'D'. An work done with materials not approved before hand shall have to be dismantled and removed.

13. Octroi or royalty.

- All octroi and royalty for any plant of materials required for the work will be paid by the contractor.

14. Want of knowledge.

- The contractor must read carefully these specifications and terms of contract and in case of any obscurity must apply to the Executive Engineer for its elucidation. No excuse for want of knowledge, for non-compliance with any part of portion of these conditions and specifications or terms of contract can be considered.

15. Supply of T & P.

- The contractor shall provide himself with all tools and plants for the proper execution of the work. He shall also provide steam rollers of at least 8 tons capacity for the proper consolidation of earthwork and power pumps for boiling water out of foundations, and necessary trolly lines, wagons and other accessories necessary for works.

16. Method of tendering.

- The contractor must fill in Schedule 'G' and the supplementary Schedule 'H' item by item in several columns and must state the total of cost in words as well as in figures, Schedule "g" and the supplementary Schedule "H" must be signed a principal of the contractor or a duly accredited agent of contractor on his behalf.

17. Examination of site plans and Specifications.

- Every tenderer must make himself thoroughly conversant with the site, plans specifications requirement of work difficulties likely to arises as to the character and amount of all necessary class of labour and materials, which will be required to carry out the ultimate work and as to all circumstances and conditions that may effect the cost of works.No information derive for any ambiguity in the maps, plans, specifications, etc. will relieve the successful tender form carrying out the terms of his contract and specifications, each bidder by his bid certifies that he has examined the local conditions, has read each an every clause of the contract and agrees that if he is awarded the contract he will make no claim against the Government, based upon ignorance of locations conditions or misunderstanding of contract provisions. He must provide rates to contingencies likely to arise at the site for completion of the works.

18. Firm tenders.

- Firm prices in Rupees (Indian coin) shall be quoted.

19. Fencing and Watching.

- The contractor shall be responsible for fencing off in sufficient manner all excavation work and material so as to prevent accidents by night as well as by day. He shall also be responsible if or lighting up in proper and sufficient manner at night the portion of works which is open or under execution and he shall always maintain a sufficient number of watchmen on duty when his staff is not actually working. Whole quarry stone or excavating rock by blasting he shall take precautions to prevent labour or public men within the danger zone of a radius not less than 100ft.

20. Damages by rains or floods.

- The contractor shall so stock the materials to be used in the execution of the work and protect the work in progress and they may not be exposed to any risk of damages by rains or floods. If in any case damages occur, the contractor shall be responsible for them and shall replace the same at his own cost.

21. Water supply

- The contractor shall make his own arrangements for the supply for pure water for drinking of his staff and labourers and also for the execution of the work.

22. Measurements.

- All measurement connected with the work shall be taken geometrically or nett. The measurement of earthwork of bund shall be measured for bank section. The measurements given in Schedule 'G' or in the supplementary Schedule 'H' attached to the tender shall be held to mean the finished sizes of the respective item of the work after any dressing or cutting required has been executed.

23. Tools and plant.

- The contractor should provide himself necessary and requisite tools and plants such as trolly lines, crossings turn-tables, trapping wagons, necessary pumps an engines steam road rollers G.l. pipes etc. and on no account will the department undertake any responsibility whatsoever for the supply of the same or any other stores required for completion of work.

24. Special penalty.

- For each and every day after expiry of completion period stated in clause 9, the Government shall be at liberty to and shall deduct from the payment of contractor the sum considered necessary as liquidated damages for the loss on account of delay of each day over and above the penalties specified under the clauses of the contract agreement.Workmanship

25. Bund - (a) Main Dam.

(i)Jungle clearance: - Before construction of the bund is started the total area of land to be occupied by the base of the dam should be demarcated by fixing boundary stones or dagbelling.The area to be occupied should be cleared of all obstructions, small and big bushes grass stumps, loose stones and rubbish of all descriptions.Small and big trees should be cut down and their roots should be entirely removed. In case removal of all roots be found impossible, the roots may be burnt to a depth of not less than 3" from the surface of the ground and the hollows thus formed should be cleared and filled up with good quality of earth well rammed and watered. This should be done after the benching in completed all holes or hollows lying within this area whether existing or produced while uprooting

the stumps of trees should also be made free from the rubbish of the nature stated above are similarly treated.The rate of clearing jungle should include the cost of removing and stacking at a suitable place proposed by the Engineer-in- Charge of his representative of all the bushes, grass and shurbs etc., removed from the base of the bund and dagbelling of the central lines and both inner and outer toes of the bund. The rate for cutting trees should include the cost of taking out or bushing roots and stacking the wood at a suitable place ordered for purpose of disposal by public auction as a State property. As the earth work of the bund is to be measured by bank sections the contractor should get finally measured all earthwork done in filling pits and hollows etc. before starting the earthwork of the dam. If he fails to do so the Engineer-in-Charge will be at liberty to make payment for this earthwork according to his own knowledge and measurements and this will be considered as final.(ii)Dagbelling. - A small trench of a triangular section 9" in with on top and 6" deep will be dug to demarcate the inner and outer toes of the bund and also the excavation or bank lines of the canal after the jungle has been cleared from the base of the dam.(iii)Digging and benching base and putting the same earth on the outer slope including ramming, watering, dressing lead and lift. - After the jungle is cleared and the base of the dam levelled, block levels will be taken and a plan prepared. The contractor should see this plan and sign it to avoid disputes so that earth work quantities of bank may be correctly taken out. The surface to be occupied by the base of the bund will then be benched according to the drawing supplied or the written instructions of the Engineer-in-Charge of the work. The purpose of benching being to give a proper frictional grip to the fresh earth used in the construction of the bund. The work should be carried out under proper instructions. The soil taken out of benching will be used in the construction of the bund on its outer slopes, if so ordered by the Engineer-in-Charge.If this soil is not suitable i.e. if it contains roots of weeds etc. it should be stacked along the outer of the bund so as to form germ.Under all circumstances the contractor shall obtain written orders of the Engineer-in-Charge of the work regarding the disposal of the benching earth.The rate provided for the work includes all lead, lift, ramming, rolling, watering, dressing etc. of this item of earth work.(iv)Sand shall be removed from the bed of the nullahas directed by the Engineer-in-Charge and shall be deposited by him up to a distance of 500ft. from the excavation. The contractor shall have the benching work measured before it is covered up otherwise, the measurements taken by the Engineer-in-Charger shall be considered as final.(v)Earthwork of bund complete with lead, lift consolidation with a steam road roller with sufficient water and dressing. - (a) For the construction of embankment good hard earth should be used. Earthwork should be done in layers of not more than 6" in thickness and the slopes should be made according to the drawings or written orders of the Engineer-in-Charge. Profiles must be erected at suitable intervals, say at every 50ft. so that the bank may be property constructed according, to the designed sections. Before the excavation of the borrow pits is commenced the surface of the ground to be dug should be cleared of all vegetable roots, rubbish growth by the contractor at his own expense. The borrow pits should not be with in 100ft. from the inner toe of the bund and should be dug more than 1ft. in depth upto 1 chain in the next chain they can be dug 2ft. deep, care being taken that no porous state are uncovered on the tank side of the bund. Then the pits should be dug with the written instructions of the Officer-in-Charge of the work. All borrow pits should be arranged with certain amount of regularity having regard for the convenience of the work during executions and for the safety and appearance of the work, after its completion. Suitable size paths should be left between rows of pits for carriage of earth by donkeys and bullocks or by tramway line. In no case earth should be taken from the outside of the tank without written orders

of the Engineer-in-Charge or his authorised representative. The earth to be used in the bank should be of soil mixed with fair proportion of clay Sand or saline oil or soil containing Bajri or small size kankar will not be allowed to be used for construction of the earthen dam. The contractor should see the site for selection of soil and tender rates to cover all lead and lift etc.(b)Consolidation, ramming and dressing. - All clods should be broken in the borrow pits and should in no case be taken to the bank and broken up there. No grass roots of trees or bushes and rubbish of any kind should be carried to the bank. The earth should be laid in layers as stated above. The benched surface should be thoroughly watered before laying the first layer of earth. After good watering a layer of 6" in thickness should be put and evently spread on the watered surface and should be properly rolled with a steam road-roller of not less than 8 tons. The rolled surface will then be roughened and watered before putting the next layer of 6" of earth and rolling is to be continued till the bank is finished to the top. Earth adjacent to the masonry corewall should be well rammed with iron rammers and sufficient watered Special care will be taken of this work, Sufficient number of steam road-rollers and iron rammers as ordered by the Engineer in-Charge should be provided by the contractor at his own cost. All profiles, dagbells and other necessary items for demarcating the work should also made by the contractor at his own expense.(c)Watering. - Sufficient number of power, pumps pipe line and house pipes should be arranged by the contractors for supplying water to each and every portion of the bund where earth work is in progress. The earthwork shall be done in six inch layers. After a layer of earth has been rolled and consolidated it shall be thoroughly watered. The next layer shall be evenly laid on it and rolled and consolidated dry. This process shall go on alternately throughout the days. The thorough watering on each consolidated layer will soak down into the soil below and make it stiff like the natural ground. The watering shall also help in making a compact junction between the two layers. Some water will rise from the lower layer into the upper layer by capillary action and the water from the top layer shall soak down into the dry earth below.After the completion of a day's the area on which the earthwork has been in progress shall be divided into shell, compartments or kiaries by means of dowlies and flooded with water so that during the night the water or moisture soaks every portion of the dry earth that may be there owing to faulty watering and consolidation.(d)Ramming. - In parts of the embankment where roller cannot be worked on or cannot reach, the consolidation should be done by heavy rammers worked by the lines of men moving in uniform manner backward and forward on the surface till the layer is thoroughly consolidated. When manual labour is used for carrying the materials the work people should as much as be made to work over the rolled portion of the dam but not in single file (row).(e)Testing the construction of the dam. - At the close of each week the work constructed during it shall be tested by means of small trial pits two feet which shall be excavated throughout its depth and any change in construction or alteration of the completed work thus found to be necessary shall be carried out in accordance with the written instructions of the Engineer-in- Charge without any extra charge.(f)Junctions of earthwork. - Junctions shall be avoided as much as possible, but where unavoidable, they shall be constructed as under:-(i)Cross Section Junctions - The loose surface earth of the end slop of the old embankment shall be entirely removed and that slope be thereafter cut into series, of joggles and tongues sloping vertically up it. The excavated surface shall be well wetted and the new earthwork consolidated in intimate union with it.(ii)Longitudinal Junction - All loose surface earth shall be removed and the solid surface of the old embankment shall be cut into a series of benching of irregular width and depth which shall be wetted. The new earthwork shall be then constructed in layers sloping steeply, on the old

embankment and shall be consolidated in intimate union with it.Such junctions shall not be raised more than 10ft. in height in one season and in case of (i) they shall be broken up into vertical sections not exceeding 5ft. in height and separated by horizontal breaks of not less than 50ft. over which the subsequent work shall lay by distance of not less than 50ft.(g)The measurement of earth work will be made by the bank but under no circumstances will the contractor be allowed measurements in excess of quantities computed by sections of the completed bund irrespective of any settlement due to rains or other factors.(a)Materials - Stones to be used shall be free from cracks hard durable and not affected by weather. These shall be from the quarry or quarries approved by the Engineer-in-Charge.(b)Bajri - Bajri shall be clean, sharp and gritty to the touch. It shall be free from organic and vegetable matter. It shall not contain any mixture of clay and shall be washed free of all clay and foreign matter.Screening - The bajri shall be used in mortar for masonry plastering and pointing and it shall be screened so as to exclude all particles retained on screen of sixty four meshes to the Square Inch. For use in lime concrete the bajri may contain particles up to one quarter inch size and screens to exclude larger particles shall only be used.Glass and Water test - Bajri shall be tested for cleanliness by shaking up five cubic inches in a number of clean water and if any perceptible thickness of mud forms after ten minutes quiescence the bajri shall be rejected.(c)Kankar lime or Stone lime.(i)Description and Source. - The kankar for burning shall be of the class known as 'Bichwa' kankar having a blue-grey fracture. It shall, be broken to two inches guage and shall be free from earth and other impurities. The kankar or stone quarry shall be subject to the approval of the Engineer-in-charge of the work.(ii)Manufacture - For firing the kiln, coal, charcoal, wood or screened cinders may be used as the Engineer-in-Charge may direct in on circumstances 'uplas' (cow-dug) shall be used. In drawing the kiln care should be taken to remove as much wood as has possible. The kankar or stone after burning shall be carefully picked so as to exclude all over and under burnt pieces and shall then be ground fine and screened through a sieve having one hundred forty four meshes to the square inch, all particles which fail to pass through the sieve being rejected.(iii)Storage and delivery - When the contractor supplies the lime as part of his contract entered into for the construction of a building bridge or other structures, he shall deliver the material at the site of the work and shall store it in a weather proofs had provided by him for the purpose.(iv)Royalty and other rules. - The contractor shall be entirely responsible for the due observance of departmental, Forest, Municipal or other rules regarding trees falling, blasting, burning and other operations carried out by him and for the payment of bills for royalty and other charges. The Engineer-in-charge shall have the right to deduct from any sum due to the contractor any claims from the forest or other departments for Royalty or other charges.(v)Bad lime. - Lime which has been condemned by the Engineer-in-Charge shall be removed from the site of the work by the contractor within twenty-four hours, failing which the Engineer-in-Charge or his representative shall have the right of removing it at the contractor's cost.(vi)Tests - At the direction of the Engineer-in-charge the lime shall be tested in following manner:The lime to be tested shall be passed through a screen having one hundred fourty-four meshes to the square inch and if an appreciable quantity is retained on the screen, lime is liable to be rejected.Briquettes shall be made by adding about 20% of water to portion of the lime selected from the bulk supplied by the contractor and approved by the Engineer until a stiff paste is formed. This paste shall then be well pressed down into mould such that area of the briquette at the smallest section shall be one square inch. The moulds required shall be supplied by the Engineer. In making the briquette the mould shall rest on a sheet of glass and the upper surface of the lime in the mould shall be struck off level

with trowel and the mould shall then be laid until the lime attains its initial set in nine hours.After this period the briquettes still in the mould shall be placed in water for two days to allow it to set gradually and shall then be taken out of its mould and placed in water for 20 days. At the end of the later period it shall be taken out of water and allowed to dry in shade for twenty-four-hours after which it shall be tested. If the briquettes break with a tenstile stress of less than one hundred pounds, the lime shall be rejected. The test load shall be supplied at the rate of five hundred pounds per minute.(d)Surkhi - The surkhi shall be made from perfectly clean and fully burnt, but not over and under burnt bricks or Dhamni Miti (Loom) well burnt and shall be screened through screens having sixty four meshes to the square inch, all particles which are retained on the screen shall be rejected.Stacking - Surkhi shall be stacked at the place directed by the Engineer and shall be protected from dust and foreign matter by adequate coverings.(e)Mortar - Mortar must of such proportion of slacked lime and sand or surkhi as may be specified for each particular class of work. Usually 2 of sand to 1 of lime. The mortar shall be ground in a bullock mill.The slacked lime is to be first placed in the mill trench in an even layer and ground for 180 revolutions with sufficiency of water.Thoroughly wetted and is then to be added evenly sand the mixture ground for another 180 revolutions.The mortar must be stirred continuously during the process particularly in the angle of Ghani-Water may be added during grinding as required, care being taken not add more water then will bring the mixed materials to the consistency of stiff paste.All mortar shall be used as soon as possible after grinding. As a rule it should be used on the day on which it is ground but in no case should mortar, 48 hours previously ground is permitted to be used or remain at the site of the work.In all cases the mortar must be kept damp and not allowed to dry.The ground quick lime and surkhi after being screened shall be in specified proportion and kept together heap till required. Then before being used they the mixed well into a adding water to ensure perfect slacking. After which the sand is added in the specified proportion and the whole well mixed. The proportion generally be to 1:1. The mortar to be ground for lime mortar.Masonry Works

1. Excavation of foundations. - Foundation trenches shall be dug out of the exact width of the lowest step of the footings according to drawings. The sides shall be left plumb when the soil permits of it but where the sides of excavations shall not stand vertical planking shall be used to support the earth at the contractor's cost.

The bottom of the foundation trenches shall be perfectly level both longitudinally, and transversely. The stepping where indicated in the plans or ordered by the Engineer-in-Charge shall be squarely benched. The bottom of the trench shall be well watered and thoroughly rammed and shall be dressed perfectly level before laying any concrete in it.If per chance excavation of trenches are made unnecessarily deep the contractor shall be liable to field the extra depth with lime concrete at his own expense.All excavated earth shall be stacked neatly at a suitable place which does not cause hindrance during the work and after its completion.If any soft place in the bed of the foundation trench or trenches comes to light it shall be dug out and dealt with as ordered by the Engineer-in-Charge.The trenches when ready for receive in concrete the contractor shall report in writing to the Engineer-in-Charge, who will inspect and pass them until this inspection is made, no concrete shall be put in.Any concrete work started before the inspection of the Engineer-in charge of

the work and without obtaining his written permission shall be removed at the contractor's cost.

2. Lime Concrete: - (a) Ingredients. - The concrete shall be composed of an aggregate of broken stones mixed with lime mortar in proportion of 2:1.

(b)Aggregate: - The aggregate will be broken from hard stones and will be perfectly clean and free from earth, grass or other impurities and shall not have weathered surface in any of the stones, it must be thoroughly washed with water before being mixed with mortar.The aggregate shall be of the size that can be passed through a 1-½" ring and is refused by a 1-½" sieve.(c)Mixing: - A platform of sufficient size of stone slabs, wood or iron sheets must be provided for mixing the concrete. On this platform the ballast shall be measured in bottomless box one foot high holding not more than 25cft. for proportion 2:1. This box should be filled to 8" depth with ballest which shall be thoroughly wetted before the mortar is placed on top and spread over it up to the level of the top of the box. The box will then be removed and the materials be thoroughly mixed together by men with phavras and pick-axes. The mixing should be thoroughly carried out so as to leave no voids in the aggregate. The proportions of the mortar will be as described under kankar time.

3. Laying of lime concrete. - Lime concrete will be laid while quite fresh and should be laid in the trenches of 6" thickness each layer should be thoroughly rammed and consolidated before the next course is laid thereon. The lower course should be washed, cleaned and well watered before laying the next course. No concrete is to be laid in the work after 2 p.m. This is to be ensure its being properly consolidated before the nightfall and to prevent ramming next day after the mortar had time to set.

Concrete will not be laid of too fluid a consistency and water will not be added during consolidation. The surface must be kept wet at least for 7 days. Iron rammers weighing not less than 121b. should be used and ramming should be continued until the lime is partially set.

4. C.R: Masonry in lime mortar including lead and lift of materials and pointing of the exposed surfaces. - All stones must be hard and free from cracks. They must be well shaped in order to keep the joints as small as possible. The length of stones used in the masonry should not be less than the thickness of the course. These stones will be well washed with water before being used in masonry, Headers and stretchers not less than 1 foot long must be put into the work at frequent intervals and at least 1/5 of the stones shall be headers which should be marked with red paint. Stones shall break joints vertically at least by 3". In walls, piers though stones shall be inserted five feet apart overlapping each other by at least 6". The joints shall vary from ¼" to ½" in thickness. No course shall be thicker than the course

below it. The masonry shall be kept wet while in progress for a fortnight until the mortar is properly set. Watering in rest work should be done very carefully so that the time may not be washed off. On completion of a day's work lime edges should be made on the top of work and filled with water before leaving. The mortar used in the masonry will be kankar or stone lime. All exposed surfaces shall be lime pointed. The rate for this item includes lime pointing of the exposed surface.

Earthwork for filling jhiries including lead, watering and ramming shall be of good hard earth in 6" layers well watered and tamped thoroughly consolidated with rammers.

5. Arch masonry in lime mortar including lead and life of materials, centering of arches and pointing of the exposed surfaces. - The arch masonry shall be in lime mortar. The proportion of lime and Bajri to be as stated under kankar lime. The face of arching shall be of dressed stones S projection of the arch to be constructed shall be marked on the ground and each voussiors shown on it. The stones shall then be dressed to the proper size of each voussior and properly fitted in by means of wooden rammers. The joints between voussior must not be more than ½" in width as necessary for a fine plaster of lime mortar between the voussiors. Arch centering should be removed as soon as the key has been driven home. Care should be taken that there is sufficient backing on the haunches before the centering is removed. The contractor will not be paid any extra charges for making, fixing and removing of the centering.

6. Bed stone 6" thick under arches. - The bed stones under arches should be provided according to the size given in the drawing. The stone should be of a tough and hard quality not likely to be whether affected and should be cut square and level on the top of bottom surface.

7. Cut stones including cutting holes etc. - The cut stones should be provided according to the size given in the drawings. The stone should be of a tough and hard quality not likely to be weather affected.

8. Stone brackets. - The stones shall be of natural uniform colour free of spots. It should be provided according to the drawings.

9. Kankar consolidation. - The kankar shall be carefully hand packed so that the larger size kankar is placed at the bottom and smaller size ones over them. The finer stuff being used for top dressing during consolidation.

The spreading shall be done between templates placed at a distance apart of not more than 50". No earth or organic material shall be mixed or spread over it before, during or after consolidation.

10. Iron work. - Iron work of all descriptions should be provided according to sanctioned drawing and shall be paid for by weight calculated from standard sizes at the rate tendered by the Contractor.

11. Lime Plaster. - Before applying mortar the joints of walls should be racked at least ¾" deep, cleaned and washed with water and the work to be plastered must be kept wet for at least 2 days.

The plaster shall be applied in 2 coats and shall have an average final-thickness of one inch over stone masonry. The mortar shall be applied and thereafter brought to a smooth surface of plaster's trowel and a wooden fleat. It should then be well beaten with wooden thapies till the mortar is partly set and then roughed with trowel. Second coat or finishing coat of fine lime should be applied and smoothed with trowel, care being take that the surface is plain both horizontally and vertically in case of walls and longitudinally and transversely. In case of floors and top of walls. The comers should be in plumb and square. The finished work should be kept well till the mortar is thoroughly set, say for at least 10 days.

12. Slab roofing. - The stone slabs to be used for roofing shall be of the kind available in locality and approved by the Engineer-in-charge. If any other type of slabs are used a written approval thereof may first be obtained from the Engineer-in-charge of the work regarding their quality, strength and suitability of materials. In any case the slabs must be free from cracks, loose material or lamine and other defects. They shall very in thickness according to length but in no case should be less than one-tenth of the span.

The slabs shall be laid in the manner indicated on the detailed drawings or as directed by the Engineer-in-charge of the work. They should be placed side by side touching each other and so that in no place the space between two slabs is more than ½" on the lower or bottom side and not more than 1" on the upper. This space should be filled in with lime concrete and tops made level by a layer of lime concrete. The process is locally known as "Ralthi". The work should be kept wet for at least a week.

13. Cast-iron sluice complete with winch etc. including carting to site and fixing in position. - The cast iron sluice shall be rectangular in size with ear opening as given in the drawings supplied to the Contractor. The faces shall be of gun metal machine and finished to a water-tight fit. The spindle shall be of forged bronze steel. The sluice shall be fixed as shown in the drawings. The lifting few spindle shall work into a groove in the cast iron pipe which when operated from top, shall open or close the sluice gate without any alteration, in the position of the pipe.

14. Dry stone pitching. - Stones used for pitching must be such as not be water affected. This should be hammer dressed to insure the fixing of one against the other so not to expose the earthwork below. The minimum thickness of the pitching will be 1 foot. No stone shall be less than 30 seers in weight. All stones shall be placed perpendicular to the slop. The joints between stones should be more than 1" in width, and no stone chips should be used for filling voids. The pitching should be free from voids.

Canals

1. Jungle Clearance. - As per specification for the bund.

2. Dagbelling. - As per specification for the bund.

3. Picking surface under banks. - The ground surface to be occupied by the banks of the canals shall be cleared of all grasses, bushes small or big trees and their roots as in the case of the main bank and picked up with pick or ploughed to make it sufficiently rough to give the fresh earth of the bunk a thorough grip on the picked ground so as to avoid leakage of water and consequent breaches in the canals.

4. Earthwork of canals including lead, lift, ramming, watering and dressing. - For the construction of the canal banks good hard earth out of excavation or borrow pits shall be used as directed by the Engineer-in-charge of the work. The banks should be raised in lays, the thickness of each layer should not be more than 9". The earth should be thoroughly moistened and consolidated by ramming. All clods should be broken up in borrow pits and not taken up to the banks and broken up there. All grasses, roots of trees and bushes and rubbish of any kind shall be picked up in the pits and also at the bank.

Slopes shall be made according to the designs. Profiles shall be erected at suitable intervals say 50ft. apart to ensure correct section of the banks. An extra height of 10% shall be allowed for the settlement of the earth. If the earth to be dug out of the canal is not sufficient for information of the banks, borrow pits shall be made, which shall not be within 10ft. of the outer of the banks. All profiles, dagbelling laying out and any other necessary items of demarcating, the works shall be done at the expense of the contractor.

(i)Germ - A germ according to the design shall be allowed between the toe of the bank and the edge of the excavation but when the canal is wholly in excavation it should be omitted.(ii)Spoil Bank - The excavated material if not required for making of banks shall be thrown up as a spoil bank in one foot layer with proper slopes at a suitable distance. The top of the spoil bank shall slope slightly away from the canal bank and its top level should be kept 6" below that of the canal banks.

5. thousand bed bench marks. - Red stone slabs of the size shown in the sanctioned plans will be fixed at every thousand feet on the canal bank mark the reduced distances of the canal and its work from the site of the outlet sluice 9" lower portion of this slab will be burried in earth and the remaining 1'3" length will be nicely dressed and the number of the thousand engraved and printed black on it. The rate of this item includes the cost of carting to size, fixing engraving painting etc. for complete work.

6. Outlets - As per sanctioned drawings.

7. Water courses. - Water courses shall be constructed according to the sanctioned plans.

8. 3" X 3" Cornices or projections. - The ornamental cornice projection shall be 3" X 3" in size built of small stones projecting out of the masonry wall and should be lime plastered so as give an ornamental appearance with straight and square edges.

9. Rima gola. - Gola shall be built simultaneously with the name of the junction of the parapets and slab reefing so as to stop leakage of water at the place.

10. Guard Stones. - Guard stones shall be provided of the shape and size given in the sanctioned plans and specifications as described in the case of cut stones.

11. Wheel Guards. - Stone wheel guards of the ordered size will be fixed to safeguard the bridges from damages.

12. Lime dar. - The dar on the top of slabs shall be of superior quality of lime mortar mixed with crushed hemp and Gur during the process of manufacture. The dar shall not be less than the thickness required in the drawings.

13. Katla coverings. - Please see under slab roofing.

14. empty coaltar drums. - Pipes of required lengths shall be constructed of empty coaltar drums.

The empty coaltar drums shall be joined together by means of flat iron pieces of requisite length and with the edges riveted both inside and outside.The rate provides for complete work.

15. Morrum casing. - One feet thick morrum casing shall be provided around the coaltar drum pipes to make them safe against heavy pressure and leakage of water. The material used shall be of consistency with greater proportion of clay i.e. it shall be lightly watered and properly rammed.

16. Red Stone railing. - The red stone railing shall be as shown in the drawings. The stone used shall be hard, durable, easily dressed and such as would not be affected by weather.