GOVERNMENT OF ODISHA

DEPARTEMNT OF WATER RESOURCES

UNDER A.I.B.P SCHEME

NAME OF THE PROJECT – KANUPUR IRRIGATION PROJECT

COVER – I

TECHNICAL BID SCHEDULE

NAME OF WORK

"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP".

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CONTRACTOR SUPERINTENDING ENGINEER

CHAPTER - I

GENERAL INFORMATION

DETAILS OF WORKS

Name of the work: - **"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP"**.

CONTRACTOR SUPERINTENDING ENGINEER

General Information

1.0. SCOPE OF WORK

The work under tender pertains to **"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP"** under Joda Block in the District of Keonjhar in the State of Odisha.

The above work comprises "Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP".

1.1. LOCATION OF WORK SITE.

The site of the work **"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP"** is located in the **Joda Block** of Keonjhar District of Odisha. The work site is located on & average **269** KM away by road from Bhubaneswar and 55 km away from the District Head Quarter, Keonjhar also connected by rail with nearest Railway Station at Banspani, Joda. Nearest Air Port is Bhubaneswar.

1.2 TRANSPORTATION/ COMMUNICATION FACILITIES:

The work sites are connected with the District Head Quarter Keonjhar by N.H. 20 up to Rimuli, N.H. 520 from Rimuli to work site.

1.3 GENERAL INFORMATION

The information and data related to work and site conditions described thereafter, represent the site conditions in general. It shall be presumed that the contractor visits the site of proposed works for his satisfaction as to the nature and location of work and local conditions in general and particularly about the availability of power supply, water supply, storage and handling of materials, disposal of soil, road communication data and bore hole data, availability of labour and other related matters required for planning for execution etc., before quoting his percentage rate for the work. The department therefore will not bear any responsibility of site conditions and consequence thereof.

1.4 AVAILABLITY OF LABOUR

Labourers required for the works may be available to some extent near project area. It is preferable to engage local labourers as far as practicable and possible. However, the contractor must make his own arrangements for execution of works after proper assessment of availability and requirement of labourers and machineries & equipments.

1.5 TOWNS:

The nearest town is Keonjhar, the District Head Quarter.

1.6 AVAILABILITY OF DIESEL AND LUBRICANT.

The nearest Filling Station for POL is located at Raghualsahi, Kandara & Bileipada.

1.7 OBSERVATION OF RULES

a) The contractor shall take all precautions to ensure safety to the workers. The Department will not take any responsibility for any accident if occurred at work site or at any place relating to this work. The relevant norms of the Government must be strictly adhered to for the purpose of compensation and other benefits etc.

b) The contractor shall take action to rectify the defects, if any, required for installation of machineries and equipments, pointed out by the Departmental Engineer in a reasonable time.

1.8 HOUSING

Private houses may be available for housing in nearby villages of the work site. But, the Contractor shall make his own arrangements for housing the labourers, materials, staff and site offices at the work site.

1.9 ELECTRIC POWER SUPPLY FOR CONSTRUCTION PURPOSE

The contractor will take steps to illuminate the borrow area and portions of haul roads as may be required while carrying out the work. No compensation will be paid to the contractor due to failure of electricity to any or entire part of the work site resulting in disrupting the construction activities of the work and for the idle labour, machinery & equipments. The electric supply for the domestic purpose of the contractor and his labourers will be the responsibility of the contractor. Supplying electricity to work shops, crushers quarries etc. by the contractor is not the responsibility of the department and shall be arranged by the contractor at his own cost. The contractor has to make his own arrangement for power supply. If the department supplies electricity, the contractor may avail the facility on payment of charges fixed by the department from time to time.

1.10 MEDICAL AID

There is a community Health centre at Basudevpur which is nearer to project site and Government Hospitals are available at Jhumpura, Champua & Keonjhar. The contractor shall make at own cost for the first aid arrangements at various work sites in accordance with rules and regulations of prevailing Labour Act.

1.11 LOCAL ROADS

The Contractor may use the existing approach roads to the site of work, to the extent of availability. The contractor shall, however construct & maintain connecting roads within the working area and in his labour colony areas including drainage crossings. The contractor shall construct and maintain haul roads, and other approach roads including river and drainage crossing, traffic management during construction, diversions etc. as may be necessary for the purpose of execution of the work at his own cost.

1.12 DUMP AREAS

Materials excavated from the foundations of structures and canal excavation and in connection with other items of work shall be dumped as per the direction of Engineer-in-charge with necessary expenditure on safeguarding environment. The Contractor shall construct and maintain all roads to the working areas at his own expenses for disposal of excavated materials.

1.13 OTHER CONTRACTORS

In the matter of dumping the excavated materials, haul roads, diversions, excavations etc. the Contractor shall take into consideration the needs and requirements of other Contractors if any, working in the vicinity. There should be proper and adequate co-operation with other working Contractors, if any other contractor is working in the vicinity. The direction of the Engineer-in-Charge must be carried out on this score. Further, the contractor shall not cause disruptions,

discontentment or disturbance to the work, labourers or arrangements etc. of the other contactors working in the vicinity of the work site.

1.14 USE OF SITES

a) Construction of temporary houses shall be made by the Contractor at his own expenses on the available Government land acquired for the project, if available and permitted by the Engineer-in- Charge, for storage sheds, office, residence etc for non-commercial use on the land handed over to him. After the completion of the work, these structures should be dismantled and the site should be cleared before handing over to the Department.

1.15 FLOOD

a) In case of flash and untimely flood in the river during the working season i.e. resulting in overtopping of coffer dam and flooding of the work areas, the Contractor shall make his own arrangements at his own cost to shift the machinery, equipment, materials, labour and any departmental machinery hired by the contractor to a safe place. The work shall have to be resumed after receding of floods and necessary strengthening of Coffer dam and de-watering will be done by the contractor at his own cost. Suitable extension of time shall however be granted on such occasions for the loss of working time on the request of the contractor if, he so desires.

b) The silt, debris, sand and other materials accumulate in the working area, during flash floods or regular floods in the monsoon, shall be removed by the contractor as required for continuing the work at his own cost. If any excavated portion, which could not be filled with concrete or earth by the Contractor, is filled up during the monsoon period with earth and silt during the execution of work whatsoever the reasons may be, the contractor will have to re-excavate such portion of work at his own cost.

c) It is the entire responsibility of the contractor to make all arrangements required from time to time for the work and protect the men, machinery, materials etc deployed by him and the work under progress, the items of work for which the payment has already been made on recorded measurements, against any damage either during working season or during the flood season. The Department accepts no liability for any damage or loss caused.

CHAPTER - II

DETAIL TENDER CALL NOTICE (DTCN)

GOVERNMENT OF ODISHA
Office of the Superintending Engineer
Kanupur Rehabilitation, Camps & Building Division,
AT/PO-Basudevpur, Dist.-Keonjhar, PIN-758047.
e- PROCUREMENT NOTICE
Bid Identification No. SE, KRC & BD- 09/2026-27
Email- eekrcbdbasudevpur@gmail.com

Sl. No	Name of work	Approx. value of work. (Rs. in Lakh)	E.M.D./ Bid Security. in Rs. (To be remitted online)	Cost of Bid document in Rs. (To be remitted online)	Period of Completion	Class of Contractor	Name & address of the Division under which the work will be executed
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
01	"Extension of office building for Chief Construction Engineer, Kanupur Irrigation Project at Basudevpur,Keonjhar."	66.00	66,050.00	10,000/-	06(Six) Calendar months	"B"	Kanupur Reh. Camps & Building Division, At/PO-Basudevpur, Dist.-Keonjhar
02	"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP".	80.65	80,700.00	10,000/-	06(Six) Calendar months	"B"	Kanupur Reh. Camps & Building Division, At/PO-Basudevpur, Dist.-Keonjhar

Procurement Officer	Bid Identification No.	Availability of tender online for bidding		Date & time of opening of tender **(Technical Bid)**	Last Date of seeking clarification	Place of opening
		From	To			
1	**2**	**3**	**4**	**5**	**6**	**7**
Superintending Engineer, Kanupur Reh. C. & B. Division, Basudevpur, Dist- Keonjhar.	SE, KRC & BD- **09**/ 2026-27	**23.06.2026** From 10.00 Hours	**07.07.2026** Up to 17.00 Hours	**08.07.2026** at 11.00 Hours	**07.07.2026** Up to 11.00 Hours	O/o the Superintending Engineer Kanupur Reh. C. & B. Division, Basudevpur, Dist-Keonjhar.

Superintending Engineer
Kanupur Reh. C.& B. Division,
Basudevpur

CONTRACTOR SUPERINTENDING ENGINEER

GOVERNMENT OF ODISHA
Office of the Superintending Engineer
Kanupur Rehabilitation, Camps & Building Division,
AT/PO-Basudevpur, Dist.-Keonjhar, PIN-758047
e- PROCUREMENT NOTICE
Bid Identification No. SE, KRC & BD- 09/2026-27
Email- eekrcbdbasudevpur@gmail.com

The Superintending Engineer, Kanupur Rehabilitation, Camps & Building Division, Basudevpur on behalf of Hon'ble Governor of Odisha invites on-line percentage rate tender in **double** cover system through e-procurement for execution of the works noted below. The bid should be submitted by eligible class of contractors as mentioned below registered in **CDMS** with State Government & contractors of equivalent grade / class registered with Central Government / MES / Railway to be eventually drawn in P1 form through on-line in the Govt. website www.tendersodisha.gov.in . The bidders should have necessary portal enrolment (with own digital signature certificate). The registered bidders of outside Odisha state can also participate in this on-line tender process after necessary portal enrolment, but shall have to subsequently undergo registration with appropriate authority of the state govt. within a month of acceptance of bid. The bidders registered outside the state are required to submit an under taking in the form of an affidavit, that they are not registered under the GST act in the state of Odisha as they have not started any business in the state and they have no liabilities under the act. But the successful bidder has to produce GSTIN certificate before signing of agreement.

Sl. No	Name of work	Approx. value of work. (Rs. in Lakh)	E.M.D./ Bid Security. in Rs. (To be remitted online)	Cost of Bid document in Rs. (To be remitted online)	Period of Completion	Class of Contractor	Name & address of the Division under which the work will be executed
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
01	"Extension of office building for Chief Construction Engineer, Kanupur Irrigation Project at Basudevpur,Keonjhar."	66.00	66,050.00	10,000/-	06(Six) Calendar months	"B"	Kanupur Reh. Camps & Building Division, At/PO-Basudevpur, Dist.-Keonjhar
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Procurement Officer	Bid Identification No.	Availability of tender online for bidding		Date & time of opening of tender **(Technical Bid)**	Last Date of seeking clarification	Place of opening
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1	**2**	**3**	**4**	**5**	**6**	**7**
Superintending Engineer, Kanupur Reh. C. & B. Division, Basudevpur, Dist- Keonjhar.	SE, KRC & BD- **09**/ 2026-27	**23.06.2026** From 10.00 Hours	**07.07.2026** Up to 17.00 Hours	**08.07.2026** at 11.00 Hours	**07.07.2026** Up to 11.00 Hours	O/o the Superintending Engineer Kanupur Reh. C. & B. Division, Basudevpur, Dist-Keonjhar.

CONTRACTOR SUPERINTENDING ENGINEER

02. Bid documents consisting of qualification, information and eligibility criteria of bidders, plans, specifications and schedule of quantities along with rates of the works are available in web-site www.tendersodisha.gov.in and the set of terms and conditions of contract and other necessary documents can be seen in the web-site till **dt.07.07.2026 up to 17.00** hours i.e. **last date of availability of tender** online for bidding. The cost of "Bid documents "shall be remitted online by the bidder by using internet banking enabled account with designated banks (SBI, ICICI, HDFC Bank) or
their aggregator banks. A bidder having account in other banks can make payment using NEFT/RTGS facilities of designated banks such as SBI, ICICI, HDFC Banks.

03. The bids for the works shall remain valid for a period of **90** days from the last date of receipt of bids. If any bidder tender withdraws his bid/ tender before the period or makes any modification in the terms and condition of the bid, the EMD deposited at the time of submission of tender shall stand forfeited.

04. The percentage rate excess or less to be quoted should be up to **two** decimal points only. In case, the percentage rate in excess or less up to two or more decimal points, the 1st two decimal points will be considered without rounding up.

05. After careful observation, government has been pleased to abolish the extant provisions of threshold negative bid caps (14.99%) introduced in Appendix-IX, Clause 36 of OPWD Code Volume-II in the procurement of works undertaken by the Gov. of Odisha and its agencies to ensure the procurement process results in viable and successful manner with adoption of following incremental **Additional Performance Security (APS)** system.

06. **Additional Performance Security (APS)** shall be taken on incremental basis from the selected bidder for low bid prices in the project works as under:

I. Where the bid price is below 0% but not below 10% of the project cost put to bid:
No additional performance guarantee/security percentage is required.

II. Where the bid price is below 10% but not below 20% of the project cost put to bid:
The additional performance guarantee/security percentage shall be incremented by 0.1% for every percentage of bid prices below 10% of the project cost put to bid starting at 11% with the additional bid performance guarantee being 0.1% and this additional performance guarantee shall be applied on bid price.

III. Where the bid price is 20% or more below the project cost put to bid:
The additional performance guarantee percentage shall be incremented by 0.2% for every percentage of bid prices below 20% of the project cost put to bid in addition to 1% of the bid price and this additional performance guarantee shall be applied on bid price.

IV. The additional performance guarantee percentage shall be rounded off to the next lower percentage based on whether the decimal point of the percentage of bid price is below 0.50% or next higher percentage based on whether the decimal point of the percentage of bid price is 0.5% or more.

v. The additional performance security shall be treated as part of the performance security.

vi. Justification for abnormally low bids shall be scrutinized by the Departmental Technical Committee and recommended to the competent authority of the Administrative Department for the approval of the Additional Performance Security (APS). An abnormally low bid is one in which the Bid price, in combination with other elements of the Bid, appears so low that it raises material

CONTRACTOR SUPERINTENDING ENGINEER

concerns as to the capability of the Bidder to perform the contract at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any other requirements of the bid document., If, after evaluating the price analyses, the procuring entity determines that the Bidder has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Procuring Entity may reject the Bid/ Proposal. However, it would not be advisable to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.

The APS amount will be received in shape of N.S.C./ Post Office Savings Bank Account/ Post Office Term Deposit Account/ Kisan Vikas Patra/ Bank Guarantee in favour of the Divisional Officer from any Nationalized Scheduled Bank in India counter guaranteed by its local Branch at Bhubaneswar/ e-Bank Guarantee executed on the National e-Governance Services Limited (NeSL)/ Insurance Surety Bond Issued by an Insurance Company authorised by the Insurance Regulatory and Development Authority of India (IRDAI) Digital Document Execution Portal within seven days of issue of Letter of Acceptance (LoA) by the Divisional Officer (by e-mail) to the successful bidder otherwise the bid of the successful bidder shall be cancelled. Further, processing for Black listing shall be initiated against the bidder as per amendment to Para 3.5.5. (v) of OPWD Code, Volume-I vide Works Department Memorandum No.14459/W dated 20.09.2018 (O.M. No.07556900052021- 4559/W, Bhubaneswar, Dated the 05.04.2021).

Clarifications

a. The phrase".... **to abolish the extant provisions of threshold negative bid caps (14.99%) introduced..**....." in the first para of the Works Department OM No. 173, dated. 03.01.2026 may be read as ".... **to abolish the extant provisions of threshold negative bid caps of 15% introduced vide Works Department OM No. 12366/W, dt. 08.11.2013 and amended vide Works Department OM No. 1437 dt, 31.01.2023**."

b. If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes), either at the estimated cost put to tender or less than the estimated cost put to tender, the tender accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and Divisional Accounts Officer (DAO) will remain present.

c. If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the L1 bidder (decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para 2 of Works Department Resolution No. 27748, dated. 11.10.1977, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractors.

07. If L1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to black list the contractor. In that case, the L2 bidder if fulfills, other required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder negotiates at par with the rate quoted by L1 bidder otherwise tender will be cancelled. In case a contractor is blacklisted, it will be widely publicized and intimated to all departments of Government and also to Govt. of India agencies working in the state.

08. The scanned copies of **valid R.C (Registration certificate), valid Active GSTIN, PAN card, Affidavit regarding authenticity of bid (Annexure-A), Litigation debarring expelling of tendered (Annexure-B), No Relation Certificate (Annexure-C), Labour undertaking (Annexure-D), Affidavit (Schedule-F) and acknowledgements / receipts, paper cost etc**. should be submitted through web-site which in original should be produced in the office of the undersigned on demand for verification after opening of the tender, otherwise, the bid will be

rejected. The date and time of **opening of Technical Bid (Cover-I)** on **dt. 08.07.2026 at 11.00 hours** in the office of the Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur, Dist- Keonjhar. If the date of opening happens to be a holiday, the next official day will be the date of opening at the same time and venue.

09. Single tender received in the 1st call shall be cancelled without opening of the bid. The acceptance of the single tender received even after retendering should have prior approval of next higher authority vide O.P.W.D. Para-3.5.18 and office memorandum No.16/W dated 01.01.2015 of works Department Govt. of Odisha.

10. Only those bidders who successfully remit their Cost of Tender Paper & EMD on submission of bids would be eligible to participate in the tender / bid process. The bidders with pending or failure payment status shall not be able to submit their bid. Tender Inviting Authority, State Procurement Cell, NIC, the designated Banks shall not be held responsible for such pendency or failure.

11. Exemption of EMD to the Engineer Contractor will be allowed for a maximum of three (3) works in a financial year and the fact of awarding a work with exemption of EMD should be entered in the original registration certificate of the Engineer contractor. Engineer Contractor desirous to avail the exemption of EMD is required to submit an affidavit to the effect that he/she has not yet availed the facility for more than two works during the current financial year.

12. The Schedule Caste/ Schedule Tribe Contractors desirous to avail the facility of price preference as per Works Department are required to submit an affidavit to this effect. The bidders have to produce their original registration certificate stating the fact of caste by their registration authority and to furnish as and when required for verification of the tender failing which they will not get price preference as per Rule.

13. **The bidder shall transfer the required amount of E.M.D/ Bid security@ 1% of the amount put to the tender i.e., as mentioned in CoI no.4 in NIT and cost of bid document as mentioned in CoI. No.5 of above table by online through a process as mentioned in DTCN.**

14. Under section 12 of contract labour (Regulation and Abolition Act. 1970) the contractor who undertakes execution of work through labour, should produce valid license from licensing authority of labour department (Labour license) before commencement of the work.

15. Authority will not be held responsible for system failure, malfunction of internet or traffic jam. Bidders are advised to submit their bids well in advance within the stipulated period.

16. The bidder should mention his/her valid E-Mail Address/Phone No. in the separate sheet for communication regarding the tender. The date of time of the lottery if required will be intimated to the qualified bidders through their valid E-Mail Id./ Contact Number provided in the tender website.

17. Any addendum corrigendum /cancellation of above tender will be published in the web-site www.tendersodisha.gov.in. The system shall generate a mail to those bidders who have already uploaded their tenders and those bidders if they wish, can modify their tenders.

18. Authority reserves the right to reject any or all the tenders without assigning any reasons thereof. No tenderer can demand the cause of rejection of his offer.

Superintending Engineer,
Kanupur Reh. C. & B. Division,
Basudevpur.

DETAIL TENDER CALL NOTICE (DTCN)

1.1 Invitation.

a. The **Superintending Engineer, Kanupur Rehabilitation, Camps & Building Division, Basudevpur** on behalf of Hon'ble Governor of Odisha invites sealed on-lined tender in double cover system for percentage rate bid through website to be eventually drawn in P.W.D. form P_1 from **"B Class"** Contractors Registered with the State Govt. of Odisha or from contractors of equivalent grade / class registered with other State Govt. / Central Govt. / M.E.S. / Railways or other Govt. undertakings. All the contractors are to be registered in the State portal and must possess compatible digital signature certificate of Class-II / III for online bidding. The website for online bidding is **http://tendersodisha.gov.in**

b. The tender documents can be downloaded from the website identified as http://tendersodisha.gov.in from Dated **23.06.2026 10.00 hrs. to 07.07.2026 up to 17.00 hrs.** The bidder for participation in on line bidding will have to pay Rs.10,000/- (Rupees ten thousand) only for each set online as per Works Department Office Memorandum No.07556900012016-17254/W dt.05.12.2017. The Bid will be received through e-procurement portal from dt. **23.06.2026 10.00 hrs. to 07.07.2026 up to 17.00 hrs.** Each set of bid document contains technical bid (Cover-I) and an intelligent bill of quantity in MS Excel format (Cover-II). The cover-I bid will be opened on dt. **08.07.2026 at 11.00 hrs.** in the office of the **Superintending Engineer, Kanupur Rehabilitation, Camps & Building Division, Basudevpur** in presence of the tenderers or their authorized representatives. The bidders who participated in the online bidding can witness opening of the bid from any system logging on to the portal away from opening place. The bids can only be opened by the pre-designated officials only after the opening time mentioned in the bid. In the event of the specified date of bid opening being declared a holiday, the bid will be opened at the specified time and location, on the next working day. Date, time and place of opening of Cover-II (Financial bid) shall be intimated separately to tenderers those who will be found eligible after evaluation of Cover-I (Technical bid). The intimation letter will be sent both through their e-mail address and postal address.

c. The value of the work tendered for is **Rs. 80.65 Lakh.**

d. No tenderer will be permitted to furnish their tender in their own manuscript.

e. The system shall reject submission of any bid through portal after closure of the receipt time. For all-purpose the portal time displayed in the system shall be the time to be followed by the bidder.

f. The bidder shall submit the scanned copies of the documents in the designated locations of **'Technical Bid' (Cover-I) & 'Financial Bid' (Cover-II).** Submission of bid documents shall be effected by using DSC of appropriate class and thus shall be in encrypted form. The bidder shall only submit single copy of the document. He is required to check the documents uploaded with the requirement asked for in the bid. Only after satisfying that all the documents have been uploaded, he should activate submit button. His bids shall not be considered responsive and action as per relevant clause shall be taken if he does not provide the required documents or provided illegible document. Clarity of the document may be ensured by taking out a sample printing.The bidder can seek clarification in pre-bid conference on the date and time mentioned in Tender

1.2 EARNEST MONEY DEPOSIT. (BID SECURITY) online

The bid must be accompanied by Earnest Money Deposit online as per Works Department Office Memorandum No.07556900012016-17254/W dt.05.12.2017 @ 1% of the amount put to tender i.e. **Rs.80,700.00/-**. Non-submission of **"bid security"** and **"Cost of bid document"** within the specified period shall debar the bidder from participating in the on-line bidding system and his portal registration shall be cancelled. His name shall also be informed to the registering authority for cancellation of his registration. Cash / Cheque payment shall not be entertained. Adjustment of earnest money given with other tenders previously and submitted with other tenders shall not to be entertained.

1.3 Additional Performance Security (APS) shall be taken on incremental basis from the selected bidder for low bid prices in the project works as under:

I. Where the bid price is below 0% but not below 10% of the project cost put to bid:
No additional performance guarantee/security percentage is required.

II. Where the bid price is below 10% but not below 20% of the project cost put to bid:
The additional performance guarantee/security percentage shall be incremented by 0.1% for every percentage of bid prices below 10% of the project cost put to bid starting at 11% with the additional bid performance guarantee being 0.1% and this additional performance guarantee shall be applied on bid price.

III. Where the bid price is 20% or more below the project cost put to bid:
The additional performance guarantee percentage shall be incremented by 0.2% for every percentage of bid prices below 20% of the project cost put to bid in addition to 1% of the bid price and this additional performance guarantee shall be applied on bid price.

IV. The additional performance guarantee percentage shall be rounded off to the next lower percentage based on whether the decimal point of the percentage of bid price is below 0.50% or next higher percentage based on whether the decimal point of the percentage of bid price is 0.5% or more.

v. The additional performance security shall be treated as part of the performance security.

vi. Justification for abnormally low bids shall be scrutinized by the Departmental Technical Committee and recommended to the competent authority of the Administrative Department for the approval of the Additional Performance Security (APS). An abnormally low bid is one in which the Bid price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the contract at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any other requirements of the bid document., If, after evaluating the price analyses, the procuring entity determines that the Bidder has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Procuring Entity may reject the Bid/ Proposal. However, it would not be advisable to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.

The APS amount will be received in shape of N.S.C./ Post Office Savings Bank Account/ Post Office Term Deposit Account/ Kisan Vikas Patra/ Bank Guarantee in favour of the Divisional Officer from any Nationalized Scheduled Bank in India counter guaranteed by its local Branch at Bhubaneswar/ e-Bank Guarantee executed on the National e-Governance Services Limited (NeSL)/ Insurance Surety Bond Issued by an Insurance Company authorised by the Insurance

Regulatory and Development Authority of India (IRDAI) Digital Document Execution Portal within seven days of issue of Letter of Acceptance (LoA) by the Divisional Officer (by e-mail) to the successful bidder otherwise the bid of the successful bidder shall be cancelled. Further, processing for Black listing shall be initiated against the bidder as per amendment to Para 3.5.5. (v) of OPWD Code, Volume-I vide Works Department Memorandum No.14459/W dated 20.09.2018 (O.M. No.07556900052021- 4559/W, Bhubaneswar, Dated the 05.04.2021).

Clarifications

a. The phrase".... **to abolish the extant provisions of threshold negative bid caps (14.99%) introduced..**....." in the first para of the Works Department OM No. 173, dated. 03.01.2026 may be read as ".... **to abolish the extant provisions of threshold negative bid caps of 15% introduced vide Works Department OM No. 12366/W, dt. 08.11.2013 and amended vide Works Department OM No. 1437 dt, 31.01.2023**."

b. If more than one bid is quoted (decimal up to two numbers will be taken for all practical purposes), either at the estimated cost put to tender or less than the estimated cost put to tender, the tender accepting Authority will finalize the tender through a transparent lottery system, where all the concerned bidders/their authorized representatives, the concerned SE/EE of the concerned Division and Divisional Accounts Officer (DAO) will remain present.

c. If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the L1 bidder (decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para 2 of Works Department Resolution No. 27748, dated. 11.10.1977, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractors.

07. If L1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to black list the contractor. In that case, the L2 bidder if fulfills, other required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder negotiates at par with the rate quoted by L1 bidder otherwise tender will be cancelled. In case a contractor is blacklisted, it will be widely publicized and intimated to all departments of Government and also to Govt. of India agencies working in the state.

1.4 VERIFICATION OF CERTIFICATES:

The tenderers are also required to upload the scanned copies **valid R.C (Registration certificate), valid GSTIN, PAN card, Affidavit regarding authenticity of bid (Annexure-A), Litigation debarring expelling of tendered (Annexure-B), No Relation Certificate (Annexure-C), Labour undertaking (Annexure-D), Affidavit (Schedule-F) and acknowledgements / receipts, paper cost etc.** submitted through web-site along with tender documents failing which his tender shall not be considered. The original documents are to be produced on demand for verification within 07(seven) days from the date of opening of technical bid document before Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur for verification during office hours within the specified date.

1.5 **TIME OF COMPLETION:**

The work is to be completed within **06 (Six)** calendar months including rainy season commencing from the date of issue of order to proceed with the work.

2. OTHER INFORMATIONS FOR SUBMISSION OF BIDS THROUGH e-PROCUREMENT PORTAL

2.1 The bidders shall prepare the documents and upload the scanned typed document in **PDF** format and **BOQ in excel format** (or as specified in the portal) in appropriate place.

2.2. An intelligent BOQ in **MS Excel format** shall be made available to the bidder through e-procurement portal. The bidder shall open that particular excel sheet and fill in the percentage rate in figures at the appropriate location. The bidder is not supposed to change or modify the format of the excel sheet in any form. If the bidder does not fill percentage rate for the work, his bid will stand cancelled.

2.3. It is allowed to modify the bid through the e-procurement portal. The bidder shall have to log in the system and resubmit the documents as asked for by the system including the financial bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and latest bid only will be admitted. But the bidder should avoid modification of the bid at the last moment to avoid system failure or malfunction of the internet or traffic jam. If the bidder fails to submit his modified bids within the designated time of receipt, the bids already in the system shall be taken for evaluation.

2.4. Withdrawal of bid is also allowed in the e-procurement portal. The bidder has to click on the "withdraw" button and record the necessary justification for the same in the space provided. In addition to this, he has to write a letter addressed to officer inviting the bid and upload the scanned document from portal in respective bid. The system shall not allow any withdrawal after expire of the closure of the bid.

3. PRE-BID INSPECTION BY CONTRACTORS:

The tenderers are required to go through each clause of PWD form P-1 / F-2 carefully in addition to clause mentioned herein before tendering. In any case the tenderer shall be deemed to have carefully examined the tender documents, visited the site of work and its surroundings and satisfied himself as the form and nature of the site approach roads, haul roads, local conditions, assessed all the facilities including requirement and availability of labour and materials needed to complete execution of the work and made an inventory of such information as to the risks, contingencies and other circumstances which would influence or affect his tender before tendering. He should also satisfy himself about the sufficiency of availability of materials in quarry and borrow area. The Department will not be responsible for any misjudgment of the tender on the account for any future claims.

4. VALIDITY OF TENDER:

4.1 The tender should be uploaded bearing the correct identification number mentioned in the tender call notice. Tendering authority shall not be held responsible if the tender uploaded with incorrect Identification number.

4.2 **The tenderer must furnish the scanned copies of valid R.C (Registration certificate), valid GSTIN, PAN card, Affidavit regarding authenticity of bid (Annexure-A), Litigation debarring expelling of tendered (Annexure-B), No Relation Certificate (Annexure-C), Labour undertaking (Annexure-D), Affidavit**

(Schedule-F) and acknowledgements / receipts, paper cost etc. submitted through web-site along with tender documents failing which his tender shall not be considered. Otherwise, his / her bid shall be declared as "non-responsive" & shall be liable for rejection.

4.3 The bidders are required to submit the valid/correct copy/copies of documents.

4.4 The percentage rate quoted shall remain valid for a period of **90 (Ninety)** days from the last date prescribed for receipt of tenders.

4.5 The tender, not in the prescribed proforma and not strictly in accordance with the terms and conditions of the tender call notice, is liable for rejection.

4.6 Alternate tenders, conditional tenders and tenders containing indefinite terms will not be entertained. The tenders will be considered giving special emphasis on the capability of the tenderer and the implements and earth moving machinery at his disposal for the work.

4.7 Letters and communications etc, raising and lowering the percentage rate or dealing with any point in connection with the tender will not be considered.

4.8 (a) The contractor has to quote percentage excess or less over the estimated cost in the Price Bid. The estimated cost is excluding GST. The rates of items basing on which estimated cost has been derived are excluding GST on different components to arrive at such rates.

(b) Percentage rate quoted should be for the complete work considering the factors required to complete all the items of the work to finished shape as per the description of the schedule (Bill) of quantity and specification. The quoted rate shall include all taxes as applicable, rent, royalty, cess, general & incidental charges pertinent to the work, other charges of materials, Octroi, ferry tolls, conveyance charges, other costs on account of land and buildings including temporary building required by the tenderer for collection and storage of materials, housing of staff or other purpose for the work.

The tenderer must quote the percentage rate for the complete work to be included in contract. Tenders containing indefinite terms and conditions shall not be considered.

(c) The bidder has to quote his rates for each item including all taxes as applicable, royalties, cess, Income tax and Surcharge. GST on works contract as applicable from time to time shall be paid at the time of bills.

(d) Prevailing rate of TDS on GST as applicable under Act on the gross amount of the bill will be deducted from the contractor's bill as tax deduction at source (TDS) as per rules.

(e) **Tax Invoice by the contractor**:- While submitting the work bills, the contractor will have to submit tax invoice as per rule-46 of OGST rule, 2017.

4.9 The tenderer shall bear the cost of various incidentals sundries and contingencies or of similar category, required for the work as mentioned below.

i) Labour camps and hutments necessary to a suitable scale including contingency

and sanitary arrangements, medical aids thereon to the satisfaction of the health authorities.

ii) Water arrangements for labourers as well as for the works. No claim for carriage for water, whatsoever, will be entertained.

iii) Fees and dues levied by the Municipality or/and Water Supply Authorities shall be borne by the contractor.

iv) Suitable equipment and wearing apparatus for the labourers engaged in risky operations and medical aid to the labourers engaged for the work.

vi) Suitable fencing, barriers, signals, including parapet and electrical signal, where ever necessary at works, and approaches in order to protect the public and employees from accidents.

vii) No compensation for any damage done by rain or by similar action during execution of the works shall be paid.

viii) The tenderer shall write the percentage rate of the whole work in figures only in appropriate column.

ix) Rent, royalties and other charges of materials, octroi, cess, entry tax, ferry tolls & including all taxes as applicable, conveyance charges, and other cost on account of land and buildings including temporary building and temporary electric connection to work site as well as construction of coffer dam, construction of service road, diversion road and its maintenance till completion of work required by the tenderer for collection of materials, storage housing of staff other purpose of the work.

4.10 The tender is to be decided as per prevailing Codal provisions taking into consideration in accordance with the stipulation made in the bid document along with the capacity of the tenderer and equipments available with him for the work. The authority reserves the right to reject any or all tenders without assigning any reason thereof.

4.11 All the tenderers are required to submit, along with their tenders declaration about the names of their relatives employed in Water Resources Department in the prescribed format appended in Annexure-"C". In case, they have no relative in Water Resources Department a certificate along with tender to the effect that he is not related to any officer in the rank of Assistant Engineer & above in the department of Water Resources. If the fact subsequently proved to be false, the contract will be rescinded, the earnest money & the total security will be forfeited & he shall be liable to make good to the loss or damages resulting in due to such cancellation.

4.12 No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering department of the State Government is allowed to work as a contractor for a period of two years after his retirement from Government service, without Government permission.

4.13 Cover-I containing "**Technical Bid**" will be evaluated first and the competent authority will approve a list of qualified bidders based on qualifying criteria fixed by

the Department. The date of opening of Cover-II containing "**Financial bid**" of the qualified bidders will be intimated later on.

4.14 An affidavit shall be furnished by the bidder at the time of submission of tender paper about the authentication of tender documents including bid security. The scanned copy of the affidavit is to be uploaded through the e-procurement portal along with the technical bid. The affidavit in original is to be produced before the officer inviting tender within 07(seven) days from the date of opening of the technical bid.

4.15 The percentage rate to be quoted by the contractor for the work should be consistent and rational. Tenders with in-consistent percentage rate and / or speculative percentage rate shall be liable for rejection.

4.16 The tender containing extraneous conditions not covered by the tender notice are liable for rejection and quotations should be strictly in accordance with the tender call notice. Any change in the wording will not be accepted.

4.17 Payment for RA bill shall be made in level section measurement and no string section measurement will be considered.

4.18 TENDERER'S CERTIFICATE

The tenderer will furnish his tender with a certificate that he has gone through all documents, including plans, drawings etc. of this tender schedule and clauses of P1 agreement in vogue and that he has visited the works spot and satisfied himself with the local conditions, sufficiency of availability of labourers and materials visited the quarries, assessed the availability of materials, water etc. camp facilities and quoted his percentage rate for the work as whole considering the finished items in the work, to cover all contractual obligations and contingencies arising thereof.

5. AWARD OF CONTRACT

5.1 The tenderer whose tender is selected for acceptance shall within a period of **Seven** days upon written intimation being sent to him by e-mail/ Regd. Post for acceptance of his tender, deposit the initial security deposit (including E.M.D.) @ 2% (two percent) of the accepted tendered amount in the form of NSC, Post office time deposit account, Post office Saving Bank Account /Kisan Vikas Patra/ Bank Guarantee in favour of **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** from any nationalized scheduled bank in India counter guaranteed by its local branch at Bhubaneswar/ e-Bank Guarantee executed on the National e-Governance service Limited (NeSL) Digital Document Execution Portal /Insurance Surety Bond Issued by an Insurance Company authorised by the Insurance Regulatory and Development Authority of India (IRDAI) Digital Document Execution Portal towards E.M.D. / initial security deposit. This initial security deposit together with the E.M.D. and the amount withheld according to the provision of P_1 agreement shall be retained as security deposit for fulfillment of this contract. Failure to enter into the required agreement and to pay the aforementioned security deposit within the specified period shall entail forfeiture

of the earnest money. No tender shall be finally accepted until the required amount of security money is deposited. The written agreement to be executed between the contractor and Government shall be the foundation of the rights of both the parties & the contract shall be deemed incomplete until the agreement has been signed first by the contractor and then the Superintending Engineer. The department will accept the initial security deposit in the accepted form prescribed in above.

5.2. The work may be distributed among the several contractors on splitting if considered necessary due to exigency of the circumstances and the contractor will not be entitled to any profit/ compensation on this account.

5.3. In case of delay in acquisition of land no compensation will be admissible but extension of time will be granted, if applied by the contractor in prescribed form within due time to keep the contract in force.

5.4. The earnest money will be retained in case of the successful tenderer and will be dealt with as per the terms and conditions of O.P.W.D. code. The earnest money of the unsuccessful tenderer except the three lowest tenderers shall be refunded on application after the financial bid is opened and comparative statement prepared. The EMD given by the other two parties except one whose tender is accepted shall also be refunded within 15 days of acceptance of tender and drawal of agreement.

5.5. Super / Special Class contractors shall employ under him one Graduate Engineer and two Diploma holders belonging to the State of Orissa. Likewise, and 'A' Class contractor shall employ under him one Graduate Engineer or two Diploma holders belonging to state of Orissa. The employment of such graduate Engineer and Diploma holders under the Contractor shall be full time and continuous and they shall not be superannuated, retired, dismissed or removed personnel from any State Government/Central Government Service / Public Sector Undertakings /Private companies and firm or be ineligible for appointment to Govt. service. The contractor shall pay them monthly emoluments, which shall not be less than the emoluments of the personnel of equivalent qualification employed under the State Govt. of Orissa. The Chief Engineer, Roads, Odisha may however assist the contractor with names of such unemployed Graduate Engineers and Diploma holders, if the contractor seeks for such help.

The name of such Engineering personnel appointed by the contractor who will supervise the works shall be intimated to the tender receiving authority along with each tender. Each bill of the contractor shall be accompanied by an employment roll of engineering personnel together with certificate of the Graduate Engineer or Diploma holder employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

5.6. No part of the contract shall be sublet without written permission of the Engineer-in-charge or any transfer shall not be made by power of attorney authorizing others to receive payment on behalf of the contractor.

5.7 No tenderer is permitted to furnish their tender in his own manuscript paper. The tender must be furnished in the manuscript used in the Bid documents.

5.8(i) All intending tenderers are required to submit the information in the forms and Annexures appended in Chapter-III for information and instruction to tenderers (IIT). In this context, they will have to submit the necessary supporting (authentic) documents as per conditions laid down in DTCN and IIT failing which their technical bid shall be considered as "non-responsive" and be liable for rejection.

5.8(ii) For the purpose of estimate, the approved quarry lead is to be provided judiciously. Engineers in charge would be responsible for ensuring the quality of the materials supplied. The contractors would however be responsible for procurement of materials from authorized sources and voluntarily disclose the source of procurement for the purpose of billing. Besides the bidder would be required to submit the details of quarry for procurement while submitting the bids.

5.8(iii) If the L-1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to blacklist the contractor. In that case, the L-2 bidder, if fulfils, other required criteria would be called for drawing agreement for execution of work subject to the condition that L-2 bidder negotiates at par with the rate quoted by the L-1 bidder otherwise the tender will be cancelled. In case a contractor is black listed, it will be widely publicised and intimated to all departments of Government and also to Govt. of India agencies working in the state.

5.8(iv) For availing incentive clause in any project which is completed before the stipulated date of completion, subject to other stipulations it is mandatory on the part of the concerned Superintending Engineer to report the actual date of completion of the project as soon as possible through FAX or e-mail so that the report is received within 7 (seven) days of such completion by the concerned Superintending Engineer, Chief Engineer & the Administrative Department.

The Incentive for timely completion should be on a graduated scale of 1 (one) percent to 5 (five) percent of the contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale.

Before 30% of contract period	=	5% of Contract Value
Before 20 to 30% of contract period	=	4% of Contract Value
Before 10 to 20% of contract period	=	3% of Contract Value
Before 5 to 10% of contract period	=	2% of Contract Value
Before 5% of contract period	=	1% of Contract Value

5.8(v) In case of tender accepted below schedule of rate, the tender amount excluding centages shall be treated as sanctioned amount and allotment will be limited to that extent. any deviation in scope of work affecting the agreement amount in such an agreement will be governed by the relevant provisions of OPWD Code.

5.8(vi) For works above values Rs 5.00 lakh in civil works and work value above Rs 1.00 lakh in electrical/ PH works the J.E.s & A.E.s will be required to submit bill for each ongoing work on 20th or next working day of every month to the concerned E.E. The E.E on receipt of the bill will take steps for payment of the same by 30th or the next

working day during the month. The E.E. in charge of the Division will furnish a certificate to the Chief Engineer with copy to the concerned SE that the bills for all ongoing months have been paid failing action will be initiated against the erring officer."

5.8(vii) Before acceptance of tender, the successful bidder will be required to submit a work programme and milestone basing on the financial achievement so as to complete the work within the stipulated time and in case of failure on the part of the agency to achieve the milestone liquidated damage will be imposed.

5.8(viii) The single tender received in the first call shall be cancelled without opening of the bid. The acceptance of a single tender received, even after retendering should have prior approval of the next higher authority.

5.8(ix) When in response to a notice calling for tenders, only a single tender is received in the first time, the tender shall be cancelled without opening of the bid and fresh tender be invited publicly. If single tender is received, even after retendering, then the approval of the next higher authority should be obtained, if the tender is otherwise in order and acceptable.

5.9 Before releasing the work order after finalization of the tender, it should be ensured that the contractors shall have Provident Fund Code Number, if applicable and the contractor shall also ensure compliance of the EPF & MP Act, 1952 by the sub-contractors, if any engaged by the contractor for the said work." (This is as per Lr. No.1909 (41)/LESI dated 04.03.2017 of Labour and ESI Department, Government of Odisha.)

5.10 Online receipt of Tender Paper Cost through e-procurement Portal as per Works Department Office Memorandum No.07556900012016-17254/W dt.05.12.2017 communicated vide their Lr. No.07679600032015-17276/W dt.06.12.2017.

6. OBSERVATIONS OF LAWS AND LOCAL REGULATIONS ACCIDENTS AND SAFETY MEASURES:

6.1 The Contractor shall observe all State and Local rules and regulations so far as they are relevant in controlling the operations involved carrying out the work and indemnify the Govt. and employees of the Govt. against all suites, losses, demands, actions, judgments and cost of every kind resulting in due to the commissions and omissions of the contract and his employees in violation of the said rules and regulations.

6.2 Payment of the compensation under workmen's compensation act VI of 1923 to the workmen awarded by any competent court of law is the responsible of the contractor. If the contractor fails to pay the compensation to the concerned work man violating the order of the competent Court, the same will be recovered from the dues of the contractor and will be paid to the workmen.

6.3 The contractor shall have to be abided by the Labour Laws and Rules in vogue and shall provide at his own cost housing, water supply, sanitation, medical aid and other facilities to the labourers engaged in the work as required under Labour Laws and

Regulations. The Contractor shall not employ labourer of minor age group. Any violation to the labour laws in vogue shall not absolve the contractor from penal action.

6.4 The contractor shall have to be abided by the safety code introduced by the Govt. of India, Ministry of works. Housing and supply in their standing order No.44 to 50 dated 25.11.57 violation of which shall drag the contractor to the orbit of penal action.

6.5 Blasting where required shall be taken up only when proper precaution have been taken for the protection of lives and property in accordance with I.S. 4081 – 1967 safety code for blasting and related drilling operations. Only persons having license for the purpose and well conversant with the working methods and precaution measures is to be deployed in using explosives and carrying out the blasting operation. To avoid the danger of injury from flaying debris, all personnel in a blasting area shall retreat to an adequate cover. While carrying out excavation, adequate precautions in accordance with I.S. 3764 – 1966, Safety code for excavation works shall be taken for the safety of workers. The contractor shall have to be abided by the rules & regulations on this score.

6.6 In case of any damage to Govt. or public property or to the property owned to any persons, firms or bodies due to negligence or any such action of the contractor resulting in damage or stoppage of work thereby, the contractor shall be liable to be penalized to the extent of the assessed value of the damage or the out turn lost. The certificate of the Engineer-in- Charge is conclusive and binding on this score.

7. CHANGE OF ADDRESS OF CONTRACTOR:

The Contractor shall inform the Engineer-in- Charge and the Department regarding change of his postal address from time to time which he has given in the tender paper and authorize any person with due intimation to the Engineer-in-charge and the Department to receive instruction or communication from the Department on his behalf if he desires , failing which the said undelivered instructions and communications published in notice board of the Engineer-in-charge shall be treated as intimation to the Contractor which is conclusive and binding on him.

8. ARCHAEOLOGICAL FINDINGS

The contractor shall deliver to the Engineer-in-charge all articles of archaeological importance as and when those are found in course of execution.

9. CONTEMPORARY CONTRACTORS

The contractor shall take into consideration the needs and requirements of the other contractors if any, working in the vicinity during the tenure of his contact and shall neither take nor cause to be taken any steps or actions that may cause disruption disturbance to their work, labour or arrangements etc. Any action by the contractor that the Engineer-in-charge in his unquestioned direction may consider as infringement of the above would be considered as a breach of contract and he may take such action against the contractor as deemed fit.

10. TAXES:

a. The percentage rate quoted by the Contractor shall be deemed to have been excluding of GST (OGST & CGST) as applicable and inclusive of other taxes e.g. income tax, labour cess and royalties of all materials that the contractor will have to purchase for performance of this contract.

b. GST on works contract shall be paid extra as applicable. GST as applicable shall be paid over the bill amount at the time of payment of bill.

c. INCOME TAX:

Income Tax will be deducted from the gross amount of each bill as applicable for Individual Contractor/ Firms (Provisional or as advised by Income tax Department from time to time.

d. ROYALTY OF MATERIALS

The Orissa Minor Mineral Concession Rules 2016 has been published in the Orissa Gazette on dt.14.12.2016 revising the percentage rate of royalty of all minor minerals with effect from **15.12.2016**. Accordingly, royalty of materials and borrow earth used in the work site will be deducted from the bill of the contractor at the prevailing rate.

In case of amendment(s) to the existing provision(s) is made during the tenure of contract, the same will be applicable to the contract.

g. CESS:

1% (One Percent) of gross amount of each running bill will be recovered towards Cess under the Building & Other Construction Workers (Regulation and Employment and Conditions of Service) Act,1996, as enforced vide Government of Odisha, Labour & Employment Department Resolution No. LL-I-(iii)-25/07- 12653, dated. 15.12. 2008.

11. INTEREST:

Under no circumstances interest is payable for dues of the Contractor, if any, lying unpaid or payable for the work for any reason.

12. PLANS AND DRAWINGS:

The work has to be carried out in accordance with the Odisha Detailed Standard Specification and relevant I.S. Specification pertaining to the tendered items of work and specifications and special conditions appended hereto. Drawings will be supplied to the contractor to execute the work, in general, conformity therewith. These drawings will be supplemented by such additional, general and details drawings or directions as may be considered necessary or desirable as the work progress. No claim will be entertained due to change of drawings. Where details shown on those drawings differ from the requirement of the specifications, the requirement of the specifications shall govern and the contractor shall not work without proper drawings, direction and instructions. He shall check all drawings carefully and bring to the notice of the Engineer-in-charge any error and omissions and discovered, where upon the Engineer-in-charge shall prepare revised additional drawings and specifications as may be required. All such additional general and

detailed drawings will be binding on the Contractor under the same terms and conditions as provided in clauses of P_1 agreement. The decision of the Engineer-in-charge with regards to specification is final, for which no compensation or claim will be entertained.

13. CONSTRUCTION PROGRAMME:

A. Construction programme proposed and submitted by the contractor prior to issue of work order may be approved by the Engineer-in-charge. The contractor shall arrange for additional shifts whenever necessary to suit the revised construction programme. No extra payment on this account is admissible.

B. The contractor shall sign as a token of final acceptance of the plans, sections and agreements for the work prior to take up the work for execution.

C. The date of commencement of work shall be as notified in work order.

D. On signing the agreement the site will be handed over to the contractor for execution and completion of works in all respect.

E. The contractor has to make adequate lighting arrangements for night works wherever necessary in fulfillment of the construction programme at his own cost and no extra payment on this account is admissible.

14. AVAILABILITY OF LABOUR:

Labourer required for the work may not be available to the full extent in the locality. The contractor may have to import labourer from outside. He shall arrange and regulate the labour strength according to necessity. The Department shall not entertain the claim for any idle labour. The contractor's percentage rate in the tender is deemed to have adequate coverage because of import and employment of required labourers and providing facilities and amenities to them. No extension of time shall be allowed to the contractor for non-availability of labourer.

15. SUSPENSION OF WORK:

The Engineer-in-charge may from time to time by written orders without in any way deviating the contract, direct the contractor to suspend the work or any part thereof at such time and the contractor shall not after receiving such written order proceed with the work or items thereof ordered to be suspended until he shall have received a written notice from the Engineer-in-charge to proceed with the work again.

Should the work be ordered to be suspended directly in the interest of safety of the work due to acts of God or major war or indirectly as a result of the contractor not complying with any of the provisions of the contract in respect of the quality of the materials, workmanship programmed of execution, he shall not be entitled to claim any compensation for any loss he may be put to directly or indirectly for such suspension of work.

During the period of suspension of the work, the contractor shall properly protect and secure the works as necessary in the opinion of the Engineer-in-charge. No compensation shall be paid to the contractor for suspension of work on any ground and protection of executed work as directed by the Engineer-In-Charge.

16. ITEMS NOT COVERED IN THE BOQ.

The items of work not covered in the BOQ of the agreement shall be paid in the current schedule of rate of the State and those not covered by the said schedule of rate, will be

paid on actual analysis on actual observation approved by competent authority prevailing during the execution of w**ork**.

17. FORCE MAJEURE:

The contractor shall take all precautions to protect the work from damages due to any cause except major natural calamity and make good to such damage, if any, at his own cost during the period of execution and till the work is taken over by the Department. No compensation will be paid to the contractor because of idle labourers and machineries due to above reason.

18. TOOLS AND PLANT:

The contractor should arrange necessary tools, plant and machineries for the efficient execution of work at his own cost and the percentage rate quoted should be inclusive of such charges. The department may lend on hire some machinery for use in the work subject to availability on terms and conditions as shall be specified by the Department from time to time and after execution of necessary agreement. But, on the plea of non supply of machineries by the Department, the works should not be delayed nor any compensation on such account is tenable nor will the contractor be eligible for any time extension on that score. No compensation shall be paid to the contractor for idle charges of machineries deployed in the work as it is the responsibility of the contractor to deploy the machineries and plants at work at his own risk and responsibility as per requirement.

19. HAUL ROADS:

All haul roads to Borrow areas and quarries will be constructed and maintained by the contractor at his own cost. The roads so constructed shall be allowed to be used free of cost by agencies working in other reaches of the canal including Govt. Department unless other wise restricted by the Engineer-in-charge.

20. DEPARTMENTAL SUPPLY OF MATERIALS.

In principle, no materials shall be supplied to the contractor as per the current policy of Govt. of Odisha, Vide G.O.No.48443/F dt.11.12.95 come in to force from 01.04.96. The contractor shall be responsible for procurement of all materials at his own cost and shall get it tested and approved as per relevant clauses of contract before use .However; stone received from excavation of canal will be issued to the agency for use in work as per requirement.

21. CONSTRUCTION SHEDS:

21.1 Temporary structures may be erected by the contractor at his expenses for storage sheds, office, residence, labour hutments etc. All preliminary works such as vats, mixing platforms etc are to be done by the contractor at his own cost.

On completion of the work these structures should be dismantled and the site to be cleared. The percentage rate to be quoted should be for the work as a whole considering finished items of works inclusive of such incidental items of works.

21.2. In the event of delay in supply of detailed structural designs for unavoidable reasons, reasonable extension of time will be granted on the request of the

contractor. But no claim for monetary compensation will be entertained under any circumstances for this reason.

21.3. Any slip debris and other foreign materials deposited on the working region on account of rains, flood or any other cause prior to and during the course of execution and till the work is completely taken over the department have to be cleared by the contractor at his cost. The percentage rate quoted by the contractor shall be inclusive of all such contingencies. If any excavated portion that could not be filled with concrete by the contractor gets filled up during the monsoon period with earth/ silt, no payment shall be made to the contractor for such removal again. The contractor will have to excavate and remove the same at his own cost.

21.4. The contractor shall not interfere with the execution of water supply or electrical arrangements or any other works entrusted to any other agency by the Department during execution of work.

21.5. It shall be the responsibility of the contractor to make such arrangements as may be required from time to time to protect men, machinery and the works against damage due to flood or any other natural calamity and the department shall not be responsible whatsoever for damage or loss on the context.

22. SITE CLEARANCE:

The entire work site or a portion thereof, as may be considered necessary for the purpose of alignment and demarcation, shall be cleared by the contractor at his own cost. The Department shall suitably demarcate the limits of the structure within which work will be carried out within the scope of the contract.

The contractor has to supply necessary labour at his own cost for fixing benchmark pillars/alignment pillars / alignment and pegs and for layout, leveling and profiling and maintaining the same until completion of the work. The contractor at his own cost will supply cement concrete pillars required for lay out. The layout and Benchmark pillars already laid out by the Department is to indicate this alignment of Canal in the field. The contractor while taking up excavation works will preserve original pillars.

The contractor should keep him in touch with the Engineer-in-charge for smooth execution of work and arrange adequate labour depending upon the workload and working space available. No claim whatsoever for detention / idle of labour and machineries will be entertained.

23. OTHER CONTRACTORS:

Contractor's operations shall be planned to prevent water flowing from his work or finding way in to the neighboring reaches. In the event of flowing water into the neighboring reaches, the respective contractor shall be liable to pay compensation towards the expenditure incurred and loss or damage sustained by the concerned contractor(s) because of the said reasons unless they otherwise mutually settle the issue amongst themselves. If any dispute arises among the contractors on the account of such compensation, the decision of the Engineer-in-charge shall be final, conclusive and binding on the concerned contractor.

24. ORDER BOOK:

An order book with pages serially numbered issued by the Superintending Engineer shall be maintained by the Sectional Officer systematically till completion of the work and there after surrendered it to the Engineer-in-charge for record. The order book shall be available at the site during working hours for recording instructions relating to the work.

Order regarding the work as and when necessary, shall be entered in this book by the Superintending Engineer or his superiors with their dated signature in exercising the statutory power vested with them which shall be duly noted by the contractor or his authorized agent with his dated signature. The authorized field functionaries, in charge of work shall also record their observations as to defective work and such orders / observation entered in the order book, and noted by the contractor or his authorized representative shall be considered to have been duly given to the contractor. Similarly, orders entered by the Superintending Engineer and Chief Engineer shall be deemed to have been duly issued by the Engineer - in - charge of the work.

25. CLAIM BOOK:

A claim book of pages serially numbered shall be issued by the Superintending Engineer to the contractor who shall maintain it systematically and securely, and shall record in it such items as are not covered in the contract and or involves extra claim, shall be entered in this book under the dated signature of the contractor or his duly authorized agent at the end of each month.

A certificate should be furnished by the contractor along with claims. He is to certify to the effect that beyond the claims entered in the book, he has no other claims up-to-date. If in any month, there is no claim, a recorded certificate to that effect should be furnished by the contractor in the claim book. Each claim must be definite with the claimed quantity and amount as far as practicable and accurate. The claim book must be submitted regularly by the contractor to the Engineer-in-charge by the 10th day of each month for his orders. Claims not made in this manner are liable to be summarily rejected. The claim book shall be finally surrendered by the contractor to the Engineer-in-charge for record after completion of the work and before settlement of the final claim.

26. RULE TO VERBAL ORDER:

It is the contractor's responsibility to get the verbal order, instructions or directions if any given for the interest of work by the competent authorities of the Department, confirmed in writing within a week without which no cognizance will be taken of such verbal orders, instructions or directions for settlement of any claim arising thereof.

27. STATUTORY OBLIGATIONS OF THE CONTRACTOR:

27.1. The contractor shall have to arrange water required for the work at his own cost.

27.2. The contractor shall have to construct and maintain coffer dam as required for the work during execution at his own cost.

27.3. Bailing out water from foundation of structures and construction of cross bund, dewatering wherever necessary during execution of the work shall have to be done by the contractor at his own cost and no extra payment will be made on that account. The term dewatering shall mean the execution or operation of the items due to

standing water as well as due to percolated water. The percentage rate of respective items of work is in inclusive of dewatering.

27.4. Gangway, scaffolding or any such arrangements required for the work are to be provided by the contractor at his own cost as per direction of the Engineer-in-charge. The Department shall have the right to inspect such arrangement made for the work and reject it partly or fully, if found defective in opinion of the Engineer-In-Charge.

27.5 Department shall not pay compensation to the contractor for the damage occurred to the materials and work entrusted to him due to natural calamities the contractual or extended period of the contract. If any damage caused due to natural calamity, the contractor shall make good the loss and damage at his own cost.

28. DEPARTMENT'S RIGHT FOR DEVIATION IN QUANTITIES:

28.1 The Engineer-in- Charge reserves **r**ight to make any increase or decrease in quantity or item of work mentioned in the schedule of quantities attached to the tender notice as may be considered necessary in his opinion for satisfactory completion of the work and such increase or decrease shall in no way invalidate / vitiate the agreed percentage rate as per the Agreement. The contractor shall not be entitled for any compensation on this account except grant of extension of time where considered necessary. The decision of the Engineer-in- Charge is final and conclusive.

28.2 **N**o claim will be entertained regarding the extra items of work or extra quantity of any item besides estimated amount, unless written order is obtained from the Engineer-in-charge and percentage rate settled before execution of the extra items of work or extra quantity of any item of work.

29. EMERGENCY MEASURE:

The work may be distributed to other contractors on splitting if considered necessary under compelling circumstances due to exigency and the contractor will not be entitled to any compensation to this account.

30. SAFETY OF MACHINERIES:

Unusual flood may occur during the working season. In the event of overtopping or breach in the cofferdam / embankment due to such flood in the working season resulting in flooding of the working area or outside the working area, the contractor shall make his own arrangement to shift the machineries and equipments, materials etc. to a safe place at his own cost. Any damage or loss for such occurrence shall be the responsibility of the contractor and no compensation on this score is permissible.

The work shall be resumed after the floods. Necessary reconstruction of the cofferdam / embankment clearing the working area of debris and silt shall have to be done by the contractor at his own cost. Suitable extension of time may however be granted in such eventualities at the request of the contractor, but no compensation whatsoever shall be paid in this regard.

31. CONTRACTOR DYING, BECOMING INSOLVENT, INSANE OR IMPRISONED:

(a) In the event of the death, insanity, insolvency and imprisonment of the contractor or the contractor being a partnership or firm becomes dissolved or being a corporation goes into the liquidation, the contract may be terminated by notice in writing posted at the site of work and advertised in one issue of the local newspaper and all acceptable works shall be paid for after recovering all the dues payable to Govt. there from at appropriate percentage rate to the person or persons entitled to receive and given dishonor-age for the payment.

(b) If the contractor becomes bankrupt or has a receiving order made against him or compound with his creditor or being a Corporation commence to be would up not being a voluntary winding up for the purpose only an amalgamation or reconstruction or carry on its business under a receiver for the benefit of the creditors of any of them, the Department shall be at liberty.

i) To give such liquidator receiver, or other person the option of carrying out the contract subject to his providing a guarantee for the due, faithful performance of the contract up to an amount to be determined by the Department.
ii) To terminate the contract forthwith by notice in writing to the contractor or to the liquidator or receiver or to any person in whom the contract may become vested and to act in the manner as per prevalent clauses of P_1/F_2 contract.

32. REMOVAL OF CONTRACTOR'S MEN:

The contractor shall on the written direction of the Superintending Engineer immediately remove from the works any person employed thereon, who may, in the opinion of the Engineer-in-charge, be incompetent or has misconduct himself. Such person shall not be employed again on the works without the written permission of the Engineer-in-charge.

33. DETAILS TENDER CALL NOTICE BEING PART OF CONTRACT:

The detail Tender Call Notice and all the Annexures thereto will form the part of the agreement when the work will be awarded to the contractor. All the correspondences made with the contractor and all his correspondences with the department after the tender is received will also be attached with the agreement.

34. FAIR WAGES CLAUSE:

34.1 The contractor should abide the fair wage clause introduced by the Govt. and shall not pay less than the fair wages fixed by the Govt. to the labourers engaged by him in the work.

34.2 In case of any complaint by the labourer about the nonpayment of his wages as per latest minimum wages Act., the Superintending Engineer will have the right to investigate and if the contractor is found to be at fault, Superintending Engineer may recover such amount due in any form from the contractor and pay such amount to the labourer directly under intimation to the local labour office of the Govt. The decision of the Superintending Engineer is final and binding on the contractor.

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35. LABOUR LICENSE AND REGISTRATION:

The contractor is to furnish labour license as per the relevant labour Act and rules in force before signing the agreement, failing which execution of agreement will not be entertained.

36. PRICE PREFERENCE:

The Concession / facilities for 10% price preference shall be allowed only to the individual registered contractors belonging to Schedule Caste and Schedule Tribe having Registration certificate up to '**B**' Class. If the tender of the individual registered contractors belonging to Schedule Caste and Schedule Tribe is within 10% of the rate quoted by the lowest tenderer for any work, the work may be considered for award to him / her at the lowest tendered rate in accordance with works Department Resolution No.16262 dated 30.10.2018.

37. QUALITY CONTROL AND TESTING:

37.1 Within the defined scope of the functions of the officer-in-charge of quality control organization working under the Chief Engineer, Kanupur Irrigation Project, Keonjhar shall have the right to inspect the various items of works executed under the contract in respect of the quality and monitoring thereof. Such staff will exercise all necessary field control requirement complying to proper specification and drawing and conduct standard test on construction materials and finished products in accordance with B.I.S. codes and ASTM procedure so as to enable the Engineer-in-charge to ensure the corrective measures from the quality analysis programme and statically control analysis of the test results. Any work executed not confirming exactly, fully and faithfully to the specification and drawings and instruction in writing relating the work signed by the quality control Officer in charge and considered as unacceptable by the Engineer-in-charge shall be removed from the site at the contractor's cost.

The contractor has to bear the cost of all materials required for the tests as and when required including the cost, conveyance from work site to laboratory, if any. **The testing charges will be borne by the contractor**.

37.2 Correction of Defects:

On receipt of notice from the Engineer-in-Charge, the contractor will rectify the defects in stipulated period at his own cost. If the defects are not rectified in the stipulated period, the Engineer-in-charge shall asses the cost, get the defect rectified and recover the cost from the dues of the contractor.

38. TESTING OF THE STRUCTURES:

During execution of work, the contractor shall arrange the requisite equipments for testing of the work at his own cost, if found necessary.

39. RESOLUTION OF DISPUTES:

a) All claims are to be settled by a Civil Court of Competent jurisdiction by way of Civil Suit.

b) The contractor shall not be entitled to invoke Civil Suit until and unless he has completed the work or until the Govt. has made alternative arrangements for completion of work in question as the case may be.

c) Non-decision of Civil Suit proceedings shall not disentitle the Government's right to terminate the contract and make alternate arrangement for completion of the work.

40. JURISDICTION OF COURT:

40.1. For the purpose of jurisdiction in the event of dispute, if any contractor should be deemed to have entered into within the State of Odisha and it is agreed that neither part to the contractor nor the agreement will be competent to bring a suit in regard to matters covered by this contract any place outside the state of Odisha.

40.2 If any further necessary information is required, the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** will furnish such information on written request, but it must be clearly understood that tenderer must be received in order and according to instructions / specifications appended herewith.

41. The security will be refunded after lapse of defect liability period on completion of the work in all respect provided the final bill is passed and the security deposit shall not carry any interest. Any defect noticed during the defect liability period after the actual date of completion of the work shall be rectified by the contractor at his own cost. Failure to comply such rectification, the defective work shall be rectified by the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** and cost involved thereof shall be recovered from the contractor from his dues. (Ref. works Deptt order No.17823/WE dt. 11.10.2006).

41.1 Security for the due fulfillment of a contract should invariably be taken. The security may be taken in shape of N.S.C./ Post Office Savings Bank Accounts/ Post Office Time Deposit Account/ Kisan Vikas Patra/ Bank Guarantee in favour of the Divisional Officer from any Nationalized Scheduled Bank in India counter guaranteed by its local Branch at Bhubaneswar/ e Bank Guarantee executed on the National e –Governance Services Limited (NeSL) Digital Document Execution Portal towards E.M.D/ initial Security Deposit/ any other security deposit from the contractor or supplier as per Amendment to para 3.5.19 (a) (b) of the OPWD Code Vol. I.

42. The Agency will be suspended for the bid validity period in any of the following cases.

(a) If the bidder backs out his offer before acceptance of tender by the competent authority, as concurred by Works Deptt. OM No:- 5984 dt. 27.04.2021.

(b) In the case of a successful bidder, if the bidder fails within the specified time limit to

(i) Furnish the required performance and additional performance security.

(ii) Enter into the agreement

(c) If any of the statements, documents, certificate uploaded by the bidder through e-procurement portal, is found to be false / fabricated / bogus, the bidder will be black listed in this case.

43. Incase of discrepancy revealed between P_1 form and Detailed Tender Call Notice, condition in P_1 form shall prevail over the Detailed Tender Call Notice.

44. The clause of printed form of P_1 contract with latest addition/ deletion/ corrections/ substitution etc. shall also prevail

45. No claim for idle labour, machineries etc. on any amount will be entertained by the Department whatsoever the reason may be.

46. UNDERTAKING FOR PAYMENT OF MINIMUM WAGES

I/We do hereby undertake that I/We shall pay minimum wages to the unskilled labourers engaged by me/us for execution of the work, at the rate specified in Department of Labour and Employment, Govt. of Odisha Notification. If the minimum wages will be changed by the Government during execution of the work, I/We shall pay to the unskilled labourer and wages of different category of labour at the rate, specified in Department of Labour and Employment, Govt. of Odisha Notification.

Signature of the Contractor.

In case the Superintending Engineer is not satisfied that the minimum wages has not been paid to the labourers, he will have the right to deduct such amounts from the bills of the contractor and pay to the labourers.

47. EXECUTION OF QUANTITY MORE THAN 10%

(i) The quantity can be increased or reduced to the extent of 10% for individual items subject to a maximum of 5% over the estimated cost. If it exceeds the limit, prior approval of competent authority is mandatory before making any payment.

(ii) **Schedule of quantity accompanies the tender notice**: It shall be definitely under stood that the Government do not accept any responsibility for the correctness and completeness of this schedule and this schedule is liable for alternations or omissions, deductions or additions as set forth in the condition of contract and such omissions, deductions, additions or alternations shall in no way invalidate/ vitiate the contract and no extra monetary compensation will be entertained.

48. SAMPLE OF MATERIALS.

The contractor shall supply sample of all materials fully to be used for the work before procurement for testing and acceptance as may be required by the concerned Superintending Engineer.

The transportation and cost of construction materials will be borne by the contractor.

49. PROVISION OF INCENTIVE IN EXECUTION

For availing incentive clause in any project which is completed before the stipulated date of completion, subject to other stipulations it is mandatory on the part of the concerned Superintending Engineer to report the actual date of completion of the project as soon as possible through FAX or e-mail so that the report is received within 7 (seven) days of such completion by the concerned Superintending Engineer, Chief Engineer & the Administrative Department.

The Incentive for timely completion should be on a graduated scale of 1 (one) percent to 5 (five) percent of the contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale

Before 30% of contract period	=	5% of Contract Value
Before 20 to 30% of contract period	=	4% of Contract Value
Before 10 to 20% of contract period	=	3% of Contract Value
Before 5 to 10% of contract period	=	2% of Contract Value
Before 5% of contract period	=	1% of Contract Value

The bonus/incentive should be paid in respect of individual project for new construction/ substantial additional improvement works , the minimum value of work for which the bonus / incentive applicable is given below.

Category of work	Minimum value
1. Building work / P.H. Work	Rs.40.00 lakh
2. Road Work	Rs.300.00 lakh
3. Irrigation work	Rs.1000.00 lakh

Incentive will be paid with approval of next higher authority of tender accepting authority on completion of original work before original time schedule.

50. ELECTRICAL WORKS

The contractor will give the undertaking that he will execute the electrical works through a registered electrical license holder contractor. The attested copy of the registered electrical license and willingness of the electrical contractor who will execute the work shall be submitted by the contractor before execution of the agreement.

51. Electricity is to be arranged by the Contractor at his own cost and risk.

52. Steel volume involved in RCC works shall not be deducted from the volume of the concrete.

53. Conditional tender is not acceptable and is liable for rejection.

54. As regards to the extra items of work besides the agreement items and extra quantities of any item of work beyond the schedule of quantities, written order must be obtained from the Engineer-in-Charge before the work is taken up.

55. Dewatering from the foundation of structures when and where necessary during execution will have to be done by the contractor and no extra payment will be made on that account. The contractor's percentage rate should be including the cost of all the dewatering works as and when necessary, till the final date of completion.

The term dewatering shall mean the execution or operation of the items due to standing water as well as due to percolation water

56. After the work is finished all surplus materials and debris's should be removed from the site of the work. Preliminary work such as vats, mixing platforms etc. shall be dismantled

and all materials shall be removed from the site and premises shall be made neat and clean and this is inclusive of the percentage rate quoted by him.

57. (i) The Contractors are required to furnish evidence of ownership of principal Machineries/ equipments asked for in the tender documents.

(ii) In case the contractor executing several works, he is required to furnish a time schedule for movement of equipment / machinery from one work site to other site when work is to be executed.

(iii) The contractor shall furnish ownership document for those machineries, which he is planning to deploy for the tendered work if these are not engaged or produce certificate from the Superintending Engineer under whom these are deployed at the time of tendering as to the period by which these machineries are likely to be released from the present contract. Certificate from the Superintending Engineer shall not be more than **90 days** old on the last date of receipt of tender.

(iv) In case the contractor proposes to engage machineries, equipments as asked for in the tender document, owned, hired but deployed outside the state, he/ she is required to furnish 1% EMD/ bid security. The entire bid security including the additional bid security shall stand forfeited in case the contactor fails to mobilize the machineries within the stipulated time as per the tender document.

(v) The Contractor intending to hire/lease equipments/ machineries are required to furnish proof of ownership from the company/ person providing equipments/ machineries on hire/ lease along with contracts / agreements/ lease deed and duration of such contract.

NOT APPLICABLE

58. **FORMS AND ANNEXURES.**

All forms from 'A' to 'B' and Annexure from 'A' to 'D' ,Schedule-F along with checklist attached to IIT must be filled up properly and submit along with the authenticated documentary evidence required therein failing which the bids shall be treated as 'non-responsive' and be liable for rejection. In case of submission of bids through e-procurement portal, the bidder shall upload the scanned copy / copies of above documents as required under Clause 4 of IIT (Chapter-III) and Clause 4.2 of DTCN (Chapter-II).

59. **GENERAL INSTRUCTIONS TO CONTRACTORS**

1. Any Agency or Contractor executing a work should be aware about the local festivals like Makar Sankranti, Raja Sankranti, Chaiti Parba, Danda Nata or any such festivals which may affect the work schedule, Therefore, the contractor should engage more work forces during working period available at his disposal to complete the work as per schedule.
2. In the peak summer season, working hour is curtailed by the Labour Department to avoid exposure to personnel to the scorching sun and heat. It is the duty of the agency to increase the number of workforce and to employ the existing workforce during morning and afternoon hours as per Government orders.
3. Rainfall is a normal occurrence during monsoon in Odisha. So, unless there is unusually heavy rainfall resulting in a declared calamity, the Contractor is not eligible for any extension of time. The Contractor should plan the deployment of workforce and machinery, so as to complete the work as per schedule considering ordinary vagaries of the nature.

The same applies for borrow areas ponding also. The contractor should foresee possible ponding of borrow area in monsoon and likewise lift more quantity of soil / other materials during dry period, so as to complete the work as per schedule.

4. The Contractor should take up the work with due diligence in the acquired land without waiting for acquisition of the entire land. This should be completed in proportionally less period depending on the quantum of available work front.
5. The Agency should plan his work programme and mobilize men and machineries considering the **canal** closure programme of a particular system or area. Kharif / Rabi closure can't be imposed arbitrarily on the farmers as per the convenience of the agency. Closure of canal for the interest of work will be solely at the discretion of the Engineer-in-Charge and can't be claimed as a matter of right.
6. There will always be standing crop before harvesting season as per crop schedule and this fact has to be clearly understood by the agency. Extension of time on this ground may not be considered by Divisional officers.
7. Only the day(s) of elections to the Local Bodies / Assembly / Parliament will be treated as a non- working day (s).

60. **The joint venture is not allowed for this bid**.

CHAPTER - III

INFORMATION AND INSTRUCTION TO TENDERERS (IIT)

INFORMATION & INSTRUCTIONS TO TENDERER (IIT)

- Bidder should do the registration in the tender site using the option available.
- Then the Digital Signature registration to be done with the e-token of SIFY/nCode/TCS after logging into the site.
- Bidder may go through the tenders published in the site and download the required documents/tender schedules for the tenders he is interested.
- Bidder then login to the site through the secured log in by giving the user id/password chosen during registration & then the password of the e-token.
- Bidder should go through the tender schedules carefully and submit the documents as asked; otherwise, the bid will be rejected.
- If there are any clarifications, this may be obtained through the site, phone, e-mail or during the pre-bid meeting. Bidder should take into account of the corrigendum (s) published before submitting the bids online.
- Bidder in advance gets ready the bid documents to be submitted as indicated in the tender schedule and they should be in PDF format.
- Bidder selects the tender which he is interested in through search option & then moves it to the my favorites folder.
- From the favourites folder, he selects the tender to view all the details indicated.
- The bidder should read the terms & conditions and accepts the same to proceed further to submit the bids.
- The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the bid submitted will not be acceptable.
- The bidder has to enter the password of the e-token and the required bid documents have to be uploaded one by one as indicated.
- The percentage rate offered have to be entered separately in a spread sheet file (xls) in the space allotted and should be updated as BOQ.xls file for each tender after the financial bid.
- The tendering system will give a successful bid updating message & then a bid summary will be shown with the bid no. & the date & time of submission of the bid with all other relevant details.
- The bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid.

CONTRACTOR SUPERINTENDING ENGINEER

- The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening date.

- For any clarifications with the TIA, the bid no. can be used as a reference.

- Bidder should log into the site well in advance for bid submission so that he submits the bid in time i.e., on or before the bid submission time. If there is any delay, due to other issues, bidder only is responsible.

- Each document to be uploaded through' online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through' zip and the same can be uploaded. However, of the file size is less than 1 MB the transaction uploading time will be very fast.

- Only one e-token should be used for a bidder and should not be misused by others

- The time settings fixed in the server side & displayed at the top of the tender site, will be valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system. The bidders should follow this time during bid submission

2. Method of submission of Tender Documents

2.1 If the intending tenderer is an individual, the documents shall be signed by the individual above with his full type written name and current address.

2.2 If the intending tender is a proprietary firm, it shall be signed by the proprietor above his full name and with his current address.

2.3 If the intending tenderer is a firm in partnership, it shall be signed by a partner holding the power of attorney for the firm in partnership in which case a certified copy of power of attorney shall accompany in the technical documents.

2.4 If the intending tenderer is a limited company or Corporation, it shall be signed by a duly authorized person holding the power of attorney in which case certified copy of power of attorney shall accompany.

2.5 The tenderer has to quote percentage rate up to two places of decimal. The entry beyond this will not be considered.

2.6 All witness and sureties shall be of person of status and probity and their full names, occupation and address shall be stated below their signatures.

2.7 The agency will install display board mentioning information about the work at worksite after drawal of the agreement at his cost.

3. **Opening of Tender Documents.**
The Technical Bid Documents (Cover-I) **will** be opened on **dt.08.07.2026 at 11.00 hrs.** in the office of the **Superintending Engineer, Kanupur Rehabilitation, Camps & Building Division, Basudevpur** in the presence of the tenderers or their authorized representatives who wish to be present. The bidder can also watch it on online in the address given in tender call notice. Date & time of opening of Financial Bid will be intimated later on to the successful bidders.

4. **Eligibility criteria: - to qualify for award of contract each bidder in its name should have tender cost (To be transferred on-line), EMD/ Bid Security (To be transferred on-line), valid R.C (Registration certificate), valid GSTIN, PAN card, Affidavit regarding authenticity of bid (Annexure-A), Litigation debarring expelling of tendered (Annexure-B), No Relation Certificate (Annexure-C), Labour undertaking (Annexure-D), Affidavit (Schedule-F) and acknowledgements / receipts, paper cost etc. which are mandatory.**

5. **Final Decision making authority**
The competent authority reserves the right to accept or reject or disqualify any of the tender of pre qualification without assigning any reasons thereof and its decision shall be final.

6. **Further Clarification**
The **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** may be contacted during office hours on any working days for any further clarification. The bidder can also seek clarification through the portal within 7 days from start of the sale of bid documents. The officer inviting the tender will respond for the queries' raised by the bidder through the same portal.

7. **Sample of all material:** The contractor shall supply sample of all materials fully before procurement for the work for testing and acceptance as may be required by the concerned Superintending Engineer.

8. **Trial Boring:** The foundation level as indicated in the body of the departmental drawing is purely tentative and for the general guidance only. The Department has no responsibility for the suitability of actual strata at the foundation level. The contractor has to conduct his own boring before starting the work and get the samples tested at his own cost to ascertain the S.B.C. and credibility of the strata at founding level. While quoting his percentage rate for tender the contractor shall take in to account of the above aspects.

9. From the commencement to the completion of the work, the contractor is responsible to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and he holds the Govt. of Orissa harmless for any claims for injuries to person or structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or any one in his employers during the execution of the work. In addition, no claim shall be entertained for loss due to earth quake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental. Damages so caused will have to be made good by the contractor at his own cost.

10. Where it will be found necessary by the Department, the Officer-in-Charge of the work shall issue an order book to the contractor to be kept at the site of the work with pages serially numbered. Orders regarding the work whenever necessary are to be entered in his book by the Officer(s)-in-Charge of the work with their dated signatures and noted by the contractor or his authorized agents with their dated signature. Orders entered in his book and noted by the contractor's agent shall be considered to have been duly given to the contractor to follow it with strict adherence. The order book shall be the property of the Department and shall not be removed from the site of work without written permission of the Engineer (Superintending Engineer) and to be submitted to the Engineer-in-Charge every month.

11. The tenderer should conduct three bores at each pier and SBC of soil at foundation level and abutments location and furnish the test results in conformity with IRC code at his own cost before execution of the work and percentage rate quoted by the contractor should be inclusive of such bores and SBC tests etc without any extra cost to the Department.

12. In case of submission of bids through e-procurement portal, the bidder shall upload the scanned copy/ copies of document as required vide clause No. **4.2, 5.8 & 58** of DTCN & clause 4 of IIT (Chapter-III). The online bidders shall have to produce the original documents in support of scanned copies and statements uploaded in the portal to the Chief Engineer, Kanupur Irrigation Project on demand before opening of technical bid (cover-I)

13. (a) **Memorandum of Government of Odisha, Works Department, Bhubaneswar issued vide Letter No 7885Dated 23.07.2013 consists of the procedural requirement of e-procurement which shall be made part of the Detailed Tender Call Notice or Instruction to Bidder for all 'works' tenders hoisted in the portal.**

(i) The e-Procurement portal of the Government of Odisha is "https://tendersodisha.gov.in".

(ii) Use of valid Digital Signature Certificate of appropriate class (Class–II or Class-III) issued from registered Certifying Authorities (CA) as stipulated by Controller of Certifying Authorities (CCA), Government of India such as n-Code, Sify, TCS, MTNL, e-Mudhra is mandatory for all users.

(iii) The DSC issued to the Department users is valid for the period of two years only. All the Department users are responsible to revalidate their DSC prior to expiry.

(iv) For all purpose, the server time displayed in the e-procurement portal shall be the time to be followed by all the users.

(v) Government after careful consideration has decided to hoist all tenders costing 10 lakhs or above in the e-procurement portal. This will be applicable across all Engineering Departments such as Works Department, Department of Water Resources, Rural Development and Housing & Urban Development Department. Government of Odisha also welcomes hosting of tenders by any other departments, authority, corporations, local bodies etc. of the state with prior approval from Works

Department. Works Department is the Nodal department for the implementation of e- procurement in the State.

(vi) The e-procurement shall be operated compliant to relevant provisions of OGFR / OPWD code / Accounts code / Government statues including any amendments brought from time to time to suit to the requirement of the best national practice.

(vii) Registration in the e-procurement portal is without levy of any charges but Government reserves the right to levy any charges for such value added services in future.

(viii) Contractors not registered with Government of Odisha, can participate in the e-procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the State Government before award of the work as per prevalent registration norms of the state.

(ix) For the role management "Department "is the Administrative Department, Organisation or wing is the Chief Engineer or highest tender accepting authority or equivalent officer, Division is the Superintending Engineer or equivalent Officer and Sub-Division is the Assistant Engineer or equivalent Officer.

(x) The e-procurement software assigns roles for operation of the module for specific function. The terminologies used in the Portal and their respective functions in the software are as follows.

13 (b). Application Administrator (NIC and State Procurement Cell)

i. Master Management.
ii. Nodal Officer Creation
iii. Report Generation
iv. Transfer of Officer's login ID
v. Blocking and unblocking of officer's and bidder's login ID

13(c) Nodal Officer (At organisation Level not below the Superintending Engineer or equivalent rank)

i. Creation of Users.
ii. Role Assignment.
iii. Report Generation
iv. Transfer of Officer's login ID
v. Blocking and unblocking of officer's login ID

13(d) Procurement Officer- Publisher (Officer having Tender inviting power at any level)

i. Publishing of Tender
ii. Publishing of corrigendum/ addendum/ cancellation of Tender.
iii. Bid Clarification
iv. Uploading of Pre-Bid Minutes.
v. Report generation.

13(e) Procurement Officer- Administrator (Generally Sub-ordinate Officer to Officer inviting Tender)

i. Creation of Tender

ii. Creation of Corrigendum/ addendum/ cancellation of Tender.

iii. Report generation

13(f) Procurement Officer- Opener: (Generally Sub- ordinate Officer to Officer inviting Tender)

i. Opening of Bid

13(g) Procurement Officer- Evaluator (Generally Sub-ordinate officer to Officer inviting Tender)

i. Evaluating Bid

13(h) Procurement Officer- Auditor (Procurement Officer, Publisher and / or Accounts Officer/Finance Officer)

i. To take up auditing.

(XI) NOTICE INVITING BID (NIB) OR INVITATION FOR BID (IFB):

14.1 The Notice inviting Bids (NIB) and Bid documents etc. shall be in the Standard formats as applicable to conventional Bids and will be finalized / approved by the Officers competent as in the case of conventional Bids.

14.2 The officers competent to Publish NIB in case of conventional Bids will host the NIB in Portal. Simultaneously, a notification should also be published in the Newspapers as per existing rules preferably in the following format to effect economy:

(i) Name of the Work:-

(ii) Estimated Cost: Rs.

(iii) Period of completion

(iv) Date & Time of availability of bid document in the portal

(v) Last date/ time for receipt of bids in the portal

(vi) Name and address of the O.I.T.

Further details can be seen from the e- procurement portal "https://tendersodisha.gov.in"

14.3 The tender documents published by the Tender inviting Officer (Procurement Officer Publisher) in the website "https://tendersodisha.gov.in" will appear in the "Latest Active Tenders". The Bidders / Guest users can download the Bid documents only after due date & time of sale. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Notice inviting Bid' after which the same will be removed from the list of "Latest Active tenders".

15 ISSUE OF ADDENDA / CORRIGENDA/ CANCELLATION NOTICE:

15.1 The Procurement / Officer Publisher (Officer inviting tender) shall publish any addendum / corrigendum / cancellation of tender in the website "https://tendersodisha.gov.in", notice board and through paper publication and such notice shall form part of the bidding documents

15.2 The system generates a mail to those bidders who have already uploaded their tenders and those bidders, if they wish can modify their tenders. The bidders are required to watch the website till last date and time of bid submission for any addendum / corrigendum / cancellation thereof. Tender inviting Authority is not responsible for communication failure of system generated mail.

16 CREATION AND PUBLISHING OF BID:

16.1 All the volumes/documents shall be uploaded in the portal by the tender creating officer (Procurement Officer Administrator) and published by the officer inviting tender (Procurement Officer Publisher) using their DSCs in appropriate format so that the document is not tampered with.

16.2 The tender document comprises the notice inviting tender, bid document / SBD, drawings in pdf format and the schedule of quantities / BoQ in.xls format to be uploaded by the Officer inviting tender

16.3 Procurement Officer Administrator creates under by filling up the following forms.

i. BASIC DETAILS

ii. COVER CONTENT: The procurement officer Administrator should briefly describe the name and type documents to be uploaded by the bidder in the following format.

a) For single cover / Packet:

Sl No	Cover Type	Document Description	Type
1	Fee/ Prequal / Technical / Finance	Tender cost, EMD, GSTN, PAN, Contractor RC	pdf
		Affidavits, undertakings and any other documents as per SBD / DTCN	pdf
		BoQ	xls

b. For Two Cover / Packet:

Sl No	Cover Type	Document Description	Type
1	Fee / Prequal / Technical	Tender cost, EMD, GSTN, PAN, Contractor RC	pdf
		Affidavits, undertakings and any other documents as per SBD / DTCN	pdf
2	Finance	BoQ	xls
		Special condition if any specifically mentioned by Officer inviting tender	pdf

iii. TENDER DOCUMENT: The Procurement Officer Administrator should upload the NIT in pdf format.

iv. WORKITEM DETAILS

v. FEE DETAILS : The Procurement Officer Administrator should mention the cost of tender paper and EMD amount as laid down DTCN / SBD.

vi. CRITICAL DATES: The Procurement Officer Administrator should mention the critical dates of tender such as publishing date, document download start date and end date, seek clarification start date and end date (optional), bid submission start date and closing date, bid opening date as per DTCN / SBD.

vii. BID OPENER SELECTION: The Procurement Officer creator can select two / three / four bid openers for a particular bid. If required the bid openers can also be selected within an organization from other procurement units (Circles / Divisions).

viii. WORK ITEM DOCUMENTS: The Procurement Officer Administrator should upload the digitally signed tender document (SBD / DTCN) or any other addition document / drawings in pdf format and Bill of Quantities in xls format.

ix. PUBLISHING OF TENDER: The Procurement Officer Publisher shall publish the tender using his / her DSC after detail scrutiny of the fields created and documents uploaded by the Procurement Officer Administrator. Procurement Officer publisher can publish tenders for multiple procurement units using multiple DSCs procured for

each post separately. After being relieved from the additional charges he has to surrender the additional DSCs to the Nodal Officer of the concerned organization.

17. PARTICIPATION IN BID:

17.1 PORTAL REGISTRATION: The Contractor / Bidder intending to participate in the bid is required to register in the portal using his / her active personal / official e-mail ID as his / her Login ID and attach his / her valid Digital signature certificate (DSC) to his / her unique Login ID. He / She has to submit the relevant information as asked for about the firm/contractor. The portal registration of the bidder / firm is to be authenticated by the State Procurement Cell after verification of original valid certificates / documents such as (i) PAN & (ii) Registration Certificate (RC) / VAT clearance certificate (for procurement of goods) of the concerned bidder. The time period of validity in the portal is at par with validity of RC / VAT clearance. Any change of information by the bidder is to be re-authenticated by the State Procurement Cell. After successful authentication bidder can participate in the online bidding process.

17.1.1 Bidders participating through Joint Venture shall declare the authorized signatory through Memorandum of Understanding duly registered and enroll in the portal in the name and style of the Joint Venture Company. It is mandatory that the DSC issued in the name of the authorized signatory is used in the portal.

17.1.2. Any third party / company / person under a service contract for operation of e-Procurement system in the State or his / their subsidiaries or their parent companies shall be ineligible to participate in the procurement process that are undertaken through the e-Procurement system irrespective of who operates the system.

17.2. LOGGING TO THE PORTAL :

The Contractor /Bidder is required to type his / her Login ID and password. The system will again ask to select the DSC and confirm it with the password of the DSC as a second stage authentication. For each login, a user's DSC will be validated against its date of validity and also against the Certificate Revocation List (CRL) of respective CAs stored in system database. The system checks the unique Login ID, password and DSC combination and authenticates the login process for use of portal.

17.3 DOWNLOADING OF BID:

The bidder can download the tender of his choice and save it in his system, undertake the necessary preparatory work offline and upload the completed tender at his convenience before the closing date and time of submission.

17.4 CLARIFICATION ON BID:

The bidder may ask question related to tender online in the e-Procurement portal using his / her DSC; provided the questions are raised within the period of seeking clarification as mentioned in tender call notice / bid. The Officer inviting the Bid / Procurement Officer - Publisher will clarify queries related to the tender.

17.5 PREPARATION OF BID:

17.5.1. The bids may consist of general arrangements drawings or typical or any other

drawings relevant to the work for which bid has been invited. Bidder may download these drawings and takeout print for detail study and preparation of his bid. Any other drawings and documents pertaining to the works available with the Officer inviting the bid will be open for inspection by the bidders.

17.5.2. The Bidder shall go through the Bid carefully and list the documents those are asked for submission. He shall prepare all documents including cost of Bid Document, Bid Security, Declaration form, Price bid etc. and store in the system.

17.6. PAYMENT OF EMD / BID SECURITY AND COST OF BID DOCUMENTS;

17.6.1 The Bidder shall furnish, as part of his Bid, a Bid security for the amount mentioned under NIT / Contract Data in online mode. Non submission of bid security within the designated period shall debar the bidder from participating in the online bidding system and his portal registration shall be cancelled. His name shall also be informed to the registering authority for cancellation of his registration.

17.6.2 **Bidder has to produce "EMD/Bid Security"** specified in the table Row-5 above as part of its bid through the process as mentioned in DTCN.

17.6.3 The tender accepting authority will verify the originals of all the scanned documents of the successful lowest bidder only within 5 days of opening of the tender. In the eventuality of failure on the part of the lowest successful bidder to produce the original documents, he will be debarred in future from participating in tender for 3 years and will be black listed by the competent authority. In such a situation, successful L-2 bidder will be required to produce his original documents for consideration of his tender at the negotiated rate equal to L-1 bidder.

17.6.5 Contractor exempted from payment of EMD / ISD will be able to participate in the tender directly by uploading documentary evidences towards his eligibility for such exemption.

17.6.6 Government of Odisha has introduced e-payment gateway in to the portal for payment of cost of Bid and Bid Security /Earnest Money Deposit. The process of using e-payment gateway is mentioned in the "Procedure for Electronic receipt, accounting and reporting of cost of Tender Paper and Earnest Money Deposit on submission of bids" as per Works Department Circular No. 17254 dt.05.12.2017.

18. SUBMISSION OF BID:

18.1 The bidder shall carefully go through the tender and prepare the required documents. The Bid shall have a Technical Bid & Financial Bid. The Technical Bid generally consist of cost of Bid documents, EMD, GSTIN, PAN, Registration Certificate, Affidavits, List of similar major items of work, work in hand, list of machineries and any other information required by as per DTCN/SBD. The Financial Bid shall consist of the Bill of Quantities (BOQ) and any other price related information.

18.2 Bidders are to submit only the original BOQ (in xls format) uploaded by Procurement Officer Publisher (Officer Inviting Tender) after entering the relevant fields without any alteration / deletion / modification. Multiple BOQ submission by bidder shall lead to cancellation of bid. In case of item rate tender, bidders shall fill in their rates other than zero value in the specified cells without keeping it blank. In the percentage rate tender the bidder quoting zero percentage is valid and will be taken at par with the estimated rate of the work put to tender.

18.3. The Bidder shall upload the scanned copy / copies of document in support of eligibility criteria and qualification information in prescribed format in Portable Document Format (PDF) to the portal in the designated locations of Technical Bid.

18.4. The bidder shall write his name in the space provided in the specified location in the Protected Bill of Quantities (BOQ) published by the Officer Inviting Tender. The bidder shall type rates in figure only in the rate column of respective item (s) without any blank cell in the rate column in case of item rate tender and type percentage excess or less up to two decimal place only in case of percentage rate tender.

18.5 The bidder shall log on to the portal with his / her DSC and move to the desired tender for up loading the documents in appropriate place one by one simultaneously checking the documents.

18.5.1 Bids can not be submitted after due date and time. The bids once submitted cannot be viewed, retrieved or corrected. The Bidder should ensure correctness of the bid prior to uploading and take print out of the system generated summary of submission to confirm successful uploading of bid. The bids cannot be opened even by the NIB or the Procurement Officer-Publisher / Opener before the due date and time of opening.

18.5.2 Each process in the e-procurement is time stamped and the system can detect the time of log in of each user including the Bidder.

18.5.3 The Bidder should ensure clarity / legibility of the document uploaded by him to the portal.

18.5.4 The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid / tender.

18.5.5 The Bidder should check the system generated confirmation statement on the status of the submission.

18.5.6 The Bidder should upload sufficiently ahead of the bid closure time to avoid traffic rush and failure in the net work.

18.5.7 The Tender Inviting Officer is not responsible for any failure, malfunction or breakdown of the electronic system used during the e-procurement process.

18.5.8 The bidder is required to upload documents related to his eligibility criteria and

qualification information and Bill of Quantity duly filled in. It is not necessary for the part of the Bidder to up-load the drawings and other Bid documents (after signing) while uploading his bid. It is assumed that the bidder has referred all the drawings and documents uploaded by the Officer inviting the Bid.

18.5.9 The bidder will not be able to submit his bid after expiry of the date and time of submission of Bid (server time). The date and time of bid submission shall remain unaltered even if the specified date for the submission of bids declared as a holiday for the Officer inviting the Bid.

18.6 SIGNING OF BID:

The online bidder shall digitally sign on all statements, documents, certificates, uploaded by him, owning responsibility for their correctness / authenticity as per IT Act - 2000. If any of the information furnished by the bidder is found to be false / fabricated / bogus, his EMD / Bid Security shall stand forfeited and his registration in the portal shall be blocked and the bidder is liable to be blacklisted.

19. SECURITY OF BID SUBMISSION:

19.1 All bid uploaded by the Bidder to the portal will be encrypted.

19.2 The encrypted Bid can only be decrypted / opened by the authorized openers on or after the due date and time.

20. RESUBMISSION AND WITHDRAWAL OF BIDS:

20.1. Resubmission of bid by the bidders for any number of times before the final date and time of submission is allowed.

20.2 Resubmission of bid shall require uploading of all documents including price bid afresh.

20.3 If the bidder fails to submit his modified bids within the pre-defined time of receipt, the system shall consider only the last bid submitted.

20.4 The bidder should avoid submission of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure etc.

20.5 The bidder can withdraw his bid before the closure date and time of receipt of the bid by uploading scanned copy of a letter addressing to the Procurement Officer-Publisher (Officer Inviting Tender) citing reasons for withdrawal. The system shall not allow any withdrawal after expiry of the closure time of the bid.

21. OPENING OF BID:

21.1 Bid opening date and time is specified during tender creation or can be extended through corrigendum Bids cannot be opened before the specified date & time.

21.2 All bid openers have to log-on to the portal to decrypt the bid submitted by the

bidders.

21.3. The bidders & guest users can view the summary of opening of bids from any system. Contractors are not required to be present during the bid opening at the opening location if they so desire.

21.4 In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid, the bids will be opened at the appointed time on the next working day.

21.5 Combined bid security for more than one work is not acceptable.

21.6 The electronically submitted bids may be permitted to be opened by the predefined Bid opening officer from their new location if they are transferred after the issue of Notice inviting Bid and before bid opening. Further, action on bid documents shall be taken by the new incumbent of the post.

21.7 In case of non-responsive tender the officer inviting tender should complete the e-Procurement process by uploading the official letter for cancelled/ re-tender.

22. EVALUATION OF BIDS:

22.1 All the opened bids shall be downloaded and printed for taking up evaluation. The officer authorized to open the tender shall sign and number on each page of the documents downloaded and furnish a certificate that "the documents as available in the portal containing ….. nos of pages".

22.2 The bidder may be asked in writing / online (in their registered e-mail ids) to clarify on the uploaded documents provided in the Technical Bid, if necessary, with respect to any doubts or eligible documents. The Officer inviting Tender may asked for any other document of historical nature during Technical Evaluation of the tender. Provided in all such cases, furnishing of any documents in no way alters the Bidder's price bid. Non-submission of legible documents may render the bid non-responsive. The authority inviting bid may reserve the right to accept any additional document.

22.3 The bidders will respond in not more than 7 days of issue of the clarification letter, failing which the bid of the bidder will be evaluated on its own merit.

22.4 Technical evaluation of all bids shall be carried out as per information furnished by Bidders.

22.5 The Procurement Officer-Evaluators will evaluate bid and finalise list of responsive bidders.

22.6 The financial bids of the technically responsive bidders shall be opened on the due date of opening. The Procurement Officer-Openers shall log on to the system in sequence and open the financial bids.

22.6.1 The Financial Bid will be opened on the notified date and time in the presence of bidders or their authorized representative who wish to be present.

22.6.2 At the time of opening of "Financial Bid", bidders whose technical bids were found responsive will be opened.

22.6.3 The responsive bidders name, bid prices, item wise rates, Total amount of each item in case of item rate tender and percentage above or less in case of percentage rate tenders will be announced.

22.6.4 The Procurement Officer-openers shall sign on each page of the downloaded BoQ and the comparative statement and furnish a certificate to that respect.

22.6.5 The Bidder can witness the principal activities and view the documents / summary reports for that particular work by logging on to the portal with his DSC from anywhere.

22.6.6 System provides an option to Procurement Officer - publisher for reconsidering the rejected bid with the approval of concerned Chief Engineer / Head of Department.

23. NEGOTIATION OF BIDS:

23.1 For examination, evaluation and comparison of bids, the officer inviting the bid may, at his discretion, ask the lowest bidder for clarification of his rates including reduction of rate on negotiation and breakdown of unit rates.

24. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:

24.1 The Employer / Engineer-in-Charge shall notify acceptance of the work prior to expiry of the validity period by cable, telex or facsimile or e-mail confirmed by registered letter. This letter of Acceptance will state the sum that the Engineer-in-charge will pay the contractor in consideration of the execution & completion of the Works by the contractor as prescribed by the contract & the amount of Performance Security and Additional Performance Security required to furnished. The issue of the letter of Acceptance shall be treated as closure of the Bid process and commencement of the contract.

24.2 The contractor after furnishing the required acceptable Performance Security and Additional Performance Security, "Letter to Proceed" or "Work Order" shall be issued by the Engineer-in-Charge with copy thereof to the Procurement Officer - Publisher. The Procurement Officer-Publisher shall up load the summary and declare the process as complete.

24.3 If the L-1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to blacklist the contractor. Besides the consortium / JV / firm where such an agency / firm already happens to be or is going to be a partner / member/ proprietor, he / they shall neither be allowed for participation in bidding for three years nor his /their

application will be considered for registration and action will be initiated to blacklist him / them. In that case, the L-2 bidder, if fulfils other required criteria, would be called for drawing agreement for execution of work subject to condition that the L-2 bidder negotiates at par with the rate quoted by the L-1 bidder, otherwise, the tender will be cancelled. In case a contractor is black listed, it will be widely publicized and intimated to all departments of Government and also to Govt. of India agencies working in the state.

25. BLOCKING OF PORTAL REGISTRATION:

25.1 If the Registration Certificate of the Contractor is cancelled / suspended by the Registering authority / blacklisted by the competent authority his portal registration shall be blocked automatically on receipt of information to that effect.

25.2 The portal registration blocked in the ground mentioned in the above para - 23.1 shall be unblocked automatically in receipt of revocation order of cancellation / suspension / blacklisting from the concerned authority.

25.3 The officer inviting Tender shall make due inquiry and issue show cause notice to the concerned contractor who in turn shall furnish his reply, if any, within a fortnight from the date of issue of show cause notice. Thereafter, the officer inviting Tender is required to issue an intimation to the defaulting bidder about his unsatisfactory reply and recommend to the Chief Manager (Technical) for blocking of portal registration within 10 days of intimation to the defaulting bidder regarding his unsatisfactory reply with intimation to Registering Authority and concerned Chief Engineer / Heads of Office, if any, of the following provisions are violated.

25:3:1 Fails to furnish original technical / financial (Tender Paper Cost, EMD/BID Security) documents before the designated officer within the stipulated date and time.

25:3:2 Backs out from the bid on any day after the last date of receipt of tender till expiry of the bid validity period.

25.3.3 Fails to execute the agreement within the stipulated date.

25.3.4 If any of the information furnished by the bidder is found to be false / fabricated/bogus.

Accordingly the Officer Inviting Tender shall recommended to the Chief Manager (Technical), State Procurement Cell, Odisha for blocking of portal registration of bidder and simultaneously action shall also the initiated OFFICER INVITING TENDER for blacklisting as per Appendix-XXXIV of OPWD Code, Volume-II.

26. GUIDE LINES FOR UNBLOCKING OF PORTAL REGISTRATION:

26.1. UNBLOCKING OF PORTAL REGISTRATION:

Unblocking of portal registration of a contractor shall be done by a committee consisting of

the following members.

EIC (Civil)-cum-CPO	**-**	**Chairman**
Engineer-in-Chief (WR)	**-**	**Member**
Concerned Chief Engineer	**-**	**Member**
Senior Manager (Finance), SPC	**-**	**Member**
Officer Inviting Tender	**-**	**Member**
Chief Manager (Technical), SPC	**-**	**Convener**

26.2. The Chief Manager (Technical), State Procurement Cell will be the convener and he will maintain all records for this purpose. The committee shall meet not less than once in a month if required and shall consider the recommendation of the officer inviting tender for unblocking of portal registration. The quorum of the meetings will be four.

26.3 The minimum period of blocking of Portal Registration shall in no case be less than 90 days. After blocking of Portal Registration, the contractor whose Portal Registration has been blocked may file application to the concerned officer inviting tender showing sufficient ground for unblocking of his portal registration along with a Treasury Challan showing deposit of Rs.10000.00 (Rupees ten thousand) only (Non refundable) under the head of accounts '0059 –Works' as processing fees. The officer inviting tender shall forward the application filed by the contractor to the Chief Manager (Technical), State Procurement Cell.

26.4 On receipt of recommendation from the concerned Chief Engineer along with the copy of challan as mentioned above, the Chief Manager (Technical) being the member convener of the Committee shall place the case before the Committee for examination and taking a decision in this regard. After examination the Committee may recommended for unblocking of the portal registration of said contractor if the Committee is satisfied that the fault committed by contractor is either unintentional or done for the first time.

26.5 After Scrutiny by the State Procurement Cell it is found that the portal registration of a contractor has been blocked for the 2nd time the Chief Manager (Technical), SPC may not consider his case to be placed before the Committee and may advise the concerned officer inviting tender to issue show cause notice to the contractor asking him to explain as to why his portal registration shall not remain blocked. On receipt of show cause reply from the contractor the officer inviting tender shall examine the same and if considered proper he may report to the Chief Manager (Technical), SPC along with his views furnishing the copy of the show cause reply for placement of the same before the Committee for taking a decision in respect of blocking / unblocking. If the Committee found that the contractor is in habit of committee such fault again and again intentionally the committee may advise the concerned officer inviting tender to initiate proceeding for blacklisting as per the existing rule.

FORM – A

STRUCTURE AND ORGANISATION

Name of Tenderer. ……

Nationality of Tenderer. ……

Office Address. ……

Telegraphic Address ……

Telephone No : ……

Mobile No : ……

Telex Number ……

Location of establishment ……

The tenderer is

1. An individual
2. A proprietary firm.
3. A limited company or limited corporation
4. A member of a group of companies (If yes, give names, address and present description of other companies.)
5. A subsidiary of large organization
   (If yes, give names, address of the present organization)
6. if the company is subsidiary, state what involvement if any, will the parent company have in the project.
   Attach the organization chart showing the structure of the organization including the names of the Directors position of officer.
7. Number of year of experience
   a. As a prime contractor
      I. In own country
      II. Other country (specify country)
   b. In a Joint venture
      I In own country
      II Other country (specify country)
8. Name of the address of any associates the tenderer has in India who are knowledgeable in the procedure of customs, immigration takes and other information necessary to do work.
9. How many years has your organization been in business under your present name? Add what were your fields were and when you established your organization. When did you add new field (if any)?
10. Were you ever required for suspending construction for a period of more than six months continuously after you started? If so, give the names of project and reason of failure.
11. Have you ever not completed any work awarded to you? If so give name of project and reasons for not completing the work.
12 In how many projects were imposed penalties for delay? Please give details.
13. In which fields of Civil Engineering construction do you claim specialization and Interest.
14. Give details of your experience in modern concreting / Earth work and quality control.
15 Give details of your material testing laboratory.

Signature of tenderer

FORM-B

RESOURCES PERSONNEL

Details of key Technical and Administrative personnel who could be assigned to the work be mentioned in the following proforma.

A Details of the Board of Directors.

1. Name of the Director.

2. Organization

3. Address

4. Remarks

B. Key Technical and Administrative personnel

1. Individual Name

2 Qualification

3. Present position of Office

4. Professional experience and details of works

5. Years with the tenderer

6. Languages known

7. Remarks

Signature of Tenderer

ANNEXURE –A

AFFIDAVIT

I, Sri…… Aged ……..years Son/ Daughter/ Wife of Sri…… at present residing At…… P.O…… P.S……Dist…… Pin…… do here by solemnly affirm as follows.

i) That, I / We posses a valid license for execution of works contract issued by *…… belongs to……Class & is valid up to * *……

ii) I am submitting tenders before the **Superintending Engineer, Kanupur Rehabilitation camps & Building Division, Basudevpur** for execution of following works in response to Invitation For Bid (IFB) Identification No. **SE, KRC & BD-09/2026-27**

1. …… * * *

2. ……

Etc.

iii) I am the authorized signatory on behalf of contractor for the tender for the work / works mentioned above.

iv) I am swearing this affidavit that all tender documents and accompanying papers those being submitted by me before the **Superintending Engineer, Kanupur Rehabilitation camps & Building Division, Basudevpur** are all authentic and bonafied documents in the eyes of the law of the land.

That the facts stated in the affidavit are true to the best of my knowledge and belief.

Signature of Contractor /
Authorized Signatory

Note:

*Mention the license issuing authority.

* *Mention the date up to which the license is valid

* * *Mention name of works for which tender is being submitted.

ANNEXURE – "B"

INFORMATION REGARDING CURRENT LITIGATION DEBARRING EXPELLING OF TENDERED OR ABANDONMENT OF WORK BY THE TENDERER

1.	a)	Is the tenderer at current involved in any litigation relating to the works	Yes/No
	b)	If yes : give details :	Yes/No
2.	a)	Has the tenderer or any of its Constituent partners been debarred/ Expelled by any agency in India During the last three years.	Yes./No
3.	a)	Has the tenderer or any of its Constituent partners failed to Perform on any contract work in India during the last three years.	Yes/No
	b)	If yes, give details:	

Note

If any information in this schedule is found to be incorrect or concealed, qualification application will be summarily being rejected.

Signature of tenderer

ANNEXURE-C

No Relationship Certificate

I/We hereby certify that I/We am / are not related to any officer of the Water Resources Department in the rank of Asst. Engineer and above and any officer of the rank of Deputy Secretary and above.

Signature of Contractor

Address _____

_____

Date: _____

List of Relatives of the tenderer serving in Water Resources Department.

Sl No	Name of the Relatives	Rank	Place of present posting with Office / Division of the Department.
1	2	3	4
1. 2. 3. 4.			

Contractor

(Vide Para - 7 of Appendix P - 33 of P.W.D. Code Vol. II)

ANNEXURE-D

UNDER TAKING BY THE CONTRACTOR

I do here by undertake that, I will pay the minimum prevailing wages and other allowances (VDA) as fixed by Government of Odisha from time to time per day to the labourers engaged by me.

Contractor

SCHEDULE-F

AFFIDAVIT

I Sri/Smt._____, aged about_____,C/o_____, at present residing At-_____, Po.: _____, P.S.: _____, Dist-_____, Odisha, Pin-_____, do hereby solemnly affirm as follows.

1. The undersigned do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s _____ nor any of its constituent partners have abandoned any road/bridge/ Irrigation/Building or other project work in India nor any contract awarded to us for such works have been rescinded during the last five years prior to the date of this bid.
3. The undersigned hereby authorized and request (s) any bank, person, firm or corporation to furnish pertinent information as deemed necessary and as requested by the Department to verify this statement or regarding my (our) competency and general reputation.
4. The undersigned understands and agrees that further qualifying information may be requested and agree to furnish any such information at the request of Department.

Signature of Contractor /
Authorized Signatory

CHECK LIST
SUBMITTED OR NOT

1.	Form A Structure and Organization	Yes/No
2.	Form B Resources / Personnel	Yes/No
3.	Annexure-A (Affidavit regarding authenticity of bid)	Yes/No
4.	Annexure-B	Yes/No
5.	Annexure-C (No Relationship Certificate)	Yes/No
6.	Annexure-D (Labour Undertaking)	Yes/No
7.	Schedule-F (Affidavit)	Yes/No
8.	Documentary evidence in support of statement under clause-4 of IIT (Chapter-III)	Yes/No
9.	Certified copy of power of attorney in case of partnership firm, limited or Corporation attached.	Yes/No

CONTRACTOR SUPERINTENDING ENGINEER

CHAPTER-IV

PERCENTAGE RATE TENDER

AND

CONTRACT FOR WORKS

CONTRACTOR SUPERINTENDING ENGINEER

ORISSA PUBLIC WORKS DEPARTMENT
(FORM P_1)

Percentage Rate Tender and Contract for works

General Rules and Directions for the Guidance of Contractor.

1. The work proposed for execution by contract will be notified in a form of invitation to tender posted through the Govt. web-site "https://tendersodisha.gov.in."

This notice will state the work to be carried out, the items and rates and approximate quantities thereof as well as the date for submitting and opening tenders also the amount of earnest money to be deposited and the amount of the security deposit to be deposited by the successful tenderer and the percentage if any, to be deducted from bills. Copies of the specification, designs, and drawings and any other documents required in connection with the submission of tender signed for the purpose of identification by the Sub-divisional Officer / Superintending Engineer shall also be open for inspection by the contractor at the office of the Sub-divisional Officer/ Superintending Engineer during office hours.

2. In the event of the tender being submitted by a firm it must be signed separately by each member thereof, or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so.

3. Receipts for payments made on account of work, when executed by a firm, must also be signed by the several partners, except where the contractors are described in their tender as a firm in which case the receipt must be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipts for the firm.

4. The memorandum of work tendered for and the memorandum of materials to be supplied by the Public Works Department and their issue rates shall be filled in and completed in the office of the Sub-divisional Officer / Superintending Engineer before the tender form is issued. If a form is issued to an intending tenderer without having been so filled in, he shall request the office to have this done before he completes and delivers his tender.

5. The amount of earnest money and security money to be deposited shall confirm to the following.

(a) All the contractors for the purpose of participation in tender have to deposit 1% of Bid amount as earnest money at the time of submission of tender and another 1% of the Bid amount at the time of drawal of agreement as initial security deposit.

(b) Besides earnest money and initial security deposit, contractors of Super, Special, A & B class will be required to furnish security deposit by way of deduction from their bills at the rate of 5% of the gross amount of each bill where as in case of C & D class contractors such deductions will be made at the rate of 3% of the gross amount of each bill. Thus the total security deposit from the contractors will be 7% for Super, Special, A & B class and 5% for C & D class contractors.

(c) The earnest money and initial security deposit will be made as per rules mentioned earlier in DTCN.

6. Any person who submits a tender shall fill up the usual printed form/ tender document downloaded from the website through e-procurement portal stating at what percentage rate he is willing to undertake the work. Incomplete tender and tenders which propose any

alternation in the work specified in the said form of invitation to tender, or which contain any other conditions of any sort, or omit to note the time within which the work can be furnished or which are not accompanied by the required earnest money will be liable to rejection. No single tender shall include more than one work. But contractors who wish to tender for two or more works shall submit a separate tender for each. Tender shall bear the name of the work to which they refer written outside the envelope.

7. The Engineer or his duly authorized assistant will open the tenders in the presence of any intending contractors who may be present at the time and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of a tender being rejected, the earnest money forwarded therewith shall there upon be returned to the tenderer with a refund order for the amount of the earnest money.

8. The Engineer shall have the right of rejecting all or any of the tenders.

9. In the event of a tender being selected for acceptance the Engineer who opened the tenders will, if he is competent to accept the tender, inform the tenderer of the selected tender who shall there upon sign copies of the specification and other document mentioned in rules 1 and 4 for the purpose of identification and for his acceptance with tender. The tenderer of the selected tender shall also deposit the required amount of the security money within the prescribed time. If the tenderer fails to deposit the required amount of the security money within the prescribed time, the Engineer may reject the tender.

If the Engineer is not competent to accept the tender himself, he will forward the tender with the specification and other documents signed by the tenderer for acceptance to the Engineer competent to accept the same. In case he rejects the tender the security money deposited shall be refunded to tenderer.

10. When a tender is selected for acceptance the tenderer shall deposit the required amount of the security deposit (As per letter no 1499/W dated 01.02.2023) in shape of N.S.C./Post Office Savings Bank Account/Post Office Time Deposit Account/Kisan Vikas Patra/Bank Guarantee in favour of the Divisional Officer (**Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur**) from any Nationalized Scheduled Bank in India counter guaranteed by its local Branch at Bhubaneswar/ e-Bank Guarantee executed on the National e-Governance Services Limited (NeSL) Digital Document Execution Portal towards E.M.D./initial Security Deposit /any other security deposit from the contractor or supplier.

11. The amount of security money to be deposited by the tenderer whose tender is selected for acceptance shall be **2** percent of the bid value of the work and towards this amount, the earnest money already deposited by him shall be credited, failing which tender shall be liable for rejection.

12. When tender has been selected for acceptance and the required amount of the security money has been deposited the Engineer shall scrutinize all pages of the form of item, rate, tender and contract for works to see that the form has been properly filled up and signed by the contractor and the signature witnessed. He shall then, if he is competent to accept the tender, sign the acceptance of the tender or if he is not so competent, shall send the form for signature of the acceptance to the officer competent to accept it.

13.(i) A separate and specific bank account may be opened to keep the security deposits deducted from the running bills in any Nationalized Bank only in the name of the concerned Superintending Engineer of the Division/ FA & CAO, but not in personal name.

(ii) The security amount so deposited should be withdrawn from the same account after completion of the defect liability period of the concerned work and after the work is found defect free in all respects.

14. All tenderers are required to submit a list of works, which are in hand at the time of submitting their tenders. The list of works are required to be submitted in the proforma by the Superintending Engineer under whom he has executed the work in order to judge their past performance (vide Works Department Circular No. 15443 dt. 01.08.2005.)

15. The earnest money deposited is liable to be forfeited to Govt. if the tenderer backs out from the offer before acceptance of the tender by the competent authority.

16. T.D.S (Tax Deducted at Source) towards GST (OGST and CGST) as applicable will be deducted at the rate prescribed in the GST acts as applicable & as amended from time to time. The Cess will be deducted @ 1% under the Building & Other Construction Workers (Regulation and Employment and Conditions of Service) Act,1996, as enforced vide Govt of Orissa, Labour & Employment Department Resolution No. LL-I-(iii)-25/07- 12653, dt. 15.12.2008.

17. The contractor has to mention percentage excess or less over the estimated (in figures as well as words) in prescribed format of the Bill of Quantity (BOQ) appended to the tender document.

18. Only percentage quoted shall be considered. Percentage quoted by the contractor should be accurately filled-in figures and words, so that there is no discrepancy.

(a) If any discrepancy is found in the percentage quoted in words and figures, then the percentage quoted by the contractor in words shall be taken as correct.

(b) The contractor will write percentage excess / less up to **two decimal** points only.

(c) The tender shall be written legibly and free from erasures, over writings or corrections of figures. Corrections, over writings and interpolations, where unavoidable, shall be made by making out, initiating, dating and rewriting.

19. Bills for percentage rate tender shall be prepared at the estimated rates for individual items only and the percentage excess or less shall be added or subtracted from the gross amount of the bill.

TENDER FOR WORKS

I/We hereby tender for the execution for the Governor of Orissa of the work specified in the under written memorandum at the percentage rate specified therein within a period of **06 (Six)** months from the date of written order to commence and complete in all respect with the specifications, designs, drawings and other documents referred to in rule-1 there of and subject to the annexed conditions of contract and with such material as are provided for by and in all other respects in accordance with such conditions so far as applicable.

MEMORANDUM

a)	If several sub works are included they should be detailed in a separate list.	a)	Name of work :	**"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP".**
		b)	Name of the Contractor :	
		c).i ii.	Amount put to tender : Agreement Amount :	**Rs. 80.65 lakh**
		d)	Earnest money deposit :	**Rs.80,700.00 (To be transferred online as mentioned in DTCN)**
e)	The deposit will be 2% of the bid value of the work	e) i)	Initial Security deposit (including earnest money) to be deposited before the commencement of the work: Additional Performance Security :	
f)	This percentage deduction from bills will be credited to the contractor's security deposit	f)	Percentage to be deducted from bills :	5% (five percent)
		g)	Time required for the work from date of written order to commence :	**06 (Six)** Calendar Months
		h) i	Date of written order to commence :	
		ii.	Stipulated date of completion:	
i)	Total number of items of work tendered for :			**Refer BOQ**

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Should this tender be accepted I/We hereby agree to abide by and fulfill all the terms and provisions of the said conditions of contract annexed here to so far as applicable, or in default there of to forfeit and pay to the Governor of Orissa or his successors in office the sums of money mentioned in the said conditions.

Dated the ……..day of ……

Signature of the Contractor

Signature of the Contractor before submission of tender

Witness:

Signature of one witness to Tenderer's signature

Address:

Occupation:

The above tender is hereby accepted by me on behalf of the Governor of Orissa.

Dated the ……day of …….

Signature of the Officer
by whom accepted

CONDITIONS OF CONTRACT.

Compensation for delay.

Clause I. All compensation or other sums of money payable by the contractor to Govt. under the terms of his contract may be deducted from or paid by sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due or may become due to the contractor by Govt. on any account whatsoever and in the event of his security deposit being reduced by reason of any such deduction or sale as aforesaid the contractor shall within ten days thereafter make good in cash or Government securities endorsed as aforesaid any sum or sums which may have been deducted from, or raised by, sale of the security deposit or any part thereof.

Clause 2 (a) The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date of which the written order to commence work is given to the contractor. The work shall throughout the stipulated period of the contract be carried on with all due diligence (time being deemed to be of the essence of the contract on the part of the contractor) and the contractor shall pay as compensation an amount $\frac{1}{2}$ percent on the amount of the estimated cost if the whole work as shown by the tender for every day that the work remains un-commenced, or unfinished after the proper dates and further, to ensure good progress during the execution of the work the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month, to complete one-fourth of the whole of the work before one fourth of the whole time allowed under the contract has elapsed one-half of the work, before one-half of such time has elapsed, and three-fourth of the work, before three-fourth of such time has elapsed, in the events of the contractor failing to comply with the conditions he shall be liable to pay as compensation, an amount equal to one third percent of the said estimated cost of the whole work for every day that the due quantity of work remains incomplete. Provided always that the entire amount of compensation to be paid under the provisions of this clause shall not exceed 10 percent on the estimated cost of the work as shown in the tender.

Action when whole security deposit is forfeited.

Clause 2 (b) If there are possibilities of exceeding this compensation amount as mentioned in clause (A) 10 percent of the estimated cost or in any case in which under any clause or clauses of this contract the contractor shall have rendered himself liable to pay compensation amounting to the whole of his security deposit in the hands of Govt. (whether paid in one

CONTRACTOR SUPERINTENDING ENGINEER

sum or deducted by installments) the Superintending Engineer on behalf of the Governor of Orissa shall have power to adopt any of the following courses, as he may deemed best suited to the interest of Govt.

i) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Superintending Engineer shall be Conclusive evidence) and 20% of the value of left over work will be realized from the contractor as penalty.

ii) To employ labour paid by the Public works department and to supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (of the amount of which cost & price certificate of the Superintending Engineer shall be final and conclusive against the contractor) and crediting him with the value of the work done, in all respects in the same manner and at the same percentage rate as if it had been carried out by the contractor under the terms of his contract the certificate of the Superintending Engineer as to the value of the work done shall be final and conclusive against the contractor.

iii)To measure up the work of the contractor, and to take such part of the work of the contract as shall be unexecuted out of his hands and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor if the whole work had been executed by him (of the amount of which excess the certificate in writing of the Superintending Engineer shall .be final and conclusive) shall be borne and paid by the original contractor and may be deducted from any money due to him by Govt. under the contract or otherwise, or from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

In the event of any of the above courses being adopted by the Superintending Engineer, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchase or procured any materials or entered into any engagements or made any advance an account of or with a view to the execution of the work or the performance of the contract and in case the contract shall be rescind under the provision aforesaid the contractor shall not be entitled to recover or be paid any sum for any work there to force actually preformed under this contractor unless and until the

Superintending Engineer shall have certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so

certified.

iv) Security deposit of the contractor shall be refunded only **one year** after the date of completion of the work provided the final bill has been paid and defects if any rectified.

Clause 3. In any case in which any of the powers, conferred upon the Superintending Engineer by clause 2 hereof shall have become exercisable and the same shall not be exercised the non exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not withstanding be exercisable in the event of any future case default by the contractor of which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his security deposit and the liability of the contractor for past and future compensation shall remain unaffected in the event of the Superintending Engineer putting in force the powers vested in him under the preceding clause he may if he so desire, take possession of all or any tools, plants materials and stores, in or upon the works or the site thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in the account as the contract percentage rate, or in case of these not being applicable at current market percentage rate to be certified by the Superintending Engineer whose certificate thereof shall be final otherwise the Superintending Engineer may be notice in writing to the contractor or his clerk of the works, foreman or other authorized agents require him to remove such tools plants, materials or stores from the premises (within a time to be specified in such notice) and in the event of the contractor failing to comply with the such requisition the Superintending Engineer may remove them at the Contractor's expenses or sell them by auction or private sale on account of the contractor and at his risk in all respect, and the certificate of the Superintending Engineer as to the expenses of any such removal and the amount of proceeds and expenses of any such sale shall be final and conclusive against the contractor.

Contractor remains liable to pay compensation if action not taken under Clause - 6

Power to take possession of or require removal of or sell contractor plants.

Clause 4. If the contractor shall desire an extension of the time for completion of the work, on the ground of his having been unavoidably hindered in its execution or any other

Extension of time

ground, he shall apply in writing to the Superintending Engineer within 30 days of the date of the hindrance on account of which he desires such extensions as aforesaid and the Superintending Engineer shall if in his opinion (which shall be

final) reasonable grounds be shown therefore, authorize such extension of time, if any, as may in his opinion, be necessary or proper. The Superintending Engineer shall at the same time inform the contractor whether he claims compensation for delay.

Final Certificate.

Clause 5. On completion of the work the contractor shall be furnished with a certificate by the Superintending Engineer (herein after called the Engineer-in-charge) of such completion but no such certificate be given nor shall the work be considered to be complete until the contractor shall have removed from the area of the premises (to be distinctly marked by the Superintending Engineer in the site plan) on which the work shall be executed, all scaffolding, surplus materials, and rubbish and cleared off the dirt from all wood works doors windows, walls, floors or other parts or any building in, upon or about which the work is to be executed or of which he may have had possession for the purpose of the execution thereof, nor until the work shall have been measured by the officer of the Public Works department in accordance with the rules of the department whose measurements shall be binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding surplus materials and rubbish and cleaning off dirt on or before the date fixed for the work the Engineer-in-charge may at the expenses of the contractor remove such scaffoldings, materials and rubbish and dispose of the same as he thinks fit and clean of such dirt as aforesaid and the contractor shall forthwith pay the amount of all expenses incurred and shall have no claim in respect of any such scaffolding of surplus materials as aforesaid except for any sum actually realized by the sale thereof.

Sub-Clause 5. If in the opinion of the Engineer-In-Charge, which shall be final & binding on the contractor, occupation or utilization of a portion of the work completed no way interferes with progress of the work the same may be occupied or utilized by on behalf of the Government under the written order of the Engineer-In-Charge and get the defects, if any rectified by the contractor at his own cost within six months from the date of completion of the whole work provided that the Contractor will not be allowed any concession either in the shape of extension of stipulated period or any other monetary compensation on account of such occupation or use.

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Clause 6. A bill shall be submitted by the contractor each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous month and the Engineer-in-charge or his subordinate shall take the requite measurement for the purpose having the same verified and the claim as admissible adjusted if possible before the expiry of ten days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid the Engineer-in-charge or his subordinate shall measure up the said work in the presence of the contractor whose countersignature to the measurement list will be sufficient warrant and the Engineer-in-charge or his subordinate shall be binding on the contractor in all respects.

Payment on intermediate to be regarded as advances and bill to be submitted monthly.

Provided that, if any balance of 5% security is outstanding from each such payment shall be deducted so much, not exceeding 5% as may be necessary to make up the balance of the security. All such intermediate payments to the contractor shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound the imperfect or unskillful work to be removed and taken away and reconstructed or re-erected or to be considered as an admission of due performance of the contract or any part thereof in any respect or the accrual of any claim nor shall it conclude determine or effect in any way the powers of the Engineer-in-charge under these conditions or any of them as to the final settlement or adjustment of the accounts or otherwise or in any other way very or affect the contract.

Clause 7. The final bill shall be prepared by the officers of the Public Works Department in accordance with the rules of the department in the presence of the contractor within one month of the date fixed for completion of the work.

Clause 8. If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the Engineer-in-charge's store, or if it is required that the contractor shall use certain stores to be provided by the Engineer-in-charge under the conditions of this contract (such materials and stores, and the price to be charged therefore as hereinafter mentioned being so far practicable for the convenience of the contractor but not so as in many way to control the meaning or effect of this contractor are specified on the schedule or memorandum hereto annexed), the contractor shall be supplied with such

Stores supplied by the Government

DELETED

materials and stores noted in the annexed schedule as are

CONTRACTOR SUPERINTENDING ENGINEER

required from time to time to be used by him for the purpose of the contract only and the value of the full quantity of materials and stores so supplied at the percentage rate specified in the said schedule may be set off or deducted from any sums then due or thereafter to become due to the contractor under the contractor or otherwise or against or from the security deposit or the proceeds of sale thereof if the same is held in securities, the same or a sufficient portion thereof being in this case sold for the purpose. All materials supplied to the contractor shall remain the absolute property of Govt. and shall not on any account be removed from the site of the work and shall all time be open to inspection by the Engineer-in- charge any such materials unused and in perfectly good condition at the time of the completion or determination of the contract shall be returned to the Engineer-in-charge's store at the prevailing market rate or at the issue whichever is less if by a notice in writing under his hand he shall so require but the contractor shall not be entitled to return any such materials unless with such consent and shall have not claim for compensation on account of any such materials so supplied to him as aforesaid being unused by him or for any wastage in or damage to any such materials.

Clause 8 (a) "If a contractor removes any material or stock so supplied to him from the site of the work in contravention of the provisions of this clauses with a view to dispose of the same dishonestly he shall in addition to any other liability civil or criminal arising out of this contract be liable to pay a penalty equivalent to five times the price of the said materials or stock, according to the stipulated rate. The penalty so imposed shall be recoverable from any sum that be then or at any time thereafter may become due to the contractor or from his security deposit or the process of sale thereof".

Clause 8 (b) Owing to difficulty in obtaining certain materials in the open market the Govt. have undertaken to supply materials specified in the schedule here to annexed. There may be delay in obtaining materials by the Department and the contractor is therefore required to keep himself in touch with the day to day position regarding the supply of materials from the Engineer-in-charge and to so adjust the progress of the work that their labour may not remain idle nor may there by any other claim due to or arising from delay in obtaining the materials. It should be clearly understood that no monetary claim whatsoever shall be entertained by the Government on account of delay in supplying materials, however extension of time for completion of work can be granted on timely

application by the contractor vide also clause – 4.

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Clause 9. The contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner and both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly full and faithfully to designs, drawings and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the contractor shall be entitled to have access at such office for the purpose of inspection during office hour and the contractor shall if he so require be entitled at his own expense to make or cause to be made copies of the specifications and of all such design, drawings and instruction as aforesaid.

Work to be executed in accordance with specification, drawing and order

Sub-clause -9 The work should be done strictly in accordance with the relevant specifications of the ISI Codes. If the work is not covered by the specification of ISI it should be done in accordance with the provision in the Detailed standard specifications (O.D.S.S.). In case, the work is not covered by O.D.S.S. the work should be executed as per the instruction of the Engineer-in-charge.

Clause 10. The Engineer-in-charge shall have power to make any alternation in or additions to the original specification, drawings, designs, and instructions that may appear to him necessary and advisable during the progress of work and the contractor shall be bound to carry out the work in accordance with any instructions which may be given to him in writing singed by the Engineer-in-charge and such alternation shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respect on which he agreed to do the main work and at the same rate as are specified in the tender for the main work. The time for the completion of the work shall be extended in the production that the additional work differs to the original contract work and the certificate of the Engineer-in-charge shall be conclusive as to such proportion. And if the additional work includes any class work for which no rate is specified in this contract then such class of work shall be carried out at the rate entered in the sanctioned schedule of rate of the locality during the period when the work is being carried on and if such last mentioned class of work is not entered on the schedule of rate of the district then the contractor shall within seven days of date of his receipt of the order to carry out the work inform the Engineer-in-charge of the rate which it is his intention to charge for such class of work and if the Engineer-

Alternation in specification and designs

Do not invalidate contracts

Extension of time in Consequence of alternations.

in-charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable.

Rate of works not in estimate of schedule or rate of the district.

No deviations from the specification stipulated in the contractor additional items of work shall ordinarily be carried out by the contractor nor shall any altered additional or substituted work be carried out by him unless the rate of the substituted altered or additional items have been approved and fixed in writing by the Engineer-in-charge. The contractor shall be bound to submit his claim for any additional work done during the month on or before the 15th day of the following month accompanied by a copy of the order in writing of the Engineer-in-charge for the additional work and that the contractor shall not be entitled to any payment in respect of such additional work if he fails to submit his claim within the aforesaid period.

Provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rate shall have been determined as lastly herein before mentioned in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate as shall be fixed by the Engineer-in-charge. In the event of a dispute the decision of the Superintending Engineer of the Circle will be final.

No compensation or alteration in or restriction of work to be carried out.

Clause 11. If at any time after the commencement of the work the Govt. or Orissa shall for any reason whatsoever nor require the whole thereof as specified in the tender to be carried out the Engineer-in-charge shall give notice in writing of the fact to the contractor. Who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full but which he did not derive in consequence of the full amount of the work not having been carried out neither shall he have any claim for compensation by reason of any alteration having made in the original specifications, drawings, designs and instruction which shall involve any curtailment of the work as originally contemplated.

Action and compensation payable in case of bad work

Clause 12. If it shall appear to the Engineer-in-charge or his subordinate-in-charge of the worm, that any work has been executed with unsound, imperfect unskillful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the contractor shall on demand in writing from the Engineer-in-charge specifying the work materials or articles complained of not withstanding that the same may have been inadvertently passed certified and paid for forth with rectify or remove and reconstruct the work so specified in whole or in part as the case may require or as the case may be remove the materials or articles at his own proper charge and cost and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid then the contractor shall be liable to pay compensation at the rate of one percent on the amount of the estimate for every day not exceeding ten days while his failure to do so shall continue and in the case of any such continue and in the case of any such failure the Engineer-in-charge may rectify or remove and execute the work or remove and replace with others the materials or articles complained of as the case may be at the risk and expense in all respect of the contractor.

Work to be open for inspection.

Clause 13. All work under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the Engineer-in-charge and his subordinates and the contractor shall at all times during the usual working hours and at all other times at which reasonable notice of the intension of the Engineer-in-charge or his subordinate to visit the works shall have been given to the contractor either himself be present to received orders and

Contractor or responsible Agents to be present.

instructions, or have a responsible agent duly accredited in writing present for that purposes. Orders given to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

Notice to be given before work is covered up.

Clause 14. The contractor shall give not less five days notice in writing to the Engineer-in-charge or his subordinate in charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is so covered up or placed beyond the reach of measurement any work without the consent in writing of the Engineer-in-charge or his subordinate in charge of the work and if any work shall be covered up or placed beyond the

reach of measurement without such notice having been given or consent obtained the same shall be uncovered at the contractor's expense or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Contractor liable for damage done and for 6 months from date of final certificate of its completion.

Clause 15. If the contractor or his work people or servants shall break defect injure or destroy any part of building in which they may be working or any building road, fence, enclosure or grass land or cultivated ground contiguous to the premises on which the work or any part of it is being executed or if any damage shall happen to the work while in progress from any clause whatever or any imperfection became apparent in it within six months from the date of final certificate of its completion shall have been given by the Engineer-in-charge as completion shall have been given by the Engineer-in-charge as aforesaid, the contractor shall make the same to be made good by other workmen and deduct the expense (of which the certificate of the Engineer-in-charge shall be final) from any sums that may be then or at any time thereafter may become due to the contractor, or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof and the contractor shall be liable to pay any part of the expenses not so recovered by the Engineer-in-charge.

Contractor to supply plants, ladders, scaffolding etc.

Clause 16. The contractor shall supply at his own cost all materials (except such special materials if any as may in accordance with the contract be supplied from the Engineer-in-charge's stores) plant, tools, appliances, implements ladders, cordage, tackle scaffolding and temporary works requisite or proper for the proper execution of the work, whether original altered or substituted and whether included in the specification or other documents forming part of the contractor or referred to in the conditions or not or which may be necessary for the purpose of satisfying or complying with the requirement of the Engineer-in-charge as any matter as to which under this conditions entitled to be satisfied, which he is entitled to require together with carriage therefore to & from the work. The contractor shall also supply without charge the requisite no of persons with the means & materials necessary for the purpose of setting out works and counting, weighing and assisting in the measurement or examination at any time and form time to time of the work or materials. Failing his so doing the same may be provided by the Engineer-In-Charge at the expense of the contractor also provide all necessary fencing and light required to protect the public from accident and shall be bound to under the contract, or from his security deposit or the proceeds of sale thereof or

And is liable for damages arising from non-provision of lights fencing etc.

of a sufficient portion thereof. The contractor shall bear the expenses of defense every suit action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit action proceedings to any such person or which may with the consent of the contractor be paid to compromise any claim by any such person.

Clause – 17 No female labour shall be employed within the limits of a cantonment. The contractor shall not employ for the purpose of this contract any labour below the age of twelve year, and shall pay to each labourer; for the work done by such labour, wages not less than the wage paid for similar work in the neighborhood.

Explanation : Fair wages means wages whether for time or piece work prescribed by State P.W.D. provided that where higher percentage rate have been prescribed under the minimum wages Act 1948 wages at such higher percentage rate would constitute "Fair wages" [W/D No.22059 dated 16.8.77.

The Superintending Engineer shall have the right to enquire into and decide any complaints alleging that the wages paid by the contractor to any labourer for the work done by such labourer is less than the wages paid for similar work in the neighborhood.

The officer in charge of the work shall have the right to decide whether labourer employed by the contractor is below the age of twelve years and to refuse to allow any labourer whom he decides to be below the age of twelve years to be employed by the contractor.

Clause – 17 (a) The contractor shall, if so required by the Engineer-in-charge employ one more Engineering Graduate or Diploma holder as apprentices at his own cost if the cost of work as shown in the tender exceeds Rs.2,50,000/- The apprentices will be selected by the Chief Engineer. The period of employment will commence within one month after the date of work order and would last till the date when 90% of work is completed. The stipend to be paid to the apprentices, should not be less than Rs.200/- per day in case of graduate Engineers and not less than Rs.150/- per day in case of Diploma holders. The number of apprentices to be employed should be fixed by the Chief Engineer in a manner so that total expenditure does not exceed 1% of the tender cost of the work.

Clause – 17 (b) Super/Special class Contractor shall employ under him one Graduate Engineer and Two Diploma Holders belonging to the State of Orissa. Like wise 'A' class contractor shall employ under him one Graduate Engineer or Two Diploma holders under the contractor shall be full time & continuous and they should not be superannuated, retired, dismissed or removed personnel from any State Govt. or Central Govt. service/public Sector undertakings, private companies and firms or be ineligible for appointment to Government service. The contractor shall pay them monthly emoluments which shall not be less than the emoluments of the personnel of equivalent qualification employed under the State Government of Orissa. The Chief Engineer, Roads Orissa may however, assist the contractor with names of such unemployed Graduate Engineer and Diploma holders if such help is sought for by the contractor. The names of such Engineering personnel appointed by the contractor should be intimated to the tender receiving authority along with the tender.

Employment of Graduate Engineers & Diploma Holders

Each bill of the **A Class/Special class** contractor shall be accompanied by an employment Roll of the Engineering personnel together with a certificate of the Graduate Engineer or Diploma holder employed by the contractor to the effect that the work executed as per the bill has been supervised by him.

Clause 18. The contractor shall not be assigned or sublet without the written approval of the Superintending Engineer. And if the contractors shall assign or sublet his contract or attempt so to do or become insolvent or commence any insolvency proceedings, or make any composition with his creditor or attempt so to do or if any bribe gratuity, gift, loan perquisite reward or advantage, pecuniary or otherwise, shall either directly or indirectly be given promised or offered by the contractor or any of his servants or agents to any public officer or person in the employ of Govt. in any way relating to his office employment or if any such officer on person shall become in any way directly or indirectly interested in the contract, the Superintending engineer may thereupon by notice in writing to rescind the contract and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure as if the contract has been rescinded under clause 3 thereof and in addition the contractor shall not be entitled to recover or be paid for any work there to for actually performed under the contract.

Work not to be sublet without written permission from Engineer-in-Charge.

Contract may be rescinded and any security deposit forfeited for subletting bribing or if contractor becomes in solvent

Clause 19. All sums payable by way of compensation under any of the conditions shall be considered as reasonable compensation to be applied to the use of Govt. without reference to the actual loss or damages sustained, and whether or not any damage shall have been sustained.

The sum payable by way of compensation to be considered as reasonable without reference to actual loss.

Clause 20. In the case of a tender by partners any change in the constitution of the firm shall be forth-with notified by the contractor to the Engineer-in-charge for his information.

Change in constitution of firm

In case of failure to notify the change in the constitution within fifteen day the Engineer-in-charge may by notice in writing rescind the contracts and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Govt. and the same consequences shall ensure as if the contract had been rescinded under clause 3 thereof and in addition the contractor shall not be entitled to recover or be paid for any works therefore actually performed under the contract.

Clause 21. All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Superintending Engineer of the circle for the time being who shall be entitled to direct at what point or points and in what manner they are to be commenced and from time to time carried on.

Clause 22. Deleted

Clause 23. When the estimate on which a tender is made includes lump sumps in respect of parts of the work the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same percentage rate as are payable under this contract for such items, or if the part of the work in question is not in the opinion of the Engineer-in-charge capable of measurement the Engineer-in-charge may by his discretion pay the lump sum amounts entered in the estimate and the certificate in writing of the Engineer-in-charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of this clause.

Lump sums in the estimate.

Clause 24. In the case of any class of work for which there is no such specification as is mentioned in rule. I, such work shall be carried out in accordance with the circle specification and in the event of the there being no circle specification then in such case the work shall be carried out in all respects in

Action where no specification.

accordance with the instruction and requirements of the Engineer-in-charge.

Clause 25. The expression "works " or "work" where used in these conditions shall unless there be something either in the

Definition of works

subject or context repugnant to such construction be construed and taken to mean the 'works' by or by virtue of the contract contracted to be executed whether temporary or permanent and whether original altered substituted or additional

Clause 26. Government shall be entitled to recover in full from the contractor any amount that the Govt. may be liable to pay under Workmen's Compensation Act VIII of 1923 to any workmen employed in course of execution of any part of the work covered by these contract.

Clause 27. That the purpose of jurisdiction in the event of dispute if any the contract should be deemed to have been entered into within the State of Odisha and it is agreed that neither party to the contract or agreement will be competent to bring a suit in regard to the matters covered by this contract at any place outside the State of Orissa.

Clause 28. The department will have the right to inspect the scaffolding and centering made for the work and can reject partly or fully such structure if found defective in their opinion.

Clause 29. The contractor at his own cost for his labour camp will make sanitary arrangements.

Clause 30. The contractor shall bear all taxes including sales tax, income tax, royalty fair-weather charges and tollage where necessary.

Clause 31. Price Escalation (AS per Works Dpt. Let No 15847/W dated 19.11.2019) **Contract price shall be adjusted for increase or decrease in rates and price of labour, cement, steel, bitumen, pipes, POL & other materials component in accordance with the following principles and procedure as per formula given below.**

31.1: Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in following Paras.

(a) The price adjustment shall apply for the work done from the start date given in the contract date up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.

(b) The price adjustment shall be determined during each month from the formula given in following Paras

(c) Following expressions and meanings are assigned to the work done during each month: R= Total value of work done during the month . It would include the amount of secured advance granted, if any, during the month, less the amount of secured advance recovered , if any during the month. It will exclude value for works executed for extra items under variations.

31.2: To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

The formula (e) for adjustment of prices are :-

31(a) (i): Adjustment of Other Materials Component

	Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen, pipe and POL procured by the contractor shall be paid in accordance with the following formula:
V_M =	$0.85 \times P_m/100 \times R \times (M_1-M_0)/M_0$
V_M =	Increase or decrease in the cost of work during the month under consideration due to changes in rates for local materials other than cement, steel, bitumen and POL.
M_0 =	The all-India wholesale price index (all commodities) on 28 days preceding the date of opening of Bids, as published by the Ministry of Commerce and Industry, Government of India, New Delhi
M_1 =	The all-India wholesale price index (all commodities) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi
P_m =	Percentage of local material component (other than cement, steel, bitumen and POL) for the work

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31(a) (ii): Adjustment for Cement Component

	Price adjustment for increase or decrease in the cost of cement, procured by the contractor shall be paid in accordance with the following formula:
V_C =	$0.85 \times P_c /100 \times R \times (C_1-C_0)/C_0$
V_C =	Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement .
C_0 =	The all-India wholesale price index for Ordinary Portland Cement (OPC) on 28 days preceding the date of opening of Bids, as published by the Ministry of Commerce and Industry, Government of India, New Delhi
C_1 =	The all-India wholesale price index for Ordinary Portland Cement (OPC) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi
P_C =	Percentage of Cement Component of the work

31(a) (iii): Adjustment for Steel Component

	Price adjustment for increase or decrease in the cost of Steel, procured by the contractor shall be paid in accordance with the following formula:
V_s =	$0.85 \times P_s/100 \times R \times (S_1-S_0)/S_0$
V_s =	Increase or decrease in the cost of work during the month under consideration due to changes in rates for Steel.
S_0 =	The all-India wholesale price index for Steel (Mild Steel long products) on 28 days preceding the date of opening of Bids, as published by the Ministry of Commerce and Industry, Government of India, New Delhi
S_1 =	The all-India wholesale price index for Steel (Mild Steel long products) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi
P_s =	Percentage of Steel Component of the work

31(a) (iv): Adjustment of Bitumen Component

	Price adjustment for increase or decrease in the cost of Bitumen, shall be paid in accordance with the following formula:
V_b =	$0.85 \times P_b/100 \times R \times (B_1-B_0)/B_0$

V_b =	Increase or decrease in the cost of work during the month under consideration due to changes in the rate for Bitumen.
B_0 =	The official retail price of bulk bitumen at the IOC / BPCL depot at nearest center on the day 28 days prior to date of opening of Bids.
B_1 =	The official retail price of bulk bitumen at IOC / BPCL depot at nearest center for the 15th day of the month under consideration.
P_b =	Percentage of Bitumen Component of the work

31(a) (v): Adjustment towards differential cost of Pipes.

	Price adjustment for increase or decrease in the cost of Pipe shall be paid in accordance with the following formula:
V_{pi} =	$0.85 \times P_{pi} /100 \times R \times (P_{i1}-P_{i0})/P_{i0}$
V_{pi} =	Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the month under consideration
P_{pi} =	Percentage of Pipe Component of the work
P_{i1} =	All India wholesale price index of Pipe for the period under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.
P_{i0} =	All India wholesale price index of Pipe on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

31(b): Adjustment of Labour Component

	Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:
V_L =	$0.85 \times P_l /100 \times R \times (L_1-L_0)/L_0$
V_L =	Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour.
L_0 =	The minimum wages for unskilled labour as Notified by the Government of Odisha as prevailed on the last stipulated date of receipt of tender including extension, if any.
L_1 =	The minimum wages for unskilled labour as Notified by Government of Odisha as prevailed on the last date of the month previous to the one under consideration.
P_l =	Percentage of labour component of the work

31(c): Adjustment of POL(fuel and lubricant) component

	Price adjustment for increase or decrease in cost POL (fuel and lubricant) shall be paid in accordance with the following formula:
Vf =	$0.85 \times P_f /100 \times R \times (F_1-F_0)/F_0$
Vf =	Increase or decrease in the cost of work during the month under consideration due to changes in the rates for fuel and lubricants.
F0 =	The official retail price of High-Speed Diesel (HSD) at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center on the day 28 days prior to the date of opening of Bids.
F1 =	The official retail price of (HSD) at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center for the 15th day of the month under consideration.
Pf =	Percentage of fuel and lubricants component of the work

Note : For the application of this clause, the price of High Speed Diesel oil has been chosen to represent fuel and lubricants group.

31(d): Adjustment for Plant and Machinery Spares component

	Price adjustment for increase or decrease in the cost of Plant and machinery spares procured by the Contractor shall be paid in accordance with the following formula:
Vp =	$0.85 \times P_p /100 \times R \times (P_1-P_0)/P_0$
Vp =	Increase or decrease in the cost of work during the month under consideration due to changes in the rates for Plant and machinery spares.
P0 =	The all-India wholesale price index for manufacture of machinery for mining, quarrying and construction on 28 days preceding the date of opening of Bids, as published by the Ministry of Commerce and Industry, Government of India, New Delhi
P1 =	The all-India wholesale price index for manufacture of machinery for mining, quarrying and construction for the moth under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi
Pp =	Percentage of Plant and machinery spares component of the work

Note: For the application of this clause, index of manufacturing of machinery for mining, quarrying and construction has been chosen to represent the Plant and machinery Spares group.

Regarding wholesale price Index (WPI) for appropriate commodity for payment of price adjustment, due to change of base year of WPI from 1993-94 to 2004-05 & 2011-12, it is observed that, the commodity "Bars and Rod", 'Cement'. Heavy machinery and parts included in the list of WPI 1993-94 series are not mentioned as such in the WPI 2004-05 & 2011-12 series. Therefore, the following items in the WPI 2004-05 & 2011-12 series shall be considered corresponding to items in WPI 1993-94 series.

Sl.No.	Item in WPI 1993-94 series	Item in WPI 2004-05 series	Item in WPI 2011-12 series.
1.	Cement	Grey Cement	Ordinary Port land Cement
2.	Bars & rods	Rebars	Mild steel long products
3.	Heavy Machinery & parts	Construction Machinery	Manufacture of machinery for mining, quarrying & construction

31(e): APPLICATION OF ESCALATION CLAUSE.

The Contractor shall for the purpose of availing re-imbursement/refund of differential cost of steel, bitumen, cement, pipe, POL and wages, keep such books of account and other documents as are necessary to show that the amount of increase claimed or reduction available and shall allow inspection of the same by a duly authorized representative of Government and further, shall at the request of the Engineer-in-Charge, furnish documents to be verified in such a manner as the Engineer-in-Charge may require any document and information kept. The contractor shall within a reasonable time of 15 days of his becoming aware of any alternation in the price of such material, wages of labour and /or price of P.O.L. give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition along with information relating to there to which he may be in a position to supply.

Percentage Table

Sl. No.	Category of works		% Component (cos wise)		
			Labour (P_l)	POL (P_f)	Steel(P_s)+Cement(P_c) +Bitumen (P_b)+ Pipes (p_p) +Plant & Machinery spare & component(P_p) + Other materials*
1	R&B works (% of component)	Road Works	5	5	90
		Bridge works	5	5	90
		Building work	5	5	90
2	Irrigation works(% of component)	Structural work	5	5	90
		Earth, Canal & Embankment work	5	5	90
3	P.H. Work	Structural work	5	5	90
		Pipeline work	5	5	Pipe-70% *Machinery + Other material-20%
		Sewer Line	5	5	Pipe-70% *Machinery + Other material-20%

Note: Further break up may be worked out considering the consumption of Cement, Steel, Bitumen, Pipe and Plant & Machinery Spare Component in the concerned works and shall be provided in the bid document in shape of "Schedule of Adjustment Data" as n "Appendix to Bid".(enclosed herewith

CONTRACTOR SUPERINTENDING ENGINEER

Appendix to Bid

Schedule of Adjustment Data

{For all works, adjustment factor for Labour and POL shall be considered @ 5% each Steel, Cement, Pipes, Other materials and Machinery shall contribute to 90% of Price Adjustment and shall be calculated for each work separately during preparation of estimate, shall be approved by the authority during technical sanction as a "Schedule of Adjustment Data" and shall form part of the Bid Document}

Name of the Work - **"Construction of Back Side Boundary Wall of Kanupur Irrigation Colony at Basudevpur of KIP".**

Cl.No.-31 of P1 contracts Sl. No.	Index description	Source of Index	Base value*	Base Date*	Weightage Item**
31(a)(i)	Other Materials	All India whole sale price index (all commodities) as published by the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31(a)(ii)	Cement	All India whole sale price index for Cement (Ordinary Portland Cement) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31(a)(iii)	Steel	All India whole sale price index for Steel (Mild Steel-Long Products) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31(a)(iv)	Bitumen (VG-30)	Official retail price of bulk bitumen at the nearest IOC/HPCL depot.			
31(a)(v)	Pipes	Whole sale price index for the type of Pipe under consideration, as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31(b)	Labour	Minimum Wage notified by the Labour and Employee's State Insurance Department of Government of Odisha, India			5%

31(c)	POL	Official retail price of HSD at nearest IOCL / GPCL / BPCL Consumer pump depot.			5%
31(d)	Plant and Machinery	Whole sale price index for Manufacture of Machinery for Mining, Quarrying and Construction as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
			Total		

Clause 32. After the work is finished all surplus materials and debris are to be removed by the contractor and preliminary works such as vats, mixing platforms, etc are to be dismantled and all materials removed from site. The ground up to 100'-0" wide from the building should be cleared and dressed.

FAIR WAGE CLAUSE

Clause 33. (a). The contractor shall not employ for the purpose of this contract any person who is below the age of twelve years and shall pay to each labour for work done by such laborers fair wages.

Explanation : 'Fair Wage' means wages, whether for time of piece work prescribed by the State Public Works Department provided that where higher percentage rate have been prescribed under the minimum wages Act 1948 wages at such higher percentage rate should constitute fair wages.

The Superintending Engineer shall have the right to enquire into and decide any complain alleging that the wages paid by the contractor to any laborer for the work done by such labor is less than the wages as per sub-paragraph (1) above.

(b) The contractor shall, not withstanding the provision of any contract to contrary, cause to be paid a fair wage to labourers indirectly engaged on the work including any labour engaged by his sub-contractors in connection with the said work, as if the labourers had been immediately employed by him.

(c) In respect of all labour directly or indirectly employed in the works for the performance of the contractors part of this agreement, the contractor shall comply with or cause to be complied with all regulations made by Government in regard to payment of wages, wage period deduction from wages recovery of wages not paid and deduction unauthorized made, maintenance of wage register, wage cards, publication of scale of wages and other terms of employment inspection and submission of periodical returns and all matters of alike nature.

(d) The Superintending Engineer or Sub-Divisional Officer concerned shall have the right to deduct, from the money due to the contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non fulfillment of the conditions of the contract for the benefit of the workers non payment of wages or of adductions made from his or their wages which are not justified by their terms of the contract or non observance of the regulations. Money so deducted should be transferred to the workers concerned.

(e) Vis-a-Vis, the Govt. of Odisha the contractor shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractor.

(f) The regulations aforesaid shall deemed to be a part of this contract and any branch thereof shall be branch of this contract.

Odisha P.W.D. / Electricity Department
Contractor's Labour Regulations

1. Short title - These regulations may be called "The Orissa Public Works Department / Electricity Department Contractor's Regulation."

2. Definitions - in these Regulations, unless otherwise expressed or indicated the following words and expressions shall have the meaning hereby assigned to them respectively, that is to say-

1) **"Labour,"** mean workers employed by a contractor of the Orissa Public Works Department/Electricity Department directly or indirectly through a sub-contractor or other persons or by an agent on his behalf.

2) **"Fair Wages"** means wages whether for time or piece work prescribed by the State Public Works Department provided that where higher percentage rate have been prescribed under the minimum wages Act, 1948 wages at such higher percentage rate should constitute fair wages.

3) **"Contractor"** shall include every person whether a sub-contractor or headman or agent employing labour on the work taken on contract.

4) **"Wages"** shall have the same meaning as defined in the payment of wages Act and include time and piece rate wages, if any.

3. Display of notice regarding wages etc.

The contractor shall –

a) Before he commences his work on contract display and correctly maintain and continue to display and correctly maintain, in a clean and legible condition, in conspicuous places on the work, notices in English and in the local Indian language spoken by the majority of the workers, giving the rate of wages prescribed by the State Public Works Department / Electricity Department for the district which the work is done.

b) Send a copy of such notice to the Engineer-in-charge of the work.

4. Payment of Wages:

1. Wages due to every worker shall be paid to him direct.
2. All wages shall be paid in current coin or currency or in both.

5. Fixation of wage period:

i. The contractor shall fix the wage period in respect of which the wages be payable.
ii. No wage period shall exceed one month.
iii. Wages of every workman employed on the contract shall be paid before the expiry of ten days, after the last day of the wage period in respect of which the wages are payable.
iv. When the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the day succeeding the one of which his employment is terminated.
v. All payments of wages shall be made on working days.

6. Wage book and wage cards, etc:

1) The contractor shall maintain a wage book of each worker in such form as may be convenient, but the same shall include the following particulars.

a) Rate of daily or monthly wages.
b) Nature of work on which employed.
c) Total number of days worked during each wage period.
d) Total amount payable for the work during each wage period.
e) All deductions made from the wages with an indication in each case of the ground for which the deduction is made.
f) Wage actually paid for each wage period.

2) The contractor shall also maintain a wage card for each worker employed on the work.

3) The Superintending Engineer may grant an extension from the maintenance of wage bond, wage cards to a contractor, who in his opinion may not directly or indirectly employ more than 100 persons on the work.

7. Fines and deduction, which may be made from wages -

1) The wages of a worker shall be paid to him without any deduction of any kind except the following –

a) Fines:

b) Deductions for absence from duty, i.e. from the place or places where by the terms of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent.

c) Deductions for damage to or loss of goods expressly entrusted to the employed person for custody or for loss of money for which he is required to account where such damage or loss is directly attributable to his neglect or default.

d) Any other deductions, which the Orissa Government may allow from time to time

2. No fines shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been any opportunity of showing cause against such fines or deduction.

3. The total amount of fines which may be imposed in any one wage period on a works shall not exceed an amount equal to five paisa in a rupee of the wages payable to him in respect of that wage period.

4. No fine imposed on any worker shall be recovered from his by installments or after the expiry or 60 days from the date on which it was imposed.

8. Register of fines etc:

1. The contractor shall maintain a register of fines and of all deductions for damage or loss such register shall mention the reason for which fine was imposed or deductions for damage or loss was made.

2. The contractor shall maintain a list in English and in the local Indian language, clearly defining acts and commissions for which penalty of fine can be imposed it shall display such list and maintain it in clean and legible condition in conspicuous places on the work.

9. Preservation of register:

The wage register, the wage cards and the register of fines deduction required to be maintained under the regulations shall be preserved for 12 months after date of the last entry made in them.

10. Power of Labour Welfare Officers to make investigation or enquiry:

The Labour Welfare Officers or any other persons authorized by the Govt. of Orissa on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and the provisions of these regulations. He shall investigate into any complaint regarding default by the contractor, sub-contractor in regard to such provisions.

11. Report of Labour Welfare Officers:

The Labour Welfare Officer or others authorized as aforesaid shall submit report of the results of his investigation or inquiry to the Superintending Engineer concerned, indicating the extent if any to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages and other due be paid to the labourers concerned.

12. Appeal against the decision of Labour Welfare Officer:

Any persons aggrieved by the decision and recommendation of the Labour Welfare Officer or other person so authorized may appeal against such decision to the Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to the Superintending Engineer concerned by subject to such appeal the decision of the officer shall be final and binding upon the contractor.

13. Inspection of registers:

The contractor shall allow inspection of the wage book and wage cards to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Commission or any other person authorized by the Govt. of Odisha on his behalf.

14. Submission of return:

The contractor shall submit periodical returns may be specified from time to time.

15. Amendments:

The Government of Odisha may from time to time add to or amend these regulations and on any question as to the application, interpretation of effect of these regulations, the decision of the Labour Commission or any other person authorized by the Govt. of Orissa in that behalf shall be final.

Clause 34. The term and condition of the agreements have been read/ explained to me and certified that I have clearly understand them

WITNESS **CONTRACTOR**

ADDENDUM TO CONDITION OF CONTRACT

2. TIME CONTROL.

2.1 Progress of work and re-scheduling programme.

2.1.1. The Superintending Engineer/Engineer in charge shall issue the letter of acceptance to the successful contractor. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

2.1.2 Within 15 days of issue of the letter of acceptance, the contractor shall submit to the Engineer-in-charge for approval and programme commensurate to clause no 2 showing the general methods, arrangements, and timing for all the activities in the works along with monthly cash flow forecast.

2.1.3. To ensure good progress during the execution of the work the contractors shall be bound in all cases in which the time allowed for any work exceeds one month to complete, 1/4th of the whole of the work before 1/4th of the whole time allowed under the contract has elapsed, ½ of the whole of the work before ½ of the whole time allowed under the contract has elapsed, 3/4th of the whole of the work before 3/4th of the whole time allowed under the contract has elapsed.

2.1.4 If at any time it should appear to the Engineer-in-charge that the actual progress of the works does not conform to the programme to which consent has been given, the contractor shall produce, at the request of the Engineer-in-charge a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. If the contractor does not submit an updated programme within this period, the Engineer-in-charge may withhold hold the amount of 1% of the contract value from the next payment certificate and continue to withhold this amount until the next payment after the date on which the over dues programme has been submitted.

2.1.5 An update of the programme shall be a programme showing the act all progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

2.1.6 The Engineer-in-charge's approval of the programme shall not after the contractor's obligations. The contractor may revise the programme submit it to the Engineer-in-charge again at any time. A revised programme is to show the effect of variations and compensation events.

2.2. Extension of the Completion date.

2.2.1 The time allowed for execution of the work as specified in contract data shall be the essence of the contract. The execution of the works shall commence from the 15th day or such time period as mentioned in letter of award after the date on which the Engineer-in-charge issue written orders to commence the work or from the date of handing over of the site whichever is later. If the contractor commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money and performance guarantee/security deposit absolutely.

2.2.2 As soon as possible after the contract is concluded the contractor shall submit a time and progress chart for each milestone and get it approved by the Department. The chart shall be prepared in direct relation to the time stated in the contract documents for completion of items of the works, it shall indicates the forecast of the dates of commencement and completion of various trades of section of the work and may be amended as necessary by agreement between the Engineer-in-charge and the Contractor within the limitation of time imposed in the contract documents, and further to ensure good progress during the execution of the work the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per milestone given in contract data.

2.2.3 In case of delay occurred due to any of the reasons mentioned below, the contractor shall immediately give notice therefore in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works.

i. Force major, or

ii. Abnormally bad weather or –

iii) Serous loss or damage by fire, or

iv) Civil commotion, local commotion of workmen, strike or lockout, officers any of the heads employed on the work or

v) Delay on the part of other contractors or tradesmen engaged by Engineer-in-charge, in executing work not forming part of the contract.

vi) In case of variation is issued which makes it impossible for completion to be achieved by the intended completion date without the contractor taking steps to accelerate the remaining work and which would cause the contractor to incur additional cost or

vii) Any other cause, which, in the absolute discretion of the authority mentioned, in contract date is beyond the contractor's control.

2.2.4 Request for re-schedule and extension of time to be eligible for consideration shall be made by the contractor in writing within fourteen days of the happening of the event causing delay. The contractor may also, if practicable, indicate in such a request the period for which extension is desired.

2.2.5 In any such case a fair and reasonable extension of time for completion of work may be given. Such extension shall be communicated to the contractor by the Engineer-in-charge in writing. Within 3 months of the date of receipt of such request, Non application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-in-charge and this shall be binding on the contractor.

2.3 Compensation for delay.

2.3.1 If the contractor fails to maintain the required progress in terms of clause 2 or to complete the work and clear the site on or before the contract or extended date of completion he shall without prejudice to any other right or remedy available under the law to the Government on account of such breach pay as agreed compensation the amount calculated at the percentage rate stipulated below as the Superintending Engineer (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every complied day /month (as applicable) that the progress remains below that specified in clause 2 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified compensation @1.5% per month of for delay of work, delay to be computed on per day basis.

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the tendered value of work or to the tendered value of the item or group of item of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set off against any sum payable to the contractor under this or any other contract with the Government. in case the contractor does not achieve a particulars milestone mentioned in contract date, or the rescheduled milestone(s) in terms of clause 2.5 the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of extension of time. Withholding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contract. However, if the contractor catches up with the progress of work on the subsequent milestone(s) the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s) amount mentioned against such milestone missed subsequently also shall be withheld. However no interest whatsoever, shall be payable on such withheld amount.

2.4 Bonus for early completion.

For availing incentive clause in any project which is completed before the stipulated date of completion, subject to other stipulations it is mandatory on the part of the concerned Superintending Engineer to report the actual date of completion of the project as soon as possible through FAX or e-mail so that the report is received within 7 (seven) days of such completion by the concerned Superintending Engineer, Chief Engineer & the Administrative Department.

The Incentive for timely completion should be on a graduated scale of 1 (one) percent to 5 (five) percent of the contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale.

Before 30% of contract period	=	5% of Contract Value
Before 20 to 30% of contract period	=	4% of Contract Value
Before 10 to 20% of contract period	=	3% of Contract Value
Before 5 to 10% of contract period	=	2% of Contract Value
Before 5% of contract period	=	1% of Contract Value

The Bonus / Incentive should be paid in respect of individual project for new construction / substantial additional improvement works, the minimum value for which the Bonus / Incentive applicable is given below.

Name of work	Minimum Value
1. Building work / P.H. Work	Rs. 40.00 Lakhs
2. Road Work	Rs. 300.00 Lakhs
3. Irrigation works	Rs. 1000.00 Lakhs

Incentive will be paid with approval of next higher authority of tender accepting authority on completion of original work before original time schedule.

2.5 Management of Meetings.

2.5.1 Either the Engineer or the contractor may require the other to attend a management meeting. The business of a management meeting shall be review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

2.5.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

NOTE: The Existing relevant provisions in this contract shall stand modified accordingly.

CHAPTER IV
SPECIAL CONDITIONS

SPECIAL CONDITIONS

1. The contractor is to supply labour for giving section and profiles. All materials necessary for such work will be supplied by the Contractor at his own cost and responsibility and profiles are to be maintained till the work is completed.

2. It must be definitely understood that the Government do not accept any responsibility for the correctness and completeness of the trial borings shown in the cross sections.

3. Excavated materials and debris unused in the area are to be removed from the site by the contractor at his own cost and responsibility as per the direction of Engineer-in-charge.

4. No claim whatsoever on account of interest will be entertained under any circumstances.

5. The Contractor will remain responsible to arrange all mechanical means whenever required to complete the work in time at his own cost.

6. Unutilized Metal, Chips, Sand and stones outside the specific alignment will not be taken into consideration for measurement.

7. Any damage caused to the work due to any cause except major natural calamity whatsoever during the execution will be made good by the contractor until it is handed over to the Department in complete shape. As a matter of abundant pre-caution and to protect the interest of Government, the contractor is required to take insurance cover on the following events which are due to contractor's risk (a) loss or damage to the works, plant, materials (b) loss or damage to equipments (c) loss or damage to property & (d) personnel injury and death.

8. The quantities provided in the tender schedule are tentative which is likely to vary during execution as directed by the Engineer-in- charge. Before starting the work, the initial levels will be taken for his acceptance.

9. Borrowing earth for the Embankment is the responsibility of the Contractor. The type of soil to be used in the embankment is to be got approved by the Engineer-in- Charge before use.

10. If use of explosives is necessary for the purpose of blasting of rock required at any stage of the execution, the contractor is to obtain necessary area license from the appropriate authorities and procure the explosives and store them at his own responsibility and arrange in the work sites. The procurement and storage of the explosives is the sole responsibility of the contractor he shall abide by all the laws of explosive act.

11. The approach road to work site will be maintained by the contractor.

12. If departmental land is available the contractor will be allowed to use the same for accommodation of his labourers, stores and machineries free of rent. If department land is not available the contractor will made his own arrangement to land at his own cost.

13. The tenderer should obtain equipment for the work. However, some equipment if available in the department will be given on hire and condition to be fixed by the Engineer-in-charge. Time for charging of cost of hire will be reckoned from the date on which equipment will be handed over to the contractor to the date of its return to the department after the work is completed or the contract is rescinded, or when the contractor is not required the same finally. The daily hire charges of the machineries will be realized from the contractor's bill on the basis of each day the machines will be under his custody. The contractor will return the equipment in perfect running condition as it was at the time of issue. While the departmental machineries given on hire are with the contractor, compensation towards any loss or damage of the same shall be paid by the contractor to make good the loss or damage. The amount of compensation will be decided by the Engineer-in – charge. The contractor shall not remove the equipment from the site while the same is in his custody. If any equipment or any part thereof is required to be sent out from the site for repair or otherwise, written permission from the Engineer-in-charge shall be taken. The contractor should maintain repair, overhaul and the equipment with due diligence and care. Proper grades of fuel, oil and lubricants should be used. Only good and genuine parts should be used. The equipment shall be made available for inspection by the Engineer-in-charge or other competent authority. If the equipments are not maintained, repaired or used properly, the contractor is liable to pay compensation to the department towards the damage caused to the equipment for improper use. The Amount of compensation shall be assessed by the Engineer-in-charge which will be final. The equipment shall be handed over initially as they are. It will be the responsibility of the contractor to get the machine actually commissioned and used in the work.

14. The quantity mentioned can be increased or reduced to the extent of 10% for individual items subject to a maximum of 5% over the estimated cost. If it exceeds the limit stated above, prior approval of competent authority is mandatory before making any payment.

15. The period of completion is fixed and can not be altered except in case of exceptional circumstances with due approval of next higher authority.

16. Royalty, DMF, EMF & Additional charges for stone products, sand and Borrow earth are to be recovered from the contractor's bill as follows:-

i) Royalty for Stone products @ **Rs.130.00** per cum.
ii) Royalty for Sand/ Borrow area earth/ Moorum @ **Rs.35.00** Per cum
iii) Additional charges for sand @ **Rs.1563.00** per cum
iv) Additional charges for stone products @ **Rs.533.00** per cum
v) EMF @**5%** of Royalty
vi) DMF @ **10%** of Royalty

Statutory increase in the rate of royalty, if any, shall be reimbursed. On the other hand, the same shall be recovered if there is any decrease in rate.

17. The rates of cement and steel have been adopted as follows in preparation of the estimate. The rates of the other materials have been adopted as per current schedule of rate for preparing the estimate under this bid. The minimum prevailing labour rates of the state has been adopted in framing the estimate.

Material	Basic Rate:-
Cement	**Rs. 575.52** per qntl.
Steel	**Rs. 72077.50** per MT.

The contractor has to utilize the available good quality stones from the canal excavation first in the work. Then only he may procure additional quantity if required. The cost of stone is to be recovered as follows:-

(a) Cost of stone =
(b) Royalty as applicable.

18. After use of cement in the work, the cost of empty gunny/HDPE bags will be recovered **@4.00/bag** from the contractor, if the same are not returned by him to the Department.

19. The Joint venture is not allowed for this bid.

20. Refund of Security Deposits made by way of Deduction / withholding payment from work bills through works expenditure Module of iOTMS (As per Finance Department Order No.FIN-WM-LC-0034/2011-68(5) Dated 01.01.2013).

i) The Security Deposits to be recovered on or after 01.01.2013 should be entered in the iOTMS incorporating the details.

ii) Before allowing refund the Divisional Officers / FA & CAOs are to obtain approval of the Head of the Department concerned.

iii) After obtaining approval of the Head of the Department, the Divisional Officers / FA & CAOs are to issue cheque against the amount approved for repayment from the balance available in the Deposit Register and enter the particular of the cheque and the Deposit appearing in Deposit Register in IOTMS.

21. Testing of reinforcement bar and concrete works.

(i) If, in the opinion of the Engineer-in-Charge of the work (**Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur**) or any other authorities, such as **Chief Construction Engineer, Kanupur Irr. Project, Basudevpur, Keonjhar** the reinforcement bars to be used in the work requires testing in order to cofirm its technical specification, the same shall be tested either in the Department laboratory or in any other authorized laboratory as referred by the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** at the cost of the contractor. The contractor shall bear all the cost towards supply of required samples, transportation and testing. The decision of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** on this aspect is final and binding on the contactor.

(ii) All the testing of concrete works shall be carried out as per the direction of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** or his authorized field functionaries and in case of any dispute arises on this aspect, the decision of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** is final and binding on the contractor. Testing of all the concrete works of all grade required for structures, Cement Concrete lining and in any other construction activities of the work shall be tested in the Department Laboratory at the cost of the contractor. The contractor shall supply all the required samples at his own cost including transportation and bear all the testing charges of the concrete. The cost for the testing as charged by the Superintending Engineer, Quality Control & Designs Division, Kanupur Irrigation Project shall be final and binding on the contractor. If, in the opinion of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur**, a Field Laboratory for acceleration of testing of concrete is required, the contractor shall install it at the work site at his own cost with all the required machineries and equipments as per the direction of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur** and cement testing work shall be carried out in the Field Laboratory under the direct supervision of the Field functionaries of the Quality Control & Designs Division, Kanupur Irrigation Project under guidance of the Superintending Engineer, Quality Control & Design Division, Kanupur Irrigation Project.

22. Minor Minerals for the work to be collected by the contractor observing all the statutory acts/ rules such as PESA/ OMMC Rule-2004 etc.

CHAPTER –V

TECHNICAL SPECIFICATION

SECTION –1

SECTION –1

GENERAL SPECIFICATION

The terms the India Standard Specification herein after referred to as BIS as used therein means the relevant Bureau of Indian Standard codes with all amendments published up to the date of Submission of tenders. A statement of relevant BIS is applicable to this contest is enclosed.

LIST OF INDIAN STANDARDS

Sl. No.	Short Title	B.I.S Number
(I)	**CEMENT**	
1.	Specification to ordinary and Low heat Portland cement	269-1976
2.	Specification for Portland Pozzolana Cement	1489-1976
3.	Portland Slag Cement (Third revision)	455-1976
4.	Method for physical tests for hydraulic cement (Reaffirmed 1980)	4031-1968
5.	Method of Chemical analysis for hydraulic cement (First revision)	4032-1985
6.	Rapid hardening Portland cement	8041-1978
7.	Hydrophobic Portland cement	8043-1978
8.	High Strength ordinary Portland cement	8112-1976
(II)	**AGGREGATES**	
1.	Specification for coarse and fine Aggregates from natural source for concrete	383-1970
2.	Specification for sand for masonry mortars	2116-1965
3.	Method of Tests for aggregates for concrete	2385-1969 (Part I to Part VIV)
4.	Standard sand for testing of cement (First revision) with amendment 1 and 2 Reaffirmed 1980	650-1966
5.	Methods for sampling of aggregates for concrete	2430 -1969
6.	Method of test for determining aggregates impact value of soft coarse aggregates	5640-1970
(III)	**STEEL**	
1.	Code of practice for bending and fixing of bars	2502-1963
2.	Specification for cold worked steel deformed bars for concrete reinforcement	1786-1979
3.	Code of practice for welding of MS Bars used for reinforced concrete construction.	2751-1966
4.	Code for practice for use of Metal are welding for general construction of mild steel	818-1989
5.	Deformed bars for concrete reinforcement hot rolled mild steel and medium tensile steel (Revised)	1139-1966
6.	Recommendations for detailing of reinforcement in reinforced concreted works	5525-1969

7.	Specification for Mild Steel and medium tensile steel Bars for Concrete reinforcement.	432-1966 (Part I)
8.	Code for practice for safety and health requirement in Electric and Gas welding and cutting operations	818-1968
9.	Code for practice for fire precautions in welding and cutting operation.	3016-1965
10.	Measurement of building and Civil Engineering works, method part VIII steel work and iron work	1200-1974 (Part VIII)
11.	Code of procedure for manual or metal ARC and welding of Mild steel	823-1964
12.	Specification for filler rods and wires for gas welding	1278-1972
13.	Recommendations for welding cold worked steel bars for reinforced concrete construction	9417-1979
14.	Hard drawn steel wire fabrics for concrete reinforcement	1566-1982

(IV) <u>CONCRETE</u>

1.	Method of Measurement of building and Civil Engineer works Part-II cement concrete works.	1200-1968 (Part-II)
2.	Code of practice for plain and reinforced concrete	456-2000
3.	Specification for pre cast concrete coping blocks.	5751-1969
4.	Methods of tests for strength of concrete	516-1959
5.	Code of practice for laying in situ cement concrete Lining on canals	3873-1993
6.	Specification for Admixtures for concrete	9103-1979
7.	Method of Test for Autoclaved cellular Concrete Products.	6441-1972-73 (Part-I to IX)
8.	Method of Sampling and Analysis of concrete	1199-1959
9.	Specification of Batch type concrete mixtures	1791-1963
10.	General requirements for Concrete Vibrators immersion type	2505-1980
11.	Specification for concrete vibrating tables	2514-1963
12.	Method of test for permeability of cement mortar & concrete	3085-1965
13.	Specification for fly ash for use as pozzolana as admixture for Concrete	3812-1981 (Part-II)
14.	Specification for Portable swing weigh batch for concrete (single and double bucket type)	2722-1964
15.	Code of practice for installation of joints in concrete pavements	6509-1972
16.	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures	457-1957
17.	General requirement for concrete vibrator screed board type (First revision)	2506-1985
18.	Code of practice for concrete structures for shortage of liquids	3370 (Part-1 to 4)
19.	Code of practice for use of immersion vibrator for consolidating concrete (First revision)	3558-1983
20.	Method for testing performance of batch type concrete mixer	4634-1968
21.	From vibrators for concrete	4656-1968
22.	Concrete batching and mixing plant	4925-1968

23.	Ready mixed concrete (First revision)	4926-1976
24.	Code of practice for sealing joints in concrete lining on canals	5256-1992
25.	Vibrating plate compactor	5889-1970
26.	Concrete transit mixer and agitator	5892-1970
27.	Concrete pavers	7245-1974
28.	Concrete slump test apparatus	7320-1974
29.	Method of making curing and determining compressive strength of accelerated cured concrete test specimen	9013-1978

(V) EARTH WORK

1.	Method of Measurement of building and Civil Engineering Works Part I, Earthwork.	1200-1969 (Part-I)
2.	Safety code for piling and other deep foundations	5121-1969
3.	Code of practice for Design installation, observation and Maintenance of uplift pressure pipes for Hydraulic structures on permeable foundation.	6532-1972
4.	Safety code for excavation works	3764-1966
5.	Code of practice for protection of slope for Reservoir embankment	8237-1985
6.	Code of practice for earth work on canals	4701-1982
7.	Guidelines for lining of canals in expansive soils	9451-19
8.	Method of test for soils Part-II Determination of water concrete	2720-1973 (Part-II)
9.	Method of test for soils Determination of water content dry density relation using light compaction.	2720-1974 (Part-VII)
10.	Method of test for soils determination of dry density of soils in place by the sand replacement method	2720-1974 (Part-XXVIII)
11.	Method of test for soils determination of dry density of soils in place by the core cutter method	2720-1975 (Part-XXIX)
12.	Classification and identification of soils for general	1498-1970
13.	Safety code for blasting and related drilling operation with Amendment No. I (Reaffirmed 1978)	4081-1967
14.	Portable Pneumatic drilling machine (First revision)	5441-1986
15.	General requirement for black hold drilling rigs	7209-1974
16.	Safety code for working with construction machinery	7293-1974
17.	Code of practice for stability analysis of earth dams	7894-1975
18.	Guidelines for design of under seepage control measures for earth and rock fill dams	8414-1977
19.	Filtration media sand and gravel	8419-1977 (Part-I)
20.	Guidelines for design of large earth and rock fill dams	8826-1978
21.	Under drainage arrangements of lined canals.	4558-1995
22.	Pre-cast cement concrete stables for canal lining	3868-1966
23.	Methods of tests of soils	2720 (Part-1 to X)
24.	Ammonium nitrate for explosive	4668-1967
25.	Method of test for commercial blasting explosives and accessories.	6609 Part-1 to V)

26.	Detonators	7632-1975
27.	Method of load test on soils (Second revision)	1888-1982
28.	Method for standard penetration test for soil (First revision)	2131-1981
29.	Glossing of terms and symbolic relating to soil engineering.	2809-1972
30	Method of sampling and preparation of stabilized soils for testing	4332 (Part-I of 1967)
31.	Test in over burden	5529 (Part-1 of 1969)

(VI) <u>OTHER SUBJECTS</u>

1.	Safety code for scaffolds and ladders part I scaffolds	3696-1966
2.	Safety code for scaffolds and ladders Part 2 ladders.	3696-1966 (Part-II)
3.	Recommendation s on stacking and storage of construction materials at site.	4082-1977
4.	Plywood for general purposes (Second revision amendment 1 to 3)	303-1975
5.	Test Sieves	460-1985
6.	Code practice for under drainage of lined canals (2nd revision)	4558-1995
7.	Code of for practice for in situ permeability test	5529 (Part-1 & 2)
8.	Structural steel (Standard quality) (with amendment No.1 to 3)	IS: 226-1975
9.	Hard drawn steel wires (Third revision)	IS: 432-1982 (Part-II)
10.	Concrete pipes (with and without reinforcement) (2^{nd} revision)	IS: 458-1971
11.	Code of practice for lying of concrete pipes	IS: 783-1959
12.	Specification for mild steel tubes, tubular and other wrought Steel fittings Part-I mild steel tubes (fourth revision) (With Amendments No. 1 to 5)	IS:1239-1979
13	Hard drawn steel wire fabric for concrete reinforcement (Second revision)	IS: 1566-1982
14.	Asbestos cement pressure pipe (Second revision)	IS: 1592-1980
15.	Preformed filler for expansion test in concrete payment and structures (non extruding and resilient type)	IS: 1838-1961
16.	Cast iron detachable joints for use with asbestos cement pressure pipes.	IS:8794-1978
17.	Structural steel (Fusion welding quality) (Second revision)	IS: 2062-1980
18.	Code of practice for laying of cast iron pipe (With amendment No. I)	IS: 3114-1965
19.	Methods of testing for concrete pipes	IS 3597-1966
20.	Rubber sealing rings for gas mains water mains and sewers	IS: 5382-1969
21.	Centrifugally cast (spun) iron low pressure pipes for water gas and sewage (First revision)	IS: 6163-1978
22.	Code of practice for laying of asbestos cement pressure pipes	IS: 6530-1972
23.	Cast iron detachable joints for use with asbestos cement pressure pipes.	IS: 8794-1978
24.	Other Publications: Ministry of shipping and transport Specification for Road and Bridge works No. 7900	

(VII) STONE PITCHING AND LAUNCHING APRON

1.	Methods of test for determination of strength properties of natural building stone.	IS: 1121-1975 (Part-1 to 4)
2.	Method of test determination of true specific gravity of natural building stone (First revision)	IS: 1122-1974
3.	Method of identification of natural building stone (1st Revision)	IS: 1123-1975
4.	Method of test for determination of water absorption apparent specific gravity and porosity of natural building stone (1st Revision)	IS: 1124-1974
5.	Method of test for determination of weathering of natural building stones (First revision)	IS: 1125-1974
6.	Method of test for determination of durability of natural building stone (First revision)	IS: 1126-1974
7.	Recommendations for dimensions and workmanship of natural building stones for masonry work (First revision)	IS: 1127-1970
8.	Recommendation of dressing of natural building stone (1st Revision)	IS:1129-1972
9.	Sand for plaster (First revision)	IS:1542-1977
10.	Code of practice for construction of stone masonry	IS: 1597-1967
11.	Rubble stone masonry	IS: 1597-1967 (Part 1to II)
12.	Method for determination of resistance to wear by abrasion of natural building stones (1st Revision)	IS: 1706-1972
13.	Sand for masonry mortars (1st Revision)	IS: 2116-1980
14.	Code of practice for preparation and use of masonry mortars (1st Revision)	IS: 2250-1981
15.	Stone facing	IS: 4101-1967 (Part-I)
16.	Method of test for determination of water transmission rate by capillary action through natural building stones	IS: 4121-1967
17.	Method of test for surface softening of natural building stones by exposure to acidic atmospheres	IS: 4120-1967
18.	Methods of test for determination of permeability of natural building stones (1st Revision)	IS: 4348-1973
19.	Method of test for toughness of natural building stones	IS: 5218-1969
20.	Gujarat State, Section 2, Engineering properties of building stones	IS: 7779-1975 (Part1/Sec.2)
21	Recommendation practice for quarrying stones for construction purpose.	IS: 8881-1977

In addition to the relevant BIS code, the specifications prescribed and guidelines issued by Central water Commission Standard Specifications shall also be followed where BIS specifications are not available.

SECTION-2

2.0 General Specification:

2.1 The enclosed drawing in the bid document gives board dimensions and outline of the works to be executed through this contract. These drawings may however be revised/modified from time to time and supplementary additional drawing(s) may also be issued as per necessity. During the course of execution there may be changes in dimensions, specifications and shapes of components. The changes in the drawings can be done without any way deviating the terms of the contract and the contractor is to execute the work as per revised drawings and specifications at the same rate as agreed upon for the work awarded under the original contract. The contractor shall do no work without proper drawings. He shall check all drawings and specifications carefully and advise the Engineer-in-charge if any error and omission are discovered where upon the Superintending Engineer will prepare revised additional drawings and specifications as may be required to suit the stage of the work.

2.2 Where the drawings are not consistent with the text of the specifications, the text shall govern.

2.3 The percentage rate shall be for finished items of works as per description in schedule of quantities and according to drawings, specification and conditions of contract. The percentage rate quoted shall be for execution of finished items of work & the specifications of which confirm to the details furnished in the Agreement and provisions in Bureau of Indian Standards and shall include all general and incidental charges which will not be paid separately. Such general and incidental charges are listed in succeeding Para for the convenience of the tenders but are not exhaustive. Omission of any such items here in but required for delivering finished items of work, shall not be plea, that such items are not covered by the percentage rate quoted.

2.3.1 Formation and maintenance of haul roads including river and drainage crossings within the work site is to be made by the Contractor at his own cost. The existing approaches and haul roads, if any under the control of the Department may be used but improvement, if required, shall be done by the contractor at his own cost.

2.3.2 Labour and materials required for construction of reference points, benchmark pillars etc. for setting out work shall be at contractor's cost.

2.3.3 Scaffolding and gang-ways as and when required for the work will be done by the contractors at his own cost. No additional payment on this score will be entertained.

2.3.4 The rate includes all leads, lifts & de-lifts.

2.3.5 Form work complete includes cost of materials, labour, maintenance, erection and removal.

2.3.6 Construction of coffer dam and dewatering required if any during execution of work is the responsibility of the contractor.

2.3.7 Protection of components of work during the rainy season shall be the responsibility of the contractor. The responsibility for the safety of the structure rests, entirely on the contractor and any damages that may occur has to be made good by the contractor at his own cost.

2.4 The sequence of construction adopted by the Contractor shall have to be approved by the Engineer-in-Charge.

2.5 The contractor has to make his own design for coffer dam or any type of cross bund required during course of execution. All materials for the coffer dam or cross bund shall be arranged by the Contractor at his own cost. The contractor shall maintain the coffer dam till completion of the work.

2.6 QUALITY CONTROL:

2.6.1 Before collecting materials required for execution of the respective items of work as laid down in the schedule of quantities and in the detailed specifications described hereafter in the subsequent sections, the contractor shall ensure that samples of materials proposed to be used are first approved by the Engineer-in-charge. When directed the samples of materials proposed to be used should be furnished to the Departmental laboratory for testing.

2.6.2 All such testing charges shall be borne by the Contractor. The contractor will provide necessary assistance for collection of samples.

2.6.3 On the basis of satisfactory test results confirming to technical specification collection of materials shall be started in the field. The testing of materials shall be checked in the field Laboratory by the Department as well as staff of Quality Control Organization. If the field test result is found unsatisfactory, the materials shall be rejected and action taken to remove the same from work site by the contractor at his own cost. In no case the defective materials shall be used in the work.

2.6.4 On receipt of notice from the Engineer-in-Charge and on observation of Quality Control Division, in charge of the project, the contractor will rectify the defect in stipulated period at his own cost. If the defects are not rectified in the stipulated period, the Engineer-in-charge shall assess the cost, get the defect rectified and recover the cost for the same from the dues of the contractor.

2.7 A quarry chart indicating possible source of materials may be seen in the office of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur**. The contractor must however satisfy himself that the materials as will be made due to non-availability of materials as per required specification and quality in the quarries shown in the departmental quarry chart. The quarry chart is only an indication of source of material and the department does not accept the responsibility if the materials are not available in full quantity and quality.

2.8 No claim for carriage of water whatsoever will be entertained.

2.9 Decision regarding usefulness of excavated materials rests fully on the Engineer-in- charge.

2.10 The item marked "N/A" Not Applicable "do not apply in this contract.

SECTION 2.1 DISCHARGE RECORDS

RECORDS 2.1.1. DISCHARGE

The Hydrological data, pertaining to the canal and the streams crossing the canal furnished in the relevant report and drawings, are for information of bidders and contractors. It should be noted that the data used in preparing these particulars were recorded at locations different from the work site. The Government (that is Govt. of Odisha) does not guarantee the reliability or accuracy of any of the data, shall assume no responsibilities for any conclusions or interpretations that may be made from them. The contractor shall undertake at his expense such studies as are necessary to assess the reliabilities and accuracy of the information presented in the Data.

SECTION- 2.2. SETTING OUT OF WORK

(A) Temporary bench marks shall be fixed at suitable location connecting G.T.S. bench marks fixed by Survey of India. Temporary Bench Marks shall be set up by the Department at every 0.5 Km .interval at convenient locations along the Dam/canal to serve as reference levels. The contractor shall establish additional reference Bench Marks as may be needed at his own cost for facilitating the setting out and taking levels for measurement of work, with the approval of the Engineer-in-Charge. The bench mark shall be marked on a concrete pillar 30 cm. (1) x 30 cm (b) x 75 cm (d) which shall be embedded 55 cm into firm ground and projecting 20 cm above the ground. The Bench Mark pillar shall be constructed in plain cement concrete of M-10. The pillar shall be protected from being disturbed. The RL of bench marks shall be conspicuously carved and painted on the pillar.

(B) Before starting any work and during execution (if required), the contractor shall erect reference Bench Marks. Reference lines and check profiles at convenient locations as per the direction of the Engineer-in-Charge. The centerline of the Dam/canal and the reference line for all alignments for demarcation purpose shall be laid by dug belling on the ground. The reference line shall comprise the base line properly dug belled on the ground with the numbered concrete/masonry RD pillar suitably spaced.

(C) Center line of the canal shall be marked by fixing pillar/stone at 30M intervals profiles of the Dam/canal in filling and in moderate cutting shall be marked at 50 M. intervals in straight reaches and at 25M intervals in curves. A reference line shall also be marked on ground away from the outer edges of cutting and filling with pillars at suitable intervals for future reference.

To ensure correctness of execution, the edges of cutting the outer toe lines of Dam/canal in filling should be marked by fixing pillars or pegs at suitable intervals or by dug belling.

(D) The check profiles shall be located 15 meter apart or longer as directed by the Engineer-in-Charge to serve as a guide for execution of all slopes and steps to the elevations and profile or profiles indicated in the approved drawings. All important levels and all reference points with respect to bench marks and reference shall be fixed and co-related by the contractor as per directions of the Engineer-in-charge.

(E) The zones of full cutting section, full filling section, partial cutting and filling section shall be separated by conspicuous demarcation in the field.

The curves stipulated in construction drawings shall be carefully laid in the field by adopting approved method of curve layout. The curves shall be marked on the ground by fixing pegs at very closer intervals and joining the peg points by dug belling to a suitable depth.

The locations of different structures indicated in construction drawing shall also be clearly marked on the ground along the alignment of the canal. The control structure locations of off taking canals shall also be clearly demarcated, so that unnecessary excavation or filling at these locations can be avoided.

The spoils dumping zones shall clearly be demarcated in the field. These zones should be at least 2m. beyond the location of catch water drains.

(F) To ensure accuracy in execution of cutting, the Dam/canal embankment, spoil banks and the structures, their layout shall be given in an appropriate manner with pegs and pillars suitably placed in relation to outer dimensions of these elements.

(G) All materials and labour for setting out works including construction of reference bench marks, reference lines, check profiles and surveys as may be required at the various states of the construction, shall be supplied by the contractor at his own cost. The cost of such works shall be deemed to have included in the cost of items in schedule.

SECTION 2.3 CLEARING AND GRUBBING:

A. CLEARING AND LEVELING SITE:

The portion of the right of way where required for constructing the work under these specifications shall be cleared of all trees bushes, rubbish and other objectionable materials. Trees designated by the Engineer-in-charge shall not be cut and shall be protected from injury. Such cleared materials shall be disposed off as provided in the sub-paragraph 'C' below or removed from the site of work before the date of completion of the contract as approved by the 'Engineer-in-charge. The clearing operation shall be in accordance with clauses 4.1., 4.1.1., 4.2 and 4.3 of IS: 4701-1982 Indian code of Practice for earth work in Dam/canals. Surface boulders either loose or partly embedded in the ground will have to be removed and stacked as directed.

B. GRUBBING:

The area described or shown on the relevant site plan shall be cleared of all obstructions loose stones, non required materials and rubbish of all kinds. All brushwood shall be cleared and the roots grubbed up. No trees shall be cut down and removed without

the instructions of the Engineer-in-Charge. Those which are cut down shall be grubbed up. The same remarks apply to jungle clearance. Trees to be preserved will be designated by the Engineer-in-Charge.

The products of the clearing shall be stacked in such place and manner as may be ordered by the Engineer-in-Charge and the ground shall be left in a perfectly clean condition all products of the clearing shall be property of Govt. and shall be disposed off as per the direction of the Engineer-in-Charge.

All holes or hollows, whether originally existing or produced by digging up roots shall be carefully filled up with earth, well rammed to the design density and leveled off as directed.

PREPARATION OF BED:

Ant hills shall be completely dug out before earth work is started. Loose stones and digging of anthills involved in the preparation of bed, the contract rate for the earth work shall be deemed to include all the work to be done in accordance with this clause. In cases where the work of preparation of bed is rather extensive, the Engineer-in-charge will usually provide a separate schedule item of such preparation, but in the absence of such schedule provision, the contractor shall understand that his tender rate is inclusive of all such work without extra charge.

The contractor shall therefore examine the site before tendering and provided for all items to be done under his earth work tender rate. Old bunds will be benched or sloped as directed by Engineer-in-charge before addition of earth, the benches being 500 mm x 500 mm unless other sizes are specified. The benches or slope shall be inspected by the Engineer-in-charge or engineer designated for the purpose and approved before new earth work is keyed into them.

C. DISPOSAL OF CLEARED AND GRUBBED MATERIAL:

The disposal of cleared and grubbed materials shall be in accordance with clause 4.1.1. of IS 470-1982 code of practice for earth work on canals. All waste materials to be burnt shall be pilled neatly and when in suitable condition shall be burnt completely to ashes. Pilling of waste material for burning shall be done at such a location and in such a manner as would not cause any fire risk. Suitable materials and equipments for prevention and suppression of the fire shall be kept available at all times.
The materials to be disposed off shall be buried.

D. PAYMENT

For the clearance of light jungles, heavy jungle with or without uprooting etc., payment will be made as provided for in the bill of quantities. No payment towards removal of small stones and boulders of size less than 0.5 cubic meter will be made, and the rate quoted for excavation will be considered to include this item. However, payment will made for the removal of surface boulders of sizes greater than 0.5 cubic meter. Either loose or partly embedded in the ground, at the rate quoted in bill of quantities for the actual quantity so removed based on stack measurement applicable for the relevant strata classification after deducting 40% towards voids.

SECTION 2.4.1: USE OF WATER:

2.4.1 WATER FOR DUST ABATEMENT.

A. GENERAL

The contractor shall procure and apply water for dust abatement. Water applied for dust abatement will not be eligible for payment. The cost of procuring and applying water including all expenses for all means of conveying water to the point of use their collection, usage, and all other incidental expenses will not be paid separately including creation of source of water and the cost shall be deemed to have been included in the concerned unit price bid in the bill of quantities of the contract for the relevant finished item of work for which water for dust abatement is required. So also the cost of procuring and applying water required for the works shall be included in the price bid in the bills of quantities for the items of work for which the water is used.

2.4.2 PREWETTING OF CANAL PREMISES AND ADJACENT AREAS:

A. GENERAL

The contractor shall furnish all labour, materials and equipment and shall procure and apply water required for pre-wetting the areas under Dam/canal and embankment. Water applied for pre-wetting areas as detailed above will not be eligible for payment. The cost of procuring and applying water including all expenses for all means of conveying the water to the point of use, their collection, usage and all incidental charges shall be included by the contractor in the concerned unit price bid in the bill of quantities for that item of work where the water shall be used and no separate payment for the same will be made.

SECTION 2.5 SITE DRAINAGE:

2.5.1 CROSS DRAINAGE:

The contractor shall handle all flows from natural drainage channel intercepted by the work under these specifications, perform any additional excavation and grading for drainage as directed and provide and maintain any temporary construction required to bypass or otherwise cause the flows to be harmless to the work and property. When the temporary construction is no longer needed and prior to acceptance of the work the contractor shall remove the temporary construction and restore the site to its original condition as approved by the Engineer-in-charge.

In addition to cross drains, longitudinal drains may the considered necessary for proper drainage. The drainage system consisting of network of cross and longitudinal drainage system will be led into out fall drains to prevent stagnation of water at the place of construction. The drains shall be constructed to the section designed and shall be either open or filled up with material to ensure free flow of water without clogging of the filled materials.

2.5.2 DRAINS, BERM DRAINS AND DOWEL BANKS:

A. DRAINS:

In connection with excavation and construction for the canal and structures, the contractor shall perform excavation for the construction of drains, beam drains and chutes and any other drains as directed by the Engineer-in-charge.

The location grades and sections of the drains shall be as shown on the drawings and or as directed. Payment for excavation for the above drains, channels and embankment will be made at the unit price bid in the bill of quantities for execution of Dam/canal, which unit price shall include the cost of placing the materials in embankment or otherwise disposing off the excavated materials and all work necessary to maintain the work in good order during construction.

B. BERM DRAINAGE AND DOWEL BANKS:

Berm drainage including drainage along the berm and banks of the Dam/canal and longitudinal berm drains shall be constructed where shown on the drawings as directed. The berm drains shall be constructed to dimensions and grades shown on the drawings or as directed.

The surface of the berm shall be sloped transversely and dowel banks shall be made along with sides of the banks and berm where shown on the drawings and elsewhere where directed. The dowel banks may be made by balding of material in place following completion of a canal reach.

Payment will be made for construing Dowel banks and sloping berm and cost there of shall be included in the unit price per cubic meter bid in the bill of quantities for construction for Dam/canal embankment including reconstructing and remodeling.

2.6 MONSOON DAMAGES:

Damages due to rain and natural calamities either in cutting or in banks shall have to be made good by the Contractor till the work is handed over to the department. The responsibility for de-silting and making good the damages due to rain/natural calamity rests with the Contractor. No extra cost is payable for such operations and the contractor shall, therefore, had to take all necessary precautions to protect the work done during the construction period.

2.7 REMOVAL OF SILT AND WATER:

Payment for removal of silt will be made as provided in bill of quantities. Accumulated silt and water in the Dam/canal and structures for the works partly done by the contractor in current or previous seasons should be removed and no extra payment will be made, for such removal of silt and water. This unit rate of excavation is deemed to include cost of removal of such silt and water.

2.8 PROCEDURE FOR MEASUREMENT:

Before commencement of work, initial levels to indicate existing ground levels shall be taken at 30m intervals longitudinally along the alignment of the Dam/canal. The level points transversely along the cross sections shall be maximum at 5 m. intervals in flat ground and 3 m. in undulating terrain. The cross sections shall be extended beyond the limit of work to a suitable distance and minimum 5 mtr. beyond the toe lines of slopes on both the sides. The interval stipulated shall be made closer depending on the topography or any stipulation made by the Engineer-in-charge.

All initial levels shall be recorded in ink/ball pen in authenticated level books issued by the Engineer-in-charge and shall be signed by the Junior Engineer / Assistant Engineer when he records the levels. The Assistant Engineers and Superintending Engineers shall exercise checks strictly in accordance with the codal provisions.

Actual construction works shall not be allowed to start unless the above formalities are fulfilled.

If the work is awarded to any agency the level shall be recorded in the presence of the contractor or his authorized agent. The contractor or his authorized agent shall sign each page of the level book/field book in token of acceptance. Without acceptance of the level by both the parties, the work shall not commence. Dispute if any arises, the decision of the Engineer-in-Charge shall be conclusive and binding. These cross sections shall form the basis of all future measurements and payments. Each dimension shall be measured to the nearest 0.01m, areas shall be computed to nearest 0.01sqm. Volume shall be computed to nearest 0.01 cubic metre.

SECTION- 3

EARTH WORK

SECTION 3.1. EARTH WORK – GENERAL

To the extent that they exist, plans and estimates for the Government's studies of Earth Work for construction of the canal will be available for inspection by the Bidders in the office of the concerned Engineer-in-charge. Such information is made available solely for the convenience of Bidders. The Government does not guarantee that the information is accurate or complete. Bidders are cautioned that this information is subject to revision and that the Govt. disclaims responsibility for any interpretation, deduction or conclusions, which may be made there from. It is not intended that this information will limit or prescribe the excavation and handling procedures of the contractor, and the Govt. reserves the right to utilize and distribute earth work materials during the progress of work it serves the interest of the Govt.

Drawing showing the typical section of the Dam/canal annexed to these specifications provides such details as would enable the contractor to execute the work in general conformity there-with under these specifications which have been prepared as definitely and in as much detail as possible with regard to design data presently available. These drawings will be supplemented by such additional, general and details drawings or directions as may be considered necessary or desirable as the work progresses. For all changes in approved drawing/design the recommendation of Chief Construction Engineer, Superintending Engineer and approval of Chief Engineer will be essential, where details shown on these drawings differ from the requirements of these specifications. The requirement of specifications shall govern. The contractor shall do no work without proper drawings. He shall check all drawings and specifications carefully and advise the Engineer-in-charge if any errors and commissions are discovered where upon the Superintending Engineer will prepare and lodge such revised additional drawings and specifications as may be required to suit the stage of the work. All such additional general and detailed drawings whether original or revised lodged in the office of the Engineer-in-charge and signed by him for purpose of identification shall be open for inspection by the contractor under the same terms and conditions as provided in agreement.

All works of the contract shall be executed as per the specific and relevant clause/clauses of relevant I.S. code unless otherwise specified. Materials used should, confirm to the desired standards prescribed in the relevant codes. Wherever a Para of IS Code is cited in specification it goes without saying that the latest revision of the specification subsequently, shall apply. For purpose of relevancy or otherwise of any provision of the I.S. Code referred to the decision of the Engineer-in-charge.

SECTION 3.2. EXCAVATION OF CANAL:

3.2.1. CLASSIFICATION OF EXCAVATION.

Payment shall be made on actual classification of soil met with during excavation. Materials excavated shall be measured in excavation to the lines shown on the drawings or as provided in these specifications, and all materials required to be excavated will be paid for at the applicable percentage rate in the schedule for excavation. No additional allowance above the percentage rate in the schedule will be made on account of any of the material being wet. Bidders and the contractors must assume all responsibility for deducing and concluding as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavations. The classification of excavation shall be decided by the Engineer-in-charge and binding on the contractor. In case of dispute, the decision of CE&BM/CCE/ SE. shall be final. Merely the use of

explosive in excavation will not be considered in areas on the higher classification unless blasting/rock breaker is clearly necessary in the opinion of the Engineer-in-charge.

3.2.2. EXCAVATION FOR CANAL:

a) The excavation may be carried out manually or mechanically and as per specification drawing and direction of Engineer-in-charge.

b) The excavation for canal in all kinds of soil and D.I. Rock shall be done according to the dimensions and grades shown on the drawing, Proud equivalent to thickness of the lining on sides and in bed on the underside of the lining shall be left unexcavated temporarily and the removal of this proud shall be done just before trimming and placing concrete for lining.

c) Blasting shall be done in such a manner as not to cause over break which in the opinion of the Engineer-in-charge is excessive. Special care shall be taken to prevent over break or loosening of material on bottom and side slopes against which concrete lining is to be placed. The method of drilling and blasting to be resorted to for rock excavation/rock breaker shall be got approved from the Engineer-in-charge.

d) Except for the area of rock, all areas to be excavated for canal sections shall be pre-wetted so that at the time of excavation moisture content shall be about optimum. However, in case the excavated material from canal is not to be used for embankment, such pre-wetting is not necessary.

e) The excavation shall be allowed to progress from the valley ends of the reach towards the ridge in conformity with the layout given. All useful earth from excavation shall be used in for filling the banking section, with varying leads and with all lifts either manually or mechanically. Excavated materials which is not useful for banking or which is in excess after meeting the banking requirement of the reach shall be disposed as specified at Para 8.1 of I.S. Code 4701-1982 either by head lead or by mechanical means or by both in spoil bank or at any specified place with all lifts and with varying leads.

f) The re-gradation for tail channel and approach channel for structures and diversion of drains,nallah shall be done according to the dimension and grade as shown on the drawings or as instructed by the Engineer-in-charge.

g) The contractor shall not be entitled to any additional rate above the percentage rate quoted in the schedule on account of the requirement for allowing additional time for drying, stock piling and re-handling the excavated materials which have been deposited temporarily and stock piled.

h) When cutting on cross sloping ground the contractor shall cut a catch water drain on the higher side to prevent water from flowing down the cutting slope.

3.2.2.1 EXCAVATION OF SOIL AND DISINTEGRATED (DI.) ROCK.

Excavation of soil shall comprise of all kinds of soil such as vegetable or organic soil, turf, sand, silt, loam, clay mud, peat, black cotton soil, loose or compact moorum, soft stiff/heavy/hard shale, stony earth mixed with gravel and boulder up to 0.5 cum size. Excavation of D.I. shall comprise of soling of roads/paths, hard core, macadam surface, soft conglomerate, and other types of D. I. rock, which does not require blasting and can be quarried or split with pick axe and crow bars. If however the contractor resorts to blasting in such strata and D.I. rocks for his convenience, no extra payment shall be made and the materials shall not be classified in higher grade.

Excavation for canal shall confirm to provisions of relevant I.S. Codes, Sides slopes are to be provided as per the approved drawings, specification and provision of I.S Code.

b. The laterite sheet rock, which cannot be removed by pick axe / crow bar and normal excavator used for excavation of AKS and DI, when encountered, the Engineer-in-Charge will apprise the fact to the concerned Chief Construction Engineer/ Superintending Engineer. The Superintending Engineer will inspect the site and certify the initial level of laterite sheet rock and excavation by rock breaker. Further, the final level of laterite sheet rock will be certified by the Chief Construction Engineer/ Superintending Engineer.

3.2.2.2. EXCAVATION OF HARD ROCK.

This shall include all solid rock in place of such hardness and textures that it can not be removed by pick axe and crowbars and only to be removed by means of appropriate blasting/rock breakers. All boulders or detached pieces of solid rocks having volume greater than 0.50 cum, can be classified as hard rock.

The excavated rock and debris so obtained shall be carried and dumped / stacked separately with varying lead at places indicated by the Engineer.

The excavated materials shall be the property of the Department.

Payment for hard rock having continuous sheet shall be made as per level section (pre & finished). A closer interval for leveling may be adopted if considered necessary as per opinion of the Engineer-in-charge. Boulders having volume more than 0.5 cum shall be pre- measured and will be paid as hard rock.

3.2.2.2 OVER EXCAVATION:

The canal shall be excavated to exact designed section in all kinds of soil and D.I. rock No over excavation will be allowed in such reaches.

3.2.2.3 DEWATERING TRENCHES AND WET EXCAVATION:

Subsoil water met within canal excavation shall be diverted to nearby drain/nallas by cutting an open channel within the canal section to be excavated, when the drain/nalla bed is higher than the subsoil water level met with, pumping shall be resorted to for dewatering below the drain/ nalla bed level. In case where topography of the area is such that surface water is not possible to be drained off by excavating the channel, pumping shall be resorted to till completion of the work. No distinction shall be made as to whether the materials being excavated are dry, moist or wet. Care should be taken to discharge the drained water not to cause damage to works, crops or any other property. No separate payment shall be made for dewatering by pumping of by any other method.

3.2.2.5 MEASUREMRENT AND PAYMENT:

The payment shall be made on volumetric basis for the quantities excavated to the required extent. The cross sections shall be taken initially before commencement of work as stipulated in earlier Para. On completion of excavation, final cross sections shall be taken at the same points

longitudinally and transversely. These cross sections shall be marked on the initial cross sections and the quantities between initial and final cross section shall be worked out and paid.

The initial and final level of laterite sheet rock requiring removal by rock breaker will be certified by the Chief Construction Engineer/ Superintending Engineer and quantity so derived as per level section will be paid.

In case of canal excavation in Hard Rock, cross sections, shall be taken at 1 m. interval longitudinally with transverse levels at 1 m. or closer intervals, as decided by the Engineer-in-charge for initial and final sections, isolated boulders having volume more than 0.50cum and not covered in section measurement shall be pre-measured.

3.2.2.6 EXCAVATION FOR STRUCTUTRES:

A. GENERAL

Excavation for the foundation of structures shall be to the elevation shown on the drawings or as directed by the Engineer-in- charge. In so far as practicable the useful materials removed in excavation for structures shall be used for back fill and embankment.

B. FOUNDATION FOR STRUCTURES.

All tranches in soil other than rock or hard compact soil more than 1.5 m. depth in which men enter shall be securely shored and shuttered and timbered. All loose stones, projecting clumps of earth, pockets of material which might come down on the workers in the trenches or any condition which is hazard, shall be either removed or the excavated sides adequately braced and the trench suitably guarded. On stiff slopes, workmen shall not be permitted to work one above the other.

The contractor shall prepare the foundations of structure site by method which will provide firm foundation for the structures. The bottom and the side slopes of common excavation upon or against which the structure is to be placed shall be finished to the prescribed dimensions and the surfaces so prepared shall be moisten and tamped with suitable tools to form firm foundation upon or against which the structures is to be placed. The contractor shall prepare the foundation of the structures as shown on the respective drawings. The horizontal foundation materials beneath the required excavation shall be moistened if required and compacted in place.

If the Engineer-in-charge considers it's necessary to consolidate the foundation strata by grouting cement slurry, then drilling and grouting or any other foundation treatment shall be done by the contractor as directed by the Engineer-in-charge and the payment will be as per the general contract document in respect of extra items. Densities of the compacted foundation materials and the testing there of shall be in accordance with relevant IS specification.

When unsuitable materials are encountered in the foundation for structure the Engineer-in-charge will direct additional excavation to remove the unsuitable materials. The additional excavation shall be refilled as follows. The excavation of soil, the over excavation shall be filled in by selected bedding materials and compacted. In excavation of rock it shall be filled by cement concrete M-7.5. Payment will be made as per unit rate as provided in the bill of quantities. Should remains of old building be met with, the materials shall be removed with wedges and levers. Blasting shall not be allowed, without the permission in writing of the Engineer-in-charge, If bad ground of loose soil is met with the contractor shall responsible for reporting the fact to the Engineer-in-charge who shall issue such orders as may be necessary. For extra excavation,

concrete and masonry arising from bad ground, the contractors shall be paid treating this as additional quantity as per the contract rate of contract documents. All excavated earth which is unfit or surplus to the requirements for filling in canal embankments etc. shall be spared, as instructed by the Engineer-in-charge at the contractor's expenses.

C. OVER EXCAVATION.

If at any point in common excavation the foundation materials is excavated beyond the lines required to receive the structure, or if at any point in common excavation the natural foundation materials is disturbed or loosened during the excavation process, it shall be compacted in place or where directed, it shall be filled by cement concrete M-7.5. and all excess excavation or over excavation performed by the contractor for any purpose or reason except as directed by the Engineer-in-charge shall be at the expense of the contractor. Filling for such excess excavation of over excavation shall also be at the expense of the contractor.

D. DISPOSAL OF MATERIALS:

All suitable materials removed in excavation or as much thereof as may be needed as directed by the Engineer-in-charge shall be used in the construction of canal embankments, roadway embankments and for selected bedding materials or for backfill and around structures. If there is an excess of materials in the excavation, it shall be used to strengthen the embankment on either side of the canal, deposited in low areas uphill of the canal to eliminate trapped drainage or otherwise wasted as directed by the Engineer-in-charge. The disposal of the excavated materials shall be accordance with clauses 8.1 and 8.2 of BIS 4701-1982.

E. MEASUREMENT FOR PAYMENT:

Foundation for structures will be measured for payment as per drawing with due consideration for shuttering. The payment shall be made on volumetric basis for the quantities excavated to the required extent.

F. PAYMENT:

Payment for excavation for structure shall be made at the unit price per cubic meter. The rate of excavation for structures shall include the cost of all labour and materials and other temporary constructions, cost of all pumping and dewatering, cost of all other work necessary to maintain the excavation in good order during construction, cost of removing such temporary construction where required and shall include the cost of disposal of the excavated material.

SECTIONS 3.2.2.7 BACK FILL:

3.2.2.7.1 BACK FILL AROUND STRUCTURES:

A. GENERAL

The item of the schedule for back fill around structures including pipe portions of structures include all back fill required to place under these specifications.

B. MATERIALS

The type of materials used for backfill, the amount thereof and the manner of depositing the materials shall be subject to approval of Engineer-in-charge. So far as practicable, back fill material shall be obtained from material removed from excavation for structures. But when sufficient suitable material is not available from this source or from adjacent canal excavation,

additional material shall be obtained from approved borrow areas. The borrow pit excavation shall be accordance with clause 9.1 to 8.3 of BIS 4701-1982.

Where sand filling is specified, the same shall be clean, free from admixture of foreign materials and approved by the Engineer-in-charge before filling is commenced. Should there be a necessity to fill in a basement with sea sand, prior written approval of the Engineer-in-charge shall be obtained. Sand filling should be saturated with water before the construction is allowed to proceed.

Filling around structures shall have well consolidated in layers of 15 cm. by ramming with iron rammers and cut ends of crowbars. When filling reaches the finished level the surface shall be saturated with water for at least 24 hours, allowed to dry and then rammed and consolidated.

Except as otherwise provided below, backfill materials to be compacted shall contain no stones larger than 80 millimeters in diameter and if not be compacted shall contain no stones larger than130 millimeters in diameter. If the excavation for the foundations of the structure is in swelling soils, a layer of cohesive non-swelling soil conforming to BIS 9451-1985 should be interposed between the swelling soil and the structure

C. PLACING BACKFILL:

Backfill shall be placed to the lines and grades shown on the drawings as prescribed in this paragraph or as directed by the Engineer-in-charge.

The surface to receive the filling shall be first prepare free from all roots, vegetation or spoil and wetted.

All backfill shall be placed carefully and spread in uniform layers so that all spaces around rocks and clods will be filed. Backfill shall be brought up as uniformly as practicable on both sides of walls and all sides of structure to prevent unequal loading. Backfill shall be placed to about the same elevation on both sides of the pipe positions of the structures and sufficient earth cover over the top of pipe to prevent damage from construction equipment loads. If a haul road is built over a pipe all backfill about and over the pipe shall be placed to a uniform surface and no humps or depressions will be permitted at the pipe crossing.

D. STRUCTURES OF FILL:

Where the original ground surface is below the base of a structure or below the bottom of pipe all fill required for the structure foundation and all fill up to the bottom of the pipe shall be placed as compacted embankment. The embankment over the natural ground up to pipe bottom and over the pipe shall be laid in accordance with clauses 9.2.4, 9.2.5 and 9.2.6 of BIS 783 code of practice for laying of concrete pipe.

E. MEASUREMENT AND PAYMENT.

Payment for backfill about structure will be made as provided in the unit price bid therefore in the bill of quantities.

SECTION 3.4. DRILLING AND BLASTING:

3.4.1. GENERAL

Blasting where required shall be permitted only when proper precaution have been taken for the protection of persons and property in accordance with I.S. 4081 – 1967 (Indian Standard Specification for safety Code for blasting and related drilling operations). While carrying out

excavation, adequate precautions in accordance with I.S. 3761-1966 (Indian Standard Specifications for safety Code for excavation work) shall be taken.

All contractors who execute blasting operations in connection with works for purpose of quarrying stones, road construction, excavating foundations, well sinking or for any other purpose shall observe the rules and precautions as per standard norms and any further additional instructions which may be given by the Engineer-in-charge.

3.4.2. PERSONNEL:

Excavation by blasting shall be permitted only under the personal supervision of competent and licensed persons and trained workmen employed by the contractor at his cost. All supervisors and workmen in charge of work of handling, storage and blasting shall be adequately insured by the contractor.

The storage of explosives shall be in charge of a very reliable person of the contractor men. The contractor shall make sure that his supervisor workmen are fully conversant with all the rules to be observed in storing, handling and use of explosives. It shall be assured that the supervisor in-charge is thoroughly acquainted with the details of the handling and the blasting operations.

3.4.3 STORAGE OF EXPLOSIVES

The contractor shall build at his cost a magazine for storing the explosives and portable magazine for carrying the explosives to work spot from the magazine or one storage magazine to be built near the site of the work on which explosive are to be used.

The explosives, detonators and fuse coils shall each be separately stored. A careful and day to day account of the use of explosives shall be kept by the contractor in register in a manner prescribed by the Engineer-in-charge.

3.4.4 TRANSPORT AND STRORAGE OF EXPLOSIVES:

For the transport of the explosives and detonators between the store and site, closed and strong containers made of soft materials such as timber, zinc, copper, leather shall be used. Explosives and detonators shall be carried in separate boxes. For the conveyance of primer special containers shall be used.

The boxes and containers used shall be kept closed. Explosives shall be stored and used chronologically to ensure the ones received earlier being use first. A make up house shall provided at each working place in which cartridge will be made up by component and licensed man as required for the work. The make-up house shall be separated from other buildings. Only electric storage battery lamps will be used in this house.

No smoking shall be allowed in the make-up house or generally while dealing explosive.

No child under 16 years of age & person who is in a state of introduction shall be employed on the loading & unloading or transport of explosive or be employed in or allowed to enter in premises where explosives are handled and / or stored.

3.4.5 DISPOSAL OF DETERIORATED EXPLOSIVES:

All deteriorated explosive shall be disposed off in an approved manner. The quantity of the deteriorated explosives to be disposed off shall be intimated to the Engineer prior to its disposal.

3.4.6 PREPARATION OF PRIMERS:

The primers shall not be prepared near open flames of fire. The work preparation of primers shall always be entrusted to the same personnel, Primers shall be used as early as possible after they are ready.

3.4.7 CHARGING OF HOLES:

The work of charging of holes shall not commence before all the drilling work at the site is completed and the contractor's supervisor be satisfied himself to the effect by actual inspection.

While charging open laps shall be kept away. For charging with powdered explosives, a naked flame shall not be allowed. The tamping rods shall have cylindrical ends. Bore hole must be of such size that the cartridges can easily pass down & they shall not however be too big.

Only one cartridge shall be inserted at a time and gently pressed into hole with the tamping rods, the sand, clay other temping material used for the holes completely shall not be tampered too hard.

3.4.8. BLASTING:

Blasting shall be carried out during fixed hours of the day which shall have the approval of the Engineer. The hours once fixed shall not be altered without prior, written approval of the Engineer.

The site of blasting operations shall be prominently demarcated by red danger flags. The order of fire shall be given only by the Contractor's supervisor in charge of the work and his order shall be given by only after giving the warning signal three times, so as to enable all the labour, watchmen, etc to reach safe shelters.

All the roads and foot paths leading to the blasting area shall be watched. Road closing barriers should be provided to close the traffic on these roads at least 400 meters away when the firing is to take place.

In special cases, suitable extra precautions shall be taken. The Engineer may however permit blasting for underground excavation, without restriction of fixed time, provided that he is satisfied that proper precaution are taken to give sufficient warning to all concerned and that work of other agencies on the site is not hampered. For lighting the fuse, a lamp with strong flame such as carbide lamp shall be used.

The Contractor's Supervisor shall watch the required time for the firing of the fuses and shall see that all the workmen are under safe shelters in good time.

3.4.9. ELECTRICAL FIRING:

Only the contractor's Supervisor in charge shall possess key of the exploder and short firing accessories and he shall keep it always with himself, special apparatus shall be used as a source of current for the blasting operations. Power lines shall not be tapped for the purpose.

The detonators shall be checked before use. For blast in series only detonators of the same manufacture of the same group of electrical resistance shall be used.

Such of electrical lines as could constitute danger for the work of charging shall be removed from the site.

The firing cables shall have a proper, insulating cover so as to avoid short circuiting due to contact with water, metallic parts of rock.

The use of the earth as a return line shall not be permitted.

The firing cables shall be connected to source of current only when nobody is in the area of blasting. Before, firing, the circuit shall be checked by a suitable apparatus. After firing whether

with or without an actual blast the contact between the firing cables and the source of current shall be cutoff before any one is allowed to leave the shelter.

During storms charging with electrical detonators shall be suspended. The charges already placed in the holes shall be blasted as quickly as possible but taking all the safety precautions and giving necessary warning signals. If this is not possible the sites shall be abandoned till the storm has passed.

3.4.10 PREACAUTIONS AFTER BLASTING:

After the blast, the contractor's supervisor must carefully, inspect the work and satisfy himself that all the charges have exploded. After the blast is taken placed in underground works, workmen shall not be allowed to go to the place till all the toxic gases are evacuated from the face.

3.4.11 MISFIRES:

If it is suspected that part of the blast has failed to fire and delayed, sufficient time shall be allowed to elapse before entering the danger zone. When fuse and blasting caps are used a safe time should be allowed and then the contractor's supervisor alone shall leave the shelter to see the misfire.

None of the drillers are to work nearer this hole under one of the two following operations have been carried out by the supervisor.

Either (i) the supervisor should very carefully (when the tamping is of camp clay) extract the tamping with a wooden scraper or jet of water or compressed air (using pipe of soft materials) and withdraw the fuse with the primer and detonator attached after which a fresh primer and detonator with fuse should be placed in this hole and fired out or (ii) the hole may be cleared of 300mm of capping and the direction then be ascertained by placing a stick in the hole. Another hole may be drilled at least 225mm. away and parallel to it. This hole should then be charged and fired. The balance of the cartridge and detonator found shall be removed.

Before leaving the work, the contractor's supervisor should inform the supervisor of the relieving shift of any case of misfires and should point out the position with Red Cross denoting the same, also stating what action if any, he has taken in the matter. A register of misfires and their location and how they were dealt with shall be maintained by the contractor.

The contractor's supervisor should also at once report at the contractor's office all cases of misfires, the cause of the same and what steps were taken in connection there with.

The name of the day and night shift supervisors of the contractor must be noted daily in the contractor's office. If misfire has been found to be due to a defective detonator, or dynamite, the whole quantity of box from which the defective article was taken must be returned to the contractor's office for inspection, and shall be disposed off.

Blasting operation, when considered necessary shall be resorted to only with the written permission of the Engineer-in-charge. Prior inspection shall be carried out for the safety and stability of the public and property. Blasting operations in the proximity of overhead power lines, communication lines, utility lines or other structures shall not be carried on until the operator or the owner or both of such lines have been notified and precautionary measures deemed necessary have been taken.

Any damage to the neighboring buildings, properties, standing crops, and life due to blasting shall be made good by the contractor at his cost.

SECTION 3.5 EMBANKMENTS:

3.5.1. PREPARATION OF SURFACES FOR EMBANKMENTS:

The preparation of surfaces for embankment shall be in accordance to relevant I.S. specification at his own cost.

Before commencing the work, the toe of the slope on each side of the Canal Banks shall be locks pitted (dog belled) and marked by pegs firmly driven into the ground at intervals of about 15 meter. Profiles made by bamboos, earth, or other convenient materials and strings shall be set up for the guidance of the workmen about 15 meters apart over straight reaches and about 7.5 meters apart at curves.

Exception in areas of rock, the areas under Dam/canal embankments shall be pre-wet by sprinkling water before cleaning, grubbing or excavation of operations or embankments construction begin.

The moisture content shall be optimum to a depth of one meter below the original ground surface or to impervious material whichever less as directed by the Engineer-in-charge. Whenever possible all water shall be added uniformly in one application. Areas, on the sides of the Dam/canal banks upon which the Engineer may direct spoil banks to be constructed will not require application of water.

The contractor is cautioned to control carefully the application of water and to cheek on the depth and amount of water penetration during application so as to avoid over watering, accumulation of water in depressions or excessive run off.

If at any location on embankment foundations, before and during embankment construction there is excessive moisture as determined by the Engineer, steps shall be taken to reduce the moisture by excavating drains, by allowing adequate drain time or by any other approved means.

The contractor shall not be entitled for any additional allowance above the unit prices bid in the schedule on account of the requirement for excavating drains or allowing additional time for drying, delays or increased closets due to poor traffic ability on the embankment foundations or on the haul roads, reduced efficiency of the equipment the contractor elects to use or on account of any other operational difficulties caused by overly wet embankment foundation or haul roads.

Where the ground surface under any embankment is not suitable as determined by the Engineer for a foundation for the embankment, the contractor shall strip the area under the embankment of such unsuitable material to such depth as may be directed. The material so removed shall be disposed off as provided in paragraph 3.3.4. Measurement for payment of stripping unsuitable materials under embankments shall be made only to the lines and to such depth as may be directed and payment therefore will be made at the unit prices per cubic meter bid in the bill of quantities for excavation for canal/construction of embankment.

Before beginning the construction of embankments the surface area of ground to be occupied shall be cleared of all roots and vegetable matter of any kind stripped to a suitable depth. The stumps shall be pulled or otherwise removed, and the roots grubbed. The stumps and roots removed shall be suitable disposed if.

The depth of which top soil is removed shall be adequate to remove all perishable material and any soil which may become unstable on saturation or may interfere with development of proper bond between foundation and embankment. It is not necessary to remove all the soil containing fine hair like roots but only the rather heavy mat. The underline table may offer as a guide for lines for finding depth of stripping.

Type of vegetable cover in the soil	**Depth of stripping.**
1. Soil containing light grass cover 2. Agricultural Lands	10 cm to 15 centimeters To bottom of ploughed zone 20.0 to 30.0 centimeters

The ground surface under all canal embankments excepting rock surface where it is below the full supply level in the canal shall be scarified making open furrows not less than 20 centimeters deep below natural ground surface at intervals of not more than 1.0 (One) meter. However, where the ground surface is low, the bed level of the canal the entire surface of the foundation of embankments shall be stripped to a depth of not less than 20 (twenty) centimeters.

Immediately after preparation of the embankment foundation, the contractor shall excavate cut off trenches. Following this operation as soon as feasible and as approved by the Engineer the contractor shall place and compact embankment in the cut off trenches and place one meter of embankment over the entire embankment foundation and compact where required. This procedure will seal the foundation against loss of moisture and provide some consolidation of the foundation.

The cost of scarifying the foundation surfaces under the canal embankments and other embankments shall be paid, if provided in the bill of quantities for excavation of canal.

Payment for excavation for cut off trenches shall be made at the unit price per cubic meter provided in the schedule of quantities for excavation for canal.

Payment for compacting embankment in the cut off trenches shall be included in the unit price per cubic meter in the bill of quantities for watering and compaction of embankments.

Water applied for pre-wetting areas under the canal embankments and under other embankments will not be measured for payment and shall be included in unit price per cubic meter provided in the bill of quantities for excavation for canal/construction of canal embankment under the canal embankment.

In case of existing canals, where the slopes in canals and embankment portions are to be modified, benching of slopes/complete filling and then section cutting shall be done or old bunds shall be sloped as directed by the Engineer duly clearing the surface area under slopes from all roots and vegetable matter and stumps shall be pulled or otherwise removed and roots grubbed. The stumps and roots removed shall be suitably disposed off.

The measurement of benching operation if done shall be done separately and the payment shall be made at unit price per running metre provided in the bill of quantities for that item.

3.5.2 CONSTRUCTION OF EMBANKMENTS:

A. GENERAL

Canal embankments shall be constructed to top widths and side slopes as shown on the drawings duly providing for compacted allowance of two cm. per meter height of bank for settlement. The embankment shall be built to heights as directed above those shown on the drawings. The top of all the canal embankments shall be graded to be suitable for a road way in accordance with subparagraph (b) and the top of other embankments shall be graded to scarify as directed.

Before commencing over haul of material from the borrow area, levels of the banks to be formed in the sections where the over hauled material is proposed for construction of embankments shall be taken. After completing the construction of embankment final cross section levels shall be taken and the volume shall be arrived at and payment shall be made to that quantity only.

All materials shall be deposited in embankments so that cobbles, gravel and boulders are well distributed through other materials and not nested in any position within or under the embankment as enunciated in clause 6.4. of IS 4701 – 1982.

In area where required excavation does not furnish suitable or adequate material for constructing embankment, material shall be obtained from area where material in excess of that required to construct the adjacent embankment is available.

Where the original ground surface is below the grade of the canal and where construction of a fill below the bottom of the canal is prescribed such fill shall be placed a compacted embankment. Where the original ground surface is below the base of a structure, the fill required to form a suitable foundation for the structure shall be placed as compacted embankment.

B. ROADS AND RAMPS:

In conjunction with construction of canal embankments, the contractor shall construct operation and maintenance roads and earth ramps adjacent to the canal and structures where shown on the drawings and where directed at his own expense. Suitable materials from required excavation shall be placed as embankment for the roads and ramps. If sufficient material is not available from required excavation the Engineer may direct excavation from borrow areas.

The width of road shall be provided as shown in the drawing and where the width of road is not shown on the drawings, it shall have a width of not less than 4.2 meters. The work required for construction, operation and maintenance of road and for earth ramps that obtainable with a motor grader provided for safe travel with a two wheel drive automobile in high gear to moderate speed. Special rolling or compact will not be normally required Provided that if compaction is directed, the embankments shall be compacted in accordance with section 3.6.

C. EMBANKMENTS NOT TO BE COMPACTED:

Embankment not be compacted shall be formed conforming to clause .6.6.1 to I.S. 4701-1982. The material for these embankments shall have optimum moisture content before earth moving equipment is routed over the embankment. The embankments shall be built in layers not exceeding 30 (thirty) cm. in thickness. Embankments shall be built in approximately horizontal layers carried across the entire width of the embankments to the required slopes. Embankments shall not be widened with loose materials dumped from the top. Embankments may be built by excavation and hauling equipment or by excavating and hauling equipment shall be made in horizontal layers and shall be kept as close to level as practicable. The travel over the embankments during construction shall be routed so as to distribute the compacting effect of the equipment to the best practicable advantage.

DEPOSITING

Spoil from the pits shall be deposited on bank to each section as are shown on the relevant plans specified or ordered by the Engineer-in-charge. Ramming breaking clods and smooth surface sectioning shall not be necessary, but a spoil banks with a neat straight toe, even slopes and even top surface shall be formed as the depositing proceeds.

Embankment built by excavating machinery depositing the materials directly from the excavation shall be made in horizontal layers having a thickness of 30 (thirty) cm. Finer portions of the materials excavated shall be placed in that part of the embankment nearest to the water and coarser materials shall be placed in the outer part of the embankment.

D. EMBANKMENT TO BE COMPACTED:

The requirements for compacted embankments shall be as specified in Section 3.6 All materials in compacting embankments shall be placed moisture and compacted as provided in Section 3.6.

The materials used for compacted embankments shall be suitable materials as determined by the Engineer-in-charge and shall be obtained from required excavation. The materials shall conform to clause 6.4 of IS: 4701-1982.

Before the materials for the 1st layer of embankment is placed, the foundation of the embankment shall be prepared as provided in paragraph 3.5.1 and shall be moistened and Compacted in the manner specified therein. The embankments shall be compacted to the elevation and to the top widths and side slopes shown on the drawings or prescribed by the Engineer-in-charge.

The layers shall be placed in rows approximately parallel to the axis of the bank. The base of embankment at every height is to be made to its full width of each zone as shown in the drawing plus offsets of not less than 1.00 meters beyond the finished profile on either side for compaction. No extra payment will be made for the utilization of the earth fill from the offsets in the embankment and unit price quoted for the banking is deemed to be included. However, the cost of lip cutting is to be paid in the respective schedule item as per the provision in BOQ. No additions will be allowed to the slope for full design section of the bank after the bank is raised. The embankment shall be compacted to 95% proctors

density using pneumatic Tampers, frog rammers or vibratory plate compactor or power roller.

Where the original ground surface is below the bottom of the canal and where compacted fill below the bottom of the canal is prescribed such fill shall be placed as compacted embankment. Where the original ground surface is below the base of structures for where slopping concrete walls or slabs extend above the original ground surface and it is practicable as determined by the Engineer-in-charge to embankments shall be constructed to lines and grades as directed to form suitable foundation for the structure of for the sloping or slabs.

3.5.3. BORROW AREA:

3.5.3.1. GENERAL.

a. All materials required for the construction of embankment and backfill for cut-off trench and around the structures which are not available from canal excavation, excavation for structure or from excavation of other ancillary works shall be obtained from the designated borrow area after stripping and approved by the Engineer-in-charge in consultation with field laboratory. The depth of cut in all borrow areas shall be designated by the Engineer-in-charge and the cuts shall be made up to such designated depths only. Shallow cut will be permitted in the borrow areas if uncertified materials with uniform moisture contents are encountered. Each designated borrow area shall be fully exploited before switching over to the next designated borrow area. Half hazard exploitation of borrow pits shall not be permitted. The type of equipment used and the operations in the excavation of materials in borrow area shall be such as to produce the required uniformity of the mixture of materials for the embankment. The contractor has to arrange borrow earth at his own cost and responsibility. No compensation whatsoever for change in limits and locations of the borrow areas and depth of cut for getting suitable earth shall be paid to the contractor. The borrow area shall not be designated within a distance of five times the height of embankment from the other toe.

b. Borrow pits shall be operated so as not to impair the usefulness or mar the appearance of any part of the work of any other property. The surfaces of wasted materials shall be left in a reasonably level and even condition.

3.5.3.2. PREPARATION OF BORROW AREAS:

All areas required for borrowing earth for embankment shall be cleared of all tree stumps. roots, bushes, rubbish and other objectionable materials. Adequate lighting arrangement should be provided by the contractor.

Particulars care shall be taken to exclude all organic matter from the materials to be placed in the embankment. All cleared organic materials shall be burnt to ashes or disposed of as directed. The cleared areas shall be maintained free of vegetable growth during the progress of the work.

3.5.3.3. STRIPPING OF BORROW AREAS:

Borrow area shall be stripped of top soil, sod and any other objectionable materials to the required depth as directed by Engineer-in-charge.

The work may be done manually or with suitable machine. Stripping operations shall be limited only to designated borrow areas. Materials from stripping shall be disposed off in exhausted borrow areas or in the approved adjacent areas as directed. The payment has deemed to be included in the respective item rate i.e. borrow earth in the BOQ.

3.5.3.4. BORROW AREA WATERING/DEWATERING:

a. Borrow area watering shall be done by the contractor at his own cost wherever necessary preferably 48 hours in advance, so that materials may be carried with adequate moisture and in the manner specified by the Engineer-in-charge.

b. The initial moisture content of the materials in the borrow areas shall be estimated with the help of field laboratory tests. The optimum moisture content required for the materials in any particular borrow areas shall be obtained from the field laboratory. The additional moisture requirements as determined by the laboratory test shall be introduced into the borrow areas by watering well in advance of the excavation to ensure uniformity of moisture content. All care shall be taken to reduce excessive moisture in any of the locations of a borrow area before or during excavation to secure the materials with moisture content close to the optimum. To avoid formation of pools in the borrow areas during excavation operation, drainage ditches from borrow areas to suitable outlets shall be excavated, wherever necessary. Upon exhausting of all materials or abandoning the borrow areas, the pits shall be fully drained to ensure no ponding of water.

3.5.3.5. HAUL ROADS:

Construction and maintenance of haulage roads will be the responsibility of the contractor. The department will have full right to way to those roads for inspection purposes. Proper roads sign as directed have to be provided for safety. For haulage of earth, the contractor shall construct ramps and haul roads of sufficient width along the shortest but most practicable route and shall maintain and illuminate them to a satisfactory manner. Watering of the haul road shall be done by the contractor as often as necessary to prevent rising of dust, formation of cuts and consequent deterioration of the surface. Whenever service roads meant for public through fare traverse through or run close to the borrow area, the contractor shall direct the excavation and haulage operation in such a manner as to ensure uninterrupted use of the service road and safety to the public. At the haul road and service road crossing, the contractor shall install necessary check gates and road signs.

No extra payment is admissible as this is deemed to have been included in the unit bid price for earth work in the bill of quantities being contingent to the main work.

3.5.4. EARTH FILL MATREIALS.

3.5.4.1. HOMOGENEOUS EARTHFILL:

Dam/Canal embankment shall be constructed to the top width and side slopes as shown on the drawings. Suitable excavated materials available from the canal cutting, proud cutting, removal of ramps and excavation for structures shall be used for construction of banks. If suitable and adequate materials for constructing embankment is not available for excavations, the desired materials shall be obtained from borrow area designated for the purpose as per the instruction of the Engineer-in-charge.

The planning for execution should be such that all the useful excavated materials are utilized in embankment prior to utilization of borrow earth from outside. The embankment earth shall be borrowed only after getting written instruction of the Engineer-in-charge.

Only suitable materials as per specification shall be excavated, loaded and conveyed to the point of placement in the embankment. Unsuitable materials if conveyed shall be removed and disposed clear of the work site as directed by the Engineer-in-charge at the cost of the contractor. The maximum dimensions of stones, pebbles and rock fragments etc. placed in the outside zone of the embankment shall not be more than 15 cm. and the quantity of such stone shall not exceed 5% of total quantity.

3.5.4.2. ZONED EARTHFILL:

i. When a embankment section is designed zoned section, the embankment shall be divided into zones within which fill materials obtained from canal excavations having different characteristics are to be placed. Placement of fill within these zones as shown on the drawings shall be performed in orderly sequences and in an efficient and workman like manner. The selected materials shall be filled above the key of lining.

ii. Chemical and physical tests of the soil in the embankment shall be carried out to ensure that the soil does not contain soluble lime salt content or cohesion less fines, and quantities harmful to the embankments. The useful materials available from canal excavation, excavation of proud and excavation of structures shall be transported over the required leads, as indicated in the respective items of schedule of quantities and placed in then specified layers for embankment.

iii. In areas, where suitable and adequate materials for constructing the inner zones of the embankment is not available from the canal excavation and excavation of structures, the materials shall be obtained from the borrow areas fixed for the purpose. The borrow areas shall be excavated to the dimensions and depths actually required and as per the instructions of the Engineer-in-charge.

iv. The rest of compacted zone in the drawings shall be constructed of materials having required percentage of clay so that it can be compacted at optimum moisture content by suitable compacting equipment, to their maximum dry density. The materials shall be compacted to a density as specified on the drawings and as per standard proctor density. Water tightness of materials shall be checked by carrying out in-situ permeability tests. Permeability of impervious materials shall not be greater than 10 cm /sec. The impervious material of inner zone should preferably by free from large size particles. If this is not possible the maximum size of gravels i.e. coarse particles to be permitted shall be 40 mm

and in that case gravel corrected density shall be considered for compaction standards. In no case the quantity of gravel shall exceed 10% of total quantity.

v. The rest of compacted zone may consist of any suitable material which provides support to impervious core under various conditions of saturation and draw down. If silty or sandy materials are used, compaction shall be done by using proper machinery utilizing the principle of vibro-compaction. The distribution of materials shall be such that the compacted material shall be homogeneous free from cracks, pockets or other imperfections. The maximum dimensions of stone placed in the embankment shall not be more than 15 cm. and the quantity of such stone shall not exceed 5% The excavating and placing operations shall be such that the materials when compacted shall be blended sufficiently to secure the best practicable degree of compaction, impermeability and stability. The materials shall be compacted to a density as specified on the drawings or as directed by the Engineer-in-charge.

3.5.5. PLACING EARTHFILL:

A. The embankment shall be constructed with earth fill of required materials as per drawing and specification. The fill shall before from lenses pockets, streaks or layer of materials differing substantially in texture or gradation from the surrounding materials. Then useful excavated materials shall be classified as impervious and semi pervious by the Engineer-in-charge. Care shall be taken to utilize the impervious materials towards the waterside of the embankment and semi pervious materials towards outer zone of the embankment as per drawing.

B. Construction of embankment shall begin at the toe of the fill and in no case shall embankment be widened by materials dumped from the top. The materials shall be placed in the earth fill in the continuous horizontal layers not more than 15 cm in thickness after being rolled as herein specified.

The thickness of the layer shall be adjusted by the Engineer-in-charge, if the contractor satisfies the Department that the particular type of compactors used by him give the required density by carrying out trial compaction and requisite tests. The thickness of horizontal layers after compaction shall not be more than 10 cm. if compaction is performed by mechanical tampers, not more than 15 cm. if by sheep foot roller and not more than 30 cm. if compaction is performed by vibratory or pneumatic rollers or similar equipment. Initially the earth in the embankment fill shall be laid in a greater width than the designed section. Adequate extra width of about 1.00 m on either side of the embankment shall be provided so that the earth fill, up to lines of the finished slopes shall have the required compaction as per the drawing and specification. Such extra width shall be removed and utilized in the upper layers of embankment along with slopes trimming. No extra payment will be made for the utilization of the earth fill from the offsets in the embankment and unit price quoted for the banking is deemed to be included. However, the cost of lip cutting is to be paid in the respective schedule item as per the provision in BOQ.

The inside proud section shall not be removed if the lining work is not included under the same contract such proud section made out of borrow earth from outside only shall be paid as per bid price of the item in the bill of quantities. No payment shall be made for compaction for such proud section left.

C. No fresh layer shall be laid until the previous layer is properly watered and compacted as per the requirement. The surface of the prepared foundation or the rolled surface of any layer of earth fill is too dry or smooth to bound properly with the layer of materials to be placed thereon; it shall be moistened or worked with harrow scarified or other suitable equipment in an approved manner to a sufficient depth to provide a satisfactory bonding surface before the next succeeding layer of earth fill materials is placed. If the rolled surface of any earth fill is found to be too wet for proper compaction of the layer of earth fill materials to be placed thereon. It shall be raked up and allowed to dry or be worked with harrow. Scarified or any other suitable equipment to reduce the moisture content to the required amount and then it shall be compacted before the next succeeding layer of earth fill materials is placed.

D. The materials shall be deposited in rows parallel to the axis and spread in the uniform layers and shall be broken clods maximum up to 5 cm. in thickness or such thickness as directed by Engineer. The work of spreading and compaction shall be so adjusted as not to interfere with each other and in such a way that neither of the operations is held up because of non completion of rolling and watering. The excavation and placing operation shall be such that the materials when compacted shall be blended sufficiently to secure the best practicable degree of compaction, impermeability and stability. If the work is held up due to failure of machinery no claim whatsoever shall be entertained even in case the machinery is supplied by Department. The surface of banking shall at all time of construction be maintained true to required cross section.

E. During construction a small transverse slope from center towards edges should be given to avoid pools of water forming due to rains.

F. When compacting the soil against the rock abutment or walls of masonry or concrete structures, the construction surface of the embankment shall be sloped away from the rock or masonry or concrete structure leaving a minimum distance of 0.6 m and at an inclination of 3:1. If the foundation surface is too irregular to allow the use of large roller directly against the structure or rock out crop, the roller shall be used to compact the soil, as close to the structure or the out crop as possible and the portion of the embankment directly against the rock or the structure shall be compacted with pneumatic hand tampers in thin layers. The moisture content of the earth fill placed against the rock or the structure shall be slightly above the optimum to allow it to be compacted into all irregularities of the rock and this shall be determined by the field laboratory. In placing the earth fill under rock foundation the foundation shall first be prepared as detailed earlier.

G. Care shall be taken in placing the first layer of the fill above the filter layer so that no damage is caused by the hauling machinery. Sheep foot rollers shall not be employed for compaction till over the filter the thickness of the layer compacted by other means is greater by 30 cm. than the teeth of the roller drum. The soil for the first layer shall be at moisture content sufficient to enable satisfactory bonding of the fill with the filter surface.

3.5.6. WEATHER CONDITIONS:

a. Embankment materials shall be placed only when the weather conditions are satisfactory to permit accurate control of the moisture content in the embankment materials. Before closing work on embankment, in any continuous reach prior to setting of monsoon, the top surface shall be graded and rolled with a smooth wheeled roller to facilitate run off. Prior to resuming work, the top surface shall be scarified and moistened or allowed to dry as necessary and approved by the Engineer for resumption.

b. The contractor shall provide suitable protection works to protect the slope from corrosion due to rain water. No payment whatsoever shall be made for providing such protection work and rectifying the monsoon damages.

3.5.7 MOISTURE CONTROL:

The water content of the earth fill materials prior to and during compaction shall be distributed uniformly throughout each layer of materials and it shall be between -2% to +2% of the optimum moisture content. Moisture determination of soil as well as needle moisture determination of soil shall be carried out as per I.S. 2720-1983

Laboratory investigations may impose some restriction on the lower limits of the practicable moisture contents on the basis of studies on consolidation characteristics of soil in embankment. Here in after the terms range of optimum practicable moisture content shall refer to the value as described above. As far as practicable, the materials shall be brought to the proper moisture content in the borrow area before excavation. If additional moisture is required it shall be added preferably at the borrow area and only in limited cases/extent. If required, on the embankment by sprinkling water before rolling of a layer. If more moisture is present than required, the material shall be spread and allowed to dry before starting rolling. Moisture control shall be strictly adhering to. The moisture content shall be relatively uniform throughout the layer of material, if necessary, ploughing, disc harrowing or blending with other materials may have to be resorted to obtain uniform moisture distribution. If the moisture content is more or less than the range of optimum practicable moisture content or if it is not uniformly distributed throughout the layer, rolling and adding of further layer shall be stopped. Further work shall be started again only when the above conditions are satisfied.

In order to have proper control of moisture content in the earth fill no earth work shall be done during rainy days. No compensation shall be made to the contractor due to held up to work for rain or fog.

SECTION 3.6. COMPACTING EARTH MATERIALS.

3.6.1. GENERAL

Where compacting or earth materials is required the materials shall be deposited in horizontal layers and compacted as specified in this paragraph. The excavation, placing moistening and compacting operations shall be such that the materials will be uniformly compacted to the required density throughout the required section, and will be homogeneous, free from lenses, pockets, streaks, voids, laminations or other imperfections.

Having decided on the filling materials to be used standard compaction test will be conducted on the materials proposed for embankment to indicate best type of equipment to be used and the moisture content at which compaction should be done, thickness of layer and number of passes etc.

The following guide lines are prescribed for compaction of different height of earth fill in canals.

A. Earth fills height.

Canal reaches having earth fill shall always be compacted by any approved method of compaction.

B. Moisture control.

The water content of the earth fill material prior to and during compaction shall be distributed uniformly throughout each layer of materials and it shall be between -5% to +2% of the optimum moisture content. As far as possible and practicable the moisture content of the materials should be brought to required level by watering of borrow area before excavation. If additional moisture is required the same should be sprinkled while laying the earth fill in layers, if the moisture content is greater than required the material shall be allowed to dry and if necessary ploughing, disc-harrowing or blending with other materials may have to be resorted to obtain uniform moisture distribution. In order to have proper control of moisture in earth fill, no embankment shall be constructed during rainy days.

3.6.2 COMPACTING CLAY AND SILTY MATERIALS.

Where compaction of earth materials containing appreciably amount of clay or silt is required the compaction shall be carried out in accordance with the clause 6.6.2 of IS 4701-1982. The materials shall be deposited in horizontal layers. The thickness of each horizontal layer before compaction shall not be more than 25 cm. (Loose layer) and the layer shall be to full width of the embankment. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure the highest practically density and best impermeability and stability. If the surface of any compacted layer of earth fill is too dry or too smooth to bond properly with the layer of materials to be placed thereon, it shall be moistened and or scarified in an approved manner to provide a satisfactory bonding surface before the next succeeding layer is placed. The entire roller used on any one layer of fill shall be of the same type and same weight.

Prior to and during compaction operations, the embankment materials shall possess optimum moistures contents as required in clause 6.6.4 of IS 4701-1982. The embankment materials shall have optimum moisture content required for the purpose of compaction and this moisture content shall be fairly uniform throughout the layer. As far as practicable the moistening of the material shall be performed at the site of excavation but such moistening shall be supplemented as required by sprinkling water at the site of compaction if necessary. If the moisture content is greater than optimum for compaction, the compaction operations shall be delayed until such time as the materials has dried to the optimum moisture content or to the level directed by Engineer-in-charge. The moisture content of soils shall be determined in accordance with I.S 2720(Part-III) 1982.

If the moisture content is not within the limit described above, the compaction operation shall not be proceeded except with the specific approval of the Engineer-in-charge., until the materials has been wetted or allowed to dry out, as may be required to obtain optimum moisture

content, and no adjustment in price will be made on account of any operations of the contractor in wetting or drying the materials or on account of any delays occasioned thereby.

When the materials has been conditioned as herein before specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas such as under pipes and at the joints of bank connections with the structures, they shall been equipped with suitably shaped heads to obtain the required density.

The dry bulk density of the soil portion in compacted embankment materials shall be not less than 95% of the maximum dry bulk density at optimum moisture content obtained in accordance with I.S. 2720 (Part-VI) 1980 Indian Code of Practice for determination of moisture content, dry density relation using light compaction.

The dry density of soil in field shall be determined in accordance with I.S. 2720 (Part – XXVIII) 1974. Indian Code of Practice of determination of soil in place by sand replacement or by I.S. 2720 (Part – XXIX) 1975 Indian Code of Practice for Determination of Dry Density of Soils in place by the Code Cutter Method.

Moisture content of soil shall be determined in accordance with I.S. 2720 (Part-II) 1973 Indian Code of Practice for Determination of Moisture Content.

The optimum moisture content is the moisture content that corresponds of the laboratory maximum dry density determined in accordance with I.S. 2720 (Part – VII) 1973.

The above compaction tests will be conducted by contractor in the presence of departmental officers and the contractor shall ensure compaction, till the Engineer-in-charge or his authorized representative is satisfied that the maximum dry density at optimum moisture content is obtained and permits the laying of next layer.

3.6.3 COMPACTING COHESIONLESS MATERIALS

Where compaction of cohesion less, free draining materials, such as sands and gravels is required the materials shall be deposited in horizontal layers and compacted to the relative density specified below. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure the best practicable degree of compaction and stability. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

As envisaged in clause 6.6.2.1 of IS 4701-1982 the thickness of the embankment layer shall not exceed 25 cm. (loose layer) before compaction and it should be spread over the full width of the embankment and compaction shall be done by tampers or crawler tractors or vibrating rollers. If the compaction is performed by Treads of crawler type tractor, surface vibrators or similar equipment the thickness of the layer before compaction shall not be more than 4 cm. if compaction is performed by internal vibrators the thickness of the layer shall not be more than the penetrating depth of the vibrator.

As envisaged in clause 6.6.3.1 of I.S. 4701-1982 the relative density of the compacted materials shall not be less than 70% when tested in accordance with I.S. 2720(Part-XIV) k1983 Indian Code of Practice for determination of density Index (relative density) of cohesion less soils.

3.6.4 COMPACTION COHESIONLESS MATERIALS CONTAININGS SOME CLAY AND SILT:

This sub-paragraph applies only to cohesion less materials and not to cohesive materials, cohesion less materials containing clay and silt may not be free draining. When compaction of cohesion less materials containing clay and silt is required, the materials shall be compacted to a

dry density in accordance with either sub-paragraph (i) and (ii) below, using whichever test those results in higher dry density of the compacted materials in the placement.

i) Dry density determined using procedure enunciated in I.S. 2720 (Part-VII) 1965 (Indian Code of Practice for termination of moisture content dry density relation using light compaction). Prior to and during compaction operation the materials shall posses optimum moisture content as determined in accordance with clause 6.6.4.1 of I;.S. 4701-1982 and the moisture content shall be uniform throughout each layer. Provided that the moisture content is ensured as required in clause 6.6.4 of I.S. 4701-1982 the dry density of take soil portion in the compacted materials shall not be less than 95% of the laboratory maximum soil dry density compacted. The field dry density shall be determined in accordance with I.S. 2720(Part-XXVIII) 1974 or IS 2720 (Part XXIX) 1975.
ii) Dry density using the relative density test as described in I.S. 2720 (Part XIV)1983 Indian Code of Practice for determination of density index (relative density) of cohesion less soils. The relative density of the compacted materials obtained shall be not less than 70% determined in accordance with clause 6.6.3.1 of I.S. 4701 – 1982 the moisture content shall be maintained as per clause 6.6.4 of I.S. 4701 – 1982.

3.6.4 ROLLERS AND OTHER COMPACTING EQUIPMENT:

As shown in Appendix C or IS 4701 – 1982 the following compacting equipment may be used for compacting the soils shown against them as detailed below.

Major Division	Sub-group	Suitable type of compacting equipments.
Coarse Well Grained Soils	Well Grained. Gravel, gravel and mixtures little or no fines.	Smooth wheel roller Diesel road rollers of 8 to 10 tones capacity pneumatic tyred Roller vibrating smooth wheel roller
	Well graded gravel sand mixtures with excellent clay binder	-do-
	Uniform gravel with little or no fines.	-do-
	Poorly graded gravel and gravel sand mixtures little or no fines.	-do-
	Gravel with fines, silty gravel, clayey gravel poorly graded gravel sand clay mixtures.	-do-
Coarse Grained soils, Sand & sandy clays.	1. Well graded sand and Gravelly sands, little or no fines.	Heavy vibrating plate Frog rammer, power rammer, power roller.
	2. Well graded sand with excellent clay binder.	-do-
	3. Uniform sand with little or no fines.	-do-
	4. Sands with fines silty sands, clayey sands, poorly graded sand clay mixtures.	-do-
Fine Grained Soils: Soil having low compressibility	1. Silts (in organic) and very fine sands rock flour, silty or clayey fine sands, with slight plasticity.	Smoot wheel roller diesel Road Rollers of 8 to 10 tonnes capacity power rollers pneumatic tyred roller.
	2. Clayey silts (inorganic)	-do-

Soils having medium compressibility	1. Organic silts of low plasticity 2. Silty and sandy clays (Inorganic of medium plasticity.) 3. Clays (inorganic of medium plasticity) 4. Organic clays of medium plasticity.	Sheep Foot Roller Frog rammer, power rammer -do- -do-
Soils having higher compressibility.	1. Micaccous or diatomaceous fine sandy and silty soils elastic silts. 2. Clay (Inorganic) c. Organic clays of high plasticity.	Smooth wheel roller diesel Road Rollers of 8 to 10 tones capacity pneumatic tyred roller. -do- -do-

The compacting equipment shall confirm to relevant India specification below.

1.	Smooth wheeled roller should conform to	IS 5502-1969.
2.	Sheep Foot roller should conform to	IS 4661-1968
3.	Pneumatic tyred roller should conform to	IS 5501-1969
4.	Vibratory plate compactor should conform to	IS 5889-1970
5.	Vibratory roller should conform to	IS 500-1970

The methods of compaction shall conform to clause 7.2.1, 7.2.2.7,2.3 of IS 4701-1982

Unless otherwise specified compaction shall be done by mechanical compactors like standard sheep foot roller hauled by dozer or tractor. While specifications below provide that equipment of particular type and size is to be used, the use of improved compaction shall be encouraged.

Tampering rollers used for compaction of earth fill shall conform to the following requirement.

A. Roller drums:

Double drum sheep foot vibratory rollers shall be used for compaction. Each drum of a roller shall have an outside diameter not less than 142.25 cms. And shall not be less than 122 cm. in length. The space between two adjacent drums when on level surface shall not be less than 30 cms. and not more than 38 cms. Each drum shall be free to pivot about an axis parallel to the direction of travel.

B. Roller Weight.

The weight of the roller when fully loaded shall not be less than 7091 Kgs. And the ground pressure when fully loaded shall not be less than 40 Kgs/Sq.cm. Appropriate equipment for hauling the rollers should be used which can pull the rollers satisfactorily at a speed of 4 Kms. Per hour when drums are fully loaded. The space between the tamping feet shall be kept clear of material striking the drum as the same can reduce the effectiveness of the tamping roller.

C. Rolling.

When each layer of materials has been prepared to have the proper moisture content uniformly distributed throughout the materials, it shall be compacted by passing the tampering roller. The exact number of passes for each layer to obtain specific density shall be designated by Field Laboratory tests and tests conducted on the borrowed material. The layers shall be compacted in strips over lapping not less than 0.6 m. rolling

shall commence at edges and progress towards centre longitudinally. The roller of loaded vehicles shall travel in a direction parallel to the axis of the canal. Turns should be made carefully to ensure uniform compaction. Rollers shall always be pulled.

3.6.6. TAMPING.

Roller will not be permitted to operate within one meter of concrete and masonry structures in the following location where compaction of the earth fill materials by means of roller is impracticable or undesirable the earth fill shall be specially compacted as specified further below.

i. Porticos of the earth fill in embankment adjacent to masonry structures and embankment foundation designated on the drawing as specially compacted earth fill.
ii Earth fill embankment adjacent to steep abutments.
iii Earth fill at specially designated location.

Earth fill shall be spread in layers of not more than 10 (ten) cms. In thickness when loose and shall be moistened to have the required moisture content as specified. When each layer of materials has been conditioned to have the required moisture content, it shall be compacted to the specified density by special rollers, pneumatic/ hand tampers or by other approved methods. The moisture control and compaction shall be equivalent to that obtained in the earth fill actually placed in the embankment in accordance with specifications.

3.6.7 TESTING:

Density tests shall be carried out after rolling to ascertain the state of compaction which should be measured in terms of dry density. Standard proctor density tests shall be carried out at regular intervals to account for variations in the borrow area material. Not less than three tests shall be conducted to indicate variation in the standard Procter density attained in the laboratory.

Density tests shall be conducted from time to time at site to ascertain whether compaction is attained as specified. For every 1500 cums of compacted earth fill, at least one field density test shall be conducted. However, minimum four density tests shall be made per day irrespective of quantity of earth work. In case the tests show that the specified densities are not attained, suitable action shall be taken either by moisture correction or by additional rolling, so as to obtain the specified density which shall be checked again by taking fresh tests at the same locations. The test locations should be so chosen as to represent the whole layer under test. Each layer should be tested for proper compaction before a fresh layer is allowed over it.

The density to be attained after compaction should be at least 95% of proctor density predetermined by Laboratory tests.

3.6.8. SETTLEMENT ALLOWANCE:

In the mechanically compacted earth fill, settlement allowance of 2% should be provided. In case of earth fill of canal which has not been mechanically compacted, settlement allowance at 16% of height should be provided and necessary adjustment should be made to take care of natural settlement due to rains. Accordingly, extra height should be provided. Settlement allowance at 10% shall be calculated after embankments are subjected to natural compaction of one full monsoon rains. Settlement allowance of 2% shall be calculated after embankments are subjected

to natural compaction for 2 or more monsoon rains. The base width of the embankment shall not be increase to maintain the design slopes indicated in the drawings for additional height as settlement allowance, but the following procedure shall be adopted.

Settlement allowance shall be calculated at various levels and the elevation including settlement allowance shall be derived keeping the embankment width at the designated levels unchanged. The edges of the embankment at the increased elevations (including settlement) when joined with the point where the slope has changed earlier below, shall give the slope to be adopted for construction.

3.6.9. SLOPE DRESSING:

The slopes for particulars reach of the Dam/canal which has been completed in the manner described earlier shall be dressed neatly to the designated line and grade. Extra earth works done at sides are to be dressed and reused in the embankment.

3.6.10. MEASUREMENT AND PAYMENT

The cost of the compacting earth materials as described in this paragraph shall be paid separately in the price bid in the bill of quantities for watering and compacting earth work in canal embankment under these specifications. The unit rate of this item shall be for unit volume of earth fill watered and compacted. No extra payment shall be allowed for labourers engaged for collecting of samples for testing and rectification during compaction as may be required.

SECTION – 4

CONCRETE WORKS

SECTION 4.1. CONCRETE STRUCUTRES:

4.1.1. CONCRETE IN STRUCTURES.

Concrete in structures shall conform to the requirements of paragraphs 4.2.1.

4.1.2. CONSTRUCTION OF STRUCTURES:

The item of the schedules for concrete in the structures including all cast in place concrete in the structure.

Cast-in-place concrete for the structures includes all cast-in-place concrete in the structure.

Cast-in-place concrete for the structures shall conform to the requirement of section 3.2 pipe and fitting miscellaneous metal work, mechanical and electrical equipment and other items forming a part of the structures are provided for elsewhere in these specification.

The structures will be located at various points along the canal as shown on the drawings or as otherwise designated.

The structures shall be built to the lines, grades and dimensions shown on the drawings. The dimensions of each structure as shown on the drawings will be subjected to such modifications as may be found necessary by the Engineer-in-charge to adopt the structure to the conditions disclosed by the excavation or to meet other conditional. Where the thickness of any portion of a concrete structure is variable it shall vary uniformly between the dimensions shown.

Where necessary as determined by the Engineer-in-charge the contractor shall furnish additional details drawings of the structures to be constructed.

The cost of furnishing all materials and performing all work for installing timber, metal and other accessories for which specific price are not provided into the schedule, shall be included in the applicable prices bid in the schedule for the work to which such items are appurtenant.

SECTION 4.2. GENERAL CONCRETE REQUIREMENTS:

4.2.1. COMPOSITION:

A. GENERAL:

Concrete shall be composed of cement, sand, coarse aggregate, water admixtures (if any) as specified and all well mixed in batching plant by weight or by concrete mixture by volume and brought to the proper consistency. Batching plant shall conform to IS Code No. 4925-1968.

For works in which water tightness is required the specification in IS 3370-1965 para 1 to 10 shall be adopted.

MIXING:

Concrete shall be mixed in a mechanical mixer and shall be as dense possible, plastic enough to consolidate well and stiff enough to stay in place on the slopes.

Mixing shall be continued until there is a uniform mixing of the materials and the concrete is uniform in colour and consistency. The time of mixing shall be as shown table 1 of IS 457-1957 reproduced below.

Capacity of Mixer	**Minimum time Mixing**	
	Natural Aggregates	Manufactured Aggregates.
All mixture	**2 minutes**	**2-1/2 minutes.**

B. NOMINAL MAXIMUM SIZE OF AGGREGATES:

For sizes of aggregates IS 383-1970 shall apply. The coarse aggregates to be used in concrete shall be as large as practicable, consistent with required strength, spacing of reinforcement and embedded items and placement thickness. The size of the coarse aggregates to be used will be determined by the Engineer-in-charge and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregates for concrete in structures and canal lining shall be as indicated in the relevant drawings appended to the contract documents. Smaller coarse aggregates than specified shall be used where in the opinion of the Engineer-in-charge that proper placement of concrete is impracticable with the size of the aggregate specified in the drawings.

C. MIX PROPROTIONS:

The proportions of various ingredients to be used in the concrete for different items of the work are given in the bill of quantities. In proportioning concrete, the quantity of both cement and aggregate should be determined by volume. Water shall be either measured by volume in calibrate tanks or weighed. Batching plant shall conform IS 4925-1968 (Indian Standard Specification for batching and mixing plant). All measuring equipments shall be maintained in a clean serviceable condition and their accuracy periodically checked. Adjustment shall be made as directed to obtain concrete having suitable workability, impermeability, density, strength and durability without the use of excessive cement. The acceptance or rejection of concrete shall be as per the acceptance criteria laid down in clause 15 of IS 456-2000.

The water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water cement ratio of various grades of concrete shall as determined and ordered by the Engineer-in-charge. Admixture of Pozzolanas, if ordered, shall conform to the requirements specified in IS 9103-1979 (Indian Standard Specification for Admixtures for concrete).

D. CONSISTENCIES:

The slump of concrete at the placement shall be as follows :

Sl. No.	Place condition	Degree of workability	Value of workability.
1.	Concreting of light reinforced sections without vibration or heavily reinforced section with brat ions.	Medium	25mm to 75mm slump for 20 aggregate.

II. For plain concrete work, slump requirements mentioned in item 1 above are applicable.

III. Lining with slip form machine 60 to 70 mm slump for concrete paver finish.

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Engineer-in-charge reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Engineer-in-charge. The use of equipment which will not readily handle and place concrete of the specified slump will not be permitted.

To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted compensate for any variation in the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete after mixing but before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

4.2.2 CONCRETE QUALITY CONTROL MEASURES AND CONCRETE QUALITY ASSURANCE TEST PROGRAMME:

CONCRETE QUALITY CONTROL MEASURES

a. The contractor shall be responsible for providing quality concrete to ensure compliance of the contract requirements.

b. Making and cutting concrete test specimens in the field will conform to IS 516-1959

c. Capping cylindrical concrete specimens will conform to IS 516-1959

d. Compressive strength of concrete specimens will confirm to IS 516-1959.

SAMPLING PROCEDURE AND FREQUENCY:

A. A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and should cover all mixing units.

B. FREQUENCY:

The minimum frequency of sampling of concrete of each grade shall be in accordance with the following-

Quantity of concrete in cum	Number of samples.
1 to 5	1
6 to 15	2
16 to 30	3
31 to 50	4
51 to above.	4 plus one additional sample for every 50 cum. or part thereof.

Note At least one sample shall be taken during each shift.

TEST FACILITIES:

The contractor shall furnish free of cost samples of all ingredients of concrete for testing. He should also supply free of cost the samples of all the ingredients of concrete used in the work for the test to be conducted by the Engineer-in-charge or any officer nominated by him.

CONTRACTOR TO FURNISH DRAWINGS AND DATA:

Not less than 30 days prior to start of installation of the contractor's plant and equipment for processing, handling, transporting, storing and proportioning concrete, the contractor shall submit its drawings and data to the Engineer-in-charge for approval, showing the arrangement of plant etc. The drawing and data shall provide a description in sufficient details for an adequate review of the facilities and equipment the contractor proposes to provide at site of work.

4.2.3 CEMENT

A. GENERAL

Cement shall confirm to clause 4 of IS 456-2000 for the purpose of specifications cement used shall be any of the following with the prior approval of the Engineer-in-charge.

a. Ordinary or low heat Portland cement conforming to IS 269-1976
b. Rapid hardening Portland cement conforming to IS 8041-1978
c. Portland slag cement conforming to IS 455-1976
d. Portland puzzolana cement conforming to Is 1489-1976
e. High strength ordinary Portland cement conforming to IS 8112-1976
f. Hydrophobic cement conforming to IS 8043-1978

The provisions of this paragraph apply to cement for use in cast in place concrete required under these specifications. Portland cement required for items such as concrete pipes, pre-cast concrete structural members and other precast concrete products for grout and mortar and for other items provided for under appropriate paragraph of these specifications covering items for which such Portland cement is required.

The contractor shall make his own arrangements for the procurement of cement to required specifications required for the work. Transportation from the place of supply to the batching plant shall be in weather tight rail cars, trucks, conveyors and other means which will protect the cement completely from exposure to moisture. Immediately upon receipt at the jobsite, bulk cement shall store in dry, weather tight, properly ventilated bins until the cement is batched. The bins shall be emptied and cleaned by the contractor when so directed by the Engineer-in-charge. However the intervals between required cleaning will normally be not less than 6 month. Each other shipment of bagged cement shall be stored separately so that it may readily be distinguished from other shipment and shall be stored in a dry enclosed area protected from moisture. Storage of materials shall be as described in IS 4082-1977 (IS recommendation on staking and storage of construction materials at site) To prevent under aging of bagged cement after delivery. The contractor shall use bags of cement in the chronological order in which they were delivered to the job site. All storage facilities shall be subject to approval of the Engineer-in-charge.

B. ACCEPTANCE OF CEMENT.

Portland cement shall be supplied by the contractor according to clause 10.1 of IS 269-1976.

C. ACCEPTANCE OF POZZOLANA:

Pozzolana added to the concrete as an admixture shall be sampled and tested as per IS 9103-1979

D. RECOVERY OF COST OF CEMENT IN WASTED CONCRETE ETC:

The cost of cement used in wasted concrete in replacement of damaged or defective concrete and extra concrete required as a result of over excavation intentionally performed by the contractor's shall be borne by the contractor himself. No extra payment shall be made to the contractors for such additional quantity.

4.2.4 ADMIXTURES:

The contractor shall use Air entraining admixtures as directed by the Engineer. Admixtures shall be of uniform consistency and quality and shall be maintained at the job site at uniform strength of solution. Admixtures shall be batched separately in liquid form in containers capable of

measuring at one time the full quantity of each admixture required for each batch. Chemical admixtures which harm the quality and strength of concrete shall not be used in the concrete.

4.2.5. WATER:

The water used in making and curing of concrete mortar and grout shall be free from objectionably quantities of silt, organic matter, injurious amounts of oils, acids, salts and other impurities etc. as per IS specification No.456-2000.

The Engineer-in-charge will determine whether or not such quantities of impurities are objectionable.

Such determination will unusually be made by comparison of compressive strength water requirement, time of set and other properties of concrete made with distilled or very clean water and concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with IS 3025-1964 shall be as tabulated below.

PERMISSIBLE LIMITS FOR SOLIDS IN WATER:

1. Organic Maximum permissible limit 200 mg. /ltr.
2. Inorganic 300 mg. /ltr.
3. Sulphate (as 504) 500 mg. /ltr.
4. Chlorides (as CL) 2000 mg. /ltr for plain concrete work and 1000 mg/ltr for RCC work.
5. Suspended matter 2000 mg. /ltr.

The PH value of water shall generally be not less than 6 (six)

If any water to be used in concrete mortar or grout is suspected by the Engineer-in-charge of exceeding the permissible limits for solids, samples, of water shall be obtained and tested by the Engineer-in-charge in accordance with IS 3025-1964

4.2.6. SAND (FINE AGGREGATES):

A. GENERAL

The term sand is used to designate aggregate most of which passes 4.75 millimeter IS . Sieve and contains only so much coarser material as permitted in clause 4.3of IS 383-1970. Sand shall be predominantly natural sand which may be supplemented with crushed sand to make up deficiencies in the natural sand grading.

All sand shall be furnished by the contractor from any approved sources specified in the contract. Sand as delivered to the batching plant shall have uniform and stable moisture content. Determination of moisture content shall be made as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge according to weather conditions (IS 456-2000)

B. QUALITY:

The sand shall consist of clean, dense durable uncoated rock fragments as per IS 383-1979. Sand may be rejected if it fails to meet any of the following quality requirements.

ORGANIC IMPURITIES IN SAND:

Colour no darker than the specified standard in clause 6.2.2.of IS 2386 Part II 1963 (Indian Standard method of test for aggregates of concrete Part II estimation of deleterious materials and organic impurities)

Sand shall be screened before use. If sand brought to site is not clean it must be washed clean in water. Fine draft sand or sea sand or sand containing saline impurities shall on no account to be used SODIUM SULPHATE TEST FOR SOUNDNESS.

The sand to be used shall pass Sodium or magnesium Sulphate accelerated test as specified in IS 2386(Part-V) 1963 for limiting loss on weight.

SPECIFIC GRAVITY:

The sand to be used shall have minimum specific gravity of 2.4.

DELETERIOUS SUBSTANCE:

The amount of deleterious substances in sand shall not exceed maximum permissible limits prescribed in table 1 clause 3.2.1 of IS 383-1970 (Indian Standard Specification for coarse and fine aggregates form natural source for concrete) when tested in accordance with IS 2386-1963 .

C. GRADING:

The sand as batched shall be well graded and when tested by means of standard sieves shall confirm to the limits given in table 4 of IS 383-1970 and shall be described as fine aggregates. Grading zones. I, II, III and IV. Sand complying with the requirements of any of the four grading zones is suitable for concrete. But sand confirming to the requirements of grading zone IV shall not be used for reinforced cement concrete work.

4.2.7. COARSE AGGREGATES:

A. GENERAL:

For the purposes of these specifications, the term "Coarse Aggregate" designate clean well graded aggregates most of which is retained on 4.75 mm. I.S. Sieve and containing only so much finer materials as permitted for various types described under clause 2.2. of IS 383-1970 Coarse Aggregate for concrete shall consist of uncrushed stone, or crushed stone and partially uncrushed and crushed stone.

Coarse Aggregates for concrete shall be furnished by the Contractor from the approved quarries specified in the contract documents. The contractor shall, unless otherwise specified in the tender notice and subsequently on this basis in the contract, be responsible for payment of taxes, quarry fees etc. on all materials.

Coarse aggregates as delivered to the batching plant shall generally have uniform and stable moisture content. In case of variations, clause 9.2.3 of IS 456-2000 shall govern during batching.

B. QUALITY:

The coarse aggregate shall consist of naturally occurring (crushed or uncrushed) stones, and shall be hard, strong durable, clear and free from veins and adherent coating, and free from

injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials. Coarse aggregate will be rejected if it fails to meet any of the following requirements.

1. LOS ANGLES ABRASION TEST:

The abrasion value of aggregates when tested in accordance with the method specified in IS 2386 (Part IV) using Los Angles machine shall not exceed 30% for Aggregates to be used in concrete for wearing surface and 50% for aggregates to be used in other concrete.

2. AGGREGATE CRUSHING STRENGTH TEST:

Aggregates crushing value, when determined in accordance with IS 2386 (Part IV) 1963 shall not exceed 45% for aggregates used for concrete other than wearing surface and 30% for wearing surfaces. As an alternative to the crushing strength test aggregates impact value shall be found out with the method specified in IS 2386 (Part IV) 1963. The aggregates impact value shall not exceed 45% by weight for aggregates used for concrete for other than wearing surfaces and 30% by weight for concrete for wearing surface such as runways roads and pavements.

3. SOUNDNESS TEST:

The coarse aggregates to be used for all concrete works shall pass a sodium or magnesium sulphate accelerated soundness test specified IS 2386 (Part V) 1963 and the average loss or weight after 5 cycles shall not exceed the limits specified in clause 3.6 of IS 383 – 1970.

4. SPECIFIC GRAVITY:

The coarse aggregates shall have specific gravity of 2.60 minimum.

5. DELETERIOUS MATERIALS:

The maximum quantity of deleterious materials in coarse aggregates shall not exceed the limits specified in Table of I.S. 383-1970 when tested in accordance with IS 2386-1963

C. SEPARATION:

The coarse aggregates shall be separated into nominal sizes during production of the aggregate. Just prior to batching, the coarse aggregates shall be rewashed by pressure spray and finish screened on multi-desk vibrating screen capable of simultaneously removing undersized and over sized aggregate from each of the nominal aggregate entering the batches occur during intermittent batching then a dewatering screen will be required after the finish screens to remove the excess free moisture. Finish screens shall be mounted over the batching plant or on the ground adjacent to be batching plant. Finish screens shall be so mounted that the vibration of the screen will not be transmitted to the batching bins or scales and will not affect the accuracy of the weighing equipment in any other manner.

The method and rate of feed for finish screening shall be such that the screens will not be over loaded and will result in a finished product which meets the grading requirements of these specifications. Coarse aggregate shall be fed to the finish screens in a combination of alternations of nominal sizes which will not cause noticeable accumulation of poorly graded coarse aggregates in any bin. The finish screened aggregates shall passes directly to the individual batching bin in such a manner as to minimize breakage. Below 2.36 mm. materials passing through the finish screens shall be wasted unless it is routed back through a sand classifier in a manner which causes uniform blending with the natural sand being processed. Water from finish screening shall be drained in such a manner as to prevent aggregate wash water from entering the batching bins and weighing

hoppers washing and finish screening requirements shall be subject to approval by the Engineer-in-charge.

Coarse aggregates for concrete shall be separated into various nominal maximum sizes specified in the relevant paragraph. Separation of the coarse aggregate into the specified sizes after finish screening shall conform to the grading requirements specified in Table 2 of IS 383 – 1970 when tested in accordance with IS 2386 (Part II) 1963 (Method of test for aggregates for concrete part I) particles size and shape.

Coarse aggregate for mass concrete may be separated as previously herein specified. Separation of the coarse aggregates into the various sizes shall be such that when tested in accordance with IS 2386 (Part I) 1963 shall conform to the requirements specified in Table 3 of IS 383 – 1970.

Sieves used in grading tests shall be standard mesh sieves conforming to IS 460 (Part I) 1978 (specification for test sieves part I wire cloth test sieves).

4.2.8. PRODUCTION OF SAND AND COARSE AGGREGATE:

A. GENERAL.

Sand and coarse aggregate for concrete and sand for mortar and grout shall be obtained by the contractor from the approved sources shown in the contract documents. The approval of deposits by the Engineer-in-charge shall not be constructed as consisting the approval of all or any specified materials taken from the deposits and the contractor will be responsible for the specified quality for all such materials used in the work.

Tests performed on samples of sand and coarse aggregate obtained from the approved sources mentioned in the contract documents indicates that they are generally suitable. Well in advance of their usage on the works, the contractor shall have his own testing of materials and satisfy himself that they conform to the specification mentioned here in for use in the works.

No separate payment will be made for such tests. If sand and coarse aggregate are to be obtained from a deposit not previously tested and approved by the Engineer-in-charge the contractor shall submit representative samples for pre construction test and approval not less than 60 days before the sand and coarse aggregates are required for use. Each sample shall approximately consist of 100 Kg. of material. In addition to pre construction tests the approval of deposits the Engineer-in-charge may test the aggregates for their suitability during their processing. The contractor shall provide such facilities as may be necessary for procuring representative samples free of cost of the aggregate processing plant and at the batch plant or mixing platform.

But use and development of any such deposit shall be subject to the approval by the Engineer-in-charge. Any royalties (taxes or other charges) required for materials taken from deposits either owned by the State Government or control by the Department of Mines and Geology, Govt. of India or owned by any other person shall be paid by the contractor.

B. DEVELOPING AGGREGATE DEPOSITS:

If the deposits is owned by the State Govt. and controlled by the department of Mines and Geology, the portion of the deposit used shall be located and operated so as not to detract

The usefulness of the deposit or any other property of the Government and so as to preserve, in so far as practicable, the future usefulness or value of the deposit. The contractor

shall carefully clear the area of deposit from which the aggregates are to be produced like trees, roots, bushes, sods, solid unsuitable sand and gravel and other objectionable matter. Materials including stripping, removed from deposits owned by the Government and controlled by the Director of Mines and Geology. Government of India and not used in the work covered by these specifications shall be disposed off as directed.

Due to the overall construction programme, it is quite likely that more than one contractor may elect to use of the sources named in the contract document. The contractor shall be responsible for coordinating his work such that it does not interfere with the operations of other contractor who are also using any given source.

C. PROCESSING RAW MATERIALS:

Processing of the raw materials shall include screening and washing as necessary to produce sand and coarse aggregate conforming to the requirements of paragraph 4.2.6 and 4.2.7 Processing of aggregate produced from any source owned by the State Government and controlled by the Department of Mines and Geology shall be done at an approved site. Water used for washing aggregate shall be free from objectionable quantities of salts, organic matter and other impurities. Oversize metal may be crushed to correct aggregate particle size and excess material in individual coarse aggregate size fractions may be crushed to given the largest practical yield of usable concrete aggregate.

Suitable types of crushers shall be used with the prior approval of the Engineer-in-charge for producing coarse aggregates. Crusher fines produced in the manufacture of coarse aggregates may be used in sand. Crushed stone, sand, crushed gravels and crusher fines if used shall be predominantly cubical in shape and shall be blended uniformly with natural sand by routing them together through sand classifier. Crusher coarse aggregate shall be blended uniformly with natural coarse aggregate by routing both together through the classifying screens.

D. COST:

This shall be included in the applicable price bid in the schedule for concrete filter and other works in which the aggregates are used.

4.2.9. BATCHING:

The contractor shall notify the Engineer-in-charge 24 hours before batching concrete. Unless inspection is waived in each case, batching shall be performed only in the presence of an Engineer authorized by Engineer-in-charge.

The contractor shall provide maintain and operate the equipment as required to accurately determine and control the prescribed amounts of the various materials entering the concrete mixtures. The quantities of cement sand and each size of coarse aggregate entering each batch of concrete shall be determined by individual volume measurement or by weight as the case may be. Cement has to be weighted / measured in volume separately from the aggregates. Sand and coarse aggregates may be weighed with separate scale and hoppers.

The grading of aggregates shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions the different sizes being stacked in separate stock piles, the materials shall be stock piled a day before use. The grading of coarse and fine aggregates will be checked as frequently as directed by the Engineer in charge. Water shall be added by weight or measured by volume in calibrated tanks. The amount of added water shall be

adjusted to compensate for any observed variations in the moisture contents. Determinations of moisture content in the aggregate shall be in accordance with I.S. 2386 (Part III) 1963 (Indian Standard Method of test for aggregate of concrete Part III). The amount of surface water carried by aggregates will be determined in accordance with Table 4 of I.S. 456-2000.

Cement and aggregates are hauled from a central batching plant to the mixture each batch shall be protected during transit to prevent loss and to limit the pre-hydration of cement. Separate compartments with suitable covers shall be provided to protect the cements or they shall be completely enfolded in and covered by the aggregates to prevent wind loss. If cement are enfolded in moist aggregates or otherwise exposed to moisture and delays occur between batching and mixing extra cement shall be added to each batch. The extent of such extra cement will be so as to attain the required quality. No separate payment for this addition of extra cement shall be made.

4.2.10. MIXING:

A. GENERAL.

The concrete ingredients shall be thoroughly mixed in mechanical mixers designed to positively insure uniform distribution of all the component materials throughout the concrete at the end of the mixing period. Mixing shall be done as per clause 9 of IS 456-2000. The mixer should comply with IS 1971-1985 (IS Specifications for batch type concrete mixers).

The concrete as discharged from the mixer shall be uniform in composition and consistency from batch to batch. Workability shall be checked at frequent intervals as IS 1199-1959. Mixer shall be examined regularly by the Engineer-in-charge or his authorized Engineer for changes in conditions due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform in colour and consistency and to the satisfaction of the Engineer. If there is segregation after unloading the concrete should be remixed.

After mixer that at any time produces unsatisfactory mix, shall not be used until repaired. If repair attempts are unsuccessful a defective mixer shall be replaced. Batch capacity shall be at least 10% of but not in excess of the rate capacity of the mixer unless otherwise authorized by the Engineer-in-charge.

B. CENTRAL MIXERS:

Water shall be admitted prior to and during charging of the mixer with all other concrete ingredients. After all materials are in the mixer, each batch shall be mixed for not less than the time specified by the Engineer-in-charge. The minimum mixing time shall be 2 minutes. The minimum mixing time specified is based on average mixer performance. The Engineer-in-charge will adjust the minimum mixing time as required by the observations of the mix delivered from mixer. Excessive over mixing which require addition of water to maintain the required concrete consistency shall not be permitted.

In addition to IS 1791-1985 the mixing equipment shall conform to the following further requirements.

1. Plant configuration shall be such that the mixing of each mixer can be observed from the safe location which can be easily reached from the control station. Provisions shall be made so that the operator can observe the concrete in the receiving hopper or bucket as it is being dumped from the mixers.

2. Each mixer shall be controlled with timing device which will indicate the mixing period and assure compliance of required period of mixing.
3. Each mixer shall be controlled with a timing device which will indicate the mixing period and assure compliance of the required period of mixing.
4. The batch plant shall be equipped with an interlocking mechanism which will prevent concrete batches from entering mixers which are not empty.

4. TRUCK MIXERS:

Each truck mixer shall be equipped with accurate water meter located between the supply tank and mixers and having a dial or digital indicator and a reliable revolution counter, located near the water meter which can be readily rest to Zero for indicating the total number of revolutions of the drum from each batch. Each mixer shall have affixed there to a metal plate on which the drum are plainly marked.

Mixing shall be continued for the minimum period specified and may be increased and no of revolutions speed of the drum may be such that the mixer as delivered from the mixer has uniform in colour and consistency to the satisfaction of Engineer-in-charge. In no case shall the design water content be exceeded.

Concrete shall be discharged within half an hour after the introduction of the water and cement into the mixer. Each batch of concrete when delivered at the job site from commercial ready mix plants shall be accompanied by a written certificate of batch weights and time of batching.

4.2.11. TEMPERATURE OF CONCRETE:

Fresh structural concrete and fresh canal lining concrete shall be placed at temperature of 15^0 C to 30^0 C. During hot or cold weather the concreting should be done as per the procedure set in IS 7861 (Part I) 1975 or IS 7861 (Part II).

The temperature will be determined by placing a thermometer in the concrete immediately after sampling at the site of placement. The temperature of concrete at the batch plant shall be adjusted to assure that the specified concrete temperature is attained at the placement.

In case of concrete in hot weather condition, the contractor shall employ effective means such as pre cooling of aggregates and mixing and placing at nights as necessary to maintain the temperature of the concrete as it is placed at the specified limit. The methods of pre cooling shall be subject to approval by the Engineer-in-charge.

Then contractor shall not be entitled for any additional compensation due to the foregoing requirements.

4.2.12 FORMS:

a. GENERAL

From shall be used wherever necessary to confine the concrete and shaping it to the required lines. If a type of form does into consistently perform in an acceptable manner as determined by the Engineer-in-charge the type of form shall be changed and method of erection shall be modified by the contractor subject to approval of the Engineer-in-charge.

Plumb and string lines shall be installed before and maintained during concrete placement. Such lines shall be used by the contractor's personnel and by the Engineer-in-charge and shall be in sufficient number and properly installed as determined by the Engineer-in-charge. During concrete placement the contractor shall continuously monitor plumb and string line form positions and immediately correct deficiencies.

Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used forms shall be sufficiently rigid to effectively transit energy from the form vibrators to the concrete while not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent of loss of mortar from the concrete. Chamfer strips shall be placed to produce beveled edges on permanently exposed concrete surfaces. Interior angle of inter setting concrete surfaces and edges of construction joints shall not be beveled except where indicated on the drawings.

Suitable struts or stiffeners or ties shall be used for the form work wherever necessary. All supports shall be braced and cross braced into two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping, by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the form work is supported on soil, sleepers etc. shall be used to properly disperse the loads. In case the supports rest on already completed beam or slab suitable props shall be provided under the latter.

b. The form work shall be of well seasoned timber or steel. When timber forms are used they shall be lined with MS sheet or other suitable smooth faced non absorbent materials as specified. Supports may be timber of steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the supports. The details of the proposed form work and supports shall be submitted to the Engineer-in-charge and got approved before erection.

c. In case of columns, retaining walls or deep vertical component, the height of the column facilitate placement and compaction of concrete and arrangement may be made for securing the forms to the already poured concrete for placing the subsequent lifts. No steel tie or wires used for securing this form work shall be left exposed of the face of the finished work.

d. Suitable inserts for block outs for electrical and other service fixtures where necessary shall be provided in the required locations as specified.

e. Cleaning and oiling of forms:- At the time the concrete is placed in forms, the surfaces of the forms shall be free from encrustations of mortar grout or other foreign material. Before concrete is placed, the surface of the forms shall be oiled with commercial forms of oil.

f. Removal of forms

The steeping of form work shall conform to clause 10.3 of IS 456-2000. The contractor shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on upper sloping faces of concrete such as forms on the water sides of wrapped transitions shall be removed as soon as the concrete has attained sufficient stiffness prevent sagging. Any needed repairs or treatment required on such slopping, surfaces shall be performed at once and be followed immediately by permitted curing.

To avoid incessant appearance in concrete that might result from swelling of forms, wood forms for wall openings shall be loosened as soon as the loosening can be accomplished without damages to the concrete. Forms for the opening shall be constructed to facilitate such loosening. Forms shall be removed with care so as to avoid injury to concrete and any concrete so damaged shall be repaired in accordance with paragraph 6.2.21.

g. Cost

The cost of furnishing all materials and performing all works for constructing forms including any necessary treatment or coating of forms is indicated in the item of form work provided in the bill of quantities.

4.2.13 TOLERANCES FOR CONCRETE CONSTRUCTION:

A. GENERAL:

Tolerances are defined as allowable variations from specified lines, grades, and dimensions and as the allowable magnitude of the surface irregularities. Allowable variations from specified lines, grades and dimensions are listed as given under sub paragraph (B) below.

The intent of this paragraph is to establish tolerances that are consistent with modern construction practice that is governed by the effect that permissible variations may have upon a structure. The Govt. reserves the right to diminish the tolerances set forth therein if such tolerances impair the structural action operational function or architectural appearance of a structure or position thereof.

Concrete shall be within all stated tolerances even though more than one tolerance may be specified for a particular concrete structure. Provided that the specified variation for one element of the structure shall not apply when it will permit another element of the structure to exceed its alterable variation where tolerance are not specified for particular structure tolerances shall be those specified for a similar work. As an exception to clause 2 of the general provisions, specific tolerance shown here in connection with any dimension shall govern. The contractor shall be responsible for finishing the concrete forms within the limit necessary to insure that the completed work will be within the tolerance limit specified. The defective work where the tolerance limit is exceeded shall be remedied in accordance with the sub paragraph b and c.

B. VARIATION FROM SPECIFIED LINES, GRADES AND DIMENSIONS:

Hardened concrete structure shall be checked by the contractor and will be subject to such inspection and measurement as needed to determine that the structures are within the tolerance specified in the table below.

Variation is defined as the distance between the actual position of the structure or any element of the structure and the specified position in plan for the structure or the particular element. Plus or minus variations shown as indicated or permitted from actual position up or down and in or out from the specified position in plan. Variations not designated as plus or minus indicate the minimum deviation permitted between designated successive points on the completed element of construction.

Specified position in plan is defined as the lines, grade and dimensions described in those specifications or shown on the drawings or as otherwise prescribed by the Engineer-in-charge.

TABLE

Variation from specified lines, grades and dimensions

B. TOLERANCE FOR CONCRETE STRUCTURES.

1. Deviations from specified dimensions of cross section of columns, beams, piers and slabs [(-6 mm to (+) 12mm]

Deviations from dimensions of footing.

a. Dimensions in plan = (-) 12mm to (+) 50 mm

b. Eccentricity = (±) 0.02 times width of footing in the direction of deviation but not more than 50mm

c. Thickness (±) 0.05 times the specified thickness.]

Note Tolerance applies to concrete dimensions only but not for positioning of vertical reinforcing bars or dowels.

C. CONCRETE SURFACE IRREGULARITIES.

a. GENERAL

Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as "abrupt" or "gradual" and are measured relative to the actual concrete surface.

b. ABRUPT SURFACE IRREGULARITIES:

Abrupt surface irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in form Plumber, or other similar forming faults. Abrupt surface irregularities are measured using a straight edge held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement.

c. GRADUAL SURFACE IRREGULARITIES:

Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface. Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The magnitude of the gradual surface irregularities is defined herein as measures of the rate of change in slopes of the concrete surface.

The surface irregularities shall not exceed 6 mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 meter in length.

The magnitude of gradual surface irregularities on concrete shall be checked by the contractor to ensure that the surfaces are within the specified tolerance. The Engineer-in-charge will also make such checks of hardened concrete surfaces as determined and ensure necessary compliance with such specifications.

d. REPAIR OF HARDENED CONCRETE NOT WITHIN SPECIFIED TOLERANCES:

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance with paragraph 6.2.21 and shall be accomplished in a manner approved by the Engineer-in-charge. Concrete repair to bring concrete with the tolerance shall be done only after consultation with a representative of Engineer-in-

charge regarding the method of repair. The Engineer-in-charge shall notify as to the time when repair will be performed.

Concrete shall be finished in a manner which will result in concrete surface with a uniform appearance. The fins and any rough projections can then be rubbed down and the whole surface brought to an even finish by rubbing with a wooden float using a mortar of one part cement by two parts of coarse sand as an abrasive, the mortar at the same time filling the voids. A neat cement works shall than be applied to give a smooth surface. If the concrete has set hard, the fins and rough projections, if any shall be removed by using carborandum brick or a paved grinding machine by chipping, before finishing off with the smoothing wash. If the work of chipping is not done with care or if the surface exposed after removal of the forms can not be satisfactorily dealt with in this manner due to bad work or for other reasons, a coat of cement plaster of 1:2 of thickness as ordered by engineer shall be applied. No extra payment will be given for finishing concrete surface as instructed above in this clause.

e. PREVENTION OF REPEATED FAILURE TO MEET TOLERANCES:

When concrete placements result in hardened concrete that does not meet the specified tolerance the contractor shall submit to the Engineer-in-charge an outline of all prevention actions such as modification to form, modified procedure for setting screeds and different finishing techniques to be implemented by the contractor to avoid repeated failure.

The Engineer-in-charge reserves the right to delay concrete placement until the contractor implements such preventive actions which are approved by the Engineer-in-charge.

4.2.14 REINFORCING BARS:

The contractor shall make his own arrangement for procurement of steel of required specification of reputed factory SAIL/ TATA/ JINDAL STEEL/ SHYAM STEEL only for the work. Transportation from the place of supply to work site and all incidental charges will be borne by the contractor.

Reinforcing bars shall be placed in the concrete as shown in the drawings or as directed. For concrete canal lining the reinforcement rods as provided for in the drawing shall be placed.

For anchoring the concrete canal lining to the hard rock provision of anchor rod is made in the drawing and contractor shall place these anchor rods to the spacing and depth shown in the drawings.

B. MATERIALS:

Unless shown otherwise on the drawings the reinforcement to be used shall be High Yield strength deformed bars of grade FE 415 conforming to IS 1786-1985 specification for high yield strength deformed steel bars and wire for concrete reinforcement.

C. PLACING:

Reinforcement shall be bent and fixed in accordance with the procedure specified in IS 2502 – 1963 (code of practice for bending and fixing of bars for concrete reinforcement). All reinforcement shall be placed and maintained in the position shown in the drawings splices shall be located where shown in the drawing provided that the location of the splice may altered subject to written approval of the Engineer-in-charge.

Subject to the written approval the Engineer-in-charge, the contractor may for his convenience, splice bars at additional locations other than those shown on the drawings. In order

to meet design and space limitation on placing some bent bars may exceed usual clearance cutting and bending of such bars from stock lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the center line of the bars. Reinforcement will be inspected for compliance with requirement as to size, shape, length, splicing.

Before reinforcement is embedded in concrete the surface of the bars shall be cleaned of heavy flaky Rusk, loose scale, dirt grease or other foreign substances which in the opinion of the Engineer-in-charge are objectionable. Heavy flaky rust that can be removed by firm rubbing with bar lap or equivalent treatment in considered objectionable.

As specified in clause 11.3 of IS 456-2000 unless otherwise specified by the Engineer-in-charge reinforcement shall be placed with the following tolerances.

a. For effective depth 200 mm or less ± 10 mm
b. For effective depth more than 200 mm ± 15 mm

The cover in no case be reduced by more than one third of specified cover or 5 mm whichever is less.

Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbances of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Engineer-in-charge and in conformity with the requirements of clause 11.4 of IS 456-2000. Concrete cover shall be as shown on the drawings.

D. REINFORCEMENT DRAWINGS:

The Engineer-in-charge will supply drawings of reinforcement details and bar bending schedules for adoption.

E. MEASUREMENT AND PAYMENT:

Measurement for payment of reinforcement bars will be based on the weight of the bars placed in the concrete in accordance with the drawings supplied by the Engineer-in-charge when conformance with these specifications drawings has been determined at the time of embedment. Except as otherwise provided below payment for furnishing and placing reinforcing bars will be made at the unit price bid in the bill of quantities for furnishing and placing reinforcement bars which unit price shall include the cost of reinforcing bars attaching wire, cutting, bending, cleaning securing and maintaining in position reinforcing bars as shown in the drawings.

The total weight of bars placed as reinforcement in concrete shall be arrived at by adding the products of lengths each size and mass per meter (vide Table 1 and Para 6.2.1 of IS 1786-1985) of that size of rod.

4.2.15 CURING:

A. GENERAL.

The contractor shall furnish all materials and perform all work required for curing concrete.

All concrete including bed and sides of canal lining shall be cured by water curing.

The precast slab for canal lining shall be cured by keeping them immersed in water for seven days and by sprinkling water for another 21 days with straw canvass, hessian or similar materials cover over slab.

The uniformed top surfaces of bridges decks shall be cured for 28 days with a damp sand cover or curing mat cover. The sand or curing mats shall not be kept so wet as to allow water to

drain from them which may stain other concrete. The sand or curing mats shall be removed after expire of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or back fill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed within 24 hours after the concrete has hardened sufficiently conforming to IS 456-2000 to prevent structural collapse or other damage by careful form removal. Where required repair of all minor surface imperfection shall be made immediately after form removal and prior to curing, minor surface repair shall be completed within 2 hours after form removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after form removal until initiation of curing.

B. MATERIALS:

Concrete cured with water shall be kept wet at least for 28 days from the time the concrete has attained sufficient set to prevent detrimental efforts to the concrete surfaces. The concrete surfaces to be cured shall be kept wet covering them with water saturated materials by using a system of perforated pipes, mechanical sprinklers or porous hose or by other methods which will keep all surface continuously wet. All curing methods are subject to approval of Engineer-in-charge.

C. COST:

The cost of furnishing all materials and performing all work for curing concrete shall be included in the price bid in the bill of quantities for the concrete on the particular curing methods are required.

4.2.16. MEASUREMENT OF CONCRETE:

Measurement for payment of concrete required to be placed directly upon or against surfaces of excavation will be made to the lines for which payment for excavation is made.

The unit measurement will be cubic meter. In measuring concrete for payment the volume of all opening, fixtures embedded pipes and metal work each of which is larger than 0.1 square meter in cross section will be deducted.

4.2.17. PAYMENT FOR CONCRETE:

Payment for concrete shall be made at the applicable unit price in therefore in the bill of quantities, which unit price shall include the cost of furnishing all materials and performing all works required for the concrete construction except that payment for furnishing and placing reinforcement bars and form work which shall be made at the respective unit price's bid thereof in the schedule.

SUPPLY OF PIPES:

Providing and fixing R.C.C. NP_2/NP_3/NP4 class pipes as per drawings.

Pipes shall be specified diameter non pressure type conforming to IS 458-1971. Maximum length of the pipe shall not be less than 2.5m. or otherwise directed by the Engineer-in-charge. The contractor shall order the pipes required for the work on the basis of the construction

drawings supplied to him by the Engineer-in-charge. Pipe marked with the following information on each type shall only be accepted for the work.

A. Class Pipe
B. Date of Manufacture
C. Name of Manufacturers or his trade mark or both
D. IS Specification mark.

HANDLING AND LAYING OF PIPES:

Work shall be done as per IS 783-1956 or its latest edition. Reasonable care shall be exercised in loading, transporting and unloading of concrete pipes. Handling shall be such as to avoid impact. All pipes shall be inspected thoroughly before being laid. Broken or defective pipes shall not be used. Trench shall be of sufficient width to provide for free working space in minimum 30cm on either side of the pipe. Pipes shall be lowered into the trenches by use of standard appliance. Pipe shall be laid true to line and as specified on the construction drawings. Lying of pipes shall be along proposed grade of the slopes. The socket ends of pipe shall face upstream. The connections of the pipes shall be joined together in such a manner that these shall produce perfect even surface along the inside of the pipe. In no case pipes shall be laid directly on rock or other hard materials.

JOINING PIPES:

Semi flexible type spigot and joint as per IS 783-1959 and as shown in the construction drawing shall be provided.

BACK FILLING TRENCHES:

A. Trenches shall be kept free from water until the materials in the joints have hardened. Walking or working on the completed pipe shall not be permitted until the trench has been back filled to a height of at least 45cm. over the pipe except as may necessary for back filling and compaction.

B. Trenches shall be back filled after pipe has been laid subject to the condition that jointing has hardened only selected materials shall be used for backfilling. Filling of the trench shall be carried out simultaneously on both sides of pipe in such manner that unequal pressure does not occur.

MEASUREMENT AND PAYMENT:

Measurement for payment shall be on running meter basis on the pipe line laid. The rate in bill of quantities shall include the cost of pipes including loading, unloading, handling, storing, laying in position, taxes, curing & all other operations to complete the work as per the specification.

SECTION – 5

STONE WORKS

SECTION-5

5.0 R. R. STONE PACKING

5.1. GENERAL

The packing shall consist of boulders and blasted rock and it shall be hand placed. The thickness of the packing shall be measured normal to the slope of the embankment.

5.2. QUALITY OF PACKING STONE

i) Packing stone shall be controlled in quarry for quality, gradation and size.
ii) Stone and spalls obtained from rock excavation shall be checked for quality, gradation and size before lifting.
iii) The stone for packing should be dense, resistant to abrasion and is free from cracks, seams, shale partings, conglomerate bonds and other defects that would tend to increase their susceptibility to destruction by the action of water and weather.
iv) The stone shall be closely packed and the interstices shall be filled with moorum. The finished surface of packing should be reasonably uniform free from loose stones.

5.3. Test for Stone

i) Soundness - The rock fragments shall be tested for its soundness as per IS-2386-Part-II.
ii) Abrasion - The rock fragments shall be tested for its abrasion as per IS-2386-Part IV.
iii) Water absorption test – As per IS-2386.
iv) Quality of stone should confirm following standards

1 Soundness	Maximum 12 %
2. Abrasion	Maximum 40 %
3. Water absorption	Maximum 5 %

5.4. THICKNESS OF STONE PACKING

In no case the minimum thickness of hand placed packing shall be less than 30 cm.

5.5. PLACEMENT OF RIP RAP / LAUNCHING APPRON

Hand placed Packing

The hand placed packing stone shall consists of size 0.02 cum and above size and laid on edge starting from the bottom. The stone shall be laid compactly with staggered joints and so matched & interlocked that, they shall be keyed together with minimum of joint space. Then rock fragments and spalls shall be driven by a hammer into interstices to wedge the packing in place.

The hand placed packing shall preferably be laid in one course and the layer thickness is same at the stone size. If two layers of stones are used the header stone extending through both layer and spaced at about 1.5m. shall be used. In two layers placing the top layer stones shall be larger.

6.6. MEASUREMENT AND PAYMENT

Thickness of packing shall be measured at a number of locations and the payment shall be made towards the average thickness arrived out of the measurements. Payment for packing shall be made at the applicable unit price per cubic meter in the bill of quantities for packing which unit price shall include the cost of procuring or finishing, hauling and placing the rock for packing including the rock spalls.

SECTION – 6

FINE DRESSING & TURFING

6. FINE DRESSING AND TURFING

6.1 Description: This work shall consist of supplying and laying live sods on the slope and other locations as ordered by the Engineer in accordance with the following specifications.

6.2 Materials: The sods shall consist of a dense well rooted growth of permanent and desirable grasses. Indigenous to the general locality where it is to be used, and shall be practically free from weeds or undesirable greases. At the time the sods is out. The grass on the sod shall have a length of approximately 2 inches (if longer, the grass shall be cut to approximately this length and the sod shall have been ranked free from debris).

The sod shall be cut in uniform strips cot larger than it is convenient for handling and transport. The thickness of the sod shall be as uniform as possible approximately 3/4 inch or more depending on the nature of the sod, so that practically all of the dense root system of the grasses will be retained but exposed in the sod strip and so that the sod can be handled without undue tearing or breading.

In the event the sod which is to be cut is in a dry condition, so as to cause crumbling or breaking during cutting operations, the contractor at his own expense, shall at least 12 hours before cutting the sod, apply water to the same in sufficient quantity to provide a well moistened condition of the sod to the depth to which it is to be cut.

Top soil of the area to be turfed shall consists of soil of the area to be turfed shall consist of soils adapted to the sustenance's of plant life.

6.3 Construction Method

Preparation of the Earth Bed:

All areas desired to be covered with sod shall be fine dressed to required contour, to an extent such that the finished work after laying sod with necessary top soil incorporated in the bed will be in accordance with required liens, grades, slopes and cross section.

The area to sodden shall be free from stones, roots or other undesirable foreign materials.

The soil of the area to be sodded shall be loosened to a depth of approximately not less than and to soil shall be spread evenly over the prepared bed to a depth of 2 inches and the clods and lumps shall be broken down to provide a uniform texture to the soil.

6.4 Placing of Sod:

The earth bed upon which the sod to be placed shall be moistened to the depth manipulated, if naturally not sufficiently moist, and the sod after the same has been and shall be properly protected and sprinkled with water until placed be laid in horizontal strips beginning at the bottom of the slopes and working onwards, when placing sods to length to the strips shall be laid at right angles to the direction of flow of water. Sods shall be laid so that the joints caused by abutting ends of sods strips were not continuous each sod strip shall be so laid to about against the strip previously laid.

As the sod is being laid shall be firmly and lightly tamped with suitable wooden door mean tampers to press the sod into the underlying soil. After tamping, the sod shall present smooth even surfaces free from bumps or depressions, at such points. Where water start flowing over a sodded area the upper edge of the sod strip shall be thoroughly compacted to conduct the surface water over the upper edge of the sod. No sods shall be laid during the dry months of March to July.

6.5 Watering

The sod shall be thoroughly watered immediately after placing and shall be kept thoroughly wet for a period of atleast seven days after laying and shall be maintained in a satisfactory condition.

6.6 Measurement and Payment

Measurement of turfing shall be made after full and satisfactory growth of the turfing. The unit and price shall contain all the specification as mentioned in the tender schedule.

Sod shall be measured by units of square meters and will be paid for at the contract unit price of square meter of sod in place which shall be full compensation for preparing the earth bed, for furnishing, placing, top dressing and watering the sod and for all labour, equipment, tools and incidental necessary to complete the work in accordance with contract.

SECTION-7

CEMENT CONCRETE LINING

7.1 SCOPE OF WORK:

a) **(i)** Canal lining shall be done with concrete paving and finishing machines, which will place, compact and finish the concrete lining in bed and slopes. Plain cement concrete of M 15 grade, with the maximum size of aggregate of 20mm shall be laid on the bed and slopes of the canal sections as shown on relevant drawings. The thickness of lining shall be 100 mm. both in bed and slopes of the canal. If during construction it is found necessary to alter the canal section and side slopes without altering the thickness of lining, the contractor shall be informed in writing of such changes.

(ii) Each concrete paving machine and associated support equipment utilized under this contract shall place canal lining at an average sustained rate of advancement of not less than 3.5 meters per hour. This minimum rate shall be obtained for paving operation on the side slopes and on the bottom of the canal while also meeting the requirements for lapsed time following trimming, consolidation of concrete, finishes, joints and other requirements specified therein.

(iii) The equipment and operation for foundation trimming, sub-grade preparation, concrete production, concrete delivery joint production curing compound placement and other association activities supporting the placement of the canal lining shall be matched with the lining equipment capability so as not to impede the specified placement rate of lining operation. The overall equipment deployment shall be such as to ensure the completion of canal lining within the scheduled period specified in the contract.

(iv) The contractor can alternatively deploy longitudinally operating self aligning slip form paver with built in vibrator attached to the mould/forms so as to effectively compact and finish the concrete (alternative to concrete paver finisher outlined in para (a) (i) above.

b) During the preparation of sub-grade for canal lining the proud earth work shall be excavated and trimmed by machine for better progress and to achieve the designed profile of the sub-grade. This excavation for trimming for base preparation of lining shall be carried out immediately prior to laying of the lining but in no case the time interval should exceed 3 days in normal whether and 2 days in adverse weather conditions.

c) The scope of work also includes the following –

i. Dewatering the canal section for preparing the base for lining and laying concrete lining.
ii. Providing steel safety ladders at required intervals or as directed.
iii. Providing necessary under drainage arrangements consisting of filter blanket of graded sand and pressure relief valves as per drawings.
iv. Providing filter materials of approved quality as per design.
v. Providing and fixing P.V.C. contraction joints forming water stops.

7.2. CLEARANCE SITE:

Area proposed for lining the canal as a whole shall have to be cleared of all objectionable materials, stumps, roots, bushes, and rubbish. Such materials, from clearing operation shall be disposed off from the working area clear of work site as per direction of the Engineer-in-charge.

7.3. TRIMMING THE CANAL SECTION AND PREPARATION OF SUB-GRADE FOR CONCRETE LINING.

7.3.1. GENERAL.

(a) Provision of this paragraph shall apply to the preparation of sub-grade which concrete lining is to be placed.

(b) The work of trimming the canal section up to the bottom of concrete lining/bottom of filter materials to be provided as the case may be and preparing sub-grade for concrete lining includes removal of proud from the slope and bed of the canal. The trimming operations is to be carried out manually or by machines (Trimmer) of adequate capacity immediately prior to laying of the lining but in no case the time interval between trimming and laying should exceed 3 days in normal weather and 2 days in adverse weather conditions. Wherever rock is over excavated the item of trimming and preparation of sub-grade includes filling the over excavated portion with suitable semi pervious materials, watering and compaction and trimming up to bottom level of the concrete lining. All along the canal alignment the rain cuts on inner slope of the banks shall be filed up with approved excavated materials and shall be compacted adequately to required line and grade and level. The material required for filling the over excavation in rock and rain cuts, if not available during excavation in soils to be done under this item, shall be hauled from stock piles or borrow area to be arranged by the contractor and placed in position.

(c) If at any point materials have been excavated beyond the pay line required to receive the concrete lining the excess excavation shall be refilled on horizontal layer with selected materials moistened. If required and compacted using rollers and slope compactors where placing and compacting bedding material is on a sloping foundation the layers may be placed parallel to the surface of the foundation. If at any point the foundation materials disturbed or loosened during the excavation process or otherwise it shall be moistened, if required and thoroughly compacted by tamping, rolling or by other approved methods to form firm foundations for placing the concrete lining.

(d) If at any place, placement of bedding material below the concrete lining is required due care shall be taken by the contractor to wet the surfaces of excavation and embankment to a depth of 15 cm. or to depth up to impermeable layer below whichever is less as per direction of the Engineer-in-charge.

(e) In the canal section requiring bedding material below the concrete lining due care shall be taken by the contractor to place the bedding materials on scientifically approved surface adequately wet as described above in layers not exceeding 15 cm. in depth in a single operation and compacted till the bedding material attains a height where it can be trimmed to form a true and even surface upon which the concrete for lining is to be placed. Each layer of bedding material shall be moistened and thoroughly compacted.

(f) All loose materials likely to be present at the end panel of existing lining adjacent of which lining is to be placed under these specifications shall be removed and all voids beneath the existing lining shall be refilled and compacted thoroughly. No extra payment shall be made to the contractor on this account.

(g) Suitable materials trimmed from the canal shall be judiciously utilized in canal embankment, road embankments or in back filling of the structures or used as a bed material as per direction of the Engineer-in-charge. The trimmed materials which can not be utilized in proper place during one continuous operation shall be piled along the out of way where designated by the Engineer-in-charge.

(h) In all the preparation of sub grade for concrete lining shall confirm to clauses 4.1. 4.2., 4.3., 4.4. and 4.5. of IS 3873-1993 (Indian code of Practice for laying in situ cement concrete lining on canal)

7.3.2. TOLEARANCE IN PREPARATION OF SUB-GRADE.

Excavated profile provides the final base for lining and tolerance departure from lines shown on the drawings shall be as indicated here below.

± 20 mm on straight section.

± 50 mm on tangents.

± 100 mm on curves.

Departure from levels shown on the drawings. = 20 mm

The above tolerance shall be negotiated gradually through smooth transition in a length of 50 m. No over run in concrete quantity shall be paid to the contractor.

7.3.3. SELECTED BEDDING MATERIALS:

The selected bedding material in the case of bed and sides of canal profile in normal soils shall be graded filter material compatible with sub grade materials and thoroughly compacted. In case of expensive soils cohesive non swelling (CNS) soil will be used for bedding. The thickness of CNS layer shall be designed according to swelling pressure of soil or as directed by the Engineer-in-charge. The bedding materials shall generally be 1000 millimeter in thickness and 600 mm thick cohesive non-swelling material in canal sections whose discharge is more than 1.5 cumecs and less than 1.5 cumecs respectively conforming to following gradation and index properties.

GRADATION:

1. Clay (less than 2 microns) 15 to 20 %
2. Silt (0.06 mm - 0.002 mm) 30 to 40 %
3. Sand (2mm - 0.06mm) 30 to 40 %
4. Gravel (greater than 2mm) 0 to 10 %

INDEX PROPERTIES:

Liquid limit Less than 55% but greater than 30 %

Plasticity Index Less than 30% but greater than 15%

The thickness of CNS layer given in table 1 of IS 9451-1994 (reproduced below) shall apply in general.

SWELLING PRESSURE OF SOIL Kg/M2	THICKNESS OF CNS MATERIALS Milimetres.
50 to 150	750 to 850
151 to 300	850 to 1000
301 to 500	1000 to 1250

The loading handling transportation and placing of the selected bedding material shall be subjected to approval and shall be such as will result in a uniform mixture of the material being

placed without separation or segregation. Selected bedding shall be obtained from required excavation in area where materials in excess of that required to construct the adjacent embankments is available or available or from borrow pits approved by the Engineer-in-charge.

7.3.4. UNDER DRAINAGE:

For a lined canal where the ground water level is higher or likely to be higher than the water level inside the canal so as to cause damage by differential pressures on the lining or where the sub-grade is sufficiently impermeable to prevent free drainage of the under side of lining in case of rapid draw down condition under drainage shall be provided with suitable pressure relief arrangements as indicated in the drawings or directed by the Engineer-in-charge.

I) FILTER DRAINS:

Wherever necessary longitudinal and / or transverse filter drains shall be laid in the concrete lining true to the canal grade as shown in the drawings or as directed by the Engineer-in-charge. The number of layers comprising the filter thickness of each layer and the materials to be used shall be as shown in the drawings. The filter material shall be clean round well graded sand or coarse aggregate the requirements of grading of which shall be established in the field laboratory on the basis of a mechanical analysis of adjacent material. Particles of decomposed rock debris rock, vegetable matter or the deleterious materials shall not be permitted in the filter. Before placing the filler the bed shall be prepared as specified in earlier paragraph.

The longitudinal drains shall be laid to the grade of the canal while the transverse drains in bed shall have a slope towards the centre of the canal bed from the edges as shown in the drawing

Payment of filter drains described above shall be made at the unit price per linear meter provided in the bill of quantities whose unit price should include the cost of all above operations as well as defined in the nomenclature of the item.

II. LOCAL FILTER.

In addition to the above filter drains, local filters of the size and type as shown in the drawing shall be provided. The cost of these local filters shall be included in the unit price bid for various pressure relief arrangements described below.

7.3.5 PRESSURE RELIEF ARRANGEMENTS:

Wherever necessary pressure relief arrangements, consisting of flap valves shall be provided in the bed and sides as shown in the drawings or as directed by the Engineer-in-charge.

1. FLAP VALVES:

Flap valves consisting of 100 mm internal diameter polyvinyl chloride (P.V.C) pipe with P.V.C. flange and rubber flap shall be fabricated with all accessories as shown in the drawings. The flap valve shall be designed as to open automatically at differential head of not more than 100 mm of water the contractor shall arrange for performance tests of all the flap valves and those that do not confirm to the specified functioning shall be rejected. Installation of flap valves shall not be permitted without the acceptance of test report of the same.

The flap valves shall be installed in position in the filter drains in the bed and normal to the canal slopes in the side at the location shown in the drawings or as directed by the Engineer-in-charge.

The tendered unit price bid for this item shall be inclusive of the cost of manufacture, handling, testing and installation in position complete and shall be inclusive of all those operations as well as those defined in the nomenclature of the item.

7.3.6. MEASUREMENT AND PAYMENT:

Measurement and payment for the pressure relief valves shall be made on the basis of numbers at the unit rate in schedule of quantity. The rate shall include the cost of providing and fixing pressure relief valves, including cost, carriage, royalty, taxes of materials as per the specifications and as directed by the Engineer-in-charge.

7.4. MATERIALS:

All materials including cement, fine aggregate and coarse aggregate, water admixture and steel shall be as specified in Section 4.2.Any ancillary material like joint seals copper plates etc required for construction of Canal / Structures will be supplied by the contractor at his own cost.

7.5. CAST IN SITU CONCRETE LINING:

7.5.1. GENERAL.

The work shall generally conform to IS 3873-1993. All concrete for lining shall be governed by IS 456-2000.The concrete shall be of controlled grade with suitable admixtures of approved air entraining agents using well graded aggregates with maximum size of aggregates of 20 mm ordinary Portland cement or Portland Pozzolana Cement to be used shall be 288 Kg. per cubic meter of concrete. However due to change in design mix, if it becomes obligatory to use lean/richer mix the contractor shall comply the same. In case of leaner mix the department shall deduct the cost of cement from the bill of the contractor at the rate prevailed on the last date of submission of bid including extension if any for less consumption of cement and no other compensation on this account shall be allowed. In case of richer mix the contractor shall be paid for the extra cement at the rate prevailed on the last date of submission of bid including extension if any for extra consumption of cement

BATCHING AND MIXING OF CONCRETE-

The batching and mixing of concrete shall be done as per Para-4.2.9 & 4.2.10 respectively.

7.5.2. TRANSPORTATION OF CONCRETE:

a) Transportation shall be handled from the place of mixing to the place of final deposition as rapidly as practicable by use of equipments such as transit mixers which shall prevent initial setting, segregation and loss of any of the ingredients. It shall be transported and compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly designed agitators operating continuously where this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator.

b) If segregation occurs during transport, the concrete shall be remixed before being placed after observing the time requirements as above.

7.5.3. PLACING AND COMPACTION.

a. Concrete shall be placed only in the presence of a duly authorized representative of the Engineer-in-charge. Concrete shall be placed and compacted before initial setting time and shall not be subsequently disturbed.

b. Placing of concrete shall not be started until all form work installation of parts to be embedded if any and preparation of surface upon which concrete is to be laid have been completely inspected by the Engineer-in-charge. All absorptive surfaces against which concrete is

to be laid shall be moistened adequately so that moisture shall not be withdrawn from freshly placed concrete. The surfaces, however, shall be free from standing water and mud.

c. Concrete shall be deposited in all cases as neatly as practicable directly from mechanized pavers in its final position and shall not be caused to flow in a manner to permit segregation. Excessive separation of the coarse aggregate caused by allowing the concrete to fall freely from too great a height or at too great an angle from the vertical shall not be permitted and where such separation would otherwise occur the contractor shall provide suitable means to convey the concrete without allowing such separation.

7.5.4. MECHANICAL PLACING.

a. For efficient placing and finishing of the concrete lining on slopes and in bed concrete lining machines such as slip form pavers or concrete pavers finisher of approved quality and design shall be used. Each lining machine and associated support equipment utilized under this contract shall place canal lining at an average sustained rate of advancement of not less than 10 meters per hour. This minimum rate shall be obtained for paving operation on the side slopes and on the bottom of the canal, while also meeting the requirements for lapse time following trimming consolidation concrete thickness tolerances, finishes, joints and other requirements specified herein.

The equipment of operations for foundation trimming, sub grade preparation, concrete production, concrete delivery, joints production, curing compound placement and other associated activities supporting the placement of the canal lining shall be matched with the lining equipment capability so as not to impede the specified placement rate of each lining operation. The overall equipment development shall be such as to ensure in the completion of canal lining within scheduled period specified in the contract.

Concrete lining shall be done in the canal prism as shown in the drawing. Mixing of concrete is to be done in a stationery or mobile weight batching plant of capacity of one cubic meter to 3.5 cubic meter installed at suitable places and concrete is to be conveyed to work spot in transit mixers to be moved on canal banks and unloaded at site in the hopper of the paver. The concrete in bed and side is to be placed with mechanized paver finisher ISI 456 CP 650 or any other paver of similar capacity. The concrete from transit mixer is to be unloaded into hopper and conveyed to other bank, through side discharge conveyor then placed with paver in bed and side and vibrated, with plate joints which will be done with Groove cutter attached to the paver Panels shall be as per drawing or as directed by the Engineer-in-charge. The above mechanized procedure is to be followed for side lining where slant length is 2.70 M. and above. In case where canal bed width is less than 2.00 M and where bed lining is not possible to be tackled with the above mechanized paver, concrete shall be laid by conventional method i.e. mixing by concrete mixtures and laying the concrete manually in alternative panels of 3 m. width and 3 m length as per drawing or as directed by Engineer-in-charge duly using steel form work to the required thickness of concrete and vibrated with mechanical pan vibrators. The concrete for side lining where the slant length is less than 2.70m shall be laid by using appropriate equipment with steel guided form work and vibrated by mechanical vibrator fitted to gantry. If the concrete is laid manually on slopes compaction by suitable method as approved by Engineer-in-charge shall be adopted. Concrete shall be mixed is stationery or mobile batching plant and conveyed through transit mixers included for manual placement. Whenever necessary for the purpose of obtaining economy, workability density, impermeability, durability, strength, mode of vibration and gradation of aggregates or other materials, the Engineer-in-charge of quality control shall after testing make necessary changes in the proportion of the mix.

b. Concrete when deposited shall unless otherwise specified have placement temperature of not less than 4.5° C and not more than 32 ° C.

c. Concrete shall be so laid as to facilitate placing, vibrating, finishing and curing operations. The side lining concrete shall be screed up on the slope while the concrete is being vibrated ahead of the screed. Concrete required for key as shown on the drawings shall be laid integrally along with the side slope lining.

Alternatively, the contractor can select to use longitudinally operating self alignment, slip form machine with built in vibrators attached to the slip forms, so as to effectively compact and finish the slope and bed concrete lining.

7.5.5. FINISHING.

a. All exposed concrete surfaces shall be cleared of impurities, lumps of mortar or grout and unsightly strains. The finished surface shall be even smooth and free from pockets and equivalent to that obtainable by effective use of long handle steel trowel. Where the surface produced by lining machine meet the specified requirements no further finishing operation shall be required. Surface irregularities, when tested with a straight edge of1.5 meter length shall not exceed 6 mm in canal bed for bottom slab and 12mm on side slopes.

b. The surface of concrete finished against form shall be smooth and be free from projections, honey combing and other objectionable effects. Immediately on removal of forms, all ridges or lips shall be removed and undesirable local bulging on exposed surfaces shall be remedied by tooling and rubbing.

c. Repairs to concrete surface and additions where required shall be made by cutting regular openings into the concrete and placing fresh concrete to the required lines. Chopped openings shall be sharp and shall not be less than 75 mm in depth.

7.5.6. CURING.

7.5.6.1 GENERAL.

The concrete lining on slopes including curvatures portion at junction of slope and bed lining shall be cured with specifications given in para6.2.20. The concrete lining in canal bed shall be cured with water in accordance with the specifications given in Para6.2.20. If water curing of lining in the canal bed is not carried out to the satisfaction of the Engineer-in-charge as per specifications the contractor shall be directed to switch over to liquid membrane forming curing compound for curing.

Water curing of concrete is to follow strictly spraying procedures and specifications as per clause 5.8 of IS 3873 of 1993.

All equipment material etc. needed for curing and protection of concrete shall be at site and ready for installing before actual concreting begins. Detailed plans methods and procedures of curing and protection of concrete lining shall be got approved in writing from the Engineer-in-charge sufficiently in advance of the actual concreting in order to avoid interruption or damage to the work of other agencies.

7.5.6.2 MEMBRANE CURING.

a. These specifications cover curing of concrete using membrane forming compound to retard the loss of water during the early hardening period and to reduce the temperature rise in concrete exposed to radiation from the sun. This compound shall be suitable for use as curing media for fresh concrete and for further curing of concrete after removal of forms or after initial moist curing.

b. Concrete of canal lining on slopes including key at the top and curved portion at the bottom of the slope of canal shall be cured with liquid membrane forming white pigmented curing compound which shall form water retaining surface to achieve the desired effect of water curing at 28 days. The curing compound shall be white pigmented of approved qualify conforming to ASTM-C-309-81 Type-2.

c. White pigmented compound (Type-2) shall consist of finely divided white pigments and particle solids, ready mixed for immediate use without alteration. The compound shall present a uniform white appearance when applied uniformly to a fresh concrete surface at a specified rate of application. It shall be of such consistency that it can be readily applied by spraying to provide uniform coating at temperatures above 4 degree Centigrade. If two coats are to be applied then it shall be applied at an interval of approximately one hour. They shall adhere to freshly placed concrete that has stiffened or sufficient to resist marking during the application and to damp hardened concert and shall form a continuous film when applied at the specified rate of application when dry the covering shall be continuous flexible and without visible breaks or pin holes and shall remain as unbroken film for at least 28 days after application. It shall not react and should not have deleterious effect on concrete.

d. The compound shall meet with the requirement of water retention test as per ASTM designation C-150-80 .The loss of water in this test shall be restricted to not more than 0.55 Kg. M2 of exposed solution of exposed surface in 72 hours.

e. The white pigmented compound (Type – 2) when tested as specified in accordance with method E- 97 of ASTM shall exhibit a day light reflectance of not less than 60% of that of magnesium oxide.

f. It shall fulfill the requirement of drying time when tested in accordance with ASTM C 309-81. The compound applied shall be dry to touch in not more than 4 hours. After 12 hours it shall not be tacky or track off (peel off) concrete where walked upon or it shall impart a slippery surface.

g. TESTING.

i. The liquid membrane forming curing compound to be brought in the manufacture's original clear containers. Such container shall be legibly marked with the name of the manufactures the trade name of the compound the type of compound and class of vehicle/solids the nominal percentage of volatile material and batch or lot number. The lot number will be assigned to the quantity of compound mixed sampled and tested as single product. The manufacturer shall exercise the care in filling the container so that all are equally representative of the compound produced.

ii. Curing compound to be used on site shall be got tested at least 14 days in advance so that the result of water retention tests reflectance test, drying etc. are available before it can be permitted for use. All of the filled containers represented by the approved sample shall then be sealed to prevent leakage substitution or dilution. The Engineer-in-charge or authorized

representative should mark each container represented by the samples with a suitable identification mark for later identification and correlation and shall be kept in store with double lock arrangements. One key shall be kept with the contractor and the other with Engineer-in-charge. Random samples shall be collected from every batch of the compound. Frequency of random sampling shall be done as directed by the Engineer-in-charge. The contractor shall provide samples and labour for collecting samples free of cost. Testing shall be carried out by the department.

h. METHOD OF APPLICATION.

The compound shall be sprayed using mechanical sprayer of approved design to ensure uniform and continuous membrane on the concrete surface. The coverage shall be at the rate specified by the manufacture or at the rate of 4 to 5 m. per liters. Field trials shall be conducted to decide effective coverage rate which depends upon surface finish. With a view to ensure through and complete coverage approximately on half of the compound for a given area should be applied by moving the spray gun back and forth in one direction and the remaining half at right angles to this direction. In case the application is still not found uniform the contractor shall have to apply the second coat as and where directed by the Engineer-in-charge. If a second coat is to be applied it should be applied approximately after an interval of one hour. The curing compound shall be applied as soon as the bleeding water or shine disappears, leaving dull appearance. Equipment for spraying curing compound shall be of pressure tank type (5 to 7 kg/cm2) with provision of continuous agitation. A curing jumbo with multiple traveling spray guns shall be provided for effective spray. Spraying on concrete lining shall be done in such a way that the green concrete is not disturbed or damaged or any foot impressions left. Necessary schemes on spraying by mechanized means shall be got approved from the Engineer-in-charge. However, in emergency for very small areas (Patches) it can be applied with wire or bristled brush. Such compounds shall be used on the work only after production of test results and approval of the schematic plan on spraying curing compounds. Adequate care shall be taken to prevent any movements on cured surface up to 28 days after application of curing compound. Under unavoidable circumstance created by non availability or short supply of specified curing compound the contractor shall be allowed to resort to water curing of concrete lining on slopes after obtaining prior approval of the Engineer-in-charge in writing. Such water curing shall be carried out in accordance with the following specification.

7.5.6.3 WATER CURING.

The surface of invert of the canal shall be kept continuously moist by covering it completely with wet burlap as soon as the concrete has hardened sufficiently. The burlap shall be kept continuously wet by spraying water for at least 12 hours. Thereafter curing by ponding shall be resorted to. The concrete to be cured with water shall be kept wet by ponding for at least 14 days. Water lost by evaporation shall be replenished periodically to keep the surfaces continuously submerged under water. The period of 14 days specified above shall be increased to 21 days when Pozzolana has been used in the concrete as part replacement of cement.

When the curing of concrete in the canal bed is not found satisfactory the Engineer-in-charge may ask the contractor to resort to membrane curing.

7.6 TESTING OF CONCRETE AND ACCEPTANCE OF WORK:

7.6.1 GENERAL.

Testing of concrete shall be carried out on representative samples taken at the site of laying the concrete in accordance with relevant clauses of IS 119-1959.The samples to be provided by the contractor at his cost.

7.6.2. SAMPLING PROCEDURE AND FREQUENCY:

a. Sampling Procedure: A random sampling procedure shall be adopted to ensure that each concrete batch has a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and should cover all mixing units.

b. Frequency: The minimum frequency of sampling of concrete of each grade shall be in accordance with the following.

Quantity of concrete M2	Number of samples.
1 to 5	1
6 to 15	2
16 to 30	3
31 to 50	4
51 to above	4 plus one additional sample for reach additional 50 M3 or part thereof

.

Note: At least one sample shall be taken during each shift.

7.6.3. TEST SPECIMEN:

Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking form work or to determine the duration of curing or to check the testing cubes cured by accelerated methods as described in IS 901-1978. The specimen shall be tested as described in IS 516-1956.

7.6.4 TEST STRENGTH OF SAMPLES:

a. The test strength of the sample shall be the average of three specimens. Individual variation shall not be more than 15%percent of the average.

b. Contractor shall provide necessary unskilled labour and facilities for collection of samples cores etc. and shall remain present at the time when the samples cores etc. are taken. Testing shall be carried out at the testing laboratories set up at the site or at any other laboratory that the Engineer-in-charge may decide upon and the results given thereby shall be considered as correct and authentic and acceptable to the contractor. All testing charges will be borne by the Department.

7.6.5 ACCEPTANCE CRITERIA.

A. The average strength of the group of cubes cast for each day shall not be less than the specified cube strength for the work. About 20 percent of the cubes cast for each day may have values less than the specified strength provided the lowest value is not less than 85% of the specified strength.

B. In case the concrete does not confirm to the accepted criteria for strength as specified above the Engineer-in-charge reserves the right to reject the work or accept the same at a reduced rate derived from the tendered rate and as approved by him. Whenever necessary for the purpose of obtaining economy, workability, density, impermeability, durability and strength or on

account of variation in the quality and gradation of aggregates or other materials, the Engineer-in-charge in consultation with Quality Control Division shall after testing make necessary changes in the proportion of mix. Contractor shall have to effect these change immediately.

7.7. INSERTION OF PVC CRACKS INDUCING JOINTS.

7.7.1. (a) The transverse and longitudinal PVC (Polyvinyl Chloride) strips shall be provided with the shapes confirming to dimensions shown on the drawing. The finished PVC crack inducing joints shall be extruded from virgin Pigmented, Plasticized Polyvinyl chloride (PVC). The PVC crack inducing joints shall be dense homogeneous free from holes and other imperfections. The cross section of the PVC crack inducing joints shall be uniform along its
length and thickness shall be symmetrical transversely. Tolerance for dimensions in overall length and width shall be 5% and thickness 10%. The finished PVC crack inducing joints shall meet the following requirements.

Sl.No	Characteristics	Unit	Values
1	Tensile strength	Kg/Cm2	116 Minimum
2.	Tear Resistance	Kg/Cm2	49 Minimum
3.	Stiffness in Flexure	Kg/Cm2	24.6 Minimum
4.	Accelerated extraction		
	a) Tensile Strength	Kg/Cm2	105 Minimum
	b) Ultimate elongation	Kg/Cm2	250 Minimum
5.	Effect of alkali (7 days)		
	a) Weight measure	%	0.25 Maximum
	b) Weight deceased	%	0.10 Maximum
	c) Hardness change	Point	1.50
	Effective of alkali (28 days)		
	a) Weight increase	%	0.4 Maximum
	b) Weight decrease	%	0.3 Maximum
	c) Dimension change	%	1.1

Weight of the PVC strip shall be a minimum of 460 gm/meter for the longitudinal strip and a minimum of 420 gm/meter for the transverse strip.

b) The above determination shall be made in accordance with the specification of C.W.C. in vogue. The surface finish of PVC strips shall be mat finish and of white colour.

c) Contractor shall arrange for getting the finished PVC crack inducing joint tested in recognized Test Laboratories by the Government. The manufacturers shall furnish test sample of PVC crack inducting joints in 30 cm. length reel, free of cost. Each sample shall be marked with the number of the reel from which sample is obtained and with certificate that the samples are from the reels to be furnished.

d) It is mandatory for the manufacturer of the PVC strips from whom the contractors shall procure PVC strips to have a full-fledged testing laboratory in the factory to enable pre-despatch testing of the products. Test reports from Government test laboratory shall also be binding on the manufacturer based on samples drawn by the Engineer-in-charge from consignments received at

site. The contractor shall get the sample of PVC strip approved by the Engineer-in-charge. He shall furnish the name of manufacturer the details of the in-house testing arrangements with the manufacturer and shall also furnish a test report from the in-house testing facilities along with the sample.

7.7.2 (a) The PVC crack inducing joints shall be inserted in the concrete lining when concrete is plastic. The longitudinal PVC crack inducing joints shall be inserted before the transverse PVC cracks inducing joints is inserted. The PVC crack inducing joints at edges shall be plastered in position fixed with longitudinal channels by clips or such other arrangement prior to lying of concrete. The PVC crack inducing joints shall be inserted in position in concrete lining as shown in drawings. The insertion of the longitudinal and or transverse PVC crack inducing joints at the predetermined locations of joints requires special attention to ensure proper location (depth is especially important) plumb installation and consolidated concrete around the PVC crack inducing joints. The longitudinal PVC crack inducing joint includes a cellular upper fin. The inspection fin shown on the drawings shall be comparatively thin and shall remain above the top surface of lining. It is important that top of the upper fin be at or near the concrete surface. The manner of installation shall include mechanical vibration that produces through consolidation of the concrete around the crack inducing joint and provides a continuous contact between the concrete and all surfaces of the crack inducing joints. The longitudinal crack inducing joint shall be fed into the fresh concrete from reels mounted in front of the pavers through guides and tension rollers so placed as to ensure proper depth and orientation of the crack inducing joints. Installation of transverse crack inducing joint shall be made by suitable joint inserted contrivance capable to insert into freshly placed concrete lining.

b) At intersection of longitudinal and transverse joints containing PVC crack inducing joints the top vertical members of the longitudinal crack inducing joints shall be removed for 10 to 15 cm. in width without pulling the crack inducing joint from the concrete lining and transverse crack inducing joint shall be placed within the notch so formed. Depression of the longitudinal cracks inducing joint below the specified positions in the concrete shall be permitted at intersection only to the extent necessary to place the transverse crack inducing joint to the specified depth. However, tolerances and concrete consolidation requirements of the preceding paragraph shall apply at intersections.

c) The manner of making the intersections shall produce transverse and longitudinal crack inducing joints and provide a neatly continuous weak end and in plan normal to the lining surface in both directions through the intersections.

7.7.3. JOINTS.

In RCC lining construction joints shall be provided to accommodate expansion and contraction of the concrete or to provide continuity between the breaks in construction work. Joints shall be provided as shown on the drawings or as directed by Engineer-in-charge. The depth of joints to be cut in the bed of the canal as well as on slope shall be as specified in the drawings. The joints are not to be filled with sealants but only to be cut at specified intervals. The sealants shall be filled in joints later but before functioning of canal. The tools to be used by the contractor for providing joints shall be got approved from Engineer-in-charge.

7.8 TOLERANCE.

a) The interest of this paragraph is to establish tolerances that are consistent with modern construction practice and yet be governed by the effect that permissible deviations shall have upon

the structural action or operational function of the structure. Deviations from the established lines, grades and dimensions shall be permitted to the extent set forth herein provided that the department reserves the right to diminish the tolerance set forth herein if such tolerance imparts the structural action or operational function of the lining.

b) Tolerance for lining shall be permitted within the following limits.

i) Departure from established alignment	20 mm on straight reaches. 50 mm on tangents. 100 mm on curves.
ii) Departure from established grade	20 mm on straight reaches.
iii) Variation in concrete lining thickness	10 mm of lining thickness provided average thickness is not less than specified.

Any departure from alignment or grade shall be uniform and no corrections in assignment be made in less than 50m . No over run in concrete quantity shall be paid to the contractor.

7.9 DEWATERING.

In canal reaches where subsoil water is met with above the canal bed level dewatering shall be resorted to and continued during preparation of sub grades, providing under drainage arrangement and placing of concrete for lining till such period the concrete attains necessary strength. No separate payment shall be made for dewatering operations as the same is deemed to have been included in rate of related item in Schedule of quantities.

7.10. MEASUREMENT AND PAYMENT:

i) Plain Cement Concrete Lining:

a) Measurement shall be on the basis of square meter/cum of plain concrete lining and payment shall be at the unit rate bid in bill of quantities for concreting works. Payment for lining shall be made for the thickness shown on the drawings and on square meter/cum basis of the area/volume including key on both sides. The thickness of lining shall be determined by setting of paver machine in relation to final sub grade on which lining is to be laid. The thickness shall be cross checked by (i) volume of concrete placed and area covered (ii) use of probe when concrete is being placed and (iii) coring if required. Any overrun in quantity of concrete in lining shall not be paid to the contractor.

b) The unit rate for lining shall include costs, carriage, royalty and taxes of all materials with all leads, lifts, mixing, form work, conveying, placing, compacting, finishing, curing and also dewatering during placing of concrete lining as required.

c) The unit rate of lining shall also include the cost of producing samples, approval of Engineer-in-charge and cost of all incidental work needed to make the cracks inducing joints cost of all operation equipment labour tools, etc. required for carrying out this work.

ii) RCC Lining:

The quantity of reinforced cement concrete lining shall be measured on square meter/cum basis on the same lines as of plain concrete lining. Payment of RCC lining shall be made at the unit rate as provided in the bill of quantities. Reinforcement shall be paid separately as per item rate in bill of quantities. The rate for RCC lining is inclusive of costs of all other material, transport with all leads, lifts, cutting of grooves, mixing, conveying, placing, vibrating,

compacting, smooth finishing curing etc. and also dewatering during the placing of reinforcement and concrete for lining as required.

7.11 SAFETY LADDERS:

7.11.1 GENERAL.

Safety ladders should be constructed in canal lining as directed by the Engineer-In-Charge.

Safety ladders consisting of ladder rungs should be constructed in canal lining about 30 m upstream of the point where the canal enters some underground structure. In other reaches safety ladders may be provided at a spacing of about 300 m, the ladders being provided alternatively on either side.

Ladder rungs should be smooth, round mild steel bars, galvanized or coated with coltar after installation.

Typical details of safety ladders are illustrated in the approved drawing.

7.11.2 MEASUREMENT AND PAYMENT:

Safety ladders shall be measured by weight of M.S. bar. Payment therefore shall be made at the unit rate in schedule of quantities. The rate shall include the cost, carriage, taxes of providing and fixing the ladders as indicated on the drawings.

DETAILS SPECIFICATION OF EXPANSION JOINTS/CONSTRUCTION JOINTS (EJ/CJ)

1. Description of Items.

The joint should be left in concrete/masonry in required places as per drawing and design. Embedded parts if any will have to be provided prior to casting of concrete/construction of masonry. Old surface of the concrete/masonry joints should be made clean free of dirt, grease, protrusions or any objectionable materials as per the direction of the Engineer-in-charge. The face of the joints should be made straight. The surface of joints should be painted with bitumen /coal tar and fitted with the approved sealing materials like bituminous filler boards, etc. The adjacent concreting masonry then only can be constructed.

In the case of P.V.C. water stop the pieces should be jointed together at the site by vulcanizing thoroughly to make it water tight having sufficient strength to withstand the designed water pressure exerted on it

In case of copper seal, the thickness of the copper sheet should be of 16 gauge (1.63 mm) and minimum of 0.6m wide with 'V', 'U' or 'Z' groove of size 2.5 cm. at its longitudinal axis. The groove should be perfectly straight and uniform. Adjacent copper sheet should be perfectly brazed together on both sides for the whole width by butting the two sheets against each other. If lapping between adjacent sheet are given, the maximum lapping should be 5 cm. and should be held together tight. Brazing should be done on both sides for the whole width. The joints should be brazed, water tight and should be capable of withstanding the hydraulic pressure exerted on it. M.S. anchor rods of 6 mm to 8mm dia 30cmlong with hook on outer side and should be brazed with the copper sheet @ 50 cm centre to centre approximately on both sides of copper sheet preferably staggered. The minimum length of the rod to be brazed is minimum 5 cm. and brazing should be done on both side of the rod.

The edges of the copper sheet should also be given a link at about 0.5 M. interval to have a better grip with concrete. The brazing should be done as per relevant IS specification.

The P.V.C water stop shall be dense homogeneous and free from holes and other imperfections. The cross section of the water stop shall be uniform along its lengths and thickness shall be symmetrical.

Location and embedment of the P.V.C./Copper water stops shall be as shown on the drawings, with approximately one half of the width of water stops embedded in the concrete on each side of the joints. In order to eliminate faulty installation that may result leakage, care shall be taken that the water stops shall be installed so as to form continuous water tight diaphragm in the joints unless otherwise shown. Adequate provision shall be made to completely protect the water stops during the progress of the work.

Additional vibrations over and above that used for adjacent concrete placement shall be carried out to assure complete embedment of the water stops in the concrete. Larger pieces of aggregate near the water stops shall be removed by hand during embedment to assure complete contact between the water stop and surrounding concrete.

CHAPTER VI

DRAWINGS

N.B. All the relevant approved drawings for this work are available in the Office of the **Superintending Engineer, Kanupur Rehabilitation Camps & Building Division, Basudevpur**, Dist.- Keonjhar.