



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/2015-16/13

UPGRADATION AND AUGMENTATION OF FIRE WATER SYSTEM

BID DUE DATE & TIME: 1500 Hrs. IST on 29th January, 2016

OPENING OF TECHNICAL BIDS: 1100 Hrs. IST on 30th January, 2016



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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

UPGRADATION AND AUGMENTATION OF FIRE WATER SYSTEM AS PER SPECIFICATIONS AS REQUIRED

TENDER NO: DAFFPL/MOD/FF/2015-16/13

Delhi Aviation Fuel Facility (P) Ltd (DAFFPL) invites sealed bids under single stage two bid system from eligible bidders for upgradation and augmentation of fire water system

Brief Scope of work:

We intend to upgrade and augment fire water system of the facility as per specification as required at our DAFFPL office.

Bid Security (EMD):	As mentioned in the Tender document
Date, Time & Venue for Voluntary Pre-bid Meeting:	11 th January, 2016; 1500 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 29 th January, 2016 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)

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.

The bidder/ contractor shall refer to various sections of this tender document for detailed scope of work. It is contractor's responsibility to execute the job in all respects as per detailed drawings, documents / specification furnished by consultant / owner and as per applicable codes, standards & in line of statutory requirements.

The field circumstances shall also be taken into consideration and methods suitable to the site conditions shall be adopted with concurrence of the Engineer-in-charge and in line with manuals, instructions of respective equipment and specified codes and standards. The successful accomplishment of the project is greatly influenced by the team work, workmanship of the workers and supervisors.

The Contractor shall employ only such workers and supervisors who have considerable experience of similar work and who can work, temperamentally in good harmony and co-operation.

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 construct the entire size/type/quantity bid by them. Bidders cannot bid for part items or part quantity.
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 Work 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 **30th January, 2016 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 / Manish Kumar Project Officer Vishnu.vardhan@daffpl.in , bksingh@daffpl.in , consultant@daffpl.in 882600228 / 9810640818	Mr V S Thakur (Consultant) Project Manager Virender.Thakur@mottmac.com 91-120-3992308 9313834546
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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 **11/01/2016 at 1500 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 4.0 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.
18. **Site Restriction:** The job has to be done in licensed area which is inside the premises of DAFFPL Fuel Facility. Successful bidder will have to follow all the security norms and procedures for entry and exit to the facility. The job timings will



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have to change as per the permissions obtained from Operation Dept. All the entry procedures for labours / machinery / raw materials as per the rules of the DAFFPL will have to be followed by the vendor. Contractor shall visit the site and ensure familiarity with the working condition / limitation at the site. Also the entire works are to be carried out in an operating Location. The contractor may have to follow the timings of the facility and have to work under restricted conditions. The normal working hours of plant is 0930 Hrs to 1800 Hrs on Monday to Saturday except holidays. Working beyond above normal working hours / holidays/ Sundays are to be with prior permission of Engineer in charge and relevant facility officers. Contractor is required to plan his work within the normal working hours and days and accordingly he has to mobilize the resources to complete the job within the scheduled time. However all efforts will be made by DAFFPL to give extended working time beyond normal working time in order to help the contractor for early completion of the job. No additional payment / charges shall be payable for such works. Not getting permission for working on holidays/ Sundays or beyond normal working hours will not be considered as reason for delay in work. The contractor and his personnel have to obey all rules and regulations of the plant. Trained and experienced supervisor/ engineer are required to be present at the work spot always.

All hot work like welding, cutting, grinding etc. needs to be done in the closed booth of asbestos cloth. No extra claim on account of the same will be considered. Also the shutdown jobs may get delayed due to operational requirement. Any extra claims on account of the same will not be entertained.

Vendor to note that DAFFPL will not provide water or electricity for construction; vendor has to arrange the same at his risk and cost.

The tenderer must visit the site of the tender and familiarize himself with location, operating / working conditions as well as any other local factors which could influence the working before quoting for the job. His quote should take care of any such restrictions; conditions etc and any claim afterwards will not be entertained. **It is suggested that the Tenderer must visit the site in order to have a better idea of site conditions and factors.**

19. **Completion Time:** Time is the essence of the contract. The time period of contract is **8 (Eight) months** from the date of Letter of Intent including monsoon period. **The time includes necessary time required for mobilizations and demobilizations after the execution of work and includes monsoon period.** Successful bidder is required to provide a bar chart /schedule showing the activities/events with time along with the Technical bid to be scheduled accordingly.



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20. The work is required to be done in a working/operating location, the party has to get necessary Hot/cold work permits from the concerned officer in plant as per OISD standards and all workmen should be provided with necessary safety helmet, safety belts, safety shoes and other standard safety equipment's. Any delay on account of non-adherence to safety norms, rules and regulations of plant as well as obtaining work permits from the plant shall not be accounted for the delay in completion of job.
21. **Receipt & storage of material at Site:** Contractor is required to make his own arrangement for unloading and storage of materials at site. Contractor is required to inform us prior to dispatch of materials and his representative required to be available for receipt and unloading of materials at site.
22. The successful vendor has to arrange and submit to fuel facility the proper **POLICE VERIFICATION DOCUMENTS** of all the labours, site in charges, supervisors, welders, grinders and all associated workmen who will be coming inside the terminal for carrying out related jobs.
23. For carrying out the jobs inside the depot the vendor has to arrange for electricity (sufficient nos. of acoustic DG sets), working water, associated tools, tackles, manpower, machinery of his own and no extra payment will be made to vendor on account of the same.
24. For arranging the electricity vendor to note that only Acoustic Proof, box type DG sets will be allowed inside the depot premises. Vendor to also note that proper GI plate type earthing system as per IS 3042 (LATEST) has to be provided by the vendor for DG set and no extra payment will be done for the same. There should be two nos. earthing system connected in a grid at a location as instructed by DAFFPL site in-charge
25. All the debris, scrap, cut pieces, etc coming out of fabricated plates, excavated earth, area cleaning will have to be shifted by the vendor to a location inside or outside the terminal premises as per the instruction of DAFFPL site in-charge and no extra payment will be done for the same.



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THE FORMS /ATTACHMENTS TO THIS TENDER ARE AS UNDER:

1. Covering Note – CHAPTER: 1
2. Instructions To Bidders - CHAPTER: 2
3. Bid-Qualification Criteria - CHAPTER: 3
4. Performance of Work – CHAPTER: 4
5. General Purchase Conditions- CHAPTER: 5
6. Technical Specification Documents - **(Attached separately as Annexure 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.
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.
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 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(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 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



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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.**
 - **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



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- 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 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 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.



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- 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 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.



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- 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.

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.**



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CHAPTER 3: BID-QUALIFICATION CRITERIA:

Bidders need to meet following pre-qualification criteria to qualify for short-listing as a successful vendor, who would be considered for tendering process for the job of “Upgradation and Augmentation of Fire Water System at DAFFPL”

➤ **Technical Criteria:-**

- **Past Experience:** Vendor should have executed successfully at-least 5 similar jobs at Petroleum oil terminals / depots / refineries / LPG plants / TOPs handling Petroleum products viz. ATF, MS, HSD, SKO, LPG in the preceding past 5 years reckoned from date of this notice.
- Bidder shall have experience of having successfully completed 05 similar works during last 5 years ending last day of month previous to the one in which applications are invited for either of the following:
 - ✓ **Three completed similar works of total value not less than 98 Lakhs**
 - Or**
 - ✓ **Two completed similar works of total value not less than 1.2 Crores**
 - Or**
 - ✓ **One completed similar works of value not less than 1.9 Crores**
- Bidder shall submit the following documents in support of full filling the above criteria:
 - ✓ PO copy for the civil works done in the past, indicating value of work.
 - ✓ Completion Certificate indicating P.O No & Date from User.

➤ **Financial criteria for job :-**

- Bidder shall have minimum average annual turnover of Rs.3 Crores as per audited financial results in the preceding three financial/calendar years. “Turnover shall mean Consolidated Turnover in case of a Bidder having wholly owned subsidiaries”

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:



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- 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 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);



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- 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 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.



CHAPTER 4: PERFORMANCE OF WORK

1. EXECUTION OF WORKS:

- a. All the works shall be executed in strict conformity with the provisions of the contract documents and with such explanatory detailed drawings, specifications, and instructions as may be furnished from time to time to the contractor by the Engineer-in-Charge whether mentioned in the contract or not. The contractor shall be responsible for ensuring that works throughout are executed in the most substantial, proper and workman like manner with the quality of material and workmanship in strict accordance with the specifications following all safety requirements of DAFFPL and as stipulated in work permits as per the directions and to the entire satisfaction of the Engineer-in-Charge.
- b. Wherever it is mentioned in the specifications that the Contractor shall perform certain work or provide certain facilities/materials, it is understood that the contractor shall do, so at his cost unless otherwise specified.
- c. The materials, design and workmanship shall satisfy the relevant Indian Standards, the Job specification contained herein and codes referred to. Where the job specification stipulate requirements in addition to those contained in the standards codes and specifications, these additional requirements shall also be satisfied.

2. COORDINATION AND INSPECTION OF WORK:

The coordination and inspection of the day-to-day work under the contract shall be the responsibility of the Engineer-in-Charge. The written instructions regarding any particular job will be normally be passed by the Engineer-in-Charge or his authorized representative. A work order book / logbook will be maintained by the Contractor for each job in which the aforesaid written instructions will be entered. These will be signed by the contractor or his authorized representative by way of acknowledgment within 12 hours. The non-maintaining of the order book or non-signing by the contractor shall not preclude the contractor from complying with the instructions.

3. WORK IN MONSOON AND DEWATERING:

- a. The completion of the work may entail working in the monsoon also. The contractor must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work in monsoon.
- b. During monsoon and other period, it shall be the responsibility of the contractor to keep the construction work site free from water at his own cost.



4. WORK ON SUNDAYS AND HOLIDAYS:

For carrying out work on Sundays and Holidays if needed, the contractor will approach the Engineer-in-Charge or his representative at least two days in advance and obtain permission in writing. No special compensation on this account will be payable.

5. GENERAL CONDITIONS FOR CONSTRUCTION AND ERECTION WORK:

- a. Place of Work: The work has to be executed at specified premises as per the tender. Contractor should apprise himself of all the conditions prevailing in such location and the restrictions placed on movement of personnel and equipment, types of equipment and tools permitted, working methods allowed etc. in the light of security and safety regulations operative in the area. The safety regulations to be complied with, by the contractor will also be provided along with the tender. No idle time wages or compensation for temporary stoppage of work or restrictions would be paid, and the rate quoted for the various items of work should cover the cost of all such contingencies and eventualities. Substantial structures and utilities exist both above ground and underground, adjacent to the work site. (The construction activity gets restrained by the existence of such structures and utilities). Special care is necessary in transportation, storage, working on equipment's and other construction activities to protect the existing features and prevent damage to any facility. Necessary protective structures barricades etc. have to be erected at various places as directed by Engineer-in-Charge. No extra payment of such protective works will be made unless specially provided in the tender.
- b. The working time or the time of work is 48 hours per week normally. Overtime work is permitted in cases of need and the Owner will not compensate the same. Shift working at 2 or 3 shifts per day may become necessary and the contractor should take this aspect into consideration for formulating his rates for quotation. No extra claims will be entertained by the Owner on this account.
- c. The contractor must arrange for the placement of workers in such a way that the delayed completing of the work or any part thereof for any reasons whatsoever will not affect their proper employment. The Owner will not entertain any claim for idle time payment whatsoever.
- d. The contractor shall submit to the Owner reports at regular intervals regarding the state and progress of work. The details and Performa of the report will mutually be agreed after the award of contract.

6. DRAWINGS TO BE SUPPLIED BY THE OWNER:

- a. Where drawings are attached with tender, these shall be for the general guidance of the contractor to enable him to visualize the type of work contemplated and scope of work involved. The contractor will be deemed to have studied the drawings and formed an idea about the work involved.



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- b. Detailed working drawings on the basis of which actual execution of the work is to proceed will be furnished from time to time during the progress of the work. The contractor shall be deemed to have gone through the drawings supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the Engineer-in-Charge, discrepancies, if any, therein before actually carrying out the work.
- c. Copies of all detailed working drawings relating to the works shall be kept at the contractor's office of the site and shall be made available to the Engineer-in-Charge at any time during the contract. The drawings and other documents issued by the Owner shall be returned to the Owner on completion of the works.

7. SETTING OUT WORKS:

- a. The Engineer-in-Charge shall furnish the contractor with only the four corners of the work site and a level bench mark and the contractor shall set out the works and shall provide efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.
- b. The contractor shall provide, fix and be responsible for the maintenance of all stacks, templates, level marks, profiles and other similar things and shall take all necessary precaution to prevent their removal or disturbance and shall be responsible for the consequence of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The contractor shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and centre line marks, either existing or supplied and fixed by the contractor. The work shall be set out to the satisfaction of the Engineer-in-Charge. The approval thereof or joining in setting out the work shall not relieve the contractor of any of his responsibilities.
- c. Before beginning the works, the contractor shall at his own cost, provide all necessary reference and level posts, pegs, bamboos, flags, ranging rods, strings and other materials for proper layout of the work in accordance with the scheme, for bearing marks acceptable to the Engineer-in-Charge. The centre, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct marks at the centre to enable theodolite to be set over it. No work shall be started until all these points are checked and approved by the Engineer-in-Charge in writing but such approval shall not relieve the contractor of any of his responsibilities. The contractor shall also provide all labour, material and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction.
- d. Pillars bearing geodetic marks located at the site of work under construction should be protected and fenced by the contractor.
- e. On completion of works, the contractor must submit the geodetic documents according to which the work was carried out.



8. RESPONSIBILITY FOR LEVEL AND ALIGNMENT:

The contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the work and shall rectify effectually any errors or imperfections therein. Such rectifications shall be carried out by the contractor, at his own cost, when instructions are issued to that effect by the Engineer-in-Charge.

9. MATERIALS TO BE SUPPLIED BY CONTRACTOR:

- a. The contractor shall procure and provide the whole of the materials required for construction including tools, tackles, construction plant and equipment for the completion and maintenance of the works except the materials which will be issued by Owner and shall make his own arrangement for procuring such materials and for the transport thereof. The materials procured by the contractor shall be DAFFPL approved/specified quality.
- b. All materials procured should meet the specifications given in the tender document. The Engineer-in-Charge may, at his discretion, ask for samples and test certificates for any batch of any material procured. Before procuring, the contractor should get the approval of Engineer-in-Charge for any material to be used for the works.
- c. Manufacturer's certificate shall be submitted for all materials supplied by the contractor. If, however, in the opinion of the Engineer-in-Charge any tests are required to be conducted on the materials supplied by the contractor, these will be arranged by the contractor promptly at his own cost.

10. MATERIALS SUPPLIED BY OWNER:

- a. If the specifications of the work provides for the use of any materials of special description to be supplied from the Owner's stores, price for such material to be charged therefore as herein after mentioned being so far as practicable for the convenience of the contractor but not so as in any way to control the meaning or effect of the contract. The contractor shall be bound to purchase and shall be supplied such materials as are from time to time required to be used by him for the purpose of the contract only. The sums due from the contractor for the value of the actual materials supplied by the Owner will be recovered from the running account bill on the basis of the actual consumption of materials in the work covered and for which the running account bill has been prepared. After the completion of the works, however, the contractor has to account for the full quantity of materials supplied to him as per relevant clauses in this document.
- b. The value of the materials as may be supplied to the contractor by the Owner will be debited to the contractor's account at the rates shown in the schedule of chargeable materials and if they are not entered in the schedule, they will be debited at cost price, which for the purpose of the contract shall include the cost of carriage and all other expenses whatsoever such as normal storage



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supervision charges which shall have been incurred in obtaining the same at the Owner's stores. All materials so supplied to the contractor shall remain the absolute property of the Owner and shall not be removed on any account from the site of the work, and shall be at all times open for inspection to the Engineer-in-Charge. Any such materials remaining unused at the time of completion or termination of the contract shall be returned to the Owner's stores or at a place as directed by the Engineer-in-Charge in perfectly good condition, at contractor's cost.

11. CONDITIONS FOR ISSUE OF MATERIALS:

- a. Materials specified to be issued by the Owner will be supplied to the contractor by the Owner from his stores/location. It shall be the responsibility of the contractor to take delivery of the materials and arrange for its loading, transport and unloading at the site of work at his own cost. The materials shall be issued between the working hours and as per the rules of the Owner framed from time to time.
- b. The contractor shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued to him.
- c. Materials specified to be issued by the Owner shall be issued in standard sizes as obtained from the manufacturer.
- d. The contractor shall construct suitable godown at the site of work for storing the materials safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward establishment for the purpose.
- e. It shall be duty of the contractor to inspect the material supplied to him at the time of taking delivery and satisfy himself that they are in good condition. After the materials have been delivered by the Owner, it shall be the responsibility of the contractor to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/ or replaced by him at his own cost, according to the directions of the Engineer-in-Charge.
- f. The Owner shall not be liable for delay in supply or non-supply of any materials which the Owner has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transport and procurement difficulties and any circumstances beyond the control of the Owner. In no case, the contractor shall be entitled to claim any compensation or loss suffered by him on this account.
- g. It shall be the responsibility of the contractor to arrange in time all materials required for the works other than those to be supplied by the Owner. If, however, in the opinion of the Engineer-in-Charge the execution of the work is likely to be delayed due to the contractor's inability to make arrangements for supply of materials which normally he has to arrange for, the Engineer-in-Charge shall have the right, at his own discretion, to Issue such materials If available with the Owner or procure the materials from the market or elsewhere and the contractor will be bound to take such materials at the



rates decided by the Engineer-in-Charge. This, however, does not in any way absolve the contractor from responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur, nor shall this, constitute a reason for the delay in the execution of the work.

- h. None of the materials supplied to the contractor will be utilized by the contractor for manufacturing item, which can be obtained from standard manufacturer in finished form.
- i. The contractor shall, if desired by the Engineer-in-Charge, be required to execute an indemnity bond for safe custody and accounting of all materials issued by the Owner.
- j. The contractor shall furnish to the Engineer-in-Charge sufficiently in advance a statement showing his requirements of the quantities of the materials to be supplied by the Owner and the time when the same will be required by him for the works, so as to enable the Engineer-in-Charge to make necessary arrangement for procurement and supply of the material.
- k. A daily account of the materials issued by the Owner shall be maintained by the contractor indicating the daily receipt, consumption and balance in hand. This account shall be maintained in a manner prescribed by the Engineer-in-Charge along with all connected papers viz. requisition, issues etc. and shall be always available for inspection in the contractor's office at site.
- l. The contractor should see that only the required quantities of materials are got issued. The contractor shall not be entitled to cartage and incidental charges for returning the surplus materials, if any, to the stores/location where from they were issued or to the place as directed by the Engineer-in-Charge.
- m. Materials/ Equipment supplied by Owner shall not be utilized for any other purpose(s) than issued for.

12. MATERIALS PROCURED WITH ASSISTANCE OF OWNER:

Notwithstanding anything contained to the contrary in any or all the clause of this document where any materials for the execution of the contract are procured with the assistance of Owner either by issue from Owner's stock or purchase made under orders or permits or licences issued by Government, the contractor shall hold the said materials as trustee for the Owner and use such materials economically and solely for the purpose of the contract and not dispose them off without the permission of the owner and return, if required by the Engineer-in-Charge, all surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason, whatsoever on his being paid or credited such prices as the Engineer in-Charge shall determine having due regard to the condition of the materials. The price allowed to the contractor however, shall not exceed the amount charged to him excluding the storage charges if any. The decision of the Engineer-in- Charge shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the contractor shall in terms of the licenses or permits, and/or for criminal breach of trust, be liable to compensate the Owner a



double rate or high rate, in the event of those materials at that time having higher rate or not being available in the market, then any other rate to be determined by the Engineer-in-Charge and his decision shall be final and conclusive.

13. MATERIALS OBTAINED FROM DISMANTLING:

If the contractor in the course of execution of the work is called upon to dismantle any part for reasons other than those stipulated in clauses 64 & 68 hereunder, the materials obtained in the work of dismantling etc. will be considered as the Owner's property and will be disposed off to the best advantage of the Owner.

14. ARTICLES OF VALUE FOUND:

All gold, silver and other materials, of any description and all precious stones, coins, treasure relics, antiquities and other similar things which shall be found in, under or upon the site, shall be property of the Owner and the contractor shall duly preserve the same to the satisfaction of the Engineer-in-Charge and shall from time to time deliver the same to such person or person indicated by the Owner.

15. DISCREPANCIES BETWEEN INSTRUCTIONS:

Should any discrepancy occur between the various instructions furnished to the contractor, his agents or staff or any doubt, arise as to the meaning of any such instructions or should there be any misunderstanding between the contractor's staff and the Engineer-in-Charge's staff, the contractor shall refer the matter immediately in writing to the Engineer-in-Charge whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, or doubts, or misunderstanding shall in any event be admissible.

16. ALTERATIONS IN SPECIFICATIONS AND DESIGNS AND EXTRA WORK:

- a. The Engineer-in-Charge shall have power to make any alterations in, omissions from, additions to or substitutions for, the schedule of rates, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out such altered / extra / new items of work in accordance with any instructions which may be given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions or substitutions shall not invalidate the contract and any altered additional or substituted work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respect on which he agree to do the main work. The time for completion of work may be extended for the part of the particular job at the discretions of the Engineer-in-Charge, for only such alteration, additions or substitutions of the work, as he may consider as just and reasonable. The rates for such additional, altered or substituted work



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under this clause shall be worked out in accordance with the following provisions:

- If the rates for the additional, altered or substituted work are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract.
 - If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for similar class of works as specified in the contract for the work. The opinion of the Engineer-in-Charge as to whether the rates can be reasonably so derived from items in the contracts will be final and binding on the contractor.
 - If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub-clause (a) and (b) above, then the contractor shall inform the Engineer-in-Charge of the rate which is his intension to charge for such class of work supported by analysis of the rate or rates claimed, and the Engineer-in-Charge shall determine the rates on the basis of the prevailing market rates of materials, labour cost at schedule of labour plus 10% to cover contractor's supervision, overheads and profit and pay the contractor accordingly. The opinion of the Engineer-in-Charge as to the current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the contractor.
 - Provisions, contained in sub-clause mentioned above shall not, however, apply: Where the value of alterations / additions / deletions or substitutions exceeds beyond plus or minus 25% of the estimated contract value (i.e. quoted item rates of contractor shall hold good for variations etc. within plus or minus 25% of estimated contract value)
- b. In the event and as a result of such alternatives / additions / substitutions / deletion, the scope of contract work exceed the value stipulated in the contract by more than the limits given in clause above, the Contractor shall claim revision of the rates supported by the proper analysis in respect of such items for quantities in excess of the above limits, notwithstanding the fact that the rates for such items exist in the tender for the main work or can be derived in accordance with the provision of sub-clause (b) of Clause 61 A, and the Engineer-in-Charge may revise their rates having regard to the prevailing market rates, and the contractor shall be paid in accordance with the rates so fixed. But, under no circumstances the contractor shall suspend / stop / slowdown the work on the plea of non-settlement of rates of items falling under this clause.



17. ACTION WHERE NO SPECIFICATIONS ISSUED:

In case of any class of work for which there is no such specification given by the Owner in the tender documents, such work shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard Specifications do not cover the same the work should be carried out as per standard Engineering Practice subject to the approval of the Engineer-in-Charge.

18. ABNORMAL RATES:

The contractor is expected to quote rate for each item after analysis of cost involved for the completion of item/work, considering all specifications and conditions of contract. This will avoid loss of profit or gain, in case of curtailment or change of specification for any item. In case it is noticed that the rates for any item, quoted by the tenderer unusually are high or unusually low it will be sufficient cause for the rejection of the tender unless the Owner is convinced about the reasonableness of the rates on scrutiny of the analysis for such rate to be furnished by the tenderer on demand.

19. INSPECTION OF WORK:

- a. The Engineer-in-Charge will have full power and authority to inspect the works at any time wherever in progress either on the Site or at the contractor's premises / workshop where situated premises /workshops of any person, firm or corporation where work in connect with the contract may be in hand or where materials are being or are to be supplied, and the contractor shall afford or procure for the Engineer-in-Charge every facility and assistance to carry out such Inspection. The contractor shall at all time during the usual working hours and at all other time for which reasonable notice of the intention of the Engineer in-Charge or his representative to visit the works have been given to the contractor, either himself be present to receive order and instructions or post a responsible agent duly accredited in writing for the purpose. Orders given to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself. The contractor shall give not less than seven days, notice in writing to the Engineer-in-Charge before covering up or placing any work beyond reach of inspection and measurement any work in order that the same may be inspected and measured. In the event of breach of above the same shall be uncovered at contractor's expense carrying out such measurement or inspection.
- b. No materials shall be dispatched by the contractor before obtaining the approval of Engineer-in-Charge in writing. The contractor is to provide at all times during the progress of the work and the maintenance period, proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of the works by the Engine in-Charge.



20. ASSISTANCE TO THE ENGINEERS:

The contractor shall make available to the Engineer-in-Charge, free of cost necessary instruments and assistance in checking of setting out of works and taking measurement of work.

21. TESTS FOR QUALITY OF WORKS:

- a. All workmanship shall be of the respective kinds described in the contract documents and in accordance with the instructions of the Engineer-in-Charge and shall be subjected from time to time to such test at contractor's cost as the Engineer-in-Charge may direct at place of manufacture or fabrication or on the site or at all or any such places. The contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required the Engineer-in-Charge.
- b. All the tests necessary in connection with the execution of the work as decided by Engineer-in-Charge shall be carried out at the field testing laboratory of the Owner by paying the charges as decided by the Owner from time to time. In case of non-availability of test facility with the Owner, the required test shall be carried out at the cost of contractor at government or any other testing laboratory as directed by Engineer-in-Charge.
- c. If any tests are required to be carried out in connection with the work or materials workmanship not supplied by the contractor, such tests shall be carried out by the contractor as per the instructions of Engineer-in-Charge and cost of such tests shall be reimbursed by the Owner.

22. SAMPLES:

The contractor shall furnish to the Engineer-in-Charge for approval when requested or if required by the specifications, adequate samples of all materials and finishes to be used in the work. Such samples shall be submitted before the work is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finishing applied in actual work shall be fully identical to the approval samples.

23. ACTION AND COMPENSATION IN CASE OF BAD WORK:

If it shall appear to the Engineer-in-Charge that any work has been executed with unsound, imperfect or unskilled workmanship or with materials of any inferior description, or that any materials or articles provided by the contractor for the execution of the work are unsound or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, the contractor shall on demand in writing from the Engineer-in-Charge or his authorized representative, specifying the work, materials or articles complained of, notwithstanding that the same have been inadvertently passed, certified and paid for forthwith shall rectify or remove and reconstruct the works specified and provide other proper and suitable materials or articles at his own charge and cost, and in the event of failure to do so within a period to be specified by the Engineer-in-Charge in his demand aforesaid, the



contractor shall be liable to pay compensation at the rate of 0.5% of the estimated cost of the whole work, for every week limited to a maximum of 10% of the estimated cost of the whole work, while his failure to do so shall continue and in the case of any such failure the Engineer-in-Charge may on expiry of notice period rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be at the risk and expenses of the contractors in all respects. The decision of the Engineer-in-Charge as to any question arising under this clause shall be final and conclusive.

24. SUSPENSION OF WORKS:

The contractor shall, if ordered in writing by the Engineer-in-Charge or his representative, temporarily suspend the works or any part thereof for such period and such time as so ordered and shall not, after receiving such written order, proceed with the work therein ordered to be suspended, until he shall have received a written order to proceed therewith. The contractor shall not be entitled to claim/compensation for any loss or damage sustained by him by reason of temporary suspension of the works aforesaid. An extension of time for completion, corresponding with the delay caused by any such suspension of the works as aforesaid will be granted to the contractor, should he apply for the same, provided that suspension was not consequent to any default or failure on the part of the contractor.

25. OWNER MAY DO PART OF WORK:

Upon failure of the contractor to comply with any instructions given in accordance with the provisions of the contract, the owner has the alternative right, instead of assuming charge for entire work to place additional labour force, tools, equipments and materials on such parts of the work, as the owner may designate or also engage another contractor to carry out the work. In such cases, the owner shall deduct from the amount which otherwise might become due to the contractor, the cost of such work and materials with ten percent added to cover all departmental charges and should the total amount thereof exceed the amount due to the contractor, the contractor shall pay the difference to the owner.

26. POSSESSION PRIOR TO COMPLETION:

The Engineer-in-Charge shall have the right to take possession of or use any completed or partially completed work or part of the work. Such possessions or use shall not be deemed to be an acceptance of any work completed in accordance with the contract agreement. If such prior possession or use by the Engineer-in-Charge delays the progress of work, suitable adjustment in the time of completion will made and contract agreement shall be deemed to be modified accordingly.

27. PERIOD OF LIABILITY FROM THE DATE OF COMPLETION OF WORK:

- a. The contractor shall guarantee the installation/site work for a period of 12 (twelve) Months from the date of completion of work, unless otherwise



specified. Any damage that may lie undiscovered at the time of issue of completion certificate, connected in any way with the equipment or materials supplied by him or in the workmanship shall be rectified or replaced by the contractor at his own expense as deemed necessary by the Engineer-in-Charge or in default, the Engineer-in-Charge may cause the same made good by other workmen and deduct expenses (for which the certificate of Engineer-in-Charge shall be final) from any sums that may be then or at any time thereafter, become due to the contractor or from his security deposit.

- b. If the contractor feels that any variation in work or in quality of materials or proportions would be beneficial or necessary to fulfill the guarantee called for, he shall bring this to the notice of the Engineer-in-Charge in writing. The work will not be considered as complete and taken over by the Owner until all the temporary works etc., constructed by the contractor is removed and work site cleaned to the satisfaction of Engineer-in-Charge.
- c. Care of Works:
From the commencement to completion of works, the contractor shall take full responsibility for the care of all works including all temporary works, and in case any damage, loss or injury happens to the works or to any part thereof or to any temporary work, from any cause whatsoever, he shall at own cost repair and make good the same, so that at completion, the work shall be in good order and in conformity in every respect with the requirements of the contract and the Engineer-in-Charge's instructions.
- d. Effects prior to taking over: If at any time, before the work is taken over, the Engineer-in-Charge shall
 - Decide that any work done or materials used by the contractor or any sub-contractor is defective or not in accordance with the contract or that the works or any portion thereof are defective or do not fulfill the requirements of contract (all such matters being herein after called 'Defects' in this clause) and
 - As soon as reasonably practicable, notice given to the contractor in writing of the said decisions specifying particulars of the defects alleged to exist or to have occurred, then the contractor shall at his own expenses and with all speed make good the defects so specified. In the case contractor shall fail to do so, the Owner may take, at the cost of the contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure, so incurred by the Owner shall be recovered from the amount due to the contractor. The decision of the Engineer-in-Charge with regard to the amount be recovered from the contractor will be final and binding on the contractor. As soon as the works have been completed in accordance with the contract and have passed the tests on completion, the Engineer-in-Charge shall issue a certificate (hereinafter called completion certificate) in which he shall certify the date on which the work have been so completed and have passed the said tests and the



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Owner shall be deemed to have taken over the works on the date so certified. If the works have been divided into various groups in the contract, the Owner shall be entitled to take over any group or groups before the other or others and thereupon the Engineer-in-Charge shall issue a completion certificate which will however, be for such group or groups as taken over only.

- e. Defects after taking over: In order that the contractor could obtain a completion certificate, he shall make good with all possible speed, any defect arising from the defective materials supplied by the Contractor or workmanship or any act of omission of the contract that may have been noticed or developed after the works or group of the works has been taken over. The period allowed for carrying out such work will be normally one month. If any defect be not remedied within a reasonable time, the Owner may proceed to do the work at the contractor's risk and expense and deduct from the final bill such amount as may be decided by the Owner. If by reason of any default on the part of the contractor a completion certificate has not been issued in respect of every portion of the work within one month after the date fixed by the contract for the completion of the works, the Owner shall be at his liberty to use the works or any portion thereof in respect of which a completion certificate has been issued provided that the works or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the issue of completion certificate.
- f. The Security Deposit/retention money deducted / furnished shall be retained for the period of liability as given in clause above. This Retention amount or Bank Guarantee furnished against Security Deposit/retention money shall be released only on expiry of the period of liability and also based on the certification of the Engineer-in-charge that no defect/damage has been reported / observed during the stipulated period of liability for the contract.
- g. Performance of contractor shall be evaluated on each job by Engineer-in-Charge and recorded. Review of performance will be carried out at appropriate intervals by DAFFPL.



CHAPTER 5: GENERAL TERMS & CONDITIONS:

1. General:

The materials and workmanship shall satisfy the relevant Indian Standards, the job specifications contained herein & codes referred to. Where the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

In the absence of any standard / specification / codes of practice for detailed specifications covering any part of the work covered in this tender document, the instruction / direction of consultant engineer will be binding on the contractor.

Wherever it is stated in this tender document that a particular supply is to be effected or that a particular work is to be carried out, it shall be understood that the same shall be affected / carried out by the contractor at his cost, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context.

2. Construction Program:

A detailed bar chart showing various activities shall be prepared by the tenderers. The work shall be executed strictly as per the agreed time schedule. The period of completion shall include, the time required for mobilization and testing as well as rectification, if any, testing & completion in all respects to the entire satisfaction of the consultant.

A joint programme of execution programme shall be prepared by the contractor.

Monthly / weekly construction programme shall be made by the contractor. The contractor shall scrupulously adhere to these targets / programme by deploying adequate personal and construction tools and tackles. He shall also supply all materials in his scope of supply in time to achieve the targets set out in the weekly and the monthly programme.

The contractor shall give every day, a report on labour and equipment deployed along with the progress of the work done on previous day, for each category of work.

3. Construction Water and Electricity:

- Electricity will be provided by DAFFPL @ Rs. 14.50 per unit. Bidder has to make own arrangement for sub meter.
- Water for construction will not be provided by DAFFPL.

4. Safety Rules and Regulations:

All Safety rules and regulations of the terminal operator have to be followed by the



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contractor without fail. If any damage occurs due to negligence of safety, contractor will be held responsible for the same.

5. Tests and Inspection:

The contractor shall carry out the various tests as enumerated in the technical specifications of this tender document and the technical documents that will be furnished to him during the performance of the work. No separate payment shall be made.

The contractor shall carry out at his cost, all the tests either on the field or through external institutions / laboratories, concerning the execution of the work and supply of materials by the contractor.

Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the contractor shall carry out the rectification at this own cost. Results of all inspection & tests shall be recorded in the inspection reports, test reports, etc., which will be approved by the Engineer-in-charge. These reports shall form part of the completion documents.

Inspection & Acceptance of works shall not relieve the contractor from any of his responsibilities under this contract.

6. Site Cleaning:

The contractor shall take care to clean the working site from time to time for easy access to work site and for safety. Working site should be always kept cleared to the entire satisfaction of DAFFPL.

Before handing over any work to the owner, the contractor in addition to other formalities to be observed as detailed in the document shall clear the site to the entire satisfaction of DAFFPL.

7. Coordination with other Agencies:

Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the contractor. Proper coordination with other agencies will be the responsibility of the contractor. In case of any dispute, the decision of Engineer-in-charge shall be final and binding on the contractor.

8. 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.



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9. 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 item 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.

10. 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.

11. All shipment shall be under deck unless carriage on deck is unavoidable.

12. 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).

13. Indian agent Commission will not be paid by the owner.

14. 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 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



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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.

15. 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.

16. 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



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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.

17. 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



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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.

18. PRICE REDUCTION FOR DELAY IN DELIVERY:

- a) The completion period quoted must be realistic & specific. The inability of successful bidder to execute orders in accordance with the agreed completion 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 completion of work shall be considered for calculation of price reduction
- c) The price reduction clause shall become applicable for works done beyond the schedule completion period of six months.

19. 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.



20. INSPECTION:

- a) Material / construction shall be inspected by owner or its representative. Charges other than third party inspection, is entirely vendor responsibility and in no way should affect the completion 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 anyway 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 non-performance of the Contract.

21. 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 18 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 warranty on the parts, components, fittings, accessories etc. so repaired and / or replaced.



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- 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.

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

23. PAYMENT TERMS: The payment terms given below are subjected to the following conditions:

- Monthly progressive payments shall be made towards the work completed as per the payment terms and as per agreed rates, against running account bills submitted by the contractors.
- Payment will be released within 30 Days from the date of receipt of Invoice.
- There will be a deduction of 10% towards retention amount from every running account bill which may be released against equivalent performance bank guarantee on completion of jobs.

➤ **CIVIL**

- **90% on completed individual item of work.**
- **10% on completion of all and final acceptance by site-in-charge**

➤ **Mechanical**

- **Structural Steel Works**
 - ✓ **60% after supply, inspection, acceptance of material and fabrication**
 - ✓ **20% after erection and welding**
 - ✓ **20% on completion of all works and final acceptance by site-in-charge**
- **Fittings**
 - ✓ **100% after supply, installation and acceptance by site-in-charge**
- **Painting Works**
 - ✓ **30% after surface preparation and application of one coat of primer**
 - ✓ **30% after second coat of primer**
 - ✓ **40% after application of finish paint, completion of all works and acceptance of site-in-charge**
- **Piping**



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- ✓ **50% after completion of fabrication**
- ✓ **30% on completion of erection including provision of supports, vents, drains etc., alignment and welding including completion of radiography and other examinations as specified.**
- ✓ **20% after lines are pressure tested and finally accepted in all respects by site-in-charge**

24. 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.
25. 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.
26. 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.
27. 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.
28. Rejected material lying in Owner premises must be replaced within 60 days from date of final report on rejection of material.
29. 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.
30. PATENTS & ROYALTIES: The vendor shall fully indemnify owner and users of



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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 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.

31. **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.
32. **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.
33. **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



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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.

34. **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.
35. **NEW & UNUSED MATERIAL**: All the material supplied by the vendor shall be branded new, unused and of recent manufacture.
36. **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



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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.

37. **ANTI –COMPETITIVE AGREEMENTS/ABUSE OF DOMINANT POSITION** : The Competition Act, 2002 as amended by the Competition (Amendment) Act, 2007 (the 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.
38. **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.
39. **GOVERNING LAW**: These General Purchase Conditions shall be governed by the Laws of India.
40. **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.
41. 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



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- 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 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.

42. 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.

43. ARBITRATION

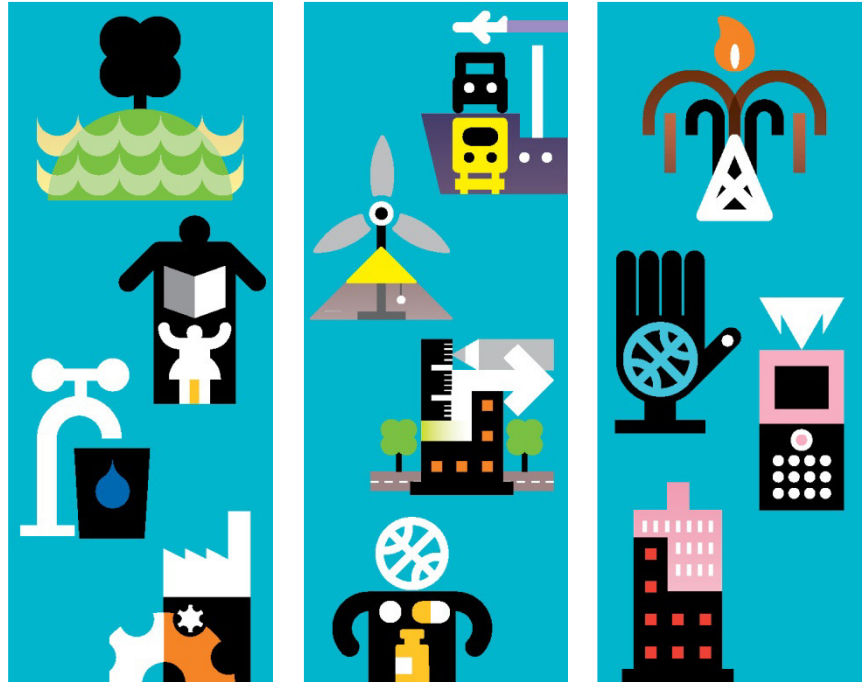
- a) Any 'dispute or difference of any nature whatsoever, any claim, cross-claim, counterclaim or set off of the Owner against the Consultant or regarding any right, liability, act, omission or account of any of the parties hereto arising out of or in relation to this agreement shall be referred to the 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



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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 & 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.



Piping Tender Specification Tech Part II Fire Suppression

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

September 2015

Delhi Aviation Fuel Facility Private Limited



Piping Tender Specification Tech Part II Fire Suppression

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

September 2015

Delhi Aviation Fuel Facility Private Limited

Delhi Aviation Fuel Facility Pvt. Ltd. Aviation Fuelling Station, Shahbad
Mohammad Pur, IGI Airport, new Delhi.110061

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
P1	Aug. 28, 2015	KDP	MMS	VST	Issued for Comments
R0	Sept. 03, 2015	KDP	MMS	VST	Issued for Bidding
R1	Sept. 19, 2015	KDP	MMS	VST	Client's comments incorporated & Issued for Bidding
R2	Dec. 14, 2015	KDP/JMT	MMS	VST	Fire pump house size revised & Issued for Bidding

Information class: Standard

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1 Project Introduction

1. 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 designed, engineered, procured, fabricated, assembled, inspected, tested, and delivered site of Diesel Engine Driven Centrifugal Pumps and Electrically Driven Jockey Pumps for its installation & commissioning within the Fuel Farm of DAFFPL, IGI Airport, New Delhi.

This technical tender shall cover the indicative quantity pipe-net required to be upgraded to fight the fire in the event of any contingency arising due to fire incidence within the Fuel Farm as per the OISD 235 / OISD 117 / OISD 118.

2. This tender pipe-net/s shall be used to pump water from cone roof existing 3 vertical fire water storage tanks to the fire hydrant cum sprinkler header & foam piping network/s & fixed / HVLR foam piping network/s.

2 General

2.1 General

This technical tender shall cover the indicative quantity pipe-net required to be upgraded to fight the fire in the event of any contingency arising due to fire incidence within the Fuel Farm as per the OISD 235.

2.2 Scope

This tender pipe-net/s shall be used to pump water from cone roof existing 3 vertical fire water storage tanks to the fire hydrant cum sprinkler header & foam piping network/s. The pipe-net of this tender is covered as 'pump-house piping & field area piping for hydrant cum sprinkler header & foam piping network/s.

Deviation from good engineering practice is not intended. In the absence of any omission in this specifications, good engineering practices will prevail, utilizing first quality new materials and with good workmanship.

2.3 Definitions

1. The "Owner / Purchaser" means M/s DAFFPL having their registered office in New Delhi.
2. The "Consultant" means Mott MacDonald Pvt. Ltd. & its India operation Registered Office at Bombay or its successor or its authorised assignees.
3. The "Contractor / Fire Suppression System / FPS contractor" means the person or the persons, firm or company, whose tender has been accepted by the Owner and includes the contractor's legal representative, his successor and permitted assignees, including his suppliers or manufacturers or on whom an order is placed for the supply & installation of referred items. This definition shall also include any sub-supplier or manufacturer on whom a sub-order is placed.
4. The "Owner representative" shall mean the person designated as such by the Owner and shall include those who are expressly authorised by the Owner to act for them on their behalf.
5. The "Work" means and includes all work to be done and all services to be rendered by the Contractor under the contract.
6. "Construction Equipment" means all appliances and equipment of whatsoever nature for use in or about the execution, completion, operation or maintenance of the work.
7. "Site" means the areas on which the Permanent Works are to be executed or carried out and any other places provided by the Owner for the purposes of the contract.
8. The "Contract Document" means collectively the bid / tender / contract documents, drawings, specifications, agreed variations if any, minutes of meeting and such other documents as may be mentioned in the contract as having to be construed with the contract.
9. The "Contract" shall mean the Agreement between the Owner and the Contractor for the execution of the works, however, including therein all contract documents.

10. The "Specifications" shall mean the specifications for materials, workmanship and mode of construction and tests annexed to this contract and forming part of Schedules
11. The "Drawings" shall include plans and tracings or prints thereof with any modifications approved in writing by the Owner representative and such other drawings as may from time to time be furnished or approved in writing by the Owner representative.
12. "Variation" shall include amendment, alteration, addition, omission and / or substitution.
13. The terms "Schedule of rates" is considered to be synonymous with the term "Schedule of quantities" and can be used interchangeably.
14. The terms "Quality Assurance Plan" is considered to be synonymous with the term "Inspection Test Plan" and can be used interchangeably.
15. "Inspection lot" shall mean a Group of items offered for inspection covered under same size, Heat and Heat treatment lot.
16. Words imparting persons include firms and corporations. Words imparting the singular number include the plural number and vice versa where the context so requires or admits.

2.4 Compliance

Compliance by all Bidders, with provisions in this specification shall not relieve him of his responsibilities to supply the piping conforming to the requirements and guide lines as specified in codes and standards.

In case, there is a conflict between the Purchaser's supplied documents and the referenced / mandatory specifications, the more stringent one shall prevail.

Should there be any deviation / from this Specification, the successful bidder (Vendor / Contractor) shall notify the Purchaser in writing and obtain Purchaser's / Owner / Consultant decision in writing in respect of such deviation/(s).

2.5 Quality Conformance

The Bidder/s shall prove and satisfy the Purchaser that his obligations within the scope of this document are in accordance with the relevant section of BS EN ISO 9001. Prior to commencement of work, the Bidder/s shall submit a Quality Plan and procedural specifications for Purchaser's review and approval.

The Quality Plan shall define scope of work of all the sub-bidder / associates with the work. This Specification shall only indicate a general requirement and shall not relieve the Bidder/s of his obligations to comply with the requirements of the Contract.

2.6 Safety

All work shall be performed in accordance with the safety requirements listed in the contract documentation and any mandatory standards and legislation.

2.7 Site Particulars

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	:	50 °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

2.8 Design Temperature

The Maximum Design is to be considered with respect to above environmental design parameters given in above table1.1.

2.9 Abbreviations

Abbreviations

A/G	:	Aboveground
ANSI	:	American National Standard Institute
EI	:	Energy Institute
ASME	:	American Society for Mechanical Engineers
ASTM	:	American Society for Testing and Materials
CE	:	Carbon equivalent
CI	:	Cast Iron
CS	:	Carbon Steel

DFT	:	Dry Film Thickness
DPT	:	Dye Penetrant Testing
ERW	:	Electric Resistance Welding
FPS	:	Fire Protection System
FLG	:	Flanged
FM	:	Factory Mutual
GA	:	General Arrangement
GFC	:	Good for Construction drawings / documents.
H	:	Hold (Do not proceed without approval)
HIC	:	Hydrogen Induced Cracking
HT	:	Heat Treatment
IC	:	Inspection Certification
IFC	:	Issued for Construction drawings / documents.
IGC	:	Inter Granular Corrosion
IP	:	Ingress Protection
ITP	:	Inspection and Test Plan
LPT/LP	:	Liquid Penetrant Test
MM	:	millimetre
MOC	:	Material of Construction
MPT/MT	:	Magnetic Particle Test
MS	:	Mild Steel
MSS- SP	:	The Manufacturers Standardization Society of Valves and Fitting Industry - Standards Practices
MTC	:	Material Test Certificate
NB	:	Nominal Bore
NDT	:	Non Destructive Testing
NFPA	:	National fire protection association
OISD	:	Oil Industry Safety Directorate
OD	:	Outside Diameter
P	:	Perform
PMI	:	Positive Material Identification
PMS	:	Piping Material Specification
PO	:	Purchase Order
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
QA/QC	:	Quality Assurance / Quality Control

QAP	:	Quality Assurance plan
QC	:	Quality Control.
R	:	Review
RAN	:	Random
RPT	:	Reports
RT	:	Radiography Test
RW	:	Random Witness
SCH/ Sch	:	Schedule
SOR	:	Schedule of Rates
SOQ	:	Schedule of Quantities
SS	:	Stainless Steel
TC	:	Test Certificate
TPIA	:	Third Party Inspection Agency / Owner / Owner representative / Consultant / Owner representative
UT	:	Ultrasonic Testing
U/G	:	Underground
UL	:	Underwriter's Laboratory
W	:	Witness (Give due notice)
WPQ	:	Welder Performance Qualification
WPS	:	Welding Procedure Specification

2.9.1 Battery limits

1. As described in chapter no. 5.4.1.

2.9.2 Qualification Criteria

1. The Bidder shall have the single point responsibility for the complete work.
2. The Bidder shall be a Fire detection & suppression pipe-net Contractor.
3. Bidder in the last five (5) years should have engineered, executed, tested and commissioned at least SEVEN (07) nos. of identical or similar piping & related electrical work tenders of Fire protection system (detection & suppression) piping net-work/s in terms of its size & cost (2 crore or more) and at least THREE (3) of these executed works should have completed the continuous trouble free operations of a minimum of 12months from the date of commissioning as on the bid due date in the last three (3) financial years.
4. For sr. no. 3 above, Bidder to give documentary evidence (confirmation from the purchaser and Owner may at his discretion make additional checks for the same).
5. The listing of these sr. no. 3 data shall also have 'start date / end date / value in In. Rs. / 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 \$'.

6. For the international Vendor shall have full-fledged service support set-up in India or have appropriate arrangements for the same with the established local reputed company.

2.9.3 Bid Submission

1. Two copies of bid are to be submitted in a separate sealed envelope, super scribed with the enquiry no. and bid due date.
2. The equipment / package are to be offered as described in the SOQ / BOQ on lump-sum turnkey (LSTK) price basis for supply & installation or only installation.
3. Bids through Telex / Fax/ E-mail are **NOT** acceptable. However, pre-bid & post bid the clarification / confirmations of each bidder shall be responded / communicated by mail only & each bidder shall be responding as per the stipulated dates given there in each communication.
4. Vendors are advised to quote strictly as per terms and conditions of the tender documents and clearly stipulate any deviations / exceptions (in the prescribed annexure only) 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.
5. Please note that the owner / purchaser reserve the right to reject any or all the vendors and accept complete or partial bids without assigning any reasons thereof.

2.9.4 Area Classification

1. Fire water pump-room - Classified Non-Hazardous
2. Field area fire water & foam concentrate piping – Hazardous licenced area (refer the hatch area of the over-all lay-out of proposed modernisation of DAFFPL facility Phase I)

3 Description of Fire Protection System

1. Firefighting facilities shall be designed to satisfy the requirements of OISD 235 / 117 / 118, regulations, and on the basis that fire water supply will not be available from any external source.
2. In accordance with OISD guidelines, two largest fire risks shall be considered for water storage and pumping requirements.

3.1 Fire Water System

1. Raw Water as available from local tube wells shall be used for fire extinguishing, and for fire control. The main components of the fire water system are:
2. Fire water storage tank (Present)
3. The water storage requirement is worked out (1964x4 hrs = 7856 say @ 7900~8000 KL.
4. The existing (old) set-up of 3 nos. (each of 4700 kl, 2300 kl, 900 kl) fire water tanks of above ground M. S. (mild steel) construction having limitation during 4700 kl cleaning schedule.
5. However, DAFFPL, future modernisation phase II planning as per over all drawing with terminal ATF storage capacity of 42800 KL with future new ATF tanks (2x9000 KL) shall also cover new fire water tanks of 2 x 9000 KL.
6. Fire water pumps configuration for proposed firewater pump-house
 - 3 x 610 m³/hr. Diesel engine driven fire water pumps (Working)
 - 1 x 610 m³/hr. Diesel engine driven fire water pumps (Future space planning)
 - 2 x 610 m³/hr. Diesel engine driven fire water pumps (Stand by)
 - 2 x 55 m³/hr. Electric motor driven Jockey pumps (shall be same for future as well).
7. The firefighting facilities shall be designed so as to meet the highest water flow requirement to extinguish two largest fire risks & fixed foam systems for one largest risk simultaneously at a time as per OISD 235. The fire / fixed-HVLR foam hydrant systems (minimum 2 Nos.) ring mains network shall be designed to cater the present requirement (DAFFPL facility)

3.2 Brief Description of Components of Fire Protection System

Fire hydrant system

MVWS system

Fixed / HVLR foam system

3.2.1 Fire hydrant system

Fire Water Pumps

1. Existing Firefighting network is working with existing pumping facilities.
2. All the fire water pump(s) including the standby pump will be capable of discharging 150% of its rated discharge at a minimum of 65% of the rated head. Each engine will have an independent fuel tank of suitable size for minimum **6 hrs**. Continuous running.
3. The new Jockey pumps and new fire pumps will be put in auto start/stop and auto/manual stop mode with the help of separate pressure switch respectively. For periodic testing each main pump (working & stand by) shall have controlling bypass toggle switch.

Fire Hydrant Network

The fire Hydrant network shall in general be on the following basis:

1. A fire hydrant ring main around the area with hydrant posts at every 30 M., which shall be placed at least 6~15 away from the periphery of the ground floor area, but not beyond 15M. to make it operational during a fire.
2. The Hydrant network shall be fed through the fire water pumps.
3. In the normal course, pressure in the hydrant network will be maintained through jockey pump. Jockey pump will come into operation to maintain the pressure in the system, to take care of small leakage and stop as and when the pressure is developed in the hydrant system.
4. In case of a fire, when the hydrant valves are opened to fight the fire, jockey pump will not be able to maintain the pressure in the system, and then main fire water pumps shall automatically come into operation as per a predefined sequence to maintain the pressure in the system. After the firefighting operation is over, the main pumps will be stopped manually and the jockey pump will maintain the pressure in the hydrant network.
5. Sizing of the fire hydrant main shall be based so that a minimum pressure of 7 kg/cm² should be available even at the hydraulically remotest hydrant point in the fire hydrant.
6. In case of excessive pressures in hydrant outlets at lower levels, orifice of suitable design shall be provided in the landing valves, where necessary, to limit the operating pressure to 7.0 kg/cm².
7. The fire hydrant network shall be in closed loops to ensure multidirectional flow in the system and for a low pressure drop. Isolation valves shall be provided to enable isolation of any section of the network without affecting the flow in the other sections. The isolation valves shall normally be located near the loop junction. Isolation valve in each loop shall be so located that even during maintenance or break down in any portion of the hydrant network; water shall be available at least in 50% of the hydrants point of that loop.
8. The vendors shall take note of the following for the fire hydrant ring main laid above ground:
 - Only at unavoidable places, the Pipelines shall be laid with their bottoms at a depth of 1200 mm from the finished grade level with suitable coatings / wrappings for protection against soil corrosion & with in the NP class III RCC Hume pipes.
 - In case of poor soil conditions it may be necessary to provide masonry supports under the pipe lines.
9. The fire water ring main shall be sized considering future expansion of the building and hence for 120% of the design water flow rate. Design flow rates shall be distributed at nodal points to give the most realistic and reliable water requirement in an emergency.
10. Double hydrants shall be located @ 30 m distances bearing in mind the fire hazards at different sections of the premises to be protected and to give most effective and reliable source of firefighting.
11. Hose boxes with 2 nos. hoses and a nozzle shall be provided at each hydrant point.
12. All the valves (gate / globe / check / control) used at the pump house & pipe-net shall be of cast carbon steel with 13 % chromium steel seat.

Other Fire Fighting Equipment & Accessories

1. Portable fire extinguishers

- Portable fire extinguishers shall be located at convenient locations and shall at all times be readily accessible and clearly visible to fight fires of minor nature.
- The maximum running distance to locate an extinguisher in working areas shall not exceed 15 meters.
- The top surface of the extinguisher shall not be located more than 1.5 meters above the floor.
- The fire extinguishers shall be provided / fixed at various locations if required and as per instruction of EIC.

2. Hoses, Nozzles and Accessories

- Reinforced rubber lined hoses conforming to IS: 636 (Type A or B) shall be provided.
- The hoses shall be of 15 meters standard length and shall be provided with SS / gun metal / aluminum alloy male and female couplings of instantaneous pattern.
- 10% (/ minimum 2 nos.) of the calculated requirement of firefighting hoses/nozzles/couplers/branch pipes shall be provided as an additional spare requirement at the store, if asked.
- In addition to above spares items minimum 2 nos. of fog Nozzles, Universal Nozzles and water curtain nozzles to be kept in store if asked.

3.2.2 Medium Velocity Water Spray (MVWS) system

This includes mainly the following:-

1. Existing Medium Velocity Water Spray (MVWS) system is working in accordance with the OISD-235 / 117. System design flow rates and pressure limit range for the nozzles as per OISD-235 /117.
2. Water flow calculated for cooling a tank on fire at a rate of 3 lpm/m² of tank shell area. In single Dyke area more than on tank there Water flow calculated for exposure protection for all other tanks falling within a radius of (R +30) m from centre of the tank on fire (R=Radius of tank on fire) and situated in the same dyke at a rate of 3 lpm/m² of tank shell area.
3. 2 Nos. spray ring has been considered for a single tank.
4. Isolation (Manual) valves, drain valves, strainers, galvanised steel protection piping & fittings, spray nozzles, pipe supports, pressure gauges, etc.
5. Fixed protection piping network system has been provided with spray nozzles located on the protection piping network around equipment for complete coverage over the shell and the roof. Rundown from the surface will control spill fires while the spray itself serves to cool the surface.
6. Fire water for the manual operated medium velocity water system has been tapped from the nearest under / above ground fire water main.
7. The Vendor (successful bidder) scope shall include the detail engineering drawing generation (& its approval by owner / consultant)

3.2.3 Fixed foam system (Manual)

This includes mainly the following:-

- a) Foam concentrate storage tank with inline educator package with required size of hydrant tap off, Foam water pipe net and Foam chamber as per drawings.

- b) Capacity of fixed foam system shall be calculated for full liquid surface of tank for 65 minutes duration as per OISD- 235 according to present layout.
- c) The foam water system is considering the foam (3% AFFF) storage tank. Inline inductor, Isolation valves, Foam chamber & Piping. In case of fire, manual Isolation valve to be opened. Foam shall mix with water in, inline inductor and foam solution shall be supply to foam chamber. Foam shall be spread on burning surface of liquid to make blanket to cut of oxygen to extinguish fire.
- d) All the valves (gate / globe / check / control) used at the foam generator package & its concentrate lines shall be SS 304 except the hydrant line hook-up valve & foam-water pipe-net shall be of cast carbon steel with 13 % chromium steel seat.

3.2.4 Fixed / HVLR foam system

- 1. Foam concentrate storage tank with inline educator package to be hooked with required size of hydrant tap off, (3% AFFF) Foam water pipe net and HVLR / fixed water cum foam monitor (capacity 1750 / 3500 lpm) to be placed staggered with water monitor as per drawing.
- 2. HVLR monitor shall be positioned in such a way that all the tanks in the installation are within horizontal / vertical flow of monitor are covered common foam water pipe-net.
- 3. Fixed foam pourers are already fixed on every vertical tank. The existing underground piping shall be replaced with above ground to these Foam Pourers as per drawing.
- 4. Capacity of HVLR Monitor shall be calculated for full surface fire scenario of the largest single tank @ 5 / 8.1 lpm / m² for 65minuts duration as per OISD-235 / 117.
- 5. All the valves (gate / globe / check / control) used at the foam generator package shall be SS 304 except the hydrant line hook-up valve & foam-water pipe-net shall be of cast carbon steel with 13 % chromium steel seat.
- 6. The foam concentrate (3% AFFF) line for the foam water generation system shall be SS304 as per piping specification.

4 Design criteria

4.1 General

1. Apart from the local statutory compliance, firefighting Systems shall be designed to meet the requirements of OISD 235 / 117 / 118 only & **if required**, NFPA 13 / 14 /15 (latest) for sprinkler / hydrant / spray type sprinkler arrangement guidelines respectively.
2. Control room (Server room) area only consider for fire detection envisagement by MSD (heat & smoke i.e. multi sensor detector) / VESDA system as per OISD & suppression by environmental friendly gas (FM200 / NOVEC 1230) suppression as per NFPA 2001, based on its viability in running terminal.
3. Design of the firefighting systems shall be based on the assumption that no firefighting resource from outside the plant will be available in case of emergency. Fire within the facility shall be controlled and extinguished from the plant resources only. The Owner shall provide 3 phase power cable at one corner of the pump-room through independent sources.
4. Power to motor driven jockey fire water pumps & rest of the D.E. driven fire water pump-sets (3w + 2s) local control panel, battery charger/s of D.E. pumps shall be through the ***free issue MCC***. The MCC shall be erected / fixed in the fire water pump room wall / floor mounting. The single point cable to the *MCC* & lighting / exhaust fans required places in the pump-room shall be by owner as per this / electrical SOQ / BOQ of electrical tender. If required more single phase power outlets at the vendor supplied *MCC* panel.
5. Fire pump set of (**free issue**) and water storage capacity is derived based on the OISD-117/235..
6. To protect each aviation fuel tank bund area for fuel spillage, HVLR foam monitor/s are envisaged. For this, there are existing monitor as well as *new (additional)* fire water cum foam monitor/s proposed where distance are not up to the requirement of OISD 235. These all monitors are to be converted to *water cum foam* monitor. Each of these existing & new / additional proposed monitors, shall be hooked to 3 % AFFF' SS 304 horizontal storage tank (to be installed at the *location as per the drawing*), a 3 % AFFF' liquid SS 304 pipe-net pump-set circuit & an inline balanced foam propotioner & 4" fire water from the fire header as per drawing. This modernisation shall give an option to the fire crew to suppress fire by any of the 2 water monitors / 2 hydrants / 2 foam monitors. There are 2 nos., mobile, trailer mounted HVLR foam monitor sets to supress the fire of tank 'no reach area'.
7. Similarly, over & above peripheral hydrants & monitor, for the HSD (high speed diesel) tank area, portable mechanical foam appliance/s are envisaged for bund area spillage protection & no spray sprinklers arrangement.
8. For the administration area, only the fire detection & alarming shall be considered, if required.
9. For the server room the detection & supressing by environmentally friendly gas (FM-200 of NOVEC 1230) system as per NFPA 2001 is envisaged.
10. MVWS system for tank surface protection is a manual operation with a provision of isolation valve with underground piping arrangement, which is to be replaced with above ground installation as per drawing.

11. In addition to above there is no provision of revolving head to be install at tank roof.

4.2 Fire Hydrant System

1. There is well laid existing hydrant cum sprinkler header circuit. However, the same pipe-net are to be upgraded as per the actual sizing requirement of OISD-117/235.. So the demolishing the same & up-grading the pipe-net as per PID & GAD shall be the requirement. These newly sized pipe-net shall be replaced at the same route & hooked up to the existing MVWS facility & proposed fixed & HVLR foam system/s described as above.
2. Carbon steel pipes as per specification no. 150C02 / black A53 wl (Heavy class / Sch. # 40 minimum) / as per specification no.150C02 & butt welded fittings with wrapping coating & painting, supports for underground and above ground applications.
3. Each external yard hydrant (YH), valve shall be **double hydrant** (duplex hydrant) & shall be with a MCP (manual call point) & 2 nos., 15 m long reinforced rubber lined fire hose pipes, branch pipes with a nozzles, instantaneous coupling in the fire hose cabinets.
4. All (YH) valve pipe net shall be having compartmental isolation gate valve/s in such a way that for any of the hydrant repair / replacement, maximum 300 m pipe net compartmental safety shall be violated.
5. Above ground painting shall be as per chapter no. 12.
6. After sand blasting, wrapping & coating material for anti-corrosion 4 mm tape protection for underground pipes as per specification / equivalents with total coating and outer-wrap thickness equal to 4 mm minimum. In no case, conventional wrapping & coating as per AWWA C203 shall be allowed. The "Holiday test" shall be carried out at 11KV to 13KV after wrapping of tape on pipes.
7. Isolation valves (gate valves – rising stem type – as per API 600 & 602, B: A 216 Gr WCB T: 13% Cr. Steel, as required along the water mains.
8. Precast reinforced concrete cylindrical (RCC NP class III) pipe to IS: 851 or equivalent for encasement of underground fire mains at the road crossing etc. at minimum 1m below finished ground level at minimum 1m below finished ground level. Also, 1" Zink coated (Galvanised) pipe to A53 we shall be used for encasement of underground fire control cable.
9. Majority of the pipes shall be laid aboveground on pedestals along with existing lines.
10. Minimum residual pressure at the outlet of the hydraulically most remote 65 mm hose shall be **7kg/cm²** and flow shall be **36m³/hr.**
11. The system shall be capable of withstanding for 02 hours a pressure equivalent to **13.8 kg/cm².**

4.3 Fire Hydrant Network

1. It shall be aboveground firewater main of as indicated in drawing diameter (500 /400 /300/ 250 / 200 mm) with external / internal fire escape (for upper floor/s) single headed hydrant

valve. **Underground** firewater main shall be laid at only road crossing & unavoidable areas of vehicle movement.

2. Proposed fire hydrants shall be laid at least 2 m away but within 15 m from face of the building

4.4 Manual call point (MCP)

1. There shall be Manual Call Point (MCP) at each & every internal & external hydrant to have area zoning & it's alarming cum annunciating fire control panel. (FCP + 1 repeater panels at security gate cabin). This FCP / repeater panels shall have also alarm & annunciation from pump room pumps running, stop, etc. as per OISD guidelines.

4.5 Selection of Fire Extinguishers (If required)

1. The selection of portable fire extinguishers is based primarily on the type of fire most likely to be encountered in the building.
2. It shall be selected and placed in accordance OISD-117/ 235 Portable fire extinguishers shall be installed at not more than 1.5 meters from finished floor level. All portable fire extinguishers shall be strategically located depending upon the hazard. The extinguisher shall be clearly accessible and shall be placed inside every room/compartiment if required.
3. OISD-117/ 235 defines the five types of fire classes Portable fire extinguishers for the proposed facility, viz:
 - **Class A:** Dry chemicals powder (DCP) type
Fires involving ordinary combustible materials, such as wood, cloth, paper, rubber, and most plastics. This is the type of fire that would occur in most building conditions.
 - **Class B:** Mechanical Foam type
Fires involving flammable and combustible liquids, petroleum-based materials, paints, solvents, alcohols, and flammable gases. This type of fire would likely occur where such materials are used, dispensed, or stored.
 - **Class C:** CO₂ type
Fires involving energized electrical equipment. In addition to building electrical service Equipment, this type of fire could occur with electric equipment, such as computers and copiers.
 - **Class D:** Special type of dry powder extinguishers & sand buckets
Fires involving combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.
 - **CLASS E:** Fires due to live electrical equipment. The supply to the live electrical equipment involved in the fire must first be isolated before tackling the fire.

- All fire extinguishers shall conform to respective IS/UL or Equivalent codes, viz. 10/9 Kg DCP Type (IS: 15683 /UL 299), 4.5/6, 8 Kg CO2 Type (IS: 2878/UL 154) & 25/50/75 Kg DCP Type (IS: 10658/UL 299) and bear ISI/UL mark. BIS/UL or Equivalent certificates of all extinguishers shall be maintained at the location.
- While selecting the Extinguisher, due consideration should be given to the factors like flow rate, discharge time and throw in line with IS: 2190 / UL 711.
- The Dry Chemical Powder used in extinguisher and carbon dioxide gas used as expelling agent shall be as per relevant IS/UL or Equivalent code.
- While selecting the dry chemical powder, due consideration should be given to the typical properties viz. Apparent Density (0.65 +/-0.05), Fire Rating (144B), Thermal Gravimetric Analysis (with decomposition at around 250oC) and foam compatibility.
- Siliconized Potassium bicarbonate DCP powder (IS 4308:2003) / Mono-ammonium phosphate based DCP powder (IS: 14609) can also be used for recharging DCP fire extinguishers.
- Spare CO2 cartridges and DCP refills as required based on their shelf life should be maintained. However, minimum 10% of the total charge in the extinguishers should be maintained at the location.
- Portable fire extinguishers shall be located at convenient locations and are readily accessible and clearly visible at all times. The no. of extinguishers at various locations shall be provided as per OISD STD-117 / 235.
- The sand buckets shall have round bottom with bottom handle having 9 liter water capacity conforming to IS: 2546. The sand stored in bucket shall be fine and free from oil, water or rubbish.
- Rain protection of suitable design should be provided for all extinguishers & sand buckets.
 - x) The maximum running distance to locate an extinguisher shall not exceed 15 m.
 - xi) The extinguisher shall be installed in such a way that its top surface is not more than 1.5m above the floor/ground level.

5 Scope of Work of Contractor

Design, engineering, supply & installation at site, fabrication, erection, testing and commissioning of Fire water pumps, modification of Fire hydrant network, hydrant, Water cum foam monitors & MVWS system. Proposed foam concentrate atmospheric tank installation with foam pumps for HVLR systems. Scope also includes the obtaining approval of drawings & from local Authorities with respect to fire protection system to be executed by the successful bidder.

Demolishing and dismantling of existing permanent / temporary structure (5.0KL Foam tank / Ex. Fire water pump house and workshop) from plant premises with due care of other existing structure not to be damage.

5.1 Design and Engineering

1. Contractor shall review the drawing(s) enclosed with this tender document and carryout design, pressure drop calculations and prepare working drawings and documents for the above mentioned fire protection system and shall obtain approval of all working drawings and documents by the Engineer-in-Charge before execution of the work.

5.2 Civil and Structural work including supply of materials

1. Excavation for trenches and carting away the surplus earth as directed by EIC.
2. Supply and laying of RCC concrete pipes under road crossings for laying underground lines
3. Back filling of trenches, levelling of surplus earth etc.
4. Indian Patent Stone (IPS) paving around hydrant posts.
5. Carting away of surplus earth, after laying the pipe lines.
6. Brick (Free issue) masonry work for operating water monitor with B.B.C.C., P.C.C.and two coat of finished plaster.

5.3 Mechanical and Piping

1. Installation, testing & commissioning of (Free issue) 2 Nos. jockey pumps and 5 Nos. diesel engine driven fire pump.
2. Supply and installation of required fire hydrant network starts from the proposed pump house to the existing & proposed facilities as per the drg., and Suction from ex. fire water storage MS tank in pump house for the proposed pumps, including pipes, valves, fittings, strainers, hydrant valves,

including hydro testing, painting of the above ground lines and coating wrapping of the underground lines.

3. Supply and installation of a package of 13KL foam concentrate atmospheric tank along with foam transfer pumps (1 Motor driven + 1 D.E. driven pump with its panel and necessary cabling).
4. Supply and installation of double headed hydrant valve, water cum foam monitor, hose boxes and hydrant nozzles.
5. Supply and installation of manual call point etc as per the schedule of quantities.
6. Supply and installation of Inline balanced pressure foam proportioner.
7. Supply and installation of fire extinguishers, fixing brackets, etc (If required).

5.4 Instrumentation / automation

1. The Contractor shall provide 15 NB NPT male connections with isolation valve for pressure switches (7 Nos. or as required) and 20 NB NPT male connections with isolation valve for pressure gauges (7 Nos. or as required). Each pump-set shall be controlled for start operation with a dedicated pressure switch connection.
2. With the new/proposed pressure switches, contractor shall provide 5 main-pumps (total 5, 3w + 2s main & + 2 jockey 1w +1s) power control diagram for sequential operation of, total 3 main & 2 stand pump-sets of auto ON / manual OFF & 2 nos. jockey pump-sets for auto ON/OFF operation.
3. The manual call point cabling required for the execution along with fire alarm panel shall also be part of the scope. The execution drawing of cable routing shall also be made in the plot layout by the Contractor and shall be executed after the same drawing approval by owner / consultant is obtained.

5.4.1 Battery Limit / Scope Matrix table

- 1 For detailed scope is briefly tabulated at the table 1.1.
- All the required items shall be supplied by the FPS contractor as per drawings, site requirements, etc. and the contractor shall fabricate, erect, test, pre-commission, etc. as detailed in this document. though drawings / documents have been furnished to help the bidder / contractor to understand the scope of work and quote accordingly, the successful bidder / contractor would be required to furnish the actual detailed engineering execution drawings & isometrics based on the siting condition.

2 The work shall be performed for the various packages, as mentioned in this document but not limited to the same. It should be noted that the works shall be executed in line with this specification / drawings / documents, etc. as applicable & according to the SOQ / BOQ

Table 1.1: Battery limit / Scope matrix table

Sr. No.	Particular	Supply	Execution testing commissioning.
1	Construction of Fire pump house ,Foundation for fire pump, Steel platform for valve operation, , Civil pedestals for pipes, Foam tank foundations, foam pump foundation ,Shed & Monorail.	Civil contractor	Civil contractor
2	Panel , cabling , earthing for fire pumps	Fire pump vendor	Electrical contractor
3	Main Power cable supply up to MCC of fire pump and foam pump	Electrical contractor	Electrical contractor
4	Fire pump sets	Fire pump vendor	Fire piping contractor
5	Civil platform for Water monitor	Civil contractor	Fire piping contractor
6	Demolition of existing pump house building, Electrical and Mechanical item inside pump house.	NA	Fire piping contractor
7	Required signal from fire panel (cable from fire panels to PLC)	Automation	Automation
8	Pressure switches for fire pumps	Fire piping contractor	Fire piping contractor

Units

- Demolishing of old fire water pump room including existing pumps with piping, diesel tanks etc. & required fire water hydrant cum sprinkler header form existing pump house.
- Fire hydrant cum sprinkler header upgrading as per drawing with proposed new fire-water pump room with new pump-sets & other related (diesel fuel & flue gas ducts etc.) facility.
- Installation of free issue Diesel engine driven main pump-sets (5) & motor driven jockey pump-sets (2) at the proposed (new) fire water pump-house & hook-up of its suction fire water piping from existing (present) fire water tank outlet as per the indicative route with its header & branches.
- Its discharge fire water piping within & out-side pump-room sub-header / header & external Hydrant (cum sprinkler) main piping network with its

<p>manual spray system valve & related proposed a/g pipe-net as per the modernisation of proposed a/g route of MVWS & fixed foam plan drawing of each ATF tank.</p> <ul style="list-style-type: none"> • DE pump-sets flue gas ducts & free issue silencers (5) as per indicative drawing. • Horizontal diesel storage tanks (5) of each DE pump-set of capacity @ 500 liters & its related diesel line piping for supply & return (to each diesel engine) pipe-net'.
<ul style="list-style-type: none"> • The demolishing of existing fixed foam pouring circuit installation to be replaced with 3 % AFFF foam tank 1x13 kL SS304 foam generator-set/s (comprised of tank with pump-set,/In line balance pressure foam proportioner) & with its SS304, 3% AFFF foam concentrate piping as per drawing for hook-up of: <ul style="list-style-type: none"> • All existing (old) & proposed (new) water cum foam monitor sets with one In line balance pressure foam proportioner. • Each ATF tank manual valve operated 'fixed foam water pipe-net' with one In line balance pressure foam proportioner.
<ul style="list-style-type: none"> • Existing fixed foam / manual water spray system u/g piping to be replaced with a/g as per the drawing.
<ul style="list-style-type: none"> • Fire extinguishers provision at the complete DAFFPL facility if required

5.4.2 Utility Units / Buildings:

The work shall be performed for the various Utility units/ Buildings, as mentioned in this document but not limited to the same. It should be noted that the works shall be executed in line with this specification / drawings / documents, etc., as applicable for complete DAFFPL campus facility as per the following table.

Table 1.2: Utility protection

Units	Protection plan
Control room	Detection & suppression by FM-200 /NOVEC 1230 / equivalent environmental friendly gas suppression system.
Diesel tank area	Fire hydrant network / water cum foam monitor and replacement of MVWS & fixed foam water header from u/g to a/g.
Rest of the area of Fuel hydrant pump-house & it's pipe manifold area etc. "live" working areas are out of the scope of this tender.	Fire hydrant network modification / water cum foam monitor.
The truck gantry loading unloading area are also live working areas & are out of the scope of this tender.	Fire hydrant network / water cum foam monitor

1. The attached schedule of quantities / Schedule of Rates may be generally referred for the various activities involved as well as for the approximate items involved, their approximate quantity & estimated quantum of work. The Schedule of quantities shall be read in conjunction with the technical specifications enumerated in this document.

2. The scope of work of the Contractor defined in this document is a general description which shall include but not be limited to the same. The Contractor shall also carry out the jobs that are not listed here but required for completion of the job in all respects.
3. Also, the Owner / Owner representative reserves the right to give additional / alternative specifications and instructions, at any time, for execution / alteration of any particular work and the Contractor shall execute such works in accordance with such additional / alternative specifications and instruction of the Owner representative. Such a step taken by the Owner / Owner representative shall not constitute a breach of the contract.
4. This Specification, Drawings and other details provided to the Contractor does not relieve Him from His obligation to complete and guarantee his scope of work and workmanship to the satisfaction of Owner / Owner representative.
5. The Contractor shall prepare the detailed procedures, outline sequence of operation, prepare time schedule for each operation and seek approval of Owner representative, as mentioned in other clauses of this tender.
6. Water shall **not** be supplied by the owner for construction / flushing / testing & drinking.
7. Power supply shall be arranged by the contractor at his own cost by installing & operating sufficient number of approved DG sets for the timely completion of various works as stipulated. Necessary distribution boards and cables for welding etc. shall be arranged by the contractor at his own cost. All works by the contractor in this regard will be done as per the Electricity Act and Rules prevailing at the site and with the prior approval of the *Owner / Owner* representative.
8. Contractor shall not undertake any extra work without **written** approval from Owner / Owner representative.

5.5 Drawings and Documents to be furnished by the Contractor

Table 5.3: List of Drawings & Documents to be provided by the Contractor

SR. NO	DRAWINGS / DOCUMENTS	No. of copies to be furnished			Remarks
		Along with Bid	4 weeks after placement of work order	As built after commissioning	
1	P & I Diagram for fire protection system	-	3	3	-
2	Layout & details of proposed fire water pump house.	-	3	3	-
3	Layout & details of proposed foam tank.	-	3	3	-
4	Modification in ex. hydrant network with sizing of mains & location of hydrant points.	-	3	3	-
5	Fixed foam and MVWS aboveground piping layout for tanks.	-	3	3	-
6	Foam concentrate piping layout drawing with sizing of mains & location of HVLR monitor.	-	3	3	-

SR. NO	DRAWINGS / DOCUMENTS	No. of copies to be furnished			
7	Layout & details of piping for proposed pump house.				
8	Brief description of system proposed by the Contractor	-	-	3	-
9	Wiring diagram for power distribution	-	3	3	-
10	Location and types of pipe supports	-	3	3	-
11	Plant layout marking locations of fire extinguishers	-	3	3	-
12	List of materials and their specifications	-	3	3	-
13	Bar chart for execution of work indicating various milestones	-	-	3	-
	a. Design, Engineering and obtaining approvals from OISD/PESO/Local authority.				
	b. Supply of materials at site				
	c. Fabrication & Erection				
	d. Testing & Commissioning				
14	Manuals and spare parts catalogues of bought out items	-	-	3	-
15	Manual for operation of the system	-	-	3	-

6 Equipment and Material Specification

NOTE: THE BIDDER SHALL FURNISHED ALL DETAILS ASKED FOR AGAINST “*” MARK IN THIS ENQUIRY.

6.1 Diesel engine driven main Fire Water Pump & Electric motor Driven Jockey Pump (free issue)

1. **Non**-FM-UL skid mounted pump-set with loose supply of SRV 1 x 8”, Single wall MS diesel day tank (6hours) with limited pipe-fittings, valves, Local Control panel, charger, 4x12v dry battery bank, flue duct crown, expansion joint, double muffler silencer (but without duct portion), companion flanges (without bolt nuts gaskets), spare-parts for commissioning / 2 years recommended spare-parts etc.
2. Non-FM-UL skid mounted pump-set with loose supply of local push button station, sub-mcc panel, companion flanges (without bolt nuts gaskets), spare-parts for commissioning / 2 years recommended spare-parts etc.
3. Capacity main / jockey : 610 / 55 m3/Hr.
4. Body / Impeller : CI / brass-bronze / gland packed
5. Discharge Head : 105 M.H.
6. Accessories : Control panel

6.2 Pipes & Valves for foam concentrate services

As per specification : Refer spec no. 150H01

6.3 Pipes & Valves for fire water services

As per specification : Refer spec no. 150C02

6.4 Single Outlet Hydrant (Oblique) Valve:

As per specification chapter no.19.

6.5 Double Outlet Hydrant (Duplex) Valve:

As per specification chapter no.19.

6.6 Branch Pipe Nozzle and Coupling

As per specification chapter no.19.

6.7 Fabricated M.S. sheet Hose Box

As per specification chapter no.19.

6.8 Hose Pipe

As per specification chapter no.19.

6.9 Pressure Indicators

As per specification chapter no.19.

6.10 Pressure Switches

As per specification chapter no.19.

6.11 Water cum foam monitor

As per specification chapter no.19.

6.12 M.S. fabricated Y type strainer

As per specification chapter no.19.

6.13 C.S. fabricated Basket type strainer

As per specification chapter no.19.

6.14 Wrapping & Coating

Type	:	Bituminastic type
Applicable codes / Standard	:	IS:10221 / TAC
Length	:	10m.
Thickness of tape	:	4mm ± 0.2mm
Width of tape	:	250mm
Nominal thickness	:	4mm
Characteristic of tape		
Thickness of polyethylene core	:	0.1mm ± 0.010mm
Heat resistance	:	In excess of 100°C ASTM-D-146
Tensile strength (+ 25°C)	:	DIN 52123
Lengthwise	:	500 N/5cm.
Crosswise	:	300 N/5cm
Primer	:	
Viscosity on ford cup # 4 at 23 Deg. C	:	35-40 seconds as per ASTM D 1200-88
Drying time in minutes	:	10-15 minutes as per ASTM D 1640-83/89

6.15 Manual call point

Product	:	Individually addressable manual Call Station.
Communications	:	ID Net-Communicating Devices device.
Address	:	1 address per station
Wire Connections	:	Screw terminal for in/out wiring, for 18 to 14 AWG wire
Approvals	:	LPCB/UL/FM
Humidity Range	:	Up to 93% RH
Housing Color	:	Red with white raised lettering
Material	:	Housing and pull lever are Lexan polycarbonate or equal
UL Listed temperature Range	:	0 to 49 °C

6.16 CO₂ Fire Extinguisher

IS Specification	:	IS: 15683/2878 & capacity 2 to 22.5 kg
Construction	:	Cylinder bearing IS:7285 and brass forged valve IS:3224
Charge	:	Co2 confirming to IS:15222 & filled with liquefied Co2 gas filling with ratio ≤0.667
Accessories	:	Wall mounting brackets.

Finish : Painted in red synthetic enamel red/fire red epoxy polyester coating.
 Approval : TAC / Approved and certified by BIS

6.17 DCP Fire Extinguisher

IS Specification : IS:15683 and capacity 6 & 9 kg
 Construction : Body CRCA sheets, IS:513
 Cap : Brass forging
 Charge : Dry powder sodium Bi-carbonate base and CO₂ gas cartridge is fixed with each extinguisher
 Accessories : Wall mounting brackets.
 Finish : Painted in red synthetic enamel red/fire red epoxy polyester powder coating.
 Approval : TAC / Approved and certified by BIS

6.18 ABC type Fire Extinguishers

IS Specification : IS: 13849 and capacity 1, 2, 5 & 10 kg
 Charge : Mono ammonium phosphate) powder with dry nitrogen propellant
 Accessories : Wall mounting brackets.
 Finish : Painted in red synthetic enamel red/fire red epoxy polyester powder coating.

6.19 Gas Suppression system

Clean agent : Environmentally friendly gas FM-200 or NOVEC 1230
 Design : As per NFPA-2001
 Basic / detail engineering : As per attached Drg. no. 322538-RPB-0907-01/NFPA-2001
 Type of detector & alarm system : As per NFPA-72.
 No./capacity of cylinders : As per NFPA-2001
 Approval : UL/FM/LPCB

7 Erection of Equipment

7.1 Scope of Work of Contractor

1. The work shall consist of transportation of equipment and accessories from the owner's storage to the work site, assembling of sub-assemblies/parts, erection of equipment on foundations, positioning, levelling, aligning, grouting, preparation of equipment for trial runs & supply of required man power during the trial run and commissioning which will be done under the supervision of the Engineer of the equipment supplier.

7.2 Erection of Rotating Equipment and Miscellaneous Machinery

1. In case of rotating equipment and machinery, manufacturer's instructions, as available, regarding installation shall be followed by the Contractor during the course of erection. The requirements prescribed therein shall be met in addition to what is stated in these specifications. Erection shall be carried out as per instructions of the machinery manufacturer's representative.
2. For all equipment, the Contractor shall follow the proper sequence for assembly and erection, coupling of equipment received with drive in assembled condition, shall be dismantled by the Contractor, if required, and alignment shall be rechecked. Realignment, if required, shall be done before recouping.
3. Where couplings are provided separately, drilling and tapping of holes in the base plates for fixing drivers, fixing of couplings on shafts, after enlarging the pilot bores to the correct size with key ways etc. and doweling including provision of dowel pins or similar arrangements for retaining the alignment, shall be carried out by the Contractor as part of erection work.
 - All equipment and accessories supplied by the Owner shall be tagged, & separately kept in the Contractor's stores till erection. All flanged connections and openings shall be kept blanked with dummies/plugs to prevent entry of foreign matter.
 - After initial alignment, the equipment shall be properly grouted. Grouting shall be carried out by the Contractor.
 - After the piping has been connected, the alignment shall be checked by the Contractor to ensure that piping connections do not induce any undue stresses on the equipment. After making necessary corrections on the piping, if any realignment is required, it shall be done by the Contractor and the Contractor shall ensure that no undue stresses are induced on the equipment.
 - Trial Runs of Machinery.
4. In case of Motor driven machinery, motors shall be decoupled and handed over to other agencies doing electrical work for testing and no load running of motors. After the no load runs of motors are satisfactorily completed, the Contractor shall re couple the motors to the machinery and recheck the alignment. The trial run of the machinery shall be started only after the above is completed. Before coupling of the motor with the equipment, directional check shall be done.

8 Fabrication & Erection of UG/AG and Laying of overhead Pipelines

8.1 Scope of Work of the Contractor

Generally the scope of work of the Contractor shall include the following but not be limited to the same. Scope of supply of various materials for fabrication and erection shall be as per details given in the Scope of Supply.

- a. Transportation of Equipment from the owner's storage to the site, fabrication and erection of the piping system in accordance with this specification, preparation of all required drawings designing to required standards and obtaining all statutory approvals and carrying out necessary modification as the work is being executed.
- b. Flushing, Blowing, Draining and Testing of all Piping Systems.
- c. Fabrication and erection of pipe supports from structural steel sections, including guides, stops/anchors, clamps, supporting fixtures, brackets, cantilevers and tee posts, etc.
- d. Fabrication, testing and erection of pipe specials including standard fittings & branch connections from plates/pipes as per drawings and specifications.
- e. Fabrication of special radius bends and elbows wherever required.
- f. The Contractor shall carry out all modifications and provide additional cleats, if required by the Engineer- in-Charge.
- g. The Contractor shall bear the cost of all repairs, changes, replacement, etc. due to non-compliance with the standards / codes or due to non-compliance of instructions given by the Engineer-in-Charge / contract specifications.

8.2 Basis of Work

1. The complete piping work shall be carried out by the Contractor in accordance with the approved working drawings (refer enclosed MMI piping specification)
2. The latest editions of the following codes, standards and regulations shall be applicable:
3. ANSI B 31.3 : Code for Chemical plant and Petroleum refinery piping.
4. ASME Sec IX : Code for welding procedure and welder qualification.
5. In case any item of work is not covered in the approved drawings, specifications, standards and codes referred to above or where a deviation from the provision of such drawings, specification, standards and codes, is deemed advantageous or essential, then, the matter shall be brought to the notice of the Engineer-in-Charge and the work shall be carried out after obtaining written approval from him in each case.

9 Piping Material

9.1 Fabrication of piping

- a) Pipes, pipe fittings, flanges, valves, gaskets, studs bolts, etc. used in a given piping system shall be strictly as per the 'Piping Material Specification' for the 'pipe class' specified for that system. To ensure the above requirements, all piping materials supplied shall have proper identification marks as per relevant standards / certificates. The Contractor shall provide identification marks on the left over pipe length, wherever the marked up pipe lengths have been fabricated/erected.

9.1.1 Dimensional Tolerances

- a) Dimensional tolerances for piping fabrication shall be as per the relevant piping code. The Contractor shall be responsible for working to the dimensions shown on the drawings. An extra pipe length of 100 mm over and above the dimensions indicated in the drawing may be left on each end of pipe for field welds. During erection, the pipe end with extra length for field weld shall be cut to obtain the actual dimension required at site.

9.1.2 Pipe Joints

- a) The piping class of each line also specifies the type of pipe joints to be adopted. However, for piping 1.5" and below where socket welding/threaded joints are specified, butt-welds may be used, with the approval of the Engineer-in-Charge, for pipe to pipe joints in long runs of piping.

9.1.3 Butt Welded and Socket Welded Piping

- a) End preparation, alignment and fit up of pipe pieces to be welded and welding shall be as described in the welding specifications.

9.1.4 Flange Connections

- a) All flanges facings shall be true and perpendicular to the axis of the pipe to which they are attached. Flange bolt holes shall straddle the normal center lines unless a different orientation is shown on the drawing.
- b) Wherever a spectacle blind is to be provided, drilling and tapping for the jack screws in the flange, shall be done before welding it to the pipe.

9.1.5 Branch Connections

- a) Branch connections shall be as indicated in the piping material specifications, For end preparation, alignment, spacing, fit up and welding of branch connections (refer welding specifications) templates shall be used wherever required to ensure accurate cutting and proper fit up.
- b) For all branch connections accomplished either by pipe to pipe connections or by using forged tees, the rates quoted for piping shall be inclusive of this work.

- c) Reinforcement pads shall be provided wherever indicated in the drawings/specifications, etc.

9.1.6 Bending

- a) Bending shall be as specified in ANSI B 31.3 except that corrugated or creased bends shall not be used.
- b) Cold bends for lines 40mm and above with a bend radius of 5 times the nominal diameter shall be used, as required, in place of elbows, wherever allowed by the piping specifications.
- c) The completed bend shall have a smooth surface, free from cracks, buckles, wrangles, bulges, flat spots and other serious defects. They shall be true to the dimensions. The flattening of a bend, as measured by the difference between the maximum and minimum diameters at any cross-sections, shall not exceed 8% and 3% of the nominal outside diameter, for internal and external pressures respectively.

9.1.7 Miter Bends and Fabricated Reducers

- a) The specific application of welded miter bends and fabricated reducers shall be governed by the Piping Material Specifications. Generally, all 90° miters shall be 4 piece, 3 weld type and 45° miters shall be 3 pieces 2 weld type unless otherwise specified. Reducers shall be fabricated as per directions of the Engineer-in- Charge.

9.1.8 Cutting and Trimming of Standard Fittings

- a) Fittings like elbows, couplings, half-coupling etc. shall be cut-trimmed wherever required to meet fabrication and erection requirements as per drawings or instructions of the Engineer-in-Charge.

9.1.9 Shop Fabrication/Pre-Fabrication

- a) The purpose of shop fabrication or pre-fabrication is to minimize to the extent possible the site work during erection. Piping spools, after fabrication, shall be stacked with proper identification marks, so as to facilitate their withdrawal at any time during erection. During this period all flange faces (gaskets contact surfaces) and threads shall be adequately protected by a coating with removable rust preventive. Care shall also be taken to avoid any physical damage to flange faces and threads. The Contractor shall fabricate miscellaneous elements like flash pots, seal pots, supporting elements, including extension of spindles and inter-locking arrangement of valves and operating platforms as required by the Engineer-in-Charge to make the work complete in all respects.

9.2 Erection of piping

9.2.1 Cleaning of Piping before Erection

- a) Before erection, all pre-fabricated spool pieces, pipes fittings etc. shall be cleaned from inside and outside by suitable means. The cleaning process shall include removal of all foreign matter such as scales, sand, weld spatter, cutting chips, etc. by wire brushes, cleaning tools etc. and blowing out with compressed air and/or flushing out with water.

9.2.2 Piping Routing

- a) No deviation from the piping route, indicated on the approved drawings shall be permitted without the consent of the Engineer-in Charge.
- b) Pipe to pipe, pipe to structures and equipment distances/clearances as shown in the drawings shall be strictly followed, as these clearances may be required for the free expansion of piping and for operation & maintenance of equipment. No deviations from these clearances shall be permissible without the approval of the Engineer-in-Charge.
- c) In case of fouling of a line with other piping, structure, equipment etc. the matter shall be brought to the notice of the Engineer-in-Charge and corrective action shall be taken as per his instructions.

9.2.3 Flange Connections

- a) While fitting up mating flanges, care shall be exercised to properly align the pipes and to check the flanges for trueness, so that faces of the flanges can be pulled together, without inducing any stresses in the pipes and on equipment nozzles. Extra care shall be taken for flange connections to pumps & rotating equipment. The flange connections to this equipment shall be checked for misalignment, excessive gap, etc. After the final alignment of the equipment is over, the joint shall be made up after obtaining approval of the Engineer-in- Charge. Axial & radial alignment shall also be checked & corrected before the hook up.
- b) Temporary protective covers shall be retained on all flange connections of pumps, and other similar equipment, till the piping is finally connected, so as to avoid any foreign material from entering these equipment.
- c) The assembly of a flanged joint shall be done in such a way that the gasket between the flange faces is uniformly compressed. To achieve this, the bolts shall be tightened in a proper sequence. All bolts shall extend completely through their nuts but not more than 1/2".
- d) Steel to C.I flange joints shall be made up with extreme care. Tightening of the bolts shall be done uniformly after bringing the flanges and its gaskets with accurate parallel and lateral alignment, to avoid failure of the C.I. flange.

9.2.4 Vents / Drains

- a) High point vents and low point drains shall be provided as per the instructions of Engineer-in- Charge, even if these are not shown in the drawings. The details of vents and drains shall be as per the piping material specifications/job standards.

9.2.5 Valves

- a) Valves shall be installed with spindle/actuators orientation/position as shown in the layout drawings. In case of any difficulty in doing this or if the spindle orientation/position is not shown on the drawings, the Engineer-in-Charge shall be consulted and work to be done as per his instructions.
- b) Care shall be exercised to ensure that globe valves, check valves and other uni-directional valves are installed with the 'flow direction arrow' on the valve body pointing on the right direction.
- c) If the directional arrow is not marked on such valves, this shall be done in the presence of Engineer-in-Charge before installation. Orientation of valve spindle shall be reconfirmed with the Engineer-in-Charge for the ease of operation & safety of operators.

9.2.6 Pipe Supports

- a) Pipe supports shall be designed and located to effectively sustain the weight and thermal effects of the piping system and to prevent its vibrations. Location and design of pipe supports will be shown on the drawings. However, any extra supports desired by the Engineer-in-Charge shall also be provided.
- b) Fabrication shall be done in accordance with IS- 800 Section V.
- c) All supports shall strictly be as given on the drawings / as per instructions of the Engineer-in-Charge. Extra care shall be taken in the correct installation of supports for pumps, etc., according to the specific detailed drawings and supplier's erection instruction/drawings.
- d) No pipe shall be off-set unless specifically shown on the drawings.

9.3 Laying of Underground Piping

- a) Underground lines shall have at least one meter of earth cushion in open ground and 1.2 meters of earth cushion under road crossings.
- b) Underground lines shall be provided with protective coating against soil corrosion as specified in this document.
- c) In case of poor soil conditions, it may be necessary to provide masonry supports under the pipelines at a regular distance not exceeding 6 meters.
- d) While digging the trenches, the Contractor shall take due care so as not to damage any underground pipeline, cable, etc.
- e) A 100mm thick bed of clean river sand is to be provided below each pipeline before they are laid in position and a further sand cover of same thickness provided over the pipe line after they are in position and all work completed in that zone.
- f) The Contractor shall take due care, that soil from the trenches to be used again for back filling is not mixed with loose debris and rubbish.

9.4 Pipe Measurement

- a) The billing for the hydrant as well as fire water piping shall be based on actual executed pipe length inclusive of all fittings only. The un-executed / wastage pipe, fitting, shall be taken away by contractor without claiming extra cost. The additional qty. of supply are based on change in site routing while

- execution and leakage of the valves at the time of hydro test. Hence contractor to bring the pipe, valve and fitting qty. after verification of the qty. on the basis of drawing developed as per site requirement.
- b) Similarly the hydrant, hose, nozzle, hose box, call point excess un-executed qty. shall be stored as a maintenance spares for the fire

10 Welding Specification

10.1 This specification shall be adopted for all welded pipe joints of carbon steel piping system coming under the Contractor's scope.

The welded pipe joints are defined as under:

1. All line joints of the longitudinal and circumferential butt welded and socket welded type.
2. Attachments of castings, forging, flanges and other supporting attachments to the pipes.
3. Welded branch connections with or without reinforcement pads.
4. Manufacture of welded/fabricated pipes & piping components.
5. The attachments of smaller connections for vents, drains, drips and other instrument tapping.

10.2 Welding Electrode Filler Materials

1. Filler materials, supplied by the Contractor, shall be of a class and make approved by the Engineer-in- Charge.
2. The electrodes supplied by the Contractor for welding, shall conform to the class specified in the welding chart and as approved by the Owner's site engineers.
3. The electrodes shall be suitable for the welding method recommended and base metal used. The physical properties of the weld produced shall not be lower than those of the base metal and shall correspond to the physical properties of the class of electrodes adopted. The choice of suitable electrodes shall be made after conducting tests on electrodes as per relevant standards and shall be at the sole discretion of the Engineer-in-Charge.
4. All electrodes shall be purchased in sealed containers and stored properly to prevent moisture absorption. The electrodes removed from the containers shall be used on the job within 4 hours. If this is not practicable then they shall be kept in storage ovens maintained at the temperature recommended by the electrodes manufacturer. The electrodes shall be handled with care to avoid damage to the flux coating.
5. Electrode wires and flux when used shall be free from rust, oil, grease, dust and other foreign matter which affect the quality of weld.
6. For joints between carbon steel of different types or for heavy joints under restraint, low hydrogen electrodes shall be used.

10.3 Weather Conditions

1. No welding shall be performed during rain or when strong winds are blowing, unless suitable protection is provided by the Contractor for the parts to be welded and the welding personnel. Where this is not practical, no welding shall be done during that time.

10.4 Welding Method

1. Welding under this specification shall be done with the following processes subject to the approval of the Engineer-in-Charge and as per welding chart.
 - a. Manual shielded metal arc process

1. Downward technique is not allowed in welding pipes in horizontal position, unless permitted by the Engineer-in-Charge for particular cases not concerning process lines.
2. Combination of welding method or use of electrodes of different classes or makes in a particular joint shall be done only after the welding procedure has been duly qualified and approved by the Engineer-in-Charge.

10.5 End Preparation

10.5.1 End preparation and welding fit up shall be as per standard/code. The Contractor shall prepare the joint in such a way as to ensure full penetration.

10.5.2 Carbon Steel Pipes

1. Gas cutting, machining or grinding method shall be used. After gas cutting, machining/grinding shall be carried out on the cut surface to remove oxides.

10.5.3 Cleaning

The ends to be welded shall be properly cleaned to remove paint, oil, grease, rust oxides, sand, dust and other foreign matter with the help of buffing machine and hand wire brushes. The ends shall be completely dry before commencing the welding.

10.5.4 Alignment and Spacing

- a. Pieces to be welded shall be aligned and spaced in a suitable manner, so as to hold the ends during welding at a distance to ensure full penetration. Root opening shall not be more than as specified. Internal misalignment shall not exceed 1.5 mm.
- b. For pipe with thickness 4mm or more, the pieces to be butt welded shall be coupled by means of pipe couplers or by yokes or bridge "C" Clamps.
- c. Owner's inspector may check and approve the joint fit up and alignment prior to the commencement of welding.

10.6 Welding Techniques for Root Pass

10.6.1 Butt Joints

- a. The maximum permitted size of electrode shall be 3.15mm or 1/8" (10 SWG) and the electrodes holder shall be connected, having due regard for the polarity requirements of the electrodes approved for the use of pipe welding in the horizontal position. Upward technique shall be used with the recommended values of current.
- b. The root pass of butt joints, regardless of the technique used, shall be such as to achieve full penetration. However, projection of weld metal into the pipe bore shall not exceed more than 3 mm. Root grooves and defective restart of the welding shall be avoided.
- c. At each interruption of welding and on completion of each run, craters, weld irregularities and slag shall be removed by grinding or chiseling.

- d. After the welding is started and until the joint has been completed, displacements, shocks vibrations or stresses shall be avoided in order to prevent cracks or breaks in the weld.

10.6.2 Fillet Welds

- a. The maximum permitted size of electrode shall be 4mm or (5/32") (8 SWG.)
- b. On completion of the root pass, any visual defect or irregularities shall be ground off to avoid defects or irregularities in the next pass.

10.7 Joint Completion

- a. Electrode of a size more than 8 SWG (4 mm or 5/32") shall not be allowed to be used for filling of the weld. Upward technique shall generally be used for welding of pipes in horizontal and vertical position.
- b. At each interruption of welding, and after each run of welding is completed, chipping and slag removal shall be done with rotary wire brush.
- c. When the welding is complete, butt joints shall have a capping pass. Weld reinforcement shall be slightly convex and fuse into the surface of the base metal in such a manner as to have a gradual notch-free finish with good fusion with the joint edges. Welds shall have a regular appearance and shall be free from defects.
- d. Welder number shall be stamped along each side of the weld, whenever required by the Engineer-in-Charge.
- e. When welding is complete, the butt joints of piping, regardless of welding methods used, shall have a weld reinforcement referred to the outside of the pipe, not more than 2mm, for pipes not thicker than 12 mm.

10.8 Welder's Qualification

- a. Welder's qualification shall be in accordance with ASME Sec. IX latest edition. Owner's Inspector shall witness the test and certify the qualification of each welder. Only welders approved by the Owner's Inspector shall be employed. Contractor shall submit the welder's qualification report before the commencement of work. It shall be the responsibility of the Contractor to carry out qualification tests of welders.
- b. The welders shall always have in their possession the identification card and shall produce it whenever demanded by Owner's Inspector. It shall be the responsibility of the Contractor to issue the identity cards only after it is certified by the Inspector.
- c. No welder shall be permitted to work without the possession of a identity card.
- d. If a welder is found to perform a type of welding or in a position, for which he is not qualified, he shall be debarred from doing any further work. All such welding so performed shall be cut and redone at the expense of the Contractor.

10.8.1 Inspection

1. Inspection of all welds shall be carried out in accordance with API-1104 or any other equivalent approved code of practice. All finished welds shall be visually inspected for parallel and axial misalignment of the work, excessive reinforcement, for a concavity of welds, shrinkage cracks,

inadequate penetration, un repaired burn through under cuts, dimensions of the weld, surface and root porosity and other surface defects.

10.8.2 Radiographic Examination

1. 5% Radiography shall be taken for butt weld joints.
2. The radiographic procedure shall be approved by the Owner's Inspector. The procedure and quality of radiographic examination, limits of acceptability, require and removal of defects shall be checked as per API 1104, ASTM E-94 and ASTM E-142.
3. The Contractor shall be responsible for carrying out radiography, rectification of defects and re- radiograph of welds repaired and rectified. He shall make his own arrangements for radiography of the weld joints for the satisfactory and timely completion of the radiography job.
4. For welds between dissimilar materials, the radiographic examination shall be to the extent required for the material which calls for more stringent examination.
5. Radiographic inspection of the welds shall preferably be made with X-rays. Iridium isotope or any other X-ray source may be used with the approval of the Engineer-in-Charge.
6. The Contractor shall fulfill all the statutory safety requirements for handling the X-ray and gamma ray sources.
7. The joints for radiography shall be selected by Owner's Inspector and the radiography shall be performed in his presence. The Contractor shall furnish all the radiographs to the Owner's Inspector immediately after processing them.
8. The details of the radiography shall be duly entered and signed by him in a register and shall be submitted to the Owner's Inspector for approval.
9. The Contractor shall provide all the necessary facilities to the Inspector at site such as darkroom with controlled temperature, viewer, etc. for the examination of the radiographic film.
10. Interpretation of radiographs shall be done as per acceptable standards.

10.8.3 Proof test

1. Soundness of the welds shall be tested by means of hydrostatic test as per specification. The test shall be conducted only after fulfilling the requirements of visual inspection, radiography, etc. and when the entire work is certified by the Engineer-in-Charge for the performance of such tests. Tightness of flange joints and leak proof test shall be done through pneumatic test.

10.8.4 Repairs of welds

1. Defects ascertained through the inspection methods which are not under permissible limits shall be removed from the welded joints through chipping or grinding.
2. When the entire joint is unacceptable, the weld shall be cut completely and the pipe ends shall be remade for re welding. After re weld, the joint shall again be checked.
3. No repair of welds shall be done without prior permission of the Engineer-in-Charge.

4. When random radiography is specified the first weld of each welder shall be completely radiographed except in pipe size 100 mm and below, wherein the first two welds shall be taken for radiography.
5. For each weld found unacceptable due to welder's fault such as lack of fusion and penetration, two additional checks shall be carried out on welds done by the same welder whose joint was found unacceptable, the operation is progressive and the procedure of radiography two additional welds for each weld deemed unsatisfactory shall be carried out till such time two consecutive satisfactory welds are obtained.
6. The Contractor shall carry out these additional radiographs at his own expenses.
7. To avoid the possibility of too many defective welds by a single welder going undetected over a period of time, the Contractor shall arrange for radiography promptly so as to know the quality of weld by each welder.
8. Repairs and/or work of defective welds shall be done in time to avoid delays in the construction programmer.
9. Repairs of weld should be carried out as specified under the relevant pipe code and instructions of the Engineer-in-charge.

11 Coating & Wrapping of pipes

11.1 Preparation and cleaning of pipes

The pipes shall be cleaned off rust, grease, dirt, weld butts etc. It shall be scrubbed manually with stiff steel wire brushes and scraped where necessary. Pipe coat primer should be applied immediately after cleaning of pipes. Entire pipe length shall be cleaned but both ends of the pipe shall be left without coating and wrapping for a distance of 230mm, for joints which shall be coated and wrapped manually, at site, after laying, welding and testing of pipes.

11.2 Priming Operation

Pipe coat Primer shall be applied on the pipe in a uniform coat leaving no drops or runs. The entire surface of the pipe should be primed without any patch left out. Any holiday or unprimed surface shall be re primed immediately. Any un cleaned pipe shall be scraped down to the surface of the pipe and re primed with pipe coat primer which shall essentially be a thin layer for quick drying.

The pipe surface shall be dry at the time of applying of the pipe coat primer.

Freshly primed pipe shall be placed on clean square cut skids and shall not be allowed to come in contact with ground or any other foreign matter. It shall remain on skids until lifted or cradled after coating and wrapping operation.

All primed pipes which have excessive coat of dust accumulated over them before primer is dry or where primer has become dead, shall be re primed. Drying time shall be minimum 24 hours. The application of pipe coat membrane shall be taken up soon after primer coat has dried up completely and in any case within three days after priming. Otherwise fresh coat of primer shall be applied.

11.3 Wrapping

a. Hot application

1. Membrane shall be blown under tension by means of a blowtorch. In this process, the inner surface of the membrane, being 10 micron thick polyethylene layer is burnt while at the same time the polymeric mix under it is softened taking care that the central core is not overheated. This molten polymeric mix shall then be pressed over the pipe surface so that no air is entrapped or no voids formed underneath.
2. The coating shall adhere perfectly to the pipe surface and free from air bubbles, wrinkles, holidays, irregularities and discontinuities, etc.

11.4 Field joints

1. Pipe coat Primer shall be applied with brushes after thorough cleaning of the pipe. Pipe coat Membrane shall be wrapped as mentioned above.
2. No wrinkling of the wrapper shall be allowed and all overlaps shall be firmly fused to secure a firm wrapping. Coating shall be absolutely free from pinholes, bubbles and holidays.

11.5 Lowering of pipes into the trenches RCC NP III sleeve pipe

1. After the application and inspection of coating and wrapping, the welded-pipe line shall be lowered into the excavated trench on the next day after completion of coating and wrapping.
2. The pipe shall fit the trench without being forced to remain in place until the back-filling operation is completed. Any extra excavation that may be required for this purpose shall be done by the Contractor at no extra cost to the owner.
3. In lowering the line, vertical slack loops shall be placed at regular intervals. Slack loops shall move horizontally from side to side of the trench after lowering. Until enough of the lowered line is securely anchored by back-fill, slack loops shall be suspended above the trench on padded support of sufficient strength to prevent collapsing of the trench, and in sufficient number so that the pressure at the points of support will not damage the coating and wrapping. Slack loops shall be lowered into the trench without being forced into it, only early in the morning when the pipe temperature is normally at its lowest value and the trench shall then be back-filled. Excessive slack shall be removed by widening the trench as may be necessary, for which no extra payment shall be made to the Contractor.
4. Vertical and lateral bends of the lowered line must be fitted into the trench with proper clearance and the Contractor shall be responsible for doing at his own expense whatever work that may be necessary for ensuring proper clearance.
5. The trench into which the coated and wrapped line is to be lowered must present an even and smooth bottom, and care shall be exercised by the Contractor to remove there from all hard projecting objects so that the protective coating and wrapping of pipe is not damaged.
6. Water if any, present in the trench at the time of lowering- in, shall be pumped out by the Contractor before lowering-in the pipe, to enable checking of the trench to conform to the specifications. If the trench has collapsed, the Contractor shall make the necessary repairs, as directed by the Engineer-in-Charge.

12 Painting of above ground pipelines

Following standards and code of practice shall be followed for painting:

- | | | |
|----|-----------------------------------|-----------|
| a. | Superior Quality Synthetic Enamel | IS : 2932 |
| b. | Color for ready mixed paint | IS : 5 |
| c. | Code of practice for painting | IS : 1477 |

Painting shall be carried out in three stages

- a. Cleaning and surface preparation
- b. Applying primer
- c. Applying finish coat

12.1 Cleaning and Surface Preparation

- a. Cleaning may be carried out manually or mechanically to ensure removal of all extraneous matters including oil, grease, etc.

Mechanical cleaning may consist of;

- a. Hand chipping / De scaling
- b. Hand scraping
- c. Hand brushing or machined wire brushing

Any or both of the above methods may be selected for cleaning the surface of pipes with the concurrence of the Engineer-in-Charge.

12.2 Painting

a. Primer

1. Primer shall be Zinc Chromate Red Oxide conforming to IS: 2074. However the Engineer-in-Charge reserves the right to change the specification.
2. Primer shall be applied in two coats on the exterior surface and the thickness of primer coat shall not be less than 25 microns per coat (Dry Film Thickness).

b. Finish Coats of Painting

1. After priming all exterior surfaces of the pipe shall be painted with superior quality Synthetic Enamel Paint of Post Office Red Color.

c. Dry Film Thickness

1. Thickness of painting shall be 25 microns minimum per coat and it shall be in two coats resulting in finished dry film thickness of 50 microns.
2. Painting shall not be carried out when the relative humidity increases to 85% or when the ambient temperature is below 5⁰C and during rain, or dusty environment.
3. A second coat shall be applied only after the first one is absolutely dry.
4. All painting shall be done with a brush and the width of the brush should not exceed 10 cm.
5. Proper attention shall be paid to storage, surface preparation, applications, usage, etc. and manufacturer's instruction shall be strictly followed.

12.3 Inspection and Testing

The Contractor shall carry out or arrange to carry out at his own cost, all necessary tests and certification and produce test reports and certificates if and when asked.

13 Hydrostatic Test

1. All erected lines shall be tested for at least an hour at a pressure of 15.75 kg/cm²g.
2. When an existing line or portion thereby is modified, cut or welded, this shall be tested once again. The nature of the test and test pressure shall be same as above.
3. New lines connected with the existing lines shall be tested by providing suitable blanks before looping. Such lines shall be drained, flushed and kept ready for hook-up.
4. When it is impracticable to isolate the piping to be tested, the condition for the test shall be determined locally by the parties concerned.
5. The Engineer-in-Charge shall be notified well in advance by the Contractor of all testing and such testing shall be witnessed by the Engineer-in-Charge.
6. **Test Fluid**
 - a. Fresh raw water shall be used for Hydrostatic Testing.

13.1 Test preparation

1. Existing piping which has not been relocated or modified shall be isolated with blinds or blanked off during the test.
2. Temporary line laying / connected with the existing system for testing purpose shall be carried out by the Contractor at no extra cost to the Owner.

13.2 Procedure for Hydrostatic Testing

1. Before carrying out the Hydrostatic testing, all lines shall be thoroughly cleaned.
2. The pressure gauges to be used in testing, shall be checked at instrument shops or with other outside agency designated by the Owner / Consultant. It shall be the responsibility of the Contractor to get the pressure gauges calibrated.
3. Lines shall be slowly filled with water. It shall be ensured that no air pockets are left over in the line.
4. All vents and other connections shall be left open, while filling the line for removal of air.
5. Tests shall be considered complete only after the Engineer-in-Charge has given approval.
6. All lines shall be completely drained after hydrostatic testing and closed with blinds.

14 Inspection and Testing

1. The Owner / Consultant / Inspector shall have free access to all places where the work is being done or where pipes are manufactured or any other place concerned with the work. The Contractor shall provide all means for carrying out inspection.
2. The Contractor shall notify sufficiently in advance, the time of commencement of welding work and acceptance tests, to enable the Owner / Inspector to supervise the same.
3. The acceptance criteria for all inspection and testing shall be as stipulated in the relevant clauses of this specification and / or code, for pressure piping ANSI/ASME B 31.3.
4. The acceptance criteria for bought out items like pipes, fittings, valves and instruments shall be as mentioned in the respective specifications. The Owner reserves the right to inspect and witness the tests for all items, before dispatch. The Contractor shall however submit material test certificates, for Owner's / Consultant's approval before erecting them.

14.1 Performance Test

1. After erection of all the equipment, piping etc. the entire system shall be tested for the performance.
2. In case the system is found inadequate, the system shall be redesigned / modified at no extra cost to the Owner.

15 Approved vendors

15.1 All materials and equipment shall be of the best type available and shall be as per Indian standards and suitable to use in the specified climatic conditions.

The following makes of materials are listed as conforming to the specifications:-

Table 15.1: List of makes

S.No.	Item	Approved Makes
1	S.S. and Carbon steel Pipes :	Jindal / Tata / MSL
2	Branch pipe with nozzle :	Shah Bhogilal / Eversafe / Winco/Newage
3	Fire hoses :	Eversafe / CRC/Newage
4	Portable fire extinguishers :	Safex / Minimax / Kanex
5	S.S. and C.S. gate valve (rising stem) :	L&T / BHEL / Fouress
6	SS Double Hydrant valve :	Shah bhogilal / Eversafe/Newage
7	Water cum Foam Monitor	Shah bhogilal / Eversafe / New age
8	Globe valve in vent only :	L&T / BHEL / Fouress
9	Air release valve :	Shah Bhogilal / Leader
10	Wrapping & coating tape (4mm thk. Tape) :	IWL / STP
11	P.O. Red enamel paint :	Berger Paints / Shalimar Paints / Asian Paints
12	First-Aid Hose Reel :	Shah Bhogilal / Eversafe / Ceasefire / Tyco
13	Rubber Hose :	Dunlop / Jyoti
14	Fire Bucket :	Kanex / Safex / Minimax
15	Ball & Swing check valve :	L&T / BHEL / Fouress
16	C. S. Strainer :	Teleflo / Grandprix / Filtration Engg / Venus
17	Pressure Gauge :	General (GIC) / Warea / Wika
18	Siren ;	Speciality /Ajinkya / Core / Super
19	Flow meter :	Emerson / E&H / Honey-well / Yokogava
20	Fire Brigade inlet with inbuilt NRV :	Shah Bhogilal / Eversafe / Ceasefire / Tyco
21	Pressure switch	Indfos / Switzer / General Electric
22	Hose box (M.S) :	Shah bhogilal / Eversafe/Newage
23	S.S. Foam concentrate tank :	HD Fire / Fire Tech
24	Sprinklers :	Tyco / Viking / HD
25	Flexible coupling :	Grinnell
26	Foam Pumps :	Del PD/JEEpumps
27	Motors :	C&G / ABB / Siemens
28	Engine :	Cummins/KEOL/Geaves
29	Cabling :	LAPP / Reliable / Finolex
30	Detector :	Vijay / AnCon / Minimax
31	Fire Control Panel :	AnCon / Notifier / Simplex
32	Foam Generator package :	Viking / Kidde / Firemix
33	MCP / Hooter / Siren :	Vijay / AnCon / Notifier
34	Safety Relief valve :	Fainger Lager / Tyco / Nirmal Industries

S.No.	Item	Approved Makes
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P.S: Vendors shall only use any of the approved “sub-vendor” from the above list. for “client”. Standardisation with respect to their existing installation. MM requests “client”.to choose or add the preferred sub-vendor.

NOTE: THE MAKES OF ITEMS OFFERED SHALL BE STRICTLY RESTRICTED TO THE ABOVE MENTIONED APPROVED MAKES

16 List of Drawings

Table 16.1: Reference drawings & documents

P & I D for Fire protection System	322538-RIA-0900-01
Proposed Fire water pump room layout	322538-RLA-0901-01
Layout & details of modification in ex. fire hydrant network	322538-RPA-0902-01
Layout & details of combined (suction & discharge) piping for proposed pump house	322538-RPA-0903-04
Proposed a/g pipe route for existing foam network	322538-RPA-0904-01
Proposed foam tank and foam concentrate network.	322538-RPA-0905-01
Layout & Section of foam tank	322538-RPB-0906-01
Conceptual layout of gas suppression system for control room	322538-RPB-0907-01
Data sheet for 13KL Foam concentrate storage tank	322538-RIC-0101-01
Fire Protection system Tender (Technical Bid)	Tender/FF-01
Schedule of Quantities.	
1) Annexure-A _ Fire Fighting system	SOR-FF/01

17 Safety Manual

17.1 Health and Safety

1. Precautions shall be taken by the Contractor to ensure the health and safety of his staff and labour.
2. The Contractor shall, in collaboration with and to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance services are available at the accommodation and on the site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
3. In case of accident, the Owner shall be informed in writing forthwith. The contractor shall strictly follow regulations laid down by Factory Inspector, Central Government and State Authorities in this regard.
4. Any Casualty of damage caused to persons or property while executing the job will be at the contractor's risk and cost.
5. The contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Owner's representative may reasonably require.

17.2 Safety Engineer

1. The contractor shall appoint a member of his staff at the site to be responsible for maintaining the safety, and protection against accidents, of personnel on the site. This person shall be qualified for his work and shall have the authority to issue instructions and take protective measures to prevent accidents. The contractor shall send, to the consultant & Owner's representative, details of any accident as soon as possible after its occurrence.
2. The contractor shall provide all safety equipment to his employees during work like safety goggle, safety belt, ear plugs, nose masks, safety helmet at his cost.
3. The contractor shall conduct training/ mock drills for his employees to understand about safety rules, safety codes at his cost. The contractor shall arrange to conduct such a training program for all the employees in work and at regular interval as required by safety rules/laws. The contractor shall ensure that new/regular employees are aware/and follows all safety rules and conduct before he/she is put on the job.
4. If in the reasonable opinion of the Engineer the Contractor health and safety system is failing or has failed to prevent a single serious breach of good safety management and or in a manner that a cumulative number of minor incidents cause the Engineer reasonable concern as to the effectiveness of the Contractor's safety management system, the Engineer will be entitled to issue a Safety Improvement Notice. On receipt of the Safety Improvement Notice the Contractor shall as soon as is reasonably practicable but in no event less than seven days provide the Engineer with full supporting details the steps taken to address the issues raised in the Safety Improvement Notice. When the Contractor has taken the actions to rectify the issues addressed in the Safety

Improvement Notice the Contractor shall write to the Engineer applying for a Safety Improvement Notice Certificate. The Engineer shall audit the actions taken by the Contractor to determine any additional actions that the Contractor needs to take or whether the Safety Improvement Notice Certificate can be issued. If the Engineer fails to respond to the Contractor application for a Safety Notice Improvement Certificate within 14 days then the Engineer will have been deemed to have issued the Safety Improvement Notice Certificate. The Engineer shall inform the Employer to suspend all Key Event Payments to the Contractor until from the date of issue of the Safety Improvement Notice to the date of issuing the Safety Improvement Notice Certificate and that such payment suspension shall not constitute an event of Default under Clause 46 of this Agreement and nor shall it entitle the Contractor to claim any late interest payments

5. Where the Engineer believes that an incident is of such magnitude and or where the Engineer has issued several Safety Improvement Notices the Engineer shall be entitled to issue a notice of Default requiring the Contractor to effect immediate improvements in the safety management system. In such any case the Contractor shall not be entitled to claim for additional costs or an extension in the Time for Completion.

17.3 Safety Code

- General
- 1. The Contractor shall ensure and arrange at its cost fire and safety provisions, as per safety code of CPWD, Indian Standards Institution for all labour, directly or indirectly employed in the Works for performance of this contract and such as locally in force from time to time. Contractor will indemnify the Owner from any consequence arising due to Contractor's failure in respect of safety code.

17.4 First Aid and Injuries

1. First aid facilities at easily accessible place shall be provided by the Contractor as per provisions of Labour Act or Authority where work is carried out.
2. The Contractor shall make outside arrangements with hospitals for ambulance service and for treatment of injuries to meet eventualities needing these facilities. The Owner shall be informed of their telephone numbers and addresses.
3. All critical injuries shall be reported promptly to the Owner. Report shall cover type, nature, cause, physician's report and actions for prevention of those types again.

17.5 General Rules

1. Smoking within Site, restricted areas, near storage place of lubricant oil and fuel etc. are strictly prohibited.
2. The Contractor shall erect and maintain barricades required in connection with its operation to guard or protect
 - Excavation
 - Hoisting / lifting
 - Slab openings
 - Hazardous area
 - Owner's property likely to be subjected to damage by the Contractor's operations

- Railroad, unloading spots.
3. The Contractor shall provide and maintain closely knitted PVC net all round building throughout the construction period. He shall also provide all round from external face about 1.5m + wide temporary platform at every alternate floor covered with welded steel mesh. This shall be maintained and updated throughout the construction period to avoid any accident due to dropping of construction material / debris. This shall be strictly followed and work shall be permitted only when complied with the total satisfaction of the owner/consultant.
 4. Failing which the Owners reserves the right to get same carried out at the Contractor's risk and cost.

17.6 Display

1. These safety provisions shall be brought to the notice of all concerned by display on a notice board at the prominent place at the work space persons responsible for ensuring compliance with the safety code shall be named therein by the Contractor. The language shall be understandable, local language, Hindi and in English.

17.7 Scaffolding

1. Suitable scaffolds shall be provided for workmen for all Works that cannot safely be done from the ground or from solid construction except such short period work which can be done safely from ladders. When a ladder is used, extra labours shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds be provided on the ladder and the ladder shall be given an inclination, not steeper than $\frac{1}{4}$ to 1 (1/4 horizontal and 1 vertical). No portable single ladder shall be over 8 meter in length. The width between the side rails shall not be less than 30 cm.

17.8 Guard Rails

1. Scaffolding or staging more than 3.25 meters above the ground or floors, swung or suspended from an overhead support or erected with stationary support, shall have guard rail property attached, bolted, braced and otherwise secured at least 1 metre high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends. Therefore, with only such openings as may be necessary for the delivery of materials, such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

17.9 Working Platform

1. Working platform, gangways, and staircase shall be so constructed that they do not sag or unequally, and if height of platform or gangway or stairway is more than 3.25 meters above the ground level or floor level, it shall be closely guarded, have adequate width and be suitably fenced as described in clause Guard Rails above.

17.10 Demolition

1. Before any demolition work is Commenced and also during the process of the work:
2. All the roads and open areas adjacent to the work Site shall be closed or suitably protected.

3. No Electrical cable or apparatus, which is liable to be a source of danger to an operator, shall remain electrically charged.
4. All steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other parts of a building shall be so overloaded with debris or materials as to render it unsafe.
5. All blasting material shall be stored and handled as per guidelines of relevant authorities.

17.11 Drowning

1. When work is done near any place where there is risk of drowning, all necessary rescue equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger, and adequate provision made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

17.12 Accident

1. No materials on the sites shall be so stacked or placed as to cause danger or inconveniences to any person or public. **The Contractor shall provide all necessary fencing and lights to protect the public from accidents** and shall be bound to bear expenses of defence of every suit, action or other proceedings at law, that may be brought by any person, for injury sustained, owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit action or proceeding to any such person or which may, with the consent of the Contractors be paid to compromise any claim by any such person.
2. In case of every hoisting machine and of every chain ring hook shackle, swivel and pulley block used in hoisting or lowering as means of suspension, safe loads shall be ascertained by adequate means. Every hoisting machine and gear referred to above shall be plainly and prominently marked with safe working load. In case of hoisting machine variable safe workloads each safe working load and the part conditions under which it is applicable shall be clearly indicated. No part of any machine or of any gear referred to above in these paragraphs shall be loaded beyond safe working load except for the purpose of testing as laid down by manufacturers.
3. In case of departmental machines, safe working load shall be notified by the Consultant. As regards Contractor's machines, the Contractor shall notify safe working load of each machine of the Consultant whenever he brings it to Site of work gets it verified by the Consultant.
4. Motors, gearing transmission wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards;
5. Hoisting appliances shall be provided with such means as will reduce to the minimum, risk of an accidental descent or of any part of suspended load becoming accidentally displaced;
6. Workers employed on energised electrical installation, will use insulated foot mats and in addition shall wear apparel such as gloves, sleeves and boots, which as ma be necessary shall be provided. Workers shall not wear any rings, watches and keys or other materials, which are good conductors of electricity.

17.13 Maintenance

1. All scaffolds ladders and other safety devices mentioned or described herein shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing and maintenance facilities shall be provided at or near places of work.

17.14 Electrical Equipment

1. All temporary and permanent Electrical installations, power distribution and supply required for execution of Work shall be carried out confirming to safety rules and regulations important specific points to be noted are as under:
2. Meter room and main switches should be freely accessible at all times and fully protected against all weathers.
3. Power distribution system shall be identifiable with display marking on switches. All power distribution shall be carried out with coated, adequately insulated and of appropriate current / load rating cables. It shall be securely routed for this purpose. No loose, naked hanging wires shall be permitted. Over load protection devices shall be installed whenever and wherever heavy current load consuming construction of plant, machinery susceptible to hazard is in use and as directed by the Owner/consultant. Metallic plugs and sockets shall be used in fieldwork. Switchboard shall be in close proximity so as to have quick control over the supply. Proper and adequate earthing connection to be provided for all installation, plant machinery and distribution system. Hand lamps and inspection lamps shall be adequately insulated and guarded with wire mesh and will have proper plugs for use. Security and illuminator light shall be secured firmly and protected to withstand all weather.

17.15 Hoisting Machine / Tackles

1. These shall be of good mechanical construction, of sound material and adequate strength and free from patent defects and shall be kept in good working order and well maintained.
2. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.
3. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age 21 years shall be in charge of any hoisting machine including any scaffold, winch or for giving signals to operators.

17.16 Personal Safety

1. All necessary personal safety equipment as considered adequate by the owner shall be available for use of person employed on the Site and maintained in a condition suitable for immediate use and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned:
2. Workers employed on mixing asphaltic materials cement and lime mortars / concrete shall be provided with protective footwear and protective gloves. Those engaged in handling any material, which is injurious to eyes, should be provided with protective goggles. Those engaged in welding Works shall be provided with welder's protective eye shield and protective gloves. Stonebreakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe spacing. Workers employed on erection Works, etc. shall be provided with helmets, safety belts etc. Workers employed on concrete finishing, welding painting and other Works above 2 metres height shall be provided with a suitable safety belt, as per Factory Rules of the locality. When workers are employed in sewers and manholes, which are in use, the Contractor shall ensure that manhole covers are opened and manholes are ventilated at least for one hour before workers are allowed to enter them. Manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accidents to the public. The Contractor shall not

employ men below the age of 18. The contractor shall not women on the work of painting with products containing lead in any form. Whenever men above the age of 18 are employed on the work of lead painting, the following precautions shall be taken:

3. No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
4. Suitable face masks shall be supplied for use by workers when the paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
5. The Contractor to workmen shall supply overalls and adequate facilities shall be provided to enable working painter for wash during and on cessation of work.

17.17 Enforcement

1. To ensure effective enforcement of the rules a regulations relating to safety precautions, arrangements made by the Contractor shall be open to inspection by the owner/consultant or its representatives and the inspecting officer as defined in the Contractor's Labour Regulations.

17.18 Storing Fuel, Oil and Lubricants

1. The Contractor shall take approval from the Owner for storing the lubricants, oil and fuel at Site for running the machinery required for the construction.

17.19 Fire Extinguishing

1. Suitable, sufficient fire extinguishers for all types of fire shall be provided at work Site. In addition, sufficient buckets filled with water and sand shall also be provided. The firefighting equipment as outlined above shall be dispersed in a suitable and purposeful manner.

17.20 Rules in Force

1. Notwithstanding the conditions stated hereof, the Contractor is obliged to enforce other Rules in force or as required in the opinion of the Owner or its representative.

18 EHS Agreement

Environment, Health and safety agreement for Contractors / Suppliers / Transporters shall be as under.

18.1 General

- a. Contractor shall adhere to safe engineering and construction practice and guard against hazardous and unsafe working conditions and shall comply with Owner's safety rules as set forth herein.

18.2 Health, Safety & Environment (HSE) Management Systems

18.2.1 Requirements

- a) The Contractor should have a documented HSE policy to cover commitment of their organization to ensure health, safety and environment aspects in their line of operations.
- b) Contractor shall be fully responsible for planning and implementing HSE requirements. Contractor as a minimum requirement shall designate / deploy the following to co-ordinate the above :
 - c) No. of workers deployed
 - a. Up to 250 designate one safety supervisor
 - b. Above 250 and unto 500 deploy one qualified and experienced safety Engineer /officer
 - c. Above 500 One additional safety engineer/officer as above.(for every 500 or less)
 - d) Contractor shall indemnify & hold harmless representative free from any and all liabilities arising out of non-fulfilment of HSE requirements
 - e) The Contractor shall ensure that the Health, Safety and Environment (HSE) requirements are clearly understood and faithfully implemented at all levels at site.
 - f) The Contractor shall promote and develop consciousness for Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programmes and fabrication shop / work site meetings shall be arranged on HSE activities to cover hazards involved in various operations during construction.
 - g) The Contractor shall evolve a comprehensive planned and documented system for implementation and monitoring of the HSE requirements. This shall be submitted to owner for approval. The monitoring for implementation shall be done by regular inspections and compliance to the observations thereof. Any review / approval by owner shall not absolve contractor of his responsibility/liability in relation to all HSE requirements.
 - h) Non-Conformance on HSE by Contractor as brought out during review/audit by owner representatives shall be resolved forthwith by Contractor.
 - i) The Contractor shall ensure participation of his Resident Engineer / Site-in-Charge in the Safety Committee / HSE Committees meetings. The compliance of any observations shall be arranged urgently. Contractor shall assist to achieve the targets set by them on HSE during the project implementation.
 - j) The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or continuous failure in implementation of any of HSE provisions; Owner may impose stoppage of work without any Cost and time implication. The decision of imposing stoppage work and its extent shall rest with owner and shall be binding on the contractor
 - k) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health for driving of vehicles, handling and erection of materials and

equipment. All lifting equipment shall be tested and certified for its capacity before use. Adequate and suitable lighting at every work place and approach there to, shall be provided by the Contractor before starting the actual operations at night

- l) The Contractor shall provide a Crèche where 10 or more female workers are having children below the age of 6 years
- m) Reasonable Canteen facilities are made available at appropriate location depending upon site conditions
- n) All fatal accidents and other personnel accidents shall be investigated by a team of Contractor's senior personnel for root cause and recommend corrective and preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to owner. Owner shall have the liberty to independently investigate such occurrences and Contractor shall extend all necessary help and co-operation in this regard.
- o) Contractor shall duly filled up and submit health and safety competence assessment form as per Appendix- I

18.2.2 Details of HSE management system by contractor

18.2.2.1 On award of contract

- a) The Contractor shall prior to start of work submit his Health, Safety and Environment Manual or procedure and HSE Plans for approval by owner. The Contractor shall participate in the site kick-off meeting to finalise HSE Plans including the following:
- b) Job procedure to be followed by Contractor for activities covering. Handling of equipment, Scaffolding, Electric Installation, describing the risks involved actions to be taken and methodology for monitoring each activity audit requirement.
- c) Organization structure along with responsibility and authority records / reports on HSE activities.

18.2.2.2 During job execution

Implement approved Health, Safety and Environment management procedure including but not limited to below and Contractor shall also ensure to:

- a) Arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc., as applicable
- b) Arrange all HSE permits before start of activities (as applicable) like confined space work at heights, hot work permit, storage of chemical / explosive materials and its use and implement all precautions mentioned therein
- c) Tool box and tackles should be given to all workers on daily basis
- d) Submit timely the completed checklist on HSE activities, Monthly HSE report, accident reports, and investigation reports etc. as per owner requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to owner
- e) Display at site office and work locations caution boards, list of hospitals, emergency services available.

- f) Provide posters, banners for safe working to promote safety consciousness
- g) Carryout audits / inspection at sub-contractor works as per approved HSE document and submit the reports for owner's review.
- h) Assist in HSE audits by owner, and submit compliance report
 - a. Generate and submit HSE records / report as per HSE Plan.

18.2.3 House keeping

Contractor shall ensure that a high degree of housekeeping is maintained and shall ensure the followings:

- a) All surplus earth and debris are removed/ disposed off from the working areas to identified location(s)
- b) Unused / Surplus Cables, Steel items and steel scrap lying scattered at different places within the working areas are removed to identified location(s)
- c) All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s)
- d) Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and bricks etc. shall not be allowed on the roads to obstruct free movement of men &
- e) machineries
- f) Fabricated steel structural, pipes & piping materials shall be stacked properly for erection
- g) Water logging on roads shall not be allowed
- h) No parking of trucks / trolleys, cranes and trailers etc. shall be allowed on roads which may obstruct the traffic movement
- i) Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas
- j) Trucks carrying sand, earth and pulverised materials etc. shall be covered while moving within the plane area.

18.3 Safety regulations

- a) In respect of all labour, directly employed in the Work for the performance of Contractor's part shall at his own expense arrange for all the safety provisions as per safety codes of C.P.W.D., Indian Standards Institution. The Electricity Act, The Mines Act, Factory Inspector and such other acts as applicable.
- b) The Contractor shall observe and abide by all fire and safety regulations of the Owner. Before starting construction work Contractor shall consult with Owner's safety Engineers or Engineer-In-Charge and must make good to the satisfaction of the Owner any loss or damage due to fire to any portion of the work done or to be done under this agreement or to any of the Owner's property.
- c) Indicative list for statutory acts and rules to be followed are as per below:
 - a. Indian Explosives Act, 1984.
 - b. The Motor Vehicles Act, 1988.
 - c. The Factories Act, 1949.
 - d. The Petroleum Act, 2002.
 - e. Workmen Compensation Act,
 - f. Static/Mobile Pressure Vessel Act,
 - g. Indian Electricity Act,

- h. Indian Boiler Act, 1923.
- i. Water (Prevention & Control Pollution) Act, 1974.
- j. Water (Prevention & Control of Pollution) Cess Act-1977.
- k. The Air (Prevention & Control of Pollution) Act-1981.
- l. The Radiation Protection Rules-1971
- m. The Indian Forest Act-1927.
- n. The Wild Life (Protection) Act-1972.
- o. The Environment (Protection) Act-1986.
- p. The Environment (Protection) Rules-1986.
- q. The Hazardous Wastes (Management & Handling) Rules-1989.
- r. The Manufacture, Storage & import of Hazardous Chemicals Rules-1989.
- s. The Central Motor Vehicle Rule-1989.
- t. The Building and Other Construction Workers (Regulation of Employment and Condition of service) Act, 1996.

7. Contractor shall observe and follow IS-codes for personal protection as follows

Sr. No.	Codes	Description
1.	IS 816:1969, R-1998	Code of practice for safety & health requirements in electric and gas welding and cutting operations
8.	IS 1179:1997, R-2003	Eye & Face precautions during welding, equipment etc.
9.	IS 14665:2000 (Part-II, Sec-I)R-2005	Lifts - Part 2: Code of practice for installation, operation & maintenance
10.	IS 15298:2004 (Part 1 to 8)	Safety, Protective, & Occupational footwear for professional use
11.	IS 2925:1984, R-2000	Industrial Safety Helmets
12.	IS 3016:1982, R-2006	Code of practice for fire safety precautions in welding & cutting operation.
13.	IS 3043:1987, R-2006	Code of practice for earthing
14.	IS 3521:1999, R-2002	Industrial Safety belts and harness
15.	IS 4770:1991, R-2001	Rubber gloves for electrical purposes
16.	IS 5216:1982 (Part-I), R-2005	Recommendations on Safety procedures and practices in electrical works
17.	IS 5983:1980, R-2002	Eye protectors
18.	IS 6519:1971, R-1997	Selection, care and repair of Safety footwear
19.	IS 6994:1973 (Part-I), R-2007	Industrial Safety Gloves (Leather & Cotton Gloves)
20.	IS 7293:1974, R-2007	Safety Code for working with construction Machinery
21.	IS 9167:1979, R-2002	Ear protectors
22.	IS 11006:1984, R-2006	Flash back arrestor (Flame arrestor)
23.	IS 11016:1984, R-2006	General and safety requirements for machine tools and their operation

Sr. No.	Codes	Description
24.	IS 11972:1997, R-2002	Code of practice for safety precaution to be taken when entering a sewerage system
25.	IS 13367:1992, R-2000	Code of practice-safe use of cranes
26.	IS 13416 (Part 1, 2 ,3&4) I & II Y/E 1992 R 2002 III & IV Y/E 2004	Recommendations for preventive measures against hazards at working place

18.4 Safety Rules to be observed at site

18.4.1 Cardinal rules of safety

The following acts are violation(s) of Cardinal Rules of Safety and would result in disciplinary actions.

- Non-compliance and / or wilful disregard/violation of Safety Rules, Standard Operation Procedures and related policies.
- Carrying, consuming and storing of alcohol, non-prescribed drugs and other intoxicants in the offices and work places.
- Smoking in the plant and other restricted places.
- Horse Play such as practical jokes, wrestling, fighting, or other physical or violent acts.
- Any verbal threat or physically threatening act will be considered the same as if it was carried out.
- Carrying of weapons, arms, and acts of sabotage in the work areas.

The above list of Cardinal Rules of Safety is not intended to be exhaustive of the events or circumstances that may result in termination of employment or any other disciplinary action.

18.4.2 General safety rules for contractor and contractor's labour

- Do not carry out sabotage in the site or plant
- Unauthorised entry to battery limit of a plant is strictly prohibited
- Do not allow children below 14 years and under age worker at the site / plant
- Smoking and carrying match box or cigarette, lighter or any other source which may produce naked flame is strictly prohibited in the Entire Complex
- Use an electric torch instead of naked light in places where inflammable liquids, vapours, gases or dusts are liable to be present is strictly prohibited. Do not enter into such premises with footwear having iron nails or studs.
- Use only nonferrous tools for opening empty or filled drums/cans of inflammable liquids.
- Contractor must provide safety appliance to their labourers. All Personal Protective Equipment (PPE) and other appliances should be of good quality and conforming to IS standards as applicable. Use of hardhats/ safety helmet and safety shoes is compulsory while working at site.
- Contractor using motor vehicles for their work inside the factory shall instruct their drivers not to drive at a speed beyond 20 kmph, and to slow down vehicles and horn before taking a turn at every corner.
- Contractor whose driver is found violating this rule and other normal rules of driving shall all be held responsible for the damage caused to any person or property and may entail debarring such

defaulting drivers from entering the works premises and even cancellation of the registration of contract with the company.

- j) Transport of hazardous chemicals to be comply with requirements of Motor Vehicle Act / SMPV Rules and as per prevailing safety practices of the company.
- k) Any unsafe condition observed should be immediately reported to the in charge of the plant/ contract awarding authority.
- l) Do not tamper with any type of valves, electric switches or any other apparatus or moving machinery installed in the factory area.
- m) Do not tamper with any switch, which is protected with Danger Board/Tag.
- n) Sitting or walking on rail tracks, crossing between wagons, taking rest under stabled wagons, crossing the rail through the openings underneath the stationary wagons are strictly prohibited.
- o) When welding or cutting metals, make sure that spark and molten slag do not come in contact with combustible material. No welding work should be done in any areas without obtaining a safety permit from the concerned departmental-in-charge. Nowhere fire should be lighted in the factory area without obtaining 'Safety Permit' for doing so.
- p) Always use carrying cases as hand-cart in transporting corrosive, offensive and irritating chemicals.
- q) Always keep gas cylinders away from direct rays of sun, hot places, acids and electric live lines. Valves on cylinder should never be lubricated.
- r) Gas cylinders should be kept away from work place. Acetylene cylinders should be kept vertical.
- s) Cylinder should never be rolled on roads for transportation from/to store. Use suitable hand-cart for the purpose.
- t) It is prohibited to carry gas cylinders at tank upstairs / dyke area for gas cutting and welding.
- u) Before you start any machinery, make sure everyone is in the clear. Keep guards in position. No work on any equipment in the battery limit should be undertaken by any person without obtaining prior permission in Work Permit from the concerned departmental head, if necessary, appropriate shut-down should be obtained before commencing any work on such equipment.
- v) It is prohibited to work on or near moving machinery by wearing loose clothing.
- w) Nobody should try to clean, lubricate or examine any part of moving machinery while the machine is running.
- x) Never tamper with electrical equipment. Always consider the electrical equipment as live unless it is ensured that it is dead.
- y) Welding Machines should be certified prior to use by Electrical Dept. Welding cables and connections should be in good condition. Fix the earthing cable at the welding place only.
- z) Electrical Dept. prior to use must certify all the electrically operated tools and earthing wire should be in good physical conditions.
- aa) No electrical connections should be done without suitable fixtures such as plug switch board and fuses.
- bb) Do not stand under a suspended load. Do not work on and around the suspended load.
- cc) When work has to be done on roofs, towers or any other lofty position without guards, use of full body harness with double lifeline safety belt is compulsory.
- dd) Undercutting a heap is strictly forbidden in case of excavation work. Undercutting is also prohibited. Always maintain a proper sloping to avoid sliding of heap of earth.
- ee) Excavated pit and road should be cordoned suitably and safety tags should be displayed.

- ff) If you get chemical splash, wash off the affected areas immediately with plenty of water.
- gg) Wash your hands thoroughly before touching any food or utensils
- hh) Be careful to keep aisles, passage-ways and stairways clean and unobstructed. All the discarded metal and other scrap should be collected and kept at one particular place for disposal.
- ii) Contractor and their labourers are required to obey safety rules, otherwise suitable actions such as suspension of work or contract will be taken for breach of rules.
- jj) Don't jump-off platforms. Use proper entrance or stairs. Use handrails while ascending/ descending stairs.
- kk) Carrying tools or material in hands while climbing ladders is strictly forbidden.
- ll) Advice of safety and fire department must be strictly followed.

18.5 First aid and industrial injuries

- a) Contractor shall maintain first aid facilities for its employees and those of its SUB-Contractor.
- b) Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to Owner prior to start of construction and their telephone numbers shall be prominently posted in Contractor's field office.
- c) All critical industrial injuries shall be reported promptly to Owner, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to the Owner.

18.6 Barricade

- a) Contractor shall erect and maintain barricades required in connection with his operation to guard or protect:-
 - a. Excavations
 - b. Hoisting Areas.
 - c. Areas adjudged hazardous by Contractor's or Owner's inspectors.
 - d. Owner's property subject to damage by Contractor's Operations.
 - e. Rail Road unloading spots.
- b) Contractor's employees and those of his SUB- Contractor's shall become acquainted with Owner's barricading practice and shall respect the provisions thereof.
- c) Barricades and hazardous areas adjacent to, but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

18.7 Scaffolding

- a) Suitable scaffolding should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra labour shall be engaged for holding the ladder and if the ladder is used for carrying material as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).
- b) Scaffolding or staging more than 4 metres above the ground or floor, swing suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one metre high above the floor or platform of such

scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

- c) Working platform, gangway and stairway should be so constructed that they should not sag unduly or unequally and if the height of platform of the gangway or the stairway is more than 4 metres above the ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as mentioned above.
- d) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum heights shall be 1 metre.
- e) Safe-means of access shall be provided to all working platforms and other working places, every ladder shall be securely fixed. No portable single ladder shall be over 9 metres in length while the width between side rails in rung ladder shall in no case be less than 30 cms for ladder up to and including 3 metres in length. For longer ladder this width should be increased 5mm for each additional foot of length. Uniform steps spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit, action or other proceeding of law that may be brought by any person for injury sustained owing to neglect of the above precautions and pay any damages and costs which may be awarded in any such suit or action or proceeding to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.

18.8 Excavation and trenching

- a) All trenches 1.2 metres or more in depth shall at all times be supplied with at least one ladder for each 50 metres length or fraction thereof. Ladder shall be extended from bottom of the trenches to at least 1 metre above the surface of the ground. The sides of the trenches which are 1.5M in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 metres of the edge of the trench or half of the trench width whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under-cutting shall be done.

18.9 Demolition/general safety

- a) Before any demolition work is commenced and also during the progress of the demolition work
 - a. All roads and open areas adjacent to the work site shall either be closed or suitably protected.
 - b. No electric cable or apparatus which is liable to be a source of danger shall remain electrically charged.
 - c. All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
- b) All necessary personal safety equipment as considered adequate by the Engineer-In-Charge should be kept available for the use of the persons employed on the SITE and maintained in

condition suitable for immediate use, and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned.

- a. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
- b. Those engaged in white washing and mixing or stacking or cement bags or any material which are injurious to the eyes be provided with protective goggles.
- c. Those engaged in welding and cutting works shall be provided with protective face & eye shield, hand gloves, etc.
- d. Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- e. When workers are employed in sewers and manholes, which are in use, the Contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or board to prevent accident to the public.
- f. The Contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.
 - i. No paint containing lead or lead product shall be used except in the form of paste or readymade paint.
 - ii. Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.
 - iii. Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash them during and on cessation of work.
- c) The Contractor shall ensure that a proper Safety Net System shall be used at appropriate locations. The safety net shall be located not more than 30 feet (9.0 meters) below the working surface at site to arrest or to reduce the consequences of a possible fall of persons working at different heights
- d) When the work is done near any place where there is risk of drowning, all necessary safety equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.
- e) Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions:
 - a. These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good working order.
 - b. Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.
 - c. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding, winch or give signals to the operator.

- f) In case of every hoisting machine and of every chain ring hook, shackle, swivel, and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gears referred to above shall be plainly marked with the safe working load of the conditions under which it is applicable and the same shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond safe working load except for the purpose of testing.
 - a. In case of departmental machine, the safe working load shall be notified by the Engineer-In-Charge. As regards Contractor's machines, the Contractor shall notify the safe working load of the machine to the Engineer-In-Charge whenever he brings any machinery to SITE of WORK and get it verified by the Engineer concerned.
- g) Motors, gears, transmission lines, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as to reduce to minimum the accidental descent of the load, adequate precautions should be taken to reduce the minimum risk of any part or parts of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, wearing apparel, such as gloves, sleeves, and boots as may be necessary should be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.
- h) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffolds, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
- i) These safety provisions should be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.
- j) To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Welfare Officer, ENGINEER-IN-CHARGE or safety Engineer of the Administration or their representatives.
- k) Notwithstanding the above clauses there is nothing in these to exempt the Contractor for the operations of any other Act or rules in force in the Republic of India. The work throughout including any temporary works shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpath at the site or in the vicinity thereto or any works whether the property of the Administration or of a third party.

In addition to the above, the Contractor shall abide by the safety code provision as per CPWD, Safety code and Indian Standard Safety Code from time to time.

18.10 Handling inflammable gas

- a) The Contractor has to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder/inflammable liquids/paints etc. as required under the law and/or as advised by the fire Authorities of the Owner.

18.11 Temporary combustible structures

- a) Temporary combustible structures will not be built near or around work site

18.12 Precautions against fire

- a) The Contractor will have to provide Fire Extinguishers, Fire Buckets and drums at worksite as recommended by Engineer-In-Charge. They will have to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinders/ inflammable liquid/ paints etc. as advised by Engineer-In-Charge. Temporary combustible structures will not be built near or around the work-site.

18.13 Explosives

- a) Explosives shall not be stored or used on the WORK or on the SITE by the Contractor without the permission of the Engineer-In-Charge in writing and then only in the manner and to the extent to which such permission is given. When explosives are required for the WORK they will be stored in a special magazine to be provided at the cost of the Contractor in accordance with the Explosives Rules. The Contractor shall obtain the necessary licence for the storage and the use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the Contractor and the Contractor shall indemnify the Owner against any loss or damage resulting directly or indirectly there from.

18.14 Use of intoxicants

- a) The unauthorised sale of spirits or other intoxicants, beverages upon the work in any of the buildings, encampments or tenements owned, occupied by or within the control of the Contractor or any of his employee is forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition
- b) In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. safety code and Indian Standard Code framed from time to time.

18.15 Mines act

- c) The Contractor shall at his own expense arrange for the safety provisions as required by the Engineer-In-Charge in respect of all labour directly employed for performance of the WORKS and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provides necessary facilities as aforesaid, the ENGINEER-IN-CHARGE shall be entitled to do so and recover the costs thereof from the Contractor.
- d) Failure to comply with Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the Contractor liable to pay Company Liquidated Damages an amount not exceeding Rs.50/- for each default or materially incorrect statement. The decision of the Engineer-In-Charge in such matters based on reports from the Inspecting Officer or from representatives of Engineer-In-Charge shall be final and binding and deductions for recovery

of such Liquidated Damages may be made from any amount payable to the Contractor from all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof the time being in force and any Rules and Regulations made there under in respect of all the persons employed by him under this Contract and shall indemnify the Owner from and against any claim under the Mines Act or the rules and regulations framed there under by or on behalf of any persons employed by him or otherwise.

18.16 Preservation of place

- a) The Contractor shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his worker and others employed or the works and for the preservation of peace and protection of the inhabitants and security of property in the neighbourhood of the WORK. In the event of the Owner requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the Contractor and if paid by the Owner shall be recoverable from the Contractor.

18.17 Outbreak of infectious diseases

- a) The Contractor shall remove from his camp such labour and their facilities that refuse protective inoculation and vaccination when called upon to do so by the Engineer-In-Charge's representative. Should Cholera, Plague or other infectious diseases break out the Contractor shall burn the huts, beddings, clothes and other belongings or used by the infected parties and promptly erect new huts on healthy sites as required by the Engineer-In-Charge failing which within the time specified in the Engineer's requisition, the work may be done by the Owner and the cost

19 List of specifications

19.1 Stainless Steel Body Hydrant Valve (Oblique Type)

1.0	Manufacturer	:	As per approved vendor list.
2.0	Type	:	Single headed female oblique type
3.0	Outlet Nozzle size	:	63mm
4.0	Code / Standard	:	IS: 5290, Type: A
5.0	Body	:	Stainless Steel Gr. 1 & 4 of IS: 3444
6.0	Female Outlet	:	Stainless Steel Gr. 1 & 4 of IS: 3444
7.0	Outlet Washer	:	Rubber – IS: 639 / IS: 581
8.0	Blank cap	:	Stainless Steel Gr. 1 & 4 of IS: 3444
9.0	Spring	:	*
10.0	Cam Tooth	:	*
11.0	Gland & Gland Nut	:	*
12.0	Bonnet	:	Stainless Steel Gr. 1 & 4 of IS: 3444
13.0	Spindle	:	Stainless Steel Gr. 1 & 4 of IS: 3444
14.0	Hand Wheel	:	M.S. as per IS: 1030:1989
15.0	Spring Washer	:	Spring Steel
16.0	Spring	:	Stainless Steel wire as per IS: 6528:1972
17.0	Seat Valve	:	*
18.0	Seat Washer	:	Rubber / S.S
19.0	Hex. Nut	:	SS
20.0	Chain	:	G.I
21.0	Stem	:	Bronze
22.0	Flow	:	900 LPM @ 7 Bar
23.0	Base Flange	:	3” Size (ANSI / PN 16)
24.0	Outlet Connection	:	63mm Female Instantaneous Oblique Outlet [2 ½” BSPT(M)]

25.0	Painting	:	Fire Red as per IS: 5, Shade No. 536.
26.0	Hydrostatic Test Pressure of		
	Body	:	21 Kg / Cm ²
	Seat	:	14 Kg / Cm ²
27.0	Operation	:	By Hand wheel
28.0	Opening Direction	:	Anti-Clockwise
29.0	Approval	:	TAC and certified by BIS
30.0	Hydraulic Test	:	25 Kg / Cm ²
31.0	Valve Seat Tightening Test	:	14 Kg / Cm ²

‘**’ Data to be filled by vendor.

19.2 Stainless Steel Body Double Headed Hydrant Valve

1.0	Manufacturer	:	As per approved vendor list.
2.0	Type	:	Double headed outlet
3.0	Outlet Nozzle size	:	63mm
4.0	Code / Standard	:	IS: 5290, Type: B
5.0	Body	:	Stainless Steel Gr. 1 & 4 of IS: 3444
6.0	Female Outlet	:	Stainless Steel Gr. 1 & 4 of IS: 3444
7.0	Outlet Washer	:	Rubber – IS: 639 / IS: 581
8.0	Blank cap	:	Stainless Steel Gr. 1 & 4 of IS: 3444
9.0	Spring	:	*
10.0	Cam Tooth	:	*
11.0	Gland & Gland Nut	:	*
12.0	Bonnet	:	Stainless Steel Gr. 1 & 4 of IS: 3444
13.0	Spindle	:	Stainless Steel Gr. 1 & 4 of IS: 3444
14.0	Hand Wheel	:	M.S. as per IS: 1030:1989
15.0	Spring Washer	:	Spring Steel

16.0	Spring	:	Stainless Steel wire as per IS: 6528:1972
17.0	Seat Valve	:	*
18.0	Seat Washer	:	Rubber / S.S
19.0	Hex. Nut	:	SS
20.0	Chain	:	G.I
21.0	Stem	:	Bronze
22.0	Flow	:	900 LPM @ 7 Bar
23.0	Base Flange	:	4" Size (ANSI / PN 16)
24.0	Outlet Connection	:	63mm Female Instantaneous Oblique Outlet [2 1/2" BSPT (M)]
25.0	Painting	:	Fire Red as per IS: 5, Shade No. 536.
26.0	Hydrostatic Test Pressure of		
	Body	:	21 Kg / Cm ²
	Seat	:	14 Kg / Cm ²
27.0	Operation	:	By Hand wheel
28.0	Opening Direction	:	Anti-Clockwise
29.0	Approval	:	TAC and certified by BIS
30.0	Hydraulic Test	:	25 Kg / Cm ²
31.0	Valve Seat Tightening Test	:	14 Kg / Cm ²

** Data to be filled by vendor.

19.3 Stainless Steel Branch Pipe

1.	Manufacturer	:	As per approved vendor list.
2.	Size	:	63 NB with 20 mm Nozzle
3.	Nozzle Type	:	63 mm screwed universal nozzle
4.	Code / Standard	:	IS: 2871
5.	Outlet	:	Jet, Spray & shut off
6.	Branch pipe / Nozzle	:	Stainless Steel as per Gr. 1 & 4 of IS: 3444:1987

7.	Testing & Inspection	:	As per Approved QAP
8.	Approval	:	TAC and certified by BIS
9.	Marking	:	ISI Mark
10.	Washer & Diffuser	:	Rubber
11.	Hydrostatic Test Pressure	:	21 kg / cm ²

19.4 Fabricated M.S. Sheet Hose Box

1.	Manufacturer	:	As per approved vendor list.
2.	Size	:	750 MM Long x 600 MM Height x 250 MM Depth for external single headed hydrant.
3.	Material of Construction	:	CRCA sheet fabricated from min. 2 mm sheet
4.	Front	:	Double door front panel glass
5.	Mounting	:	Wall mounted / Pedestal mounted
6.	Door Type	:	Hinged
7.	Glass Thickness	:	3 mm
8.	Painting	:	Fire Red (Shade No: 536 of IS:5)
9.	Locking Arrangement	:	Yes
10.	Markings	:	Yes
11.	Hammer & Chain	:	Yes
12.	Inspection & Testing	:	As per QAP

19.5 Hose Pipe (RRL)

1.	Manufacturer	:	As per approved vendor list.
2.	Type	:	Reinforced Rubber Lined (RRL), Cotton Synthetic Fibre, Circularly Woven Jacketed Rubberised Fabric.
3.	Size	:	63MM
4.	Code / Standard	:	IS: 636 Type-A
5.	Length	:	15 Mtrs / 7.5 Mtrs

6.	Working Pressure	:	14 Kg / cm ²
7.	Proof Pressure	:	22 Kg / cm ²
8.	Burst Pressure	:	36 Kg / cm ²
9.	End Fitting	:	Quick Coupling End, Instantaneous Spring Lock Type
10.	Approval	:	TAC and certified by BIS

19.6 Pressure Gauge

1.	Make	:	As per approved vendor list.
2.	Type	:	Bourdon
3.	Ref. Standard	:	EN-837
4.	Range	:	0 – 16 kg / cm ²
5.	Dial size	:	150 mm
6.	Dial	:	Aluminium with Black Marking on White Background
7.	Case material	:	Epoxy Painted Black SS 304
8.	Bezel ring	:	Bayonet
9.	Enclosure	:	Weather Proof IP 67
10.	Sensing Element	:	Bourdon tube
11.	Sensing Element Material	:	SS 316
12.	Socket Material	:	SS 316
13.	Bourdon Material	:	SS 316
14.	Movement	:	SS 304
15.	Accuracy	:	± 0.5% of FSD
16.	Zero Adjustment	:	Micrometer pointer (internal)
17.	Connection	:	½" NPT (M)
18.	over range protection	:	130% of FSD
19.	Blow out disc	:	Provided

- | | | | |
|-----|------------------------|---|---------------------|
| 20. | Mounting | : | Bottom entry |
| 21. | Inspection and Testing | : | As per approved QAP |

19.7 Pressure Switch

19.7.1 General

- | | | | |
|-----|--------------------------|---|---|
| 1. | Make | : | As per approved vendor list. |
| 2. | Model No | : | - |
| 3. | Type | : | Pressure, Diaphragm actuated |
| 4. | Indication | : | Blind |
| 5. | Mounting | : | Direct |
| 6. | Enclosure protection | : | Weather proof IP 66 as per IS: 13947, Part 1 |
| 7. | Setting | : | Set in Field |
| 8. | On-Off Differential | : | Fixed Max of 0.8 Kg / cm sq. |
| 9. | Repeatability | : | ± 0.5%FSR |
| 10. | Case Material | : | Die-cast Aluminum enclosure |
| 11. | Cable entry & connection | : | 2 Nos. (1 with cable gland & 1 with Plugged)
3/4" ET Double compression cable gland. |
| 12. | Process connection type | : | Bottom entry. |
| 13. | Adjustability | : | Set point is adjustable from 20 to 90% |
| 14. | Over range protection | : | 150% FSR |

19.7.2 Element

- | | | | |
|----|-----------------------|---|---------------------------------|
| 1. | Type | : | Diaphragm actuated |
| 2. | Material | : | SS-316 Diaphragm |
| 3. | Process connection | : | 1/2 NPT (F) |
| 4. | Max. Working Pressure | : | 65 Kg / cm sq (Static Pressure) |
| 5. | Micro switch type | : | Snap action |
| 6. | Contact | : | 2 SPDT |

- 7. Rating : 15A-250VAC, 0.4A-110VDC
- 8. Set point adjustment : Internal, throughout the Range.
- 9. Piston Actuator Provides Set point: $\pm 0.5\%$ FSR Repeatability
- 10. Operating ambient temperature : Operating -20°C to 170 °C

19.8 Water cum Foam Monitor

- 1. Manufacturer : As per approved vendor list.
- 2. Model : M - Manually Controlled Type
- 3. Maximum Rated Pressure : 12.3 Kg/Cm2
- 4. Nominal Waterway Size : 63 MM / 75 MM
- 5. Standards : IS: 8442
- 6. Flow At 7 Kg/Cm2 Pressure
 - 63 MM : 1750 LPM
 - 75 MM : 3500 LPM
- 7.0 Hydrostatic Test Pressure : 25 Kg/Cm2
- 8.0 Inlet Flange Size
 - 63 MM : 80 NB
 - 75 MM : 100 NB
- 9.0 Flange Dimensions : IS 6392 – 1971 Table 17 & 28 /ANSI B 16.5 /
IS: 1538
- 10. Nozzle Type : Jet Spray
- 11. Monitor Elevation
 - Above Horizontal : 900
 - Below Horizontal : -450
- 12. Rotation : 3600 Continuous
- 13. Weight : 32 Kg
- 14.0 Material of Construction
 - Water Barrel : Seamless IS: 1239 Part-I

	Nozzle	:	Bronze IS: 318 LTB – II
	Base Flange	:	IS: 6392 / IS: 2062 / IS: 2002 ANSI B 16.5 / IS:
	Drain Valve	:	Brass
	Swivel Joint	:	Bronze IS: 318 LTB – II
	Grease Nipple	:	Brass
	Lock Nut	:	Brass IS: 291 Part – I
	Handle	:	M.S IS: 1732 - 1971
15.	Nozzle Size	63 MM Monitor :	32 MM
		100 MM Monitor:	45 MM
16.	Jet (Horizontal Straight Stream Range in Still Air with Nozzle Elevation 300 to Inlet Flange And at 7 Kg/cm ² Nozzle Pressure		
		63 MM Monitor :	Water : 53 M, Foam : 45M
		100 MM Monitor:	Water : 64 M, Foam : 55M
17.	Finish	:	Hot Dip Galvanized Steel Parts with Fire Red Shade 536 of IS: 5 -1961 Painted from Outside.
18.	Approval	:	TAC and certified by BIS

19.9 M.S. Fabricated 'Y' type Strainer

1.	Manufacturer	:	As per approved vendor list.
2.	Type	:	'Y' Type
3.	Body	:	Cast Iron, IS: 210 Gr. Fg. 200
4.	Cap	:	Cast Iron, IS: 210 Gr. Fg. 200
5.	Screen	:	Stainless Steel, AISI-30
6.	Gasket	:	Rubber
7.	Plug	:	Carbon steel IS: 1363
8.	Bolts	:	G.I Hexagonal head as per IS: 1367 / 1364

9.	Nuts	:	G.I As per IS: 1367 / 1364
10.	End	:	Flanged (Drilling – ANSI B 16.5) / IS: 1538 / IS: 6392
11.	Pressure / Temperature Range	:	ANSI 125, 8.62 bar @ saturation
12.	Test Pressure – Hydrostatic	:	ANSI 125 - 17.24 bar
13.	Filter Element	:	40 Mesh stainless steel.
14.	Accessories	:	Drain & Vent valve.
15.	Inspection & testing	:	As per QAP.

19.10 C.S. Fabricated Basket type Strainer

1.0	Manufacturer	:	As per approved vendor list.
2.0	Construction	:	Fabricated
3.0	Material of Construction		
	Body	:	Carbon Steel
	Dish Ends, Legs & Davit arm	:	Carbon Steel
	Filter	:	*
	End Connection	:	Flanged
	Cover	:	Bolted / Quick Opening Hinged
	Accessories	:	Drain & Vent with Plug (Standard) and Davit Arm for the Covers (for Higher Sized Strainers)
	Basket	:	6 MM Hole Perforated in SS 304 sheet. Outer Filter Element Lined with 40 Mesh (SS304) Inner Filter Element.

PIPING MATERIAL SPECIFICATION

CLIENT	Delhi Aviation Fuel Facility Pvt. Ltd.	PIPING CLASS	150C02
JOB NO	322538	BOILER CODE	NO
PROJECT	Modernization of Existing Fuel Farm	PWHT	NO
LOCATION	New Delhi.		

SERVICE	Fire Water
----------------	------------

DESIGN CONDITION	BASE MATERIAL :	CS - A 53 Gr B											
	RATING CLASS :	150 #											
	CORROSION ALLOWANCE, mm :	1.5											
PRESSURE TEMPERATURE RATING													
TEMP-°C	-29.0	38.0	50.0	100.0	150.0	200.0	250.0	300.0	325.0	350.0	375.0	400.0	425.0
PRES-Bar (a)	19.60	19.60	19.20	17.70	15.80	13.80	12.10	10.20	9.30	8.40	7.40	6.50	5.50

PIPE JOINTS	ITEMS	SIZE	DESCRIPTION
	PIPE JOINTS		40 NB & BELOW
		50 NB & ABOVE	BUTTWELD
DRAINS		ON LINE<= 40 NB	AS PER P & ID OR 20 NB,TEE
		ON LINE>= 50 NB	AS PER P & ID OR 20 NB, HALF COUPLING
VENTS		ON LINE<= 40 NB	AS PER P & ID OR 20 NB,TEE
		ON LINE >= 50 NB	AS PER P & ID OR 20 NB, HALF COUPLING
TEMP. CONN PRESS. CONN		ALL	AS PER HOOK UP DIAGRAM
		ALL	AS PER HOOK UP DIAGRAM AS PER PIPING DRG/MM STD


GENERAL	1 NDT SHALL BE AS PER JOB SPECIFICATION
	2 ASBESTOS FREE GASKET AND STEM PACKING SHALL BE USED FOR ALL VALVES.

BRANCH CONNECTION CHART

LEGEND

R	REINFORCED FAB TEE
S	SOCKOLET
T	TEE
P	PIPE TO PIPE
W	WELDOLET
H	HALF COUPLING
SW	SOCKETWELD
SC	SCREWED

BRANCH

TITLE PIPING MATERIAL SPECIFICATION 150C02				 Mott MacDonald				A-20 Sector-2, Noida - 201301 Tel +91 (0)12 0254 3582 Fax +91 120 254 3562 Web www.mottmac.com			
Date	Prepared By	Checked By	Approved By	Scale	Document No.	Sheet	Rev.	Status			
23.07.15	KDP	MMS	VST/GDS	NA	322538-RSD-971	1 of 2	APR	P1			

PIPING MATERIAL SPECIFICATION

CLIENT	Delhi Aviation Fuel Facility Pvt. Ltd.	PIPING CLASS	150C02
JOB NO	322538	BOILER CODE	NO
PROJECT	Modernization of Existing Fuel Farm	PWHT	NO
LOCATION	New Delhi.		

ITEMS	TYPE	SIZE		SCH/ THK/RAT.	FACE/FINISH RADIUS	DIM/ DGN STD	MATERIAL	DESCRIPTION	NOTE
		END	LOWER						
PIPE	PE	15	40	SCH 80		B 36.10	A 53 Gr B	ERW	
	BE	50	50	SCH 40		B 36.10	A 53 Gr B	ERW	
	BE	80	150	SCH 40		B 36.10	A 53 Gr B	ERW	
	BE	200	350	SCH 20		B 36.10	A 53 Gr B	ERW	
	BE	400	400	SCH 20		B 36.10	A 53 Gr B	ERW	
	BE	450	600	10mm		B 36.10	A 672 Gr.B60 CL.12	EFW	
FLANGE	SW	RF	15	40	150 #	125 AARH	B 16.5	ASTM A 105	
	SO	RF	50	600	150 #	125 AARH	B 16.5	ASTM A 105	
BENDS	SW	PE	15	40	3000 #		B 16.11	ASTM A 105	
	BW	BE	50	150		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
	BW	BE	200	350		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
	BW	BE	400	600		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
FITTINGS	SW	PE	15	40	3000 #		B 16.11	ASTM A 105	
	BW	BE	50	50		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
	BW	BE	80	350		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
	BW	BE	400	600		R= 1.5 D	B 16.9	A 234 Gr WPB	WELDED
VALVES	GATE	Refer Valve Specification 322538-RSD-973							
	GLOBE								
	CHECK								
	BALL								
BUTTERFLY									
BOLTING	STUDS						B 18.2	A 193 Gr B7	GAL.
	NUTS						B 18.2	A 194 Gr 2H	GAL.
GASKET	RING			3.0 mm		B 16.21	NON ASBESTOS FIBER		
STRAINER	SW	15	40	800 #	Y TYPE	MNF STD	B: A 105 , INT : SS 304		
	FLG	50	250	150 #	Y TYPE	MNF STD	B: A 216 GR:WCB , INT : SS 304		
	FLG	50	600	150 #	BASKET TYPE	MNF STD	B: A 216 GR:WCB , INT : SS 304		
MISC									

GENERAL NOTES

- BEND/FITTING THK SHALL BE SUIT TO PIPE THICKNESS.
- B : BODY , T : TRIM , St : STELLITED, MNF: MANUFACTURING , INT : INTERNAL

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23.07.15	KDP	MMS	VST/GDS	NA	322538-RSD-971	2 of 2	APR	P1

PIPING MATERIAL SPECIFICATION

CLIENT	Delhi Aviation Fuel Facility Pvt. Ltd.	PIPING CLASS	150H01
JOB NO	322538	BOILER CODE	NO
PROJECT	Modernization of Existing Fuel Farm	PWHT	NO
LOCATION	New Delhi.		


SERVICE	AFFF Foam concentrate		
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DESIGN CONDITION	BASE MATERIAL :	SS - A 312 TP 304L											
	RATING CLASS :	150 #											
	CORROSION ALLOWANCE, mm :	NIL											
PRESSURE TEMPERATURE RATING													
TEMP-° C	-29.0	38.0	50.0	100.0	150.0	200.0	250.0	300.0	325.0	350.0	375.0	400.0	425.0
PRES-Bar (a)	15.90	15.90	15.30	13.30	12.00	11.20	10.50	10.00	9.30	8.40	7.40	6.50	5.50

PIPE JOINTS	ITEMS	SIZE	DESCRIPTION
		PIPE JOINTS	40 NB & BELOW 50 NB & ABOVE
	DRAINS	ON LINE<= 40 NB ON LINE>= 50 NB	SAME AS LINE SIZE, SW TEE AS PER P & ID OR 20 NB, HALF COUPLING
	VENTS	ON LINE<= 40 NB ON LINE >= 50 NB	SAME AS LINE SIZE, SW TEE AS PER P & ID OR 20 NB, SW COUPLING
	TEMP. CONN PRESS. CONN	ALL ALL	AS PER HOOK UP DIAGRAM AS PER HOOK UP DIAGRAM AS PER PIPING DRG/MM STD

GENERAL	1 NDT SHALL BE AS PER JOB SPECIFICATION 2 ASBESTOS FREE GASKET AND STEM PACKING SHALL BE USED FOR ALL VALVES.
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BRANCH CONNECTION CHART	LEGEND	
	R	REINFORCED FAB TEE
	S	SOCKOLET
	T	TEE
	P	PIPE TO PIPE
	W	WELDOLET
	H	HALF COUPLING
	SW	SOCKETWELD
	SC	SCREWED
	RUN PIPE	
	MM	15 20 25 32 40 50 65 80 100 150 200 250 300 350 400 450 500 550 600

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PIPING MATERIAL SPECIFICATION

CLIENT	Delhi Aviation Fuel Facility Pvt. Ltd.	PIPING CLASS	150H01
JOB NO	322538	SHEET	2 OF 2
PROJECT	Modernization of Existing Fuel Farm		
LOCATION	New Delhi.		

ITEMS	TYPE	END	SIZE		SCH/ THK/RAT.	FACE/FINISH RADIUS	DIM/ DGN STD	MATERIAL	DESCRIPTION	NOTE
			LOWER	UPPER						
PIPE	PE	15	20		SCH 80s		B 36.19	A 312 TP 304L	ERW	
	PE	25	40		SCH 40s		B 36.19	A 312 TP 304L	ERW	
	BE	50	50		SCH 40s		B 36.19	A 312 TP 304L	ERW	
	BE	80	200		SCH 10s		B 36.19	A 312 TP 304L	ERW	
	BE	250	600		SCH 10s		B 36.19	A 358 TP 304 CL.1	EFW	
FLANGE	SW	RF	15	40	150 #	125 AARH	B 16.5	A 182 GR F 304L		
	SO	RF	50	150	150 #	125 AARH	B 16.5	A 182 GR F 304L		
	LJ	FF	200	600	150 #	125 AARH	B 16.5	ASTM A 105		NOTE-3
	LJ STUB	RF	200	600	150 #	125 AARH	MSS-SP-43	A 403 GR WP 304L		NOTE-3
BENDS	SW	PE	15	40	3000 #		B 16.11	A 182 GR F 304L		
	BW	BE	50	200		R= 1.5 D / 5 D	B 16.9	A 403 WP 304L	WELDED	NOTE-1 & 5
	BW	BE	250	600		R= 1.5 D / 5 D	B 16.9	A 403 WP 304L	WELDED	NOTE-1 & 5
FITTINGS	SW	PE	15	40	3000 #		B 16.11	A 182 GR F 304L		
	BW	BE	50	200		R= 1.5 D / 5 D	B 16.9	A 403 WP 304L	WELDED	NOTE-1 & 5
	BW	BE	250	600		R= 1.5 D / 5 D	B 16.9	A 403 WP 304L	WELDED	NOTE-1 & 5
VALVES	GATE	Refer Valve Specification 322538-RSD-974								
	GLOBE									
	CHECK									
	BALL									
BOLTING	STUDS						B 18.2	A 193 Gr B7	GAL.	
	NUTS						B 18.2	A 194 Gr 2H	GAL.	
GASKET	RING				3.0 mm		B 16.21	NON ASBESTOS FIBER		
								NON ASBESTOS FIBER WITH PTFE ENVELOPE		
STRAINER	SW	15	40	800 #	Y TYPE	MNF STD		B: A 182 GR:316L , INT : SS 316L		
	FLG	50	250	150 #	Y TYPE	MNF STD		B: A 351 GR:CF3M , INT : SS 316L		
	FLG	50	600	150 #	BASKET TYPE	MNF STD		B: A 351 GR:CF3M , INT : SS 316L		
MISC										

- GENERAL NOTES**
- BEND/FITTING THK SHALL BE SUIT TO PIPE THICKNESS.
 - B : BODY , T : TRIM , St : STELLITED, MNF: MANUFACTURING , INT : INTERNAL
 - LONG STUB END WITH LOOSE FLANGE CAN BE USED AS PER JOB SPECIFICATION (stubend thk as per pipe thk)
 - LAP JOINT SHALL BE FINALIZED BASED ON PROJECT SPECIFICATION REQUIREMENT.
 - 5D BENDS TO BE USED FOR CUP / FOAM PIGGABLE LINES.

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GATE VALVE SPECIFICATION FOR FOAM SERVICE

DESIGN DATA											
DESIGN TEMPERATURE - Deg C											
DESIGN PRESSURE - Kg/cm2											
CLASS / RATING											
SIZE RANGE			15 NB TO 40 NB			50 NB & ABOVE					
END CONNECTION			SOCKET WELD			FLANGED					
FACE FINISH						125 AARH (SMOOTH)					
BODY & BONNECT CONNECTION			BOLTED BONNET								
STEM			OUTSIDE SCREW & YOKE : RISING STEM								
WEDGE (DISC)			SOLID								
SEAT			RENEWABLE			RENEWABLE					
HANDWHEEL			NON RISING			NON RISING					
LOCKING ARRANGMENT			NOT REQUIRED			NOT REQUIRED					
MODE OF OPERATION			HANDWHEEL			HANDWHEEL / GEAR OPERATED			NOTE : 1		
SPECIAL REQ.											
BODY			A 182 Gr. F304 L			A 351 Gr. CF3					
BONNET			A 182 Gr. F304 L			A 351 Gr. CF3					
GASKET			NON ASBESTOS FIBRE			NON ASBESTOS FIBRE					
WEDGE (DISC)			STELLITED			STELLITED					
STEM			AISI 304 L			AISI 304 L					
SEAT			STELLITED			STELLITED					
FLANGE			A 182 Gr. F304 L			A 351 Gr. CF3					
GLAND PACKING			FLEXIBLE GRAPHITE / GRAPHOIL			FLEXIBLE GRAPHITE / GRAPHOIL					
BOLTS & NUTS			A 193 Gr B7 & A194 Gr 2H			A 193 Gr B7 & A194 Gr 2H			NOTE : 2		
HANDWHEEL			CI/DI			CI/DI					
DESIGN STANDARD			API 602			API 600					
DIMENSION STANDARD			ANSI B 16.10			ANSI B 16.10					
END CONNECTION STANDARD			ANSI B 16.11			ANSI B 16.5					
INSPECTION STANDARD			API 598			API 598					
FIRE SAFE TEST											
OTHERS											

1. WARM GEAR OPERATED VALVE USED FOR 12" & ABOVE.
2. NUT & BOLT SHALL BE USED WITH GALVANISED.


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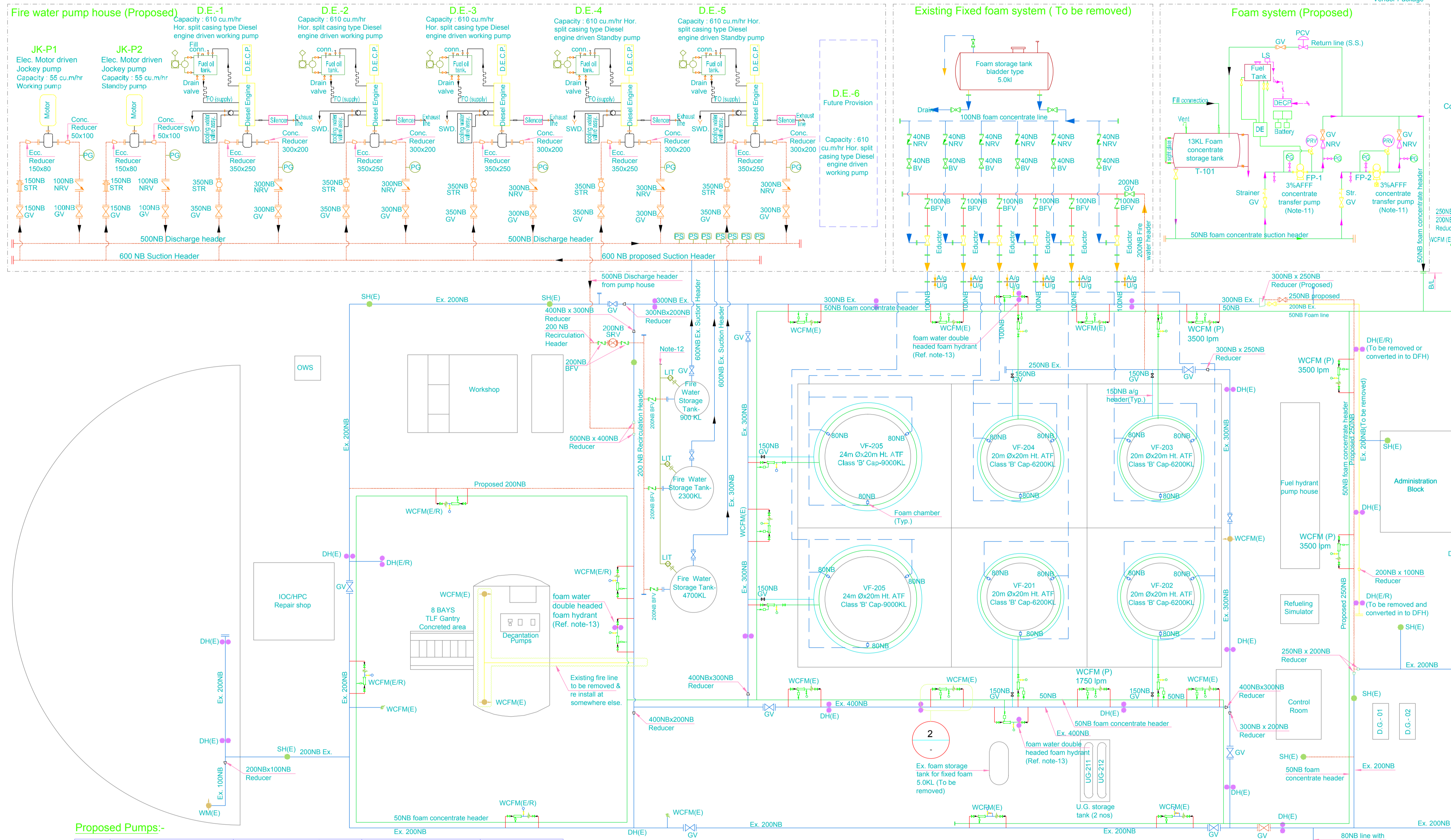
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P1	27.07.15	KDP	Issued for approval	MMS	VST/							
BALL VALVE SPECIFICATION												
	SPECIFIC DETAIL			DESCRIPTION					REMARKS			
DESIGN DATA	SERVICE			AS PER PIPING MATERIAL SPECIFICATION GENERAL NOTES					FOR 150C02			
	DESIGN TEMPERATURE - Deg C											
	DESIGN PRESSURE - Kg/cm2											
	CLASS / RATING			800 #			150 #					
	SIZE RANGE			15 NB TO 40 NB			50 NB & ABOVE					
	END CONNECTION			SOCKET WELD / SCREWED			FLANGED					
	FACE FINISH						125 AARH (SMOOTH)					
CONSTRUCTION DETAIL	BODY			SPLIT TYPE - 3 PIECE			SPLIT TYPE - 2 PIECE					
	STEM			STD - ANTI BLOW OUT DESIGN								
	PORT			FULL BORE			FULL BORE					
	BALL			SOLID BALL, FLOAT TYPE			FLOATING / TRUNION MOUNTED.			NOTE : 1		
				SOFT SEATED			SOFT SEATED					
	MODE OF OPERATION			LEVER OPERATED			LEVER / WARM GEAR OPERATED			NOTE : 2		
	ANTISTATIC FAILURE			REQUIRED			REQUIRED			NOTE : 3		
	LOCKING ARRANGMENT			REQUIRED			REQUIRED					
	SPECIAL REQ.											
MATERIAL OF CONSTRUCTION	BODY			ASTM A 105			ASTM A 216 Gr WCB					
	BALL			AISI 304			AISI 304					
	SEAT			PTFE			PTFE					
	GLAND PACKING			PTFE			PTFE					
	STEM			AISI 410			AISI 410					
	STUD & NUTS			A 193 Gr B7 & A194 Gr 2H			A 193 Gr B7 & A194 Gr 2H					
	LEVER / GEAR			CS			CS			NOTE : 4		
STANDARD	DESIGN STANDARD			BS 5351			BS 5351					
	DIMENSION STANDARD			ANSI B 16.10			ANSI B 16.10					
	END CONNECTION STANDARD			ANSI B 16.11			ANSI B 16.5					
	INSPECTION STANDARD			BS 6755 Pt.1			BS 6755 Pt.1					
	FIRE SAFE TEST			REQUIRED AS PER API607			REQUIRED AS PER API 607					
	OTHERS											
GENERAL NOTES												
1. BALL VALVE SHALL BE USED ONLY FOR H2 & OTH SERVICES.												
2. FLOAT TYPE BALL VALVE USED UPTO 4" AND TRUNION MOUNTED BALL VALVE USED FOR 6" & ABOVE.												
3. WARM GEAR OPERATED VALVE USED FOR 6" & ABOVE.												
4. LEVER SHALL BE USED WITH PVC SLEEVE.												
5. ALL VALVES ARE FIRE SAFE TEST.												
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GATE VALVE SPECIFICATION											
	SPECIFIC DETAIL			DESCRIPTION				REMARKS			
DESIGN DATA	SERVICE			AS PER PIPING MATERIAL SPECIFICATION GENERAL NOTES				FOR 150C02			
	DESIGN TEMPERATURE - Deg C										
	DESIGN PRESSURE - Kg/cm2										
	CLASS / RATING			800 #		150 #					
	SIZE RANGE			15 NB TO 40 NB		50 NB & ABOVE					
	END CONNECTION			SOCKET WELD		FLANGED					
FACE FINISH					125 AARH (SMOOTH)						
CONSTRUCTION DETAIL	BODY & BONNET CONNECTION			BOLTED BONNET							
	STEM			OUTSIDE SCREW & YOKE : RISING STEM							
	WEDGE (DISC)			SOLID		FLEXIBLE					
	SEAT			RENEWABLE		RENEWABLE					
	HANDWHEEL			NON RISING		NON RISING					
	LOCKING ARRANGMENT			NOT REQUIRED		NOT REQUIRED					
	MODE OF OPERATION			HANDWHEEL		HANDWHEEL / GEAR OPERATED		NOTE : 1			
	SPECIAL REQ.										
MATERIAL OF CONSTRUCTION	BODY			ASTM A 105		ASTM A 216 Gr WCB					
	BONNET			ASTM A 105		ASTM A 216 Gr WCB					
	GASKET			NON ASBESTOS FIBRE		NON ASBESTOS FIBRE					
	STEM			13% Cr		13% Cr					
	DISC/WEDGE			13% Cr		13% Cr					
	SEAT			AISI 410 + STELLITE		AISI 410 + STELLITE					
	BACK SEAT			13% Cr		13% Cr					
	GLAND / GLAND FLANGE			ASTM A 105		ASTM A 216 Gr WCB					
	GLAND PACKING			FLEXIBLE GRAPHITE		FLEXIBLE GRAPHITE					
	BONNET/ GLAND BOLTS & NUTS			A 193 Gr B7 & A194 Gr 2H		A 193 Gr B7 & A194 Gr 2H					
HANDWHEEL			CI/DI		CI/DI						
STANDARD	DESIGN STANDARD			API 602		API 600					
	DIMENSION STANDARD			ANSI B 16.10		ANSI B 16.10					
	END CONNECTION STANDARD			ANSI B 16.11		ANSI B 16.5					
	INSPECTION STANDARD			API 598		API 598					
	FIRE SAFE TEST										
	OTHERS										
GENERAL NOTES											
I. WARM GEAR OPERATED VALVE USED FOR 12" & ABOVE.											
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GLOBE VALVE SPECIFICATION												
	SPECIFIC DETAIL			DESCRIPTION				REMARKS				
DESIGN DATA	SERVICE			AS PER PIPING MATERIAL SPECIFICATION GENERAL NOTES				FOR 150C02				
	DESIGN TEMPERATURE - Deg C											
	DESIGN PRESSURE - Kg/cm2											
	CLASS / RATING			800 #		150 #						
	SIZE RANGE			15 NB TO 40 NB		50 NB & ABOVE						
	END CONNECTION			SOCKET WELD		FLANGED						
	FACE FINISH					125 AARH (SMOOTH)						
CONSTRUCTION DETAIL	BODY & BONNET CONNECTION			BOLTED BONNET								
	STEM			OUTSIDE SCREW & YOKE : RISING STEM								
	DISC			FLAT / PLUG		FLEXIBLE		NOTE : 1				
	SEAT			RENEWABLE		RENEWABLE						
	HANDWHEEL			NON RISING		NON RISING						
	LOCKING ARRANGMENT			NOT REQUIRED		NOT REQUIRED						
	MODE OF OPERATION			HANDWHEEL		HANDWHEEL / GEAR OPERATED		NOTE : 2				
	SPECIAL REQ.											
MATERIAL OF CONSTRUCTION	BODY			ASTM A 105		ASTM A 216 Gr WCB						
	BONNET			ASTM A 105		ASTM A 216 Gr WCB						
	GASKET			NON ASBESTOS FIBRE		NON ASBESTOS FIBRE						
	BODY SEAT & BACK SEAT			13 % Cr + STELLITED & 13 % Cr		13 % Cr + STELLITED & 13 % Cr						
	DISC			13% Cr.		13% Cr.						
	STEM			13% Cr.		13% Cr.						
	GLAND FLANGE			ASTM A 105		ASTM A 216 Gr WCB						
	GLAND PACKING			FLEXIBLE GRAPHITE		FLEXIBLE GRAPHITE						
	BOLTS & NUTS			A 193 Gr B7 & A194 Gr 2H		A 193 Gr B7 & A194 Gr 2H						
	HANDWHEEL			CI/DI		CI/DI						
STANDARD	DESIGN STANDARD			BS 5352		BS 1873						
	DIMENSION STANDARD			ANSI B 16.10		ANSI B 16.10						
	END CONNECTION STANDARD			ANSI B 16.11		ANSI B 16.5						
	INSPECTION STANDARD			BS 6755 Pt.1		BS 6755 Pt.1						
	FIRE SAFE TEST											
	OTHERS											
GENERAL NOTES												
1. DISC SHALL BE GUIDED FOR 8" & ABOVE.												
2. WARM GEAR OPERATED VALVE USED FOR 12" & ABOVE.												
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CHECK VALVE SPECIFICATION												
	SPECIFIC DETAIL			DESCRIPTION				REMARKS				
DESIGN DATA	SERVICE			AS PER PIPING MATERIAL SPECIFICATION GENERAL NOTES				FOR 150C02				
	DESIGN TEMPERATURE - Deg C											
	DESIGN PRESSURE - Kg/cm2											
	CLASS / RATING			800 #		150 #						
	SIZE RANGE			15 NB TO 40 NB		50 NB & ABOVE						
	END CONNECTION			SOCKET WELD		FLANGED						
FACE FINISH					125 AARH (SMOOTH)							
CONSTRUCTION DETAIL	BODY & COVER CONNECTION			BOLTED COVER								
	SEAT			INTEGRAL		RENEWABLE						
	TYPE			PISTON LIFT		SWING CHECK		NOTE : 1				
MATERIAL OF CONSTRUCTION	BODY			ASTM A 105		ASTM A 216 Gr WCB						
	COVER			ASTM A 105		ASTM A 216 Gr WCB						
	SEAT			ASTM A 105 + STELLITED		ASTM A 105 + STELLITED						
	PISTON			13% Cr.		NA						
	DISC			NA		13% Cr.						
	GASKET			NON ASBESTOS FIBRE		NON ASBESTOS FIBRE						
	HINGE & HINGE PIN			NA		ASTM A 216 Gr WCB & 13% Cr.						
	SPRING			13 % Cr + STELLITED & 13 % Cr		NA						
	BOLTS & NUTS			A 193 Gr B7 & A194 Gr 2H		A 193 Gr B7 & A194 Gr 2H						
STANDARD	DESIGN STANDARD			BS 5352		BS 1868						
	DIMENSION STANDARD			ANSI B 16.10		ANSI B 16.10						
	END CONNECTION STANDARD			ANSI B 16.11		ANSI B 16.5						
	INSPECTION STANDARD			BS 6755 Pt.1		BS 6755 Pt.1						
	FIRE SAFE TEST											
	OTHERS											
GENERAL NOTES												
I. PISTON CHECK VALVE SHALL BE INSTALLED IN HORIZONTAL LINE.												
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BUTTERFLY VALVE SPECIFICATION											
	SPECIFIC DETAIL			DESCRIPTION				REMARKS			
DESIGN DATA	SERVICE			AS PER PIPING MATERIAL SPECIFICATION GENERAL NOTES				FOR 150C02			
	DESIGN TEMPERATURE - Deg C										
	DESIGN PRESSURE - Kg/cm2										
	CLASS / RATING			150 #							
	SIZE RANGE			50 NB & ABOVE							
	END CONNECTION			SANDWICH TYPE							
CONSTRUCTION DETAIL	FACE FINISH			125 AARH (SMOOTH)							
	BODY & CONNECTION			WAFFER SANDWICH TYPE							
	STEM			STD							
	DISC			SOLID							
	SEAT			RENEWABLE							
	HANDWHEEL			REQUIRED							
	LOCKING ARRANGMENT			NOT REQUIRED							
	MODE OF OPERATION			HANDWHEEL / GEAR OPERATED				NOTE : 1			
	SPECIAL REQ.										
MATERIAL OF CONST	BODY			ASTM A 216 Gr WCB							
	SEAT			EPDM / PTFE							
	DISC			13% Cr							
	STEM			13% Cr							
	BUSHING			GLASS REINFORCED EPOXY							
	STEM / SHAFT SEAL / GLAND PACKING			EPDM / PTFE							
	BOLTS & NUTS			A 193 Gr B7 & A194 Gr 2H							
STANDARD	HANDWHEEL			CI/DI							
	DESIGN STANDARD			API 609/ BS 5155							
	DIMENSION STANDARD			ANSI B 16.10							
	END CONNECTION STANDARD			ANSI B 16.11							
	INSPECTION STANDARD			API- 598 / BS 6755 Pt.1							
	FIRE SAFE TEST										
OTHERS											
GENERAL NOTES											
I. WARM GEAR OPERATED VALVE USED FOR 6" & ABOVE.											
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Client : Delhi Aviation Fuel Facility Pvt. Ltd. Aviation Fuelling Station Shahbad, Muhammad Pur IGI Airport, New Delhi - 110061						 Mott MacDonald			A-20 Sector-2, Noida - 201301 Tel +91 (0)12 0254 3582 Fax +91 120 254 3562 Web www.mottmac.com		
Title : Valve Specification 150C02											
Date	Prepared	Checked	Approved	Document No.		Sheet	Rev.	Status			
23.07.15	KDP	MMS	VST/GDS	322538-RSD-973		5 of 5	P1	APR			



- Notes**
- The vent at the highest point and the drain at the lowest point, shall be provided in the pipe lines. The size of vent and drain shall be 20NB.
 - All drain shall be routed to nearest drain pit or as per instruction of engineer-in-charge (EIC).
 - All drain valve shall be normally closed.
 - Indicator & transmitter to be located at farthest point of fire hydrant network.
 - All pumps shall have manual starting in addition to auto start.
 - Water pressure in the network shall be maintained at 7.0 kg/cm² at farthest remote location, with the help of Jockey pump (Auto cut off / cut in).
 - Fire pumps shall be stopped manually after fire fighting operation is over.
 - All main and standby pumps shall have provision for auto as well as manual start, however standby pumps shall be set on auto manual mode.
 - Battery charging arrangement shall be provided for stand by batteries also.
 - Double foam hydrant is provided for trolley mounted HVLR monitor connection. (To be hooked-up with DFH to fight the fire with the help of trolley mounted HVLR monitor.
 - Prime mover added due to increase of length of concentrate network.
 - Level transmitter signal to be connected to SCADA panel as well as local indication in fire water pump house.
 - Foam water double headed hydrant provided for trolley mounted HVLR monitor to mitigate distance criteria.

Key to symbols

Abbreviations :

	Centrifugal pump (side suction, side discharge)		Interlock
	Gate valve (GV)		Pressure Indicator
	Non return valve (NRV)		Electric Motor
	Strainer Y Type		Hose Box
	Butterfly valve		NC - Normally close
	Concentric Reducer		PH - Pump House
	Eccentric Reducer		PG - Pressure gauge
	IV = Isolation valve		PS - Pressure switch
	Typ. = Typical		PT - Pressure transmitter
	Proposed Hydrant Line		SOL - Solenoid valve
	Water cum foam monitor		GLV - Globe valve
	Double headed hydrant		GV - Gate valve
	Existing foam lines		BV - Ball valve
	Existing fire lines		BFV - Butterfly valve
	Proposed fire lines		QBV - Quarter turn ball valve
	Existing fire line to be removed		DFH - Double foam hydrant
			LIT = Level Transmitter with local indication
			WCFM(E/R) = Water cum foam monitor (Existing to be remove & Relocate elsewhere)

- Reference drawings**
- DAFFPL-GEL-PP-007-A P & I diagram for existing foam system, of M/s Greenleaf Engg. Ltd.
 - DAFFPL-GEL-PP-013 Existing fire hydrant layout, of M/s Greenleaf Engg. Ltd.

0	09.11.15	BNC	Issued for Tender.	MMS	VST
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Title
Modernization of Existing Fuel Farm

P & ID for Fire fighting system

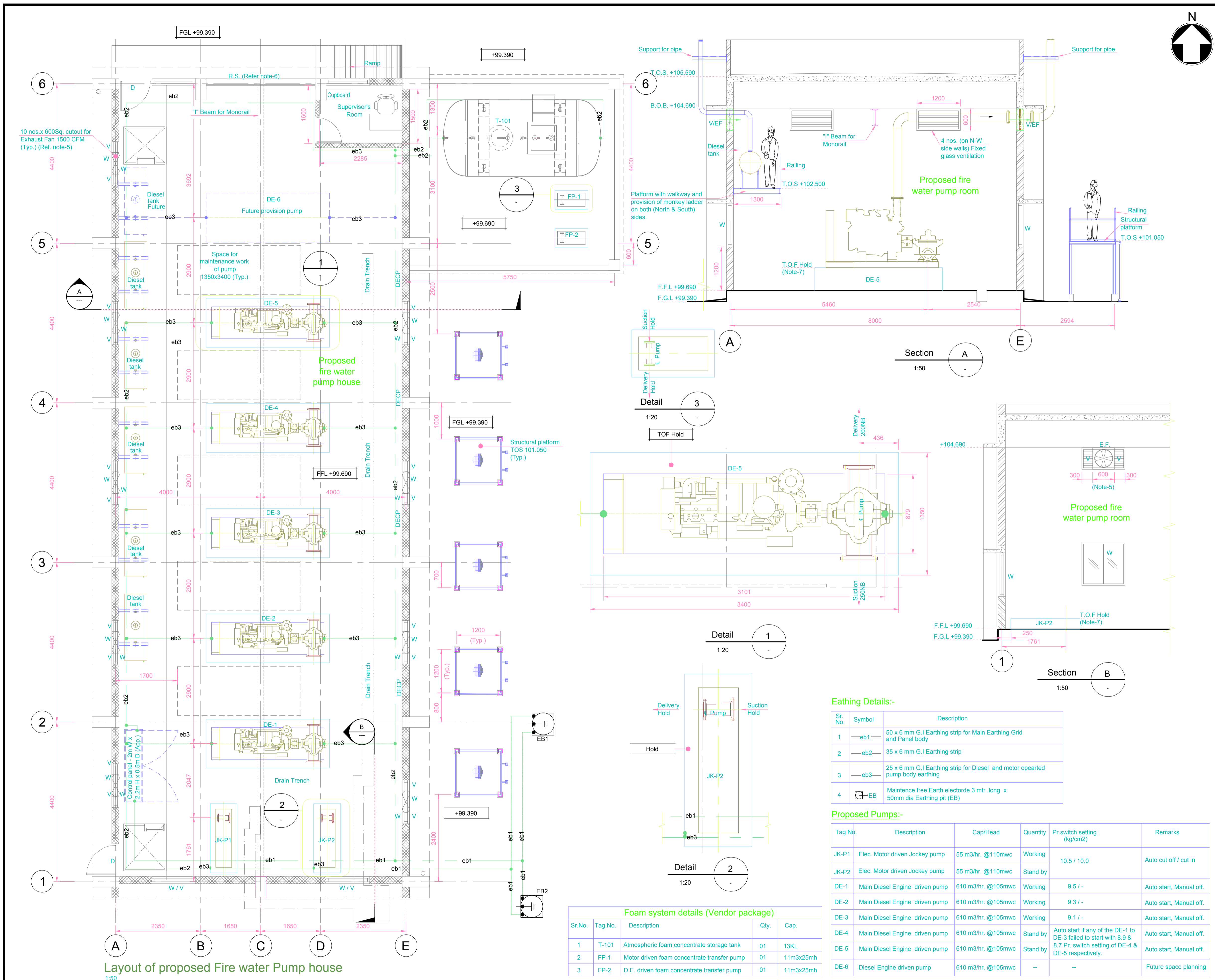
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Dwg check	KDP	Approved	VST
Scale at A1	Status	Rev	Security
NTS	TEN	0	STD
Drawing Number			
322538-RIA-0900-02			

Proposed Pumps:-

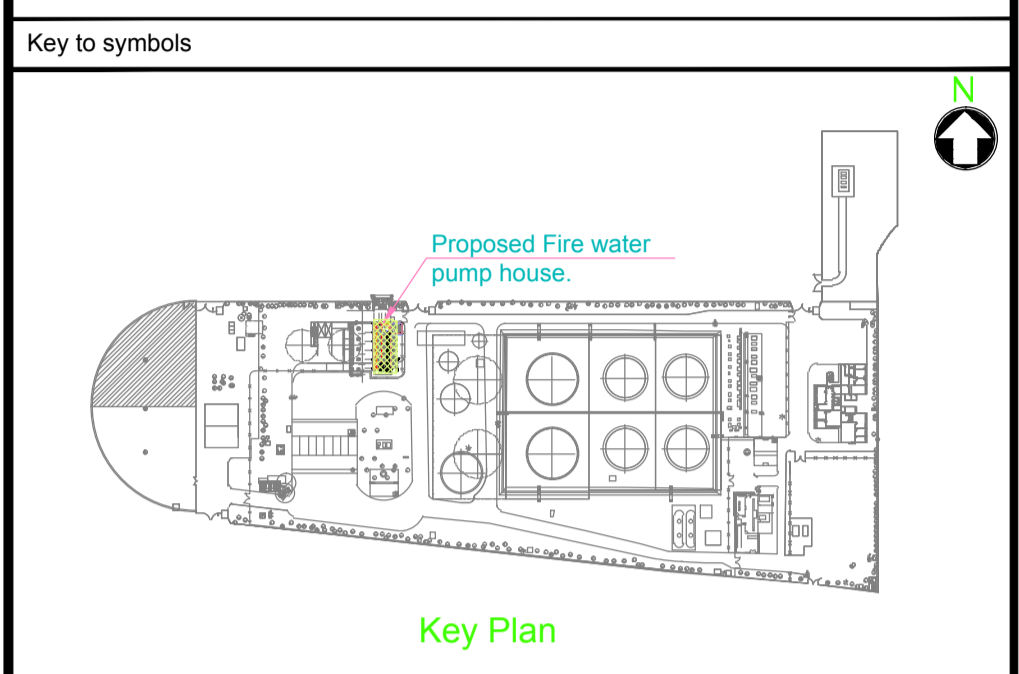
Tag No.	Description	Cap/Head	Quantity	Pr switch setting (kg/cm ²)	Remarks
JK-P1	Elec. Motor driven Jockey pump	55 m ³ /hr. @110mwc	Working	10.5 / 10.0	Auto cut off / cut in
JK-P2	Elec. Motor driven Jockey pump	55 m ³ /hr. @110mwc	Stand by		
DE-1	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working	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 DE-1 to DE-3 failed to start with 8.9 & 8.7 Pr. switch setting of DE-4 & DE-5 respectively.	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	--	--	Future space planning

Foam system details (Vendor package)

Sr.No.	Tag.No.	Description	Qty.	Cap.
1	T-101	Atmospheric foam concentrate storage tank	01	13KL
2	FP-1	Motor driven foam concentrate transfer pump	01	11m ³ x25mh
3	FP-2	D.E. driven foam concentrate transfer pump	01	11m ³ x25mh



- 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.
 - 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 |
| D | Door | Lvl | Level |
| W | Window | | |

- Reference drawings**
- | | |
|-----------------------|--|
| 1) 322538-APA-0001-01 | Plot plan |
| 2) 322538-ABA-0011-01 | Arch. layout of fire water pump house. |
| 3) 322538-ELA-0002-01 | Power & Earthing layout for FWP |

- Hold List**
- Pump data/drg. for proposed D.E Driven fire pump.
 - Pump data/drg. for proposed jockey pump.

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	09.12.15	BNC	Revised as per Arch. plan & Issued for Tender		
0	09.11.15	BNC	Issued for Tender		

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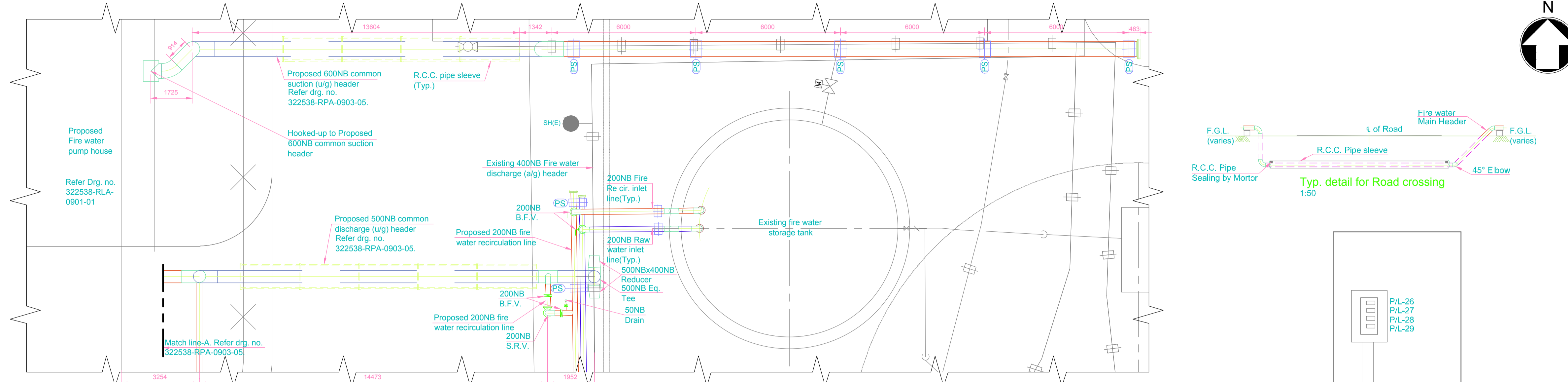
Title
Modernization of Existing Fuel Farm

Layout & section of proposed
Fire water pump house.

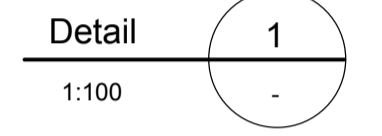
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Drawing Number 322538-RLA-0901-02

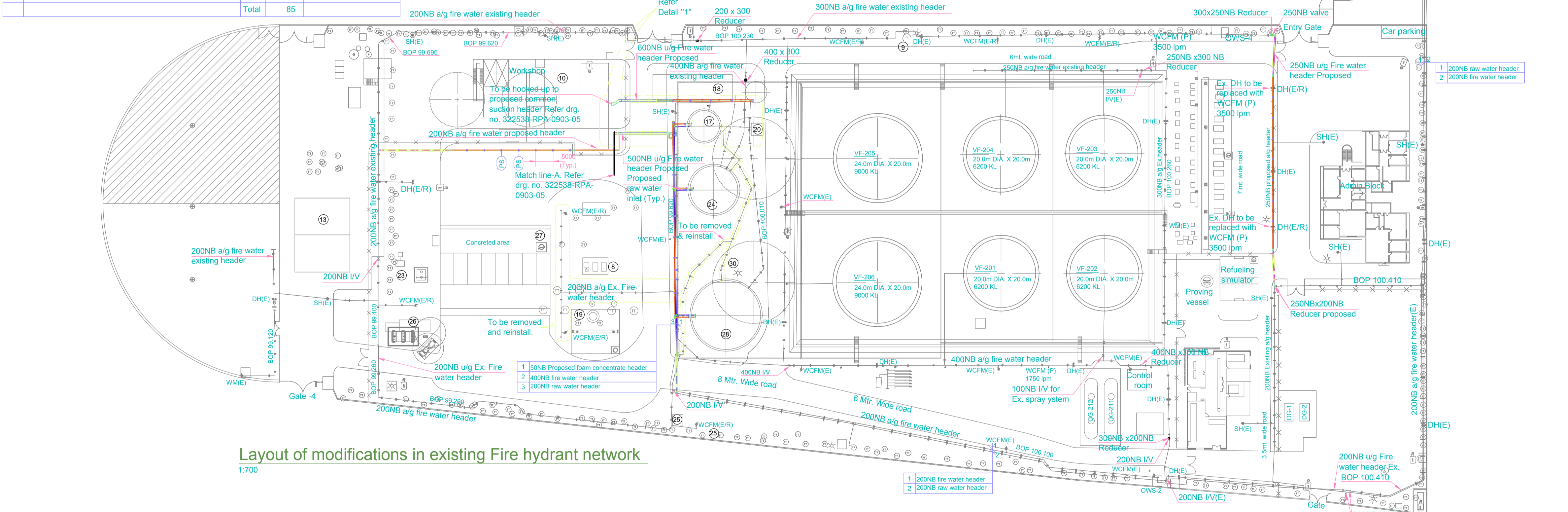


Sr. No.	Description	Qty. in Nos.	Remarks
1	Single headed Hydrant Valve	7	
2	Double headed Hydrant Valve	15	2 Nos. To be removed or converted in to DFH
3	Water monitor (01 Water monitor = 3 Hydrant)	02	
4	Water cum foam monitor (01 Water monitor = 3 Hydrant)	14	
Total		85	



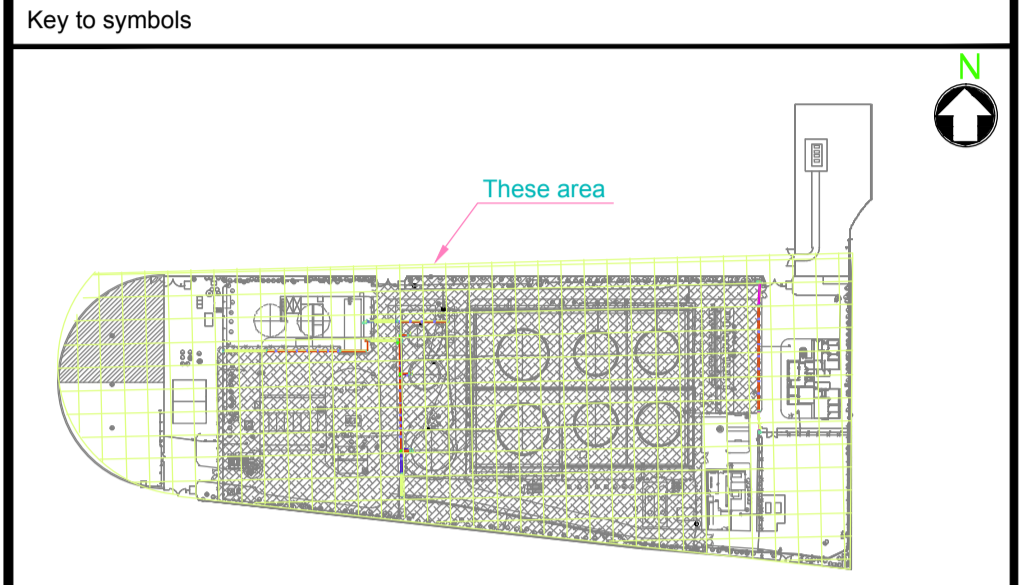
Sr. No.	Description	Qty. in Nos.
1	Water cum foam monitor - 1750 lpm (01 Water monitor = 3 Hydrant)	1
2	Water cum foam monitor - 3500 lpm (01 Water monitor = 3 Hydrant)	3

Sr No.	Size of service pipe	R.C.C pipe Size (NP3 Class)
1	100NB / 150NB	300NBx2500mm
2	200NB / 250NB	500NBx2500mm
3	500NB / 600NB	900NBx2500mm



Layout of modifications in existing Fire hydrant network
1:700

- Notes
- All Dimension are in mm and Levels are in meter.
 - All hydrant (SH and FEH) should be installed with hose pipe, hose box, MCP, stand pipe & nozzle complete as per schedule.
 - Fire Escape hydrant (FEH) should be installed with additional 1" hose reel.
 - All double hydrant and water cum foam monitor should be installed in accordance with OISD-235 and as per engineer in charge.
 - For water cum foam monitor and its layout , ref. drg. no. 322538-RPA-0905-02.



- Abbreviations :
- DH(E) = Existing Double Hydrant
 - SV = Sluice Valve
 - IV = Isolation Valve
 - WCFM (E) = Water monitor -Existing
 - WCFM (E) = Water cum foam monitor (E) Existing
 - WCFM (P) = Water cum foam monitor (P) Proposed
 - PS = Pipe support
 - Proposed above ground
 - Proposed under ground
 - Fire water Line
 - TOS = Top of Structure
 - C/L = Center Line
 - Typ = Typical
 - Lvl = Level
 - FGL = Finished Ground Level
 - FFL = Finished Floor Level
 - R.C.C. Pipe sleeve
 - DH (E/R) = Double Hydrant (Existing to be remove & Reinstall elsewhere)
 - WCFM(E/R) = Water cum foam monitor (Existing to be remove & Reinstall elsewhere)

- Reference drawings
- 322538-MPE-0100-01 Plot plan
 - DAFFPL-GEL-PP-005 Plot plan of complete fuel farm of Greenleaf Engineering Ltd. Rev. 02 dated 18.04.15
 - 322538-RPA-0905-02 Layout & details of proposed foam tank and foam concentrate network.
 - 322538-RLA-0901-02 Layout & details of fire water pump house
 - 322538-RPA-0903-05 Layout & details of piping for fire water pump house.
 - 322538-RPB-0906-02 Layout & details of 13KL Foam concentrate storage tank.

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	09.12.15	BNC	Issued for Tender		
0	09.11.15	BNC	Issued for Tender		

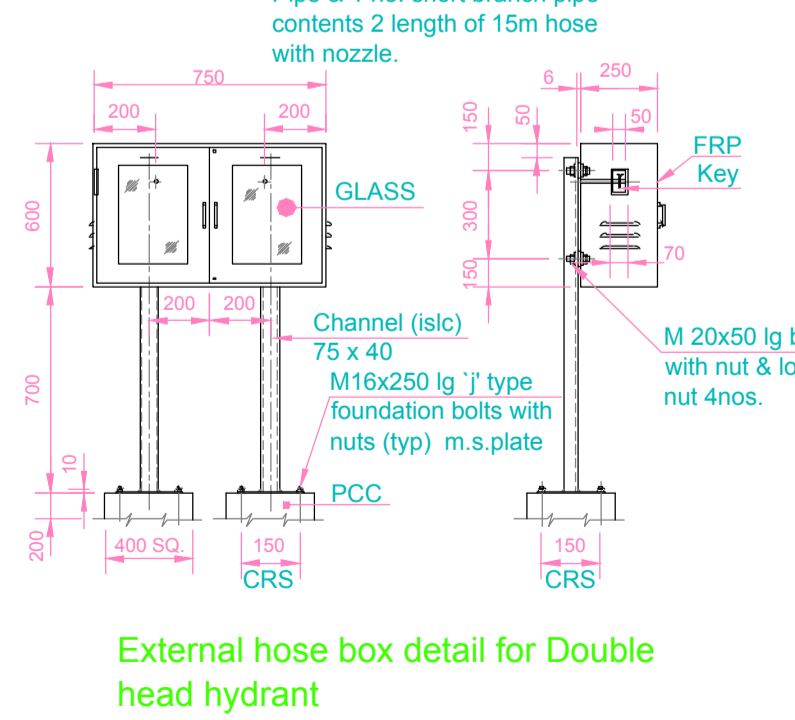
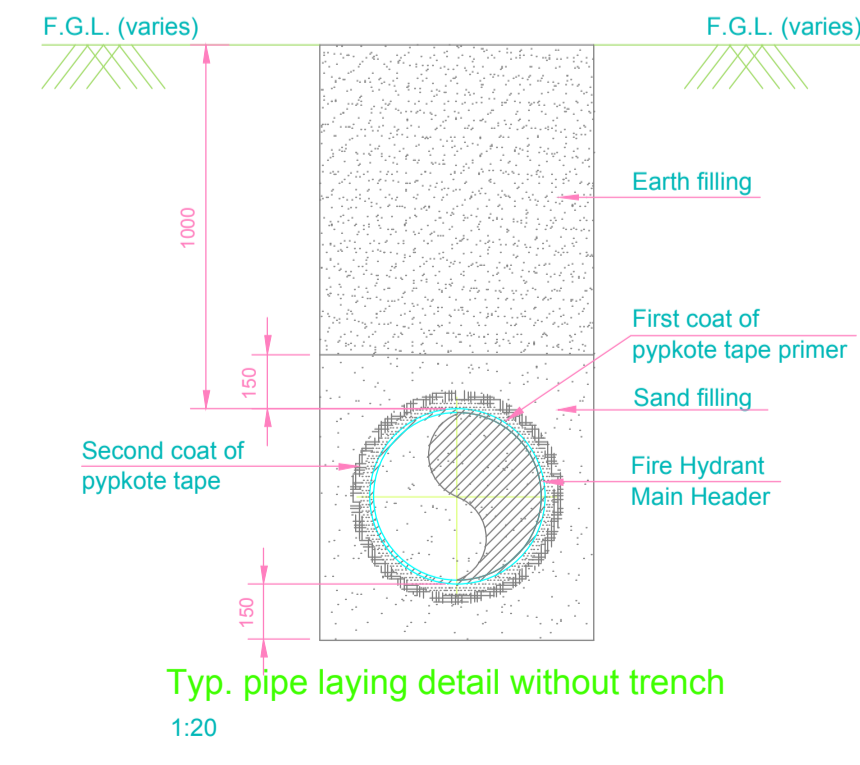
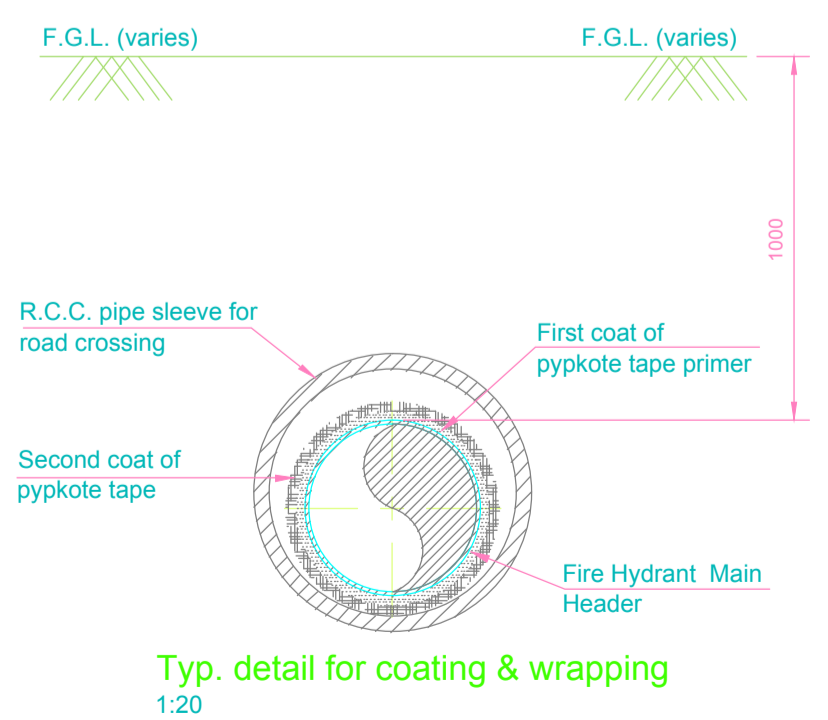
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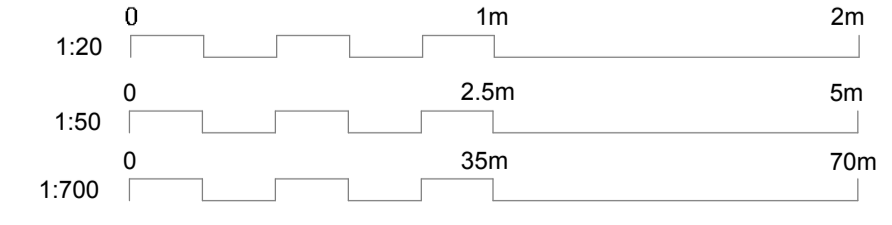
Layout & details of Modification in existing fire hydrant network.

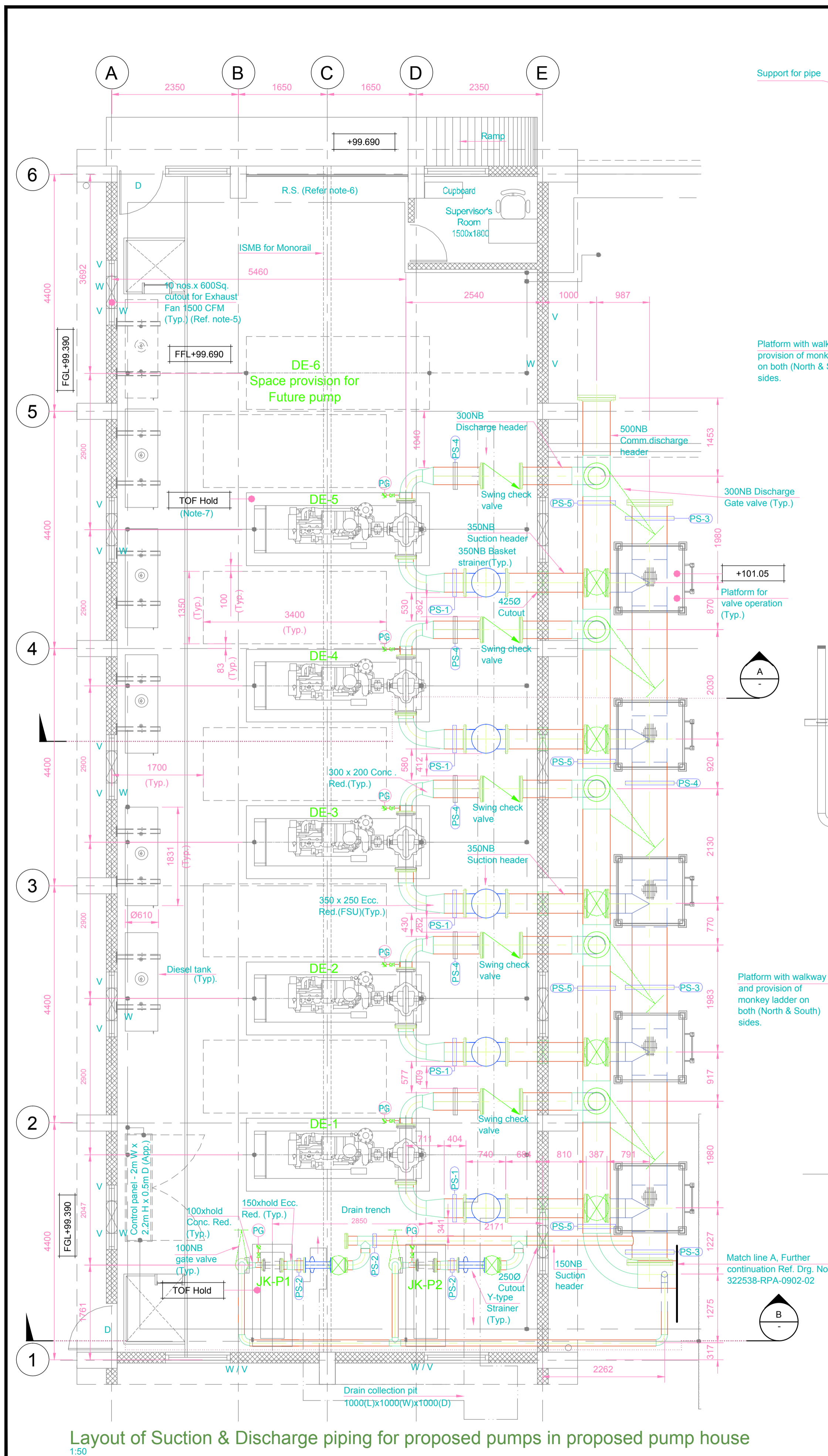
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Dwg check	KDP	Approved	VST
Scale at A1	Status	Rev	Security
As noted.	TEN	1	STD
Drawing Number	322538-RPA-0902-02		



Building Number	Description
1.	SECURITY CABIN(4 NOS)
2.	ADMIN AND CANTEEN BUILDING
3.	PUMP HOUSE
4.	TESTING RIG
5.	LT/HT/DG AND CONTROL ROOM
6.	DIESEL TANK FARM
7.	ATF STORAGE TANK FARM
8.	TLD PUMP HOUSE
9.	HIGH FLOOD LIGHT TOWER(20m HIGH)
10.	REPAIR SHOP
11.	METER CALIBRATION UNIT (5KL)
12.	TANK LORRY DECONTAMINATING GANTRY
13.	REPAIR SHOP HPC/LOC
14.	U.C. STORAGE TANK(2 NOS)
15.	PARKING AREA
16.	FUELLERS PARKING
17.	WATER STORAGE TANK

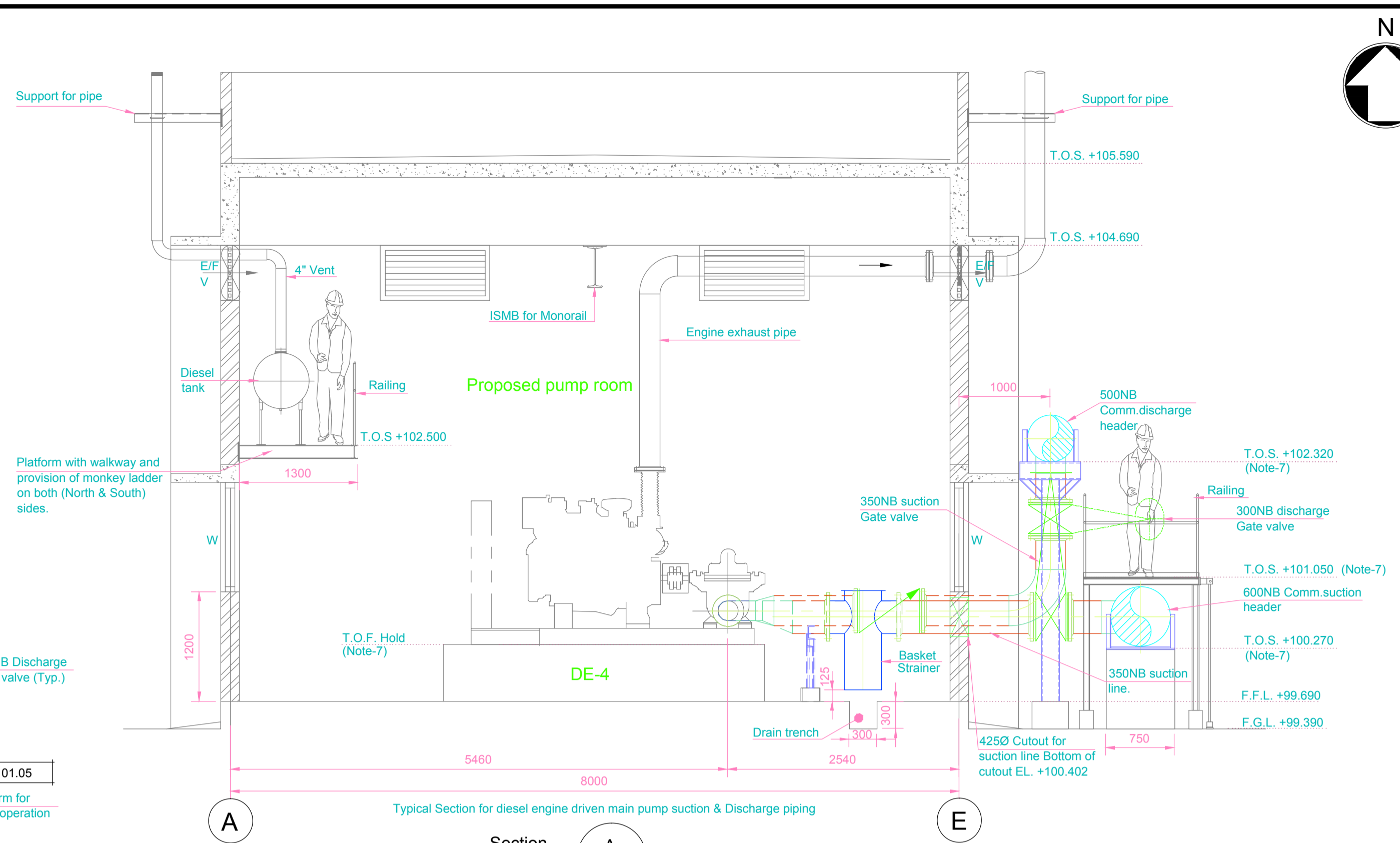
Building Number	Description
18.	FIRE HYDRANT PUMP HOUSE
19.	DIP PLATFORM
20.	TUBE WELL NO.1
21.	OVER HEAD WATER TANK
22.	COOLING TOWER
23.	U.G. SLOP TANK
24.	WATER STORAGE TANK
25.	TUBE WELL NO.2
26.	TUBE WELL NO.3
27.	A.O./TLF ROOM
28.	WATER STORAGE TANK
29.	ROAD FOR FIRE TENDER
30.	HIGH MAST TOWER(2 NOS)
31.	FORM TANK
32.	CONNECTION POINT



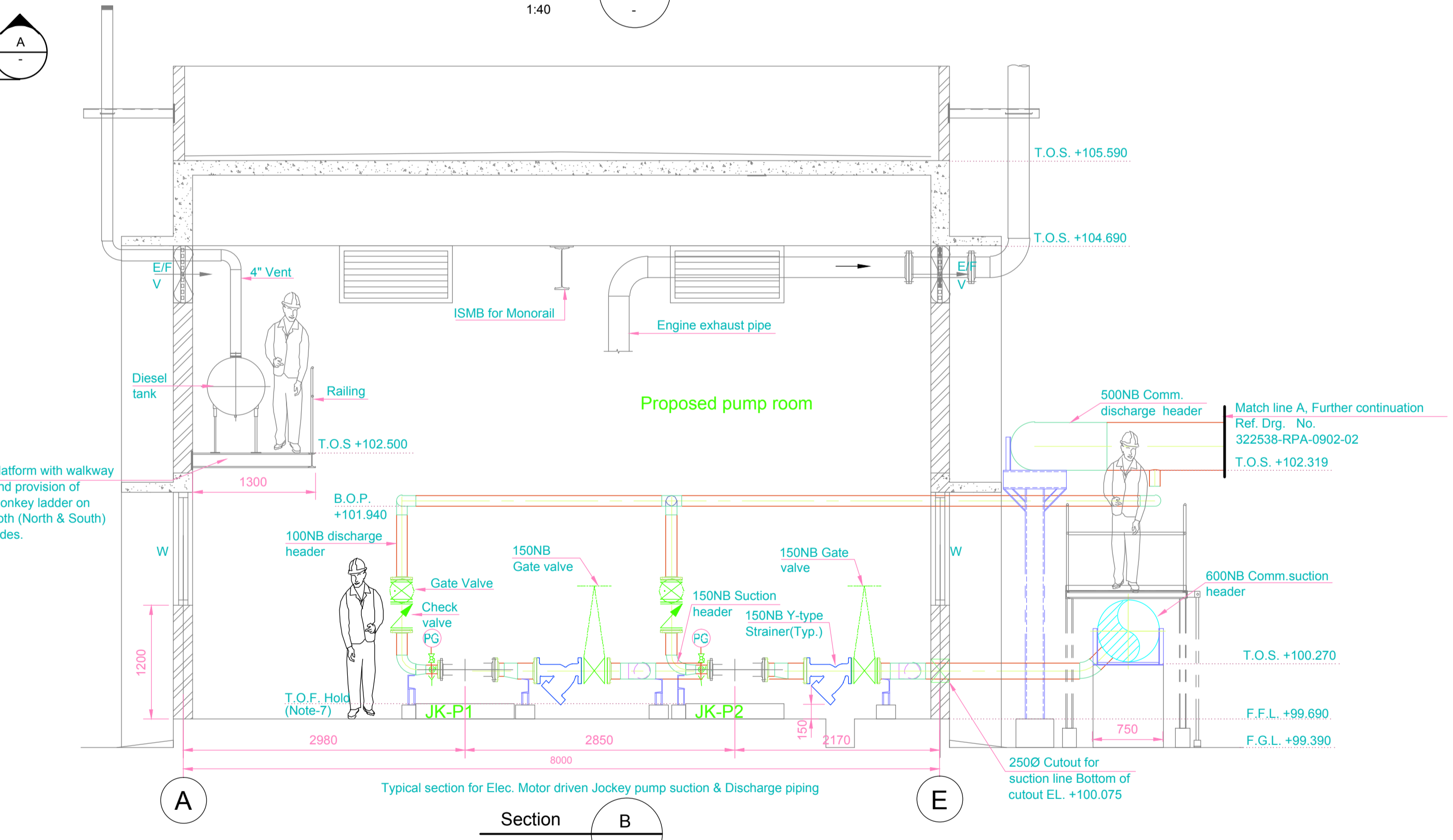


Layout of Suction & Discharge piping for proposed pumps in proposed pump house

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Section A
1:40



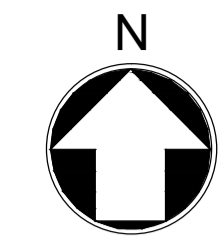
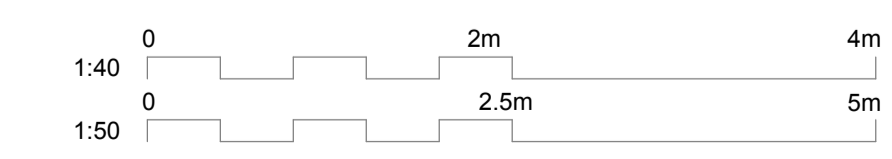
Section B
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Proposed Pumps:-

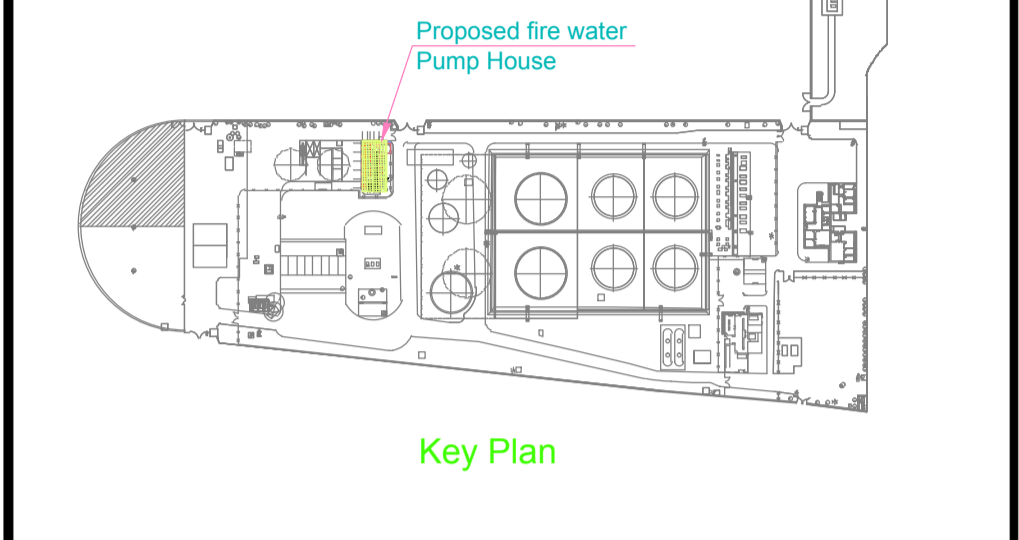
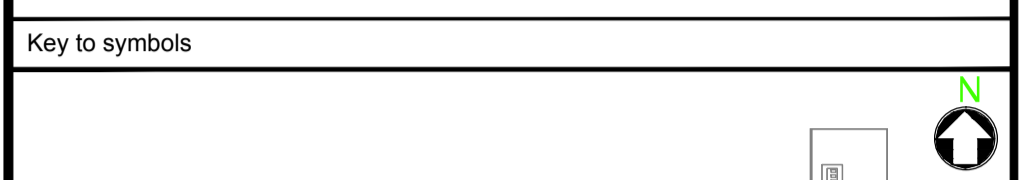
Tag No.	Description	Cap/Head	Quantity	Pr. switch setting (kg/cm ²)	Remarks
JK-P1	Elec. Motor driven Jockey pump	55 m ³ /hr. @110mwc	Working	10.5 / 10.0	Auto cut off / cut in
JK-P2	Elec. Motor driven Jockey pump	55 m ³ /hr. @110mwc	Stand by		
DE-1	Main Diesel Engine driven pump	610 m ³ /hr. @105mwc	Working	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 DE-1 to DE-3 failed to start with 8.9 & 8.7 Pr. switch setting of DE-4 & DE-5 respectively.	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	--	--	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 grided 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 | CL | 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) 322538-ABA-0011-01 | Arch. layout of fire water pump house. |
| 3) 322538-RLA-0901-02 | Layout & section of fire water pump house |
| 4) 322538-ELA-0002-01 | Power & Earthing layout for FWPH |

- Hold List**
- Pump data/drg. for proposed D.E Driven fire pump.
 - Pump data/drg. for proposed jockey pump.

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	09.12.15	BNC	Revised as per Arch. plan & Issued for Tender		
0	19.11.15	BNC	Issued for Tender		

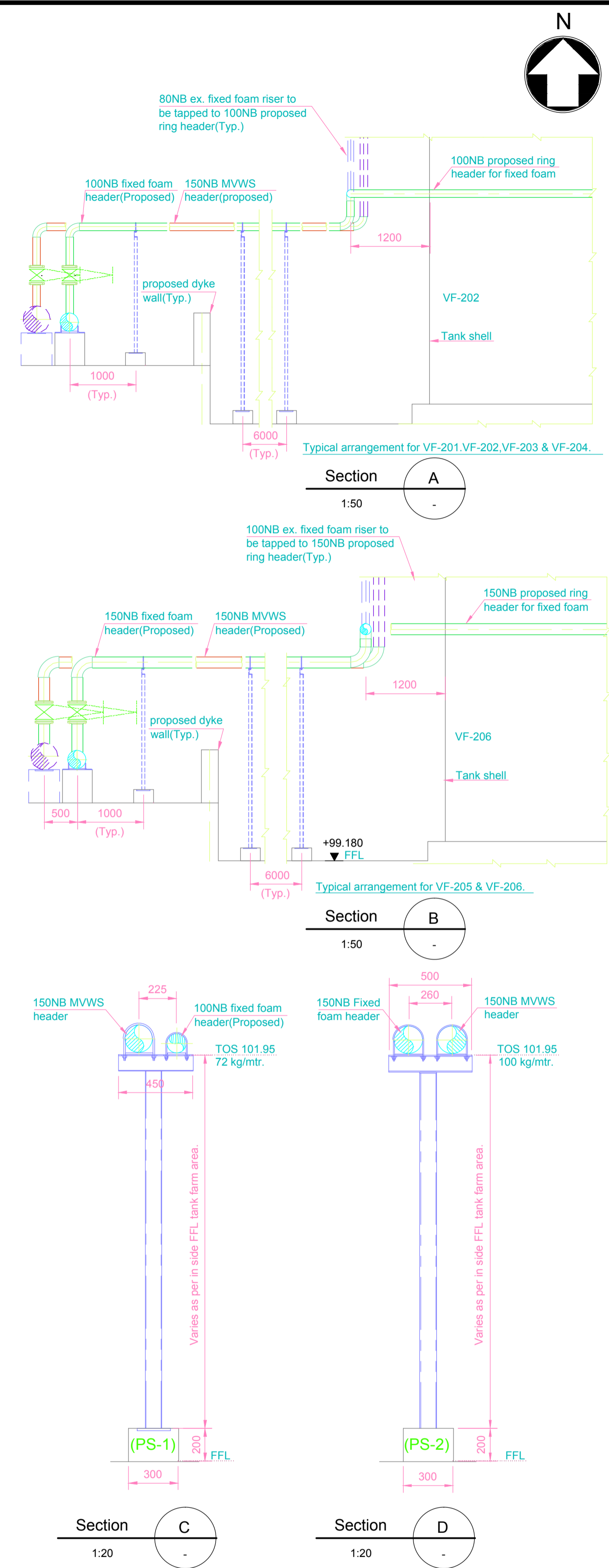
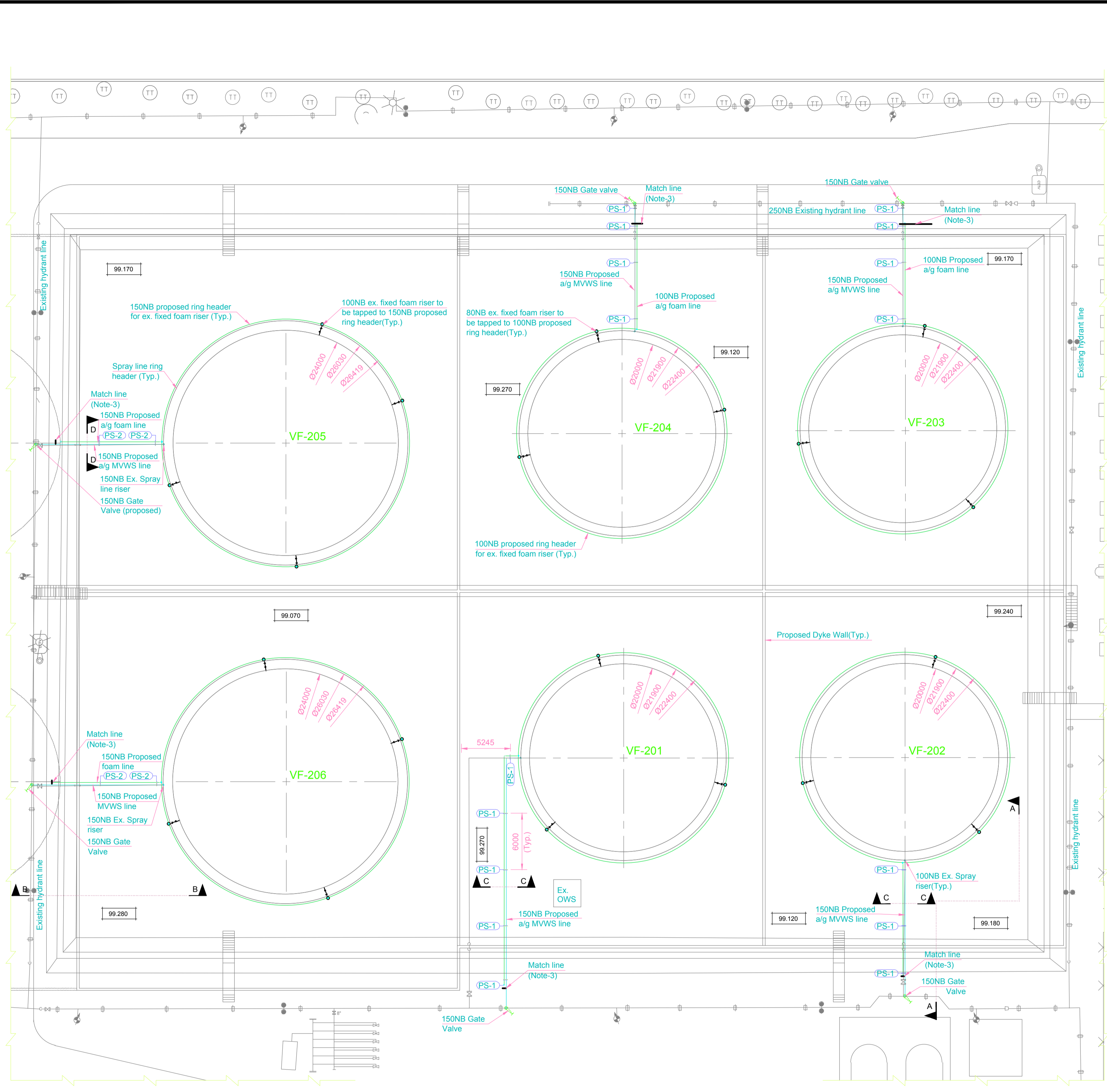
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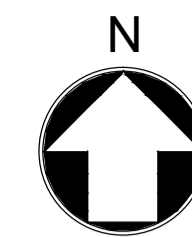
Title
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Layout and sections of Piping for proposed fire water pump house.

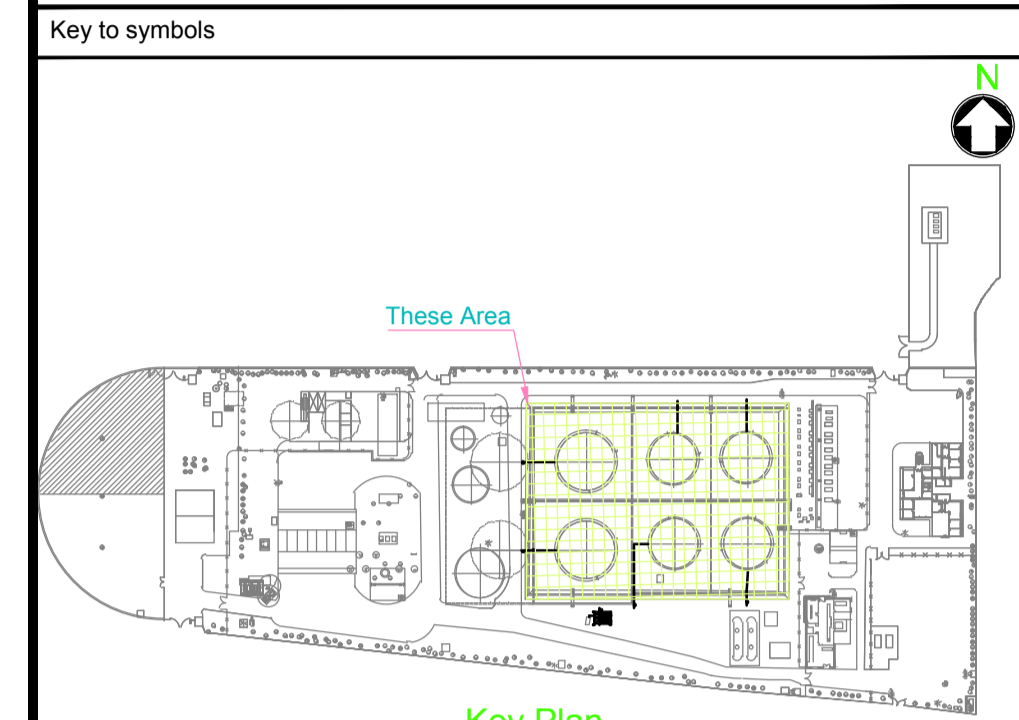
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As Noted.	TEN	1	STD
Drawing Number	322538-RPA-0903-05		



Layout of Proposed aboveground pipe route for fixed foam and MVWS network in existing tank farm.
1:250



- Notes
- All Dimension are in mm and Levels are in meter.
 - Levels of pipe to be considered as per existing line level to continue for aboveground routing requirement.
 - Further continuation Refer Drg. No. 322538-RPA-0905-01



- Abbreviations :
- | | | | |
|--------|-----------------------|----------|----------------------------------|
| FGL | Finished Ground Level | a/g | Above ground |
| FFL | Finished Floor Level | TOS | Top of Structure |
| --- | Existing fire line | WCFM (P) | Water cum foam monitor(propose) |
| --- | Existing fire line | WCFM (E) | Water cum foam monitor(Existing) |
| (PS-x) | Pipe support proposed | BOP | Bottom of pipe |
| --- | proposed foam network | Lvl | Level |
| --- | proposed MVWS network | TOS | Top of Support |
| --- | Existing Demolish | | |
| --- | Existing Item | | |

- Reference drawings
- | | |
|------------------------|--|
| 1) 322538-MPE-0100-01 | Equipment Plot plan |
| 2) 322538-CCE-0009-01 | Layout & details of proposed dyke wall |
| 3) 322538-RPA-09002-01 | Proposed Hydrant network |

0	29.09.15	BNC	Issued for Tender	MMS	AKM
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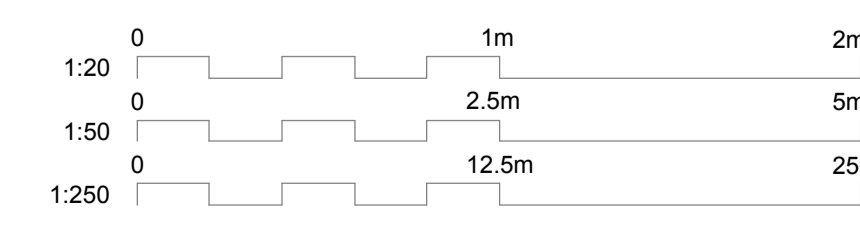
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Modernization of Existing Fuel Farm

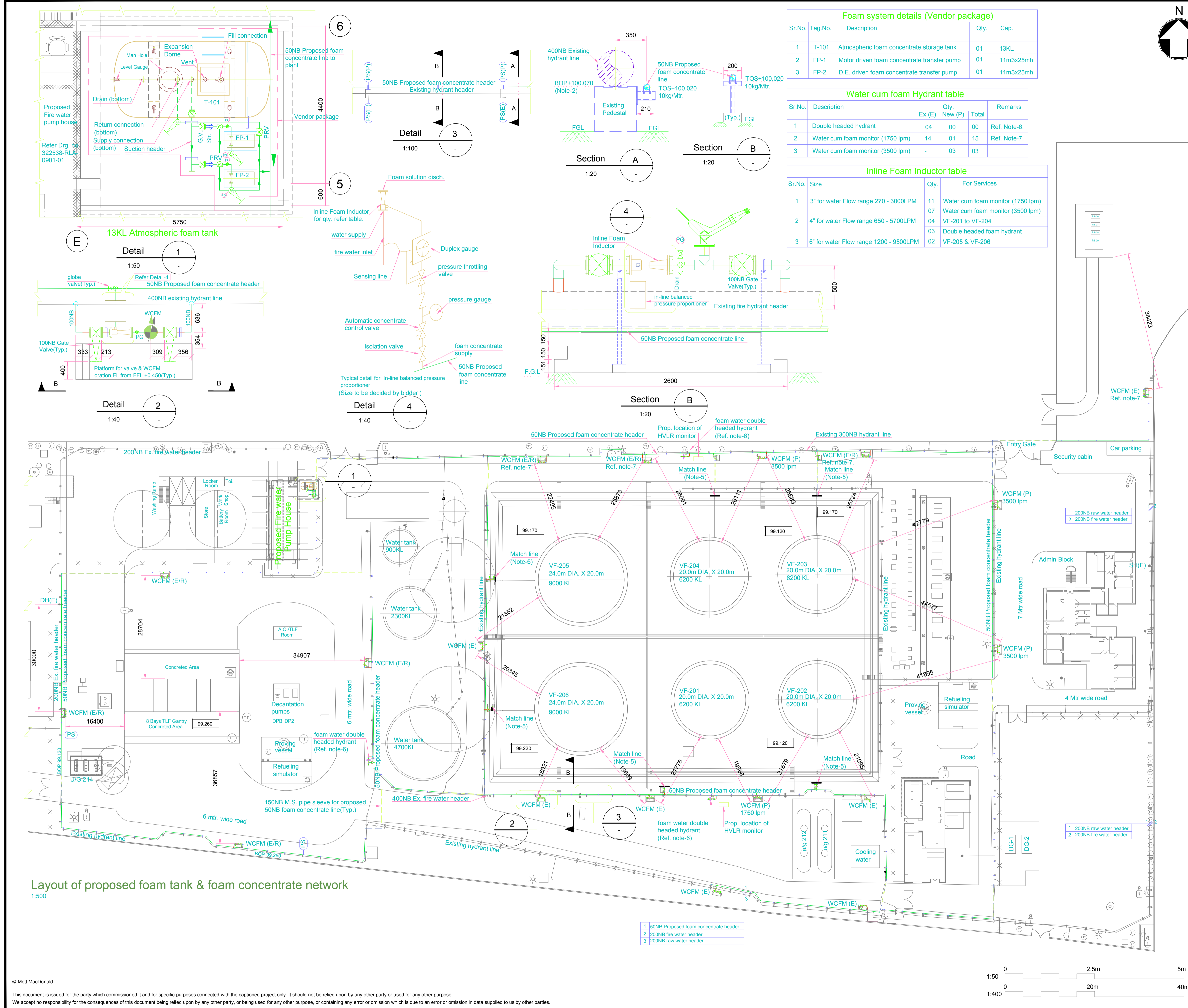
Layout & details of proposed a/g line
Route for existing MVWS & fixed foam

Designed	KDP	Eng check	MMS
Drawn	BNC	Coordination	AKM
Dwg check	KDP	Approved	VST

Scale at A1	Status	Rev	Security
As Noted	TEN	0	STD

Drawing Number
322538-RPA-0904-01





Foam system details (Vendor package)

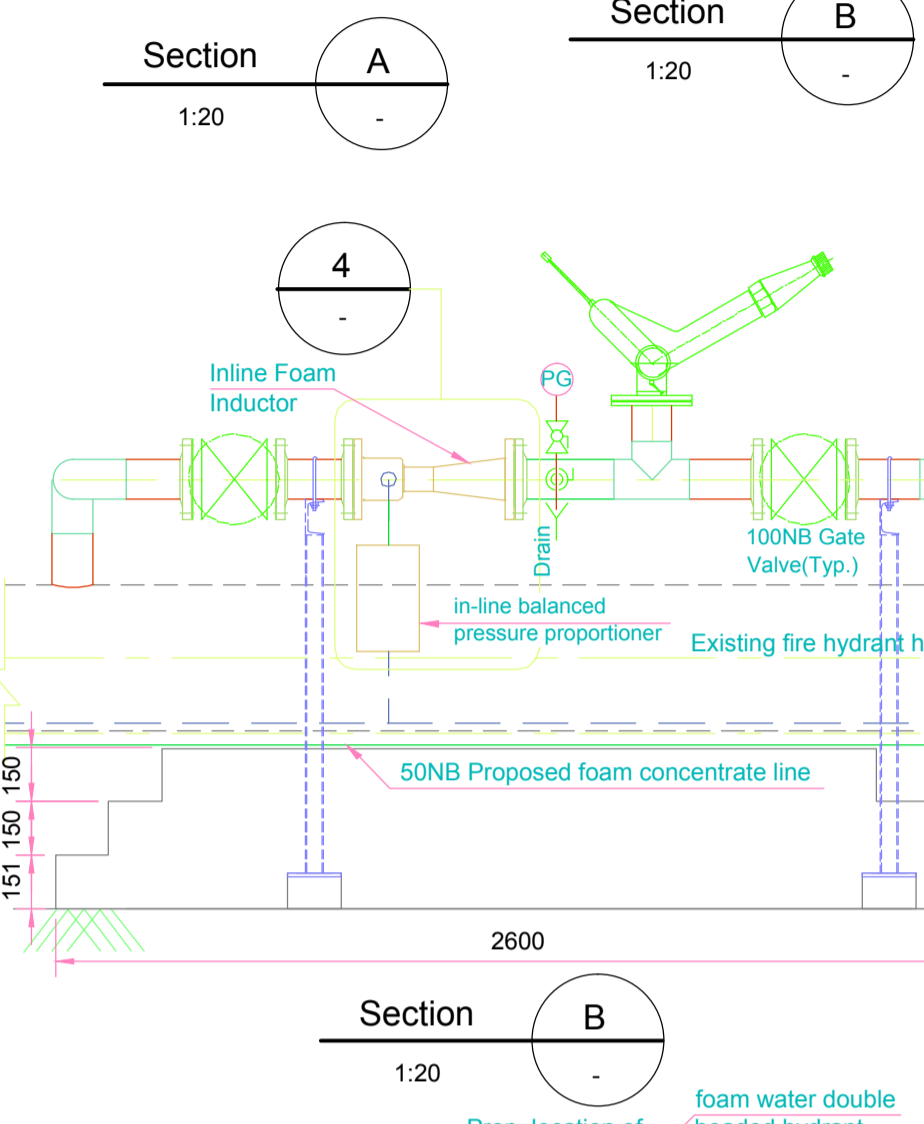
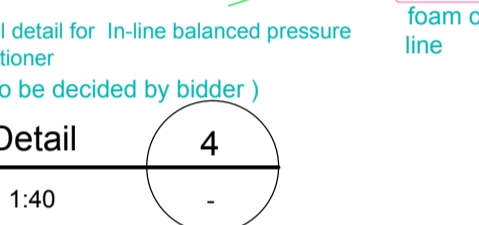
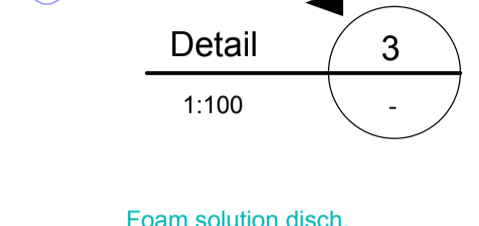
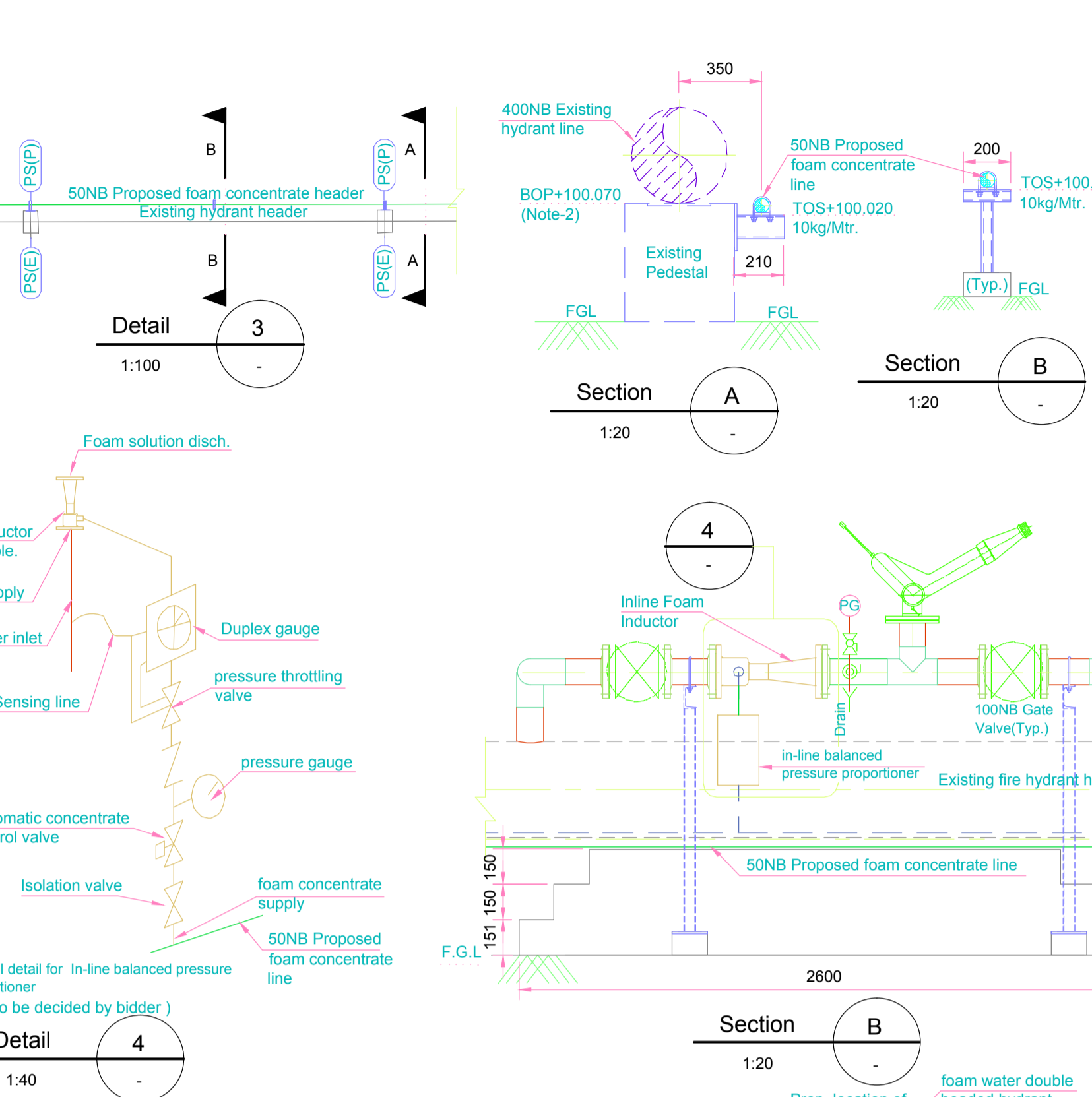
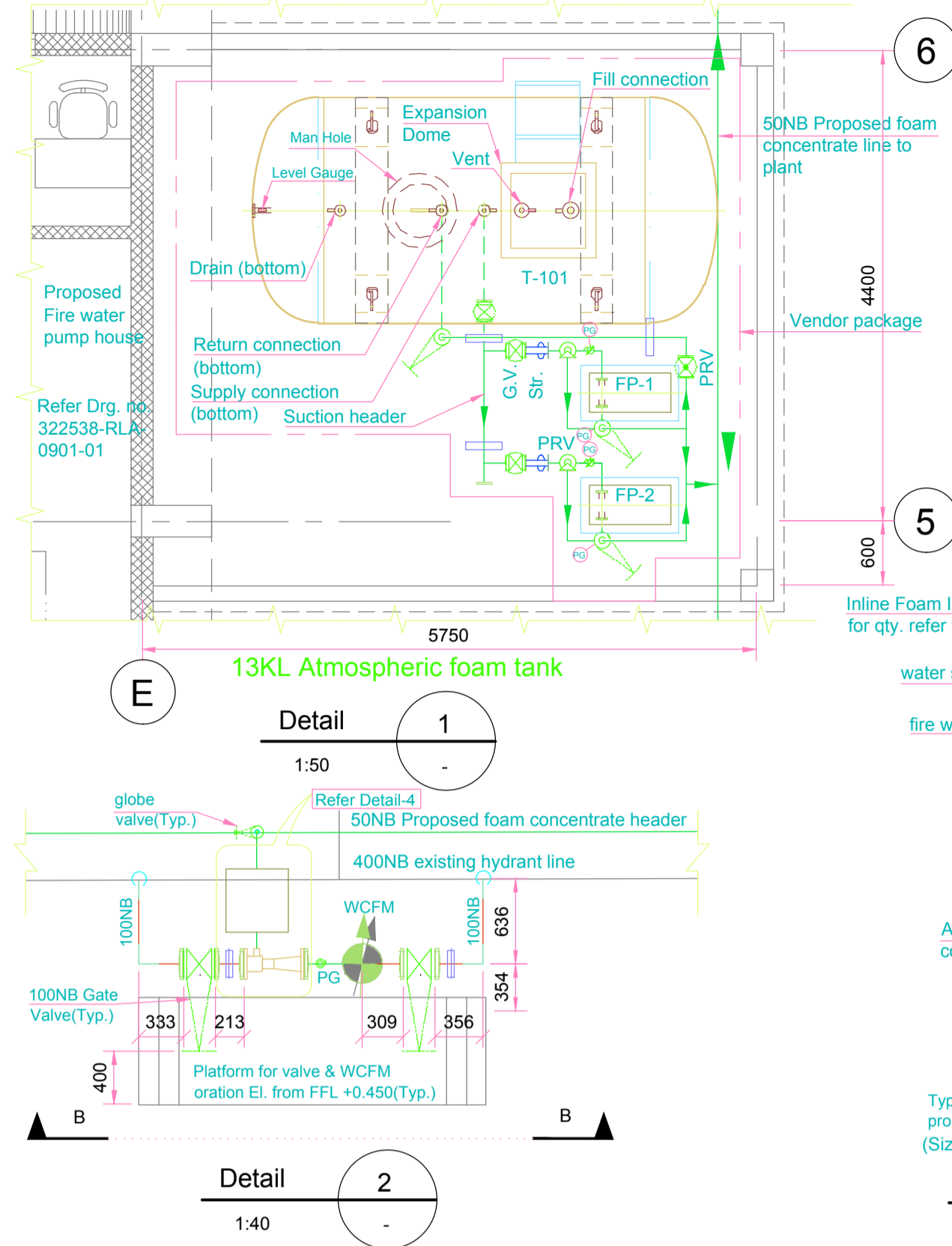
Sr.No.	Tag.No.	Description	Qty.	Cap.
1	T-101	Atmospheric foam concentrate storage tank	01	13KL
2	FP-1	Motor driven foam concentrate transfer pump	01	11m3x25mh
3	FP-2	D.E. driven foam concentrate transfer pump	01	11m3x25mh

Water cum foam Hydrant table

Sr.No.	Description	Ex.(E)	Qty. New (P)	Total	Remarks
1	Double headed hydrant	04	00	00	Ref. Note-6.
2	Water cum foam monitor (1750 lpm)	14	01	15	Ref. Note-7.
3	Water cum foam monitor (3500 lpm)	-	03	03	

Inline Foam Inductor table

Sr.No.	Size	Qty.	For Services
1	3" for water Flow range 270 - 3000LPM	11	Water cum foam monitor (1750 lpm)
2	4" for water Flow range 650 - 5700LPM	07	Water cum foam monitor (3500 lpm)
3	6" for water Flow range 1200 - 9500LPM	02	VF-201 to VF-204
			Double headed foam hydrant
			VF-205 & VF-206



- Notes**
- All Dimension are in mm and Levels are in meter.
 - Levels of pedestal to be considered as per existing pedestal to continue for aboveground routing requirement.
 - WCFM to be shifted.
 - To be demolish existing 5 KL foam tank.
 - further continuation refer Drg. No. 322538-RPA-0904-01
 - Existing 3 Nos double headed hydrant to be converted in to foam hydrant for trolley mounted HVLr monitor to mitigate distance criteria.
 - 4 Nos. of ex. water cum foam monitor may required to be change to suitable capacity i.e. (3500 lpm) if not match with the flow requirement.
 - This drg. is for only foam layout pl. refer separate drg. no. 322538-RPA-0902-02 for hydrant network with modification in ex. network.

Key to symbols

Key Plan

Abbreviations :

- alg Above ground
- TOS Top of Structure
- BOP Bottom of pipe
- Lvl Level
- DH Double hydrant
- WCFM(E) = Water cum foam monitor (E) Existing
- WCFM(P) = Water cum foam monitor (P) Proposed
- WCFM(E/R) = Water cum foam monitor (Existing to be remove & Relocate here)

Reference drawings

- 322538-MPE-0100-01
- 322538-CCE-0009-01
- 322538-RPA-0902-02
- DAFFPL-GEL-PP-013
- 322538-FDC-101

Equipment Plot plan
Layout & details of proposed dyke wall
Proposed fire Hydrant network
As built fire Hydrant network
Foam tank data sheet

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	09.12.15	BNC	Revised as per Arch. plan & Issued for Tender	MMS	VST
0	06.11.15	BNC	Issued for Tender	MMS	VST



Client

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

Title

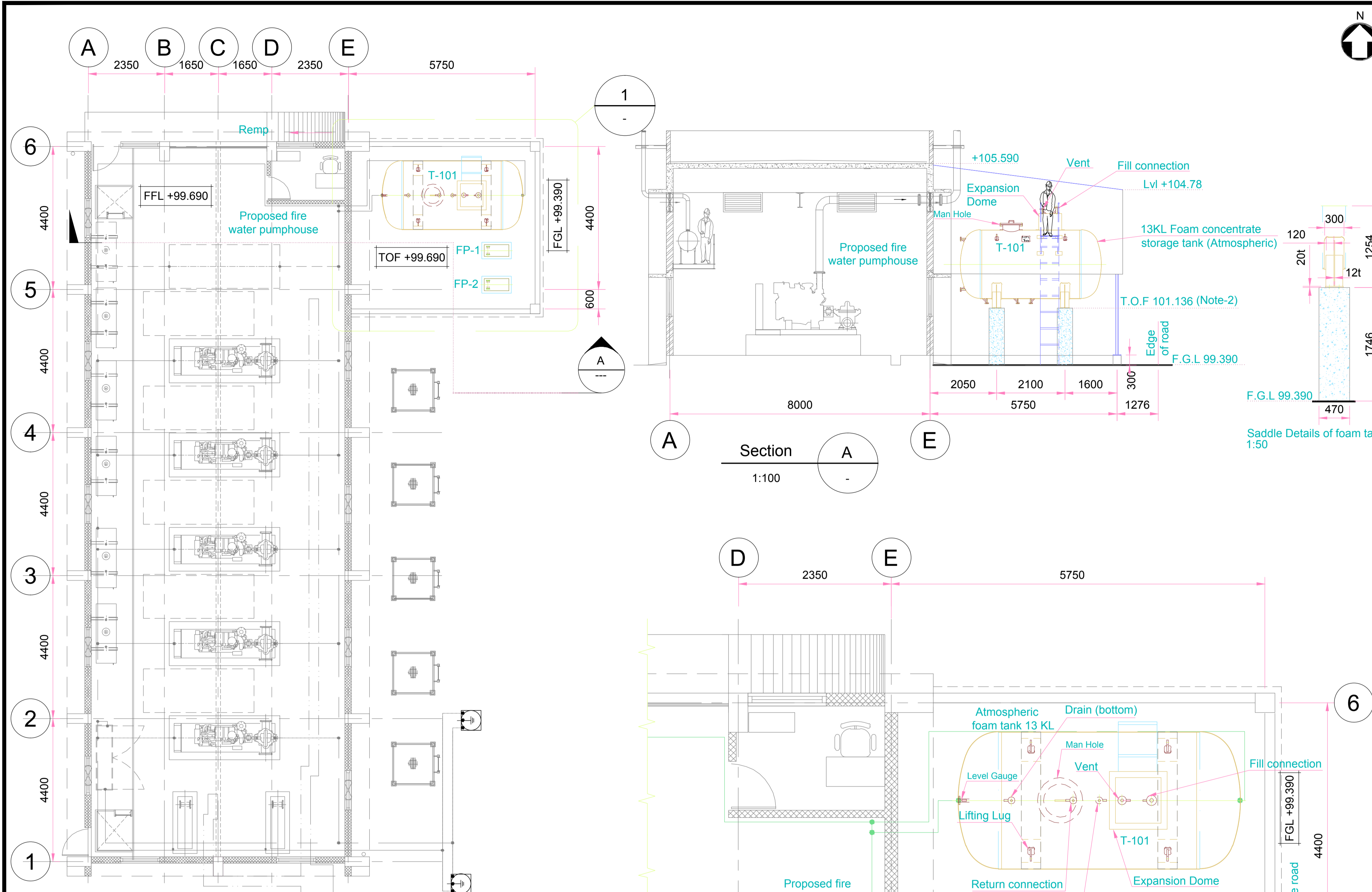
Modernization of Existing Fuel Farm

Layout & details of proposed foam tank and foam concentrate network.

Designed	KDP	Ehg check	MMS
Drawn	BNC	Coordination	VST
Dwg check	KDP	Approved	AKM
Scale at A1	Status	Rev	Security
As Noted.	TEN	1	STD

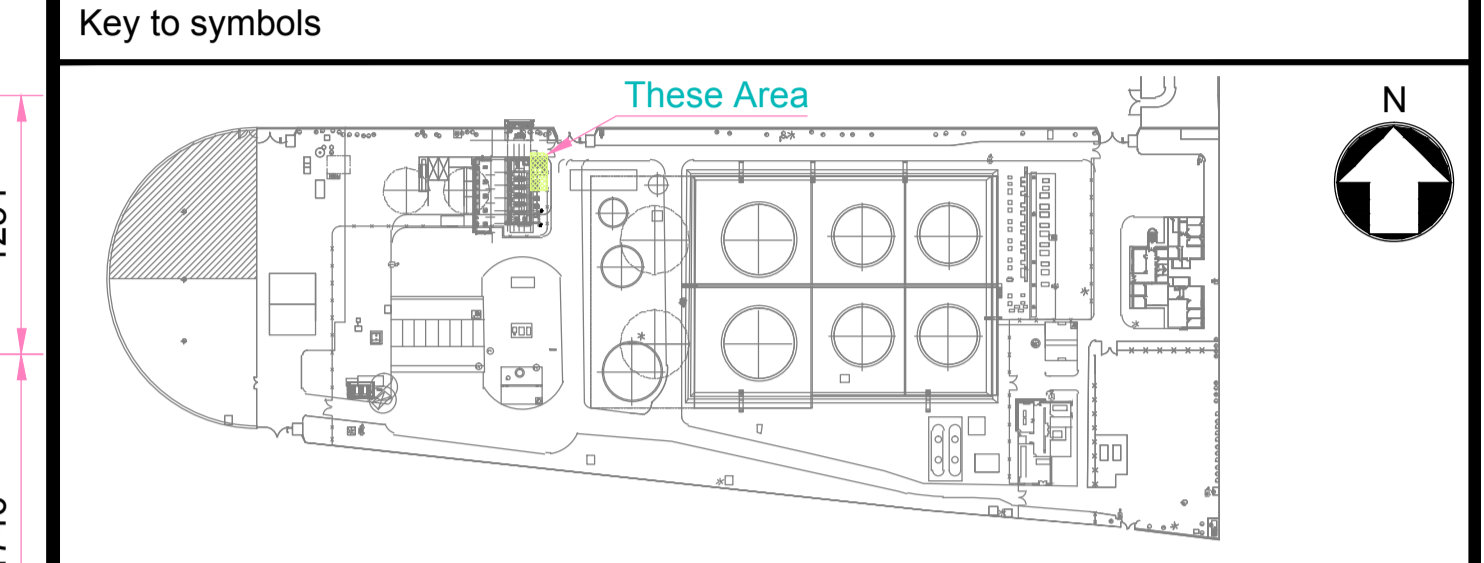
Drawing Number: 322538-RPA-0905-02

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Notes

- All dimensions are in millimeters and levels are in meters, unless otherwise
- Top of foundation of foam tank is w.r.t., F.G.L of fuel hydrant pump house i.e. +101.136.



Abbreviations :

FGL	Finished Ground Level	TOS	Top of Structure
FFL	Finished Floor Level	C/L	Center Line
TOF	Top of foundation	Typ	Typical

Reference drawings

1) 322538-MPE-0100-01	Eq. Plot plan
2) 322538-RLA-0901-02	Proposed fire water pump room layout
3) 322538-RPA-0905-02	proposed foam concentrate network
4) 322538-RIC-0101-01	Atmospheric foam concentrate storage tank Datasheet(Tag No: T-101)

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	09.12.15	BNC	Revised as per Arch. plan & Issued for Tender	MMS	VST
0	09.11.15	BNC	Issued for Tender	MMS	VST

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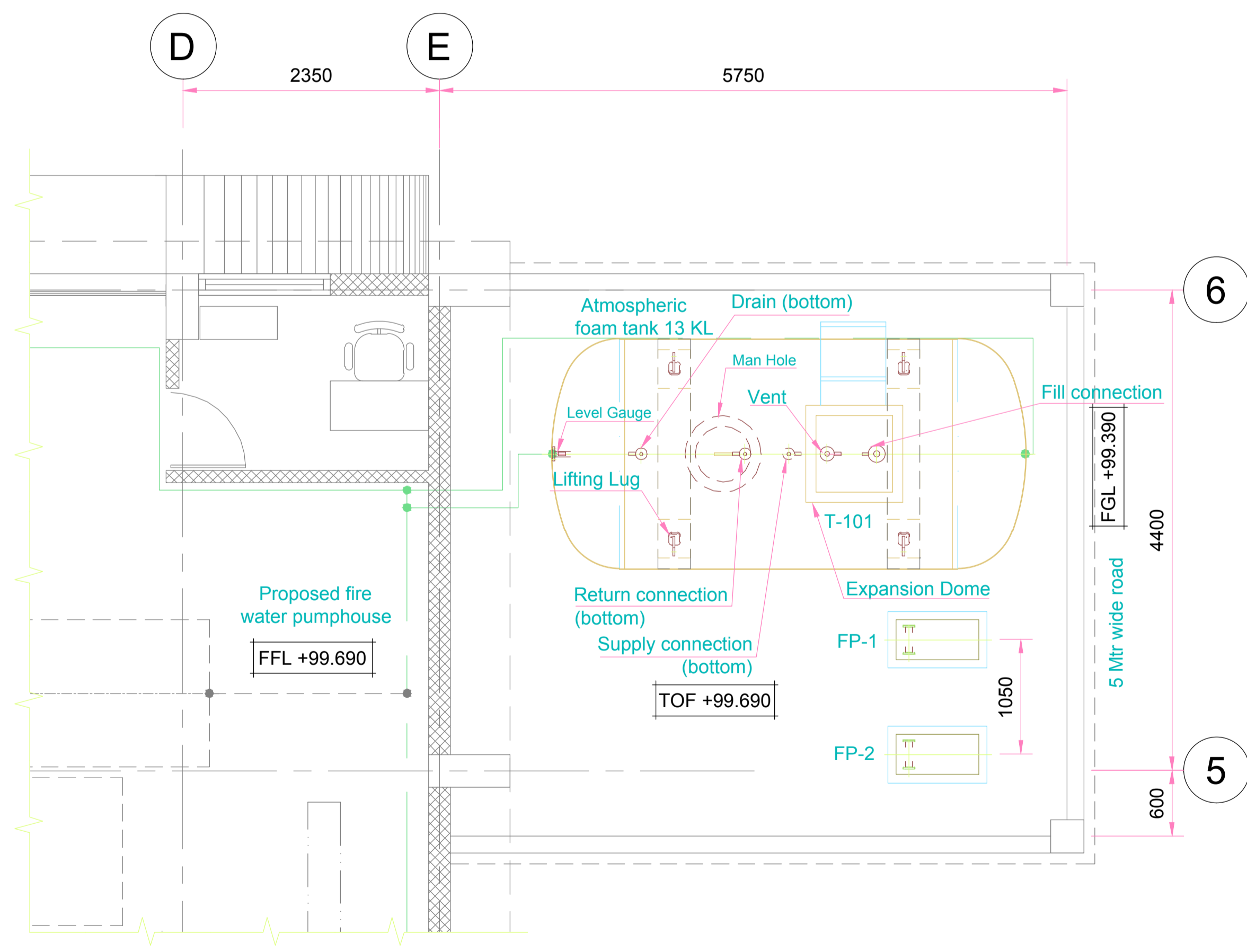
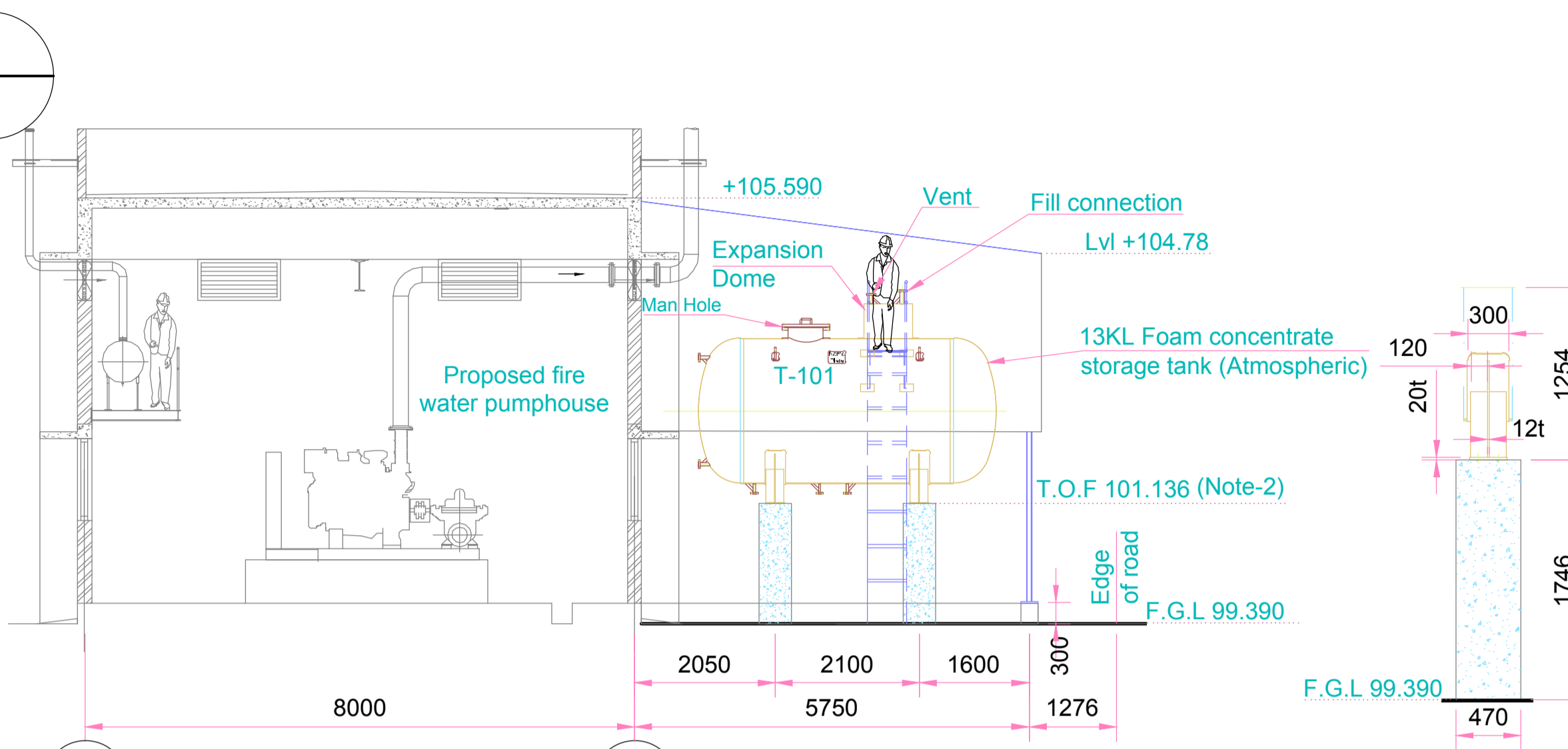
Client
M/s Delhi Aviation Fuel Facility Pvt. Ltd.
Aviation Fuelling Station
Shahbad, Muhammad Pur
IGI Airport, New Delhi - 110061

Title
Modernization of Existing Fuel Farm

13KL Foam concentrate storage tank(Atmospheric).

Designed	KDP	Eng check	MMS
Drawn	BNC	Coordination	VST
Dwg check	KDP	Approved	AKM
Scale at A2	Status	Rev	Security
As Noted.	TEN	1	STD

Drawing Number
322538-RPB-0906-02



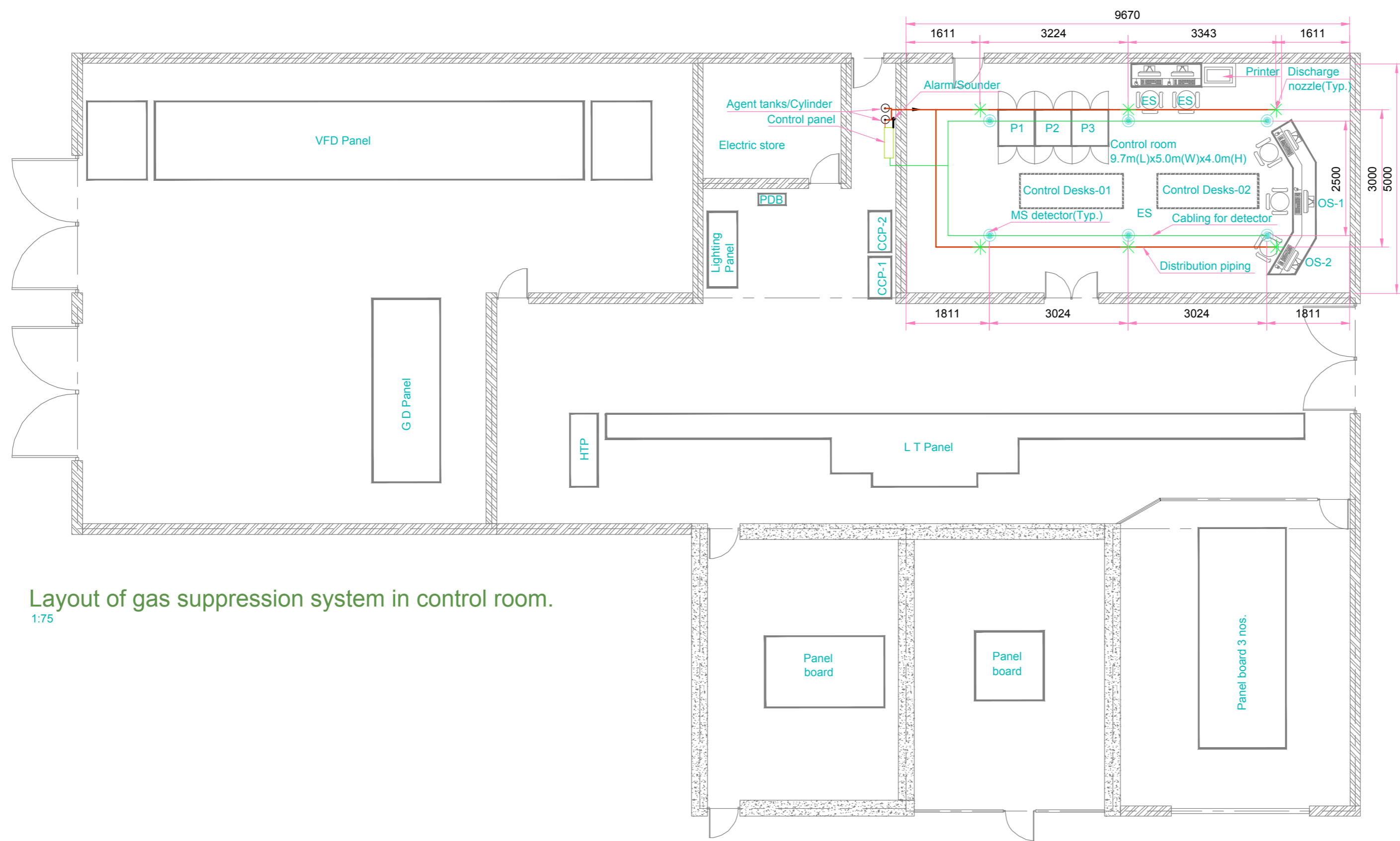
Layout of foam concentrate storage tank

Foam system details (Vendor package)

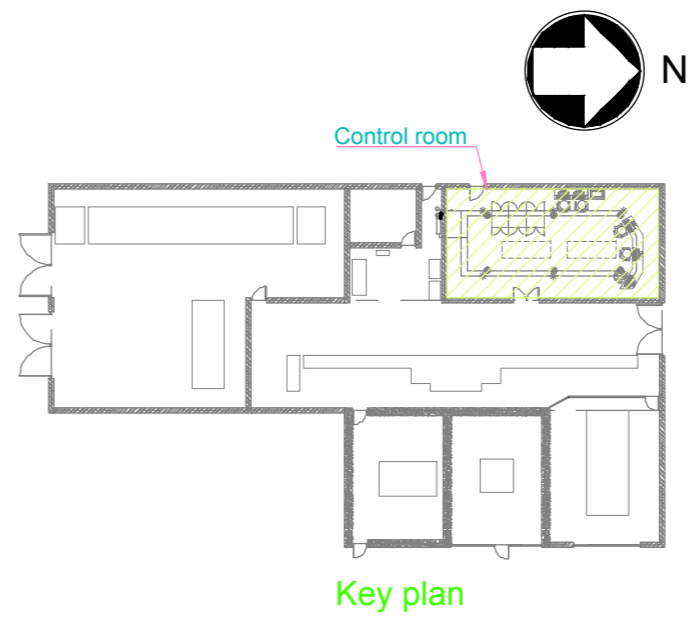
Sr.No.	Tag.No.	Description	Qty.	Cap.
1	T-101	Atmospheric foam concentrate storage tank	01	13KL
2	FP-1	Motor driven foam concentrate transfer pump	01	11m3x25mh
3	FP-2	D.E. driven foam concentrate transfer pump	01	11m3x25mh

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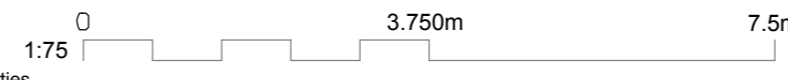
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Layout of gas suppression system in control room.
1:75



Key plan



Notes

- All dimensions are in m.m. unless otherwise specified.
- Gas suppression system by environmental friendly gas (FM-200 or NOVEC 1230) as per NFPA-2001

Reference drawings


- DAFFPL-AGEL-PID-014 for control room plan drawing of Greenleaf engineering ltd.
- 322538-NLC-0264-01 for HT & LT Sub Station layout of MottMacDonald pvt ltd.

Key to symbols

Abbreviations :


- Discharge nozzle
- MS Detector (Multi sensor)
- Distribution piping
- Cabling for detector

Rev	Date	Drawn	Description	Ch'k'd	App'd
0	29.09.15	BNC	Issued for Tender		



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Aviation Fuelling Station
Shahbad, Muhammad Pur
IGI Airport, New Delhi - 110061



Title
Modernization of Existing Fuel Farm

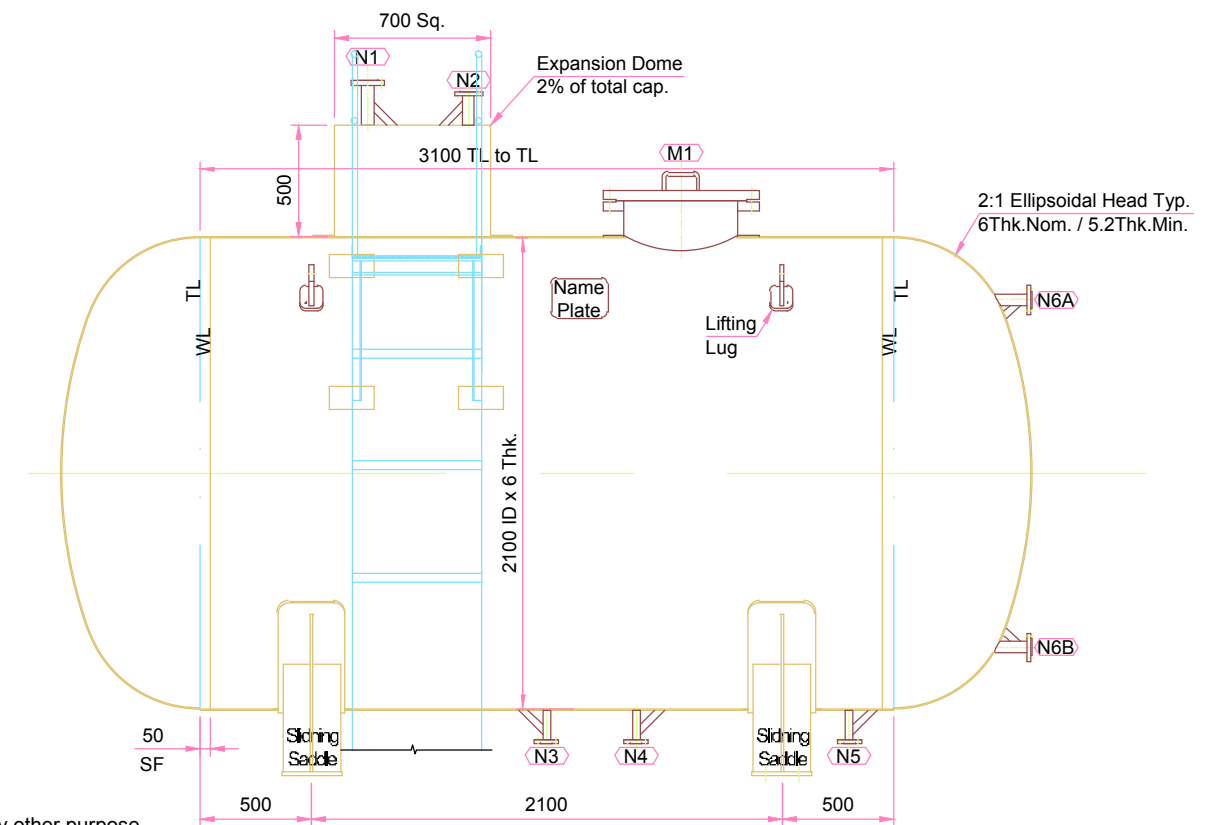
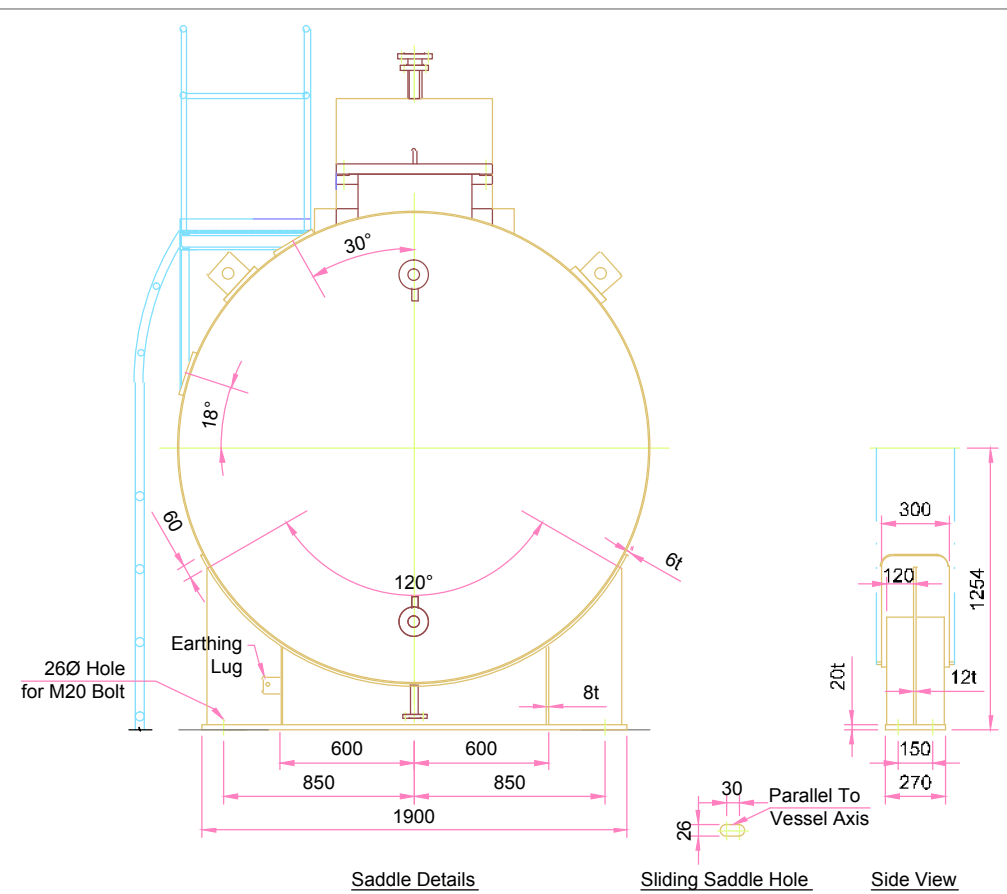
Conceptual layout of
Gas suppression system in control room.

Designed	KDP	Eng check	MMS
Drawn	BNC	Coordination	VST
Dwg check	KDP	Approved	AKM

Scale at A2	Status	Rev	Security
1:75	TEN	0	STD

Drawing Number
322538-RPB-0907-01

Service Data	Tag No. : T - 101	Working Capacity : 13 KL	Gross Capacity : 13.3 KL	Delivery : Single Piece					
	Qty. Reqd. : One No.	P & ID No. :322538-RIA-0900-01	Plant / Sec. : ----	PDS No. : ----					
	Type : Cylindrical, Horizontal								
	Contents	----							
Design Data	Density	Kg/m ³	----						
	Working Temperature (Nor / Max)	°C	40						
	Working Pressure (Nor / Max)	Kg/cm ² (g)	0.2						
	Design / Fabrication Code	ASME Sec. VIII DIV. 1 (ED. 2010)							
	Statutory Approval Required	(a) From CCE : No (b) From IBR : No							
	Details of Support	Saddle	Qty : Two						
	Design Temperature (Min / Max)	°C	100						
	Design Pressure	Kg/cm ² (g)	2 / 0.1 Extrenal						
	Test Pressure (Hydrotest)	Kg/cm ² (g)	2.6						
	Radiography	(Shell / Dish)	Spot + 'T' / Full						
	Weld Joint Efficiency	(Shell / Dish)	0.85 / 1						
	Corrosion / Erosion Allowance	mm	Nil						
	Heat Treatment	As per Code							
	Internals	----							
External Loading	----								
Details of Insulation (Reqd.) No	Scope	: ----							
	Type	: ----							
	Cleat Scope	: ----							
Details of Vessel Weights, kgs.	Empty Wt	: * ~ 2500 kgs.							
	Hyd. Test Wt	: * ~ 16000 Kgs.							
	Operating Wt.	: * ~ 16000 kgs.							
Material	Main Vessel	Shell : SA 240 Gr. 304	LH & RH. Dish : SA 240 Gr. 304	Saddle : IS2062GrA/B with SS304 Pad					
		Nozzle Pipes : SA 312 Tp 304	Internals : SS 304	Couplings : ----					
		Nozzle Flanges : SA 182 F 304	Pad : SA 240 Gr. 304	Bolts & Nuts : SA193GrB7/SA194Gr2H					
		Gaskets : Non Asbestos Fibre	Body Flanges : ----	Manhole : IS2062GrA/B + AISI304 Lining					
Other	Surface Finish : Internal : Weld Ground Smooth	External : Smooth	Area Classification : Hazardous **						
	Welding Procedure : As per ASME Sec. IX	Welding Process : As per Code	Accessories : ----						
	Painting : ** All External & Non Insulated CS Surface shall have two coats of zinc chromate primer.	Inspection : Client / **							
Nozzle Schedule	Nozzles	Service	DN mm	Thk. / Sch.	Flanges Std.	Type	Class	Nozzle Projec.	Remarks
	N1	Fill connection	50	Sch.40s	ANSI B16.5	SORF	150 #	150	
	N2	Vent	40	Sch.40s	ANSI B16.5	SORF	150 #	150	
	N3	Supply connection	50	Sch.40s	ANSI B16.5	SORF	150 #	150	
	N4	Return connection	50	Sch.40s	ANSI B16.5	SORF	150 #	150	
	N5	Drain	50	Sch.40s	ANSI B16.5	SORF	150 #	150	
	M1	Man Hole	500	6 Thk.	ANSI B16.5	SORF	150 #	150	
	N6A	Level Gauge	40	Sch.40s	ANSI B16.5	SORF	150 #	150	
	N6B	Level Gauge	40	Sch.40s	ANSI B16.5	SORF	150 #	150	





- * Indicates data to be furnished by vendor, to be furnished by client.
- All dimensions are in mm unless otherwise noted.
- Prior to fabrication, vendor shall submit material lab & test certificates.
- All nozzles fabricated from plate to be 100 % Radiographed.
- Vendor to submit detailed fabrication drawings & QA plan before fabrication.
- Earthing lugs are not to be painted.
- All bolt holes shall straddle centre line.
- Nozzle flange gasket face shall have surface finish of 125 to 250 AARH.
- All RF pad & tell tale holes shall be tested with soap solution using air at 1.25 kg/cm², telltale hole shall be plugged by hard grease after test.
- Contractor can suggest standard lifting lug arrangement as per their own design for erection and lifting.
- All sharp corners should be rounded off.
- For nozzle size up to 50DN, gusset supports to be provided, for nozzle size above 50DN, RF pad shall be provided as per code.
- Wherever counter flanges or blind flanges specified vendor shall supply gasket, studs & nuts.
- Contractor's scope include all component shown in this data sheet & as per applicable standard / spec. / MR.

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 A20 Sector 2 Noida 201301 India	T +91 (0)12 0254 3582 F +91 120 254 3562 W www.mottmac.com	Client		 M/s Delhi Aviation Fuel Facility Pvt. Ltd. Aviation Fuelling Station Shahbad, Muhammad Pur IGI Airport, New Delhi - 110061	Rev	Date	Drawn	Description	Ch'k'd	App'd	Title	Drawn	BNC
		0	24.09.15		BNC	Issued for Tender	MMS	GDS	Atmospheric foam concentrate storage tank Datasheet(Tag No: T-101)	Checked	MMS		
										Approved	V.S.T		
		Scale at A3			N.T.S			Security	Status	Rev	STD	TEN	0
		Drawing Number		322538-RIC-0101-01									



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/2015-16/13 (JOB: UPGRADATION AND AUGMENTATION OF FIRE WATER SYSTEM as per specification) including Scope of job, quantities, completion period, terms & conditions 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



Bill of Material for Fire protection system work at DAFFPL - New Delhi

Sr. No.	Item Description	Unit	Qty.	Bidder Name :	Total Amount of Supply & Installation (Rs.)
				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
1	Supply and installation of Pipes with all required (Structural/civil) <i>supports</i> including painting of above ground pipes as per technical specification with cutting and making good walls complete. Including all tools and tackles and misc. work e.g. making opening in wall etc. including hydrotesting of pipe as required. Including all tools, tackles, labours required to complete the job and as per instruction of Engineer In-charge (EIC).				
i)	C.S. Pipes (Refer Piping Material Specification no.150C02).				
a	15 NB	RM	6		-
b	25 NB	RM	6		-
c	80 NB	RM	24		-
d	100 NB	RM	416		-
e	150 NB	RM	98		-
f	200 NB	RM	194		-
g	250 NB	RM	76		-
h	300 NB	RM	15		-
i	350NB	RM	12		-
j	500 NB	RM	51		-
k	600 NB	RM	61		-
ii)	S.S. Pipes (Refer Piping Material Specification no. 150H01)				
a	15 NB	RM	6		-
b	20 NB	RM	6		-
c	25 NB	RM	6		-
d	40 NB	RM	6		-
e	50 NB	RM	1050		-
2	Supply and installation of Pipe fittings including painting of above ground fittings as per technical specification. Including all tools, tackles, labours required to complete the job and as per instruction of Engineer In-charge.				
i)	Fittings for C.S Pipes (Refer C.S.Piping Material Specification no.150C02).				
a	90 Deg. Elbows				



Bill of Material for Fire protection system work at DAFFPL - New Delhi

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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
1	80NB	Nos.	6		-
2	100NB	Nos.	138		-
3	150NB	Nos.	14		-
4	200 NB	Nos.	28		-
5	250 NB	Nos.	13		-
6	300NB	Nos.	5		-
7	500 NB	Nos.	4		-
8	600 NB	Nos.	3		-
b	45 Deg. Elbows				
1	600NB	Nos.	2		-
c	Equal Tee				
1	15NB	Nos.	7		-
2	100NB	Nos.	5		-
3	150NB	Nos.	4		-
4	200 NB	Nos.	8		-
5	250 NB	Nos.	1		-
6	500 NB	No.	1		-
7	600 NB	No.	1		-
d	Un Equal Tee				
1	100x80	Nos.	12		-
2	150x100	Nos.	8		-
3	300x100	Nos.	14		-
4	200X100	Nos.	10		-
5	250X100	Nos.	6		-
6	500x200	Nos.	2		-
7	500x300	Nos.	5		-
8	600x350	Nos.	5		-
e	Concentric Reducer				



Bill of Material for Fire protection system work at DAFFPL - New Delhi

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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
1	100X80	Nos.	22		-
2	100x50	Nos.	2		-
3	250x200	Nos.	2		-
4	300x200	Nos.	5		-
5	300x250	Nos.	1		-
6	500x400	Nos.	2		-
f	Eccentric Reducer				
1	150x80	Nos.	2		-
2	350X250	Nos.	5		-
3	150x65	Nos.	U.R.		-
4	350X200	Nos.	U.R.		-
5	150x100	Nos.	U.R.		-
6	350X300	Nos.	U.R.		-
g	Companion Flange				
1	80NB	Nos.	6		-
2	100NB	Nos.	122		-
3	150NB	Nos.	17		-
4	200NB	Nos.	25		-
5	250NB	Nos.	5		-
6	300NB	Nos.	20		-
7	350NB	Nos.	20		-
8	500NB	No.	1		-
9	600NB	Nos.	3		-
h	Blind Flanges				
1	150NB	No.	1		-
2	200NB	No.	3		-
3	500NB	No.	1		-
4	600NB	Nos.	3		-



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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
i	Half Coupling				
1	15NB	Nos.	7		-
ii)	Fittings for S.S Pipes (S.S. Piping Material Specification no. 150H01)				
a	90 Deg. Elbows				
1	50NB	Nos.	40		-
b	45 Deg. Elbows				
1	50NB	Nos.	13		-
c	Equal Tee				
1	50NB	Nos.	5		-
d	Companion Flange				
1	50NB	Nos.	4		-
e	Blind Flanges				
1	50 NB	Nos.	2		-
f	Half Coupling				
1	15NB	Nos.	11		-
2	20NB	Nos.	14		-
3	25NB	Nos.	2		-
3	Providing and fixing Valves , including all tools, tackles, labours required to complete the job and as per instruction of Engineer In-charge. as per specification.				
i)	Valves for C.S Pipes (Refer Valve Specification for Fire water services Spec. no. 150C02)				
a	Gate valve				
1	80 NB	Nos.	2		-
2	100 NB	Nos.	52		-
3	150 NB	Nos.	10		-
4	300 NB	Nos.	5		-
5	350 NB	Nos.	5		-
b	Non- Return valve				
1	100 NB for Jockey pump disch.	Nos.	2		-



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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
2	300 NB for main pump disch.	Nos.	5		-
c	ball valve				
1	15 NB	Nos.	68		-
2	25 NB	Nos.	7		-
d	Safety relief valve				
1	200 NB	No.	1		-
e	Butterfly valve				
1	50NB	No.	1		
2	200NB	Nos.	8		
ii)	Valves for S.S Pipes (Refer Valve Specification Foam concentrate services Spec no. 150H01)				
a	Gate valve				
1	15 NB	Nos.	11		-
2	20 NB	Nos.	14		-
3	25 NB	Nos.	2		-
5	50 NB	No.	1		-
4	Installation & commissioning of Fire water pumps in proposed pump house, including all tools, tackles, machinery, labours required to complete the job and as per instruction of Engineer In-charge. All Main Fire pumps "on start", shall have provision of cabling to start alarm at security cabin & an electric siren kept at Pump house/main plant bldg./security cabin. (Foundation by client as per GAD of Bidder based on manufacturer's data.) Refer drg. no. 322538-RLA-0901-01 (FIM = Free Issue Material)				
i)	Jockey Pump (single stage) horizontal back pull out type centrifugal pump (55m3/hr each). (FIM = Free Issue Material)	Each	2		-
ii)	Diesel Engine Driven Fire Pump , horizontal split casing pumping set inclusive of 3 working + 2 stand by with battery sets. (610m3/hr each). (FIM = Free Issue Material)	Each	5		-
5	Providing and fixing dual type Pressure Switch including electrical connections setting of Cut-In and cut-Off pressure signal complete in all respects. 1 each for main fire hydrant pump. (Refer specification).				



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(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
i)	suitable for 1-20 Kg/cm ²	Nos.	7		-
6	Providing and fixing dial type Pressure Gauge with isolation cock and copper pipe at hydrant station. (Refer specification & Drg. no. 322538-RLA-0903-04).				
i)	Dial diameter 100 mm calibration 0 – 16 kg / cm ²	Nos.	7		-
7	Providing and fixing 'Y' OR Basket type suction Strainer with M.S. flanged connection suitable for 80 to 400 mm dia., fabricated from 8 mm thick M.S. plate / cast c.s. and stainless steel 20 mesh complete including companion flanges etc. (Refer specification & Drg. no. 322538-RLA-0903-04).				
i)	150 NB 'Y' type strainer.	Nos.	2		-
ii)	350 NB 'Basket' type strainer.	Nos.	5		-
8	Providing and fixing two coat of 2 mm thick PYPKOTE anti-rust pipe protection including primer and lap of 25mm on buried pipe including surface preparation, complete in all respects with tools tackles and as per drawing, technical specs. and as per instruction of E.I.C..(Refer specification & Drg. no. 322538-RLA-0902-01).				
i)	200 NB	RM	32		-
ii)	250 NB	RM	26		-
iii)	500 NB	RM	18		-
iv)	600 NB	RM	18		-
9	Supply and installation of NP3 class RCC Pipe sleeve for road crossing as per IS 458 including 3" PCC (1:2:4) bed below hume pipe required as per instruction of EIC. (Refer specification & Drg. no. 322538-RLA-0902-01).				
i)	100 mm dia for 50NB service pipe.	RM	116		-
ii)	300 mm dia for 100/150NB service pipe.	RM	20		-
iii)	500 mm dia for 200/250NB service pipe.	RM	45		-
iv)	900 mm dia for 500/600NB service pipe.	RM	24		-



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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	Total Amount of Supply & Installation (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
10	Supply and installation of SS 304 (confirming to IS 3444) Double headed hydrant landing valve as per technical specification conforming to IS-5290, Type-B with 63 mm dia. instantaneous female coupling on the outlet SS metal blank cap and chain, necessary companion flanges, nuts, bolts, washer and gasket complete as per specification. (ISI marked). All parts and body shall be of SS as per IS:5290. (Refer specification for Stainless steel double headed hydrant valve).	No.	U.R.		
11	Supply and installation of standpost type manually operated 75mm size Water cum foam Monitor for HVLR as per UL /FM having 100NB inlet and Variable flow nozzle & capable to 500 GPM & 1000 GPM complete as per technical specification. Including all tools, tackles, labours required to complete the job and as per instruction of Engineer In-charge. (Refer specification for Water cum foam monitor)				
i)	1750 LPM	No.	1		-
ii)	3500 LPM	Nos.	3		-
12	Providing and fixing 63 mm dia. 15m/7.5m long Rubberized lined Hose including SS male and female instantaneous type coupling approved by fire authority, machine wound with copper wire complete in all respects. Hose shall conform to IS 636 Type-B and coupling to IS 903 -1975 (ISI marked). (Refer specification for RRL Hose).				
i)	15m for field hydrant	Nos.	U.R.		
13	Supply and installation of standard short size SS branch pipe with S.S. nozzle 20 mm dia. outlet with standard instantaneous type 63 mm dia. coupling. (ISI marked) (Refer specification for Stainless steel branch pipe).	No.	U.R.		
14	Providing and fixing Fire hose cabinet including all tools, tackles, labours required to complete the job and as per instruction of Engineer In-charge. as per specification. (Refer specification & Drg. no. 322538-RLA-0902-01).	No.	U.R.		



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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	Total Amount of Supply & Installation (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
15	Excavation of trenches of required width for pipes. in any type of soil including (breaking road, R.C.C. etc. if reqd.) excavation for sockets and dressing of sides ramming of bottom, depth upto 1.5 M including taking out the excavated soil, and then back filling the soil as required in layers not exceeding 10 cms / 20cms (sand / soil) in depth including consolidating. Sets deposited layer by ramming, watering etc. and disposing of surplus excavated soil as directed within a lead of 1.0 km. (supply of sand is in bidders scope)				
i)	For 100 NB pipe	RM	24		-
ii)	For 200 NB pipe	RM	34		-
iii)	For 250 NB pipe	RM	24		-
iv)	For 500 NB pipe	RM	15		-
v)	For 600 NB pipe	RM	20		-
16	Supply and laying the 3" thick PCC bed required below RCC NP3 class pipe sleeve including ramming, levelling etc. with all material, tools, tackles and labour as per instruction of EIC.				
i)	For 100 NB pipe	RM	24		-
ii)	For 200 NB pipe	RM	34		-
iii)	For 250 NB pipe	RM	24		-
iv)	For 500 NB pipe	RM	15		-
v)	For 600 NB pipe	RM	20		-
17	Supply and Installation of 13KL AFFF Foam concentrate storage tank with transfer pumps as per technical specification (Foam concentrate to be used shall confirm to IS: 4989 2006 / UL-162 as per OISD-117) for HVLR system. Atmospheric tank as per specification / datasheet no. 322538-RIC-0101-01. Including 2 nos. S.S. foam pump (Q=11KL / Hr.x 25mH ; 1 no. motor driven + 1 no. diesel engine driven with 1 + 1 suitable battery back-up and charger) including control Panel for above pumps and necessary cabling with associated piping, isolation valve, strainer, control valve etc. as a vendor package as per P & I D no. 322538-RIA-0900-01. and layout for foam tank drg. no. 322538-RPB-0906-01.	No.	1		-
i)	3% AFFF Foam concentrate confirm to IS: 4989 2006 / UL-162 as per OISD-117)	KL	13		-



Bill of Material for Fire protection system work at DAFFPL - New Delhi

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				Unit Rate of supply & installation items or any items, fabricated & completed in all respects, inclusive of necessary testing, transportation, handling and safe custody at site & all incidental cost.	Total Amount of Supply & Installation (Rs.)
(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
18	Supply and Installation of complete SS304-3% AFFF Inline balance foam concentrate pressure proportioners set with flange connectin confirm to ANSI B16.5 Class 150# for stainless steel with manual override valve including appropriate In-line inductor . Including all material, tools, tackles and labour as per instruction of EIC. and as per drg. no. 322538-RPA-0905-01				
i)	3" for water Flow range 270- 3000LPM	No.	11		-
ii)	4" for water Flow range 650- 5700LPM	No.	14		-
iii)	6" for water Flow range 1200 - 9500LPM	No.	2		-
19	Providing and fixing Fire extinguishers (If required) as per OISD-117/235, (Contractor should submit test certificate form manufacturer along with serial number of every extinguishers supplied.) Instalation shall be as per OISD-117/235 & as per instruction of EIC.				
i)	Providing and fixing Carbon-di-oxide fire extinguishers consisting of welded M.S cylindrical body, squeeze lever discharge valve fitted with internal discharge tube, 30cms long high pressure discharge hose, discharge nozzle, suspension bracket (confirming to IS: 2878, suitable for B,C Class & Electrical Fire, (i.e. Flammable Liquids and Gases) finished externally with red enamel paint and fixed to wall with brackets with rawl plug/dash fasteners complete with internal charge. Instalation shall be as per OISD-117 & as per instruction of EIC.				
a	4.5 kg Co2	Nos.	U.R.		
ii)	Providing and fixing Dry Chemical Powder (Sodium Bi Carbonate) type Fire Extinguishers, confirming to IS:10658, suitable for B,C Class & Electrical Fire (i.e. Petrol, Paints & Gases) finished externally with red enamel paint and fixed to wall with brackets with rawl plug/dash fasteners complete with internal charge. Instalation shall be as per OISD-117 & as per instruction of EIC.				
a	9 Kg	Nos.	U.R.		
b	25 Kg	Nos.	U.R.		
c	75 Kg.	Nos.	U.R.		



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(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
20	Supply and installation of 9 ltrs. capacity Sand Bucket (If required) with its cover; MS, 24 G, painted with two coats of primer & enamel paint on a structural stand complete. The cost shall also include @ 12.5 kg of dry rever sand for fire fighting purpose. Instalation shall be as per instruction as per OISD-117 & as per instruction of EIC.	Nos.	U.R.		
21	Dismantalling and re-installation of existing fire hydrant line with fittings, valves, supports etc. including (If required) excavation & backfilling the same for sizes as mentioned here in below with required all tools, tackles, labours and machinery. Pipes after removal, to be stored at appropriate location / store as per instruction of engineer in charge and re-installation of the same pipes at the requisite location with all tools, tackels, etc. as per the drawing and as per the instruction of E.I.C.				
i)	100NB	RM	90		-
ii)	150NB	RM	240		-
iii)	200NB	RM	152		-
iv)	400NB	RM	30		-
22	Supply, fabrication and erection of structural steel for fire hydrant, HVLR, fixed foam and MVWS system's all type of piping support with all materials, labours, tools and tackles as per technical specification, drawings and as per instruction of EIC.	kg.	1500		-
23	Design, Engg., Manufacturing, supply, installation & commissioning of Gas Suppression system for Control room in sub station bldg. (control room Size 9.7 x 5 x @ 4 m as per Drg. no. 322538-RPB-0907-01) areas by FM200 / NOVEC 1230, an Environmentally friendly gas as per NFPA 2001 comprise of fire detection by provision of heat / smoke detector & response indicator as per NFPA-75.	M3	194		-



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(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
24	Installation of 6 hours running diesel tank @ 500 Ltrs (net.) for 1 no. of diesel engine driven pump . C.S. horizontal tank single wall mounting with structural support for diesel engine driven fire water pump in proposed fire water pump house as per drawing and as per instruction of EIC, with all tools tackles, labours, machinery required to complete the job. (Refer drg. no. 322538-RLA-0901-01). including installation of 15NB HSD supply & return line @ 10-12 mtrs. for 1 pump , from diesel tank to diesel engine of pump, including associated piping with flanges, fittings, valves etc. required to complete the job as per good engineering practice and instruction of EIC.. However, piping materials will be ree issue, coming with tank. (FIM = Free Issue Material)	Each	5		-
25	Installation of 100NB Vent line @ 10-12mtrs. long with fittings/fixtures for 1 no. of diesel engine driven pump from diesel tank to atmosphere including flanges, fittings etc. required to complete the job as per drg. No. 322538-RPA-0903-04, good engineering practice and instruction of EIC. (FIM = Free Issue Material)	Each	5		-
26	Installation of 1 x 150NB Exhaust duct line from 1 expansion joint, 1 silencer of diesel engine to atmosphere including flanges, fittings etc. required to complete the job as per drg. No. 322538-RPA-0903-04, good engineering practice and instruction of EIC. (1 Expansion jt. & 1 silencer (FIM = Free Issue Material))	Each	5		-
26 (Opt.)	Installation of 2 x 125NB Exhaust duct line for 01 no. of pump , from 2 expansion joint, 2 silencer of diesel engine to atmosphere including flanges, fittings etc. required to complete the job as per drg. No. 322538-RPA-0903-04, good engineering practice and instruction of EIC.(free issue (2 expansion jts. & 2 silencers. (FIM = Free Issue Material))	Each	5		-
27	Demolishing & dismantling of existing Fire water pump room (Sized 23m x 7.3m x @5.0m) including existing pumps with piping, civil/structural supports diesel tanks with piping etc. & required fire water hydrant header form existing pump house including all tools, tackles, labours, machinery required to complete the job and as per instruction of EIC (Engineer in-charge). Removal & storing of mechanical items as per EIC. Disposal of surplus dbries from site within a lead of 1km as per instructio of EIC.	LSTK	1		-



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(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
28	Dismantling & removal of existing 5KL foam bladder tank with piping, civil/structural supports & required fire water hydrant header form existing tank including all tools, tackles, labours, machinery required to complete the job and as per instruction of EIC (Engineer in-charge). Removal & storing of mechanical items as per EIC. Disposal of surplus dbries from site within a lead of 1km as per instructio of EIC.	LSTK	1		-
29	Providing and constructing (Free issue Bricks) masonry Platform of size 2000mmx800mm and height up to 450mm as per drawing no. 322538-RPA-0905-01 for operating of water monitor. Including excavation, up to 600-750mm depth from FGL, P.C.C., 350mm / 230mm thick foundation brick walls, plinth filling, top concrete grade slab, masonry steps, outside double coat finished plaster, cement paint etc. with all materials, tools, tackles, labours required to complete the job as per drawing and including disposing of surplus excavated soil as directed within a lead of 1.0 km. as per instruction of E.I.C.	Nos.	24		-
30	Preparation of all required drawings / documents to obtaining all statutory approvals from OISD / PESO / local authority (whichever is applicable.) on drawings & required documents as per instruction of E.I.C.	LSTK	1		
31	Removing from existing hydrant header and re-installation of the same to another location as per drawing, with good engineering practice by welding, cutting, grinding with good finishing and as per instruction of engineer in-charge. Including all tools, tackles , machineries & labours required to complete the job.				
i)	Double headed hydrant	Nos.	3		
ii)	Water monitor	Nos.	3		
Sub Total					-
				VAT * % on	% of Sub total
				Service Tax * % on	% of Sub total
Total Amount (inclusive of taxes - including Freight & Insurance - FOR Site)					-
Total Amount in words :					



Bill of Material for Fire protection system work at DAFFPL - New Delhi

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(1)	(2)	(3)	(4)	(5)	(6)=(4) x (5)
Notes:	* If VAT / Service tax is not applicable, then mention as "Nil".				
1	Construction power, water, loading and boarding, Site Storage with watch and ward, receipt, unloading, shifting material to store and internal shifting to site shall be included in Vendor's scope.				
2	The unit rates as quoted to arrive at above total price shall be firm and inclusive of all taxes, duties, levies, transportation etc. No separate payment shall be made for site mobilization / demobilization, insurance etc.				
3	The Schedule of Rates should be read with all the other sections of the tender.				
4	The tenderer shall be deemed to have studied the drawings, specifications and the details of work to be done within the time schedule and to have acquainted with the conditions prevailing at site. Site visit is mandatory.				
5	The quantities shown against the various items are only indicative of the quantum of work and it may vary to any extent. Billing will be done as per actual.				
6	The rate quoted shall be inclusive of all work as mentioned in the scope of work (Technical Specifications).				
7	All the items of work in the schedule of rates shall be carried out as per specifications, drawings and instructions of the Engineer-in-Charge.				
8	The rates quoted by tenderers shall be inclusive of all costs for removal and re-installation, should any defects occur or modifications are required during testing, calibration and loop tests and no extra claims for such works shall be entertained.				
9	Either item no. 26 or 26(Opt.) will be operated & shall be considered in final tender valuation.				
10	DAFFPL will not provide Form "C"				

Signature of Bidder along with company seal