



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

**DELHI AVIATION FUEL FACILITY PRIVATE LIMITED
AVIATION FUELLING STATION
SHAHBHAD MOHAMMADPUR
IGI AIRPORT
NEW DELHI-110061**



TENDER NO: DAFFPL/MOD/FF/2015-16/11

**INVITING TENDER FOR
SUPPLY OF FIRE WATER PUMPSETS**

BID DUE DATE & TIME: 1500 Hrs. IST on October 12th, 2015

OPENING OF TECHNICAL BIDS: 1100 Hrs. IST on October 13th, 2015



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PRICE BID FORMAT

NOTE: BIDDERS ARE REQUESTED TO SIGN AND STAMP ALL THE PAGES OF THE TENDER DOCUMENT AND SEND THE SAME BACK IN THEIR OFFER AS A TOKEN OF UNCONDITIONAL ACCEPTANCE OF TENDER FIRMS.

THE DEVIATIONS, IF ANY, SHOULD BE MENTIONED SEPARATELY ON BIDDER'S LETTER HEAD IN TECHNICAL BID. THE DEVIATIONS MENTIONED ANYWHERE ELSE SHALL NOT BE CONSIDERED. IN ABSENCE OF DEVIATION SHEET IT WOULD BE CONCLUDED THAT BIDDER HAS ACCEPTED THE TENDER TERMS WITHOUT ANY DEVIATIONS. CORRECTIONS IN TENDER DOCUMENT WILL NOT BE ACCEPTED.



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TENDER NOTICE

DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

INVITING TENDER FOR SUPPLY OF FIRE WATER PUMPSETS AS PER SPECIFICATION AS REQUIRED

TENDER NO: DAFFPL/MOD/FF/2015-16/11

Delhi Aviation Fuel Facility (P) Ltd (DAFFPL) invites sealed bids under single stage two bid system from eligible bidders for supply of Diesel Engine Driven Fire Water Pump Sets and Motor Driven Jockey Pumpsets complete as per specification as required.

Brief Scope of work:

We intends to procure Diesel Engine Driven Fire Water Pumpsets and Motor Driven Jockey Pumpsets complete as per specification as required. Scope of supply includes Design, Manufacturing, Testing, Supply, and Supervision of Installation & Commissioning for Diesel Engine Driven Fire Water Pumpsets and Motor Driven Jockey Pumpsets at our DAFFPL office.

Bid Security (EMD):	As mentioned in the Tender document
Date, Time & Venue for Voluntary Pre-bid Meeting:	September 25 th , 2015; 14:30 HRS (IST) at DAFFPL, Aviation Fuelling Station, Shahabad Mohammadpur, New Delhi-110061
Bid Due Date, Time & Place of Submission:	Upto 15:00 HRS (IST) on October 12 th , 2015 at the office of the Chief Executive Officer, DAFFPL, Aviation Fuelling Station, Shahabad Mohammadpur,

Detailed Invitation for Bids (IFB) along with Pre-qualification Criteria, Bid Document Corrigenda can be viewed and downloaded from DAFFPL's website: <http://www.daffpl.in>

Chief Executive Officer
DAFFPL, New Delhi
8826120066



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CHAPTER 1: INTRODUCTION (COVERING NOTE)

TENDER FOR SUPPLY OF DIESEL ENGINE DRIVEN FIRE WATER PUMPSETS & MOTOR DRIVEN JOCKEY PUMPSETS COMPLETE AS PER SPECIFICATION FOR OUR FUEL FACILITY IN SHAHBAD MOHAMADPUR, NEW DELHI, INDIA

We are pleased to invite your most competitive offer for the captioned work in complete accordance with the tender documents attached herewith.

Delhi Aviation Fuel Facility Private Limited (DAFFPL) is a Joint Venture comprising Indian Oil Corporation Ltd. (IOCL), Bharat Petroleum Corporation Ltd. (BPCL), and Delhi International Airport (P.) Ltd. (DIAL). We provides the infrastructure aimed at ensuring an uninterrupted flow of Aviation Turbine Fuel (ATF) to all type of aircrafts at the Indira Gandhi International Airport, New Delhi (IGI Airport) as per international benchmarking.

We intend to procure Diesel Engine Driven Fire Water Pumpsets & Motor Driven Jockey Pumpsets complete as per specification as required.

Fire Water Pump Sets are required to be supplied as specified in the tender document, specifications / Bill of quantities.

The details of specifications of Pump Sets required to be procured is enclosed along with this tender document.

Delhi Aviation Fuel Facility Private Limited (DAFFPL) invites sealed tenders in prescribed tender form under two-bid system. For viewing details including EMD, BID QUALIFICATION CRITERIA etc. please visit our web site www.daffpl.in and go to tender section by clicking the link "Tenders". Tender documents are available on our website.

The bid documents can also be collected from our office and the bids are to be submitted in Physical form in the Tender Box kept at the office of the **Delhi Aviation Fuel Facility Private Limited (DAFFPL)** at Shahabad Mohammadpur, New Delhi-110061, India.



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1. The Tender is floated in Two Bid system consisting of Technical Bids (Bid Qualification Criteria - BQC, Technical plus Commercial) and Price Bids.

Part-I : Bid Security / EMD in accordance with tender document.
Part-II : BQC (Bid qualification criteria), Technical & commercial Bid, duly filled in & along with all supporting as requested to be submitted in Physical form in the Tender Box.
Part –III : Price Bid.

2. The bidder should be able to manufacture & supply the entire size/type/quantity bidded by them. Bidders cannot bid for part items or part quantity of a lot.
3. Firstly the Technical bid (BQC & Techno commercial bids) shall be opened. The Bids shall be initially scrutinized by a team as per tender requirements of BQC (Bid qualification criteria). Technical cum commercial bids of only those vendors who qualify the BQC will be processed further. The price bids of only techno-commercially qualified bidders will be opened, evaluated and shortlisted for Placement of Purchase Order.
4. Each page of bid documents is to be duly signed & stamped by the bidder before submitting the Tender.
5. The bids submitted should be valid for **four months** from the due date of bid submission for Owners acceptance. Once accepted it will remain firm till completion of contracts/orders.
6. We request the bidder to carefully go through all tender documents before submitting the offer. Please note that any exceptions or deviations to the tender document are necessarily to be recorded in the attached deviation statement only. Any exceptions/deviations brought out elsewhere in the bid shall not be considered.
7. The bidders may be invited for a presentation to DAFFPL during Techno-commercial evaluation before price bid opening.
8. The bidders to provide their bank details/ PAN / Sales Tax /WCT Registration numbers/Service Tax Registration No. / VAT registration No., as applicable for updating vendor master file. You are also requested to keep us informed of any change in address / status of your business / contact details including email address etc.
9. Party can quote with the deviations as referred in Point No.6 above. Please refer query end date / time in tender calendar after which no query posted by bidder



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shall be considered. However DAFFPL reserves the right to respond the queries after cutoff date / time mentioned in tender calendar.

10. Please note that queries related to scope of job, tender specifications, terms & conditions etc., should be submitted by means of letter/E mail to reach the owner's office not later than one week before the meeting .It may not be practicable to answer queries received late, but queries and responses/clarifications will be posted in the form letter, E-mail within one week from the date of Pre Bid Meeting. Any modification in the bid document that may become necessary as a result of the Pre Bid meeting shall be made by the owner exclusively through the issues of corrigendum/ addendum posted at web site and not through the minutes of the pre bid meeting.
11. **UNSOLICITED POST BID MODIFICATION**
Bidders are advised to quote strictly as per terms and conditions of the Bidding Document. After tender submission due date & time/ extended due date & time (as the case may be) the bidders shall not make any subsequent price changes, whether resulting or arising out of any technical / commercial clarifications sought/allowed on any deviations or exceptions mentioned in the bid unless discussed and agreed by DAFFPL in writing.
12. EMD & Techno Commercial bid shall be opened on **October 13th, 2015 at 11:00 Hrs (IST)** in the presence of authorized representative of bidders (Restricted to one [1] person per bidder only) at the office of DAFFPL. Price Bid of only those bidders whose offer is found meeting both PQC & techno-commercially acceptable, shall be opened on a later date as per convenience of DAFFPL after intimation to the qualified bidders.
13. DAFFPL reserves the right to accept any tender in whole or in part or reject any or all tenders without assigning any reason. DAFFPL reserves right to accept any or more tenders in part. Decision of DAFFPL in this regard shall be final and binding on the bidder.

QUERIES AND CLARIFICATIONS: Any query or clarification with regard to this tender may please be referred to below address & phone nos. on any working day during office working hours

Mr M Vishnu Vardhan Project Officer Vishnu.vardhan@daffpl.in , bksingh@daffpl.in 8826000228	Mr V S Thakur (Consultant) Project Manager Virender.Thakur@mottmac.com 91-120-3992308
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14. **GOVERNING LAWS:** The laws of Union of India shall govern all matters concerning the tender. Any issue arising related to the tender or the selection process shall be adjudged by the courts in Delhi alone.



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15. A Pre-bid meeting is scheduled for **25/09/2015 at 14:30 Hrs IST** at the office of DAFFPL, New Delhi. All prospective bidders can participate in the same. Any clarification with regard to tender shall be sorted out during the pre-bid meeting.
- The purpose of the pre-bid meeting is to clarify any doubts of the BIDDER on the interpretation of the provisions of tender.
 - Bidder(s) are requested to submit their queries, mentioning form name, clause no. & clause, by a letter / e-mail to our office as per schedule in order to have fruitful discussions during the meeting.
 - All the Bidder(s) are requested to attend the pre-bid meeting to be held at DAFFPL Office as per schedule.
16. **Tender document can be purchased from our office located at Shahabad Mohammadpur at a cost of Rs 1000/- and also can be downloaded from our website www.daffpl.in.**
- A bidder who downloads the document from website has to submit a separate DD for an amount of Rs.1000/- along with the EMD document.**
 - Bidders who purchase the document from our office have to submit a DD for an amount of Rs.1000/- at the time of purchase.**
17. **Earnest Money Deposit (EMD) (also referred to as Bid Security):** Bidder shall be required to submit the Earnest Money Deposit (EMD), either in the form of Bank guarantee as per format (provided as Annexure) or PAY ORDER or BANK DRAFT (in favour of Delhi Aviation Fuel Facility Private Limited, payable at New Delhi) at our office. The EMD in either form has to be submitted on or before the due date & due time of bid submission of this tender with a covering note mentioning the tender no.
- The bidders not submitting EMD by due time & date shall be rejected & their bids shall not be evaluated further.
 - The EMD amount shall be 2.5 Lakhs INR**
 - Firms registered with National Small scale Industries (NSIC)/MSME of India are exempted from submission of bid security .Central Public Sector Enterprises of India and Firms registered with Nation Small Scale Industries Corporation (NSIC) of India are exempted from submission of Bid Security. Central Public Sector Enterprises are requested to give a self-declaration on their letter head to this effect. Bidders registered with NSIC of India are also requested to submit self-declaration on their letter head to this effect along with a copy of their Valid Registration certificate, specifying limit of volume and other details which should be submitted.

THE FORMS /ATTACHMENTS TO THIS TENDER ARE AS UNDER:

- Covering Note – CHAPTER: 1



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2. Instructions To Bidders - CHAPTER: 2
3. Bid-Qualification Criteria - CHAPTER: 3
4. BQC –List of Documents – CHAPTER: 4
5. General Purchase Conditions- CHAPTER: 5
6. Technical Specification Documents - **(Attached separately as Annexures I)**
7. Annexure attached are as follows:
 - Annexure II – DEVIATION SHEET
 - Annexure III – DECLARATION SHEET
 - Annexure IV – FORMAT FOR DRAFT BANK GUARANTEE IN LIEU OF BID SECURITY (EMD)
 - Annexure V - FORMAT DRAFT COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT/PERFORMANCE GUARANTEE
 - Annexure VI – FORM OF LETTER OF UNDERTAKING
 - Annexure VII – DECLARATION TO BE SUBMITTED ALONGWITH Technical BID
 - Price Bid

Thanking you,
Yours faithfully,
For DELHI AVIATION FUEL FACILITY (P) LTD.

Chief Executive Officer
DAFFPL, New Delhi



CHAPTER 2: INSTRUCTIONS TO BIDDERS

1. The bidder shall bear all costs associated with the preparation and submission of the bid and Owner will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
2.
 - Vendor is requested to submit their bids taking full notice of all the technical specifications, terms and conditions, forms & attachments to this tender. Bids must be submitted in Physical form only.
 - The authorized Indian representatives of foreign manufacturers submitting their offers shall ensure that the bids are submitted strictly as per the rules. Bids in Foreign Currency will not be accepted. If successful, order will be on Indian representative only. EMD shall also be submitted in Indian currency as per Clause mentioned above.
3. Owner reserves the right to accept / reject any or all bid qualification documents at their sole discretion without assigning any reason whatsoever.
4. Owner is not responsible for any delays from bidder end.
5. Owner reserves the right to make any changes in terms and conditions of purchase before due date of bid submission and to reject any or all bids received incomplete.
6. Undertaking by the bidder:
 - a. I/we hereby undertake that the statements made herein/information given in the bids through Physical Tendering system/annexure/forms referred are true in all respects and that in the event of any such statement or information being found to be incorrect in any particular, the same may be construed to be a misrepresentation entitling DAFFPL to avoid any resultant contract.
 - b. I/we further undertake as and when called upon by DAFFPL to produce, for its inspection, original(s) of the document(s) of which copies have been annexed hereto.
7. Owner, at its discretion reserves the right to verify information submitted by the bidders.
8. Bidder to submit documents/information to satisfy the bid qualification criteria. Bidders should also be in a position to produce further information as and when required by DAFFPL with in a time limit of 15 days.
9. DAFFPL reserves their right to negotiate the quoted prices with lowest bidder.



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10. Bidders would be qualified based on data and documents submitted by them.
11. Owner's decision on any matter regarding short listing of vendors shall be final and no corresponding in this regards will be entertained.
12. The vendors who are on IOCL/BPCL/DIAL holiday list or delisted will not be considered.
13. The bidder is expected to examine all instructions, forms, attachments, terms and specifications in the tender document. The entire tender document together with all its attachments thereto, shall be considered to be read, understood and accepted by the bidder, unless deviations are specifically stated seriatim by the bidder. Failure to furnish all information required in the tender document or submission of a bid not substantially responsive to the tender documents in every respect will be at bidder risk and may result in the rejection of his bid. The bidder scope of supplies as specified in the material requisition shall be in strict compliance with the scope detailed therein and in the bid document.
14. Bidders in their own interest shall ensure that they submit their bid, complete in all respects, well within the specified bid due date and time. No relaxation shall be given for delay due to any unforeseen event in submission of bid.
15. At any time prior to the bid due date, we may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bid document. The amendment will be notified through our portal www.daffpl.in to all prospective bidders and will be binding on them. In order to afford prospective bidder, reasonable time in which to take the amendment into account in preparing their bids, we may, at our discretion, extend the bid due date.
16. The bid prepared by the bidder and all correspondence/ drawings and documents relating to the bid exchanged by bidder and the owner shall be written in ENGLISH language, provided that any printed literature furnished by the bidder may be written in another language so long as accompanied by an ENGLISH translation, in which case, for the purpose of interpretation of the bid, the ENGLISH translation shall govern.
17. Declaration with the bid qualification criteria that bidder has not been banned or delisted by any Government or quasi Government agencies or Public Sector Undertaking (PSU) as per declaration format (provided as annexure) of the tender document should be submitted along with the bid.
18. Bidders are advised to submit bids based strictly on the terms & conditions and specifications contained in the tender document and not to stipulate any



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deviations. Each Bidder shall submit only one bid. A Bidder who submits more than one bid will be rejected. Alternative bids will not be accepted.

19. The Owner may, at its discretion, extend the bid due date, in which case all rights and obligations of the Owner and the Bidders, previously subject to the bid due date, shall thereafter be subject to the new bid due date as extended. The same will be hosted in the web site.
20. Bids shall be kept valid for 4 months from the bid due date. A bid valid for a shorter period shall be considered as non-responsive and rejected by the Owner. Notwithstanding above, the Owner may solicit the Bidder consent to an extension of the period of bid validity. The request and the responses thereto shall be made in writing. The EMD (bid security) shall also be accordingly extended.
21. Telex/ Telegraphic/ Telefax / E-mail offers will not be considered and shall be rejected.
22. No bid shall be modified subsequent to the due date & time or extension, if any, for submission of bids. Bidder(s) to note that Price changes after submission of bid shall not be allowed. In case any bidder gives revised prices/price implication, his bid shall be rejected. No bid shall be allowed to be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder. Withdrawal of a bid during this interval shall result in the forfeiture of Bidder s EMD.
23. Bids that do not meet the Bid qualification criteria as specified in the bid document shall be rejected. A bid with incomplete scope of work and/or which does not meet the technical requirements as specified in the bid document, shall be considered as non-responsive and rejected. Conditional bids will be liable for rejection.
24. The Owner will examine the bids to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed and whether the bids are generally in order.
25. The bids without requisite EMD and/or not in the prescribed Performa and the time limit will not be considered and bids of such bidder Bidder(s) shall be rejected.
26. PRICE EVALUATION CRITERIA: As award is on overall landed lowest basis, part offers will be rejected. Bidder has to quote for all items in a lot for us to consider them.
27. Prior to the expiration of period of bid validity, the owner will notify the successful bidder in writing or by e-mail, that his bid has been accepted. The Notification of



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Award will constitute the formation of the Contract. Delivery Period shall be counted from the date of notification of award (Letter/Fax/e-mail of Intent).

28. Any efforts by a bidder to influence the owner/ in the owner bid evaluation, bid comparison or contract award decisions may result in the rejection of their bid.
29. **ISSUE OF CONTRACT/ PURCHASE ORDER:** After the successful bidder has been notified that his bid has been accepted, DAFFPL will send to such bidder a detailed contract/purchase order incorporating all the terms and conditions agreed between the parties. Within 15 days of receipt of the detailed purchase order, the bidder shall sign and return to the owner the duplicate copy of the order as a token of their acknowledgement.
30. **Vigil Mechanism:** DAFFPL has developed the Vigil Mechanism to deal with references/ grievances, if any, that is received from bidders who participated / intends to participate in the tender. The details of the same are available on our website www.daffpl.in
31. **VERIFICATION BY OWNER:** All statements submitted by bidder regarding experience, manpower availability, equipment and machinery availability etc., are subject to verification by the owner either before placement of order or after placement of order. If any data submitted by the bidder at the bid stage is found to be incorrect, the offer is liable to be rejected or the contract/order is liable to be terminated.
32. **SEALING & MARKING OF BIDS**
- A. Bids shall be submitted separately in THREE SECTIONS in sealed envelopes superscribed with the Bid Document number, bid due date and time, item and nature of bid as under:
- **SECTION - I (Envelope No. 1): Bid Security / EMD:**
Bid security in accordance with tender document.
 - **SECTION - II (Envelope No. 2): Technical Bid:**
 - a. Information and documentary evidence establishing bidder's claim for meeting qualification criteria as stipulated in IFB. This section/envelope should necessarily contain all the required back-up documents for Bid Qualification.
 - b. Technical bid complete with all technical and commercial details, covering letter and un-priced copy of price Schedule with prices substituted with 'QUOTED' or 'NOT QUOTED' or 'NOT APPLICABLE'. **Deviation sheet duly filled with deviations, if any, shall form part of technical bid.**



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- **SECTION - III (Envelope No. 3): Price Bid:**

- a. PRICE BID WITH FULL PRICE DETAILS. The price bid shall contain prices only in the prescribed price schedule formats, without any technical and commercial details. Technical specifications or commercial terms given in unpriced schedule will only be evaluated and the same will be binding on the Bidder. The bids shall be sealed and kept in a single envelope with marking as Section - III (Price Bid) / Envelope No. 3 : "Original"
 - b. The bidder shall quote the final prices (including taxes, Cess, duties and other levies etc) in the 'PRICE SCHEDULE FORMAT' of bid document ONLY. Prices quoted in any other format shall not be considered for evaluation.
 - c. The Price bid shall be kept in a larger envelope duly sealed and shall bear the name and address of the bidder.
- B. The envelopes containing Section -I, Section -II, Section -III of bid shall be enclosed in a larger envelope duly sealed and pasted and shall bear the name and address of the bidder.
- C. Bidder to note that if bid security / EMD (in the Proforma attached with these documents) in original and/or bid document fee (if the bid document is downloaded) is kept in any other envelope and not found in envelope no. 1, the offer of the bidder(s) will be REJECTED during opening.
- D. Bidder to note that prices are to be quoted in the format provided in the price schedule formats provided along with the tender without any conditions. Price bids submitted in any other format and conditional price bids will be liable to be rejected. Price bids received in open condition (not in sealed envelope) or kept in any other Section of the bid (i. e, Section - I or II) will also be liable for rejection.
- E. If the outer envelope is not sealed and not marked as required, then DAFFPL will assume no responsibility for the bid's misplacement or premature opening.
- F. Bidders in their own interest shall ensure that they send their bid complete in all respects well in time to reach the specified office within the specified bid due date and time. No relaxation shall be given for delay due to any unforeseen event in submission of bid.
- G. Central Public Sector Enterprises and Firms registered with NSIC are exempted from submission of Bid Security. Central Public Sector Enterprises are requested to give a self declaration on their letter head to this effect, which should be submitted in a sealed envelope marked as Bid Security.
- H. Bidders registered with NSIC are also requested to submit self declaration on their letter head to this effect along with a copy of their Valid



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Registration certificate, specifying limit of volume and other details which should be submitted in a separate sealed envelope no. 1 marked as Bid security.

- I. Bid Security strictly in the Proforma attached with these documents shall be submitted in Original along with the Bid. Bids received without original bid security, shall not be opened for evaluation.
- J. Tender document complete in all respects must be submitted in the tender box provided at the DAFFPL office before due date and time

33. DOCUMENTS COMPRISING THE BIDS

The bid prepared by the Bidder shall comprise the following components:

- I. **ORIGINAL BID SECURITY (Section - I):** Bidders are advised to instruct their banks not to post Bid Security directly to Owner as the same has to accompany with the bid.
- II. **TECHNICAL BID (Section -II):**
 - Documentary evidence establishing Bidder's claim for meeting qualification criteria as stipulated in the Bid Document.
 - Notarized Audited Annual Report of previous three financial years.
 - Documentary evidence establishing Bidder's eligibility to bid and that the offered Goods conform to the Bid Document.
 - Price Schedule (with Price figures blanked) completed in accordance with the requirements specified in the bid document.
 - Agreed Terms & Conditions duly filled-in.
 - Deviation Sheet, if any.
 - Declaration with the bid qualification criteria that bidder has not been banned or delisted by any Government or quasi Government agencies or PSU's.
 - Any other information/details/documents/data required as per Bid Document.
 - Parent Company Guarantee, if applicable
- III. **PRICE BID (Section -III):** Bid Form and Price Schedule (Both given along with tender) duly filled in.

34. BID FORM & PRICE SCHEDULE

The bidders shall complete the Bid Form and appropriate Price schedule furnished of Bid Document, indicating the required information for all quoted items.

35. FORMAT AND SIGNING OF BID

- a. The Bidder shall prepare required number of copies of the bid, clearly marking each 'Original Bid' and 'Copy of Bid' as appropriate. In the event of



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- any discrepancy between them, the 'Original Bid' shall govern.
- b. The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the bidder on all pages of the bid. Such authorization shall be indicated by written Power of Attorney accompanying the bid. The name and position held by each person signing must be typed or printed below the signature. The person or persons signing the bid shall initial all pages of the bid, except for unamended printed literature.
 - c. The complete bid shall be without alterations, interlineations or erasures, except as may be necessary to correct errors made by the Bidder, in which case such corrections shall be rewritten & initialed by the person or persons signing the bid.
 - d. All the pages of the price bid shall be signed by the authorized signatory. In case all the pages of the price bid are not signed, the bid shall be rejected.

36. OPENING OF BIDS

Bids will be opened by Owner at DAFFPL Office, New Delhi, in the presence of bidders/bidders authorized representatives available on the opening date and time (duly authorized by a competent person and having the letter of authority).

- a. **BID SECURITY / EMD (SECTION-I) AND TECHNICAL BID (SECTION-II):**
 - I. On the day and time of bid opening, Bid security (Envelope 1) and Technical Bid (Envelope 2) shall be opened in presence of bidders.
 - II. The Bidder's representatives, who are present, shall sign a register/attendance sheet evidencing their attendance.
 - III. The Bidder(s) names, presence or absence of requisite bid security will be announced at the opening.
 - IV. Bidder (s), whose bids are not opened for any reason, including non receipt of original bid security, will not be allowed to be present during bid opening.
- b. **PRICE BID OPENING (SECTION -III):**
 - I. Only those bidders whose bids meet the qualification criteria and are technically/commercially acceptable shall be called for opening of Price bid (Envelope 3) at a later date, informed in advance.
 - II. The Bidder's representatives, who are present, shall sign a register/attendance sheet evidencing their attendance.
 - III. Bidder(s), whose bids are not opened for any reason, will not be allowed to be present during bid opening.

37. EVALUATION OF BIDS

- a. Qualification of Bidder: The experience details and financial & technical capabilities of the bidder(s) shall be examined to determine whether the



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bidder(s) meet the Bid Qualification Criteria mentioned in the INVITATION FOR BIDS (IFB).

- b. The Owner will examine the bids to determine whether they are complete, any computational errors have been made, whether the documents have been properly signed and whether the bids are generally in order.
- c. The bids without requisite Bid Security and/or not in the prescribed proforma will not be considered and bids of such bidder Bidder(s) shall be rejected.
- d. To assist in the examination, evaluation and comparison of technical bids, the owner/ may, at its discretion, ask the Bidder clarifications on the bid. The request for such clarifications and the response thereto shall be in writing.
- e. Prior to the evaluation and comparison of the bid, the owner will determine the substantial responsiveness of each bid to the bidding documents. For the purpose of this Article, a substantially responsive bid is one, which conforms to all the terms and conditions of the bidding document without material deviations or reservations. A material deviation or reservation is one which affects in any substantial way the scope, quality, or performance of the works or which limits in any substantial way, inconsistent with the bidding document, the DAFFPL's rights or Bidder's obligation under the contract and retention of which deviation or reservation would affect unfairly the competitive position of other bidders presenting substantially responsive bids. The owner's determination of bid responsiveness is to be based on the contents of the bid itself without recourse to the extrinsic evidence.
- f. A bid determined as substantially non-responsive will be rejected by the Owner and shall not subsequently be allowed by the Owner to be made responsive by the Bidder by correction of the non-conformity.
- g. The Pumpsets shall be supplied from the same Manufacturing unit as specified in the Documents submitted by Bidder in Compliance to BQC(Bid Qualification Criterion).

Note:

- 1) The Bid Shall be submitted in English Language Only**
- 2) For any Document submitted in any language other than English, the translation copy in English language shall be submitted.**



CHAPTER 3: BID-QUALIFICATION CRITERIA:

BQC REQUIREMENT	BIDDER RESPONSE
1. ESTABLISHED MANUFACTURER	
Vendor shall be a regular manufacturer and supplier of the specified equipment/ package. Bidder to give complete details of their manufacturing unit/s & to submit necessary documents in support of same	
2.ORDER ONLY ON MANUFACTURING COMPANY-	
Authorized Indian representative of foreign manufacturer is also permitted to quote / participate on behalf of the foreign manufacture. All documents to be submitted should pertain to the foreign manufacture only along with relevant authorization / warranties / guarantees from foreign manufacture. However, if successful, the purchase order will be placed on the Indian representative company only	
3. OWN FACILITY FOR MANUFACTURING	
Supply of entire tendered quantity for Fire Water Pump Sets shall be from bidders own manufacturing facility	
4. COMPLIANCE CERTIFICATE	
Centrifugal Pump set testing and inspection shall strictly as per applicable Codes. "Vendor" shall provide the compliance certificate.	
5.TWO YEARS PROVEN EXPERIENCE OF SUPPLY	
The vendor should be having minimum 2 years proven supply experience of specified equipment/ package (2 years shall be reckoned prior to the due date of bid submission). Vendors should provide valid proof of pump sets supplied from vendors same manufacturing location from which the vendor proposes to supply against this tender. The acceptable proof is copy of Excise/vat Invoices / custom documents and the related Purchase orders, two years prior to due date of bid submission.	
6. MINIMUM QUANTITY SUPPLIED IN THE PAST	
Vendor in the last five years should have engineered, manufactured, tested, supplied and commissioned at least TEN (10) nos. of identical or similar packages (or higher capacity packages) in terms of capacity, pressure, purity and at least FIVE (5) of these packages shall have completed the continuous trouble free operations of a minimum 8000 Hrs. as on the bid due date in the last three (3) financial years. Vendor to give documentary evidence (confirmation from the purchaser)	



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7. AFTER SALES SUPPORT	
The vendor shall have full-fledged service support set-up in India or have appropriate arrangements for the same with the established local reputed company	
8.FINANCIAL CAPACITY	
The vendor or their group companies should have achieved a minimum average Annual financial turnover as per Audited Balance Sheet and Profit & Loss account, in the last three accounting years, ending March 2015 prior to due date of bid submission, as indicated below: Other than MSME: INR 1.0 Crore For MSME as per CTE Guidelines	
Vendor to submit their Audited Balance Sheets & Profit & Loss accounts for last 3 years, ending 31st march 2015 of the previous financial year prior to the due date of bid submission.	
Group companies are defined as parent company and all their subsidiaries. Subsidiaries are those companies in which the parent company holds 51% or more of the equity share capital.	
10. Positive Net Worth	
Vendor's Net worth as per latest Audited Balance Sheet should be positive.	

OTHER INFORMATION OF PQC

1. Parties who are affiliates of one another can decide which Affiliate will make a bid. Only one affiliate may submit a bid. Two or more affiliates are not permitted to make separate bids directly or indirectly. If 2 or more affiliates submit a bid, then any one or all of them are liable for disqualification. However up to 3 affiliates may make a joint bid as a consortium, and in which case the conditions applicable to a consortium shall apply to them.
"Affiliate" of a Party shall mean any company or legal entity which:
 - a. Controls either directly or indirectly a Party, or
 - b. Which is controlled directly or indirectly by a Party; or
 - c. Is directly or indirectly controlled by a company, legal entity or Partnership which directly or indirectly controls a Party. "Control" means actual control or ownership of at least a 50% voting or other controlling interest that gives the power to direct, or cause the direction of, the management and material business decisions of the controlled entity.
2. Bids may be submitted by:
 - a. A single person/ entity (called sole bidder);
 - b. A newly formed incorporated joint venture (JV) which has not completed 3



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- financial years from the date of commencement of business;
- c. A consortium (including an unincorporated JV) having a maximum of 3 (three) members;
 - d. An Indian arm of a foreign company.
3. Fulfillment of Eligibility criteria and certain additional conditions in respect of each of the above 4 types of bidders are stated below, respectively:
- a. The sole bidder (including an incorporated JV which has completed 3 financial years after date of commencement of business) shall fulfill each eligibility criteria.
 - b. In case the bidder is a newly formed and incorporated joint venture and which has not completed three financial years from the date of commencement of business, then either the said JV shall fulfill each eligibility criteria or any one constituent member/ promoter of such a JV shall fulfill each eligibility criteria. If the bid is received with the proposal that one constituent member/ promoter fulfils each eligibility criteria, then this member/promoter shall be clearly identified and he/it shall assume all obligations under the contract and provide such comfort letter/guarantees as may be required by Owner. The guarantees shall cover inter alia the commitment of the member/ promoter to complete the entire work in all respects and in a timely fashion, being bound by all the obligations under the contract, an undertaking to provide all necessary technical and financial support to the JV to ensure completion of the contract when awarded, an undertaking not to withdraw from the JV till completion of the work, etc.
 - c. In case the bidder(s) is/are a consortium (including an unincorporated JV), then the following conditions shall apply:
 - I. Each member in a consortium may only be a legal entity and not an individual person;
 - II. The Bid shall specifically identify and describe each member of the consortium;
 - III. the consortium member descriptions shall indicate what type of legal entity the member is and its jurisdiction of incorporation (or of establishment as a legal entity other than as a corporation) and provide evidence by a copy of the articles of incorporation (or equivalent documents);
 - IV. One participant member of the consortium shall be identified as the "Prime member" and contracting entity for the consortium;
 - V. This prime member shall be solely responsible for all aspects of the Bid/ Proposal including the execution of all tasks and performance of all consortium obligations;
 - VI. The prime member shall fulfill each eligibility criteria;
 - VII. a commitment shall be given from each of the consortium members in the form of a letter signed by a duly authorized officer clearly identifying the role of the member in the Bid and the member's



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- commitment to perform all relevant tasks and obligations in support of the
- VIII. Prime/lead member of the Consortium and a commitment not to withdraw from the consortium;
 - IX. No change shall be permitted in the number, nature or share holding pattern of the Consortium members after pre-qualification, without the prior written permission of the Owner.
 - X. No change in project plans, timetables or pricing will be permitted as a consequence of any withdrawal or failure to perform by a consortium member;
 - XI. No consortium member shall hold less than 25% stake in a consortium;
 - XII. Entities which are affiliates of one another are allowed to bid either as a sole bidder or as a consortium only;
 - XIII. Any person or entity can bid either singly or as a member of only one consortium.
- d. In case the bidder is an Indian arm (subsidiary, authorized agent, branch office or affiliate) of a foreign bidder, then the foreign bidder shall have to full fill each eligibility criteria. If such foreign company desires that the contract be entered into with the Indian arm, then a proper back to back continuing (parent company) guarantee shall be provided by the foreign company clearly stating that in case of any failure of any supply or performance of the equipment, machinery, material or plant or completion of the work in all respects and as per the warranties/ guarantees that may have been given, then the foreign company shall assume all obligations under the contract. Towards this purpose, it shall provide such comfort letter/guarantees as may be required by Owner. The guarantees shall cover inter alia the commitment of the foreign company to complete the entire work in all respects and in a timely fashion, being bound by all the obligations under the contract, an undertaking to provide all necessary technical and financial support to the Indian arm or to render the same themselves so as to ensure completion of the contract when awarded, an undertaking not to withdraw from the contract till completion of the work, etc.



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CHAPTER 4: BQC DOCUMENTS BY VENDORS

LIST OF DOCUMENTS FOR BID-QUALIFICATION OF VENDORS		
1	Copy of approvals from any statutory body or equivalent, if applicable	
2	Details of the Manufacturing Facility	
3	Details of testing facility	
4	Certified list giving supply quantity details to meet minimum quantity supplied in the past criteria along with copies of Excise / VAT Invoices / Custom documents and the related purchase orders	
5	Audited Balance Sheets & Profit and Loss accounts for the previous 3 accounting years prior to the due date of bid submission	
6	Bank Guarantee in lieu of EMD / Demand Draft / Pay Order	
7	Declaration documents as per attached Annexure of the Tender	
8	Satisfactory Performance certificates from minimum 3 Installations / Terminals in India or Abroad	
9	Relevant authorization from foreign Manufacturer for their Indian representative if applicable	
10	Details of the agency / company in India who will be providing maintenance & service support OR declaration to set up Service centre in India on being awarded the order, as applicable	
11	Other Supporting Documents, if any	

Every page of attachments to be duly signed stamped before submitting the Tender.



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CHAPTER 5: GENERAL TERMS & CONDITIONS OF PURCHASE:

1. DAFFPL reserves the right to accept any tender in whole and reject any or all tenders without assigning any reason. DAFFPL also reserves the right to allow public enterprises (Central/State) Price / purchase /contract / service preference as admissible under the Indian Government Policy.
2. BID PRICES:
 - a) Prices shall be furnished strictly in the Price Bid format of the tender document.
 - b) Bidder should quote their lowest and best offered price. Prices so quoted will remain firm till satisfactory completion of order. The price will not be subjected to escalation for any reason whatsoever.
 - c) Bidders quoted prices shall be deemed to include entire Specification of Fire Water Pumpsets and all obligations and responsibilities to be carried out / executed by the Bidder as per terms of tender document. It is clearly understood by the Vendor that it is for the Vendor to ascertain and assess the applicable Acts/ Regulations/ Laws etc., entirely of their own. It is also for the Vendor to ascertain and assess the applicability of taxes, duties, levies etc. In case of any difference of opinion between Vendors proposal and interpretation by any tax/assessing (or similar) authorities, on the rate or terms and conditions related to taxes and duties etc., owners liability shall be strictly as per terms/provisions of the contract based on tender document and Vendors offer.
 - d) No other charges accept those mentioned in the tender document will be payable to vendor.
3. The materials should be properly packed so as to withstand all transit hazards. Materials are required to be dispatched by the vendor to the locations, on freight paid DOOR- DELIVERY CONSIGNEE COPY ATTACHED basis along with copies of Inspection release note & internal test certificates & other documents as mentioned elsewhere in this tender document.
4. All shipment shall be under deck unless carriage on deck is unavoidable.
5. Bidder to note that Special Packaging Requirement as in technical specifications of this tender. The materials should be properly packed so as to withstand all transit hazards (both ocean & inland transit).
6. Indian agent Commission will not be paid by the owner.
7. TAXES & DUTIES:
 - a) Bidder(s) quoted prices shall be inclusive of all taxes, duties, cess, levies etc.
 - b) The invoice should clearly mentioned that applicable Excise Duty, Education



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Cess or any other taxes charged and paid / payable on quoted item to enable the owner to claim MODVAT / Input credit.

- c) The statutory variation in Excise duty, Education Cess and Sales tax / VAT on finished goods and introduction of new tax, from bid due date till the contractual completion period shall be to owner account against submission of the documentary evidence. However, any increase in the rate of these taxes and duties beyond the contractual delivery period shall be to Seller account. Any decrease in the rate of these taxes and duties shall be passed on to the owner. Any additional excise duty due to increase in turn-over would be to seller account.
- d) It is for the Bidder to assess and ascertain the rate of excise duty, education Cess and sales tax/VAT applicable on quoted items. It is clearly understood that Owner will not have any additional liability towards payment of Excise Duty, Education Cess and Sales Tax/VAT which is based on Bidders wrong assessment / interpretation of applicability of such Excise Duty and/or education cess and / or Sales Tax/VAT.
- e) Successful bidder shall carry out its obligations towards services at site as mentioned in technical specifications without any extra charges.
- f) Octroi/Entry tax, if any, in the any state of India shall be directly paid by the vendor, if applicable.
- g) DAFFPL shall not be liable, in case the tax authorities assess the tax elements in a different way on account of any reason, whatsoever.
- h) Taxes and duties other than those specified in this document, if any, shall be included in the quoted prices and no separate reimbursement shall be made by DAFFPL.

8. Income Tax / Corporate Tax :

- a) As regards Income Tax, Surcharge on Income Tax or any other Corporate Tax payable by the Bidder for reason of the contract awarded, and / or on their expatriate personal, the Owner shall not bear any Tax liability whatsoever, irrespective of the mode of construction of contract / order. The Bidder shall be liable and responsible for payment of such tax, if attracted under the provision of Indian Income Tax Act.
- b) Bidder may note that if any tax is deductible at source as per Indian Income Tax Law, the same will be so deducted before releasing any payment to the Bidder and a TDS (Tax deducted at source) certificate will be furnished to the Bidder.
- c) Accordingly, Bidder shall have the responsibility to check and include such provision of taxes in the prices.
- d) In case of delay in delivery due to reasons attributable to Bidder, any new or additional taxes or duties levied by Statutory authorities during this period shall be borne by the Bidder.



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9. DELIVERY PERIOD:

The items covered in this enquiry are required to be delivered as per Delivery Schedule stipulated below.

a) DELIVERY PERIOD (FOR SUPPLY)

Total Order quantity of Pumpsets should be delivered within 05 months from date of notification of award.

b) Delivery Period shall be counted from the date of notification of award (Letter/Fax/e-mail of Intent) up to the Date of receipt of goods at defined locations.

10. EMD / BID SECURITY

a) The bidder shall furnish, as part of his bid, a bid security in original for the amount specified in the tender document by way of pay order, bank guarantee on Rs.100/-value non-judicial stamp paper or demand draft.

b) The bid security is required to protect the Owner against the risk of Bidders conduct, which would warrant the security forfeiture.

c) If bid Security / EMD is in the form of bank guarantee, it shall be in the form of irrevocable bank guarantee (in the format attached) issued by any Indian Scheduled Bank (other than Co-operative Bank) will be accepted.

d) Bid Security / EMD shall be issued in favour of M/s Delhi Aviation Fuel Facility (P) Limited, New Delhi. .

e) Unsuccessful bidders bid security without any interest will be discharged/ returned as promptly as possible, but not later than 60 days after the expiry of the period of bid validity prescribed by the Owner.

f) The successful bidder bid security without any interest will be discharged, upon the Bidder accepting the Contract/ Purchase Order and furnishing the Contract performance bank guarantee to DAFFPL.

g) The bid security may be forfeited:

i. If a bidder withdraws his bid during the period of bid validity or

ii. In the case of a successful bidder, if the bidder fails or refuses to:

➤ Accept the Purchase Order in accordance with agreed terms and conditions.

➤ Furnish Contract performance bank guarantee as per bid document/ Purchase Order.

iii. Detection of submission of false / forged documents and fraud.

h) Bid Security / EMD should be in favour of "Delhi Aviation Fuel Facility Private Limited", payable at New Delhi and submitted to the relevant office of DAFFPL as mentioned in covering note of the tender document. Covering letter to bid Security / EMD must indicate the tender number. This is essential to have proper co-relation at a later date. The bid security / EMD shall be strictly in the form provided in the bid document before the due date & time of bid submission.



- i) Central Public Sector Undertaking of Govt. Of India are exempted from furnishing the bid security. Firms registered with NSIC/ MSME are also exempted from furnishing bid security, provided they are registered for the tendered items and up to the monetary limit they intend to quote. Provided further that they submit a copy of the current and valid registration certificate for the quoted item and monetary value along with their bid(s). Owner reserves right to verify the registration certificate provided, with relevant authorities.

11. CONTRACT PERFORMANCE BANK GUARANTEE [CPBG]

- a) As a Performance security, the successful Bidder, to whom the work is awarded by, shall be required to furnish within 30 days of notification of award of contract (Letter/ Fax/e-mail of Intent) a Performance Bank Guarantee on RS.100/- VALUE non-judicial stamp paper in favour of the Owner (M/S DAFFPL).
- b) The Bank Guarantee amount shall be equal to TEN PERCENT (10%) of the Total Order Value and it shall guarantee the faithful performance of the Order in accordance with the Terms and conditions specified in the documents and specifications.
- c) CPBG shall be in the form of an irrevocable Bank Guarantee (in the format attached) issued by any Indian Scheduled Bank (other than Co-operative Bank).
- d) The Bank Guarantee shall be valid for the entire period of the Contract, namely, till the end of the guarantee / warranty period. The guarantee amount shall be payable on demand to the Owner.
- e) In case, the Contract Performance Bank Guarantee stated above gets reduced/ deducted for reasons of non-fulfillment of any Contractual obligations upto the completion of guarantee period, the bidder shall immediately take action to increase the value of Bank Guarantee to TEN PERCENT (10%) of the Contract price, to cover his guarantee/warranty obligations.
- f) The Performance Guarantee will be returned to the bidder without any interest at the end of the warranty / guarantee period subject to fulfillment of all contractual obligations by the Bidder. The bank guarantee shall have a claim period of 3 months beyond the contractual guarantee period.
- g) The proceeds of performance security shall be appropriated by the owner as compensation for any loss resulting from vendor's failure to complete his obligations under the contract to the prejudice to any of the rights or remedies the owner may be entitled to as per terms and conditions of contract. The proceeds of this performance security shall also govern the successful performance of goods and services and vendors all obligations during the entire period of contractual warrantee / guarantee.



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12. PRICE REDUCTION FOR DELAY IN DELIVERY:

- a) The delivery period quoted must be realistic & specific. The inability of successful bidder to execute orders in accordance with the agreed delivery schedule will entitle DAFFPL, at its options, to:
- b) Accept delayed delivery at prices reduced by a sum equivalent to half percent (0.5%) of the value of any goods not delivered for every week of delay or part thereof, limited to a maximum of 10% of the total order value. Date of receipt of materials at owners premises shall be considered for calculation of price reduction
- c) The price reduction clause shall become applicable for deliveries made beyond the schedule delivery period of six months.

13. INSURANCE

Supplier shall carry and maintain any and all statutory insurance(s) required under Indian Laws and Regulations, including Workmen compensation Act/ESI/Third party liabilities etc. and insurances for their personnel engaged in performance of the work at their own cost.

14. INSPECTION:

- a) Material shall be inspected by owner or its representative before dispatch of material from bidder works. Charges for arranging & providing inspection facilities are entirely vendor responsibility and in no way should affect the delivery schedule.
- b) OWNER may, at its own expense, witness any test or inspection. In order to enable OWNER to witness the tests/inspections OWNER will advise the bidder in advance whether it intends to be present at any of the inspections.
- c) Even if the inspection and tests are fully carried out, the Vendor shall not be absolved from its responsibilities to ensure that the Material(s), raw materials, components and other inputs are supplied strictly to conform and comply with all the requirements of the Contract at all stages, whether during manufacture and fabrication, or at the time of Delivery as on arrival at site and after its erection or start up or consumption, and during the defect liability period. The inspections and tests are merely intended to prima-facie satisfy OWNER that the Material(s) and the parts and components comply with the requirements of the Contract. The Vendor s responsibility shall also not be anywise reduced or discharged because OWNER or OWNER s representative(s) or Inspector(s) shall have examined, commented on the Vendor s drawings or specifications or shall have witnessed the tests or required any chemical or physical or other tests or shall have stamped or approved or certified any Material(s).
- d) Although material approved by the Inspector(s), if on testing and inspection after receipt of the Material(s) at the location, any Material(s) are found not to be in strict conformity with the contractual requirements or specifications, OWNER shall have the right to reject the same and hold the Vendor liable for



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non-performance of the Contract.

15. UNLOADING & STACKING

Unloading & stacking will be arranged by consignee. However, advance information regarding expected date of delivery to Site In-charge must be given well in time for making unloading arrangements under advice to originator of ORDER.

16. PAYMENT TERMS

- a) Bidders to note that Advance Payment is not permissible in the contract.
- b) The following payment terms shall be applicable :
 - 80% payment will be released within 30th day from the receipt and acceptance of materials at site adjusting deductible if any and balance 20% after completion of supervision.
 - Supervision charges for Installation, Testing & Commissioning will be paid on Prorate basis as and when the Pumpsets are commissioned.

17. GUARANTEE/WARRANTY:

- a) Materials shall be guaranteed against manufacturing defects, materials, workmanship and design for a period of 12 months from the date of commissioning or 24 months from the date of dispatch whichever is later. Warranty for replacement of material / accessories should be provided free of charges at our premises. The above guarantee/warranty will be without prejudice to the certificate of inspection or material receipt note issued by us in respect of the materials.
- b) All the materials including components and sub contracted items should be guaranteed by the vendor within the warranty period mentioned above. In the event of any defect in the material, the vendor will replace / repair the material at DAFFPL concerned location at vendor risk and cost on due notice.
- c) Alternatively, DAFFPL reserves the right to have the material repaired / replaced at the locations concerned, at the vendors risk, cost and responsibility, in case, vendor does not replace / repair the material.
- d) The Vendor shall provide similar warrantee on the parts, components, fittings, accessories etc. so repaired and / or replaced.
- e) Vendor shall guarantee that the performance of the EQUIPMENT supplied under the CONTRACT shall be strictly in conformity with the specifications and shall perform the duties specified under the CONTRACT.
- f) RISK PURCHASE CLAUSE: We reserve the right to curtail or cancel the order either in full or part thereof if bidder fails to comply with delivery schedule and other terms & conditions of the order. DAFFPL also reserves the right to procure same or similar materials/equipment through other sources at vendor's entire risk, cost and consequences.

18. TEST & PERFORMANCE CERTIFICATES: Bidder shall furnish Material test and Performance Certificates for the materials along with the challans and invoice.



19. Only in the event of causes of Force Majeure occurring within the contractual delivery period and if they impede the performance of contract, the delivery dates shall be extended on receipt of application from the bidder / Owner without imposition of penalty. Only those causes which depend on natural calamities, civil wars, fire and national strikes which have duration of more than seven consecutive calendar days are considered the causes of force Majeure. The decision of Owner shall be final and binding on vendor.
20. The Vendor must advise the Owner by a registered letter duly certified by Local Chamber of Commerce or statutory authorities and Owner must advise the Vendor by a letter, the beginning and the end of the delay immediately, but in no case later than within 10 days of the beginning and end of such causes of Force Majeure condition as defined above. Provided further that if the performance in whole or part of any obligation under this contract is prevented or delayed by reason of any such event for period exceeding 60 days either party may at its option terminate the contract.
21. Repeat Order: DAFFPL reserves the right to place repeat order up to the order quantity within SIX MONTHS from the date of original order on mutual agreement basis.
22. Any reference to the Govt. Acts /Regulations etc. in the Bid Document is only indicative, and it is entirely for the bidder to ascertain the applicable Acts/Regulations.
23. Rejected material lying in Owner premises must be replaced within 60 days from date of final report on rejection of material.
24. RECOVERY OF SUMS DUE: Whenever, any claim against bidder for payment of a sum of money arises out of or under the contract or in any other form, the owner shall be entitled to recover such sums from any sum then due or when at any time thereafter may become due from the vendor under this or any other form and should this sum be not sufficient to cover the recoverable amount of claim(s), the vendor shall pay to DAFFPL on demand the balance remaining due.
25. PATENTS & ROYALTIES: The vendor shall fully indemnify owner and users of materials specified herein/supplied at all times, against any action, claim or demand, costs and expenses, arising from or incurred by reasons of any infringement or alleged infringement of any patent, registered design, trademark or name, copy right or any other protected rights in respect of any materials supplied or any arrangement, system or method of using, fixing or working used by the vendor. In the event of any claim or demand being made or action sought against Owner in



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respect of any of the aforesaid matter, the vendor shall be notified thereof immediately and the vendor shall at his/its own expense with (if necessary) the assistance of Owner (whose all expense shall be reimbursed by the vendor) conduct all negotiations for the settlement of the same and/or litigation which may arise thereof.

26. **LIABILITY CLAUSE:** In case where it is necessary for employees or representatives of the Vendor to go upon the premises of owner, vendor agrees to assume the responsibility for the proper conduct of such employees/representatives while on said premises and to comply with all applicable Workmen s Compensation Law and other applicable Government Regulations and Ordinances and all plant rules and regulations particularly in regard to safety precautions and fire hazards. If this order requires vendor to furnish labour at site, such vendors workmen or employees shall under NO circumstances be deemed to be in owner s employment and vendor shall hold himself responsible for any claim or claims which they or their heirs, dependent or personal representatives, may have or make, for damages or compensation for anything done or committed to be done, in the course of carrying out the work covered by the purchase order, whether arising at owner s premises or elsewhere and agrees to indemnify the owner against any such claims, if made against the owner and all costs of proceedings, suit or actions which owner may incur or sustain in respect of the same.
27. **COMPLIANCE OF REGULATIONS:** Vendor warrants that all goods/Materials covered by this order have been produced, sold, dispatched, delivered and furnished in strict compliance with all applicable laws, regulations, labour agreement, working condition and technical codes and statutory requirements as applicable from time to time. The vendor shall ensure compliance with the above and shall indemnify owner against any actions, damages, costs and expenses of any failure to comply as aforesaid.
28. **REJECTION, REMOVAL OF REJECTED GOODS AND REPLACEMENT:** In case the testing and inspection at any stage by inspectors reveal that the equipment, materials and workmanship do not comply with specification and requirements, the same shall be removed by the vendor at his/its own expense and risk, within the time allowed by the owner. The owner shall be at liberty to dispose off such rejected goods in such manner as he may think appropriate. In the event the vendor fails to remove the rejected goods within the period as aforesaid, all expenses incurred by the owner for such disposal shall be to the account of the vendor. The freight paid by the owner, if any, on the inward journey of the rejected materials shall be reimbursed by the vendor to the owner before the rejected materials are removed by the vendor. The vendor will have to proceed with the replacement of the equipment or part of equipment without claiming any extra payment if so required by the owner. The time taken for replacement in such event will not be added to the contractual delivery period.



29. NON-WAIVER : Failure of the Owner to insist upon any of the terms or conditions incorporated in the Purchase Order or failure or delay to exercise any rights or remedies herein, or by law or failure to properly notify Vendor in the event of breach, or the acceptance of or payment of any goods hereunder or approval of design shall not release the Vendor and shall not be deemed a waiver of any right of the Owner to insist upon the strict performance thereof or of any of its or their rights or remedies as to any such goods regardless of when such goods are shipped, received or accepted nor shall any purported oral modification or revision of the order by DAFFPL act as waiver of the terms hereof. Any waiver to be effective must be in writing. Any lone incident of waiver of the any condition of this agreement by DAFFPL shall not be considered as a continuous waiver or waiver for other condition by DAFFPL.
30. NEW & UNUSED MATERIAL: All the material supplied by the vendor shall be branded new, unused and of recent manufacture.
31. CANCELLATION:
- a) DAFFPL reserves the right to cancel the contract/purchase order or any part thereof through a written notice to the vendor if –
 - i. The vendor fails to comply with the terms of this purchase order/contract.
 - ii. The vendor becomes bankrupt or goes into liquidation.
 - iii. The vendor fails to deliver the goods on time and/or replace the rejected goods promptly.
 - iv. The vendor makes a general assignment for the benefit of creditors.
 - v. A receiver is appointed for any of the property owned by the vendor.
 - vi. Any other conditions where owners commercial interest get affected.
 - b) Upon receipt of the said cancellation notice, the vendor shall discontinue all work on the purchase order matters connected with it. DAFFPL in that event will be entitled to procure the requirement in the open market and recover excess payment over the vendor s agreed price if any, from the vendor and also reserving to itself the right to forfeit the security deposit if any, made by the vendor against the contract. The vendor is aware that the said goods are required by DAFFPL for the ultimate purpose of materials production and that non-delivery may cause loss of production and consequently loss of profit to the DAFFPL. In this-event of DAFFPL exercising the option to claim damages for non delivery other than by way of difference between the market price and the contract price, the vendor shall pay to DAFFPL, fair compensation to be agreed upon between DAFFPL and the vendor. The provision of this clause shall not prejudice the right of DAFFPL from invoking the provisions of price reduction clause mentioned aforesaid.
32. ANTI –COMPETITIVE AGREEMENTS/ABUSE OF DOMINANT POSITION : The Competition Act, 2002 as amended by the Competition (Amendment) Act, 2007 (the



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Act), prohibits anti- competitive laws and aims at fostering competition and at protecting Indian markets against anti- competitive practices by enterprises. The Act prohibits anti- competitive agreements, abuse of dominant position by enterprises, and regulates combinations (consisting of acquisition, acquiring of control and M&A) wherever such agreements, abuse or combination causes, or is likely to cause, appreciable adverse effect on competition in markets in India. DAFFPL reserves the right to approach the Competition Commission established under the Act of Parliament and file information relating to anti-competitive agreements and abuse of dominant position. If such a situation arises, then Vendors are bound by the decision of the Competitive Commission and also subject to penalty and other provisions of the Competition Act.

33. **ASSIGNMENT:** The Vendor can / does not have any right to assign his rights and obligations under these general purchase conditions without the prior written approval of DAFFPL.
34. **GOVERNING LAW:** These General Purchase Conditions shall be governed by the Laws of India.
35. **AMENDMENT:** Any amendment to these General Purchase Conditions can be made only in writing and with the mutual consent of the parties to these conditions.
36. The following expressions used in these terms and conditions and in the purchase order shall have the meaning indicated against each of these:
 - a) **OWNER**, Client, Purchaser, buyer : means DAFFPL
 - b) **VENDOR**, tenderer, Bidder, Contractor, Seller, Supplier, manufacturer stated anywhere in the tender document carry the same meaning: It means the person, firm or the Company / Corporation to bidding and shall include its successors and assigns.
 - c) **INSPECTOR/ TPIA:** Person/agency deputed by Owner for carrying out inspection, checking/testing of items ordered and for certifying the items conforming to the purchase order specifications..
 - d) **GOODS / MATERIALS:** means any of the articles, materials, machinery, equipments, supplies, drawing, data and other property and all services including but not limited to design, delivery, installation, inspection, testing and commissioning specified or required to complete the order.
 - e) **SITE / LOCATION:** means any Site where DAFFPL desires to receive materials anywhere in India as mentioned in tender
 - f) **CONTRACT**, Order or Purchase Order/CALL-OFF means the agreement for supply of goods/ materials for required quantity between Owner and Vendor, for a fixed period of time on mutually agreed terms and conditions.
 - g) The term MR means Material Requisition containing technical requirements and scope of work (technical), GPC means General Purchase Conditions containing commercial terms & conditions, PO means Purchase order issued after award of



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contract incorporating agreed deviations in MR, ATC means Agreed Terms & Conditions , RFQ means Request For Quotation.

- h) For the purpose of contract, the trade terms FOB, CFR and CIF, DAP shall have the meanings as assigned to them by INCOTERMS 2010 published by ICC, Paris.

37. REFERENCE FOR DOCUMENTATION :

The number and date of Collective Request for Quotation (CRFQ) must appear on all correspondence before finalization of Contract / Purchase Order.

After finalization of Contract / Purchase Order: The number and date of Contract /Purchase Order must appear on all correspondence, drawings, invoices, dispatch advices, (including shipping documents if applicable) packing list and on any documents or papers connected with this order.

38. ARBITRATION

- a) Any 'dispute or difference of any nature whatsoever, any claim, cross-claim, counterclaim or set off of the Owner against the Consultant or regarding any right, liability, act, omission or account of any of the parties hereto arising out of or in relation to this agreement shall be referred to the Sole Arbitration of the nominated Director of the Owner or of some Officer of the Owner who may be nominated by the nominated Director. The consultant will not be entitled to raise any objection to any such arbitrator on the ground that the arbitrator is an officer of the Owner or that he has dealt with the matters to which the contract relates or that in the course of his duties as an Officer of the Owner, he had expressed view on all or any other matters in dispute or difference. In the event of the arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, the nominated Director as aforesaid at the time of such transfer, vacation of office or inability to act may in the discretion of the nominated Director designate another person to act as arbitrator in accordance with the terms of the agreement to the end and intent that the original Arbitrator shall be entitled to continue the arbitration proceedings notwithstanding his transfer or vacation of office as an officer of the Owner if the nominated Director does not designate another person to act as arbitrator on such transfer, vacation of office or inability of original arbitrator. Such person shall be entitled to proceed with the reference from the point at which it was left by his predecessor. It is also a term of this contract that no person other than the nominated Director of the Owner or a person nominated by such nominated Director as aforesaid shall act as arbitrator hereunder. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to the agreement subject to the provisions of the Arbitration &



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Conciliation Act,1996 or any statutory modification or reenactment thereof and the rules made there under for the time being in force shall apply to the arbitration proceedings under this clause.

- b) The arbitrator shall have power to order and direct either of the parties to abide by, observe and perform all such directions as the arbitrator may think fit having regard to the matters in difference i.e. dispute, before him. The arbitrator shall have all summary powers and may take such evidence oral and/or documentary, as the arbitrator in his absolute discretion thinks fit and shall be entitled to exercise all powers under the Indian Arbitration & Conciliation Act 1996 including admission of any affidavit as evidence concerning the matter in difference i.e. dispute before him.
- c) The parties against whom the arbitration proceedings have been initiated, that is to say, the Respondents in the proceeding, shall be entitled to prefer a cross claim, counter claim or set off before the Arbitrator in respect of any matter in issue arising out of or in relation to the Agreement without seeking a formal reference of arbitration to the nominated Director/officer for such counter-claim, or set off and the Arbitrator shall be entitled to consider and deal with the same as if the matters arising therefore has been referred to him originally and deemed to form part of the reference made by the nominated Director/officer.
- d) The arbitrator shall be at liberty to appoint, if necessary any accountant or engineering or other technical person to assist him, and to act by the opinion so taken.
- e) The arbitrator shall have power to make one or more awards whether interim or otherwise in respect of the dispute and difference and in particular will be entitled to make separate awards in respect of claims of cross claims of the parties.
- f) The arbitrator shall be entitled to direct any one of parties to pay the costs to the other party in such manner and to such extent as the arbitrator may in his discretion determine and shall also be entitled to require one or both the parties to deposit funds in such proportion to meet the arbitrators expenses whenever called upon to do so.
- g) The parties hereby agree that the courts in the city of Delhi alone shall have jurisdiction to entertain any application or other proceedings in respect of anything arising under this agreement and any award or awards made by the Sole Arbitration hereunder shall be filed (if so required) in the concerned courts in the city of Delhi only.

Technical Specifications for Fire Water Pump sets

Modrenisation of Fuel Farm IGI-Airport,
Shahbad Mohammadpur, New Delhi

August 2015

Delhi Aviation Fuel Facility Private Limited

Aviation Fuelling Station, Delhi International Airport, Shahbad Mohammadpur,
New Delhi-110061

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1 Introduction

1.1 General

Existing Fuelling System i.e. Fuel Farm of Delhi Aviation Fuel Facility Pvt. Ltd. (DAFFPL) for refueling aircrafts at IGI Airport, New Delhi is slated for modernization and up-gradation so as to conform to International Standards for receipt, storage and dispensing of Jet A1 fuel.

At DAFFPL fuel farm, Jet A1 fuel is brought aboveground/underground pipe from Oil Terminals of IOCL and BPCL and also by road tanker. This fuel is stored in the Cone Roof Vertical Tanks installed in the fuel farm. Presently, the aircrafts are being refueled by hydrant pumps through fuel underground Jet A1 fuel hydrant pipe line.

This document specifies the minimum acceptable requirements set by the Purchaser for design, engineering, procurement, fabrication, assembly, inspection, testing, commissioning and delivery to site of Diesel Engine Driven Centrifugal Pumps for and Electrically Driven Jockey Pumps for its installation within the Fuel Farm of DAFFPL, IGI Airport, New Delhi.

These pumps will be used to fight the fire in the event of any contingency arising due to fire incidence within the Fuel Farm.

1.2 Definitions

For the purposes of this document the following definitions shall be used.:

- Must/Shall the word 'shall' is to be understood as mandatory.
- Should the word 'should' is to be understood as strongly recommended.
- May the word 'may' is to be understood as indicating a possible course of action
- Purchaser Delhi Aviation Fuel Facility Pvt. Ltd., IGI Airport, New Delhi.
- Consultant Mott MacDonald Pvt. Ltd
- Supplier/Vendor Agency responsible for manufacture or supply of equipment and services to perform the duties specified by the Consultant.

1.3 Site Particulars

1.3.1 Location

The site is located at Shabad Mohammadpur adjoining to Indira Gandhi International Airport, New Delhi. The site is approachable by road.

1.3.2 Environmental Design Parameters

Table 1.1: environmental design parameters

Site address		1st Floor, Wing "A", T-III Project Office, IGI Airport, New Delhi-110037
Project		Delhi Aviation Fuel Facility Private Limited
Nearest Railway Station	:	New Delhi Railway Station
Nearest Airport	:	Indira Gandhi International Airport, New Delhi
Altitude	:	237 m
Operating Max. Temperature	:	48.4 °C
Operating Min. Temperature	:	-2.2 °C
Design Temperature	:	55 °C
Humidity, Maximum	:	100 %
Humidity, Minimum	:	25 %
Maximum Rainfall	:	20-30 mm in one hour duration
Designed Wind Velocity	:	47 m/s
Barometric Pressure	:	0.98 bar
Seismic Zone	:	Zone IV as per IS:1893

1.3.3 Design Temperature

The Maximum Design is to be considered with respect to above environmental design parameters given in table 1.1.

1.3.4 Battery limits

- a. *The basis of the this tender document is on the philosophy that along with 7 pump-sets (5 DE driven main + 2 Jockey) supplies, each bidder shall also furnish all required all electro-mechanical items to commission the pump-sets in present of successful bidder commissioning supervisor. However, RO water & diesel oil for all the DE (diesel engine) sets air cooled radiator tube side & diesel tank respectively shall be arranged by Owner's Contractor.*
- b. Any of the items specifically not mention here or elsewhere in this tender but specifically covered as per price schedule shall be part of the requirement as per this tender.
- c. Any of the items specifically not mention here or elsewhere in this tender but specifically required to commission the pump-sets shall be part of the supplies of each bidder.
- d. Companion Flanges with nut-bolt-gaskets & fasteners for Pump set suction & discharge nozzles.
- e. Companion flanges with nut-bolt-gaskets & fasteners for SRV / PRV valve inlet, outlet and by-pass connections.
- f. Anchor fixing bolts, wedges for its use during the erection for each pump-set.
- g. Recommended commissioning / Start-up Spares & two years maintenance spares for each category of pump-set (listing is required in the bid).
- h. Special tools if required tool-kit common to each category of pump-set.

- i. Supervision of Installation & commissioning services per diem rate.
- j. Exhaust flue gas duct shall be in bidder scope based on the attached drawing including crown piece (if applicable), expansion joint/s, silencer/s shall supplied by each bidder scope including the insulation & cladding complete.
- k. First fill lubricants / oil for all the pump-sets (DE & motor driven).
- l. For technical person supervision services, the installation of pump-set, battery limit shall be DAFFPL's fuel farm at Shabad Mohammadpur, IGI Airport, and New Delhi fire water pump-house only.
- m. Complete MCC as per the specifications.
- n. Only 215 VAC Battery chargers with minimum 12 m / as required (refer the drawing copper flexible armoured cable for each DE driven pump-set.
- o. Horizontal, single wall, C. S. diesel storage tank for each DE driven pump-set with net capacity of net (excluding free board & dead volume) **6 hour** running diesel consumption & its associated piping & valves etc. as described in this tender document.
- p. With supply of all consumable for the double earthig strips grid in the pump-room all pumps, local panel, PBS (push button stations) & right up to earthing pit located out-side the pump-room.

1.3.5 Qualification Criteria

- a. The Vendor shall have the single point responsibility for the complete work.
- b. The Vendor shall be a regular manufacturer and supplier of the specified equipment/ package.
- c. Vendor in the last five years should have engineered, manufactured, tested, supplied and commissioned at least TEN (10) nos. of identical or similar packages (or higher capacity packages) in terms of capacity, pressure, purity and at least FIVE (5) of these packages shall have completed the continuous trouble free operations of a minimum 8000 Hrs. as on the bid due date in the last three (3) financial years. Vendor to give documentary evidence (confirmation from the purchaser).
- d. The listing of these sr. no. 3 data shall also have 'start date / end date / value in In. INR. / US \$' for their executed ordered of last 10 years as well as current year data with 'start date / scheduled end date / value in INR. / US \$'.
- e. The vendor shall have full-fledged service support set-up in India or have appropriate arrangements for the same with the established local reputed company.
- f. The offered packages shall be of proven make from the existing production range of the centrifugal pumps manufacturer and must meet performance requirement as stated in the specifications.
- g. The vendor shall be required to submit the documentation and proof for above requirements and purchasers may at his discretion make additional checks for the same.

1.3.6 Bid Submission

- a. Two copies of bid are to be submitted in a separate sealed envelope, super scribed with the item and due date.

- b. The equipment / package are to be offered on lump-sum turnkey (LSTK) price basis as per Price Preambles Fire water pump. The per diem rate for the services of erection & commissioning supervisor shall also be furnished.
- c. The rates for mandatory spares for 2 years shall also be furnished separately & shall be also ordered separately by owner.
- d. Vendor shall clearly mention whether equipment shall be transported in fully assembled condition or in a knocked down condition and to be assembled at site. Vendor shall punch match marks to avoid confusion at site.
- e. Bids through Telex / Fax/ E-mail are NOT acceptable; however, clarification / confirmation shall be through mail only.
- f. Vendors are advised to quote strictly as per terms and conditions of the tender documents and clearly stipulate any deviations / exceptions or alternate design. The deviations / exceptions shall be listed separately for each specification / document with cross-references and proper reasons for the deviations / exceptions. In case of any deviation not listed under the 'List of deviations / exceptions to the specifications' but appear in other part of the bid, the same shall not be considered / applicable.
- g. Rates for AMC shall be given separately as an attachment and shall be valid for 1 year from the date of PO placement for supply of pumps for with & without consumable as per price schedule.

1.3.7 Area Classification

Classified Non-Hazardous

2 Scope of Work

2.1 Scope of Work

1. This specification covers design, manufacture / fabrication, procurement, assembly, testing, packing, transportation, supply and delivery of diesel engine driven pumps and electrical driven jockey pumps including prime mover, coupling, base plate and accessories as specified in data sheet.
2. The Supplier shall supply the pump set as described herein and in accordance with the quantities, size, features, type and accessories as detailed including supply of prime mover.
3. The Supplier shall supply but not limited to the additional loose supply items & complete MCC package as per the price preamble attached with this tender document.
4. Special tool- kit, commissioning spars, 2 years recommended spare parts for trouble free operation & maintenance of the pump including prime mover. Each bidder to submit the listing
5. The following drawings shall be submitted for approval after placement of order.
 - i. Outline and general arrangement drawings incorporating all principal dimensions and also foundation design data for pump set.
 - ii. Sectional drawing of each pump and diesel engine incorporating data on materials of construction.
 - iii. Predicted performance curves for pumps.
 - iv. Static and dynamic loads.
6. All drawings, load data and other information to be furnished for Owner approval shall be progressively submitted in three (3) copies and the entire submission of documents completed within a month's time from the date of Owner's telex / letter of acceptance.

The approval / comments, if any, of/on the drawings shall be communicated by Owner within a week of receipt of the same. Changes, if any in the drawings have to be incorporated and submitted to owner for their record.

Approval of supplier's drawings by Owner shall not relieve the supplier of any responsibility covered by the requirement of the Contract.

7. The supplier shall get the equipment/s inspected by approved Third Party agencies before dispatch of the equipment/s. The approved agencies for Third Party Inspection are DNV, Lloyds, EIL, IRS, BVQI.
8. The supplier shall supply operation and maintenance manuals along with the equipment. The manuals shall meet the following requirements:
 - i. The instruction manuals shall present the categories of information in practical, complete and comprehensive manner prepared for use by operating and/or maintenance personnel.
 - ii. Instructions for initial installation.
 - iii. Instructions for operation, maintenance and repair.
 - iv. Recommended inspection points and periods of inspection.

- v. Ordering information for all replaceable parts.
 - vi. Lubrication chart.
 - vii. Drawings and other illustrations shall be included or copies of drawings shall be bound in the manual. Test, adjustment and calibration information as appropriate shall be included and shall be identified to the specific equipment. Safety and warning notices and installation, maintenance and operating cautions shall be emphasized.
 - viii. A parts list shall be included showing part nomenclature, manufacturer's part number and/or other information necessary for accurate identification and ordering of replacement parts.
 - ix. If a standard manual is furnished covering more than the specific requirement purchased, the applicable model No., parts No. and other information for the specific equipment purchased shall be clearly identified.
 - x. The instruction manual shall include a list of all special tools and tackles furnished with complete drawings and instructions for use of such tools and tackles.
9. The supplier shall furnish list of special tools required for erection and maintenance.
10. Other miscellaneous works
- a. Initial visit of service representative and finalization of pump skid layout, fuel piping routing, fuel tank positioning, panel positioning, cable routing, power cable requirement for local panel, expansion joint/s, silencer/s, crown piece (if applicable), exhaust pipe location etc. and other details and freezing of layout plan for pump, engine and accessories and reconciliation of materials received at site to identify missing items, if any.
 - b. During final visit, supervision of commissioning work has to be carried out by the vendor. The written intimation to the vendor shall be given by owner for commissioning visit and the vendor shall ensure that their personnel is available at site within a week from the date of intimation.
 - c. The fuel pipe sizing and end connection should be advised in advance.
 - d. Flexible hose with fittings from MS pipe to engine to be decided as standards of OEM.
 - e. Cable from Panel to Batteries to be kept as 2 runs of @ 12 or **as required** length (for working and standby battery set)
 - f. All consumables for engine for initial commissioning to be supplied by the party. - Initial charging of batteries to be arranged by the party.
 - g. Party has to arrange for suitable cladding of the exhaust pipe during commissioning.
 - h. Foundation drawing, bolt size and numbers, grouting method etc. should be advised in advance after order placement. The scope of supply includes supply of foundation bolts.
 - i. The scope also including brief training of the working personnel at site about predictive maintenance, do's & don'ts, daily checks etc.
 - j. Matching flange with studs, nuts and gasket has to be supplied by the party.
 - k. 2 Nos. Pressure gauges with 0-16 kg/cm² range per pump to be supplied by the party.

- l. All other accessories between pump, engine, local panel and fuel tanks which are not mentioned specifically but required for successful commissioning of the system have to be supplied by the party.
- m. The fire water system will be automated by other agency, hence provision should be kept in the local panel for remote start at full speed, potential free contacts and other contacts for feedback & actuation.
- n. The main fire water DE driven pump-set engine shall be with single / double silencer/s, expansion joint/s & crown piece in the case of double silencer as per the requirements of engine. If the crown piece is not covered, then its plan-elevation, sections along with its isometric shall be supplied by each bidder along with technical bid in a-cad format only based on the indicative GAD of the pump-room attached with this tender.

2.2 Exclusions

- a. Erection of pump sets at site has been excluded from the scope of work of the tenderer.
- b. *However commissioning and supervision of erection of pumps are included in the scope of work of the tenderer.*
- c. *Also the 1st fill diesel oil to diesel tank & 1st fill R. O. water to air cooled radiator shall be arranged by Owner's Contractor at site.*

2.3 Specific Electrical Information

1. The Vendor shall ensure all supplied equipment and assemblies conform to the electromagnetic compatibility requirements [EMC] and associated guidelines.
 - a. Low Voltage Directive 72/23/EEC
 - b. Machine Directive 89/392/EEC
2. The vendor shall furnish details of Diesel Engines and electric motors as listed in data sheets. For each Pump set, the vendor shall furnish the above details with Tag Nos., for each Pump set clearly. The Pump set vendor shall stand for guarantee for the satisfactory performance of the Pump sets. Performance of the Pump set shall be tested without overloading the Diesel Engines and electric motors. Diesel Engines and electric motors shall be subject to test run.
3. All Pump sets, Diesel Engines and electric motors shall be properly aligned, bolted and doweled to the base plates by Pump set vendor. Trial runs of Pump sets shall be carried out for 72 hours continuous duty at site.
4. For electrical motor motors shall confirm to IE2 standard for high efficiency electric motors.
5. Each jockey pump-set motor shall be supplied with local push button station (PSB) & a common, suitable starter in MCC for both 3Ø jockey pump-sets offered & motorised 3% AFFF pump-set (by Owner; only feeder) & 3Ø spare (estimated @ 3Ø; 3 kw & 3Ø; 7.2 kw spare) feeder, plus with 14 nos. x 1Ø x 0.5 DPN MCCB/MCB for (5+5 DE local panel heater /charger & 1 siren, 1 spare, 2 jockey pump motor heaters (if above 30 kw rating) above FW pump-room pumps-sets.
6. These electrical items cost of jockey & one chemical concentrate pump-set, & Jockey PBS / DE driven main pumps. (2 # push button stations & 4 starters), starters cost shall also be furnished as asked in price preambles fire water pump.

7. The scope shall include, supply, Installation, testing (commissioning by others; owner) of MCC Panel.
8. Panel shall be dust & vermin proof cubicle type motor control centre (IP-55) fabricated from powder coated 16 SWG MS sheet comprising of, (cable outgoing and incoming top entry, Single Front panel) All details shall be as per LV Panel specification attached with this document.
9. In-comer (a to e) out-going (f to k)
 - a. One in-coming main isolation TPN MCCB of 250A rating.
 - b. One fully taped copper bus bar of 250A capacity in separate bus bar chamber and current density shall be 1.4A/mm² for copper bus-bar.
 - c. The panel shall be designed with 50 kA for 1 second. One square panel type Voltmeter reading 0-500 V with rotary selector switch for reading voltage between phases.
 - d. One panel type Ampere-meter (0-250A) with selector switch and CT.
 - e. Phase indication lights, Amp and Voltmeter shall be digital type only.
 - f. 1 No. (1w), 3 kW DOL starter for AFFF pumps, with MPCB, Contactor and with on-off indication lamp on panel door and connection facility for LCS.
 - g. 2 No. 160A TPN MCCB Feeders with 50 KW soft-starters (with inbuilt bypass) or DOL for Jockey pumps (1w+1s) with on, off, trip indication & metering circuit.
 - h. 1 No. 25A, MCCB for 3Ø spare feeder without starter for 7.2kw.
 - i. 14 Nos., 10A DP MCB Feeders for 10 DE panels (5, local panel lube oil heaters / 5, battery chargers), 1 siren, 1 spare, 2 jockey pump motors of above FW pump-house.
 - j. Colour coded internal wiring from main to bus bar, switchgear, starters, indicating lamps complete in all respects.
 - k. Separate marshalling cabinet for all incoming and outgoing feeder for control and communication termination.

2.4 Performance Guarantee

1. Materials shall be guaranteed against manufacturing defects, materials, workmanship and design for a period of 12 months from the date of commissioning or 24 months from the date of dispatch whichever is later. Warranty for replacement of material / accessories should be provided free of charges at our premises. The above guarantee/warranty will be without prejudice to the certificate of inspection or material receipt note issued by us in respect of the materials

2.5 Letter of Conformance

The Vendor has to submit a signed statement indicating compliance with the relevant Material Standard and Technical Specification.

3 Technical Specification

3.1 Technical Specification for TAC Approved Pumps

1. Approved make: Kirloskar, Mather & Platt, Varat, KSB
2. MATERIALS OF CONSTRUCTION FOR ALL THE PUMP PARTS SHALL BE IN ACCORDANCE WITH IS: 12469-1988(RE-AFFIRMED 2002) AND IS: 5120-1977(REAFFIRMED 2001)
 - a. Pumps shall be direct-coupled. Belt driven pumps will not be accepted.
 - b. Parts of pumps like impeller, shaft sleeve, wearing ring etc. shall be of non-corrosive metal as specified in the data sheet..
 - c. Pumps shall be capable of developing not less than 150% of rated capacity at a head of not less than 65% of the rated head. The shut-off head shall not exceed 120% of rated head.
 - d. The coupling between the prime mover and the pump shall allow each unit to be removed without disturbing the other.
 - e. For diesel engine driven fire water pump, the rated horse power of the diesel engine shall be higher of the following 'i & ii' values:
 - i. 20% in excess of the maximum horsepower required to drive the pump set at its duty point.
 - ii. The bhp required to drive the pump set at 150% of its rated discharge.
 - iii. For electrical driven fire water pump, the rating of the motor shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge.
 - iv. The pump shall be manufactured, tested and marked in accordance with IS 12469 – Specification for pumps for firefighting systems.
 - v. The pump rated capacity, total dynamic head and other performance requirements shall be as per the requirement indicated in the pump data sheet.
 - vi. The pump shall be designed to have the best efficiency at the specified duty point. The pump set shall be suitable for continuous operation at any point within the range of operation wherever specified.
 - vii. The pump shall have a continuous rising head capacity characteristic from the specified duty point towards the shut-off point, the maximum being shut-off. The horse power characteristic shall preferably be non-over loading type beyond the rated capacity point.
 - viii. The material of construction for components other than those specified in IS: 12469 & 5120 shall be as per standard of the pump manufacturer and shall be indicated separately.
 - ix. The pumps shall be suitable for parallel operation.
 - x. The pump set shall be designed in such a way that there is no damage due to reverse flow through the pump which may occur due to any mal-operation in the system.
 - xi. Pump along with its drive shall run smooth without undue noise and vibration.
 - xii. The main pump casing shall be horizontally split casing type and the jockey pump shall be end suction back pull out as specified in the data sheet enclosed.
 - xiii. Replaceable / renewable wearing rings shall be provided for both the casing and the impeller or for the casing only.
 - xiv. The complete assembled unit shall be designed so that all covered parts including shafts and bearings shall be easily accessible for inspection, maintenance and replacement with minimum down time.

- xv. The rotor assembly with impeller and shaft sleeve shall be dynamically balanced at 150% of operating speed.
- xvi. Pump casing shall be made of cast iron and tested at 150% of shut-off head or 200% of rated total head whichever is higher.
- xvii. In case of end suction back pull out type pump, flexible spacer coupling shall be provided. Coupling guard shall be provided for all types of pumps.
- xviii. Suction and discharge flanges shall be drilled in accordance with the standard IS 6392-1971.
- xix. The gland packing should be easily accessible for changing without having to disassemble the pump.
- xx. A common base plate mounting both for the pump and drive shall be furnished. The base plate shall be of rigid construction, suitably ribbed and reinforced. Base plate and pump supports shall be so constructed and pumping unit so mounted as to minimize misalignment caused by mechanical forces such as normal piping strain, hydraulic thrust etc. Suitable drip taps and drip lip shall be provided.

3.2 Prime Mover

The prime mover of the pump shall be diesel engine and/or AC electric motor as indicated in the data sheet.

1. AC ELECTRIC MOTOR: for Jockey Pumps See Enclosed Specification clause. 4.3.6 to 4.3.8.
2. DIESEL ENGINE : For Main Fire Fighting Pumps
 - a. **General**

Suitable diesel engine to drive the main fire water pump shall be supplied with all standard accessories. While rating the diesel engine, the site conditions and climatic data of the place of installation shall be taken into account. The engine shall be capable of delivering the rated output continuously. The diesel engine shall be multi-cylinder type four-stroke cycle with mechanical (airless) injection, cold starting type. All parts susceptible to temperature changes shall have tolerance for expansion and contraction without resulting in leakage, misalignment of parts or injury to parts.
 - b. **Diesel Engine**

The engine shall be of the compression ignition mechanical direct injection type, capable of being started without the use of wicks, cartridges, heater plugs or either, at an engine room temperature of 7°C and shall accept full load within 15 seconds from the receipt of the signal to start.

 - i. Naturally aspirated, supercharged or turbo-charged and either air cooled.
 - ii. Provided with an adjustable governor to control the engine speed within 10% of its rated speed under any condition of load up to the full load rating. The governor shall be set to maintain rated pump speed at maximum pump load.
 - iii. Provided with an in-built tachometer to indicate R.P.M. of the engine. Any manual device fitted to the engine that could prevent the engine from starting shall return automatically to the normal position. Engines, after correction for altitude and ambient temperature, shall have bare engine horsepower rating equivalent to the higher of the following two values:
 - iv. 20% in excess of the maximum brake horsepower required to drive the pump at its duty point.

- v. The brake horsepower required to drive the pump at 150% of its rated discharge.

Note: In the case of engines guaranteed by the manufacturers as capable of being overloaded by 10% at the rated speed for one hour in any period of 12 hours consecutive running, the value under (b) above may be considered as 10% lower than the horse power required to drive the pump-set at 150% of its rated discharge. The coupling between the engine and the pump shall allow each unit to be removed without disturbing the other.

c. Cooling System:

An air cooled radiator arrangement shall be for the engine heat rejection system.

d. Lubrication System

The lubrication system shall be self-contained with the following equipment:

- i. Sump: To store sufficient oil for circulation, suitable sump shall be provided in the engine.
- ii. Pump: Suitable pump shall be provided for forced lubrication.
Filter Lubricating oil cooler Interconnecting piping

e. In take Air Filtration:

The air intake shall be fitted with a filter of adequate size to prevent foreign matter entering the engine.

Each bidder to note no water shall be provision shall be made available for intake air cooling. Bidder shall confirm that the offered engine shall run satisfactorily with fire-room atmospheric air as per chapter 1.3 site particulars.

f. Exhaust System:

The exhaust shall be fitted with a suitable silencer and the total backpressure shall not exceed the engine maker's recommendation. When the exhaust system rises above the engine, means shall be provided to prevent any condensate flowing into the engine. All the hot parts located at the working level shall be insulated. The exhaust system has to be designed assuming stack height as per PCB norms.

The exhaust system shall include:

- i. Exhaust manifold.
- ii. Silencer: Sufficient length of straight pipe shall be provided after the exhaust silencer to leave the gases at sufficient height above the engine room and outside the room.
- iii. Expansion joint.

g. Engine Shut-Down Mechanism:

The fire water system will be automated, hence the engine should be suitable for starting in a predefined sequence, the shutting down operation shall be manual operated and the engine should return automatically to the starting position after use.

h. Fuel System:

- i. Fuel: The engine fuel oil quality and grade shall be as specified by engine makers. These shall be kept on hand at all times, sufficient fuel to run the engine on full load for six hours, in addition to that in the engine fuel tank.

- ii. Fuel tank: The fuel tank shall be of welded steel constructed to relevant Indian Standard for Mild Steel Drums. The tank shall be mounted above the engine fuel pump to give gravity feed unless otherwise recommended by the manufacturer. The tank shall be fitted with an indicator showing the level of the fuel in the tank. The inside surface of the fuel Tank shall be surface preparation to SA 2 1/2 and provided with suitable primer and epoxy finish paint. The capacity of the tank shall be sufficient to allow the engine to run on full load for 6 hrs net.

Note: There shall be a separate fuel tank and fuel feed / return pipe for each engine.

Fuel feed pipes: Any valve in the fuel feed pipe between the fuel tank and the engine shall be placed adjacent to the tank and it shall be locked in the open position. Pipe joints shall not be soldered and plastic tubing shall not be used.

i. Auxiliary equipment:

The following shall be provided:

- i. Fuel pump, fuel injection and control system for compression ignition.
- ii. A sludge and sediment trap.
- iii. A fuel level gauge and a level switch of approved make to signal fuel less than or equal to 30% of tank capacity.
- iv. An inspection and cleaning hole.
- v. A duplex filter between the fuel tank and fuel pump mounted in an accessible position for cleaning.
- vi. Means to enable the entire fuel system to be bled of air. Air relief cocks are not allowed; screwed plugs are permitted.

j. Starting Mechanism

Provision shall be made for two separate methods of engine starting viz.

- i. Automatic starting by means of a battery powered electric starter motor incorporating the axial displacement type of pinion, having automatic repeat start facilities initiated by a fall in pressure in the water supply pipe to the sprinkler and/or hydrant installation. The battery capacity shall be adequate for ten consecutive starts without recharging with a cold engine under full compression.
- ii. Manual starting by:
 - Electric starter motor (thru Push Button in Panel or Key in Local start station)

Note: The starter motor used for automatic starting may also be used for manual starting provided there are separate batteries for manual starting.

k. Governing System

The engine shall be provided with an adjustable governor capable of regulating engine speed within a range of 10% between shut-off and maximum load conditions of the pumps. The governor shall be set to maintain rated pump speed at maximum pump load. The governor shall

be capable of operating without external power supply.

l. Instruments

Instrument control and protection required for the safe operation of the engine shall be provided.

m. Codes and Standards for the Diesel Engine

IS:10002 – 1981 Specification for performance requirements for constant speed compression ignition (diesel) engines for general purposes (above 20kW).

n. Tools:

A standard kit of tools shall be provided with the engine and kept on hand at all times.

o. Testing at Manufacturer's Works

Pressure testing of casing, pump assembly etc. up to twice the working pressure or one and half times the shut off head of the pump whichever is higher.

The standards to be followed for testing of pumps shall include but not limited to IS: 9137, class C, (code for acceptance tests for centrifugal, mixed flow and axial pumps).

The diesel engine shall be tested at the manufacturer's works as per IS: 10002-1981.

p. Name Plate

A corrosion resistant nameplate shall be permanently attached to the pump and prime mover.

The nameplate shall be stamped with the following information:

- i. Manufacturer's name
- ii. Serial number
- iii. Model number
- iv. Rated capacity
- v. Rated head
- vi. Speed in rpm
- vii. Rating of the prime mover

q. Painting

The pump and prime mover shall be painted 'Fire red' (Shade No.536 as per IS:5) and suitably marked for identification.

r. Protection

- i. Unpainted exterior like machined surfaces shall be coated with suitable rust preventive.
- ii. All threaded openings shall be plugged and flanged openings shall be provided with full flange dia protective covers. The cover material shall be 4.5 mm thick metal plate bolted to the flange with a gasket in between using a minimum of four bolts.

s. Tags

Each pump-set shall be identified by its purchase order number and equipment number by means of a tag. Tags shall be attached to the pump-set with a stainless steel wire.

t. Packing

- i. The pump-set shall be packed, securely anchored and protected for domestic shipment by rail or truck. All un-amounted components shall be suitably crated and firmly attached to the main pump unit for shipment.
- ii. The purchase order number and equipment number shall be stencilled on the crate.
- iii. One complete set of installation, operation and maintenance instruction shall be packed with the pump-set.

u. Approved makes

Kirloskar Oil Engines/Ashok Leyland/Greaves/Cummins India/Ruston & Hornby

4 Control Panel/Local Indication/Alarm Annunciation/ Electrical

4.1 Controls

- a. On failure of main electric supply, the jockey pump motor shall get supply from plant emergency DG set. Jockey Fire pumps controller shall be provided with both main and DAFFPL DG supply.
- b. On actuation of low-pressure switch on the firewater discharge line, diesel engine driven fire water pump shall be started (manual stop) with a separate pressure switch signal for each pump-set in a sequential manner. However, provisions for the additional pressure switch signal shall be made in such a way that if any of the pump-set/s (limited to 2 max.) in the sequence is not started, the available stand by D. E. driven FW pump-set/s (limited to 2 max.) shall be started automatically.
- c. A single line diagram of control scheme (as per sr. 1 & 2) showing each diesel engine controller & jockey pump controller and motor control centre (MCC) panel for each electric power shall be furnished by contractor / vendor after award of the contract.

4.2 Pump Controller

- a. The pump controller must fulfil the requirement of NFPA 20 & National Electric Code guideline and shall have an ingress protection 55 (IP-55) rating.
 - b. Proposed motor control panel as per requirements of each jockey pump motor (2) / engine rating (5). Proposed incoming power supply for the control panel will be 415V, 3 phase, 4 wires, 50 Hz.
 - c. The electric motors shall be provided with DOL / Star Delta starters with emergency start facility of approved make having a minimum protection rating of IP 55 and suitable for :
 - 230 V \pm 10 % AC, 50 Hz \pm 5 %. The single phase supply shall be provided by the Owner at one point at site.
 - 415 V \pm 10 % AC, 50 Hz \pm 5 %. The three phase supply shall be provided by the Owner at one point at site.
 - d. The motor starters shall consists of electrically actuated contactors, The starter shall be complete with ON - OFF push buttons, timers & auxiliary contacts & shall be fully automatic. There shall be an indicating lamp with each of the pumps & an ammeter & selector switch with the fire pumps.
 - e. One hooter shall be provided on skid mounted Local Control panel of each main DE driven pump-set to alert in fire condition with provisions of acknowledging & resetting & in the event of any of the below mentioned fault conditions
 - f. Pump Running
 - i. Fire water pump(s) fail to start
 - ii. Jockey pump fail to start
 - iii. Low header pressure
 - iv. Low level in FW tank
 - v. Auto/Manual status of Pump
 - vi. Loss of power to electric motor
 - vii. Trouble on diesel engine (i.e. low oil pressure level, high engine jacket water temperature, shut down from over speed, battery failure and fail to start.
- Each Fire pump starting shall be having *provision to hook* its annunciated signal to electrical siren on the pump-room.
- The pump controller shall have provisions to interface with the BMS / DCS / PLC SCADA).

- Proposed Jockey pump shall start automatically upon receipt of a signal from pressure sensing line installed in the delivery line of the pump set.
- A single line diagram of control scheme and each diesel engine **microprocessor** based controller and Motor control panel & each electric motor shall be furnished by Contractor / Vendor after award of the contract.

4.3 Electrical

4.3.1 Diesel Engine Control Panel

Each diesel engine driven firewater pump shall have an independent control/panel. The panel shall consist of:

- a. Push buttons, Auto/manual selector switches circuits with auxiliary contactors and interlocks for starting/stopping/regulating of diesel engine pumps as per technological requirements mentioned elsewhere in the specification. Electronic timers shall be provided for achieving the logic of engine starting (for 3 trial starts) etc.
- b. Indication lamps and hour run meter.
- c. Provision of terminals for interlocking for start/stop of engine from header pressure switches
- d. Requisite no. of NO/NC potential free contacts and wire up to terminal block for external interlocking of the jockey pump.
- e. Two numbers additional (spare) auxiliary contactors (12/24 V DC 2no. +ve relays) for purchaser's use, fully wired up to terminal block.
- f. The control panel shall be floor mounted type sheet steel (2mm thk) enclosed, with hinged door completely wired with terminal block. The wiring shall be carried out with 2.5mm PVC insulated, copper wires. Earthing studs (2 Nos.) shall be provided at two ends of the panel.

4.3.2 Approved Makes

Metron Eledyne, Firetrol, Achyut, Gem, Sukrut.

4.3.3 Battery

Each diesel engine pump shall have independent 12/24 V DC lead acid batteries with teak wood stand and accessories, rated for quick starting of diesel engine. All power and control cabling (supply) between diesel engine control panel and Engine/Battery Charger/Batteries (Working and standby) is included in the scope. The Battery shall be 1+1 (1 working + 1 standby) with automatic & manual selector switch changeover facility.

4.3.4 Fire Water Jockey Pumps

Approved make: Kirloskar, Mather & Platt, Varat, KSB

- a. Materials & construction for all the pumps shall be in accordance with IS: 12469-1988(re-affirmed 2002) & IS:5120-1977(re-affirmed 2001)

- i. Pumps shall be direct-coupled. Belt driven pumps will not be accepted.
- ii. Parts of pumps like impeller, shaft sleeve, wearing ring etc. shall be of noncorrosive metal.
- iii. Pumps shall be capable of discharging 150% of its rated discharge at a minimum of 65% of the rated head. The shut-off head shall not exceed 120% of rated head.
- iv. For electrical driven fire water pump, the rating of the motor shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge.
- v. The coupling between the prime mover and the pump shall allow each unit to be removed without disturbing the other.
- vi. The pump shall be manufactured, tested and marked in accordance with IS 12469 — Specification for pumps for firefighting systems.
- vii. The pump rated capacity, total dynamic head and other performance requirements shall be as per the requirement indicated in the pump data sheet.
- viii. The pump shall be designed to have the best efficiency at the specified duty point. The pump set shall be suitable for continuous operation at any point within the range of operation wherever specified.
- ix. The pump shall have a continuous rising head capacity characteristic from the specified duty point towards the shut-off point, the maximum being shut-off. The horse power characteristic shall preferably be non-over loading type beyond the rated capacity point.
- x. The material of construction for components other than those specified in IS:12469 & 5120 shall be as per standard of the pump manufacturer and shall be indicated separately.
- xi. The pumps shall be suitable for parallel operation.
- xii. The pump set shall be designed in such a way that there is no damage due to reverse flow through the pump which may occur due to any mal-operation in the system.
- xiii. Pump along with its drive shall run smooth without undue noise and vibration.
- xiv. The jockey pump shall be end suction back pull out as specified in the data sheet enclosed.
- xv. Replaceable / renewable wearing rings shall be provided for both the casing and the impeller or for the casing only.
- xvi. The complete assembled unit shall be designed so that all covered parts including shafts and bearings shall be easily accessible for inspection, maintenance and replacement with minimum down time.
- xvii. The rotor assembly with impeller and shaft sleeve shall be dynamically balanced at 150% of operating speed.
- xviii. Pump casing shall be tested at 150% of shut-off head or 200% of rated total head whichever is higher.
- xix. In case of end suction back pull out type pump, flexible spacer coupling shall be provided. Coupling guard shall be provided for all types of pumps.
- xx. Suction and discharge flanges shall be drilled in accordance with the standard IS 6392-1971.
- xxi. The gland packing should be easily accessible for changing without having to disassemble the pump.
- xxii. A common base plate mounting both for the pump and drive shall be furnished. The base plate shall be of rigid construction, suitably ribbed and reinforced. Base plate and pump

supports shall be so constructed and pumping unit so mounted as to minimize misalignment caused by mechanical forces such as normal piping strain, hydraulic thrust etc. Suitable drip taps and drip lip shall be provided.

- xxiii. The pumps shall be provided with auto cut-off / cut-in facility with pressure drop in fire water network.

4.3.5 Earthing

Refer the attached pump-room drawing & earthing specifications attached with the tender documents.

4.3.6 Motors

a. General

Motors shall be of squirrel cage TEFC design induction motors conforming to IS: 325.

The make/type of motor offered shall have track record of faultless service for a min. period of 3 years continuous service in similar installation. Documentary evidence in support of the same shall be furnished along with the offer. Motors shall be suitable for giving the rated output, without reduction in the expected life span when operated continuously under the following system conditions.

- i. 415V+ 10%, 3 Phase, 50 Phase, 50 Hz + 5% and, a combined, voltage and frequency variation of + 10%.
- ii. Motors shall be suitable for full voltage, direct-on-line starting/soft starting for Jockey pumps. Rest of all small rating of feeders shall be operate through DOL starting.
- iii. Motors shall be capable of starting and accelerating the load with any of the above mentioned methods of starting, (without exceeding the specified limits of temperature) with applied voltage at its terminals between 80% and 110 % of rated voltage.
- iv. The locked rotor current of motors shall not exceed 600 % of the full load rated current.
- v. Motors vibrations shall be within limits as per applicable standards.

Motor's insulation shall be class 'F' with temperature rise limited to class 'B'. The motors shall be given tropical and fungicidal treatment for successful operation of motor in hot, humid and tropical environment

4.3.7 Constructional Features

1. The stator frame and end shields shall be fabricated steel or cast iron of high quality conforming to IS: 210 (1993). They shall be ribbed externally to maximize heat dissipation. The feet shall be integrally cast with the stator frame; bolted feet construction is not acceptable.
2. The stator and rotor cores shall be of low loss, high permeability steel stampings duly varnished to reduce eddy current losses. The stampings shall be hydraulically pressed, keyed and clamped to ensure rigidity.
3. The motor shaft shall be of cylindrical design made of high carbon steel. The cross – section shall be chosen to provide high torsion strength and minimize deflection. The shaft shall be finely machined to ensure fit and eccentricity shall be minimized. Unless specified otherwise, the motor shall be with single shaft extension with slotted keyway. Motor shall be provided with half key.

4. The motor shall be cooled by means of an external fan mounted on the rotor shaft. The fan shall be protected by a cowl which shall be bolted to the stator frame. The fan shall be of cast iron preferably. The body of the fan shall be provided with 2 numbers, diametrically opposite drilled holes to enable removal of fan without breakage. The fan shall be designed to ensure low noise and adequate ventilation. The fan should be suitable for bi-directional rotation.
5. The motor shall be provided with ball/roller bearings with grease lubrication. Greasing nipples and arrangement for drainage of excess/old grease shall be provided as a standard feature. Seals shall be provided to ensure that excess grease does not reach the windings. The L10 life of bearings shall not be less than 40000 hour under rated conditions. Bearings shall be suitable for bi-directional rotation.
6. The terminal box for motor shall be of sheet steel /cast-iron and shall be mounted on R.H.S when viewed from DE side. The terminal box shall be suitable for rotation in steps of 90°. The design of terminal box shall be spacious to suit termination of armoured aluminium conductor cable. Six ends of windings shall be brought to the terminal box and shorting links shall be provided.
7. The terminal box shall be provided with gland plate. If required, cable spreader box/trifurcating box shall be provided additionally to facilitate termination of large size cables. Double compression brass cable glands shall be provided along with the motor.
8. One no. internal earthing terminal shall also be provided in the terminal box as a standard feature.
9. The terminal box shall also feature a cover plate. The cover plate shall be bolted to the terminal box with Allen bolts.
10. Where space heaters / thermistors are specified, separate TBs for each shall be provided for these accessories.
11. Terminal marking shall conform to IS: 4728 (1975)
12. Phase terminals shall be stud type of FRP material. Terminals for space heaters shall be stud type; terminals for thermistor / RTDs may be clip-on type suitable for 2.5 sq. mm conductor.
13. The rotor shall be dynamically balanced with half key. Other shaft mounted components viz. fan, coupling half etc., shall be balanced separately. Balancing shall be carried out at rated r.p.m. of the motor. The balancing weights shall be firmly secured to the rotor. The balance quality grade shall conform to class "G2.5" as per IS: 11723, Part I (1992).
14. The motor shall be provided with lifting lugs/eye bolts to facilitate erection/ maintenance requirements.
15. All nuts, bolts, studs shall be based on metric units.
16. The motor shall be provided with a stainless steel rating plate with punched markings. Markings shall be provided as per clause no 20.1 and 20.2 of IS: 325 (1996).
17. The painting of motor shall be epoxy-powder-coated type. Final paint shade shall be as indicated in Ordering Data Sheet.
18. The overhang of the stator windings shall be given an additional coat of epoxy gel to minimize the effect of end turn forces at switch-on. The vendor shall furnish the details of bracing method employed.
19. Stator slot wedges shall be of non-magnetic material.
20. Rotor shall be of rigid cage design. Rotor bars shall be of high conductivity ETP copper and shall be firmly wedged in the rotor slots. The portion of rotor bars in the rotor slot shall be uninsulated. The rotor bars shall be brazed to the end short-circuiting rings, which shall be of annealed high conductivity copper. If retaining rings are provided in vendor's design, same shall be forged non-magnetic material.
21. Motor rated 30 kW and above shall be provided with single phase anti-condensation heaters as a standard feature. The heaters shall be placed in the lower part of the motor and shall be accessible for easy replacement/maintenance.

22. The main terminal box of the motor shall be rated for 40 kA/ 0.25 sec at 415V.
23. The motor frame shall be provided with two diagonally opposite tapped holes for earthing along with required hardware viz. bolts/screws, plain and spring washers. The hardware shall be electro-galvanized type.

4.3.8 Motors make:

Kirloskar / Crompton / Siemens / ABB / Bharat Bijlee / Marathon.

4.3.9 Abbreviations:

ASA	-	American Standards Association
ASME	-	American Society for Mechanical Engineers
QA/QC	-	Quality Assurance / Quality Control
API	-	American Petroleum Institute
ASTM	-	American Society for Testing and Materials
SS	-	Stainless Steel
CS	-	Carbon Steel
GA	-	General Arrangement
NPSH	-	Net Positive Suction Head
MLC	-	Metre of Liquid Column
MOC	-	Material of Construction
TAC	-	Tariff Advisory Committee
NBC	-	National Building Code

4.3.10 Applicable Standards and Codes

i.	IS 325-1996	:	3-phase induction motors.
ii.	IS 2148-1981	:	Specification for Flame proof, enclosure of electrical

	Re-affirmed 1993		apparatus.
iii.	IS 2253-1974 Re-affirmed 1991	:	Designation for types of construction and mounting arrangement of rotating electrical machines.
iv.	IS 4691-1985 Re-affirmed 1991	:	Degrees of protection provided by Enclosures for rotating electrical machines.
v.	IS 4728-1975	:	Terminal markings for rotating electrical machines.
vi.	IS 4029-1967 Re-affirmed 1991	:	Guide for testing three phase induction motors.
vii.	IS 5571-1979 Re-affirmed 1991	:	Guide for Selection of electrical equipment for hazardous area.
viii.	IS 6362-1995	:	Designation of methods of cooling of rotating electrical machines.
ix.	IS 12065-1987	:	Permissible limits of Noise level for rotating Electrical Machines.
x.	IS 12075-1987 Re-affirmed 1991	:	Mechanical vibration of rotating electrical machines with shaft heights 56mm and higher-measurement, evaluation and limits of vibration severity.
xi.	IS 4722 (1992)	:	Rotating electrical machines
xii.	IS 1231 (1974)	:	Dimensions of 3 ph. Foot mounted induction motor.
xiii.	IS 8789 (1996)	:	Values of performance characteristics for 3 ph. Induction motor.
xiv.	IS 12824 (1969)	:	Type of duty and classes of rating assigned.

4.3.11 Mandatory Spare Parts for Pump

The following minimum spares required for two years operation shall be offered:

SL.NO.	PART	QUANTITY RERUIRED FOR EACH PUMP ORDERED
	Set of gaskets/packing ring/O ring	1 set
	Mechanical seal where applicable	1 No.
	Other parts such as coupling bushes, coupling pins, etc.	As required

'1 set' means quantity required for complete replacement in one pump set.

4.3.12 Mandatory Spare Parts for Engine

The following spare parts shall be offered for each of the diesel engines.

- a. Two sets of fuel filters, elements and seals,
- b. Two sets of lubricating oil filters, elements and seals,
- c. Two sets of belts (where used),
- d. One complete set of engine joints, gaskets and hoses,

4.3.13 Mandatory Spare Parts for Control Panel

The following spare parts shall be offered for each of the control panels.

- a. 24 V 16 A Fuse- Ten Nos.
- b. 24 V 5 A Relays-Ten Nos.

NOTE: Following mandatory spare parts (4.3.10, 4.3.11, 4.3.12) to be provided for 5.1, 5.2, 5.3 chapter of main, jockey pumps, engine & control panel respectively.

4.3.14 Inspection

- i. The equipment shall be inspected by the Purchaser and/or TPI agency at manufacturer's works prior to dispatch. The equipment will be inspected as per the tests pre-identified in the approved Quality Assurance Plan (QAP), relevant approved drawings, specifications, data sheet etc.
- ii. The contractor shall finalize the QAP within two weeks after placement of order with the owner.
- iii. The purchaser shall have free access to the manufacturer's works to carry out any stag inspection to ensure the quality of the equipment being manufactured.
- iv. The inspection call shall be accompanied by internal inspection/test reports by the manufacturer ensuring that the equipment has been manufactured and tested as per the requirement/approved QAP. In case of any subcontracting, only the main contractor shall give inspection call enclosing internal inspection report by the main contractor.
- v. The manufacturer shall furnish all relevant documents and test certificates as required by the inspection agency during inspection. Materials shall be tested only in recognised test houses.
- vi. The contractor/manufacturer shall provide all necessary assistance to the inspection agency during inspection.
- vii. The contractor shall provide all required measuring instruments to carry out the inspection.
These instruments shall be calibrated by an agency of National / International recognition.
- viii. The inspection agency shall have the right to insist on re-testing of any material / recalibration
- ix. of instruments. The charges for such tests shall be to the account of the contractor only.
- x. No equipment shall be dispatched without inspection and receipt of inspection certificate and dispatch clearance from the Third Party Inspection Agency.

- xi. In case of waiver category items, the same shall be pre-identified in QAP itself. For such items, the contractor shall furnish necessary certificates as agreed upon. For these items also, the contractor shall obtain inspection waiver certificate and dispatch clearance from the inspection agency before dispatch of equipment.
- xii. Issue of inspection certificate/waiver certificate for any equipment does not absolve the contractor of his contractual obligations towards satisfactory performance of the equipment. Should any equipment be found defective in whole or part thereof after receipt at site or during erection/commissioning the same shall be made good by the contractor free of cost.

5 Datasheet

5.1 Fire Water Pump & Diesel Engine Data Sheet:

Plant	1	PROJECT	DAFFPL	3	AMBIENT TEMP deg.	Max: 48.4 Min: -2.2
	2	LOCATION	New Delhi	4	TYPE OF HAZARD	Class B
Pump Characteristic	5	No. of Pumps	Five (5)	8	Suction Condition	Flooded
	6	Capacity of each pump	610Kl/hr	9	Operation	Parallel
	7	Total Head-Rated	105m WC	10	Duty	Continuous
Pump Construction	11	Type of Pump	Horizontally Split Casing			
Material of Construction	12	Casing	CI FG 260, IS210	15	Shaft Sleeve	Bronze Gr. 2 IS 318
	13	Impeller	Bronze Gr. 2 IS 318	16	Wearing Ring	Bronze Gr. 2 IS 318
	14	Shaft	SS AISI 410	17	Stuffing Box	CI FG 260,
	15	Gland Packing	Gr. Cotton	18	Lantern Ring	Bronze Gr.2 IS318
				19	Gland	CI,FG 260,IS21
Liquid Pumped	20	Temp.	Less than ambient sr. 3			
Accessories & Services Required	21	MS Companion Flange with nuts, bolts &	YES	25	Recom Spares for 2 yrs of normal operation	YES
	22	Foundation Bolts	YES	26	Erection Supervision	YES
	23	Common Base Plate	YES	27	Commissioning	YES
	24	Coupling Guard	YES	28	Paint	Fire Red Shade no. 536 as per
Driver Data	29	Prime Mover	Diesel Engine			
Diesel Engine	30	Cylinder Arrangement	Vertical in line	33	Cooling System (Heat exchanger	Water Cooled
	31	Working Cycle	4-stroke diesel engine	34	Starting system of the engine	24, V electrical
	32	Combustion System	Direct Injection	35	Paint	Fire Red, Shade No. 536 as per IS-5
Miscellaneous	36	Local Start/stop	Yes	39	Local Control Panel	YES
	37	Pressure Gauge (0- 16kg/cm ²)	Yes (2 Nos for each pump)	40	Cabling between batteries and Control Panel	YES
	38	Automation Facility in Control Panel	Yes			

5.2 Fire Water Pump Data Sheet (Jockey Pump)

Plant	1	PROJECT	DAFFPL	3	AMBIENT TEMP deg	Max: 48.4 Min: -2.2
	2	LOCATION	New Delhi	4	TYPE OF HAZARD	B
Pump Characteristics	5	No. of Pumps	Two (2)	8	Suction Condition	Flooded
	6	Capacity of each pump	55 Kl/hr	9	Operation	Parallel
	7	Total Head-Rated	110m WC	10	Duty	Intermittent
Pump Construction	11	Type of Pump	End Suction			
Material of Construction	12	Casing	CI FG 260, IS210	15	Shaft Sleeve	Bronze Gr2 IS318
	13	Impeller	Bronze Gr.2 IS318	16	Wearing Ring	Bronze Gr.2 IS318
	14	Shaft	SS AISI 410	17	Stuffing Box	CI FG 260, IS210
				18	Lantern Ring	Bronze Gr.2 IS318
				19	Gland	CI,FG 260,IS210
Liquid Pumped	20	Temp.	Less than ambient sr. 3			
Accessories & Services Required	21	MS Companion Flange with	YES	25	Recom Spares for 2 yrs of normal	YES
	22	Foundation Bolts	YES	26	Erection Supervision	YES
	23	Common Base Plate	YES	27	Commissioning	YES
	24	Coupling Guard	YES	28	Paint	Fire Red Shade no. 536 as per IS-5
Driver Data	29	Prime Mover	Motor			
Miscellaneous	36	Local Start/stop	Yes	38	Automation Facility in Control Panel	Yes
	37	Pressure Gauge (0- 16kg/cm2)	Yes (2 Nos for each			

5.3 Datasheet for Engine

S.No.	Description	Units	Bidder to Indicate
1.	Name of manufacturer	:	
2.	No. of Diesel Engine	:	

3.	Power rating of the engine @ rpm.	BHP	
4.	Engine rating at site condition	BHP	
5.	Model of Engine		
6.	Standard Rating type		
7.	Gross Engine BHP	BHP	
8.	Gross Engine KW	KW	
9.	Length (Engine Alone)	Mm	
10.	Width (Engine Alone)	Mm	
11.	Arrangement of Cylinder		
12.	Height (Engine Alone)	Mm	
13.	No. of Cylinders	No.	
14.a	Bore	Mm	
b.	No. of Strokes.		
15.	Displacement	L	
16.	Compression ratio	No	
17.	BMEP of the engine	KPa	
18.	Direction of rotation		
19.	Operating Speed		

S.No.	Description	Units	Bidder to Indicate
20.	'V'/ 'H' angle	Deg.	
21.	Firing order		
22.	Aspiration of engine		
23.	Piston speed of engine	M/Sec.	
24.	Max. over speed allowed (Trip set at)	rpm	
25.	Max. Engine rating at site with 10% overload	KW	
26.	Total dry weight of engine	Kg	
27.	Total wet weight of engine	Kg	
28.	Horse power consumed by engine driven accessories	KW/HP	
29.	Mechanical efficiency of the engine	%	
30.	Thermal efficiency of the engine	%	
31.	Ref. standards for these engines		
32.	Height of base rail used for the engine	Mm	
	Exhaust System		
1.	Exhaust system back pressure permitted (max.)	KPa	
2.	Diameter of engine exhaust outlet (inside)	mm	
3.	No. of exhaust outlets required	No.	
4.	No. of silencers / Expansion joint / crown piece (if applicable) supplied with each engine	No.	
5.	Noise reduction provided by the silencers	DB(A)	

6.	Restriction offered by silencers	In.H20	
7.	Exhaust gas flow rate	CPM	
8.	Exhaust gas flow rate	M3/Min	
9.	Exhaust gas temp (stack)	Deg. C	

S.No.	Description	Units	Bidder to Indicate
10.	Exhaust silencer type		Residential
11.	Height of each chimney	M	
	Heat exchangers (radiator cooled)		Lube Oil Jacket Water System
1.	No. of heat exchanger per DG set	Nos.	
	Construction Features		
1.	Type: skid mounted, engine shaft driven		
	Finned side		
1.	Fluid circulated air :		
2.	Quantity of fluid (room air) circulated	M ³ /hr	
3.	Temperature — inlet	°C	
4.	Temperature – outlet	°C	
	Tube Side		
1.	Fluid circulated	Raw Cooling water	

2.	Quantity of fluid circulated	M ³ /hr	
3.	Temperature — inlet	°C	
4.	Temperature – outlet	°C	
	Material Specification		
1.	Fins	Aluminum	
S.No.	Description	Units	Bidder to Indicate
2.	Tubes (copper / aluminum (as per mfgr.))		
	Position of Center of Gravity(Approx.)		
1.	Forward from rear face of the block	mm	
2.	Above crank shaft centerline	mm	
3.	Right of crankshaft centerline	mm	
	Specific Fuel Consumption		
1.	Specific Fuel Consumption @ 100% load	g/bkW-Hr	
2.	Specific Fuel Consumption @ 75% load	g/bkW-Hr	
4.	Specific Fuel Consumption @ 50% load	g/bkW-Hr	
5.	Tolerance	g/bkW-Hr	

	Fuel Consumption in Liters		
1.	Fuel Consumption in Liters @ 100% load	L/Hr	
3.	Fuel Consumption in Liters @ 75% load	L/Hr	
4.	Fuel Consumption in Liters @ 50% load	L/Hr	
5.	Tolerance considered		
6.	Density of fuel considered	Kg/L	
7.	Alternator Efficiency considered	%	
	Consumption of the Engine		
S.No.	Description	Units	Bidder to Indicate
1.	Lube oil Consumption @ 100% load	L/Hr	
2.	Lube oil Consumption @ 75% load	L/Hr	
3.	Lube oil Consumption @ 50% load	L/Hr	
5.	Recommended lube oil		
6.	Lube Oil change period	Hrs.	
7.	Minimum acceptable lube oil temperature at start up	°C	
8.	Lube oil priming pump		Yes/No
9.	Lube oil priming pump		Engine Driven / AC motor driven / DC motor driven

10.	AC motor driven stand by pump if any		Included / excluded
11.	DC motor driven stand by pump if any		Included / excluded
	Heat Rejection Details		
1.	Heat Rejection to coolant	kW	
2.	Heat Rejection to exhaust	kW	
3.	Heat Rejection to atmosphere	kW	
6.	Heat that can be recovered from exhaust	kW	
	Deration Details		
1.	Deration of the engine \pm Altitude(normal temp)	M	
2.	Deration of the engine \pm Altitude (@ 50 deg C)	M	

S.No.	Description	Units	Bidder to Indicate
3.	Deration of the engine \pm Temperature	Deg. C	
4.	Deration of the engine — Humidity		
5.	Inlet air temperature	%	
6.	Overall de-rating factor	%	
	<i>Air Intake System</i>		
1.	<i>Intake filter type</i>		

2.	Air intake restriction – with clean element	kPa	
3.	Air intake restriction — with dirty element	kPa	
4.	Filtration capacity in microns	Microns	
5.	Intake manifold pressure	kPa	
6.	Max. intake manifold temperature	Deg. C	
7.	Combustion air inlet flow rate	CFM	
8.	Combustion air inlet flow rate	M3/Min	
	Fuel System		
1.	Fuel System type		
2.	Filter type & No.		
3.	Filtration capacity (particle size)	Microns	
4.	Full oil suction filters		
5.	Priming pump type		AC/DC motor driven / Engine Driven
6.	Fuel supply line restriction max. allowable	kPa	
S.No.	Description	Units	Bidder to Indicate
7.	Fuel return line restriction min. allowable	kPa	
8.	Normal fuel pressure	kPa	
9.	Fuel flow to transfer pump (max.)	L/Hr.	
10.	Max. head on transfer pump — static / dynamic		
11.	Fuel filter change recommended	Hrs.	
	Fuel Oil System		

1.	Day tank size	Litres	
2.	Fuel Oil suction filters		
	Type and Number		
	Engine Construction Future		
1.	Turbo charger / Super charger		Included / excluded
2.	Name of the manufacture		
3.	Number		
4.	Speed	RPM	
5.	After cooler		Included / excluded
6.	Inter cooler		Included / excluded
	Lube Oil System		
1.	Engine lube oil capacity	L	
2.	Refill volume with filter	L	
3.	Sump capacity — low mark level	L	
4.	Sump capacity – high mark level	L	
S.No	Description	Units	Bidder to Indicate
5.	Oil temp. — max.	Deg. C	
6.	Oil pressure — normal range	kPa	
7.	Oil pressure — low oil	kPa	
8.	Filter type & No.		
9.	Filtration capacity in microns	Microns	
10.	Crankcase ventilation type		
11.	Oil cooler type		

12.	Pre-lub priming pump rating		
13.	Connecting hose details		
14.	Max. flow of lube oil priming pump		
15.	Mounting details for the pre-lube pump		
16.	Lube oil heater connection details		
	Starting System		
1.	System voltage	VDC	
2.	No. motors provided & rating of motors	No.	
3.	Battery charging alternator capacity Min. Recommended Battery Capacity	Amps.	
1.	Engine jacket water coolant capacity	L	
2.	Engine jacket water coolant flow rate	LPM	
4.	Coolant outlet temp. max. allowed	Deg. C	
S.No	Description	Units	Bidder to Indicate
5.	Coolant inlet temp. min. allowed	Deg. C	
6.	System pressure min. recommended	kPa	
7.	Start to open temp. f thermostat	Deg. C	
8.	Fully open temp. ± thermostat	Deg. C	
9.	Min. coolant fill rate (if applicable)		
10.	Min. coolant expansion space as % of system capacity	%	
	Noise Level Details		
	Mechanical noise (all loads)		
	@ 1 Meter	dB(A)	
	@ 7 Meters	dB(A)	

	Exhaust noise @ 1.5 Meters		
	@ 100% load	dB(A)	
	@ 90% load	dB(A)	
	@ 80% load	dB(A)	
	@ 75% load	dB(A)	
	@ 70% load	dB(A)	
	@ 50% load	dB(A)	
	@ 25% load	dB(A)	
	Exhaust noise @ 7 Meters		
	@ 100% load	dB(A)	
	@ 90% load	dB(A)	
No.	Description	Units	Bidder to Indicate
	@ 80% load	dB(A)	
	@ 75% load	dB(A)	
	@ 70% load	dB(A)	
	@ 50% load	dB(A)	
	@ 25% load	dB(A)	
	Emission Details @ 100% Load		
	NOX level as NO2	gm/hr	
	CO	gm/hr	
	Total HC	gm/hr	
	Sox as SO2	gm/hr	
	Particulate matter	gm/hr	

	Oxygen dry	%	
	Smoke Opacity	%	
	Bosch smoke No.		
	MOUNTING SYSTEM		
1.	SAE No. of the flywheel housing		
2.	Fly wheel dimension		
	- Diameter	Mm	
	- Width	Mm	
	- No. of teeth	No.	
3.	Type of coupling (for 2 bearing)		
S.No.	Description	Units	Bidder to Indicate
4.	Whether comes with a base frame		
	GOVERNING SYSTEM		
1.	Type of governor (Digital –PCC)		
	Make		
	Model		
2.	Class of Governor		
3.	Steady state band of regulation	%	
4.	Droop range	%	
5.	Recovery time		
6.	Temporary variation		
7.	Permanent variation		

5.4 Information to be furnished by the Tenderer for Fire Water Main Pump

1	PUMPS	
1	Make & Model	
2	Type	
3	Pump Capacity (m3/hr)	
4	Head ,mWC	
5	No. of Pumps Offered	
6	Pump Efficiency	
7	RPM of pump	
8	Power absorbed by Pump, kW	
9	Material of Construction	
	Casing	
	Impeller	
	Shaft	
	Shaft Sleeve	
	Wearing Rings	
10	Prime Mover (Diesel Engine)	
11	Type of Shaft Sealing	
12	Bearing Lubrication	
13	a) Shaft power at Duty Point b) Shaft Power at 150% of rated discharge	
14	Noise Level(Max) at 1m distance	
15	Mode of connection to prime mover	
16	Vibration level (unfiltered)	
	Material of Construction	
17	Base Plate Type	
18	Weight- Pump - Base Plate - Prime Mover	
19	Type of Coupling	
20	Accessories Included	
21	Location	

5.5 Information to be furnished by the Tenderer for Diesel Engine

S.N	SPECIFICATION	UNIT	
1.	Make & Model		
2	Type		
3	No. of Cylinders		
4	Direction of Rotation as seen from driven end		
5	Compression Ratio		
6	Bore	Mm	
7	No. of Strokes	Mm	
8	Total Displacement	Cm3	
9	Firing Order (from flywheel end)		
10	Peak Pressure	Kg/cm2	
11	Engine Speed		
	Max. Operating (continuous rating)		
	Min Operating speed (under loaded condition for continuous duty application)		
	Min. idling speed		
12	Rated Output at rated speed and ambient condition prevailing at site	kW	
13	Type of Lubrication		
14	Lube Oil consumption		
15	Fuel Injection pressure	Kg/cm2	
16	Specific fuel consumption(SFC) at rated speed for full load		
17	Height of fuel tank to be located from Diesel Engine base frame	mm	
18	Overall dimension of standard engine with pump		
	Length	mm	
	Width	mm	
	Height (Total)	mm	
	Height (below cnak shaft centre line)	mm	
19	Weight/ load of engine and pump (static/ dynamic)	Kgs	
20	Details of Fuel Tank		
	Type of Construction		

	Capacity (min 6 hrs running)	Lts	
	Accessories		
21	Location		

5.6 Data Sheet for Electrics (Details to be furnished by Tenderer)

Motor Technical Data Sheet (Shall meet the minimum requirements specified cl. 3.2) To be submitted along with the offer.

5.6.1 Motor Details

1. Name of manufacturer
2. a) Rated voltage :
- b) Voltage variation :
3. a) Rated frequency :
- b) Variation in frequency :
4. No. of phases :
5. a) Motor kw at _ 0 c ambient :
- b) Motor kw at 40 0 c
6. Frame size :
7. a. Rated speed
- b. Rated slip :
- c. Rated P.f :
- d. Rated efficiency
8. Enclosure class of protection : IP-55
9. Hazardous area suitability : - NA-
10. Class of Insulation :
11. Temperature rise above_0c ambient :
12. a) Locked rotor current / rated current:
- b) Starting torque / Rated :
- c) Pull out torque / rated torque :
13. a) No. of equally spread starts / hour :
- b) No. of successive starts from cold condition :

- c) No. of successive starts from hot condition :
- 14. External paint shade :
- 15. Epoxy based painting :
- 16. Terminal Box location (viewed from DE side) : R.H.S. / L.H.S
- 17. Space heaters provided :
- 18. Temperature detectors provided : Type :PTC / Pt-100
 - a) No. of detectors
- 19. Vibration level
- 20. Noice level at 1 mt (dba)
- 21. Bearings
 - a. Type \pm DE / NDE :
 - b. Grease lubricated & Type of grease :
 - c. Re-greasing nipple provided :
 - d. Expected bearing life (LIO)
- 22. Earthing details
- 23. Approx. total weight

5.6.2 Electrical & Instrumentation Diesel engine control panel

- i Type and make :
- ii Control description :
- iii Dimensions :
- iv Typical control scheme :

5.6.3 Details of battery and battery charger equipment

Battery

- i) Make and type :
- ii) No. of cells :
- iii) No. of plates/cell :
- iv) Amp. Hour rating :
- v) Type of connectors & material :
- vi) Boost charge voltage/cell :
- vii) Trickle charge voltage/cell :
- viii) Voltage at the end of 10 hrs. discharge :
- ix) Type of cell container :
- x) Overall dimensions of each cell :
- xi) Overall dimensions of battery stand :
- xii) Total weight of battery & stand :

Battery Charger

- i) Make & type :
- ii) Whether DC output voltage constant :
- iii) Protections :
- iv) Provision for boost & trickle charging :
- v) Panel GA drawing :

5.7 Supervision of Commissioning:

Vendor shall provide necessary supervision of commissioning assistance for supplied equipment at site.

5.8 AMC

- a. Vendor shall enter into Annual Maintenance Contract with Purchaser at appropriate time.
- b. Vendor shall have all India Service Network for providing efficient AFTER SALES.
- c. The PO for the AMC shall be placed separately after the completion of the Defect Liability Period.
- d. Rate shall be without consumable of oil & spare-part, for all main pump-sets & all jockey pump-sets.

6 Unpriced Schedule of Quantities

SR. No.	DESCRIPTION	QUANTITY	UNIT	Bidder Information Note 4
	Supply of Fire Pumps along with Diesel Engine and its accessories, fuel tank, fuel pipe, water pipe and accessories and the control panel.			
	TAC APPROVED PUMPS			
1.	SUPPLY OF 610 M3/HR PUMPS WITH 105 M HEAD with all accessories (As per price preamble Sr. No. 1)	5	LOT	
2.	SUPPLY 55 M3/HR JOCKEY PUMP WITH 110 M HEAD with all accessories (As per price preamble Sr. No.2)	2	EACH	
3	Supply of MCC (As per price preamble Sr. No.3)	1	Lot	
4.	Supervision & Commissioning of Pumps (As per technical scope cl. 2.1-10-a to n & price preamble)	15	MAN-DAYS	
5a.	1 set x 2 years mandatory maintenance spares for sr. no 1 pump-set as per tender specifications 4.3.11		LOT	
5b.	1 set x 2 years maintenance spares for sr. no 2 pump-set as per tender specification 4.3.12		LOT	
5c	1 set x 2 years maintenance spares for sr. no 2 pump-set as per tender specification 4.3.13		LOT	
6.	Rates for AMC shall be given separately as an attachment and shall be valid for 1 year from the date of PO placement for supply of pumps.	12	PER MONTH	

NOTE:

1. Price bid evaluation shall be done for all items together and bidders to the quote for Sr. No. 1, 2 & 3 total cost only as per price preamble.
2. Rates for AMC shall be given separately as an attachment and shall be valid for 1 year from the date of PO placement for supply of pumps.
3. Purchase order for the AMC shall be given separately after the completion of defect liability period.
4. Bidder's information column shall be filled by each bidder **offered or not offered** with his technical bid.
5. Deviation list shall also be attached with the technical bid by each bidder.

7 Packing, Protection, Preservation & Delivery

1. The Vendor will perform following activities for packing & transportation of the Pump set/(s)

8 List of Attachments

- 8.1 Price Preambles Fire water pump**
- 8.2 Pump-room GAD & section drawing no. 322538-RLA-0901_P5**
- 8.3 Pump-room piping GAD & section drawing 322538-RPA-0903_P2**
- 8.4 322538-ETD-01-P3_LT Switchgear Panel; for MCC supply guide line**
- 8.5 Earthing Specs for Fire-fighting system**
- 8.6 ETD-E-01 Standard for earthing pit with G.I. electrode**

Earthing

General

1. Earthing work shall be carried out in accordance with IS 3043 – Code of practice for Earthing.
2. All electrical equipment shall be earthed as per details on applicable drawings.
3. All process pipe lines, tanks, buildings and other metal structures that may receive lightning stroke or develop a static charge shall be earthed, as per details on applicable drawings.
4. All equipment to be earthed shall be cleaned down to bare metal before attaching the ground wire.
5. NEUTRAL CONDUCTORS SHALL NOT BE USED FOR EQUIPMENT EARTHING.
6. All earthing connections shall be carried out in an approved manner and with specified materials. Typical methods of earthing as per standard drawings, will be adopted for the earthing, as indicated in the applicable drawings.
7. The entire plant shall be earthed by a parallel of ground loops. The loops will be effectively earthed by means of earthed electrodes.
8. All earth connections shall be applied bitumen compound if welded with the system earthing grid / equipment. However, welding should be avoided as far as possible.
9. Sizes of the earth wires shall be as shown in the applicable drawings.
10. Copper strip if used shall be tinned at the joints.
11. Armouring of cables shall be earthed at both ends through suitable cable glands.
12. Earthing wires and cables shall be terminated on the earth bus with solder less cable sockets with silicon bronze / G.I. bolts.
13. Each earthing wire shall be in one length from the equipment to the earth bus.
14. Pipe electrodes in earth pit as per standard drawing shall be provided unless otherwise indicated in the relevant drawings. The earthing electrode and pits shall be in accordance with IS: 3043.
15. The earth pit centre shall be at a minimum of 2.5 metres distance from the nearest building. Distance of not less than 3 meters shall be maintained between centres of two earth pits.
16. Specialised Earthing shall be provided to the sensitive equipment by means of dedicated Cu. earthing pits, Cu. earthing conductor and Cu. earth bus bar mounted on the insulators.
17. Test links are required for testing of earth pit.
18. The main earthing strip outside the building shall be laid at a minimum depth of 350 mm below finished grade level.
19. All earthing joints and connections shall be carried out as per enclosed standards with duplicate conductors for systems of 415 V, 3 phase & above and single conductor for 240V, 1 phase system.
20. Main earth grid, all switchgear panels, isolators, push button stations, motors, equipment, vessels, etc. shall be earthed with wire / strip as per following list for G.I. conductor and for copper conductor, as applicable connected to the nearest earth bus.

– Main Earth Grid Conductor	50 x 6 mm GI. Strip
– For MCCs	50 x 6 mm GI. Strip
– For LDBs, Process equipments	25 x 6 mm GI. Strip
– For Lighting Panels, Power DBs	25 x 3 mm GI. Strip
– For Push Button Stations	4.0 sq. mm Cu. FRLS wire
– For 3-Phase Power Sockets	4.0 sq. mm Cu. FRLS wire
– Pump Motors up to 15 HP	16.0 sq. mm Cu. FRLS wire
– Pump Motors above 15 HP to 30 HP	25 x 3 mm GI. Strip
– Pump Motors above 30 HP to 75 HP	25 x 6 mm GI. Strip
– Pump Motors Above 75 HP	25 x 6 mm GI. Strip
– For Storage Tanks, Vessels, etc.	25 x 6 mm G.I. Strip

All the equipments (i.e. three phase equipments, storage vessels) shall have two earthing connections. An earth bus bar shall be used for connecting copper earthing wires using tinned copper lugs of suitable sizes. Bus bar shall be installed near the equipment on wall structures.

240 V Equipment

1. All 240 V equipment shall be earthed with minimum one number of 12 SWG cu. wire unless stated otherwise on the relevant drawing.
2. For lighting circuits in conduits, one number 12 SWG. copper wire shall run inside the conduit for earthing.
3. Fluorescent fixtures and all other fixtures provided with earthing terminals shall be earthed by 12 SWG copper wire.
4. Switch and single phase lighting receptacle housings shall be earthed with 12 SWG copper wire. The earthing wire shall be connected to the earthing screw on the switch or receptacles by a solder less cable socket duly crimped.

415 V Equipment

1. All 415 V equipment shall be earthed by 2 independent paths to earth through earth wires. The earthing conductors shall be of the sizes as specified on the drawings and be of G.I., aluminium or bare copper where buried. Outside the building shall be laid at a minimum depth of 350 mm below finished grade level.
2. All motor frames, hoist rails, pipe racks, etc. shall be effectively earthed, as shown on the applicable drawing.
3. Earth strip extending above the floor shall be protected from mechanical injury by running it through GI pipe sleeve to at least 300 mm height.
4. The entire conduit system, supports, cabinets, transformers, motor control centres and equipments shall be effectively earthed as shown on the drawings and in accordance with the latest Indian Codes.

Connection

All the Earthing system connections shall generally cover the following:

- Equipment earthing for personnel safety
- System neutral earthing
- Static and lightning protection

The following shall be earthed:

- System neutral
- Current and potential transformer secondary neutral
- Metallic non current carrying parts of all electrical apparatus such as transformers, HV / MV and LV switchgears, bus ducts, motors, neutral earthing resistors, capacitors, UPS, battery charger panels, welding receptacles, power sockets, lighting / power panels, distribution boards, control stations, lighting fixtures, etc.
- Steel structures / columns, rail loading platforms, etc.
- Cable trays and racks, lighting masts and poles.
- Storage tanks, spheres, vessels, columns and all other process equipments.
- Fence and gate for electrical equipment (e.g. HV switchyard, transformer yard, etc.)
- Cable shields and armour.
- Flexible earth provision for wagon, truck. Shield wire etc.

Specifications and Testing

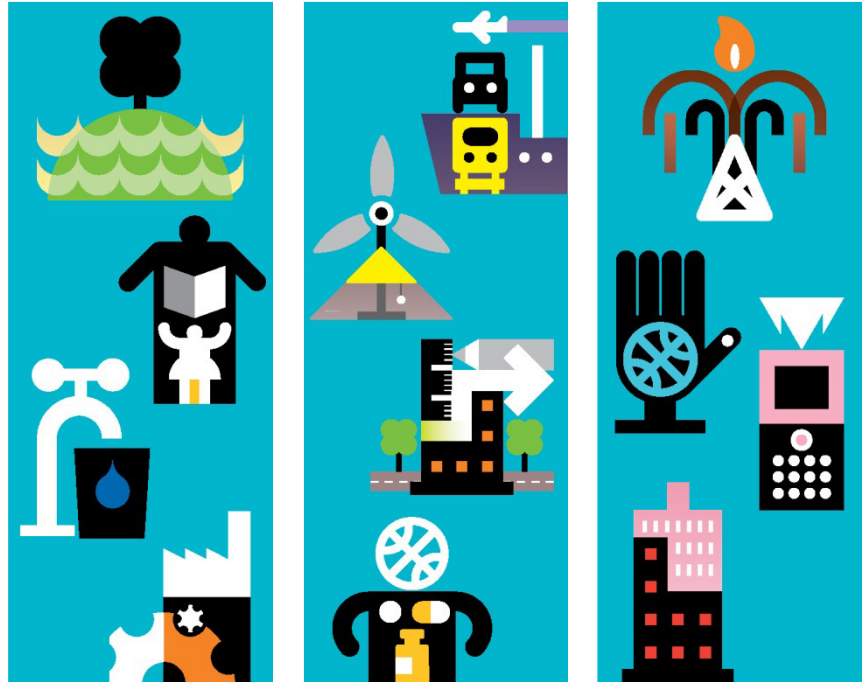
Earthing shall be carried out as per IS Code of Practice: 3043 and as shown in the relevant drawings.

- Check that earthing system is installed as per drawings.
- Check that all connections are tight and connections are protected from mechanical injury.

The resistance to ground shall be measured at the following locations:

- The resistance of the system/neutral earthing should be maintained preferably at less than 1 Ohm.
- At each earthing point provided for lightning protection, the earth resistance shall preferably not exceed 1 Ohm.
- At any one point of each system used to provide earthing to electrical equipment enclosures, resistance shall not preferably exceed 1 Ohm.

Measurements shall be done before connection is made between the earth and the object to be earthed.



Specification # ETD-01 Low Voltage Switchgear Panel

Modernisation of Fuel Farm-IGI Airport,
Shahbad Mohammadpur, New Delhi.

February 2015

Delhi Aviation Fuel Facility Pvt. Ltd

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Delhi Aviation Fuel Facility Pvt. Ltd

'1st floor, Wing"A", T-III Project, IGI Airport, New Delhi-110037

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
P1	19.02.2015	SK	TKV	VST	Issued for Approval
P2	18.08.2015	SK	PPP	VST	Issued for Approval
P3	31.08.2015	SK	PPP	VST	Issued for Approval

Information Class: Standard

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1 General

1.1 Introduction

- M/s Delhi Aviation Fuel Facility Private Limited (DAFFPL) is a joint venture between Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL) & Delhi International Airport Limited (DIAL). M/s Indian Oil Sky Tanking Limited (IOSL) is responsible for running day to day operations of receiving the Jet fuel, storing the same in Fuel Farm and refuelling the Air Crafts.
- DAFFPL has avail design, engineering, procurement assistance and construction management services from Mott MacDonald which has been retained to provide consultancy services for the same.
- Existing Fuelling System i.e. Fuel Farm of Delhi Aviation Fuel Facility Pvt. Ltd. (DAFFPL) for refueling the aircrafts at IGI Airport, New Delhi is slated for modernization and up-gradation so as to conform to International Standards for receipt, storage and dispensing of Jet A1 fuel.
- At DAFFPL fuel farm, Jet A1 fuel is brought aboveground/underground pipe from Oil Terminals of IOCL and BPCL and also by road tanker. This fuel is stored in the Cone Roof Vertical Tanks installed in the fuel farm. Presently, the aircrafts are being refueled by hydrant pumps through underground Jet A1 fuel hydrant pipe line.
- This document specifies the minimum acceptable requirements set by the Purchaser for design, engineering, procurement, fabrication, assembly, inspection, testing, commissioning and delivery to site of Electrically Driven ATF Centrifugal Pumps for installation within the Fuel Farm of DAFFPL, IGI Airport, New Delhi.

1.2 Definitions

For the purposes of this document the following definitions shall be used.

- **Must/Shall** the word 'shall' is to be understood as mandatory.
- **Should** the word 'should' is to be understood as strongly recommended.
- **May** the word 'may' is to be understood as indicating a possible course of action.
- **Purchaser** Delhi Aviation Fuel Facility Pvt. Ltd., IGI Airport, New Delhi.
- **Consultant** Mott MacDonald Pvt. Ltd
- **Mfg / Supplier/vendor** The party responsible for manufacture or supply of equipment and services to perform the duties specified by the Consultant or company

2 Scope of work and basis

2.1 Scope of work

This specification covers the requirement for Low Voltage (LV) Switchboard or Main LT Panel or Power Control Centre (PCC), Motor Control Centre (MCC) and Power Distribution Board required distributing power in the plant at low voltage. The data sheets form part of the specifications

The drawings and specifications complement each other and what is shown or called for in one shall be interpreted as being called for in both. Material(s), if any, which may have been inadvertently omitted but fairly implied as required to make a complete assembly of the switchgear as shown in the drawing and the specification to make the unit properly operational shall be construed as required and covered in the Vendor's scope.

Any deviation from the specification must be stated clearly in the proposal. In the absence of such a statement, it will be considered that the requirements of specification are met without any deviation

2.2 Site particulars

2.2.1 Location

The site is located at Shahbad Mohammadpur adjoining to Indira Gandhi International Airport, New Delhi. The site is approachable by road.

2.2.2 Topography

The whole Site is levelled surface, with a nominal gradual slope.

2.2.3 Environmental Design Parameters

Elevation above M. S. L. : 237 metres. Above Sea level

Metrological data (Based on climatologically data of Delhi)

- a) Ambient temperature
 - (max.) : (+) 48.4°C
 - (min.) : (-) 2.2°C
- b) Relative humidity, % : Max: 100%; Min 25%
- c) Rainfall intensity : 20-30mm in one hr intensity in Delhi
- d) Design Wind speed : 47 m/s
- e) Area Classification : Non Hazardous – Admin. & Pump House :
Hazardous – Tank Farm & Product Pump House
- f) Earthquake Zone : Zone IV (as per IS:1893)
- g) Site Access : By Road, By Rail, By Air (Nearest Airport – Delhi)
- h) Unit Installed : Indoor

2.2.4 Design Temperature

The Maximum Design is considered as 50° C. This is an appropriate margin above the Maximum Operating Temperature of 48.4° C.

3 Technical specifications

3.1 Applicable industry standards

The design, manufacture and performance of the equipment shall comply with all Indian Standards, I.E. Rules, Statutory Regulations and Safety Codes currently applicable in the locality where the equipment will be installed.

Unless otherwise specified, the equipment shall conform to the latest applicable Indian Standards and, in particular, the following:

Table 1.1: Codes and standards

CODES	DESCRIPTION
IS : 2147	Degree of Protection provided by enclosure for low voltage switchgear and control gear.
IS : 13947	Specification for low voltage switchgear and control gear.
IS : 2705	Specification for current Transformers.
IS : 3156	Specification for voltage transformer.
IS : 1248	Specification for direct acting indicating analogue electrical measuring instrument accessories.
IS : 8623	Specification for low voltage switchgear and control gear assemblies.
IS : 3231	Specification for electrical relays for power system protection.
IS : 5578	Guide for marking of insulated conductors.
IS : 11353	Guide for uniform system of marking and identification of conductors and apparatus terminals.
IS : 13703	Specification for Low-voltage fuses not exceeding 1000V AC or 1500V DC.
IS : 6875	Control Switches for Voltages up to and including 1000V AC or 1200V DC – Pushbuttons & Related Control Switches
IS : 2959	Contactors for Voltages not Exceeding 1000V AC or 1200V DC
IS : 4237	General Requirements for Switchgear and Control gear for Voltages not Exceeding 1000V AC or 1200V DC

3.2 Constructional requirement

3.2.1 General technical Details

1. All identical equipment and parts shall be interchangeable.
2. The switchgear shall consist of indoor, floor-mounted, metal-enclosed, compartmentalised (if not indicated specifically in data sheet), modular type, totally front side operated vertical sections.
3. It shall be dust and vermin proof and shall be easily extensible on both sides.
4. All doors and removable covers shall be gasketed all around with neoprene gaskets.
5. Each vertical section shall comprise the following:
 - Metal enclosed busbar compartment running horizontally throughout the length of switchgear and shrouded by barrier plates
 - Individual feeder modules in multi-tier formation.
 - Shrouded main and vertical bus bars and individual feeder connections by 650V grade stranded PVC insulated wires/strips
 - Vertical cable alley and bus bar alley with doors or covers covering the entire height of the feeder module panel.
 - Horizontal wire way for control wiring for full length of panel.
 - Space heater with thermostat, lighting and MCB in each vertical panel.

- Sheet steel barrier between two adjacent vertical sections except for horizontal bus bar compartments.
 - Separate door for each feeder module.
 - Additional 20% should be provided for Terminal Block. However, Vendor to keep in mind during GA designing of panel for vacant compartment, if possible.
 - Totally front operated panel, i.e. cable and bus bar alleys of suitable sizes (minimum 300 mm width) shall be on the panel front side only.
 - Each vertical panel should be divided into the distinct zones for bus bars, feeders, power cabling, control cabling and power & control terminals.
6. The switchgear unit shall consist of rigid structural frame enclosed by 2 mm thick cold rolled (CRCA) sheet steel. Doors and covers shall be of 1.6 mm thick cold rolled (CRCA) sheet steel. Structural framework with foundation bolts, etc. at the bottom shall be provided to mount the switchgear directly on concrete/steel channel base.
7. The switchgear shall be provided with removable cable gland plate (of minimum 3 mm thickness), with pack hole for cable entry, as indicated in the data sheet.
8. Separate labels shall be provided for switchgear modules, relays, instruments, switches, etc. Approval for the type of label shall be taken from the Owner / Consultant.
9. Control switches, push buttons, indicating lamps, meters and relays shall be mounted on the front door. Current Transformers (CTs) and Voltage Transformers (VTs) shall be mounted on the fixed portion. For fully draw out / semi draw out execution, all other equipment shall be mounted on withdraw able chassis with suitable guides for easy withdrawal.
10. Painting shall include seven-tank process like emulsion cleaning, pickling with dilute acid, washing and rinsing by water, phosphating and oven drying.
11. Painting shall be done by surface coating comprising pre-treatment, electrostatic powder spraying and curing. The surfaces to be coated shall be chemically de-rusted and degreased at a temperature of 70° to 80°C, zinc phosphatised and then passivated at about 60°C and, after proper drying, subjected to spraying of powder charged at about 90 KV through electrostatic guns. Curing shall be done in stoving oven at 180° to 200° C for 12 to 15 minutes ensuring a uniform and continuous coating. The colour of the shade shall be Siemens 7032 of IS 5.
12. Feeder control and motor control equipment not incorporating circuit breaker shall either be of fully draw out, semi draw out or fixed type execution, as specified in the drawing/data sheet.
- In the case of fully draw out type withdraw able chassis, all electrical power and control connections shall be of plug-in type.
 - In the case of semi draw out type withdraw able chassis, all electrical power connections shall be of plug-in type. All control connections shall be of screwing-in type.
13. Minimum 300 mm clearance shall be provided between the finished floor and the bottom of the lower most feeder compartment.
14. Panel lifting lugs shall be of removable type and to be fixed with panel using bolts and nuts.
15. Fixed type-both power and control connections shall be of bolted/screwed type.
16. All feeders name plates shall be provided. Name plate shall have white letter with Black background with rear engraving. Name plate shall have following details:
- Feeder rating with type of feeders.
 - Feeder description.
 - Feeder Module No.
17. The MCCs shall be divided into convenient shipping sections not exceeding 2.5 metres.
18. Complete panel shall be mounted on a base frame made out of ISMC 100 x 50 sections.
19. Every panel shall have independent vertical bus bar chamber / alley.
20. The panel shall be divided into following compartment:-
- Bus bar Chamber

- Cable connection Chamber
 - Main Incomer feeder
 - Individual switch - disconnecter fuse chamber with motor starters etc.
21. Each chamber shall be divided into two by 16 SWG cold rolled steel plates.
 22. Door opening shall be away from the cable alley and be provided with interlocking arrangement. Suitable keys shall be provided. Door interlock defeat arrangement shall be provided.
 23. Each vertical panel shall be provided with maximum six modules. Minimum height of motor feeder shall be 300 mm and SFU feeder shall be 250 mm.
 24. Switchgear shall be provided with removable minimum 3 mm thick cable gland plate. Brass cable glands and crimping type copper cable lugs for cables shall be provided if specified in data sheet.
 25. The cable alley shall be provided with hinged doors for easy access to cables inside the cable alley. The compartment door shall be as far as possible, open away from the cable alley.
 26. Doors with half round knob (No screws) for easy opening and closing.
 27. For MCC panel feeder incomer and outgoing details, rating of feeder, busbar rating, fault level etc. refer point 2.3 Technical specification for Fire Water Pump Sets.

3.2.2 Main bus bars

1. Main bus bars shall be of uniform cross section of electrolytic quality grade in aluminium or copper as specified in the drawing/data sheet.
2. Wherever aluminium to copper connections is required, suitable bimetallic connections/clamps shall be provided.
3. Maximum temperature of the bus bars and the bus connections shall not exceed 85°C.
4. Bus bars shall be air insulated. Busbars shall also be provided with heat shrinkable PVC insulating sleeves and phase colour coded
5. Tinning shall be done for copper busbars as required.
6. Separate supports shall be provided for each bus bar. If common support is provided for all bus bars, anti-tracking barriers shall be incorporated.
7. Busbars shall run throughout the length of the chamber and shall be extensible type on either side.
8. Provision shall be made to connect the earthing busbar to the main earthing grids at the two ends.
9. Copper/Aluminium busbars shall have sufficient cross section to carry full load current and fault current without any damage. All aluminium bus bars shall be provided with current density of 0.7 A/mm² and for copper busbar with current density of 1.4A/mm²
10. In order to avoid any accidental hazards, bus bar compartments shall be protected with 3 mm thick hylem / Bakelite sheets.
11. The size of the neutral bus bar shall be similar to that of phase bus bars in the case of MLDB and Single Phase DBs. However, the neutral bus bar shall be of half size that of phase bus bars in other panels.

3.2.3 Circuit breaker

1.1.1.1 Air circuit breaker (ACB)

1. Air-break, fully draw-out type circuit breakers shall consist of the following:
 - Shunt trip.
 - Mechanical OPEN/CLOSE position indicator, visible with door closed.
 - Emergency trip push button.
 - `Red`, `Green`, `Blue` and `Amber` indicating lamps for Breaker ON, Breaker OFF and Breaker trip on fault.
2. There shall be `Service`, `Test` and `fully withdrawn` positions for the breakers along with their indications on the breaker front facia.

3. Anti-pumping and over & under voltage trip facility should be provided.
4. It shall be possible to with-draw the breaker only in open position.
5. Compartment door of the breaker shall not open unless the breaker is in open position.
6. Automatic safety shutters shall be provided to cover live contacts when carriage is withdrawn.
7. Relays shall have potential-free contacts and shall have variable time settings.
8. Facility shall be provided for blocking under-voltage releases.
9. Manual operating mechanism shall be of spring charged stored energy type.
10. Power-operated mechanism shall be of motor-wound spring-charging stored energy type. Emergency manual charging facility shall also be provided.
11. Indicators shall be provided to show 'charged' and 'discharged' conditions of the spring.
12. The operating mechanism shall be trip-free.
13. The breaker shall be provided with the microprocessor based release with breaker control through RS 485 port and communication with PC through universally used protocol.
14. The Microprocessor release should have over current / short circuit and earth fault protections along with their indications due to which the breaker has tripped.
15. It shall be ensured that circuit breaker body is grounded while it is racked-in into the panel.
16. Trip circuit healthy indicating lamp with integral push button shall be provided.
17. Flame retardant FRP Barrier plate between Incoming and Outgoing terminals of ACB shall be provided.

3.2.3.1 Moulded case circuit breaker (MCCB)

MCCBs shall be incorporated in the Main Power distribution Board and Sub Distribution Board wherever specified in SLD. MCCB's shall be suitable either for single phase or three phase.

1. The moulded case circuit breaker (MCCB) shall be air break type and having quick make quick break with trip free operating mechanism.
2. Housing of the MCCB shall be of heat resistant and flame retardant insulating material.
3. Rotary type operating handle of MCCB shall be provided in front and should clearly indicate ON/OFF/TRIP positions and should have padlocking facility.
4. The electrical contact of the MCCB shall be of high conducting non deteriorating silver alloy contacts.
5. The MCCB should have shunt trip release, earth fault release with adjustable current setting facility.
6. The MCCB shall be provided with adjustable type thermal overload release and adjustable type short circuit protection device. All the release shall operate on common trip bus bar so that in case of operation of any one of the releases in any of the three phases, it will cut off all the three phases and thereby single phasing of the system is avoided.
7. The MCCB wherever called for in the appended drawings shall provide an earth fault relay.
8. The MCCB shall provide required sets of extra auxiliary contacts for the indication circuit, control circuit and for remote signalling purpose and should have inbuilt indications for tripping due to over current, short circuit or earth fault.
9. MCCB shall be provided with current limiting feature. All MCCB's shall have spreaders and phase barriers on each terminal
10. The electrical parameters of the MCCB shall be as per the description given in the appended drawings.
11. MCCB up to & including of 250 A should be with Thermal Magnetic Release and above 250 A with Microprocessor Release.

3.2.4 Protective relay

1. The Microprocessor based release unit shall be provided on circuit breaker for short circuit, over current and earth fault protection with adjustable settings.

2. The release shall incorporate an Suitable bit micro-computer to offer accurate and versatile protection with complete flexibility and shall offer complete over-current protection to the electrical system in the following four zones (1)Long time protection, (2)short time protection with intentional delay (3)Instantaneous protection, (4)Ground fault protection.
3. Microprocessor based / Static type Relays shall be suitable for flush or semi flush mounting with connections from rear. Protective relays shall be in draw out cases. Load Analyser / Load manager shall have communication port to interface with the Plant DCS / Control room.
4. Relay operation / trip indication shall be provided on door.
5. All protective and tripping relays and timers shall be provided with fault display LEDs.
6. The release shall be suitable for communication between breakers to enable zone selective interlocking. This feature shall be provided for both short circuit and ground fault protection zones to offer intelligent discrimination between breakers. This feature enables faster clearance of fault conditions, thereby reducing the thermal and dynamic stresses produced during fault conditions and thus minimises the damage to the system
7. For the setting range of release, like pick-up current, time setting etc. refer respective manufacturer technical catalogue

3.2.5 Air break switches (If applicable)

1. Switches shall withstand a short circuit current of value equal to the let-through current of the associated fuse for 1 second and peak short circuit current equal to cut-off current of the fuse.
2. Switches of motor feeders shall be of motor duty (AC23A), group-operated, fault-make, load-break type. All other switches shall be of heavy-duty type. All the Switches shall be provided with phase barriers and auxiliary contacts.
3. Switch handle shall have padlocking facility in `OFF' position.
4. It shall be possible to open the door only when switch is in `OFF' position and it shall not be possible to close the switch when the door is open. However, defeat mechanism shall be provided for inspection purpose.

3.2.6 Fuses (If applicable)

1. Fuses shall be of link type with visible indication of operation and shall have rupturing capacity of more than the fault level specified.
2. Fuses of smaller capacity rating for control circuit shall be of cartridge type.
3. 1 no. fuse pulling handle shall be provided for each Switch-board / Power Control Centre / Motor Control Centre.
4. Fuses of smaller capacity rating for control circuit shall be of cartridge type
5. All fuse switch units shall be provided with DIN type fuse

3.2.7 Motor starter

3.2.7.1 Contactor

1. Contactors shall be air break, double break, single throw, electromagnetic type.
2. Main contacts shall be of silver faced copper.
3. Minimum Two `NO' and two `NC' auxiliary contacts shall be provided for each power contactor. However, additional nos. of auxiliary contactors should be added in the control scheme as per the requirement.
4. The auxiliary contacts shall be wired to the terminals.

3.2.7.2 Direct-on-line (DOL) starter

- DOL starters shall be suitable for AC3 utilisation category as per IS: 13947(Part-4 /Sec-1). It shall be comprised of: -
 - MPCB
 - Power Contactor
 - Auxiliary Contactor(s)
 - Mushroom Headed stay put type. Red Stop PB.
 - Start Push Button.
 - O/L Relay reset push button on door
 - Red, Green & Amber indicating Lamps (LED) for ON, OFF & Trip indications respectively.
 - Set of selector switches as per various control requirements.

3.2.7.3 Automatic star-delta starter

- Star-delta starters shall be suitable for AC3 utilisation category as per IS: 13947(Part-4 / Sec-1). It shall be comprised of: -
 - MPCB/MCCB
 - Set of power Contactors (3 nos.)
 - Auxiliary Contactor(s)
 - O/L relay with built-in SPPR if MCCB is at an incomer.
 - Timer.
 - Mushroom Headed stay put type. Red Stop PB.
 - Start Push Button.
 - O/L Relay reset push button on door
 - Red, Green & Amber indicating Lamps (LED) for ON, OFF & Trip indications respectively.
 - Set of selector switches as per various control requirements.

3.2.7.4 Microcomputer motor protection relay – Not applicable

1. Starters shall be complete with Microcomputer based Motor protection relay with display facility for the motors of 15KW and above rating and without display for motors below 15KW rating.
2. The relay shall have over current protection (with medium tripping characteristics), Under current protection, Instantaneous short circuit protection, Single phasing protection, Current unbalance protection - for all the ratings of motors and for motors above 55KW ratings, in addition to the above standard protections, the relay should be provided with Stator Ground Fault Protection, over temperature protection and locked rotor protection.
3. The relay shall be Auto / hand reset type. A hand reset push button separate from the stop push button shall be brought out on the front of the compartment door for all starter feeders of all ratings.

3.2.7.5 Single phasing Preventer –

Separate single phasing Preventer shall be provided in the starters along with inbuilt SPP provided with over load relay. The relay shall be current operated and hand reset type with separate hand reset push button.

3.2.8 Instrument transformer

1. CTs and VTs shall conform to the requirement of IS: 2705 and IS: 3156 respectively. The ratings specified are indicative only and it shall be Vendor's responsibility to ensure that the ratings offered are adequate for the relays/meters provided considering lead resistance, etc.
2. CTs and VTs shall be of dry air insulated type.

3. Facility shall be provided in the terminal blocks for shorting and earthing the CTs and terminal blocks.
4. VTs shall be provided with adequately rated primary and secondary fuses.

3.2.9 Instrument

1. Indicating meters shall be of Digital type, 96 x 96 mm size, suitable for flush mounting with constant accuracy for entire range of respective parameter with an inbuilt provision for calibration verification.
2. Watt-hour and VAR-hour meters shall be suitable for 3 phase, 4 wire system, and balanced as well as unbalanced load and suitable for semi-flush mounting.
3. All KWH meter shall have computer interface facility through RS 485 port.

3.2.10 Miscellaneous accessories

1. Breaker control switch shall be :
 - Spring return-to-neutral type with pistol grip handle
 - Lockable in neutral position.
2. Indicating lamps shall be multiple LED type made from FR type polycarbonate material with Low voltage glow protection (up to 50V) and translucent lamp covers. Lamps shall be replaceable from front. The power consumption of each indicating lamp should not exceed 0.5 Watts.
3. The lamps shall have translucent covers. Lamps shall have diameter of 22.5.
4. Push buttons shall be momentary contact type rated for 10A at 500 V AC. The colour of push buttons shall be as follows:
 - Start - Green
 - Stop - Red
 - Trip - Amber
 - Spring Charger - Blue
 - Trip Circuit Healthy - White
5. All push buttons are required to have functional labels.
6. Battery and battery charger (110 V DC) shall be provided for supplying 110 V DC to annunciator panel, indications and tripping circuit with 2 hours battery backup. Vendor to furnish the calculations for VA rating of the control transformer.
7. Alarm Annunciator
 - a. Alarm Annunciator shall be provided, if specified in drawing/data sheet.
 - b. Alarm Annunciator shall comprise flush mounted facia units with two lamps and series resistor and ground glass plate in front for inscriptions.
 - c. Alarm annunciation scheme shall include facia units with relay for each fault, a common alarm bell and Accept / Reset / Test Push buttons.

3.2.11 Internal wiring

1. All wiring inside the switchgear shall be carried out with 650V/1100 Volt grade FRLS PVC insulated flexible stranded copper wires. Minimum size of conductor for control wiring shall be 2.5 mm² Copper. Control circuits shall be provided with MPCBs in place of fuses.
2. Ferrules shall be provided on each wire.
3. All wiring shall be terminated on terminal blocks with crimping type Copper cable lugs.
4. Power connections above 63A can be carried out with Aluminium/Copper Busbar.
5. Vertical / horizontal Al. wire ways shall be provided to run the control wires within the same vertical panel and / or between different vertical panels.

6. The control power supply shall be tapped from R phase and Neutral before / after the main fuses of each feeder. Control circuit shall have protection fuses. Wiring shall be carried out to facilitate testing of control circuit, without energising the power circuit.

3.2.12 Terminal block

1. All Terminal Blocks for power circuit will be stud type and control circuit will be screw type.
2. Terminal blocks of different voltage groups shall be segregated and suitably labelled.
3. Terminals shall be numbered as per wiring diagrams.
4. Minimum 20% spare terminals shall be provided.
5. Shorting links shall be provided for all C.T. terminals.
6. All spare contacts of contactor shall be wired up to terminal blocks.

3.2.13 Earthing

1. An earth bus extending throughout the length of the Switch-board / PCC / MCC/ PMCC / DBs / APFCR Panel shall be provided.
2. The earth bus shall be of sufficient cross section to carry safely momentary short circuit current for 1 sec.
3. All non-current carrying metal parts shall be effectively bonded to the earth bus.
4. All doors shall be bonded to earth, wherever electrical switchgear is mounted on door.

4 Active Power Factor Correction Panel

Active Power Factor Correction Panel with Anti Harmonic Block Reactors, suitable for 415V, 3-phase with PF control.

4.1 System details of Capacitor bank with Harmonic Reactor

1. System should be capable of Fast Real Time (Cycle to Cycle) Thyristor Switching.
2. Harmonic Resonance control through Anti Harmonic reactors of 7% Detuning Frequency
3. Fixed banks for transformer no load compensation.
4. Data logging facility, Data transmission and control through internet / wireless connection.

System should be capable of compensating P.F of Balanced 3 phase network in Real Time, Cycle to Cycle basis. The sensing has to be taken from one phase to measure P.F.

Scan Feature for each bank/group shall be having Scan features contributing to longer life expectancy of all the groups. Each moment group current and temperature shall be monitored. In case of overheating of one group, the switching element should connect one group simultaneously and other group shall get disconnected resulting in lower duty cycle.

Real Time Fast Switching capabilities - System shall use advanced algorithm with suitable rapid electronic for switching time of 1 cycle.

Simultaneous Group Switching - In case of more than 1 group is required for compensation, system should be capable of firing all the groups at the same time and should not use slow ladder logic.

Separate PF for each phase – As the system should control power factor separately of each phase, it is required to display the same separately. Power factor of each phase should be visible on system controller separately at all the times.

Energy and Power Quality Management with Data Logging – System should be capable of data management with display, logging and transmission of all electrical parameters, energies, power quality, THDs, Harmonic components. System should be capable of transmitting the data with Ethernet or remotely with GSM.

The system should also be capable of recording all the important power quality and electrical parameters. Historical data should be periodically analysed to check the performance of the system

Anti-Harmonic Block Reactors – System should have 7%detuned Three Phase Anti Harmonic Block Reactors connected in series with capacitor banks for avoiding Resonance condition. Each Reactor should be with Single layer winding and proper air gaps to minimize the losses.

True RMS readings and Control taking into accounts harmonics up to 30TH: Power Factor and harmonic Resonance shall be monitored and controlled through an advanced open and closed – loop control and measuring system that uses information from all three phases as well as accounts for the effect of harmonics (3rd through 30th).

4.2 Control Module with Intelligent Data Management

Control Module technology should be advanced with digital signal processor (DSP). It should have clearly visible LCD display to display the each phase data separately for e.g. Power factor of all the 3 phases can be viewed at the same time. In order to have complete system and network control, it should have 7 input channels, 4 channels for voltage (for wye Connection), 3 channels for main network current. It should be capable of performing fast Fourier Transformation and calculating Power Factor and harmonics on all phases. It should give true RMS measurement (taking into account up to 30th Harmonic).

4.3 Advanced Data Management capabilities with Data Logging

1. The system controller should be capable of getting and showing all the data as given below for the feeder to which the system is connected.
2. System controller should have LCD displays for each phase separately. It should be capable of displaying harmonics up to 30th. It should take sensing from 1 CT and should switch ON/OFF capacitor banks on basis of average power factor.
3. The System should have Data Logging facility to record all the important power quality and electrical parameters for checking system performance.
4. System Controller should have following features:
 - Displaying P.F of each phase separately on LCD Display.
 - P.F control for Utility supply.
 - Measuring and displaying up to 30th harmonic for electrical parameters.
 - Programmable THD (Total Harmonic distortion) protection.
 - Programmable discharge time.
 - Programmable over THD alarm
 - Automatic calculation of power values for each capacitor step.
 - Providing minimum switching steps for maximum service life time
 - Displaying of electrical parameters for each phase at the same time.
 - Automatic / Manual mode selection
 - C+ / Normal / C- Condition lights
 - Automatic calculation of C/k value
 - Target Cos phi setting (Ind. 0.80 – Cap. 0.80)
 - Insufficient compensation alarm.
 - Optional temperature control
 - Capability of SMS sending for alarm sending
 - Capability of Data sending by email / FTP server
5. The system controller should be capable of measuring and displaying following parameters for each phase:-
 - Displaying P.F of each phase separately on LCD Display.
 - P.F control for Utility supply.
 - Measuring and displaying up to 30th harmonic for electrical parameters.
 - Programmable THD (Total Harmonic distortion) protection.
 - Programmable discharge time.
 - Programmable over THD alarm
 - Automatic calculation of power values for each capacitor step
 - Providing minimum switching steps for maximum service life time
 - Displaying of electrical parameters for each phase at the same time.
 - Automatic / Manual mode selection

- C+ / Normal / C- Condition lights
- Automatic calculation of C/k value
- Target Cos phi setting (Ind. 0.80 – Cap. 0.80)
- Insufficient compensation alarm.
- Optional temperature control
- Capability of SMS sending for alarm sending
- Capability of Data sending by email / FTP server

6. Controller Measurement-The system controller should be capable of measuring and displaying following parameters for each phase:

- Currents
- Voltages
- Power Factor
- Cos Phi
- Active Power
- Reactive Power
- Apparent power
- THD-I (%)
- THD-V (%)
- Individual Current and Voltage Harmonics up to 30th
- Active Energy (KWH)
- Reactive Energy (KVARH)
- Equivalent 3 phase Active Power
- Equivalent 3 phase Reactive Power
- Equivalent 3 phase Apparent Power

7. Alarms

- It should have following alarms:-
- Insufficient compensation alarm
- Over compensation alarm
- Programmable over voltage protection and alarm for capacitors.
- Programmable over THD alarm
- Automatic disconnection of all capacitor steps in case of mains failure over 20 ms.

4.3.1 Capacitor Bank

Capacitor Bank – Capacitor used should be Heavy Duty Gas filled APP type with Un of 600V, 50Hz. Capacitor Bank should be capable of withstanding peak currents up to 4 x In. They should be capable of withstanding up to 70°C temperature on its surface without any deterioration in its lifespan. The capacitor bank rating at 600V has to be so adjusted so as to offer KVAR Bank net out- put at 415V, 50 Hz. They should be installed in Non-compartmentalized enclosure on perforated surface for proper and uniform air circulation.

4.3.2 Anti-Harmonic Block Reactor

Anti-Harmonic Block Reactor - Three Phase Harmonic Block Reactors of 7% iron core type in series with Capacitor Banks. It should be designed with very low flux designing so as to offer high linearity making it work in worst condition of ambient and harmonic overloads. It should be designed to offer low losses. It

should have linearity of 200% i.e. Inductance shall not vary more than ($\pm 3\%$) in 200% Loading condition.

It should have following features :

1. Single layer winding with proper air gaps
2. Step Core
3. H-Class winding (180°C)
4. Thermal temperature disconnection switch at 155°C
5. Linearity $> 200\%$

4.3.3 Switching Module

Electronic Thyristor Switching Module (SCR-SCR configuration) should be capable of Voltage peak withstand capacity of up to 2200 Vpk. They should be installed in separate enclosure with heat sink and axial fan.

4.3.4 Enclosure with Forced Ventilation

Non-compartmentalized Enclosures should be used to house complete banking system with Axial Flow / Centrifugal fans for proper air circulation. It shall house the complete Capacitor Filter assembly.

Transformer PF correction Panels should be considered with capacitor duty contactors. Whereas for APFCR panels, thyristorised capacitor panel should be considered.

5 Inspection and testing

5.1 Inspection

The Owner or his authorised representative reserves the right to witness all the following tests at Vendor's place of manufacturing. Vendor shall give two weeks' notice prior to the proposed date of inspection to the Owner or his authorised representative.

All apparatus, instruments, etc. required for tests shall be provided by the vendor and shall have been checked and tested for accuracy during the twelve month prior to the test, bearing tag of competent authority.

5.2 Testing

- Vendor shall test the switchgear to conform to IS: 4237 with all components assembled and fully wired.
- The following routine tests shall be carried out on all the components and the assembled switchgear, as per relevant standards :-
 - Mechanical and Electrical Operation tests by simulating operating conditions as at site.
 - Secondary wiring conformity test with a low voltage (6 Volt) tester.
 - High voltage test (2.5 KV for one minute).
 - Test for verification of calibration of releases thro' primary injection test.
 - CT Polarity test.
 - Insulation resistance test before and after HV test.
 - Earth continuity test with a low voltage (6 volts) tester.
 - Test for verification of calibration of protective relays thro' secondary injection test
- Seven (7) copies of the routine and type test certificates shall be submitted for Owner's approval before despatch of the switchgear.

5.3 Spares

Vendor shall submit the list of recommended spare for 2 years of operation of switchgear and quote separately.

6 Performance, guarantee / warrantee

6.1 Performance criteria

Along with the offer, vendor shall submit guaranteed technical parameters (GTP) for the approval by Owner.

6.2 Guarantees and warrantees

Vendor shall guarantee the design, materials, workmanship and performance of all goods to be supplied under the order for a period of twelve months (12) from the date of commissioning duly certified by the site-in-charge / Owner representative for satisfactory operation of the equipment or eighteen (18) months from the date of delivery of equipment at job site, whichever is earlier.

7 Data required from the vendor

SR. NO	DESCRIPTION	SPECIFIED	VENDOR DATA
1	GENERAL		
a	Switchgear designation	See Note # 9	
b	Rated voltage	415V ± 10%	
	Rated Frequency	50 Hz ± 5%	
	1 sec short circuit withstand capacity	Vendor to offer with details /BOM and Panel SLD	
c	Dielectric withstand test voltage for		
	(i) Power circuits	2.5 Kv For One Minute	
	(ii) Control circuits	1.0 Kv For One Minute	
d	Reference ambient temperature °C	45°C	
e	Main busbar material	Aluminium	
		E91E Grade Aluminium For Rest Of All LT Panels	
f	Earth busbar material	E91E Grade Aluminium For All LT Panels	
g	Busbar rating	Continuous	As Required
		Short time	1 SEC.
h	Single front/ double front	Single / Double front as mentioned in SLD	
i	Fully, draw out / semi-draw out / fixed type	Fixed Type / Do Type (As Per SLD)	
j	Cable entry	Power cable	As per SLD
		Control cable	As per SLD
k	Painting shade	Exterior	Siemens RAL 7032 As Per IS.5
		Interior	Siemens RAL 7032 As Per IS.5
l	Cable glands and lugs	Excluded	
m	Material	CRCA	
n	Thickness of sheet steel	2 mm. frame, 1.6 mm. door, 3mm gland plate & covers	
o	Base frame channels	3 mm.	
p	Overall dimensions (L x D x H) mm.	Vendor to furnish	
q	Overall weight	Vendor to furnish	
2	BUSBAR		
a	Sizes for		
	(i) Phases	Vendor to furnish	
	(ii) Neutral	Vendor to furnish	
	(iii) Earth	Vendor to furnish	
b1	Current density for Copper Busbar	1 sq. mm = 1.4 A	
b2	Current density for Aluminium Busbar	1 sq. mm = 0.7 A	
c	Three pole/Three pole & neutral	As Per SLD	
d	Bare/painted/taped/insulating sleeve	Insulating Sleeve - Heat Shrinkable	

SR. NO	DESCRIPTION	SPECIFIED	VENDOR DATA
e	Minimum clearance in air	25 mm	
f	Temperature rise over design ambient temperature	50° c above ambient temp.	
g	Busbar support	Material	Epoxy / cast resin
		Common or individual support	Individual
3	CIRCUIT BREAKERS		
a	Vendor's name	As per approved make list	
b	Type	As per SLD	
c	Rated voltage and frequency	415v ±10%, 50 Hz ± 5%	
d	Continuous current under site conditions	Vendor to furnish	
e	Rated symmetrical interrupting current	Vendor to furnish	
f	Making current capacity	Vendor to furnish	
g	Short time current (1 sec.)	Vendor to furnish	
h	Power frequency withstand voltage	2.5 kv for one minute	
i	No. of breaks per phase	ONE	
j	Minimum clearance	Between Poles	25 mm (MIN.)
		In air between live parts & earth	19 mm (MIN.)
k	Fixed trip / trip free	Trip free	
l	Electrical & mechanical anti pumping feature provided	Required	
m	Type of opening mechanism	As per SLD	
n	Overload release setting range	Required	
o	Short circuit release setting range and time relay feature provided	Required	
p	Under voltage release setting range	Required	
q	Earth fault release setting range	Required	
r	Version / No. of pole	Vendor to furnish	
4	SWITCH - DISCONNECTOR FUSE		
a	Rating of switch disconnecter	As per SLD	
b	Duty	Heavy duty type	
c	Triple pole / triple pole and neutral	As per SLD	
d	Fuses	HRC type	
5	DIRECT ON LINE (DOL) STARTER COMPONENTS		
a	Motor Protection Circuit Breaker	Vendor to furnish	
b	Contacting rating	Vendor to furnish	
c	Microcomputer motor protection relay and separate SPP.	Not required	
d	Indicating lamp	Multiple led type	
e	Push button	Mushroom Head – Stay Put Type	
f	Control fuses	HRC type	

SR. NO	DESCRIPTION	SPECIFIED	VENDOR DATA
6	STAR - DELTA (S/D) STARTER COMPONENTS		
a	Motor Protection Circuit Breaker / Moulded Case C. B.	Vendor to furnish	
b	Contacting rating for main, star and delta rating	Vendor to furnish	
c	Microcomputer motor protection relay and separate SPP.	Required if MCCB incomer	
d	Indicating lamp	Multiple led type	
e	Push button	Mushroom head - stay put type	
f	Control fuses	HRC type	
7	CONTROL / AUXILIARY SUPPLY		
7.1	ACB		
a	SPRING CHARGING MOTOR	Vendor to furnish	
b	CLOSING COIL	Vendor to furnish	
c	TRIPPING COIL	Vendor to furnish	
d	CONTROL CIRCUITS	Vendor to furnish	
e	ANNUNCIATORS	Vendor to furnish	
7.2	MOTOR FEEDERS		
a	CONTACTOR CIRCUITS	Vendor to furnish	
7.3	POTENTIAL INDICATING LAMPS	Vendor to furnish	
7.4	OTHER INDICATING LAMPS	Vendor to furnish	
7.5	SPACE HEATERS	Vendor to furnish	
8	MISCELLANEOUS ACCESSORIES		
a	Control wiring	2.5 Sq. mm PVC Cu. Wire (FRLS TYPE)	
b	Door Earthing	Required	
c	Gaskets for doors & covers	Neoprene type	
d	Name plate	Rear engraved aluminium	
e	IP Rating	IP - 54	
f	Space heater with controls	Required for each vertical panel	
g	Hooter circuits	Vendor to furnish	
h	Relays	Vendor to furnish	
i	Current transformer for measuring instruments / protective relays with ratio class of accuracy	Vendor to furnish	
j	Burden of CTs	Vendor to furnish	
9	MAKE OF SWITCHGEAR COMPONENTS	As per approved make list	
NOTES :-			
1	Vendor to furnish list of spares.		
2	Vendor to furnish list of tools & tackles.		
3	Starter components shall be provided as per Type-2 co-ordination.		
4	Painting shall be carried out with seven tank process. Final paint shade shall be epoxy powder coated.		
5	Vendor to furnish GA sketch along with offer.		
6	Coloured heat shrinkable insulating sleeves shall be provided for bus bar.		
7	All spare contacts shall be wired up to the terminal block for any use in the future. Also minimum 20% spare terminals shall be provided for each feeder in Terminal block.		
8	All data / documents asked for in the specifications shall be furnished by Vendor		

9	Motor starters shall be as follows:
a)	Up to & including 7.5 KW - DOL starter
b)	Above 9.3 KW up to & including 30 KW - Star-Delta starter
c)	Above 30 KW - Soft Starters as per process requirements
d)	Rating – Variable Frequency Drive as per process requirements
10	Meters shall be of digital type.
11	All ACBs & MCCBs shall be provided with microprocessor based O/C, S/C & E/F releases.
12	Ics should be equal to 100% Icu for all breakers and MCCBs.
13	Cable Entry- Top/Bottom for all panels
14	All routine tests specified in relevant latest IS shall be carried out and test certificates submitted to the consultant.
15	Minimum 4 NO and 4 NC auxiliary contacts shall be provided on each circuit breaker. The contacts shall be rated 5 amps.

8 Non-material requirements (drawings and documents)

8.1 Quality assurance plan

After the order is placed, Vendor shall submit their quality assurance plan followed for manufacturing of the equipment for approval of Owner. This shall be adhered to and shall be monitored by Owner during manufacturing.

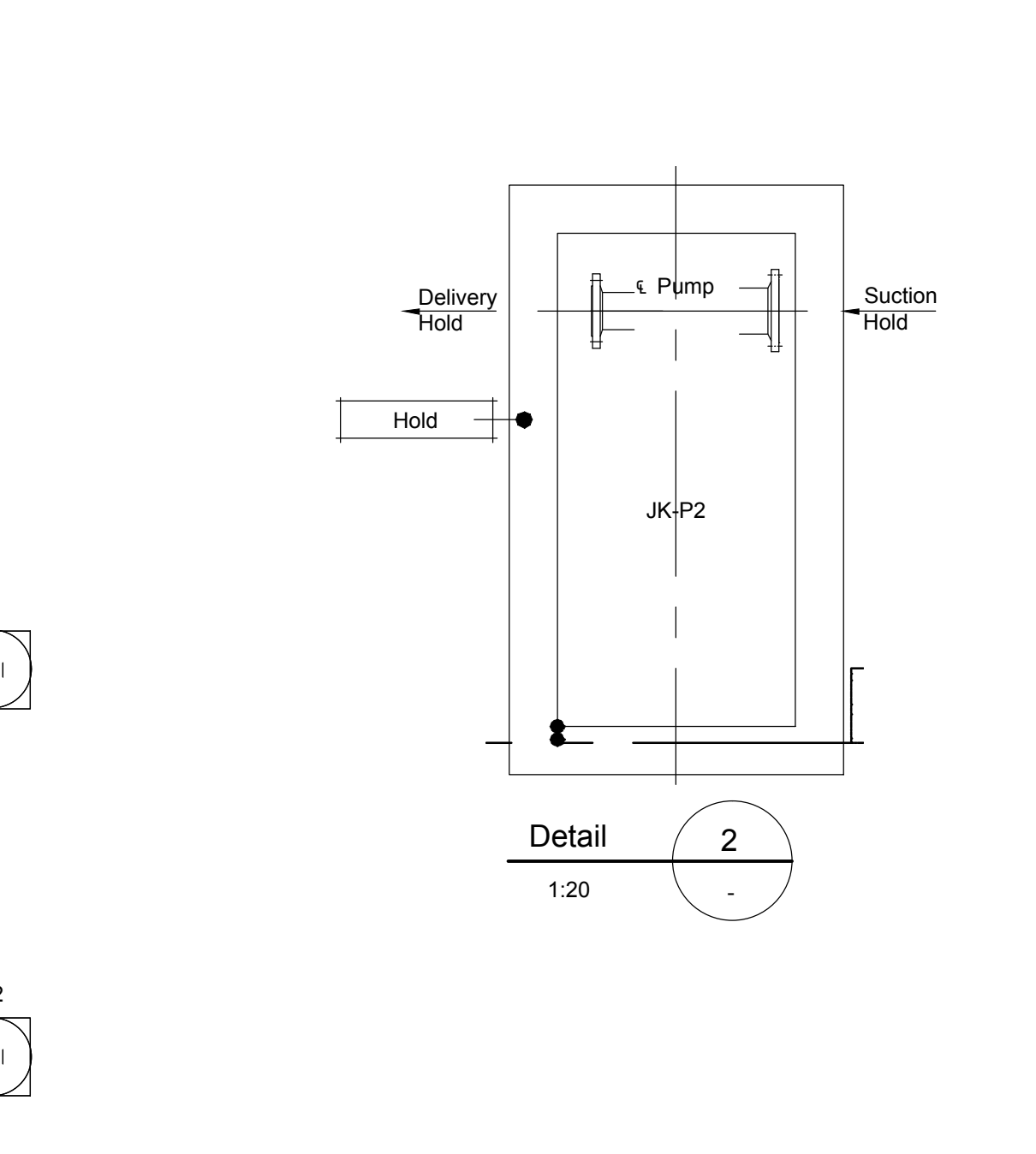
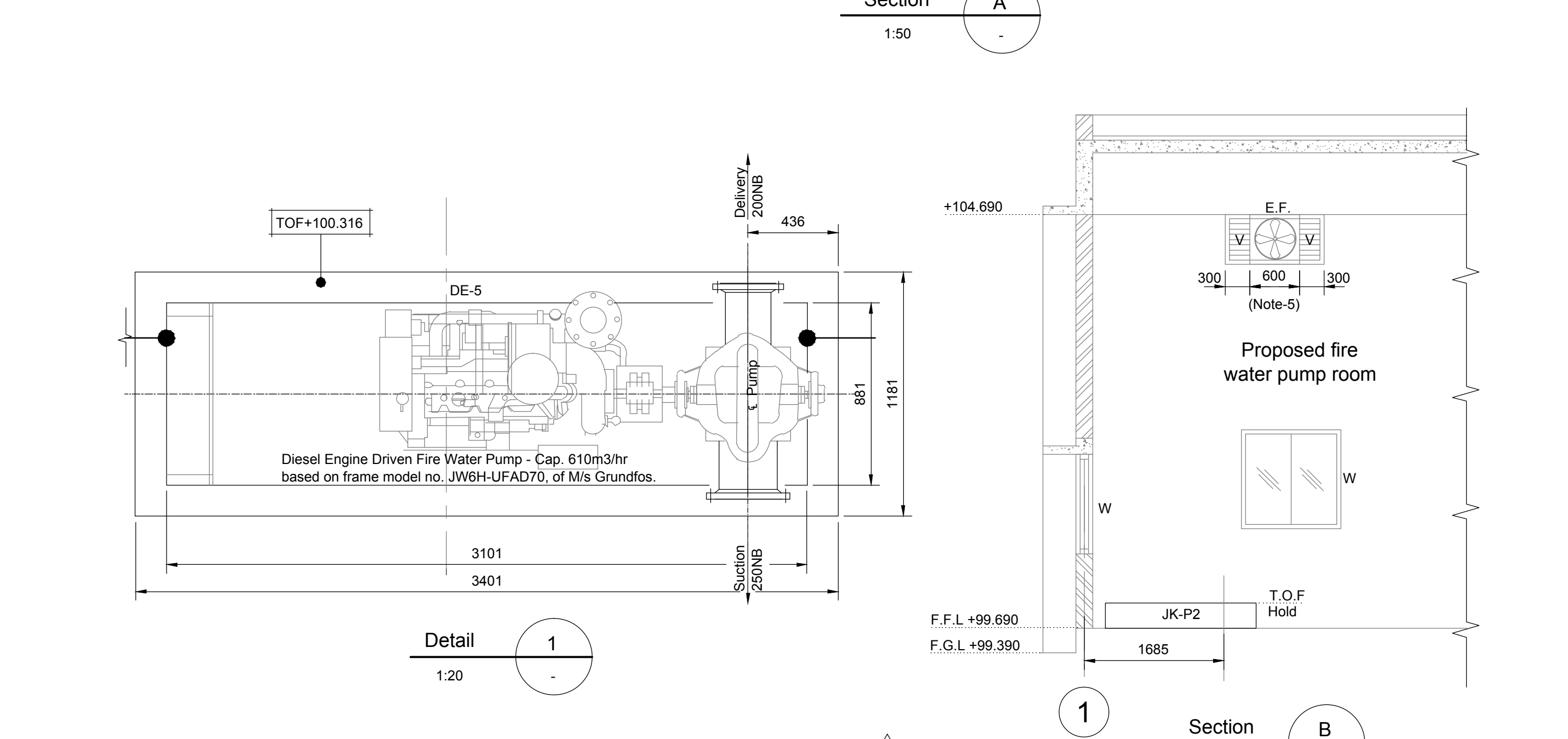
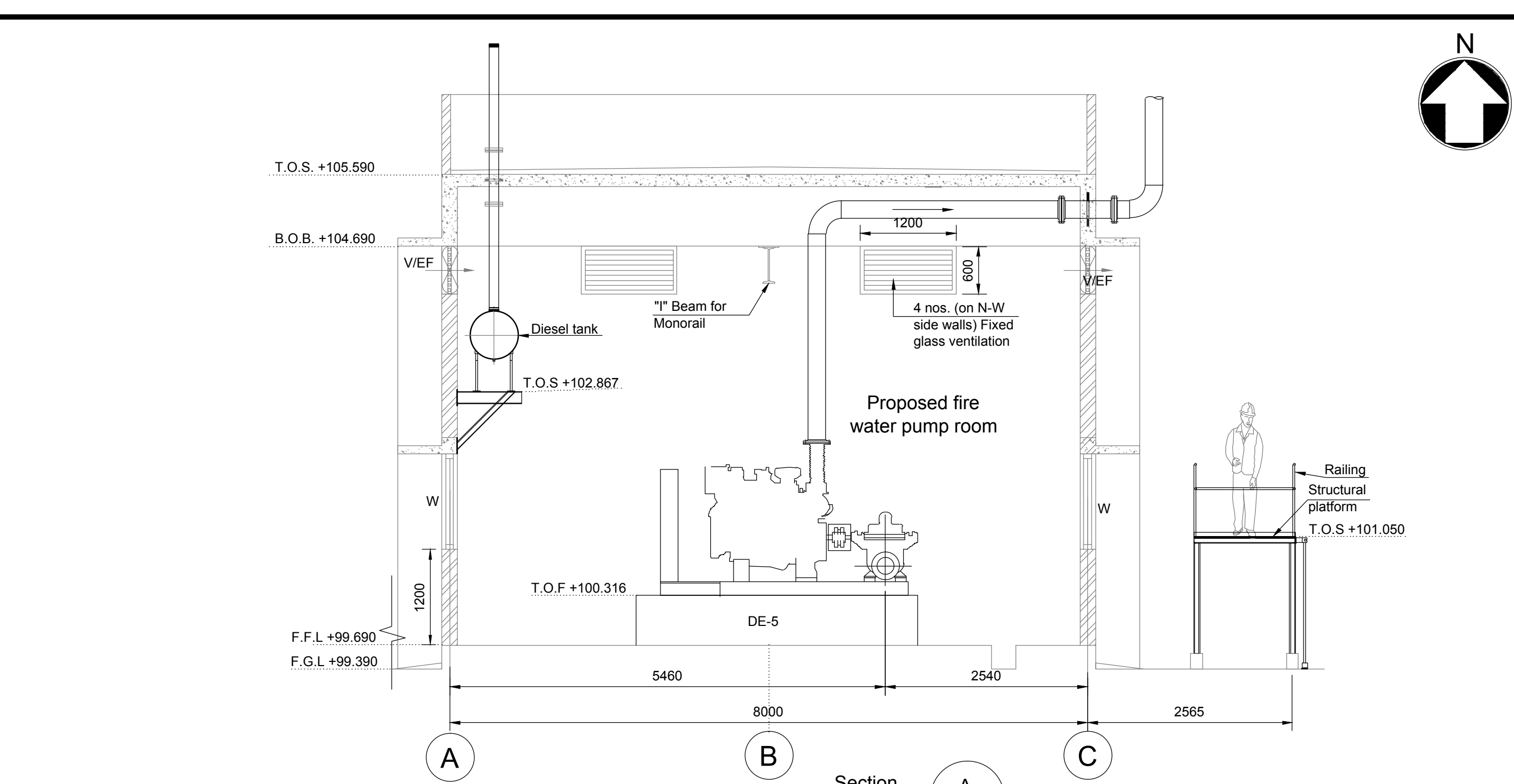
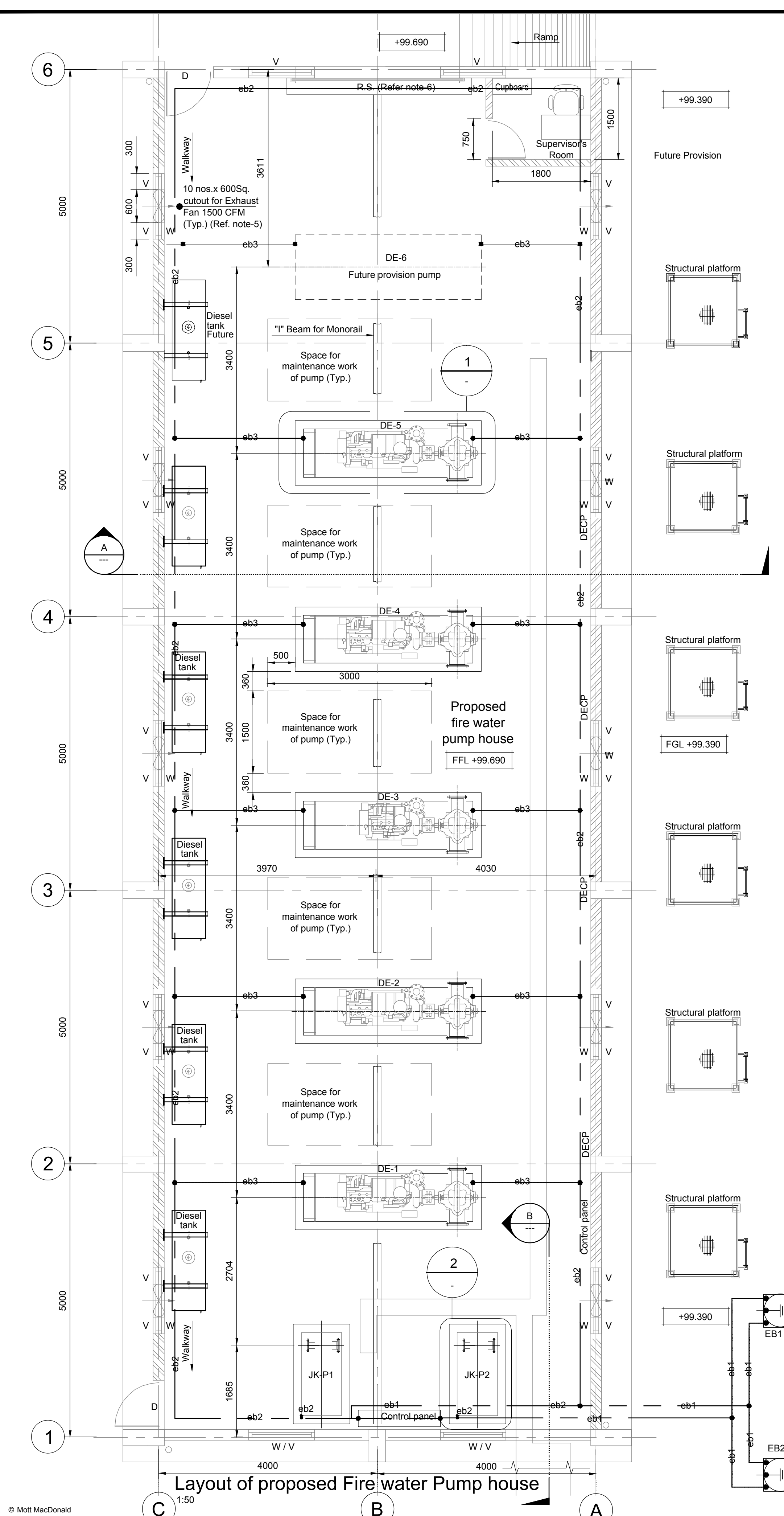
8.2 Drawings and instruction manuals

- Vendor shall submit two sets of G.A. drawings, bill of quantities, make of materials, standard product catalogues, etc., along with the initial offer and four (4) sets of the following drawings for approval of Owner / Consultant after award of contract.
 - Complete assembly drawing of the switchgear, showing plan, elevation and typical sections with dimensions and location of terminals for external connections.
 - Switchgear elevation and layout plan with floor openings and floor fixing arrangements.
 - Schematic diagrams with terminal and ferrule numbers for each module/switchboard panel.
 - Wiring diagram for each module indicating terminal blocks and various apparatus.
 - Final list of apparatus for each module.
 - Characteristic curves for circuit breaker releases, relays of each type, fuse, and thermal overload relays.
 - Manufacturer's descriptive literature on various components used in the switchgear.
 - Index sheet with document reference data like Number description, Number of sheets, Rev. No. etc.
 - The Vendor shall submit CPRI test certificates for short time rating test and temperature rise test.
 - Detailed calculations of Bus bar sizing shall be furnished.
- One print of each drawing will be returned to vendor with comments and required clarifications, if any. Vendor shall incorporate these and send within fifteen days, seven prints of each drawing marked "Certified for record and use".
- After final review, five (5) number of copies and reproducible shall be furnished as final certified drawings. As built drawings shall be submitted after installation and commissioning along with CD.
- Vendor shall also submit seven (7) copies of 'Installation and Instruction' manual.

9 Recommended vendor list for switchgear / components

For list of recommended makes, please refer approved make list for the project.

1	MCCB/MCB/ELCB/MPCB	Siemens/ L&T/ ABB / Schneider
2	CONTACTORS	Siemens/ L&T/ ABB / Schneider
3	SWITCH FUSE UNIT	Siemens/ L&T/ ABB / Schneider
4	NEUTRAL LINK	GE/ C&S /SIEMENS
5	PROTECTIVE RELAY	SIEMENS/L&T/ABB/GE
6	INDICATING LAMPS(LED TYPE)	Siemens/ Schneider/ Telemecanic
7	PUSH BUTTON AND PUSH BUTTON SET	Omron/Siemens/ L&T/ Telemecanic / Vaishno
8	TERMINALS	ELMEX/CONNECTWELL
9	PVC & XLPE Cables LT	KEI/ AVOCAB / POLYCAB/ HAVELLS / Lapp / Nicco
10	FLEXIBLE WIRE (FRLS)	Finolex / HAVELLS/ANCHOR/LAPP
11	SELECTOR SWITCH	Salzer / Kaycee
12	TIMER	Siemens/ L&T/ Selectron /HANGSLER
13	LUGS & SOCKETS	Dowell's/ 3D/ Comet
14	BIMETALLIC LUGS	Dowell's/ Comet/ Ismal/ HMI
15	CONNECTORS	Salzer/ Connectwell / Elemax
16	PVC CONDUITS AND ACCESSORIES	Precision/ Polycab/ Anchor
17	ROTARY SWITCH	Siemens/ Keycee / Salzer/ ABB
18	FRP cable tray	Kemrock/ Ercon/ EPP/ Sumip / Satyam
19	Junction Box	Hensel/ Sintex/RITTAL



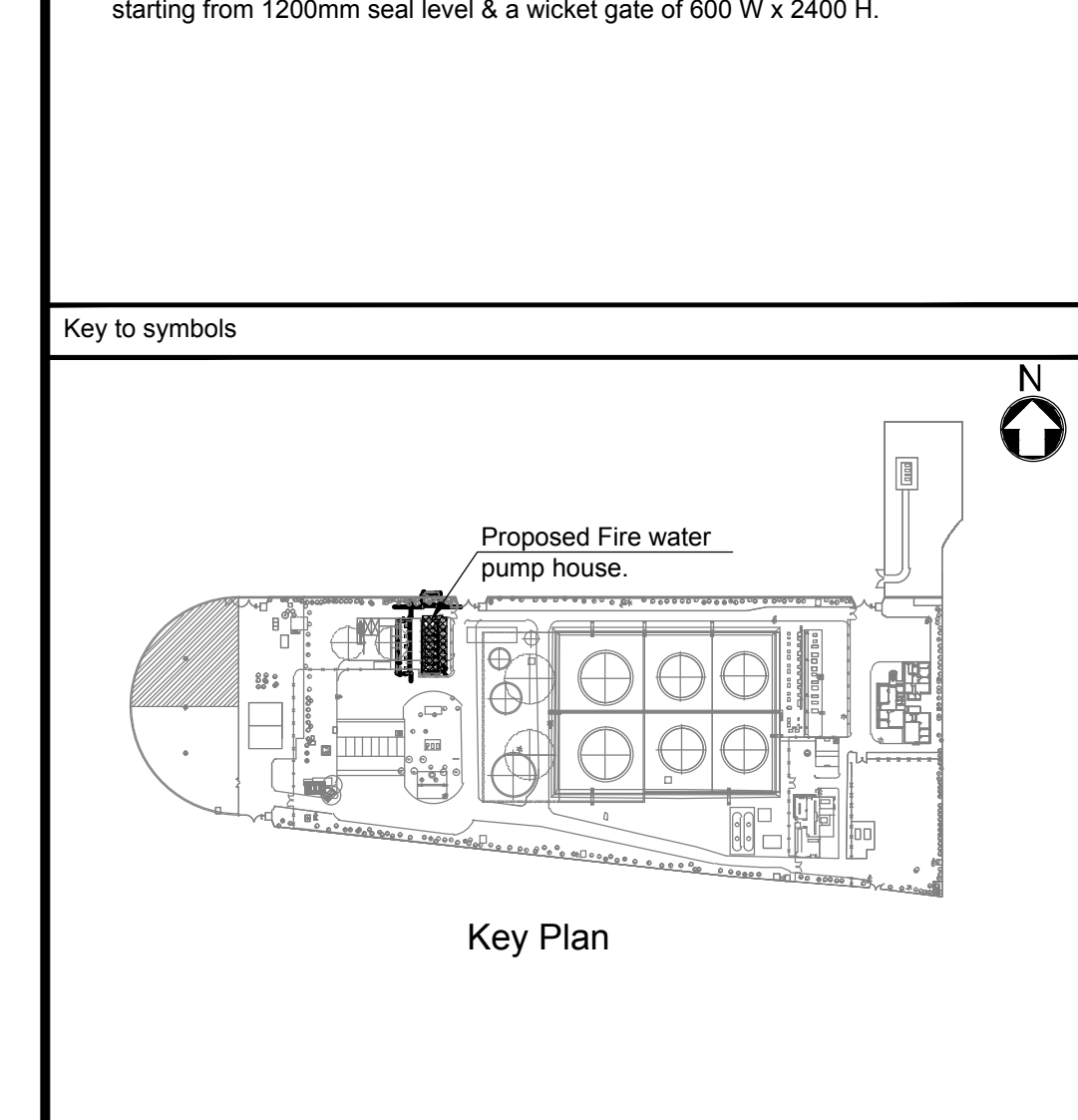
Eathing Details:-

Sr. No.	Symbol	Description
1	eb1	50 x 6 mm G.I Earthing strip for Main Earthing Grid and Panel body
2	eb2	35 x 6 mm G.I Earthing strip for Motorized pump body earthing
3	eb3	25 x 6 mm G.I Earthing strip for Diesel opearted pump body earthing
4	EB	Maintence free Earth electrode 3 mtr. long x 50mm dia Earthing pit (EB)

Proposed Pumps:-

Tag No.	Description	Cap/Head (kg/cm2)	Quantity	Pr.switch setting (kg/cm2)	Remarks
JK-P1	Elec. Motor driven Jockey pump	55 m3/hr. @110mwc	Working	11.0 / 9.8	Auto cut off / cut in
JK-P2	Elec. Motor driven Jockey pump	55 m3/hr. @110mwc	Stand by		
DE-1	Main Diesel Engine driven pump	610 m3/hr. @105mwc	Working	9.5 / -	Auto start, Manual off.
DE-2	Main Diesel Engine driven pump	610 m3/hr. @105mwc	Working	9.3 / -	Auto start, Manual off.
DE-3	Main Diesel Engine driven pump	610 m3/hr. @105mwc	Working	9.1 / -	Auto start, Manual off.
DE-4	Main Diesel Engine driven pump	610 m3/hr. @105mwc	Stand by		Auto start if any of the P-1 to P-3 failed to start. Auto start, Manual off.
DE-5	Main Diesel Engine driven pump	610 m3/hr. @105mwc	Stand by		Auto start, Manual off.
DE-6	Diesel Engine driven pump	610 m3/hr. @105mwc	Working	--	Future space planning

- Notes**
- All dimensions are in millimeters and levels are in meters, unless otherwise.
 - Details shown like structure / civil / architecture are indicative. Refer related drawing for the same. (i.e. stair, roof, column, ramp, wall, door window R.S. etc.)
 - All main pumps shall have manual starting in addition to auto start.
 - Battery charging arrangement shall be provided for stand by batteries also.
 - All ventilation shall be fixed glass of 300x600mm or as shown in the drg.
 - Rolling shutter shall be having bottom grided type with 1200mm height starting from 1200mm seal level & a wicket gate of 600 W x 2400 H.



- Reference drawings**
- | | |
|--------------------------|---|
| 1) 322538-APA-001-01 | Plot plan |
| 2) Quote No. US-5573-571 | Diesel Engine Driven Fire Water Pump - Cap. 610m3/hr. frame model no. JW6H-UFAD70, of M/s Grundfos. |

Hold List

Rev	Date	Drawn	Description	Ch'k'd	App'd
P5	28.08.15	BNC	Revised as marked & issued for approval	MMS	VST
P4	10.08.15	BNC	Generally revised & Issued for approval	MMS	VST
P3	06.07.15	KDP	Revised as per wind data & client comments; Issued for re-approval.	MMS	VST
P2	22.06.15	BNC	Generally revised due to proposed Pump house location finalised	MMS	VST
P1	12.05.15	BNC	Issued for approval	MMS	VST

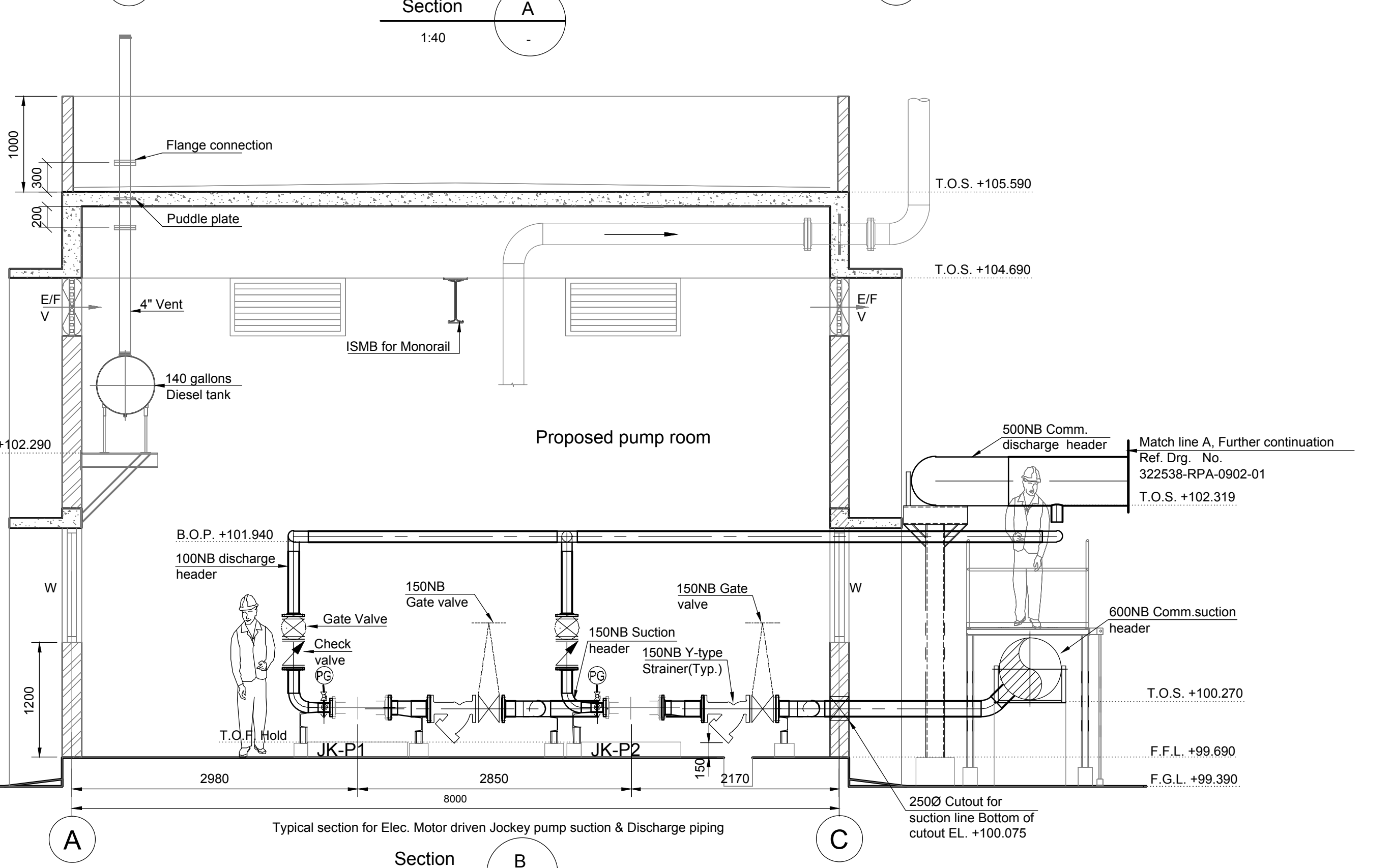
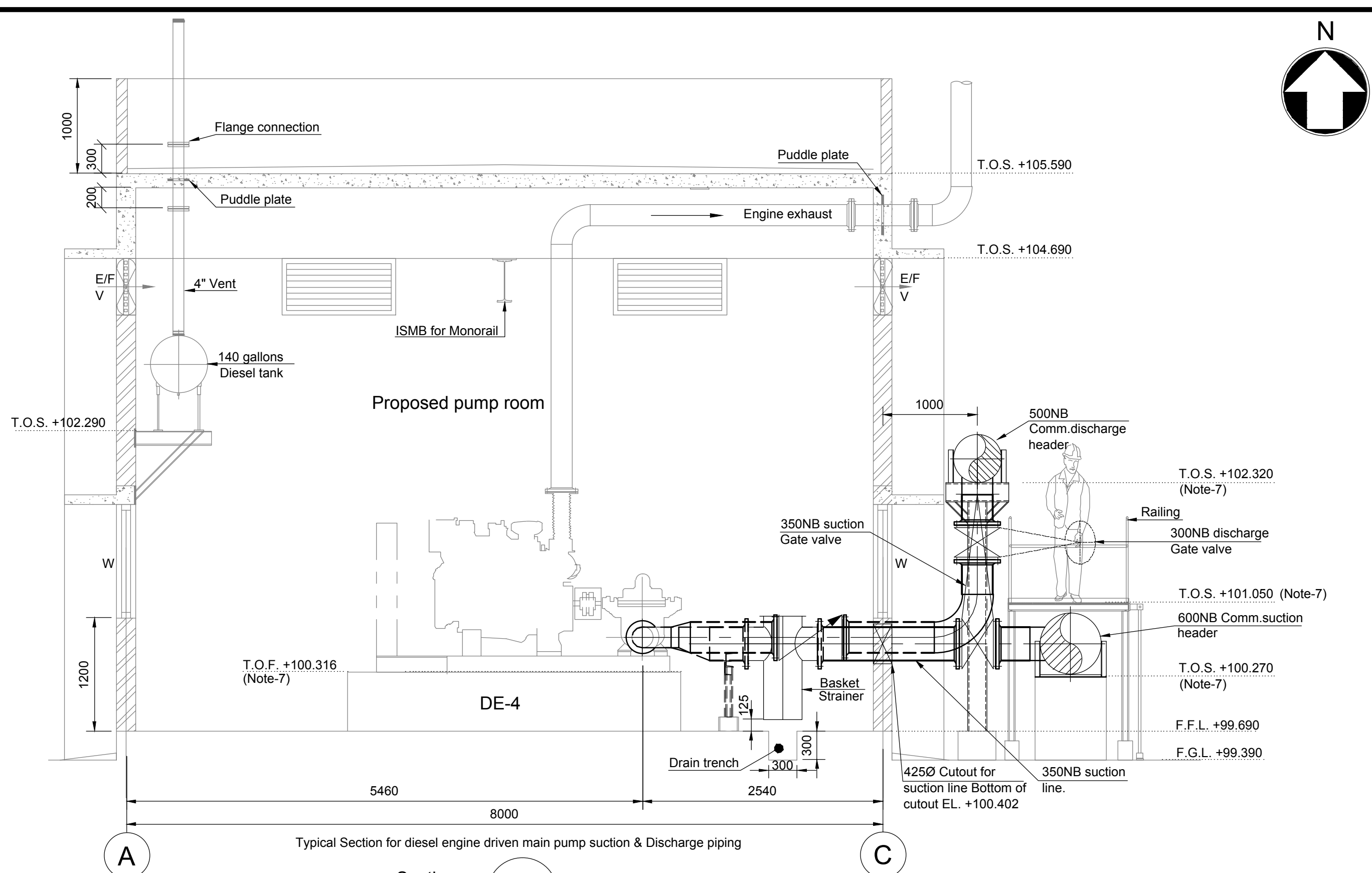
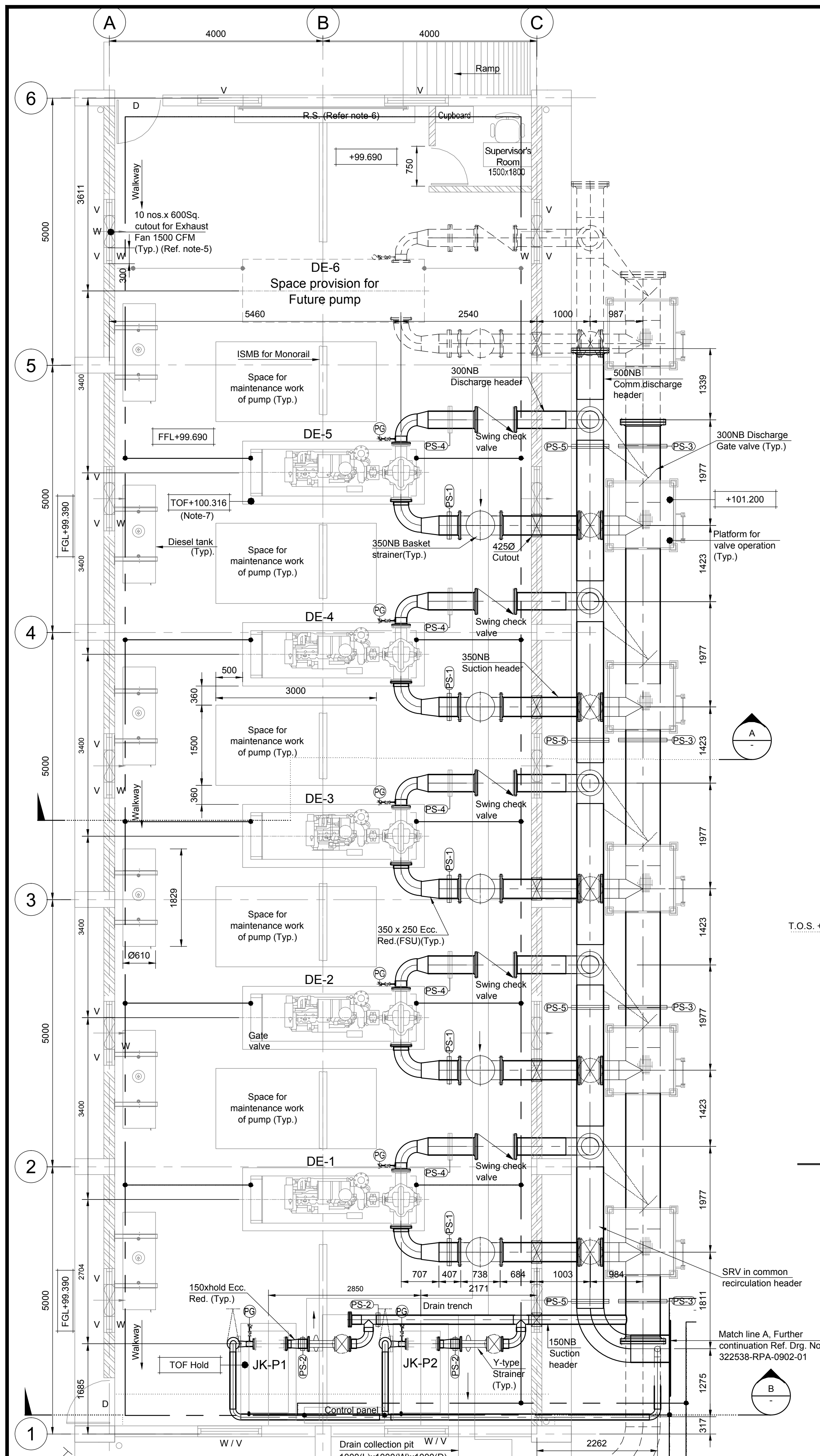
A20
Sector 2
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201301
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T +91 (0)12 0254 3582
F +91 120 254 3562
www.mottmac.com

Client **M/s Delhi Aviation Fuel Facility Pvt. Ltd.**
Aviation Fuelling Station
Shahbad, Muhammad Pur
IGI Airport, New Delhi - 110061

Title **Modernization of Existing Fuel Farm**

Layout & section of proposed Fire water pump house.

Designed	KDP	Eng check	MMS
Drawn	BNC	Coordination	AKM
Dwg check	KDP	Approved	VST
Scale at A1	Status	Rev	Security
As noted.	APR	P5	STD
Drawing Number	322538-RLA-0901-01		

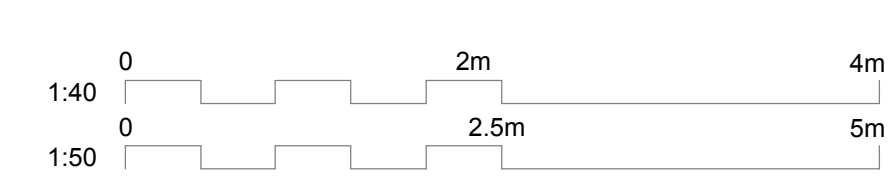


Proposed Pumps:-

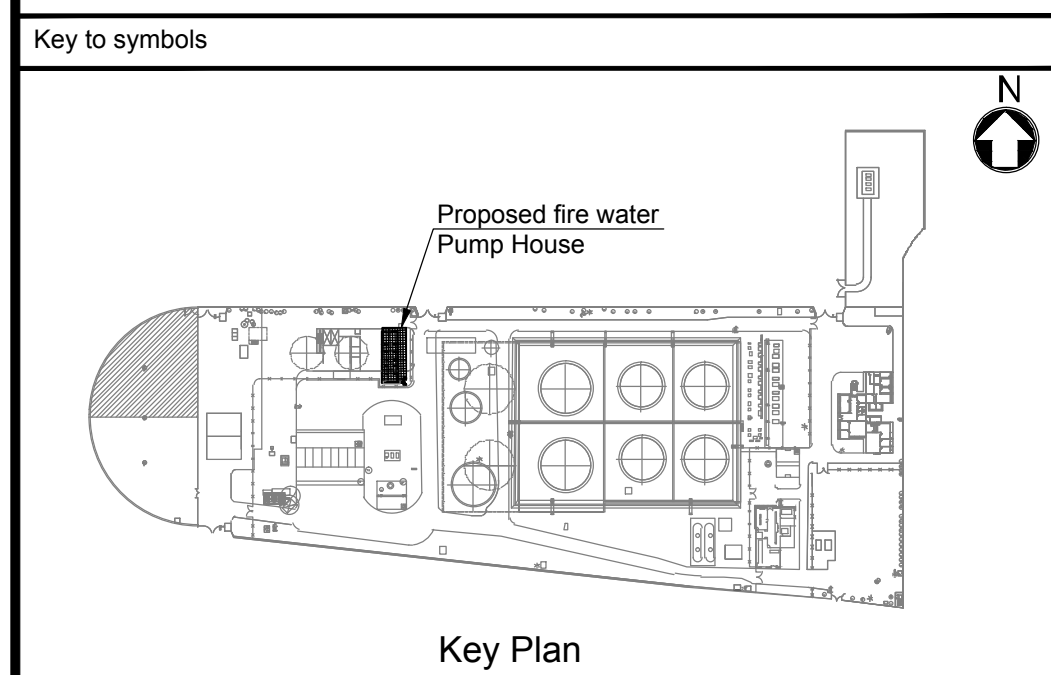
Tag No.	Description	Cap/Head	Quantity	Pr. switch setting (kg/cm ²)	Remarks
JK-1	Elec. Motor driven Jockey pump	55 m ³ /hr. @110mwc	Working	11.0/ 9.8	Auto cut off / cut in
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DE-1	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working	9.5 / -	Auto start, Manual off.
DE-2	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working	9.3 / -	Auto start, Manual off.
DE-3	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working	9.1 / -	Auto start, Manual off.
DE-4	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Stand by	Auto start if any of the P-1 to P-3 failed to start.	Auto start, Manual off.
DE-5	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Stand by		Auto start, Manual off.
DE-6	Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working		Future space planning

Pipe support details Table

P.S. No.	No. of Support.	Pipe size (O.D. in mm)	No. of Lines.	Weight / mtr. with water	T.O.S. Lvl. (Note-7)
PS-1	05	356	01	175 k.g.	100.437
PS-2	03	169	01	50 k.g.	100.116
PS-3	04	610	01	300 k.g.	100.270
PS-4	05	324	01	175 k.g.	100.521
PS-5	04	508	01	225 k.g.	102.320



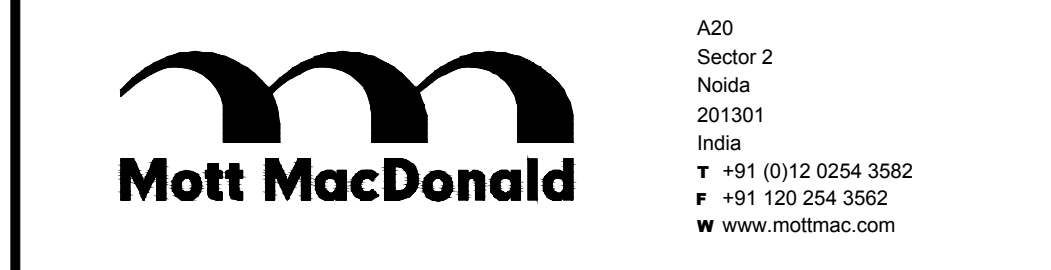
- Notes**
- All dimensions are in millimeters and levels are in meters, unless otherwise specified.
 - Details shown like structure / civil / architecture are indicative. Refer related drawing for the same. (i.e. stair, roof, column, ramp, wall, door window R.S. etc.)
 - All main pumps shall have manual starting in addition to auto start.
 - Battery charging arrangement shall be provided for stand by batteries also.
 - All ventilation shall be fixed glass of 300x600mm or as shown in the drg.
 - Rolling shutter shall be having bottom grilled type with 1200mm height starting from 1200mm seal level & a wicket gate of 600 W x 2400 H.
 - All levels like top of foundation plan of pumps, suction/discharge lines, pipe supports, platform level etc., subject to change as per the final vendor drawing of pump.



- Abbreviations :**
- | | | | |
|-------|-----------------------|-----|------------------|
| FGL | Finished Ground Level | TOS | Top of Structure |
| FFL | Finished Floor Level | C/L | Center Line |
| TOF | Top of foundation | Typ | Typical |
| BOP | Bottom of Pipe | Lvl | Level |
| (PS) | Pipe support | D | Door |
| - - - | Future provision | W | Window |
| - - - | Proposed fire line | DT | Drain Trench |

- Reference drawings**
- | | |
|-----------------------|---|
| 1) 322538-MPE-0100-01 | Plot plan |
| 2) DC/1 Ph. 12/230 V. | Diesel Engine Driven Fire Water Pump - Cap. 610m ³ /hr Frame size based on ref. doc. no of Grundfos. |

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	28.08.15	BNC	Revised as marked & issued for approval		
P1	13.07.15	BNC	Issued for approval		



Client **M/s Delhi Aviation Fuel Facility Pvt. Ltd. Aviation Fuelling Station Shahbad, Muhammad Pur IGI Airport, New Delhi - 110061**

Title **Modernization of Existing Fuel Farm**

Layout and sections of Piping for proposed fire water pump house.

Designed	Drawn	Dwg check	Scale at A1	Status	Rev	Security
KDP	BNC	KDP	As Noted.	APR	P2	STD
Eng check	Coordination	Approved				
MMS	AKM	VST				

Drawing Number **322538-RPA-0903-04**



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

ANNEXURE II – DEVIATION SHEET

EXCEPTION AND DEVIATIONS STATEMENT				
S.NO.	PAGE NO. OF TENDER DOCUMENT	CLAUSE NO.	SUBJECT	DEVIATIONS

Bidder shall list all the deviations in the following given format only on their Letterhead. The Deviation sheet should be submitted along with technical bid.

In case no deviation sheet is submitted along with technical bid, it would be concluded that bidder has accepted all specifications, terms and conditions.

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

ANNEXURE III – DECLARATION SHEET

Date:

DECLARATION

We, M/s _____ hereby, unconditionally accept all terms & conditions of TENDER NO. : DAFFPL/MOD/FF/2015-16/11 (JOB: TENDER FOR SUPPLY OF FIRE WATER PUMPSETS) including Scope of job, quantities, completion period, terms & condition without any deviations.

Sign & Stamp of Bidder

Note: In case of deviations (whether technical or commercial) the above declaration should not be submitted and the deviations should be mentioned separately on bidders letter head with the heading "DEVIATION SHEET". In absence of "DEVIATION SHEET", it would be concluded that bidder has submitted his offer as per tender specifications, terms & conditions. Corrections in tender booklet will not be accepted.

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

ANNEXURE-IV

PROFORMA OF BANK GUARANTEE (EARNEST MONEY DEPOSIT)

(On Non-Judicial Stamp paper for appropriate value)

BANK GUARANTEE NO. :

BANK GUARANTEE AMOUNT:

CLAIM:

(Till 120 days from date of submission of Proposal)

TENDER NO. /DATE:

JOB DESCRIPTION/

LOCATION:

Tender Security No. [*]

Name and Address of the Beneficiary: Delhi Aviation Fuel Facility (Private) Limited
Aviation Fuelling Station, Shahabad Mohammadpur, IGI Airport, New Delhi – 110 061, India

We [*name and address of the issuing bank*] have been informed that [*Name of the Interested party*] (hereinafter called the “Interested Party”) is submitting a proposal for the Award of the Works in response to a Request for Proposal (“RFP”) by Delhi Aviation Fuel Facility (P.) Ltd. (“DAFFPL” or ‘Beneficiary’) for [*Insert description of work*] (“Works”). The conditions of the RFP, which are set out in a documents entitled Request for Proposal dated [*Please insert*] require its offer to be supported by a Tender Security.

At the request of the Interested Party, we hereby irrevocably undertake to pay you without demur, the Beneficiary, any sum or sums not exceeding Rs. _____ [*Please insert*].

Upon receipt by us of your demand in writing and your written statement (in the demand) stating that:

- 1) The Interested Party has, without written consent of DAFFPL, withdrawn its offer after the latest time specified for its submission and before the expiry of its period of validity; or
- 2) The Interested Party has refused to accept the correction of errors in nits offer in accordance with the instructions to Interested parties contained in the RFP; or

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

- 3) DAFFPL entered in to the contract with the Interested party but the Interested party has failed to deliver the **COMPOSITE BANK GUARANTEE (SECURITY DEPOSIT & PERFORMANCE)** in compliance with the Contract conditions; or
- 4) The Interested Party has failed to enter into the Contract within 30 (Thirty) days of being required to do so by the Tender Officer.

Any demand for payment must contain your signature(s). The demand must be received by us at this office on or before the expiry of the earliest of the following dates, when this security guarantee shall expire and shall be returned to us:

- a) Date of issue of letter communicating to the Interested Party that it has not qualified for the contract or the Proposal submitted by the Interested Party is unsuccessful or the TENDER is withdrawn and/or cancelled by the Beneficiary; or
- b) 7 (seven) days after the date of delivery of an acceptable performance bond complying with the Contract conditions and execution of the Contract after the award of the works to the Interested Party; or
- c) 120 (One hundred twenty) days from the last date of submission of Proposal in accordance with the TENDER.

Date:

Signature:

Designation:

Name of the Branch

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

ANNEXURE-V

PROFORMA OF COMPOSITE BANK GUARANTEE (SECURITY DEPOSIT & PERFORMANCE)

(On Non-Judicial paper of Rs. 100/-value)

To,

DAFFPL

Dear Sirs,

M/shave taken tender for the workfor DAFFPL,.

The tender Conditions of Contract provide that the Contractor shall pay a sum of Rs. (Rupees) as security deposit & performance guarantee in the form therein mentioned. The form of payment of security deposit & performance guarantee includes guarantee executed by Scheduled Bank at New Delhi, undertaking full responsibility to indemnify DAFFPL, in case of default. The said party have approached us at and their request and in consideration of the premises we having our office at have agreed to give such guarantees as hereinafter mentioned.

1. We -----hereby undertake and agree with you that if default shall be made by M/s. -----in performing any of the terms and conditions of the tender or in payment of any money payable to Daffpl. We shall on demand pay to you, without demur, protest or requiring you to seek recourse to M/s _____, in such matter as to you may direct the said amount of Rupees ----- only or such portion thereof not exceeding the said sum as you may from time to time require.
2. You will have the full liberty without reference to us and without effecting this guarantee, postpones for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said -----and to enforce or to forbear from endorsing any powers of rights or by reason of time being given to the said -----which under law relating to the sureties would but for provision have the effect of releasing us.
3. Your right to recover the said sum of Rs. ----- (Rupees -----) from us in manner aforesaid will not be affected or suspended by reason of the fact that any

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

- dispute or disputes have been raised by the said M/s. -----
-----and/or that any dispute or disputes are pending before any officer, tribunal or court.
4. The guarantee herein contained shall not be determined or affected by the liquidation or winding up dissolution or change of constitution or insolvency of the said -----but shall in all respect and for all purposes be binding operative units payment of all money due to you in respect of such liabilities is paid.
 5. Our liability under this guarantee is restricted to Rupees -----our guarantee shall remain in force until -----unless a suit or action to enforce a claim under Guarantee is filed against us within six months from -----(which is date of expiry of guarantee) all our rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under.
 6. NOT WITHSTANDING anything hereinbefore contained our liability under this Bank Guarantee is restricted to Rupees -----(Rupees -----).This Bank Guarantee shall be valid up to -----and we are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before.
 7. This guarantee is to be returned to us within fifteen (15) days from the date it ceases to be in force. If the guarantee is not returned to us within the date of aforementioned it shall be automatically cancelled.
 8. We have power to issue this guarantee in your favour under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney dated -----granted to him by the Bank.

Yours faithfully

-----Bank
By its Constituted Attorney
Signature of a person duly
Authorized to sign on behalf of the bank

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

Annexure- VI

Form of Letter of Undertaking

[On the letterhead of the Interested Party]

Letter of Undertaking

Date:

Delhi Aviation Fuel Facility (Private) Limited
Aviation Fuelling Station, Shahabad Mohammadpur,
IGI Airport, New Delhi – 110 061, India

Re:

The undersigned Interested Party acknowledges that the TENDER issued is confidential and personal to the undersigned Interested Party and hereby undertakes and agrees as follows:

1. **“Confidential Information”** means the TENDER and everything contained therein, all documentation, data, particulars of the Works and technical or commercial information made by (or on behalf of) Delhi Aviation Fuel Facility (Private) Limited or obtained directly or indirectly from Delhi Aviation Fuel Facility (Private) Limited or its representatives by the undersigned Interested Party or which is generated by the undersigned Interested Party or any information or data that the undersigned Interested Party receives or has access to, as a result of the TENDER, as being confidential information of Delhi Aviation Fuel Facility (Private) Limited, provided that such term does not include information that (a) was publicly known or otherwise known to undersigned Interested Party prior to the time of such disclosure, (b) subsequently becomes publicly known through no act or omission by undersigned Interested Party or any person acting on its behalf.
2. The undersigned Interested Party shall maintain the confidentiality of Confidential Information in accordance with procedures adopted by the undersigned Interested Party in good faith to protect confidential information of third parties delivered to it, provided that the undersigned Interested Party may deliver or disclose Confidential Information to its authorized representatives who agree to hold confidential the Confidential Information substantially in accordance with the terms of this Undertaking.
3. The undersigned Interested Party shall not at any time whatsoever:
 - (i) Disclose, in whole or in part, any Confidential Information received directly or indirectly from the Delhi Aviation Fuel Facility (P) Limited to any third party.

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

(ii) Reproduce, publish, transmit, translate, modify, compile or otherwise transfer the Confidential Information.

4. In case the Proposal of the undersigned Interested Party is not accepted and immediately upon the acceptance of the Proposal of any of the other Interested Party, the undersigned Interested Party, shall:

(i) Return all Confidential Information including without limitation, all originals, copies, reproductions and summaries of Confidential Information; and

(ii) Destroy all copies of Confidential Information in its possession, power or control, which are present on magnetic media, optical disk or other storage device, in a manner that ensures that the Confidential Information is rendered unrecoverable.

5. The undersigned Interested Party shall certify to Delhi Aviation Fuel Facility (Private) Limited that it has returned or destroyed such Confidential Information to the Delhi Aviation Fuel (Private) Limited within two (2) days of such a request being made by Delhi Aviation Fuel (Private) Limited.

Name of Interested Party's

Signature of Authorized Representative

Sign & Stamp of Bidder



DELHI AVIATION FUEL FACILITY PRIVATE LIMITED

Annexure VII

DECLARATION to be submitted along with Technical Bid

(M/s. _____) hereby declare / clarify that we have not been banned or delisted by any government or quasi Government agencies or Public Sector Undertakings.

Stamp & Signature of the bidder

NOTE: If a bidder has been banned by any Government or quasi Government agencies or PSUs, this fact must be clearly stated with details. If this declaration is not given along with the technical bid, the tender will be rejected as non-responsive.

Sign & Stamp of Bidder

Price schedule & Bill of quantities

Price Schedule (separately sealed cover with enquiry no & due date)					
SN	Scope	Unit	Qty.	Unit Rate including all taxes and transportation up to the site (in Rs.)	LSTK total cost (in Rs.)
1	<p>Design, manufacture, supply for each TAC certified skid mounted FW diesel air cooled engine driven main pump-set with suc.-dis companion flanges & its nuts, bolts, gaskets at DAFFPL, Delhi site as per the attached specification & inclusive cost of local control panel, twin batteries sets (1W+1S) & supply of chargers (of 215 V or 110 V input with transformer set & its minimum 12 m cable), 1 (common) x 8" SRV / PRV, Expansion joint/s, silencers & related flue gas ducting as per drawing, diesel storage tanks , foundation bolts & wedges, first fill lubricants / oil, one set of: special tools kit, set of commissioning spares, and 5 nos. commissioning manual with each pump-set (refer notes also).</p> <p>Note:</p> <p>a) Above sr. 1 price shall be inclusive of with horizontal @ 6xSFC (specific fuel consumption) ltr. capacity net, C. S. / M. S. diesel storage tanks of single wall with piping, (refer drawing all supply, return-@ 12 / as req'd m each & drain, 3 m vent for each pump engine) & all type of valves, duplex filter, level gauge etc.)</p> <p>b) 5 Lot cost = 5 pump-engine sets with skid + 5 set of suc.-dis. Companion flanges with nut, bolts, gaskets + 5 local con. Panels + 5 twin battery-sets + 5 chargers + 5 sets; diesel tanks + <u>5 insulated & cladded flue gas path</u> expansion joint/s, required gas ducts, silencer/s, + 5 local control panels + 5 set each of: commissioning manuals + 5 sets of anchor fixing bolts & wedges + 5 first fill lubricants / oil + 1 SRV / PRV, 1 set special tool-kit +</p>	Lot	5		

Price Schedule (separately sealed cover with enquiry no & due date)

	<p>1 set commissioning spares</p> <p>c) First fill of lubricants to be supplied separately along with the Pump sets. The same shall be separately tagged for the pump & engine.</p> <p>d) Silencer/s, expansion joint/s, flue gas ducts & crown piece (if applicable) for each pump-set</p> <p>e) Any of the items as above but not limited to within the pump-room, but required to commission the pump-sets shall be supplied by bidder.</p>				
2	<p>Design, manufacture, supply of the each TAC certified skid mounted motor driven FW jockey pump-set with suc.-dis. companion flanges, nut, bolts, gaskets at DAFFPL, Delhi site.as per the attached specification including cost of suitable loose supplies of local push button stations, 2 x anchor fixing bolts sets & wedges, first fill lubricants / oil, 1x set special tools kit & 2 nos. commissioning manual with each pump-set ((refer a to c notes also)</p> <p>Note:</p> <p>a) The loose supplied PBS (push button station) shall be separate for each pump-set duly fixed on pump-set skid.</p> <p>b) First fill of lubricants to be supplied separately along with the Pump sets. The same shall be separately tagged for the pump & also for motor if applicable.</p> <p>c) 2 lot cost = 2 jockey pump-set with skid + 2 PBS + 2 set commissioning manuals + 2 sets of foundation fixing bolts & wedges + 1 set of special tool-kit + 1 set commissioning spares + 1 set 2 years maintenance spares</p>	Lot	2		
3	<p>1 x sub-MCC pump-room-panel for jockey pumps 02 Nos (1w+1s), AFFF pump-set & 1 no spare feeder as per following description</p> <p>a) The MCC shall be common to both 3 phase jockey offered & 01 No - 3 phase AFFF pump-set & 3 phase spare feeder for 3 kw & 3 phase 7.2 kw spare feeder without starter and 14</p>				

Price Preambles for Fire Water Pump-sets

Modernization of Fuel Farm -IGI Airport, Shahbad Mohammadpur, New Delh



Price Schedule (separately sealed cover with enquiry no & due date)					
	Nos. x 1 phase x 0.5 DP MCCB (for 05 Nos. DE local panels and 05 nos. oil heaters & 1 siren, 2 motors of jockey sets if exceed30 kw).				
	b) Consumable & G. I. 35 x 6 mm thick double earthing strip grid for the pump-room pumps (sr. 1 & 2 both) & sub-MCC (sr. no. 3 below), pumps local panels & PBS & hooking up to out-side pump-room earthing pits as per specifications.				
1+2+3	Total LSTK rate (SN 1, 2, 3)				
4	Installation & commissioning assistance by providing services of 'Installation & commissioning supervisor per dime rate.		15		
5a	1 set x 2 years mandatory maintenance spares for sr. no 1 pump-set		Lot		
	1 set x 2 years mandatory maintenance spares for sr. no 2 pump-set				
5b	1 set x 2 years mandatory maintenance spares for local control panel pump-set at sr. no1 above		Lot		
6	Rates for AMC shall be given separately as an attachment and shall be valid for 1 year from the date of PO placement for supply of pumps. a) Rate shall be with & without consumable of oil & spare-part for all main pump-sets & all jockey pump-sets.	Month	12		

PS: The price bid comparison shall be based on sum of cost of sr. no. 1, 2 & 3 items only.

Signature of the Contractor with Company Seal