

Government of West Bengal  
Irrigation & Waterways Directorate  
Office of the Superintending Engineer  
Mechanical & Electrical Circle  
"Jalasampad Bhavan" (6<sup>th</sup> floor)  
Salt Lake City, Kolkata - 700 091.  
Ph No 033-23218430 e-Mail semeciwd2017@gmail.com

NOTICE INVITING EXPRESSION OF INTERESTS (EoI)  
(for Budgetary purpose)

EoI No. **WBIW/SE/MEC/EoI -04/2017-18** (2<sup>nd</sup> Call of Electrical portion)

Expression of interest for obtaining competitive budgetary quotes at competitive market prices is being invited from reliable reputed resourceful Manufacturer/Distributor/Stockiest in connection with the determination of estimated cost for the work "Supply installation testing commissioning of 33KV/6.6KV and 33KV/0.415 KV sub-station complete of both H.T & L.T components in the sub-station & pump house as per enclosed schedule of work for the proposed 2<sup>nd</sup> Additional Uttarbhag Pumping Station at Uttarbhag, P.O. Brindakhali, P.S. Baruipur, Dist South 24 Parganas of West Bengal under Irrigation & Waterways Department, Govt. of West Bengal" by the Superintending Engineer, Mechanical & Electrical Circle, Irrigation & Waterways Directorate on behalf of the Governor of West Bengal.

**Issue of EoI documents :**

The EoI documents can be obtained from the departmental website [www.wbiwd.gov.in](http://www.wbiwd.gov.in) as well as from the office of the Superintending Engineer, Mechanical & Electrical Circle during office hours on working days till 06.09.2017.

**Submission of EoI :**

The intending agencies should submit their most competitive budgetary quotes, as per current market price as per the BOQ FORMAT in a sealed envelope super scribing on the top EOI for the budgetary quotes for the work "**Supply installation testing commissioning of 33KV/6.6KV and 33KV/0.415 KV sub-station complete of both H.T & L.T components in the sub-station & pumphouseas per enclosed schedule of work, detailed specification for the proposed 2<sup>nd</sup> Additional Uttarbhag Pumping Station**" in the tender box to be available at the following offices:

1. Office of the Superintending Engineer, Mechanical & Electrical Circle, Jalasampad Bhavan (6<sup>th</sup> floor), Bidhannagar, Kolkata - 700091.  
Or
2. Office of the Executive Engineer, Metropolitan Drainage Mechanical Division, Jalasampad Bhavan, (4<sup>th</sup> floor), Bidhannagar, Kolkata - 700091.

The intending agencies should submit their most competitive budgetary quotes as per enclosed schedule of work (BOQ) conforming to detailed specifications with reputed manufacturers name. Rate and amount to be quoted should be legible and both in words and figure.

The budgetary quotes rates should be inclusive of GST & all other statutory taxes/duties applicable in the State of West Bengal.

GA Drawing, Electrical Single line diagram (S.L.D) of sub-station and pump house and lay out of sub-station is enclosed for ready reference of the EOI. In this connection it may be stated that the values as shown in S.L.D. may vary.

Intending agencies or their authorized representatives may remain present while opening of the sealed covers containing Eols.

The Superintending Engineer, Mechanical & Electrical Circle., I & W Dte. reserves the right to accept or reject any or all Eol's without assigning any reason thereof.

Since, the Notice Inviting Expression of Interests (EoIs) is being made to assess the value of the work, no work order will be issued in favour of any agency against the Eols.

#### **Pre-Qualification / Credential :**

The intending agencies should possess the following and self-attested copies of the same are to be submitted with the Eol.

- i) At least one work any where in any Govt. Sector in India for procurement, supply & installation of similar work.
- ii) Suitable document determining financial strength of the bidder & authorization of reputed manufacturer in India.

#### **Inspection of site and its premises before submission of EoIs :**

Before submitting Eol's, the intending agencies should make themselves acquainted thoroughly with the exact requirement of works and details of existing civil installation/structures accompanied with the official/representative of the Executive Engineer, Metropolitan Drainage Mechanical Division, having its office at the 4<sup>th</sup> floor of Jalasampad Bhawan, Bidhannagar, Kolkata - 700091 (Mobile Nos. 9476155032) during any working day between 11.30 hours and 17.00 hours prior to the date of submission of proposal.

#### **Pre Bid Meeting :**

Pre bid meeting will be held at the office chamber of the Superintending Engineer, Mechanical & Electrical Circle on the following date and interested agencies may attend the meeting for technical discussions.

Eols so received in sealed covers will be opened in the chamber of the Superintending Engineer, Mechanical & Electrical Circle in presence of the intending agencies those who will be present at that time.

#### **Schedule of Dates for EoIs :**

Sl No.	Activity	Date & Time	Remarks
1	Publishing Date	21.09.2017	
2	Pre Bid Meeting	14.10.2017 at 12.00 Hrs	
4	E.o.I submission end date	16.10.2017 at 15.00 Hrs	
5	Date of E.o.I opening	16.10.2017 at 15.30 Hrs	

Memo No: 1554(10)/1T-6

Dated: 21.09.2017

Copy submitted for favours of kind information to :-

- 1) The Secretary to the Govt of West Bengal, I. & W. Directorate. Department
- 2) The Chief Engineer (South), I. & W. Directorate. Govt. of West Bengal
- 3) The Joint Secretary (Works) to the Govt of West Bengal, I. & W. Department
- 4) The Dy Secretary (Works) to the Govt of West Bengal, I. & W. Department
- 5) The Superintending Engineer, Metropolitan Drainage Circle, I&W Dte.
- 6) The Superintending Engineer, Eastern Circle, I&W Dte.
- 7) The Superintending Engineer, Western Circle-I, I&W Dte.
- 8) The Superintending Engineer, Greater Calcutta Drainage Circle, I&W Dte
- 9) The Superintending Engineer, Western Circle-II, I&W Dte
- 10) The Financial Advisor, I & W Deptt.

21/09/17  
Superintending Engineer  
Mechanical & Electrical Circle

Memo No: 1554/1(3)/1T-6

Dated: 21.09.2017

Copy Forwarded for favours of kind information to :-

- 1) The Executive Engineer, Metropolitan Drainage Mechanical Division for wide circulation.
- 2) The Executive Engineer & T.A to Superintending Engineer Mechanical & Electrical Circle for wide circulation.
- 3) The Director of information, department of Information & cultural Affairs, NABANNA (9<sup>th</sup> Floor) 325, Sarat Chatterjee Road, Howrah - 711102 for wide circulation.
- 4) The Notice Board of Mechanical & Electrical Circle.

21/09/17  
Superintending Engineer  
Mechanical & Electrical Circle

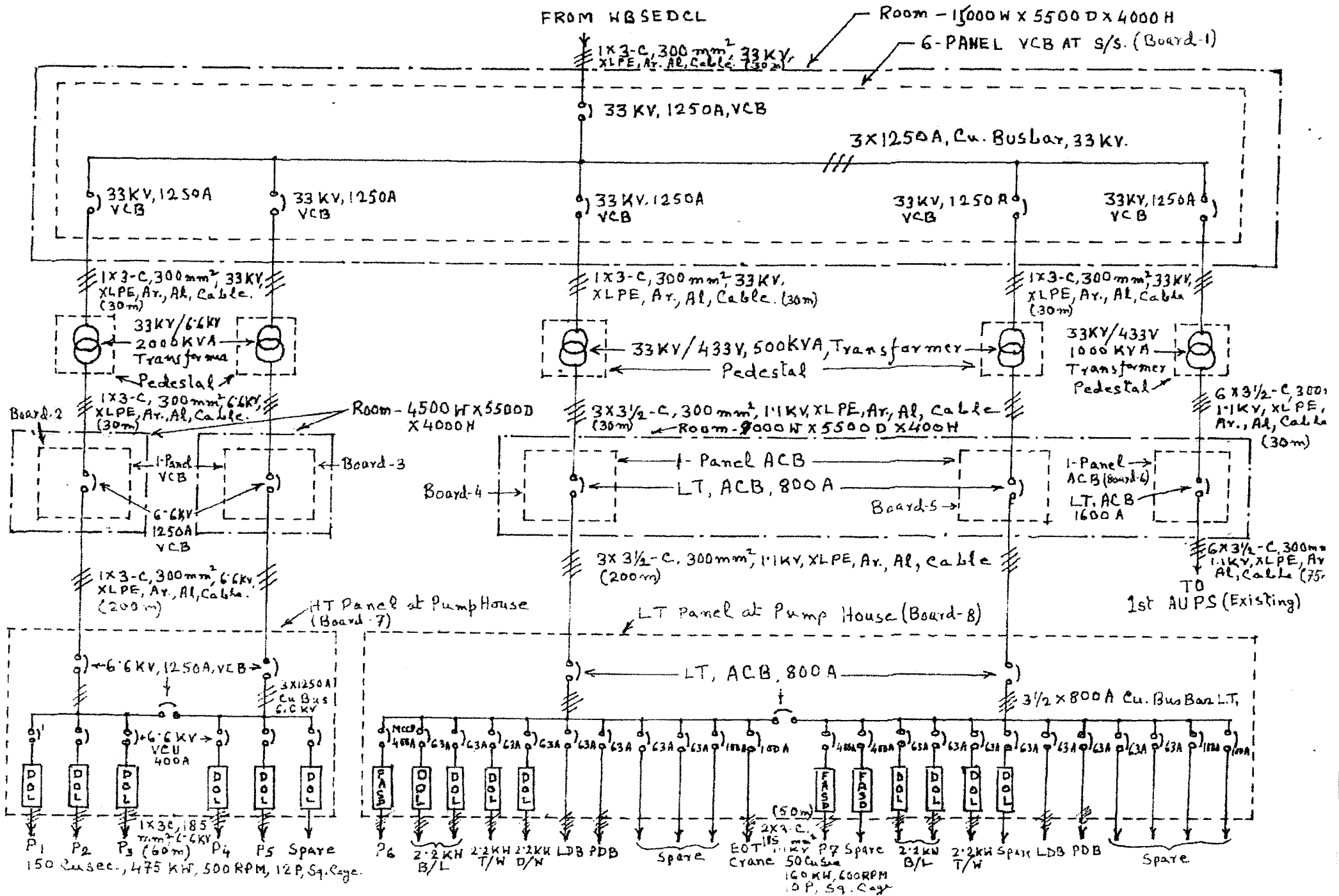
## ACCEPTABLE MAKES

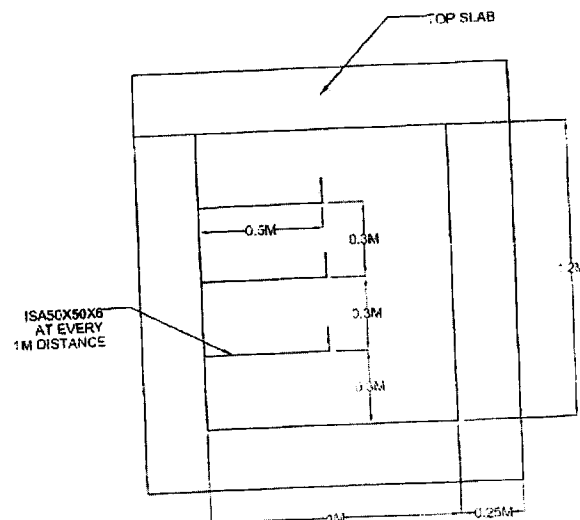
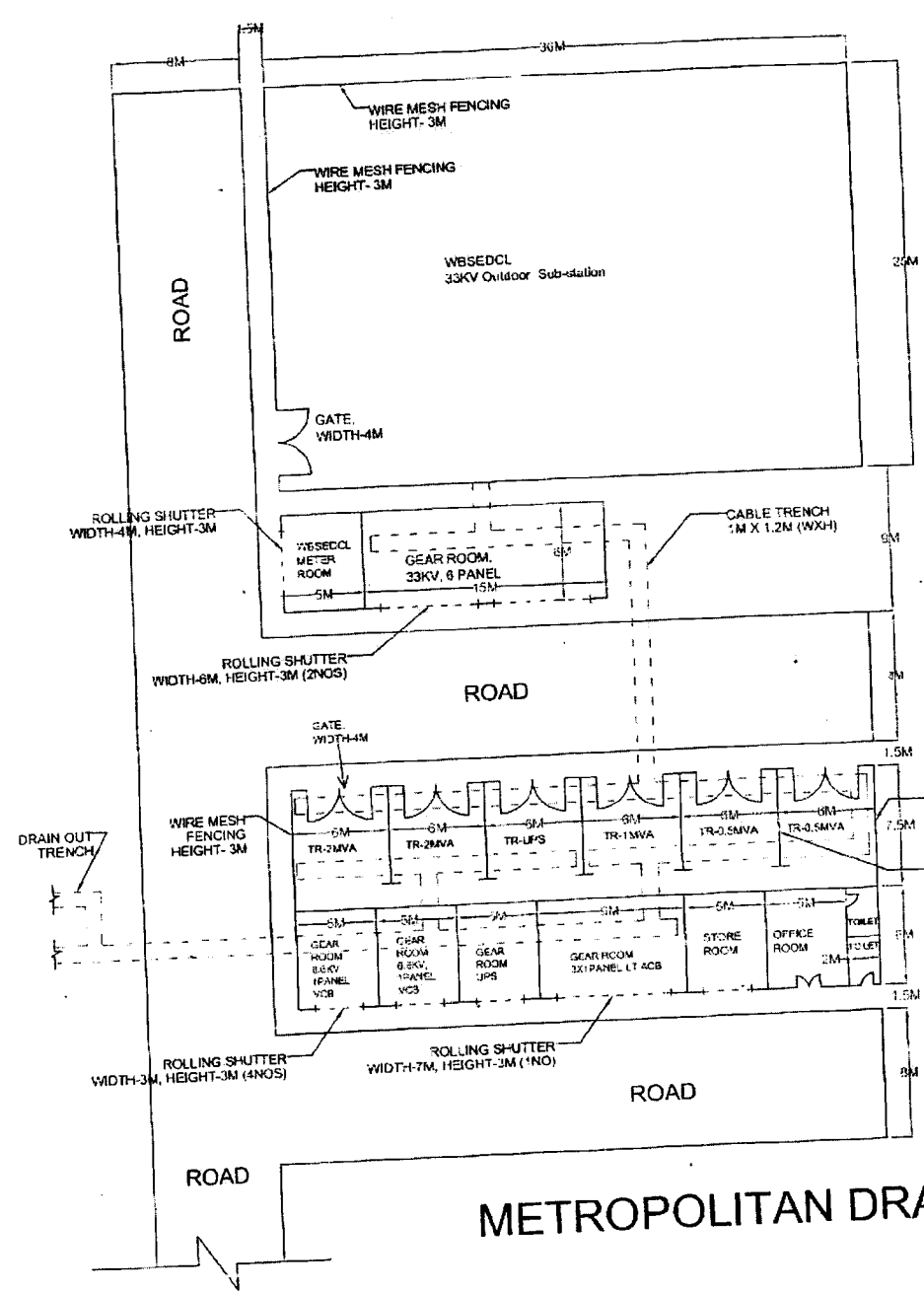
SI. NO.	PARTICULARS	ACCEPTABLE MAKES
1	<b>H.T Panel</b>	
1.1	Panel	In house production of Original Equipment Manufacturer
1.2	V.C.B and V.C.U/V.C.P	Siemens/ABB/Schneider/C.G.L
1.3	Relays (Digital & others)	Siemens/ABB/Areva (MICOM)
1.4	C.T.s & P.T.s	Jyoti/A.E/Kappa
1.5	DOL Starter	Siemens/ABB/Schneider
2	<b>Transformer</b>	BHEL/Kirloskar Electric/Siemens/Raychem RPG/C.G.L
3	<b>L.T panel</b>	
3.1	Panel	Techno Commece/Hindustan Control (Should be authorised panel manufacture, recommended by OEM).In house production of Original Equipment manufacturer preferred.
3.2	ACB & MCCB	Siemens/Jyoti/ABB/L & T
3.3	C.Ts & P.T.s	Jyoti/A.E/Kappa
3.4	FASD Starter	Siemens/ABB/L & T
3.5	Relays (Digital & others)	L & T/Siemens/ABB/Areva (MICOM)
4	<b>Capacitor Bank (Both H.T &amp; L.T)</b>	EPCOS/MADHAV/UNIVERSAL/Raychem RPG
5	<b>Lead Acid Batteries(Station Type)</b>	Exide
6	<b>Battery Charger</b>	Exide/A.P.C/Numeric
7	<b>Ultrasound type level transmeter with probe.</b>	Siemens/Vega

Sd/-

Superintending Engineer  
Mechanical & Electrical Circle  
I & W Dte.

SINGLE LINE DIAGRAM FOR PROPOSED 2ND ADDL. PUMP HOUSE AT THE OUTFALL OF SAND PART-1 AT UTTAR BHAG





**DETAILS OF CABLE TRENCH**

**ALL ROOM HEIGHT 4M  
 FENCING HEIGHT-3M  
 (MASONARY-0.3M + WIRE MESH WITH ISA-2.4M+ 0.3M Y SHAPE)**

**SUB STATION LAYOUT FOR PROPOSED PUMPING STATION OF AT UTTARBHAG**

**METROPOLITAN DRAINAGE MECHANICAL DIVISION**

*Shabe*  
 05/09/17  
 Sub-station  
 Metropolitan Drainage Mechanical Division  
 1 & W. Dia. Govt. Engg. College  
 Indraprastha Sarai (P) New Delhi City

*Sh*  
 05/09/17  
 Executive Engineer  
 Metropolitan Drainage Mechanical Division  
 1 & W. Dia. Govt. Engg. College  
 Indraprastha Sarai (P) New Delhi City

Sd/- M. K. KAMAKAR DRAUGHTSMAN	Sd/- S. A. HAKIM ASSISTANT DIRECTOR CENTRAL DESIGN OFFICE	Sd/- AMIYA BERA DEPUTY DIRECTOR CENTRAL DESIGN OFFICE	Sd/- M. P. GHOSH DIRECTOR CENTRAL DESIGN OFFICE
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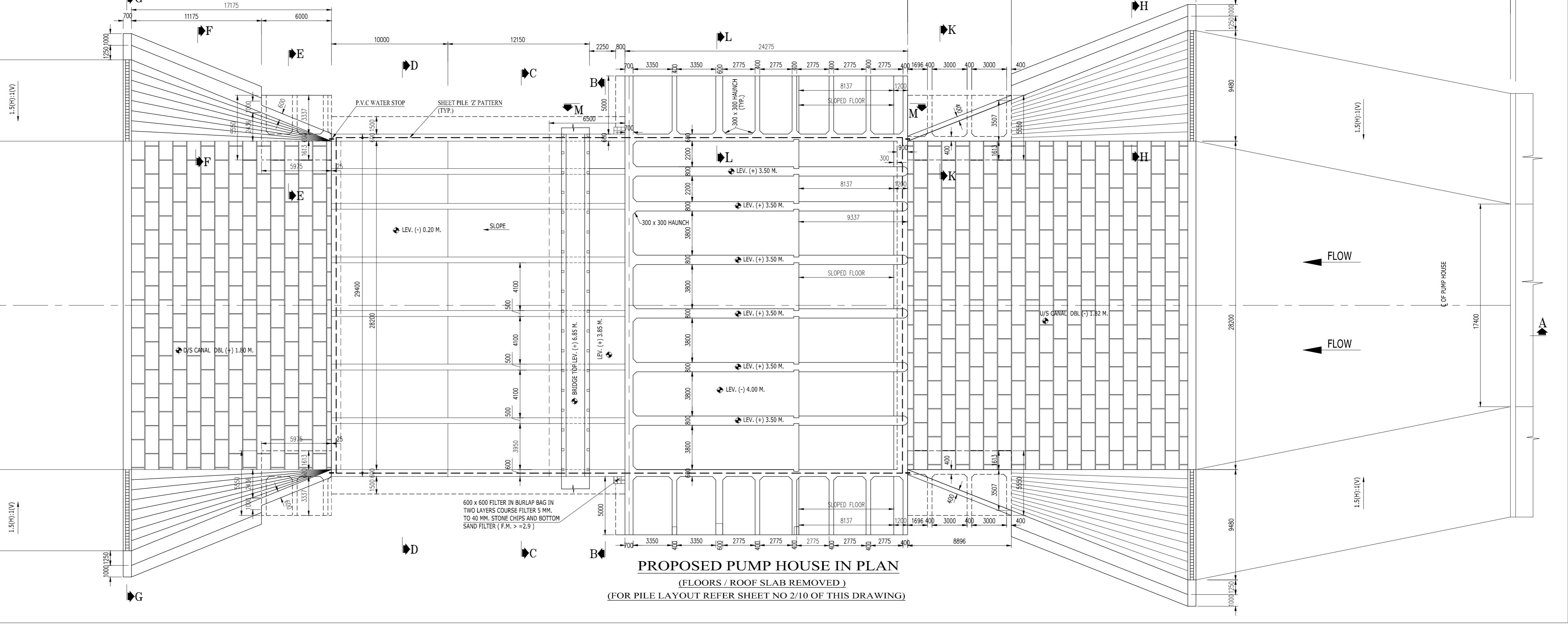
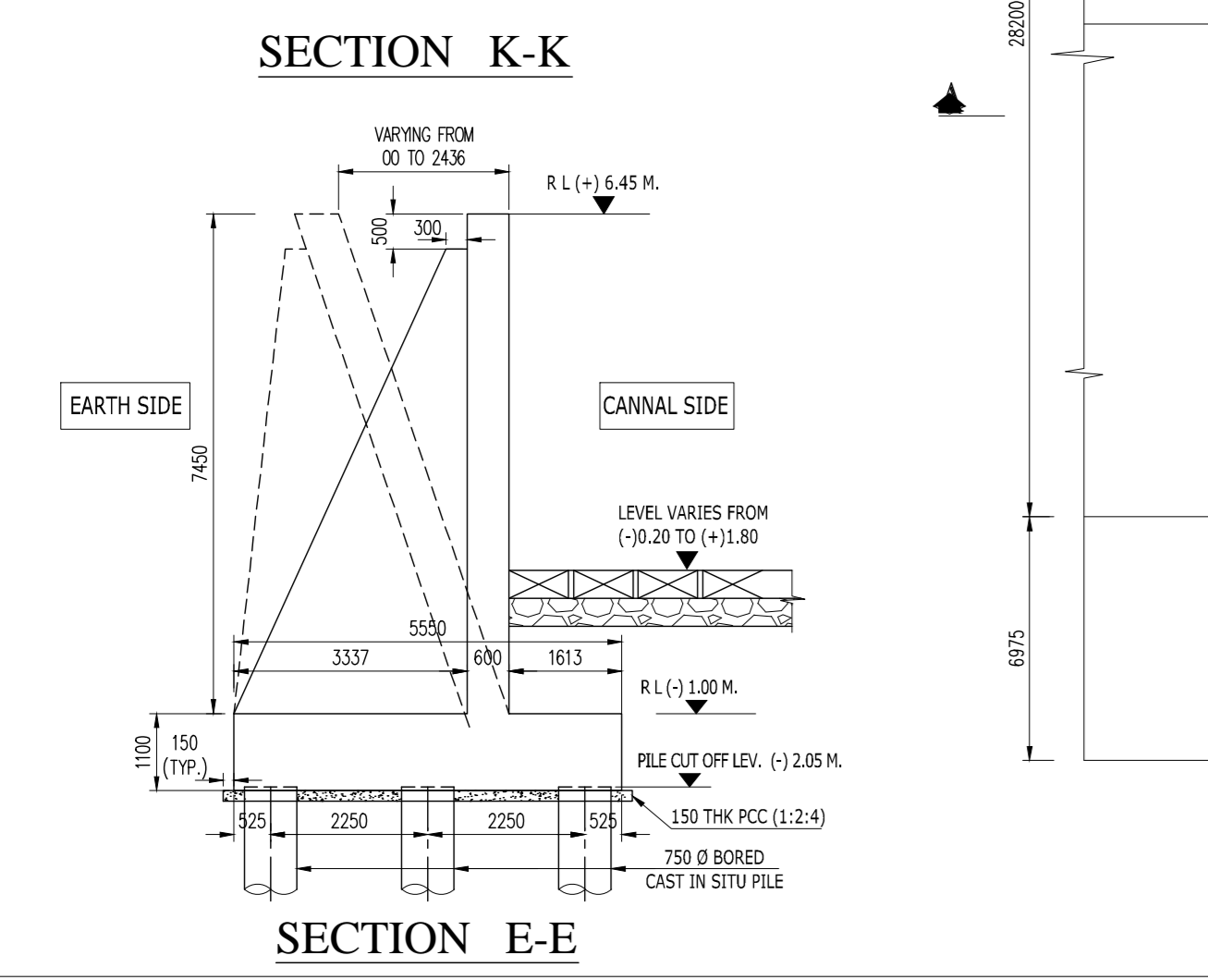
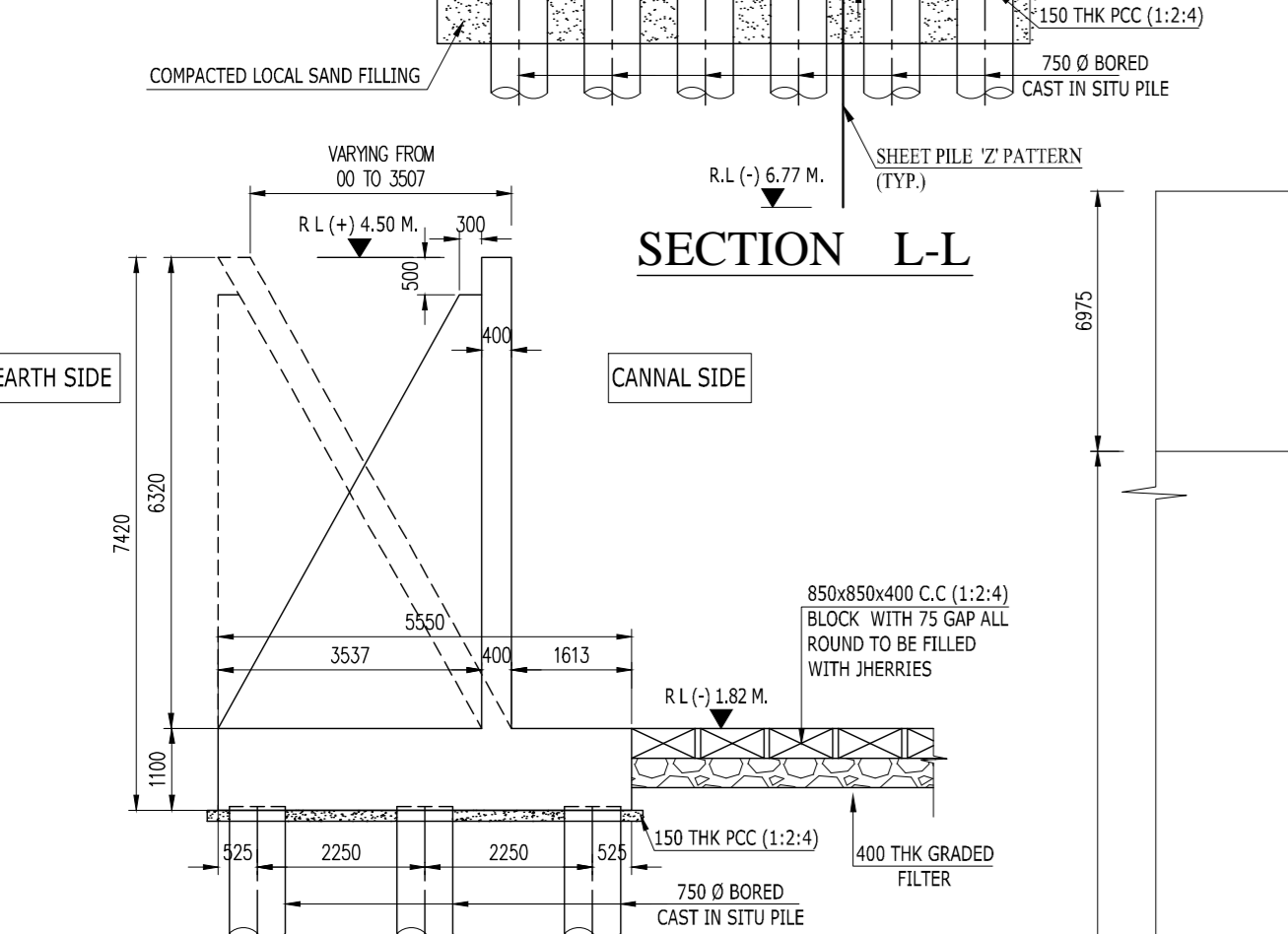
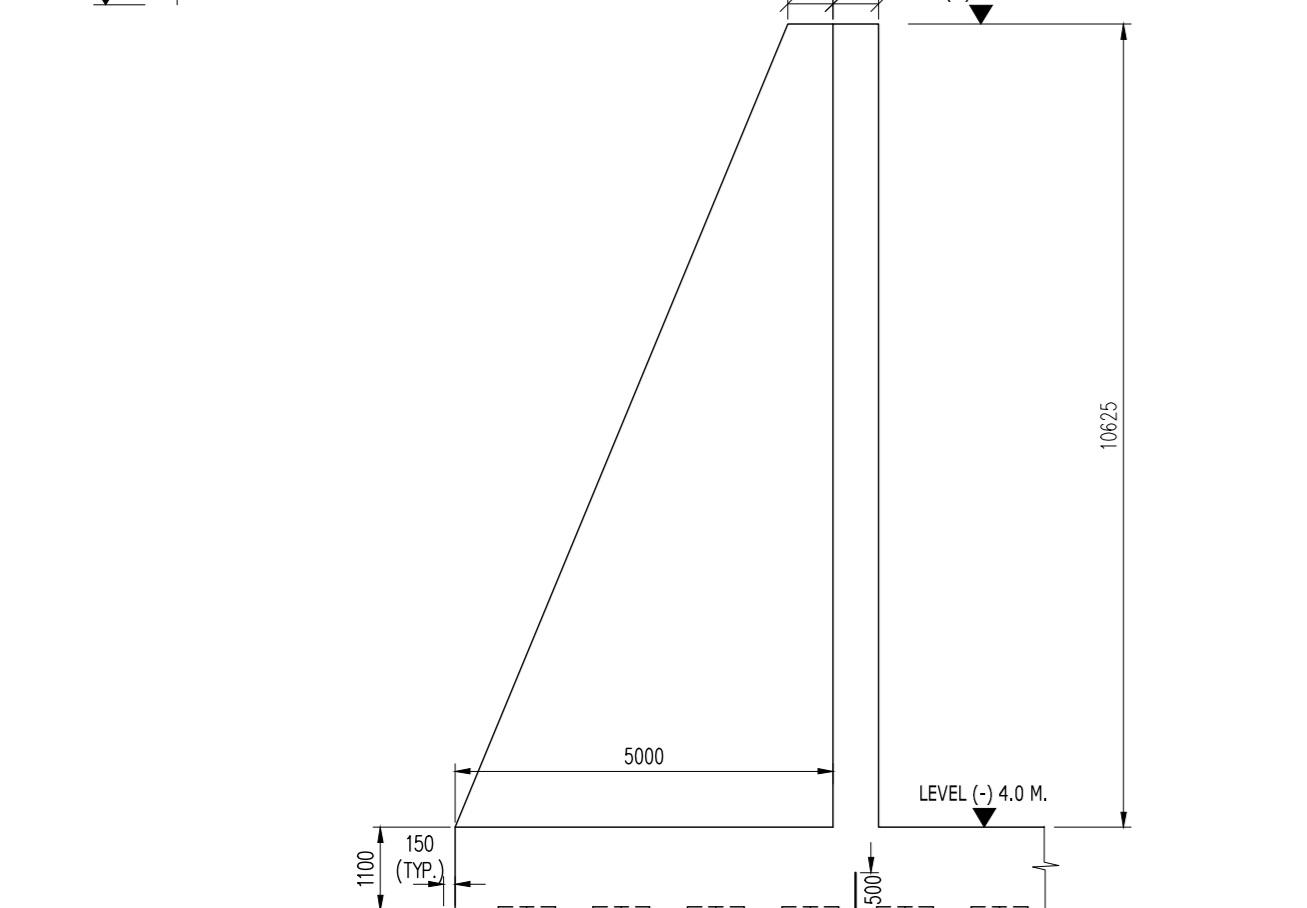
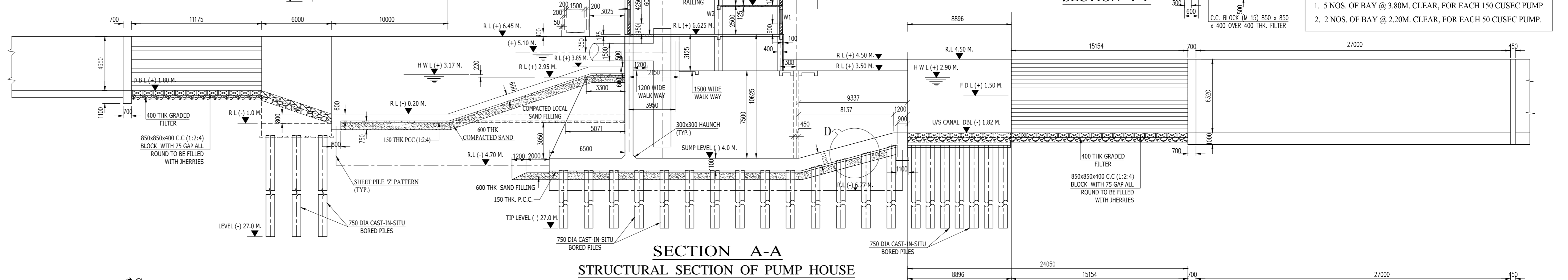
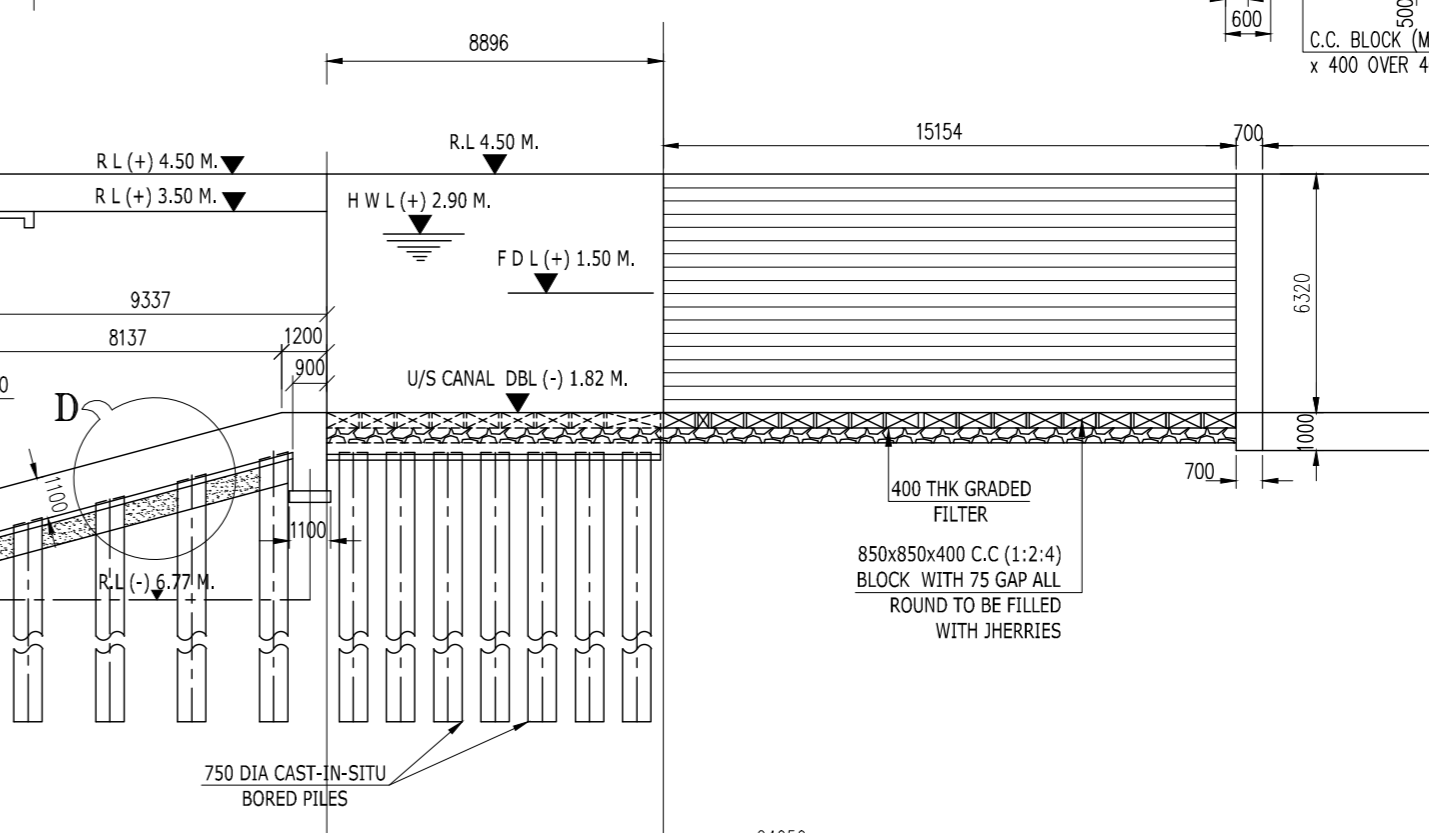
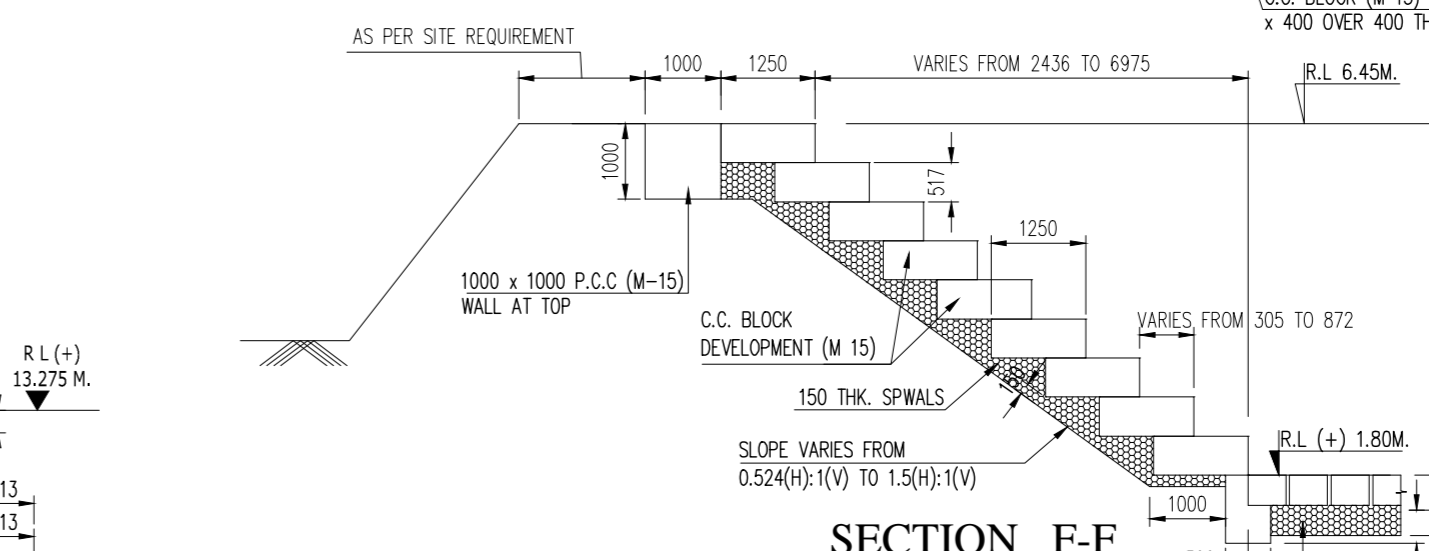
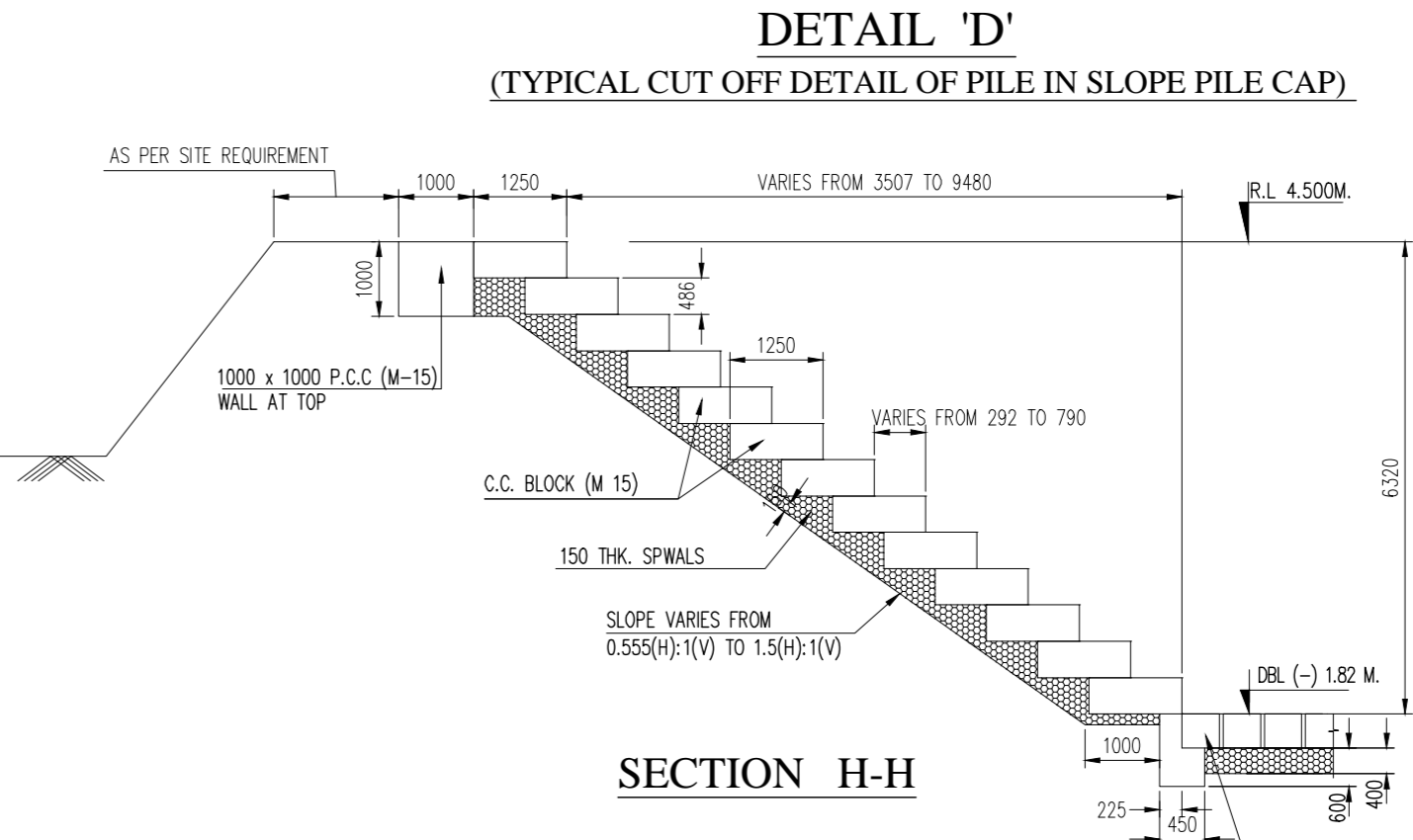
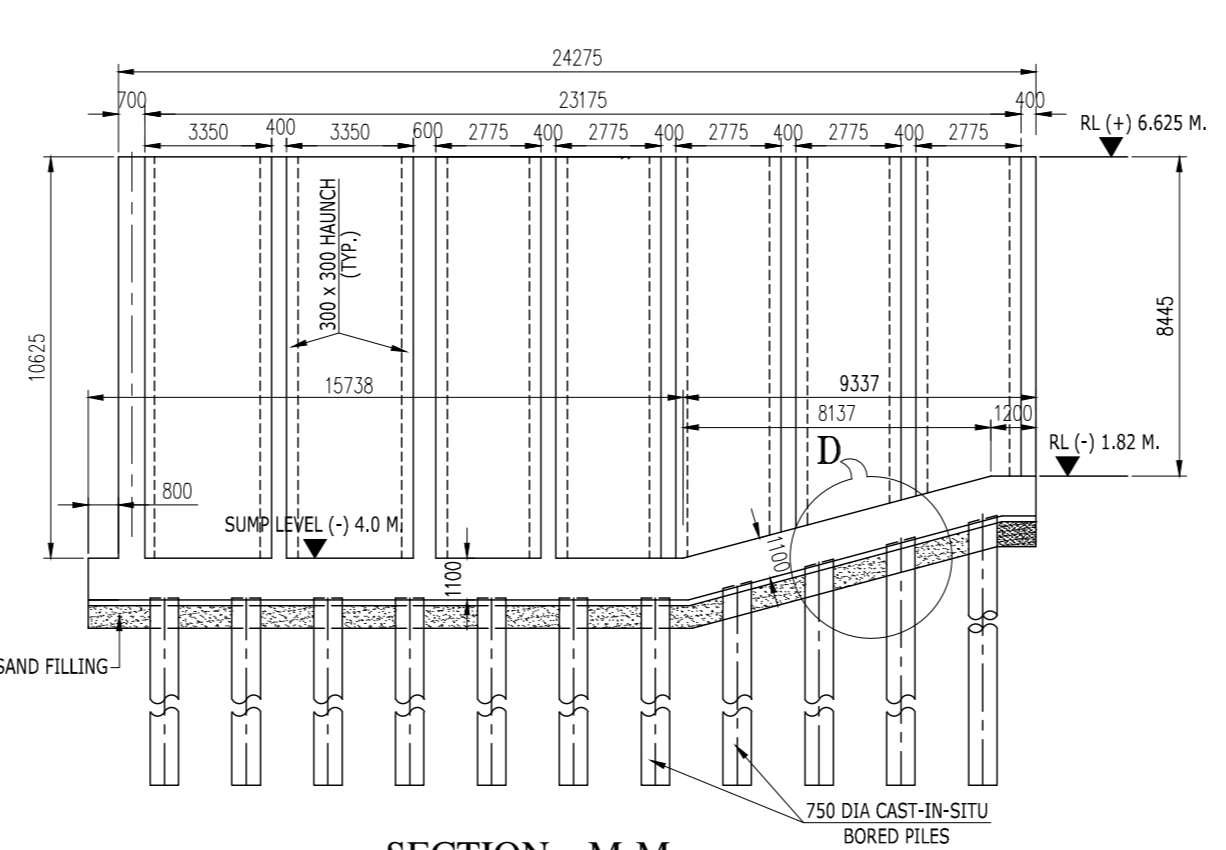
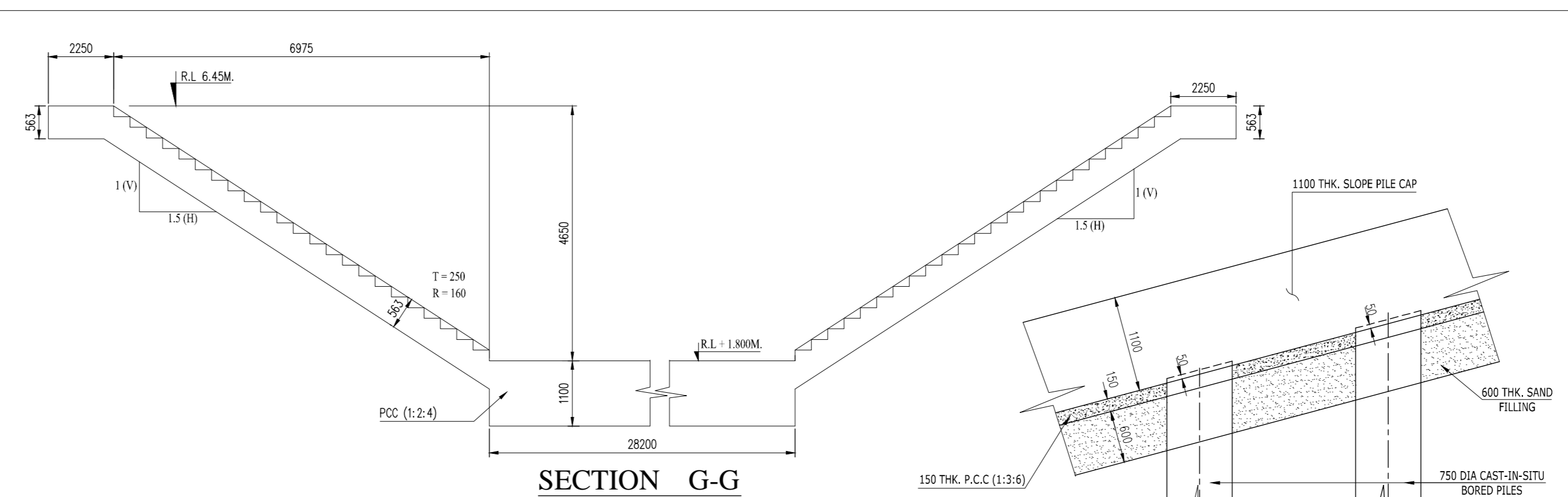
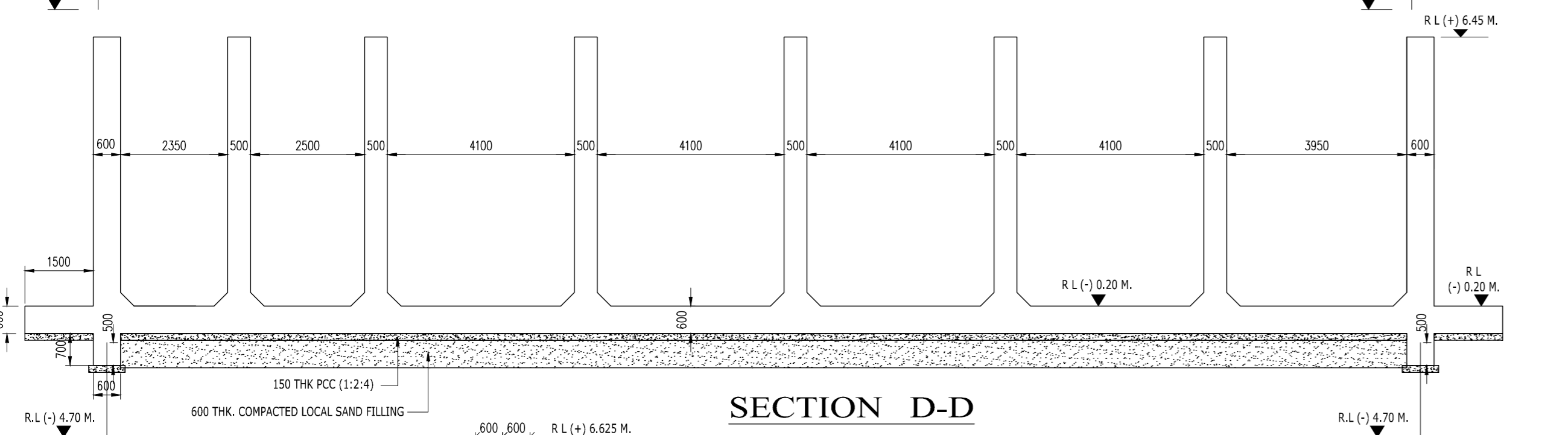
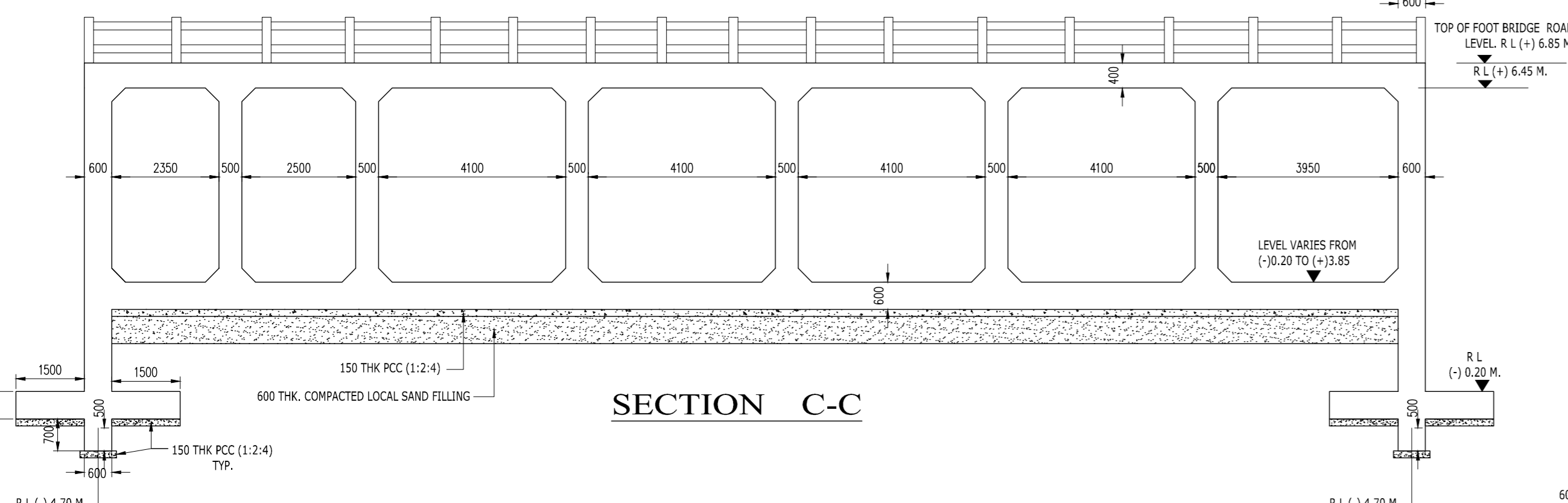
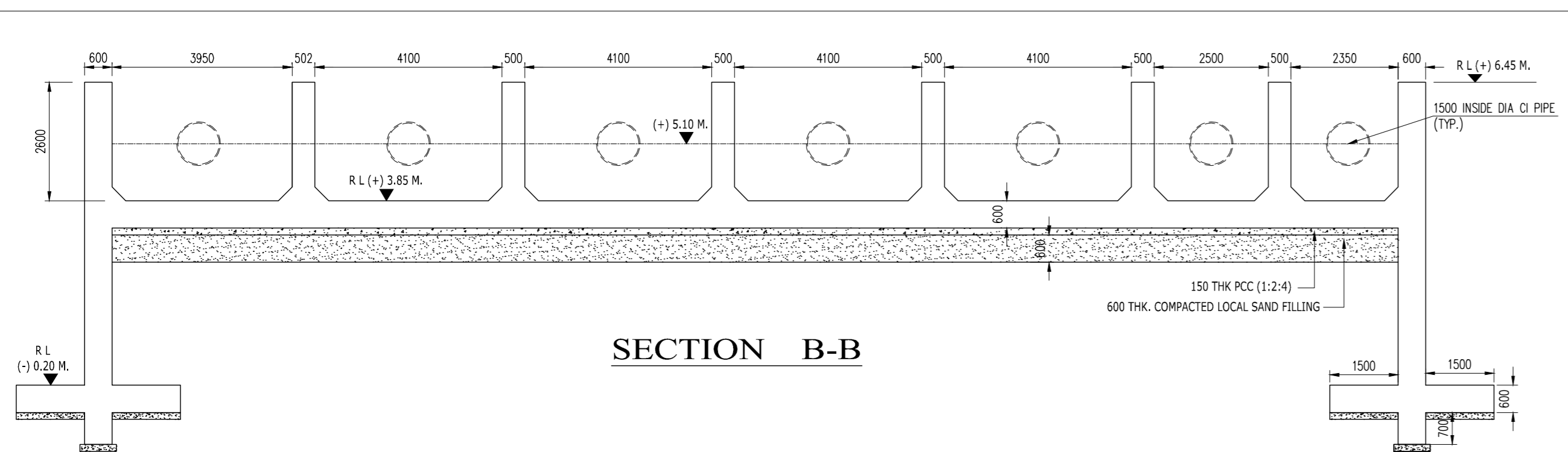
REFERENCE:-  
1. MEMO NO. 3F-2 / 1791 DT. 30.09.15 S.E. METROPOLITAN CIRCLE.  
2. MEMO NO. 5M-21 / 661 DT. 18.04.16 S.E. METROPOLITAN CIRCLE.

REVISION DRG. NO. - PH-74/1/10/(R-1)/16 DATE : 18.07.16

REVISION MADE	SIGNATURE
FILE DA HAS BEEN CHANGED FROM 600MM TO 750MM & PILE CAP HAS BEEN MODIFIED.	
DRAUGHTSMAN C.D.O.	ASSISTANT DIRECTOR C.D.O.
DEPUTY DIRECTOR C.D.O.	DIRECTOR C.D.O.

- NOTES :
- ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN METRE EXCEPT OTHERWISE SPECIFIED.
  - DO NOT SCALE ANY DIMENSION ; ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN. IN CASE OF OMISSION OR DISCREPANCY REFER TO THE DESIGN OFFICE.
  - ALL P.C.C. WORKS SHALL BE OF 1:2:4 CONCRETE UNLESS OTHERWISE MENTIONED.
  - (a) CONCRETE USED FOR R.C.C. WORKS EXCEPT PILES SHALL BE OF M - 25 (DESIGN MIX) CONFORMING TO IS - 456 - 2000.  
(b) PILES ARE OF M-35 GRADE CONCRETE.
  - MAXIMUM SIZE OF COURSE AGGREGATES USED SHALL BE 20 mm BOTH FOR P.C.C. & R.C.C. WORKS.
  - MINIMUM COVER TO MAIN REINFORCEMENT  
(a) PILE & PILE CAP 50mm.  
(b) OTHER R.C.C. WORKS 50 mm.
  - 200 mm LDPE FILM SHALL BE PROVIDED UNDER P.C.C. TO PREVENT WATER PERCOLATING IN TO THE SOIL.
  - 50 MINIMUM DIA PIPE SHALL BE EMBEDDED IN THE WALL ( ABUTMENT WALL / RETAINING WALL ) AS WEEP HOLES. ITS HORIZONTAL ROWS OF WEEP HOLES SHALL BE PROVIDED AS PER SUITABILITY AND SITE CONDITION. HORIZONTAL & VERTICAL SPACING BETWEEN ROWS SHALL BE 1000 mm. INVERTED FILTER IS TO BE PROVIDED AT THE BACK OF THE WALL IN TWO LAYERS EACH OF 300 mm THICK.
  - ISIS Z' TYPE SHEET PILE SHALL BE USED AS SHOWN.
  - GROVE FOR SECONDARY CONCRETE SHALL BE LEFT WHERE GUIDE CHANNEL, SILL BEAM ETC. ARE TO BE EMBEDDED.
  - REINFORCING STEEL BARS USED SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF Fe-415 GRADE CONFORMING TO IS - 1786 - 1985.
  - SPLICING IN REINFORCEMENT BARS MAY BE ALLOWED IN STAGGERED POSITION AND DEVELOPMENT LENGTH OF BARS IN SPLICING SHALL BE 50 TIMES THE DIA OF BAR.

- 5 NOS. OF BAY @ 3.80M. CLEAR, FOR EACH 150 CUSEC PUMP.
- 2 NOS. OF BAY @ 2.20M. CLEAR, FOR EACH 50 CUSEC PUMP.



## PART -B (Electrical Works)

**Supply, Installation, Testing and Commissioning of 33KV/6.6 KV and 33 KV/0.415 KV sub-station complete of both H.T & L.T components in the sub- station & pump house as per enclosed schedule of work, detailed specification for the proposed 2nd Additional Uttarbhag Pumping Station at Uttarbhag, P.O - Brindakhali, P.S - Baruipur, Dist- South 24 Parganas of West Bengal under Irrigation & Waterways Department, Govt. of West Bengal.**

### Bill of Quantities

SI No	Description	Proposed Modification of	Unit	Qty	Rate in Figure (Rs.)	Amount(Rs.)
	<b>SECTION-I, SUB-STATION EQUIPMENTS</b>					
<b>1.0</b>	<b>CONSUMER 6-PANEL VACUUM CIRCUIT BREAKER AT SUB-STATION</b>					
	Supply,delivery, storing at site,erection testing & commissioning of indoor, floor mounted metal clad totally enclosed horizontal cubicle fully compartmentalized,extensible on either side motor operated spring charged, electrically/manually operated fully draw-out type 33KV Vacuum Circuit Breaker(VCB) Board having rupturing capacity of 1800MVA at 33KV with suitable digital breaker protection relay etc. conforming to specification etc and detail shown in single line diagram and as described below Including supplying necessary mounting channels and all other mounting accessories complete. Offered switchgear should be compliant to IEC 62271. The VCB offered should be type tested as per IEC 62271-100 & type tested for E2, M2 & C2 Duty. The switchgear panel should be as per IEC 62271-200. Offered switcgear should be classified and type tested as LSC 2B, PM, IAC AF-LR. In addition the switchgear panels should be fully arc proof of rated STC for 1 second. To ensure the integrity of the arc fault containment requirement, the operations (CB Opening / Closing) must be carried out with the switchgear doors closed. Circuit breaker compartment door must be padlockable. The switchgear panel doors should be constructed with CRCA (Type : Aluzinc / Sendzimir GI) of minimum 2mm thickness, so as to withstand Internal Arc for complete 1 second. Bolted construction of door not acceptable. Viewing port on the front of the VCB compartment , should be of suitable thickness / material , so that it can withstand Internal Arc for complete 1 second. All busbars and associated jumpers should have full voltage sleeving. Inter-panel barriers is mandatory for containment of internal arc within the switchgear vertical. Vaccum Circuit Breaker, Vaccum Interruptor, Vaccum Contractor Unit/ Panel & Panel should be of same manufacturer.					
	<b>(A) Incomer</b>					
	(i) 1-No 1250A TP,33 KV, 31.5 KA, electrically operated, motorised springcharged, drawout type Vacuum Circuit Breaker (VCB).					
	(ii)1-set (3 Nos) 15VA,250/5A,CL-1 for metering and 5P10 for protection CTs, 13.12 KA/sec					
	(iii)1-set flush mounting digital type trivector meter with accuracy class 0.5 with maximum demand indicator at 30 minute interval					
	(iv)1-set cable termination box suitable for 3C x 300 sqmm.33KV, XLPE /A, AL cable					



(v)1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF.
(vi)1-set 0-250A AC flush mounting digital ammeter with selector switch.
(vii) 1-set-IDMTL type over voltage & under voltage relay having settings 90% to 110% in equal steps.
(viii) 1-set Draw out type 33KV/ 110V, 100VA star/star dry type potential transformer with primary (3A) and secondary (4A) HRC fuse protections.
(ix) 1set -0-33KV flush mounted digital voltmeter and selector switch
(x) 1-set high speed master trip relay.
(xi) 1 set-Continuous trip circuit supervision with relay
(xii) 1 set-ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons
(xiii) 1-set (2 Nos.)-110V,DC shunt trip coil for tripping with power pack unit
(xiv) 1 set (2 Nos.)- Aux. contactors with necessary fittings
(xv) Earth bus-bar and all other accessories complete
(xvi) Annunciator unit. 8W
(xvii) Hooter
(xviii) 1-set R/Y/B phase indication lamps
<b>(B) Bus-Bars</b>
1-Set TP, 33KV, 1250A, 1500 MVA continuous rated copper bus-bar with insulating sleeves
<b>(C ) Outgoing</b>
(i) 5 Nos - 1250A, TP, 33 KV, 31.5 KA,Vacuum Circuit Breaker (VCB) (2 nos for 2 MVA transformer feeder , 2 nos for 0.5 MVA transformer feeder & 1 no. for 1 MVA Transformer feeder)
(ii)2set (3 Nos. in each set) 15VA,150/5A,CL-1 for metering and 5P10 for protection CTs, 13.12 KA/sec, for 2 MVA transformer feeder.
(iii)2set (3 Nos. in each set) 15VA,50/5A,CL-1 for metering and 5P10 for protection CTs, 13.12 KA/sec, for 0.5 MVA transformer feeder.
(iv)1 set (3 Nos. in each set) 15VA,100/5A,CL-1 for metering and 5P10 for protection CTs, 13.12 KA/sec, for 1 MVA transformer feeder.
(v)5 set-cable termination box suitable for 3C x 300sqmm. 33 KV, XLPE/A, AL cable


	(vi)5-set microprocessor based Communicable Numerical type relay with three nos elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 5I,5O, 51N, 50N, 68,49, 46PD,46 & 51BF.				
	(vii)2set-0-150A flush mounting digital ammeter with selector switch for 2MVA transformer feeder				
	(viii)2set-0-50A flush mounting digital ammeter with selector switch for 0.5MVA transformer feeder				
	(ix)1set-0-100A flush mounting digital ammeter with selector switch for 1MVA transformer feeder				
	(x) 5 set - high speed master trip relay.				
	(xi) 5 set - Continuous trip circuit supervision with relay				
	(xii) 5 set - ON/OFF/TRIP/TRIPCIRCUIT HEALTHY lamps and push buttons				
	(xiii) 5 set (2 Nos. in each set) - 110V, DC shunt trip coil for tripping with power pack unit				
	(xiv) 5 set (2 Nos. in each set)- Aux. contactors with necessary fittings				
	(xv) 5 set-3 pole H/R Aux. relay				
	(xvi) Earth bus-bar and all other accessories complete				
	(xvii) Annunciator unit. 8 W				
	(xviii) 5-set R/Y/B phase indication lamps				
<b>2.0</b>	<b><u>TRANSFORMER</u></b>				
<b>2.1</b>	Supply, delivery, storing at site,erection, testing & commissioning of 2 MVA 33KV / 6.6KV, 3 phase, 50HZ Δ/λ, Dyn 11 outdoor ONAN type transformer in IP 55 enclosure with copper windings, OFF load tap changing arrangement in equal steps of 2.5 % per step from + 12.5% to - 7.5%, having HT cable end boxes with cable gland plate suitable for terminating 33KV ,3C x 300 sqmm XLPE/ ARMD, AL cables for primary side and 6.6 KV, 3C x 300 sqmm. XLPE/ARMD, AL cables on the secondary side, three channel temperature scanner for continuous monitoring of the windings & oil, with supply of all associated materials and accessories like oil conservator, silica gel breather, mounting channels bolts ,nuts washers, screw, clamps, painting, earthing etc.and confirming to IS 2026 (I to J) and as per specification as laid down in the contract complete in all respect as required at site including construction of required size CC pedestal.With Buchholz relay trip & alarm indicator, pressure release valve indicator and magnetic oil level gauge trip and alarm indicator.				
		per set	1		
		Set	2		

2.2	Supply, delivery, storing at site,erection, testing & commissioning of 0.5 MVA 33KV / 433V, 3 phase, 50HZ Δ/λ, Dyn 11 outdoor ONAN type transformer in IP 55 enclosure with copper windings, OFF load tap changing arrangement in equal steps of 2.5% per step from +12.5% to -7.5% having HT cable box and LT cable box with cable gland plate suitable for terminating of 33KV ,3C x 300 sqmm XLPE/ ARMD, AL cables for primary side and 3 nos. 1.1 KV grade, 3¼C x 300 sqmm. XLPE/ARMD, AL cables on the secondary side, three channel temperature scanner for continuous monitoring of the windings & oil, with supply of all associated materials and accessories like oil conservator, silica gel breather, mounting channels bolts ,nuts washers, screw, clamps, painting, earthing etc.and confirming to IS 2026 (I to J) and as per specification as laid down in the contract including construction of required size CC pedestal. With Buchholz relay trip & alarm indicator, pressure release valve indicator and magnetic oil level gauge trip and alarm indicator.		Set	2		
2.3	Supply, delivery, storing at site,erection, testing & commissioning of 1 MVA 33KV / 433V, 3 phase, 50HZ Δ/λ, Dyn 11 outdoor ONAN type transformer in IP 55 enclosure with copper windings, OFF load tap changing arrangement in steps of +12.5 & -7.5 having HT cable boxe and LT cable box with cable gland plate suitable for terminating of 33KV ,3C x 300 sqmm XLPE/ ARMD, AL cables for primary side and 6 nos. 1.1 KV grade, 3¼C x 300 sqmm. XLPE/ARMD, AL cables on the secondary side, three channel temperature scanner for continuous monitoring of the windings & oil, with supply of all associated materials and accessories like oil conservator, silica gel breather, mounting channels bolts ,nuts washers, screw, clamps, painting, earthing etc.and confirming to IS 2026 (I to J) and as per specification as laid down in the contract including construction of required size CC pedestal. With Buchholz relay trip & alarm indicator, pressure release valve indicator and magnetic oil level gauge trip and alarm indicator.		Set	1		
3.0	<b>CONSUMER 1-PANEL VACUUM CIRCUIT BREAKER AT SUB-STATION</b>					
	Supply,delivery, storing at site,erection testing & commissioning of indoor, floor mounted metal clad totally enclosed horizontal cubicle fully compartmentalized,extensible on either side motor operated spring charged, electrically/manually operated fully draw-out type 6.6KV Vacuum Circuit Breaker(VCB) Board having rupturing capacity of 180MVA at 6.6KV with suitable digital breaker protection relay etc conforming to specification etc and detail shown in single line diagram and as described below Including supplying necessary mounting channels and all other mounting accessories complete. Offered switchgear should be compliant to IEC 62271. The VCB offered should be type tested as per IEC 62271-100 & type tested for E2, M2 & C2 Duty. The switchgear panel should be as per IEC 62271-200. Offered switcgear should be classified and type tested as LSC 2B, PM, IAC AF-LR. In addition the switchgear panels should be fully arc proof of rated STC for 1 second. To ensure the integrity of the arc fault containment requirement, the operations (CB Opening / Closing) must be carried out with the switchgear doors closed. Circuit breaker compartment door must be padlockable. The switchgear panel doors should be constructed with CRCA (Type : Aluzinc / Sendzimir GI) of minimum 2mm thickness, so as to withstand Internal Arc for complete 1 second. Bolted construction of door not acceptable. Viewing port on the front of the VCB compartment , should be of suitable thickness / material , so that it can withstand Internal Arc for complete 1 second. All busbars and associated jumpers should have full voltage sleeving. Inter-panel barriers is mandatory for containment of internal arc within the switchgear vertical. Vaccum Circuit Breaker, Vaccum Interruptor, Vaccum Contractor Unit/ Panel & Panel should be of same manufacturer.In house production of Original Equipment manufacturer.					
	Note:All works are to be done in accordance with I.E.rules and regulation and as per direction of Engineer-in-charge.GA drawing for each panel has to be get approved by the engineer-in-charge before manufacturing the same.					
	<b>Incomer/ Outgoing</b>					

	(i) 1-No. 1250A TP,6.6 KV, 16 KA,Vacuum Circuit Breaker (VCB)				
	(ii)1-set (3 Nos in each set) 15VA,250/5A,CL-1 for metering and 5P10 for protection CTs, 16 KA/sec				
	(iii)2-set cable termination box suitable for 3C x 300 sqmm.6.6KV, XLPE /A, AL cable				
	(iv)1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 5I,5O, 5IN, 5ON, 68,49, 46PD,46 & 51BF.				
	(v)1-set 0-250A AC flush mounting digital ammeter with selector switch.				
	(vi)1-set Draw out type 6.6KV/ 110V, 100VA star/star dry type potential transformer with primary (3A) and secondary (4A) HRC fuse protections.				
	(vii) 1-set 0-8KV flush mounted digital voltmeter and selector switch				
	(viii) 1-set High speed master trip relay.				
	(ix) 1-set Continuous trip circuit supervision with relay				
	(x) 1-set ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons				
	(xi) 1-set (2 Nos. in each set) 110V, DC shunt trip coil for tripping with power pack unit				
	(xii) 1- set (2 Nos. in each set) Aux. contactors with necessary fittings				
	(xiii) 1-set Digital KWH & PF meter				
	(xiv) Earth bus-bar and all other accessories complete				
	(xv) 1-set R/Y/B phase indication lamps				
		set	2		
<b>4.0</b>	<b>CONSUMER 1-PANEL AIR CIRCUIT BREAKER AT SUB-STATION</b>				
	Supply,delivery, storing at site,erection testing & commissioning of indoor, floor mounted metal clad totally enclosed horizontal cubicle fully compartmentalized,extensible on either side motor operated spring charged, electrically/manually operated fully draw-out type 433V microprocessor based Air Circuit Breaker(ACB) Board having rupturing capacity of 35MVA at 433V conforming to specification etc and detail shown in single line diagram and as described below Including supplying necessary mounting channels and all other mounting accessories complete.LT panel shall be suitable for 433V AC 50HZ,3 phase and neutral system.				
	Note:All works are to be done in accordance with I.E.rules and regulation and as per direction of Engineer-in-charge.GA drawing for each panel has to be get approved by the engineer-in-charge before manufacturing the same.				
	<b>(A) Incomer/ Outgoing</b>				
	(i) 1-Nos 800A FP,433V, 50 KA,Air Circuit Breaker (ACB)				
	(ii)1-set (3 Nos in each set) 15VA,800/5A,CL-1 for metering CTs				
	(iii)2-set cable termination box suitable for 3 nosx 3½ -C x 300 sqmm.1.1KV, XLPE /A, AL cable				

	(iv)1-set 0-800/2000A AC flush mounting digital ammeter with selector switch.				
	(v) 1-set 0-500V flush mounted digital voltmeter with selector switch				
	(vi) 1-set ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons				
	(vii) 1-set R/Y/B phase indication lamps				
	(viii) 1-set TRIP/NEUTRAL/CLOSE selector switch				
	(ix) Earth bus-bar and all other accessories complete				
	(x) 1-set Multi Function Meter				
	xi) 1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocolfor SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF or suitable.				
	<b>Complete set as stated above.</b>	set	2		
<b>5.0</b>	<b>CONSUMER 1-PANEL AIR CIRCUIT BREAKER AT SUB-STATION</b>				
	Supply,delivery, storing at site,erection testing & commissioning of indoor, floor mounted metal clad totally enclosed horizontal cubicle fully compartmentalized,extensible on either side motor operated spring charged, electrically/manually operated fully draw-out type 433V Air Circuit Breaker(ACB) Board having rupturing capacity of 35MVA at 433V microprocessor based conforming to specification etc and detail shown in single line diagram and as described below Including supplying necessary mounting channels and all other mounting accessories complete.LT panel shall be suitable for 433V AC 50HZ,3 phase and neutral system.				
	Note:All works are to be done in accordance with I.E.rules and regulation and as per direction of Engineer-in-charge.GA drawing for each panel has to be get approved by the engineer-in-charge before manufacturing the same.				
	<b>(A) Incomer/ Outgoing</b>				
	(i) 1-Nos 1600A FP,433V, 50 KA,Air Circuit Breaker (ACB)				
	(ii)1-set (3 Nos in each set) 15VA,1600/5A,CL-1 for metering CTs				
	(iii)2-set cable termination box suitable for 6 nosx 3½ -C x 300 sqmm.1.1KV, XLPE /A, AL cable				
	(iv)1-set 0-1600/3000A AC flush mounting digital ammeter with selector switch.				
	(v) 1-set 0-500V flush mounted digital voltmeter with selector switch				
	(vi) 1-set ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons				
	(vii) 1-set R/Y/B phase indication lamps				
	(viii) 1-set TRIP/NEUTRAL/CLOSE selector switch				
	(ix) Earth bus-bar and all other accessories complete				
	(x) 1-set Multi Function Meter				

	<p>xi)1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent &amp; 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocolfor SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date &amp; time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 5I,50, 51N, 50N, 68,49, 46PD,46 &amp; 51BF or suitable.</p>					
	<p><b>Complete set as stated above.</b></p>					
			<p>set</p>	<p>1</p>		
<p><b>6.0</b></p>	<p><b>HT PANEL AT PUMP HOUSE</b></p>					
	<p>Supply, delivery, storing at site,erection, testing &amp; commissioning of 6.6KV T.P VCB having rupturing capacity 180 MVA at 6.6 KV with suitable digital breaker protection relay floor mounting free standing HTpanel made of 14SWG CRCA sheet steel extensible on either side totally enclosed,dust and vermin proof, self supported,free standing unit with base channel,multi tier, compartmentalised cubicle,front access type construction with details of feeders as given below .HT panel shall be suitable for 6.6KV AC 50HZ,3 phase system.Panels shall be treated with seven tanks process before painting with two coats of epoxy paint over two coats of epoxy primer all of approved shade complete with front operated incoming and outgoing switchgears,cablealleys,provision for cable entries from top and bottom, necessary meters, internal wiring with1.1KV,copper wire (2.5 sq.mm) protection HRC fuse etc terminal blocks, selector switches, inter connection with insulated(1.1KVgrade) colour coded copper conductor cable,gland plates, earth bus of copper, lifting bolts, level inscriptions, earth connections etc and supply of all necessary accessories all complete and mending good the damages as required. Offered switchgear should be compliant to IEC 62271. The VCB offered should be type tested as per IEC 62271-100 &amp; type tested for E2, M2 &amp; C2 Duty. The switchgear panel should be as per IEC 62271-200. Offered switcgear should be classified and type tested as LSC 2B, PM, IAC AF-LR. In addition the switchgear panels should be fully arc proof of rated STC for 1 second.To ensure the integrity of the arc fault containment requirement, the operations (CB Opening / Closing) must be carried out with the switchgear doors closed. Circuit breaker compartment door must be padlockable. The switchgear panel doors should be constructed with CRCA (Type : Aluzinc / Sendzimir GI) of minimum 2mm thickness, so as to withstand Internal Arc for complete 1 second. Bolted construction of door not acceptable. Viewing port on the front of the VCB compartment , should be of suitable thickness / material , so that it can withstand Internal Arc for complete 1 second. All busbars and associated jumpers should have full voltage sleeving. Inter-panel barriers is mandatory for containment of internal arc within the switchgear vertical. Vaccum Circuit Breaker, Vaccum Interuptor, Vaccum Contractor Unit/ Panel &amp; Panel should be of same manufacturer.</p>					
	<p>Note:All works are to be done in accordance with I.E.rules and regulation and as per direction of Engineer-in-charge.GA drawing for each panel has to be get approved by the engineer-in-charge before manufacturing the same.</p>					
	<p><b>(A) Incomer</b></p>					
	<p>(i) 2-No 1250A TP,6.6 KV, 16 KA,Vacuum Circuit Breaker (VCB)</p>					
	<p>(ii)2-set (3 Nos in each set) 15VA,250/5A,CL-1 for metering and 5P10 for protection CTs, 16 KA/sec</p>					
	<p>(iii)2-set cable termination box suitable for 3C x 300 sqmm.6.6KV, XLPE /A, AL cable</p>					

(iv)2-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF.
(v)2set-0-250A flush mounting digital ammeter with selector switch
(vi) 2-set Draw out type 6.6KV/ 110V, 100VA star/star dry type potential transformer with primary (3A) and secondary (4A) HRC fuse protections.
(vii) 2-set 0-8KV flush mounted digital voltmeter and selector switch
(viii) 2-set high speed master trip relay.
(ix) 2 set-Continuous trip circuit supervision with relay
(x) 2 set-ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons
(xi) 2- set (2 Nos. in each set) - 110 V, DC shunt trip coil for tripping with power pack unit
(xii) 2- set (2 Nos. in each set)- Aux. contactors with necessary fittings
(xiii) 2-set Digital KWH & PF meter
(xiv) Earth bus-bar and all other accessories complete
(xv) 2-set R/Y/B phase indication lamps
<b>(B) Bus-Bars</b>
2-Set TP, 6.6KV, 1250A, 180 MVA continuous rated copper bus-bar with insulating sleeves
<b>(C) Bus Coupler</b>
(i) 1-No 1250A TP,6.6 KV, 16 KA,Vacuum Circuit Breaker (VCB)
(ii)1-set (3 Nos) 15VA,250/5A,CL-1 for metering and 5P10 for protection CTs, 16 KA/sec
(iii)1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF.
(iv)1set-0-250A flush mounting digital ammeter with selector switch
(v) 1-set high speed master trip relay.
(vi) 1set-Continuous trip circuit supervision with relay
(vii) 1 set-ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons
(viii) 1- set (2 Nos.)- Aux. contactors with necessary fittings
(ix) Earth bus-bar and all other accessories complete

(x) Annunciator unit. 8W					
(xi) 1-set R/Y/B phase indication lamps					
<b>(D ) Outgoing</b>					
(i) 6-set 6.6KV, drawout type electrically operated vacuum contactor unit/vacuum contactor panel, 400A, 16KA, with HRC fuse, 100A (5 nos for 150 cusec, 475 KW, VT pump & 1 no spare. Offer VCU should have magnetic actuator mechanism with proven electrical life of 10, 00,000 operations (AC1 Duty ) & 1,00,00 operations (AC3 Duty). Offered VCU should have a mechanical life up to 10,00,000 operations (both with electrical latching function and with mechanical latching function.					
(ii) 6-set (3 Nos in each set) 15VA,65/5A,CL-1 for metering and 5P10 for protection CTs, 16 KA/sec					
(iii)6-set cable termination box suitable for 3C x 185 sqmm.6.6KV, XLPE /A, AL cable					
(iv)For VCP/VCU switch gear protection6-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF.					
(v)6-set 0-65/390A AC flush mounting digital ammeter with selector switch.					
(vi) 6-set high speed master trip relay.					
(vii) 6-set-ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons					
(viii) 6-set - Aux. contactors with necessary fittings					
(ix) Annunciator unit. 8W					
(x) Hooter					
(xi) 6-set R/Y/B phase indication lamps					
(xii) 6-set Temperature Scanner for HT motor.					
xii)For HT motor protection 6-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF, 99, lock rotor, and start up supervision as per ANSI/IEEE Standard C- 37.2.					
			per set	1	



7.0	<b>LT PANEL AT PUMP HOUSE</b>					
	Supply, delivery, storing at site,erection, testing & commissioning of 415V (35MVA) TPN floor mounting free standing LTpanel made of 14SWG CRCA sheet steel extensible on either side totally enclosed,dust and vermin proof, self supported,free standing unit with base channel,multi tier, compartmentalised cubicle,front access type construction with details of feeders as given below .LT panel shall be suitable for 500/415VAC 50HZ,3 phase and neutral system.Panels shall be treated with seven tanks process before painting with two coats of epoxy paint over two coats of epoxy primer all of approved shade complete with front operated incomingandoutgoing switchgears,cablealleys,provision for cable entries from top and bottom, necessary meters, internal wiring with1.1KV,copperwire (2.5 sq.mm) protection HRC fuse etc terminal blocks, selector switches, inter connection with insulated(1.1KVgrade) colour coded copper conductor cable,gland plates, earth bus of copper, lifting bolts, level inscriptions, earth connections etc and supply of all necessary accessories all complete and mending good the damages as required.					
	Note:All works are to be done in accordance with I.E.rules and regulation and as per direction of Engineer-in-charge.GA drawing for each panel has to be get approved by the engineer-in-charge before manufacturing the same.					
	<b>(A) Incomer</b>					
	(i) 2-Nos 800A FP,433V, 50 KA,Air Circuit Breaker (ACB)					
	(ii)2-set (3 Nos in each set) 15VA,800/5A,CL-1 for metering CTs					
	(iii)2-set cable termination box suitable for 3 nosx 3 1/2-C x 300 sqmm.1.1KV, XLPE /A, AL cable					
	(iv)2-set 0-800/2000A AC flush mounting digital ammeter with selector switch.					
	(v) 2-set 0-500V flush mounted digital voltmeter with selector switch					
	(vi) 2-set ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons					
	(vii) 2-set R/Y/B phase indication lamps					
	(viii) 2-set TRIP/NEUTRAL/CLOSE selector switch					
	(ix) Earth bus-bar and all other accessories complete					
	(x) Annunciator unit. 8W					
	(xi) 2-set Multi Function Meter					
	xii) 2-sets microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocolfor SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF or suitable.					
	<b>(B) Bus-Bars</b>					
	2-Set TPN, 500/415V, 800A, 50Hz, 35 MVA continuous rated copper bus-bar with insulating sleeves					
	<b>(C) Bus Coupler</b>					
	(i) 1-No 800A FP,433V, 50 KA,Air Circuit Breaker (ACB)					

	(ii)1-set (3 Nos) 15VA,800/5A,CL-1 for metering CTs
	(iii)1-set 0-800/2000A AC flush mounting digital ammeter with selector switch.
	(iv) 1-set ON/OFF/TRIP/TRIP CIRCUIT HEALTHY lamps and push buttons
	(v) 1-set R/Y/B phase indication lamps
	(vi) 1-set TRIP/NEUTRAL/CLOSE selector switch
	(vii) Earth bus-bar and all other accessories complete
	(viii) Annunciator unit. 8W
	ix)1-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocolfor SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF or suitable.
	<b>(D ) Outgoing</b>
	(i) 3Nos-400A TPN 500/415V, AC 50KA breaking capacity MCCB with motor protection digital relay , microprocessor based O/L,E/F and S/C releases having independent time and current settings (time settings 0.3sec to 1.0sec and current settings 80% to 100%) with all other accessories complete including 415V, Fully Automatic StarDelta Starter (FASD) for operation of 180KW pump motor having 3nos.300A,415V,TP AC 3 contactors and timer 0-30 sec CT operated thermal O/L relay having suitable setting range with single phase preventor,ON/OFF/TRIP lamps, START/STOP push buttons, 0-500A, CT operated digital ammeter with 500/5A class-1 CTS and selector switch, local/remote selector switch, temperature scanner (Masibus make),completely wired up to the terminals (2 nos for 50 cusec, 160 KW, VT pump &1 no spare) with three sets microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocolfor SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BFFor suitable for breaker protection or suitable and for motor protection three sets as 6-set microprocessor based Communicable Numerical type relay with three elements for O/C and one element for E/F protection with time and current setting,(70%- 100%for current and 0.3-1.0 for time settings) with IDMT/DMT setting with sensitive low set ( 10% for overcurrent & 2% for earthfault), RS 485 232 port on Modbus® / IEC 60870-5-103 protocol for SCADA integration and data up and down loading etc. The offered relay should have 3 phase inrush detector , built-in trip circuit supervision and 4 numbers of freely configurable Binary Inputs + 6 numbers of Binary outputs. Offered should have the capability to store 100 events with date & time stamping which should be stored in Non Volatile memory. The offered relay should offer the following protections : 51,50, 51N, 50N, 68,49, 46PD,46 & 51BF, 99, lock rotor, and start up supervision as per ANSI/IEEE Standard C- 37.2 or suitable with three nos temperature scanner for motor.

	(ii) 8Nos-63A TPN 500/415V, AC 50KA breaking capacity MCCB with motor protection relay MICOM brand (Schneider/ Siemens/ L&T), microprocessor based O/L,E/F and S/C releases having independent time and current settings (time settings 0.3sec to 1.0sec and current settings 80% to 100%) with all other accessories complete including 415V, DOL starter for operation of 2.2KW bearing lubrication & cooling/drinking water lifting pump motor having 1 no contactor 32A, CT operated thermal O/L relay having setting range 4-6.3A with, single phase preventor, ON/OFF/TRIP lamps, START/STOP push buttons, 0-500A, CT operated digital ammeter with 500/5A class-1 CTS and selector switch, local/remote selector switch, completely wired up to the terminals (4 nos. for 2.2 KW bearing lubrication & cooling pump motor ,1 no. for 2.2KW drinking water lifting pump motor, 2 nos. for 2.2 KW submercible pump motor & 1 no. spare)				
	(iii) 8Nos- 63A TPN 500/415V MCCB with breaking capacity of 50 KA including 0-63A CL-1 digital ammeter with 60/5A class-1 CTs and selector switch and ON/OFF/TRIP indication light complete (2 nos for LDB, 2 nos for PDB, 2 nos for control panel of tubewell-1&2, 2 nos spare).				
	(iv) 4Nos- 100A TPN 500/415V MCCB with breaking capacity of 50 KA including 0-100A CL-1 digital ammeter with 60/5A class-1 CTs and selector switch and ON/OFF/TRIP indication light complete ( 1 no for EOT crane, 3 nos spare).				
	<b>(E) Earth bus-bar</b>				
	Continuous earth bus bar of 50 x 6mm G.I. flat running continuous through out the length of the switch board with earthing terminals.				
	<b>Complete set as stated above</b>	Set	1		
<b>8.0</b>	Local / Remote Push Button Station including all accessories and wiring complete for 5 nos, 6.6 KV, 475 KW, motors and 2 nos 415 V, 160 KW motors.	Set	7		
<b>9.0</b>	<b>Capacitor Bank</b>				
<b>9.1</b>	Supply, delivery and storing at site, erection, testing & commissioning of capacitor bank of 290KVAR or suitable rating to reach improve power factor near to 1, delta connected double dielectric heavy duty Metalised poly propylene -Heavy duty (MPP-H) power factor correction capacitor 6.6KV AC, 3ph, 50Hz, as per IS:13340 & IEC specification to be connected directly in parallel with the 475 KW motor terminals. Including supply and installation of Reactor/ Inductor coil against each module. Including supply of 16G well ventilated, Powder coated MS enclosure of appropriate size and duly painted Note: Capacitor should be able to with stand a 110% of rated voltage and 130% of rated current.	Set	5		
<b>9.2</b>	Providing and fixing inductance coil, contactor, auxiliary contacts, auxiliary bus and auto manual switch I/C wiring complete with material and labour for capacitor bank.	Set	5		
<b>9.3</b>	Supply, delivery and storing at site, erection, testing & commissioning of capacitor bank of 100KVAR or suitable rating to reach improve power factor near to 1, delta connected double dielectric heavy duty Metalised poly propylene -Heavy duty (MPP-H) power factor correction capacitor 415V AC, 3ph, 50Hz, as per IS:13340 & IEC specification to be connected directly in parallel with the 160 KW motor terminals. Including supply and installation of Reactor/ Inductor coil against each module. Including supply of 16G well ventilated, Powder coated MS enclosure of appropriate size and duly painted Note: Capacitor should be able to with stand a 110% of rated voltage and 130% of rated current.	Set	2		

9.4	Providing and fixing inductance coil, contactor, auxiliary contacts, auxiliary bus and auto manual switch I/C wiring complete with material and labour for capacitor bank.		Set	2		
	<b>Installation of Instrumentation.</b>					
10.0	<b>Instrumentation System</b>					
10.1	Installation, testing and commissioning of following terms with supply of all accessories and equipment, erection hardware and all power and control cables, laying arrangement, etc. as required as per specifications - all inclusive.					
	(i) 6 nos Ultrasound type level transmitter with probes.					
	(ii) 1 no Rain gauge (Manual)					
	(iii) Power, control & signal cables and accessories as may be required-all inclusive.		Set	1		
10.2	Installation, testing and commissioning of instruments control panel with following instruments, control equipment and associate direction hardware as well as accessories, push buttons, indicating lamps, etc and all other accessories, power and control cabling, earthing complete as per specification.					
	(a) Upstream Panel with following items of work :					
	(i) 1 set-Microprocessor based Alarm Audio visual type annunciator with hooters as per specification					
	(ii) 1 set-Instrument control panel with digital type level indicator as per specification.					
	(iii) Power & Control cables and accessories as are required.		Set	1		
11.0	<b>BATTERIES, BATTERY CHARGER &amp; D.C.D.B.</b>					
11.1	Supplying, installation, testing and commissioning batteries, Battery Charger and D.C. Distribution Board (D.C.D.B) complete unit, comprising of following and as per detailed specification. (1) Batteries with 55 cells, 2 Volts each, total 110V D.C. 200 Amp-Hr Capacity along with all accessories. (2) Charger will be float can boost for rating 20 Amps. (3) D.C.D.B. would have 12 nos. of feeder. (4) D.C.D.B. comprising of two incoming double pole miniature circuit breaker (M.C.B.) 50 Amps and 12 nos. of 10 Amps outgoing feeder with M.C.B. or switch fuse unit, complete with accessories etc. conforming to specification. Batteries should be of station type.		set	1		
	<b>Total amount of Electrical works</b>					

Superintending Engineer  
 Mechanical & Electrical Circle  
 Irrigation & Waterways Dte.