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Name of Work	Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.	
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## **NOTICE INVITING TENDER**

The Advisor (Coordination), MMRCL, Mumbai on behalf of MD, MMRCL invites online percentage rate bids from eligible contractors having registration in appropriate class of CPWD, M.E.S., BSNL, Railway, MCGM, State P.W.D. and other Govt. Departments dealing with building works for the following work:-

NIT No.	:	MMRC/Planning/TTI Byculla/NIT/18/02,
Name of Work	:	Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.
Estimated Cost	:	₹2,83,77,340/- (Civil 1,70,86,266/- & Electrical and allied 1,12,91,074/-)
Earnest money	:	₹2,83,773/-
Period of completion	:	12 Months.

Bid Form shall be available online from 14/05/2018.

Last date of submission of bid up to 12.00 Noon on 12/06/2018.

Pre- Bid Meeting will be held on 22/05/2018 at 03:00 PM in MMRC Office, BKC, Bandra (East), Mumbai  
Corrigendum/Addendum if any will be issued only on following websites.

The bid forms and other details can be obtained from the website [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC)

Press notice is also available on [www.mmrc.com](http://www.mmrc.com)

प्रबंध निदेशक, मुंबई मेट्रो रेल कॉर्पोरेशन लिमिटेड की ओर से, सलाहकार (समन्वय), निम्नलिखित कार्य के लिए के.लो.नि.वि. (सी.पी.डब्ल्यू.डी), एमईएस, बीएसएनएल, रेलवे, एमसीजीएम, राज्य पीडब्ल्यूडी और अन्य सरकारी विभागों के उचित वर्ग में अनुमोदित तथा पात्र ठेकेदारों से ई-निविदा आमंत्रित की जाती है।

एनआईटी क्र.	:	MMRC/Planning/TTI Byculla/NIT/18/02
कार्य का नाम	:	ट्रैफिक ट्रेनिंग इन्स्टिट्यूट (मुंबई पुलिस एचआर केंद्र) भायखला मुंबई का उन्नयन, सुधार और नवीनीकरण का कार्य सिविल, विद्युत, एचवीएसी, अग्निशामक एवं अन्य संबद्ध सेवाओं सहित।
अनुमानित लागत	:	2,83,77,340/- (Civil 1,70,86,266/- & Electrical and allied 1,12,91,074/-)
बयाना राशी	:	2,83,773/-
कार्य पूरे होने की अवधि	:	12 महीने

बोली प्रपत्र १४/०५/२०१८ से ऑनलाइन उपलब्ध होंगे।

निविदा जमा करने का अंतिम तिथि व समय १२/०६/२०१८ अपराहन १२ बजे तक।

पूर्व बोली बैठक २२/०५/२०१८ को अपराहन ०३ बजे मुंबई मेट्रो रेल कॉर्पोरेशन लिमिटेड के बान्द्रा कुर्ला कॉम्प्लेक्स, बान्द्रा (पू), स्थित कार्यालय में होगी।

शुद्धिपत्र तथा परिशिष्ट (यदि कोई) सिर्फ निम्नलिखित वेबसाइट पर प्रकाशित किया जायेगा।

बोली प्रपत्र और अन्य विवरण वेबसाइट [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC) से प्राप्त किए जा सकते हैं।

प्रेस विज्ञप्ति [www.mmrc.com](http://www.mmrc.com) पर भी उपलब्ध है।

व्यवस्थापकीय संचालिका मुंबई मेट्रो रेल कॉर्पोरेशन लि. यांच्या वतीने, सल्लागार (समन्वय), खालील कामासाठी सीपीडब्ल्यूडी, एम.ई.एस., बीएसएनएल, रेल्वे, एम.सी.जी.एम, सार्वजनिक बांधकाम विभाग आणि इतर इमारतीशी संबंधित शासकीय विभागांमार्फत योग्य वर्गामध्ये नोंदणी केलेल्या पात्र कंत्राटदारांकडून ऑनलाईन टक्केवारी दर निविदा आमंत्रित करत आहेत:-

एनआईटी क्र.	:	MMRC/Planning/TTI Byculla/NIT/18/02
कामाचे नाव	:	ट्रैफिक ट्रेनिंग इन्स्टिट्यूट (मुंबई पुलिस एचआर केंद्र) भायखला मुंबई स्थित इमारतीचे उन्नतीकरण, सुधार व नूतनीकरणाचे काम स्थापत्य, इंटेरीयर, अग्निशामक, विद्युत, एचवीएसी आणि इतर संबंधित सेवा सोबत
अंदाजी किंमत	:	2,83,77,340/- (स्थापत्य 1,70,86,266/- & विद्युत व इतर संबंधित सेवा 1,12,91,074/-)
बयाणा रक्कम	:	2,83,773/-
कार्य पूर्ण करण्याची अवधि	:	१२ मास

निविदा १४/०५/२०१८ पासून ऑनलाईन उपलब्ध होईल.

निविदा सादर करण्याची अंतिम दिनांक १२/०६/२०१८ दुपारी १२ वाजे पर्यंत

पूर्व-निविदा बैठक दिनांक २२/०५/२०१८ रोजी ०३:०० वाजता एमएमआरसी ऑफिस, बीकेसी, बान्द्रा (पूर्व), मुंबई येथे आयोजित केली जाईल.

शुद्धीपत्रक / परिशिष्ट (जर असल्यास) फक्त खालील वेबसाइटवर प्रकाशित होणार.

निविदा फॉर्म आणि इतर तपशील वेबसाइट [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC) वरून प्राप्त होईल

प्रेस नोटिस [www.mmrc.com](http://www.mmrc.com) या वेबसाइट वर उपलब्ध आहे

# PART A

**INFORMATION AND INSTRUCTIONS TO BIDDERS FOR e-TENDERING FORMING**  
**PART OF BID DOCUMENT**

1. The Advisor (Coordination) on behalf of the Managing Director, MMRCL invites online the bids from contractors of repute in three-bid system for the following work:

S. No.	NIT No.	Name of Work and Location	Estimated Cost put to bid	Earnest Money	Period of Completion	Last date & time of submission of bid, EMD, e-tendering processing fee and other documents	Time and date of opening of technical bid
1	2	3	4	5	6	7	8
	MMRC/Planning/TTI/Byculla/NIT/18/02	Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai	₹2,83,77,340 (Civil 1,70,86,266/- & Electrical and allied services 1,12,91,074/-)	₹2,83,773/-	12 Months	12/06/2018 12.00 Noon	12/06/2018 03.00 PM

**NOTE: The tender document can be seen on website [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC) or [www.mmrc.com](http://www.mmrc.com) free of cost. However, a non-refundable tender fee of ₹5,900/- (₹5,000/- Fee plus ₹900/- (GST @ 18%)) shall be payable.**

2. Contractors who fulfil the following requirements shall be eligible to apply. Joint ventures are not accepted.

- a. Should have satisfactorily completed the works as mentioned below during the **last Seven years** ending previous day of last date of submission of bids.

- i. Three similar works each costing not less than **₹ 1,13,50,936/-**

Or

- two similar works each costing not less than **₹ 1,70,26,404/-**

Or

- one similar work costing not less than **₹ 2,27,01,872/-**

Similar work shall mean works of Civil, Interior, and Supply, Installation, Testing and Commissioning of Electrical, Firefighting and HVAC works for non-residential buildings (Institutional & Commercial) along with allied services.

- b. Should have had average annual financial turnover of **₹ 3 Crores** on construction works during the last three years ending 31st March 2018. (Scanned copy of Certificate from CA to be uploaded)

- c. Should not have incurred any loss in more than two years during the last five years ending 31st March 2018 (Scanned copy of Profit and Loss Statement of last 5 Financial Years to be uploaded)
- d. Should have a solvency of **₹ 1,13,50,936/-** (Scanned copy of original solvency to be uploaded as per Form B)
- e. The bidder should own constructions equipment as per list required for the proper and timely execution of the work. Else, he should certify that he would be able to manage the equipment by hiring etc., and submit the list of firms from whom he proposes to hire.
- f. The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

$$\text{Bidding Capacity} = \{[A \times N \times 2] - B\}$$

Where,

A = Maximum turnover in construction works executed in any one year during the last five years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids has been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

- g. The bidder should have sufficient number of Technical and Administrative employees for the proper execution of the contract. The bidder should submit a list of these employees stating clearly how these would be involved in this work.
  - h. The bidder's performance for each work completed in the last Seven years and in hand should be certified by an officer not below the rank of Executive Engineer or equivalent and should be obtained in sealed cover.
3. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
  4. Information and Instructions for bidders posted on website shall form of bid document.
  5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC) or [www.mmrc.com](http://www.mmrc.com).
  6. Work shall be executed according to General Conditions of Contract for Central P.W.D.
  7. But the bid can only be submitted after depositing Processing Fee and EMD online at tender wizard through Payment Gateway.
  8. Those contractors not registered on the website mentioned above, are required to get registered beforehand. If needed they can be imparted training on online bidding process as per details available on the website. Bidders can contact the tender wizard help desk at 7666563870, 7980042472, 8013426317.
  9. The intending bidder must have valid class-III digital signature to submit the bid.
  10. Contractor can upload documents in the form of JPG format and PDF format.

11. Bidder must ensure to quote rate of each item. The column meant for quoting rate in figures appears in pink colour and the moment rate is entered, it turns sky blue.
12. In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO).
13. The Technical bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.
14. Pre- Bid conference shall be held in the MMRC NaMTTRI Building 2<sup>nd</sup> Floor at 3.00 PM on 16/05/2018 to clear the doubt of intending bidders, if any.
15. MMRCL reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.
16. Evaluation Criteria: The details submitted by the bidders will be evaluated in the following manner:
  - a. The initial criteria prescribed above in 2 (a) to 2 (g) in respect of experience of similar class of works completed, bidding capacity and financial turn over etc. will first be scrutinized and the bidder's eligibility for the work be determined.
  - b. The bidders qualifying the initial criteria as set out in 2(a) to 2(g) above will be evaluated for following criteria by scoring method on the basis of details furnished by them as follows:
    - i. Financial strength (Form 'A' & 'B')
    - ii. Experience in similar nature of work during last seven years
    - iii. Performance on works (Form 'E') – Time over run
    - iv. Performance on works (Form 'E') – Quality
    - v. Personnel and Establishment (Form "F" & "G")
    - vi. Plant & Equipment (Form "H")

Total 100 marks

To become eligible for short listing the bidder must secure at least fifty percent marks in each and sixty percent marks in aggregate.

The department, however, reserves the right to restrict the list of such qualified contractors to any number deemed suitable by it.

- c. Even though any bidder may satisfy the above requirements, he would be liable to disqualification if he has:
    - i. made misleading or false representation or deliberately suppressed the information in the forms, statements and enclosures required in the eligibility criteria document,
    - ii. record of poor performance such as abandoning work, not properly completing the contract, or financial failures / weaknesses etc.
17. Award criteria
 

The employer reserves the right, without being liable for any damages or obligation to inform the bidder, to:

  - a. amend the scope and value of contract to the bidder.
  - b. Reject any or all the applications without assigning any reason.

Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

18. List of Documents to be scanned and uploaded within the period of bid submission:
- a. Online Deposit Receipt for EMD and tender fee.
  - b. Registration certificate of relevant class.
  - c. Certificates of Work Experience (For completed works completion certificate issued by competent authority).
  - d. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/Certificate from CA mentioning Financial Turnover of last 3 years or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.
  - e. Bank Solvency Certificate.
  - f. Affidavit as per provisions of clause 1.2.1 of CPWD-6.
  - g. Certificate of Registration for Goods & Services Tax.
  - h. Labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including provident Fund Code No.
  - i. Following Forms:
    - i. **FORM A:** FINANCIAL INFORMATION
    - ii. **FORM B:** FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK
    - iii. **FORM C:** DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST FIVE YEARS ENDING LAST DAY OF APRIL 2018
    - iv. **FORM D:** PROJECTS UNDER EXECUTION OR AWARDED
    - v. **FORM E:** PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "C" & "D"
    - vi. **FORM F:** STRUCTURE & ORGANISATION
    - vii. **FORM G:** DETAILS OF TECHNICAL & ADMINISTRATIVE PERSONNEL TO BE EMPLOYED FOR THE WORK
    - viii. **FORM H:** DETAILS OF CONSTRUCTION PLANT AND EQUIPMENT LIKELY TO BE USED IN CARRYING OUT THE WORK



## CPWD-6 - NOTICE INVITING TENDER

1		<p>Percentage rate tenders are invited on behalf MD, MMRC from approved and eligible contractors having registration in appropriate class of CPWD, M.E.S., BSNL, Railway, MCGM, State P.W.D. and other Govt. Departments dealing with building works, for the work of <b><u>Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.</u></b> The enlistment of the contractors should be valid on the last date of submission of tenders.</p> <p>In case the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of tenders.</p>
1.1		The work is estimated to cost ₹ 2,83,77,340/-. This estimate, however, is given merely as a rough guide. The estimated cost for electrical, HVAC, firefighting and other services is excluding GST.
1.2		Intending tenderer is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below: -
1.2.1		<p>Three similar works each of value not less than <b><u>₹ 1,13,50,936/-</u></b> OR Two similar work each of value not less than <b><u>₹ 1,70,26,404/-</u></b> OR One similar work of value not less than <b><u>₹ 2,27,01,872/-</u></b></p> <p>in last 7 years ending last day of the month previous to the one in which the tenders are invited.</p>
		<p><b>To become eligible, the tenderer shall have to furnish an affidavit as under: -</b> I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for tendering in MMRC in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee. (Scanned copy to be uploaded at the time of submission of bid).</p>
2		Agreement shall be drawn with the successful tenderer on prescribed Form No. CPWD 7 which is available as a Govt. of India Publication. Tenderer shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3		The time allowed for carrying out the work will be <b><u>12 Months.</u></b> from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the tender documents.
4		<p>i. The site for the work is available.</p> <p>ii. The architectural &amp; MEP drawings shall be made available in phased manner, as per requirement of the same as per approved program of completion submitted by the contractor after award of work</p>

5		The tender document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen on website <a href="http://www.tenderwizard.com/MMRC">www.tenderwizard.com/MMRC</a> or <a href="http://www.mmrc.com">www.mmrc.com</a> free of cost. However, a non-refundable tender fee of ₹5,900/- (₹5,000/- Fee plus ₹900/- (GST @ 18%)) shall be payable.
6		After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
7		While submitting the revised bid, contractor can revise the percentage any number of times (he need not reenter rate of all the items) but before last time and date of submission of bid as notified.
8		<del>When bids are invited in three stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.</del>
9		Earnest Money shall be paid online on the e-tender portal and the receipt generated through payment gateway shall be scanned and uploaded to the e-tendering website within the period of tender submission. Copy of Enlistment Order and certificate of work experience and other documents as specified in the tender document shall be scanned and uploaded to the e-Tendering website within the period of bid submission. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose EMD receipt and other documents scanned and uploaded are found in order. The technical bid shall be opened at <b>03:00 PM on 12/06/2018</b>
10		The bid submitted shall become invalid if: (i) The bidder is found ineligible. (ii) The bidder does not upload all the documents (including GST registration) as stipulated in the bid document including the copy of receipt for deposition of original EMD. (iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of tender opening authority. (iv) If a tenderer does not quote any percentage above/below on total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
11		The contractor whose bid is accepted will be required to furnish performance guarantee of 5% (Five Percent) of the bid amount within the period specified in Schedule F. This guarantee shall be in the form Demand Draft of any Scheduled Bank/ Fixed Deposit Receipts of any Scheduled Bank. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The Earnest Money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The Contractor whose bid is accepted will also be required to furnish either copy of applicable licenses / registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW

		Welfare Board including provident Fund Code No. if applicable and also ensure the compliance of aforesaid provisions by the sub-contractors, if any engaged by the contractor for the said work and Programme Chart (Time and Progress) within the period specified in Schedule F.
12		<p>Description of Work: The work includes Upgradation, renovation and interior designing works, finishing and furnishing for effective and judicious use of space of Traffic Training Institute, Byculla. The institute is a G+4 framed RCC structure having a built-up area of approximately 3000 sqm. Improvement and Upgradation of Auditorium, lectures halls, exhibition halls, training rooms, Principal's Chamber, Vice Principal's Chamber, etc.</p> <p>Intending Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools &amp; plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.</p>
13		Advisor (Coordination) on behalf MD, MMRC does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without the assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.
14		Canvassing whether directly or indirectly, in connection with tenderers is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
15		The Advisor (Coordination) on behalf of MD, MMRC reserves to himself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
16		The contractor shall not be permitted to tender for works in the MMRCL responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazette officer in the MMRCL or in the Ministry of Housing and Urban Affairs. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

17		No Engineer of gazette rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the tender or engagement in the contractor's service.
18		The bid for the works shall remain open for acceptance for a period of Ninety (90) days from the date of opening of bids. If any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidders shall not be allowed to participate in the rebidding process of the work.
19		This notice inviting Tender shall form a part of the contract document. The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of: - a) The Notice Inviting Tender, all the documents including additional conditions, specifications and drawings, if any, forming part of the tender as uploaded at the time of invitation of tender and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto. b) Standard C.P.W.D. Form 7
20		For Composite Tenders
	20.1.1	The Executive Engineer in charge of the major component will call tenders for the composite work. The cost of tender document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite tender.
	20.1.2	The tender document will include following three components: <b>Part A:</b> - CPWD-6, CPWD-7 including schedule A to F for the major component of the work, Standard General Conditions of Contract for CPWD 2014 or latest edition as applicable with all amendments/modifications. <b>Part B:</b> - General / specific conditions, specifications and schedule of quantities applicable to major component of the work. <b>Part C:</b> - Schedule A to F for minor component of the work. (SE/EE in charge of major component shall also be competent authority under clause 2 and clause 5 as mentioned in schedule A to F for major components) General/specific conditions, specifications and schedule of quantities applicable to minor component(s) of the work.
	20.1.3	The tenderer must associate with himself, agencies of the appropriate class eligible to tender for each of the minor component individually.
	20.1.4	The eligible tenderers shall quote rates for all items of major component as well as for all items of minor components of work.

	20.1.5	After acceptance of the tender by competent authority, the Advisor (Coordination) shall issue letter of award on behalf of the MD, MMRC. After the work is awarded, the main contractor will have to enter into one agreement with Advisor (Coordination) and has also to sign two or more copies of agreement depending upon number of Engineers in charge of minor components. One such signed set of agreement shall be handed over to Engineer in charge of minor component. Advisor (Coordination) will operate part A and part B of the agreement. Engineer in charge of minor component(s) shall operate Part C along with Part A of the agreement.
	20.1.6	Entire work under the scope of composite tender including major and all minor components shall be executed under one agreement.
	20.1.7	Security Deposit will be worked out on the total estimated cost of all components of work. The Earnest Money will become part of the security deposit of work if asked by contractor in writing.
	20.1.8	The main contractor has to associate agency(s) for minor component(s) conforming to eligibility criteria as defined in the tender document and has to submit detail of such agency(s) to Engineer-in-charge of minor component(s) within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-charge of minor component(s).
	20.1.9	In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge of minor component. The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
	20.1.10	The main contractor has to enter into agreement with contractor(s) associated by him for execution of minor component(s). Copy of such agreement shall be submitted to Engineer in charge of each minor component as well as to Engineer in charge of major component. In case of change of associate contractor, the main contractor has to enter into agreement with the new contractor associated by him.
	20.1.11	Running payment for the major component shall be made by Engineer-in-Charge of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer-in-charge of the discipline of minor component directly to the main contractor.
	20.1.12 A	The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-charge of major component after record of completion certificate of all other components.
	20.1.12 B	Final bill of whole work shall be finalized and paid by the Engineer-in-Charge of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the Engineer-in-Charge of major component for including in the final bill for composite contract.
21		In case any discrepancy is noticed between the documents as uploaded at the time of submission of the bid, then the bid submitted shall become invalid and the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the tenderer shall not be allowed to participate in the retendering process of the work.

**MUMBAI METRO RAIL CORPORATION LIMITED**  
(A JV-SPV of GoI & GoM)

**Percentage Rate Tender & Contract for Works**

- (A) Tender for the work of **Upgradation, Improvement and Renovation including Civil, Interior Firefighting, Electrical, HVAC works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai**
- (i) To be uploaded by **12:00 PM** on **12/06/2018** at [www.tenderwizard.com/MMRC](http://www.tenderwizard.com/MMRC)
- (ii) To be opened in presence of tenderers who may be present at **03:00 PM** on **12/06/2018** in the office of **Advisor (Coordination), MMRC NaMTTRI Building, 'E' Block Bandra Kurla Complex, Bandra (E) Mumbai - 400051.**

**TENDER**

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the MD, MMRC within the time specified in Schedule 'F' viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.

We agree to keep the tender open for Ninety (90) days from the date of opening of technical bid and not to make any modification in its terms and conditions.

Receipt of Earnest Money for a sum of ₹ 2,83,773/- is uploaded on tender wizard.

If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the MD, MMRC or the successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/ We agree that MD, MMRC or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those more than that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

Further, I/We agree that in case of forfeiture of Earnest Money or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in MMRCL in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived therefrom to any person other than a person to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated

Signature of Contractor

Witness

Postal Address

Address:

Occupation:

## ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the MD, MMRC for a sum of Rs. .... (Rupees .....

The letters referred to below shall form part of this contract agreement: -

- (a)
- (b)
- (c)

For & on behalf of the MD, MMRC.

Signatures.....

Designation.....

Dated:



# INTEGRITY PACT

To,

.....,

.....,

.....

Sub: NIT No. .... for the work .....

Dear Sir,

It is here by declared that MMRCL is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the MMRCL.

Yours faithfully

Advisor (Coordination)

**INTEGRITY PACT**

To,

Advisor (Coordination),

.....

.....

Sub: Submission of Tender for the work of .....

Dear Sir,

I/We acknowledge that MMRCL is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that **THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE** of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by MMRCL. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, MMRCL shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/ bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent / authorized to sign the relevant contract on behalf of MMRCL.

## INTEGRITY AGREEMENT

This Integrity Agreement is made at ..... on this ..... day of ..... 20.....

BETWEEN

MD, MMRC represented through Advisor (Coordination)

MMRCL, (Hereinafter referred as the 'Principal/Owner', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

\_\_\_\_\_  
(Name and Address of the Individual/firm/Company)

through \_\_\_\_\_ (Details of duly authorized signatory) \_\_\_\_\_ (Hereinafter referred to as the "Bidder/Contractor" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

### Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. **MMRC/Planning/TTI Byculla/NIT/18/02**) (hereinafter referred to as "Tender/Bid") and intends to award, under laid down organizational procedure, contract for Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai hereinafter referred to as the "Contract".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relationship with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "Integrity Pact" or "Pact"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

#### Article 1: Commitment of the Principal/Owner

- (1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
  - a. No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - b. The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
  - c. The Principal/Owner shall endeavor to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- (2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC

Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

- (1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- (2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
  - a. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
  - b. The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
  - c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/ Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
  - d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/ representatives in India, if any. Similarly, Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
  - e. The Bidder(s)/Contractor(s) will, when presenting his bid, disclose all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- (3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- (4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.

- (5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation or property to influence their participation in the tendering process).

#### Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

- (1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes.  
The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.
- (2) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.
- (3) Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

#### Article 4: Previous Transgression

- (1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.
- (3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

#### Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any

violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/sub-vendors.

- (2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- (3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/ Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor / Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, MMRCL.

Article 7- Other Provisions

- (1) This Pact is subject to Indian Law, place of performance and jurisdiction is the Headquarters of the Division of the Principal/Owner, who has floated the Tender.
- (2) Changes and supplements need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- (4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- (5) It is agreed term and condition that any dispute or difference arising between the parties about the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

Article 8- LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....  
(For and on behalf of Principal/Owner)

.....  
(For and on behalf of Bidder/Contractor)

WITNESSES:

1. ....  
(signature, name and address)

2. ....  
(signature, name and address)

Place:

Dated:

## PROFORMA OF SCHEDULES

### SCHEDULE 'A'

Schedule of quantities (as per PWD-3) (See Pg. No. 134-154)

### SCHEDULE 'B'

Schedule of materials to be issued to the contractor.

S. No.	Description of Item	Quantity	Rate	Place of issue
1	2	3	4	5
-----NIL-----				

### SCHEDULE 'C'

Tools and plants to be hired to the contractor

S. No.	Description	Hire Charges per day	Place of issue
1	2	3	4
-----NIL-----			

### SCHEDULE 'D'

Extra schedule for specific requirements/document for the work, if any.

### SCHEDULE 'E'

Reference to General Conditions of contract: GCC 2014, CPWD form-7 as modified and corrected upto 31.03.2018

Name of work: Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.

Estimated cost of work : Civil ₹ 1,70,86,266/-

- (i) Earnest money : ₹ 2,83,773/- (to be returned after receiving performance guarantee)
- (ii) Performance Guarantee : 5% of tendered value (of all works).
- (iii) Security Deposit : 2.5% of tendered value (of all works).

### SCHEDULE 'F'

**GENERAL RULES & DIRECTIONS:** Officer inviting tender Advisor (Coordination)

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3.

Definitions:

2(5)	Engineer-in-Charge	<u>Deputy General Manager (Civil)</u>
2(8)	Accepting Authority	<u>Advisor (Coordination)</u>
2(10)	Percentage on cost of materials and labour to cover all overheads and profits.	<u>15%</u>

2(11) Standard Schedule of Rates CPWD DSR 2016,  
 2(12) Department Planning Department, MMRCL  
 9(2) Standard CPWD contract Form  
 GCC 2014, CPWD Form 7  
 as modified & corrected upto 31 March 2018

**Clause 1**

- (i) Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance 15 days
- (ii) Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (I) above 15 days

**Clause 2**

Authority for fixing compensation under clause 2 Advisor (Coordination)

**Clause 2A**

Whether Clause 2A shall be applicable No

**Clause 5**

Number of days from the date of issue of letter of acceptance for reckoning date of start: 7 days  
 Mile stone(s) as per table given on: Pg. No. 133  
 Time allowed for execution of work 365 days

**Authority to decide:**

- (i) Extension of time Advisor (Coordination)  
 (ii) Rescheduling of mile stones Advisor (Coordination)  
 (iii) Shifting of date of start in case of delay in handing over of site Advisor (Coordination)

**Schedule of Handing over of site:**

Part	Portion of site	Description	Time Period for handing over reckoned from date of issue of letter of intent.
Part A	Portion without any hindrance	Nil	There is no hindrance.
Part B	Portions with encumbrances	Nil	There are no encumbrances as such however, furniture etc. stores have been intimated to user department and also to shift the existing offices.
Part C	Portions dependent on work of other agencies	Nil	Nil



### Schedule of issue of designs

Part	Portion of Design	Description	Time Period for issue of design reckoned from date of receipt of tenders
Part A	Portion already included in NIT	Layout Drawings for Architectural, Interior and MEP Services	-
Part B 1	Portions of Architectural Designs to be issued	-	-
Part B 2	Portions of civil designs to be issued	-	-
Part B 3	Portions of E&M Designs to be issued	-	-

#### Clause 5.2

Nature of Hindrance Register: Physical

#### Clause 5.4

Schedule of rate of recovery for delay in submission of the modified programme in terms of delay days

S. No.	Contract Value	Recovery Rs.
I	Less than or equal to Rs. 1 Crore	500
II	More than Rs. 1 Crore but less than or equal to Rs. 5 Crore	1000
III	More than Rs. 5 Crore but less than or equal to Rs. 20 Crores	2500
IV	More than Rs. 20 Crores	5000

#### Clause 6A

Clause applicable –

- i. For this work Clause 6A (Computerized Measurement Book) is applicable. Clause 6 is not applicable to this work.

#### Clause 7

Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment

Not Applicable

#### CLAUSE 7A

Whether Clause 7A shall be applicable

Yes

#### CLAUSE 8B

- (i) This shall not apply for maintenance or upgradation contracts not involving any services.
- (ii) For other works, the limit shall be as below.

S. No.	Contract Value	Recovery Rs.
I	Less than or equal to Rs. 1 Crore	2000
II	More than Rs. 1 Crore but less than or equal to Rs. 5 Crore	5000
III	More than Rs. 5 Crore but less than or equal to Rs. 20 Crores	25000
IV	More than Rs. 20 Crores	50000

**Clause 10A**

List of minimum testing equipment to be provided by the contractor at site lab.

1. Weigh Balance (10 kg and 2 kg)   2. Sieve Set (2 Nos.)   3. Measuring Tapes (5m and 30m)  
4. Measuring Flask   5. Screw Gauge   6. Vernier Calipers

**Clause 10B(ii) & (iii)**

Whether Clause 10 B (ii) shall be applicable	Yes
Whether Clause 10 B (iii) shall be applicable	No

**Clause 10C**

Component of labour expressed as percent of value of work	N. A.
---	-------

**Clause 10CA**

S. No.	Materials Covered under this clause:	Nearest Materials (other than cement*, reinforcement bars, the structural steel and POL) for which All India Wholesale Price Index to be followed:	Base Price and its corresponding period of all the Materials covered under clause 10 CA*
1			
2			
3			

\* includes Cement component used in RMC brought at site from outside approved RMC plants, if any.

\*\* Base price and its corresponding period of all the materials covered under clause 10 CA is to be mentioned at the time of approval of NIT. In case of recall of tenders, the base price may be modified by adopting latest base price and its corresponding period.

**ABOVE CLAUSE IS NOT APPLICABLE TO THIS TENDER****Clause 10CC**

Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column

NOT APPLICABLE

**Schedule of component of other Materials, Labour etc. for price escalation.**

Component of civil (except materials covered under clause 10CA) /Electrical construction

value of work. - X<sub>m</sub>\_\_\_\_\_ %

Component of Labour -

expressed as percent of total value of work. Y \_\_\_\_\_ %

Note: X<sub>m</sub>... % should be equal to (100) - (materials covered under clause 10CA i.e. Cement, Steel, POL and other material specified in clause 10CA + Component of Labour)

**ABOVE CLAUSE IS NOT APPLICABLE TO THIS TENDER**

**Clause 11**

Specifications to be followed for execution of work

- For Civil items of work : CPWD Specifications 2009 Vol. 1 and Vol. 2 with correction slips up to 31-03-2018 (Hereinafter called CPWD specifications also) along with additional specification mentioned elsewhere in the tender.
- For electrical works : }  
 For HVAC works : }  
 For firefighting works : }  
 Maha PWD Specification and other specifications mentioned elsewhere in the tender

**Clause 12**

Type of work : Project and Original Work

12.2 & 12.3 Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for building work N.A.

- 12.5 (i) Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for foundation work (except items mentioned in earth work subhead in DSR and related items) N.A.
- (ii) Deviation Limit for items mentioned in earth work subhead of DSR and related items N.A.

**Clause 16**

Competent Authority for deciding reduced rates

Advisor (Coordination)

**Clause 18**

List of mandatory machinery, tools & plants to be deployed by the contractor at site: -

Vacuum Blower	Putty Knife	Tile Cutter	Measuring Box	Polishers
Digging bar	Ladder	Flat Pry Bar	Block Plane / Jack Plane	Hand Saw
Circular Saw	Cordless Drill	Torpedo Level	Line Level	Framing Hammer
Framing Square	Crow Bar	Chisel	Wooden Float/wooden rendering float	Bump Cutter/Screed
Safety Glass	Gloves	Sand screening machine	Rubber Boots	Wheel Barrow
Plumb Bob	Masonry trowel	Head Pan	Hoe	Measurement Tape

**Clause 25**

Above Clause not applicable to this tender. However, in case of any dispute decision of Executive Director (Planning), MMRCL shall be final and binding.

**Clause 36 (i)****Requirement of Technical Representative(s) and recovery Rate**

S. No.	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical /Technical representative)	Minimum Experience (In Years)	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Fig.	Words
1	(i)Graduate Engineer  (ii)Graduate Engineer Or Diploma Engineer	Civil	Principal Technical representative. Project Planning/Site/ Billing Engineer	5	1	₹ 15000 pm (each)	Rupees Fifteen Thousand Only
				2			
				5			
2	Architect/Interior Designer	Interior Designer	Technical representative	5	1	₹ 15000 pm	Rupees Fifteen Thousand Only

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

**Clause 42****NOT APPLICABLE**

- (i)
- a. Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates \_\_\_\_\_ printed by C.P.W.D.
- (ii) Variations permissible on theoretical quantities:
- a. Cement
- For works with estimated cost put to tender not more than Rs. 5 lakhs. NA
- For works with estimated cost put to tender more than Rs.5 lakh. NA
- b. Bitumen All Works NA
- c. Steel Reinforcement and structural steel sections for each diameter, section and category NA
- d. All other materials. NA

**Details of Electrical Contractor**

**(To be submitted before award of work)**

- 1. Name of Electrical Contractor : M/s .....
- 2. Address : .....
- 3. Class of Registration : .....
- 4. Details of Registration of the Electrical Contractor

S. No.	Department	Registered Yes/No	Registration No.	Tendering Limits	Validity of Registration	Debarred from tendering Yes/No
1	2	3	4	5	6	7
1	CPWD or so					
2						
3						

Note: All columns of above Proforma must be filled in.

Contractor's signature

**CONSENT LETTER**

I hereby give my consent to work as electrical contractor till the completion of work. Also, I will be responsible for necessary action to hand over the installation and for rectification of defects and repair during the obligatory maintenance period. I will execute the work as per CPWD Specifications and Additional Conditions of the Contract.

I will also engage suitable Engineer for the work as per condition of the contract. I further certify that the above particulars pertaining to me are correct.

Dated:

Signature of Electrical Contractor

## General Rules & Directions

Name of Work		Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.
	1	The tenderer is advised to read and examine the tender documents for the work and the set of drawings available with Engineer-in-charge. He should inspect and examine the site and its surroundings by himself before submitting his tender.
	2	Separate schedule of quantity is included in this tender for civil and electrical items of work. If the tenderer wants to offer any unconditional rebates on their rates, the same should also be offered in the respective components of civil and electrical schedule separately. The contractor shall quote the percentage rates in figures and words accurately so that there is no discrepancy in rates written in figures and words.
	3	Time allowed for the execution of work is 12 months.
	4	The contractor(s) shall submit a detailed program of execution in accordance with the master programme/milestone within ten days from the date of issue of award letter.
	5	Quality of the project is of utmost importance. This shall be adhered to in accordance with the provisions of CPWD specifications and guidelines given in the relevant paras.
	6	The contractor (s) shall make his own arrangements for electricity and water required for the execution of work.
	7	Cement shall be arranged by the contractor himself.
	8	Steel Reinforcement shall be arranged by the contractor himself.
	9	<p>Contractor has to use specialized agencies for specialized items of works such as water proofing, aluminum works, structural glazing, ACP, External Painting and other specialized items as mentioned in the tender documents. Only those specialized agencies/firms who have satisfactorily executed works as per following criteria during last seven years are eligible for the specialized works-</p> <p style="padding-left: 40px;">(a) Three similar works each costing not less than 40% of estimated cost for concerned sub head.</p> <p style="padding-left: 40px;">Or</p> <p style="padding-left: 40px;">(b) Two similar works each costing not less than 60% of estimated cost for concerned sub head.</p> <p style="padding-left: 40px;">Or</p> <p style="padding-left: 40px;">(c) One similar work costing not less than 80% of estimated cost for concerned sub head.</p> <p>Approval of the specialized agencies for each specialized work shall be obtained from the Engineer-in-Charge within one month of award of work. Even if, such specialized items of work shall be executed by the specialized agencies, the work shall be deemed to be executed by the tenderer for all purposes and the responsibility of the quality of items of works executed etc. shall continue to be that of the tenderer only.</p>
	10	Contractor has to deploy required Plant and machinery on the project. Minimum number of plant and machinery to be deployed by him is indicated in Schedule

		F. In case the contractor fails to deploy the plant and machinery whenever required and as per the direction of the Engineer-in-charge, he (Engineer-in-charge) shall be at a liberty to get the same deployed at the risk and cost of the contractor.
	11	The contractor shall submit the running bills in the shape of the computerized MB in pages of A-4 size as per the standard format of department and shall act as per modified clause 6 A of CPWD-7
	12	Contractor has to provide reinforcement cover blocks made of approved proprietary pre- packed free flowing mortars (Conbextra as manufactured by M/s Fosroc Chemical India Ltd. or approved equivalent) of high early strength.
	13	The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules and orders issued there under from time to time.
	14	In the event of the tender being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power-of attorney authorizing him to do so, such power of attorney to be produced with the tender, and it must disclose that the firm is duly registered under the Indian Partnership Act, 1932.
	15	Receipts for payment made because work, when executed by a firm, must also be signed by all the partners, except where contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners, or by some other person having due authority to give effectual receipts for the firm.
	16	<p>In case of Percentage Rate Tenders, contractor shall fill up the usual printed form, stating at what percentage below/above (in figures as well as in words) the total estimated cost given in Schedule of Quantities at Schedule-A, he will be willing to execute the work. The tender submitted shall be treated as invalid if: -</p> <ol style="list-style-type: none"> <li>1. The contractor does not quote percentage above/below on the total amount of tender or any section/sub head of the tender.</li> <li>2. The percentage above/below is not quoted in figures &amp; words both on the total amount of tender or any section/sub head of the tender.</li> <li>3. The percentage quoted above/below is different in figures &amp; words on the total amount of tender or any section/sub head of the tender.</li> </ol> <p>Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort including conditional rebates, will be summarily rejected. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit separate tender for each. Tender shall have the name and number of the works to which they refer, written on the envelopes.</p>
	17	In case the lowest tendered amount (estimated cost $\pm$ amount worked on the basis of percentage above/below) of two or more contractors is same, such lowest contractors will be asked to submit sealed revised offer in the form of letter mentioning percentage above/ below on estimated cost of tender including all sub sections/sub heads as the case may be, but the revised percentage quoted above/below on tendered cost or on each sub section/ sub head should not be

		<p>higher than the percentage quoted at the time of submission of tender. The lowest tender shall be decided based on revised offers.</p> <p>In case any of such contractor refuses to submit revised offer, then it shall be treated as withdrawal of his tender before acceptance and 50% of earnest money shall be forfeited.</p> <p>If the revised tendered amount of two more contractors received in revised offer is again found to be equal, the lowest tender, among such contractors, shall be decided by draw of lots in the presence of DGM (Civil), Engineer-in-charge of major &amp; minor component(s) &amp; the lowest contractors those have quoted equal amount of their tenders.</p> <p>In case all the lowest contractors those have quoted same tendered amount, refuse to submit revised offers, then tenders are to be recalled after forfeiting 50% of EMD of each contractor.</p> <p>Contractor(s), whose earnest money is forfeited because of non-submission of revised offer, shall not be allowed to participate in the re-tendering process of the work.</p>
	18	The officer inviting tenders shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest or any other tender.
	19	The tenderers shall sign a declaration under the officials Secret Act 1923, for maintaining secrecy of the tender documents drawings or other records connected with the work given to them.
	20	Use of correcting fluid, anywhere in tender document is not permitted. Such tender is liable for rejection.
	21	In case of Percentage Rate Tenders only percentage quoted shall be considered. Any tender containing item rates is liable to be rejected. Percentage quoted by the contractor in percentage rate tender shall be accurately filled in figures and words, so that there is no discrepancy.
	22	In Percentage Rate Tender, the tenderer shall quote percentage below/above (in figures as well as in words) at which he will be willing to execute the work. He shall also work out the total amount of his offer and the same should be written in figures as well as in words in such a way that no interpolation is possible. In case of figures, the word 'Rs.' should be written before the figure of rupees and word 'P' after the decimal figures, e.g. 'Rs. 2.15P and in case of words, the word 'Rupees' should precede and the word 'Paisa' should be written at the end.
	23	<p>i. The Contractor whose tender is accepted, will be required to furnish performance guarantee of 5% (Five Percent) of the tendered amount within the period specified in Schedule F. This guarantee shall be in the form of Demand Draft of any scheduled bank/ Fixed Deposit Receipts of any Scheduled Bank/Bank Guarantee of any Scheduled Bank.</p> <p>ii. The contractor whose tender is accepted will also be required to furnish by way of Security Deposit for the fulfillment of his contract, an amount equal to 2.5% of the tendered value of the work. The Security deposit will be collected by deductions from the running bills as well as final bill of the contractor at the rates mentioned above.</p>



	24	On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Engineer-in-Charge shall be communicated in writing to the Engineer-in-Charge.
	25	GST or any other tax applicable in respect of inputs procured by the contractor for this contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same. However, component of GST at time of supply of services (as provided in CGST Act 2017) provided by the contract shall be varied if different from that applicable on the last date of receipt of tender including extension if any.
	26	The contractor shall give a list of both Gazetted and non-Gazetted MMRC employees related to him.
	27	The tender for the work shall not be witnessed by a contractor or contractors who himself/ themselves has/have tendered or who may and has/have tendered for the same work. Failure to observe this condition would render, tenders of the contractors tendering, as well as witnessing the tender, liable to summary rejection.
	28	The tender for composite work includes, in addition to building work, all other works such as sanitary and water supply installations drainage installation, electrical work, horticulture work, roads and paths etc. The tenderer apart from being a registered contractor (B&R) of appropriate class, must associate himself with agencies of appropriate class which are eligible to tender for sanitary and water supply drainage, electrical and horticulture works in the composite tender.
	29	The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules and orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Deputy General Manager (Civil)/Assistant General Manager (Civil) may in his discretion, without prejudice to any other right or remedy available in law, cancel the contract. The contractor shall also be liable for any pecuniary liability arising because any violation by him of the provisions of the said Act.

## CONDITIONS OF CONTRACT

Definitions	1.	The Contract means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of the MD, MMRC and the Contractor, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in- Charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.
	2.	<p>In the contract, the following expressions shall, unless the context otherwise requires, have the meanings, hereby respectively assigned to them: -</p> <ol style="list-style-type: none"> <li>1. The expression works or work shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional</li> <li>2. The Site shall mean the land/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.</li> <li>3. The contractor shall mean the individual, firm or company whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.</li> <li>4. The MD, MMRC means the Managing Director, Mumbai Metro Rail Corporation Limited and its successors.</li> <li>5. The Engineer-in-charge means the Engineer Officer who shall supervise and be in charge of the work and who shall sign the contract on behalf of the MD, MMRC as mentioned in Schedule 'F' hereunder.</li> <li>6. Government or Government of India shall mean the State Government or Central Government.</li> <li>7. The term Director includes Managing Director, MMRCL and Executive Director (Planning) of MMRCL.</li> <li>8. Accepting Authority shall mean the authority mentioned in Schedule 'F'.</li> <li>9. Excepted Risk are risks due to riots (other than those on account of contractor's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any acts of Government, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by Government of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to Government's faulty design of works.</li> </ol>

		<p>10. Market Rate shall be the rate as decided by the Engineer-in-Charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Schedule 'F' to cover, all overheads and profits.</p> <p>Provided that no extra overheads and profits shall be payable on the part(s) of work assigned to other agency(s) by the contractor as per terms of contract.</p> <p>11. Schedule(s) referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard Schedule of Rates of the government mentioned in Schedule 'F' hereunder, with the amendments thereto issued upto the date of receipt of the tender.</p> <p>12. Department means Planning Department of MMRCL which invites tenders on behalf of MD, MMRC as specified in schedule 'F'.</p> <p>13. District Specifications means the specifications followed by the State Government in the area where the work is to be executed.</p> <p>14. Tendered value means the value of the entire work as stipulated in the letter of award.</p> <p>15. Date of commencement of work: The date of commencement of work shall be the date of start as specified in schedule 'F' or the first date of handing over of the site, whichever is later, in accordance with the phasing if any, as indicated in the tender document.</p> <p>16. GST shall mean Goods and Service Tax – Central, State and Inter State.</p> <p>17. MMRC or MMRCL shall mean Mumbai Metro Rail Corporation Limited, A 50:50 Joint Venture, Special Purpose Vehicle of Government of India and Government of Maharashtra.</p>
Scope and Performance	3	Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.
	4	Headings and Marginal notes to these General Conditions of Contract shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.
	5	The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications, Schedule of Rates and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of this contract.
Works to be carried out	6	The work to be carried out under the Contract shall, except as otherwise provided in these conditions, include all Labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of Quantities (Schedule- A) shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labors necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.
Sufficiency of Tender	7	The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices

		quoted in the Schedule of Quantities, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.
Discrepancies and Adjustment of Errors	8	The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General Conditions.
	8.1	In the case of discrepancy between the schedule of Quantities, the Specifications and/ or the Drawings, the following order of preference shall be observed: - (i) Description of Schedule of Quantities. (ii) Specification and Special Condition, if any. (iii) Drawings. (iv) CPWD Specifications. (v) Indian Standard Specifications of B.I.S. (vi) Additional Specifications given by MMRC.
	8.2	If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority about the intention of the document and his decision shall be final and binding on the contractor.
	8.3	Any error in description, quantity or rate in Schedule of Quantities or any omission therefrom shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.
Signing of Contract	9	The successful tenderer/Contractor on acceptance of his tender by the Accepting Authority, shall, within 15 days from the stipulated date of start of the work, sign the contract consisting of: - (i) the notice inviting tender, all the documents including drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto. (ii) Standard C.P.W.D. Form as mentioned in Schedule 'F' consisting of: a. Various standard clauses with corrections up to the date stipulated in Schedule 'F' along with annexures thereto. b. Safety Code provided in the tender. c. Model Rules for the protection of health, sanitary arrangements for workers employed by MMRCL or its contractors. d. CPWD Contractor's Labour Regulations provided in the tender. e. List of Acts and omissions for which fines can be imposed. (iii) No payment for the work done will be made unless contract is signed by the contractor.

## CLAUSES OF CONTRACT

<p>CLAUSE 1 Performance Guarantee</p>	<p>(i)</p>	<p>The contractor shall submit an irrevocable Performance Guarantee of 5% (Five percent) of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-Charge up to a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge. This guarantee shall be in the form of Cash (in case guarantee amount is less than Rs. 10,000/-) or Deposit at Call receipt of any scheduled bank/Banker's Cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay Order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the form annexed hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.</p>
	<p>(ii)</p>	<p>The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work by the competent authority, 50% of the performance guarantee shall be returned to the contractor, without any interest. However, 50% of the Performance Guarantee shall be released along with the Security Deposit.</p>
	<p>(iii)</p>	<p>The Engineer-in-Charge shall not make a claim under the performance guarantee except for amounts to which the MD, MMRC is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:</p> <p style="padding-left: 40px;">(a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.</p>

		(b) Failure by the contractor to pay MD, MMRC any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge.
	(iv)	In the event of the contract being determined or rescinded under provision of any of the Clause / Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the MD, MMRC.
	(v)	<p>On substantial completion of any work which has been completed to such an extent that the intended purpose of the work is met and ready to use, then a provisional Completion certificate shall be recorded by the Engineer-in-Charge. The provisional certificate shall have appended with a list of outstanding balance item of work that need to be completed in accordance with the provisions of the contract.</p> <p>This provisional completion certificate shall be recorded by the concerned Engineer-in-Charge with the approval of Project Manager/ Chief Project Manager/ Deputy General Manager (Civil). After recording of the provisional completion certificate for the work by the competent authority, the 80% of performance guarantee shall be returned to the contractor, without any interest.</p> <p>However, in case of contracts involving Maintenance of buildings and services/any other work after construction of same building and services/ other work, then 40% of performance guarantee shall be returned to the contractor, without any interest after recording the provisional completion certificate.</p>
CLAUSE 1A Recovery of Security Deposit		<p>The person/persons whose tender(s) may be accepted (hereinafter called the contractor) shall permit Government at the time of making any payment to him for work done under the contract to deduct a sum at the rate of 2.5% of the gross amount of each running and final bill till the sum deducted will amount to security deposit of 2.5% of the tendered value of the work. Such deductions will be made and held by Government by way of Security Deposit unless he/they has/have deposited the amount of Security at the rate mentioned above in cash or in the form of Government Securities or fixed deposit receipts. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the security deposit and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.</p> <p>All compensations or the other sums of money payable by the contractor under the terms of this contract may be deducted</p>

	<p>from, or paid by the sale of a sufficient part of his security deposit or from the interest arising therefrom, or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale as aforesaid, the contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the State Bank of India or by Scheduled Banks or Government Securities (if deposited for more than 12 months) endorsed in favor of the Engineer-in-Charge, any sum or sums which may have been deducted from, or raised by sale of his security deposit or any part thereof. The security deposit shall be collected from the running bills and the final bill of the contractor at the rates mentioned above.</p> <p>The security deposit as deducted above can be released against bank guarantee issued by a scheduled bank, on its accumulations to a minimum of Rs. 5 lac subjects to the condition that amount of such bank guarantee, except last one, shall not be less than Rs. 5 lac. Provided further that the validity of bank guarantee including the one given against the earnest money shall be in conformity with provisions contained in clause 17 which shall be extended from time to time depending upon extension of contract granted under provisions of clause 2 and clause 5.</p> <p>In case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.</p> <p>Note-1: Government papers tendered as security will be taken at 5% (five per cent) below its market price or at its face value, whichever is less. The market price of Government paper would be ascertained by the Divisional Officer at the time of collection of interest and the amount of interest to the extent of deficiency in value of the Government paper will be withheld if necessary.</p> <p>Note-2: Government Securities will include all forms of Securities mentioned in Rule No. 274 of the G.F. Rules except fidelity bond. This will be subject to the observance of the condition mentioned under the rule against each form of security.</p> <p>Note-3: Note 1 &amp; 2 above shall be applicable for both clause 1 and 1A</p>
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<p>CLAUSE 2 Compensation for Delay</p>	<p>If the contractor fails to maintain the required progress in terms of clause 5 or to complete the work and clear the site on or before the contract or justified extended date of completion as per clause 5 (excluding any extension under Clause 5.5) as well as any extension granted under clauses 12 and 15, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the authority specified in schedule 'F' may decide on the amount of tendered value of the work for every completed day/month (as determined) that the progress remains below that specified in Clause 5 or that the work remains incomplete.</p> <table border="1"> <tr> <td>Compensation for delay of work</td> <td>@ 1 % per month of for delay of delay to be computed work on per day basis</td> </tr> </table> <p>Provided always that the total amount of compensation for delay to be paid under this Condition shall not exceed 10% of the Tendered Value of work or of the Tendered Value of the Sectional part of work as mentioned in Schedule 'F' for which a separate period of completion is originally given.</p> <p>In case no compensation has been decided by the authority in Schedule 'F' during the progress of work, this shall be no waiver of right to levy compensation by the said authority if the work remains incomplete on final justified extended date of completion. If the Engineer in Charge decides to give further extension of time allowing performance of work beyond the justified extended date, the contractor shall be liable to pay compensation for such extended period. If any variation in amount of contract takes place during such extended period beyond justified extended date and the contractor becomes entitled to additional time under clause 12, the net period for such variation shall be accounted for while deciding the period for levy of compensation. However, during such further extended period beyond the justified extended period, if any delay occurs by events under sub clause 5.2, the contractor shall be liable to pay compensation for such delay.</p> <p>If compensation during the progress of work before the justified extended date of completion for delay under this clause shall be for non-achievement of sectional completion or part handing over of work on stipulated/justified extended date for such part work or if delay affects any other works/services. This is without prejudice to right of action by the Engineer in Charge under clause 3 for delay in performance and claim of compensation under that clause. In case action under clause 2 has not been finalized and the work has been determined under</p>	Compensation for delay of work	@ 1 % per month of for delay of delay to be computed work on per day basis
Compensation for delay of work	@ 1 % per month of for delay of delay to be computed work on per day basis		



		<p>clause 3, the right of action under this clause shall remain post determination of contract but levy of compensation shall be for days the progress is behind the schedule on date of determination, as assessed by the authority in Schedule F, after due consideration of justified extension. The compensation for delay, if not decided before the determination of contract, shall be decided after of determination of contract.</p> <p>The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Government. In case, the contractor does not achieve a particular milestone mentioned in schedule F, or the re-scheduled milestone(s) in terms of Clause 5.4, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied as above. With-holding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever, shall be payable on such withheld amount.</p>
<p>CLAUSE 2A Incentive for early completion</p>		<p>DELETED FOR THIS TENDER</p>
<p>CLAUSE 3 When Contract can be Determined</p>		<p>Subject to other provisions contained in this clause, the Engineer-in-Charge may, without prejudice to his any other rights or remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and/or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:</p> <ul style="list-style-type: none"> <li>(i) If the contractor having been given by the Engineer-in-Charge a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or workman like manner shall omit to comply with the requirement of such notice for a period of seven days thereafter.</li> <li>(ii) If the contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence and</li> </ul>

		<p>continues to do so after a notice in writing of seven days from the Engineer-in-Charge.</p> <p>(iii) If the contractor fails to complete the work or section of work with individual date of completion on or before the stipulated or justified extended date, on or before such date of completion; and the Engineer in Charge without any prejudice to any other right or remedy under any other provision in the contract has given further reasonable time in a notice given in writing in that behalf as either mutually agreed or in absence of such mutual agreement by his own assessment making such time essence of contract and in the opinion of Engineer-in-Charge the contractor will be unable to complete the same or does not complete the same within the period specified.</p> <p>(iv) If the contractor persistently neglects to carry out his obligations under the contract and/ or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-Charge.</p> <p>(v) If the contractor shall offer or give or agree to give to any person in Government service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Government.</p> <p>(vi) If the contractor shall enter into a contract with Government about which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-in-Charge.</p> <p>(vii) If the contractor had secured the contract with Government as a result of wrong tendering or other non-bonafide methods of competitive tendering or commits breach of Integrity Agreement.</p> <p>(viii) If the contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for</p>
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		<p>the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors.</p> <p>(ix) If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order. If the contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.</p> <p>(x) If the contractor assigns (excluding part(s) of work assigned to other agency(s) by the contractor as per terms of contract), transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer -in-Charge.</p> <p>When the contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in-Charge on behalf of the MD, MMRC shall have powers:</p> <p>(a) To determine the contract as aforesaid so far as performance of work by the Contractor is concerned (of which termination notice in writing to the contractor under the hand of the Engineer-in-Charge shall be conclusive evidence). Upon such determination, the Security Deposit already recovered and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Government</p> <p>(b) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined as above, shall not be allowed to participate</p>
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		<p>in the tendering process for the balance work. In the event of above courses being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.</p>
CLAUSE 3A		<p>In case, the work cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work or one month whichever is higher, either party may close the contract by giving notice to the other party stating the reasons. In such eventuality, the Performance Guarantee of the contractor shall be refunded within following time limits:</p> <ul style="list-style-type: none"> <li>(I) If the Tendered value of work is up to Rs. 45 lacs: 15 days.</li> <li>(II) If the Tendered value of work is more than Rs. 45 lacs and up to Rs. 2.5 Crore: 21 days.</li> <li>(III) If the Tendered value of work exceeds Rs. 2.5 Crore: 30 days.</li> </ul> <p>Neither party shall claim any compensation for such eventuality. This clause is not applicable for any breach of the contract by either party.</p>
CLAUSE 4 Contractor liable to pay Compensation even if action not taken under Clause 3		<p>In any case in which any of the powers conferred upon the Engineer-in-Charge by Clause-3 thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the Engineer-in-Charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of (or at the sole discretion of the Engineer-in-Charge which shall be final and binding on the contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools, plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the</p>

		contractor and intended to be used for the execution of the work/or any part thereof, paying or allowing for the same in account at the contract rates, or, in the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge, whose certificate thereof shall be final, and binding on the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the Engineer-in-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.
CLAUSE 5 Time and Extension for Delay		The time allowed for execution of the Works as specified in the Schedule 'F' or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the work shall commence from such time as mentioned in schedule 'F' or from the date of handing over of the site, notified by the Engineer-in-Charge, whichever is later. However, the handing over of site by the Engineer in Charge, in full or in part (if so provided in contract), shall be completed within two months from issue of acceptance letter. If the Contractor commits default in commencing the execution of the work as aforesaid, the performance guarantee shall be forfeited by the Engineer in Charge and shall be absolutely at the disposal of the Government without prejudice to any other right or remedy available in law.
	5.1	As soon as possible but within twenty-one days of award of work and in consideration of <ul style="list-style-type: none"> <li>(a) Schedule of handing over of site as specified in the Schedule 'F'</li> <li>(b) Schedule of issue of designs as specified in the Schedule 'F'</li> <li>(i) the Contractor shall submit a Time and Progress Chart for each mile stone. The Engineering-Charge may within 30 days thereafter, if required modify, and communicate the program approved to the contractor failing which the program submitted by the contractor shall be deemed to be approved by the Engineer-in- Charge. The work programme shall include all details of balance drawings and decisions required to complete the contract with specific dates by which these details are required by contractor without causing any delay in execution</li> </ul>

		<p>of the work. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given in Schedule 'F'.</p> <p>(ii) In case of non-submission of construction programme by the contractor the program approved by the Engineer-in-Charge shall be deemed to be final.</p> <p>(iii) The approval by the Engineer-in-Charge of such programme shall not relieve the contractor of any of the obligations under the contract.</p> <p>(iv) The contractor shall submit the Time and Progress Chart and progress report using the mutually agreed software or in other format decided by Engineer-in-Charge for the work done during previous month to the Engineer-in charge on or before 5th day of each month failing which a recovery Rs. 2500/- (for works costing upto Rs. 20 Crores) / Rs. 5000/- (for works costing more than Rs. 20 Crores) shall be made on per week or part basis in case of delay in submission of the monthly progress report.</p>
	5.2	<p>If the work(s) be delayed by: -</p> <ol style="list-style-type: none"> <li>a. force majeure, or</li> <li>b. abnormally bad weather, or</li> <li>c. serious loss or damage by fire, or</li> <li>d. civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or</li> <li>e. delay on the part of other contractors or tradesmen engaged by Engineer-in- Charge in executing work not forming part of the Contract, or</li> <li>f. non-availability of stores, which are the responsibility of Government to supply or</li> <li>g. non-availability or break down of tools and Plant to be supplied or supplied by Government or</li> </ol>

		<p>h. any other cause like above which, in the reasoned opinion of the Engineer-in-Charge is beyond the Contractor's control.</p> <p>then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-in-Charge for entry in the hindrance register (physical or web-based as prescribed in schedule F) but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.</p> <p>The contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s for events listed in sub clause 5.2.</p>
	5.3	<p>In case the work is hindered by any reasons, in the opinion of the contractor, by the Department or for someone for whose action the Department is responsible, the contractor may immediately give notice thereof in writing to the Engineer-in-Charge in the same manner as prescribed under sub Clause 5.2 seeking extension of time or rescheduling of milestone/s. The authority as indicated in Schedule 'F' shall, if justified, give a fair and reasonable extension of time and reschedule the mile stones for completion of work after due consideration of the same within 30 days of receipt of such request. In event of non-application by the contractor for extension of time E-in-C after affording opportunity to the contractor may give, supported with a programme, a fair and reasonable extension within a reasonable period of occurrence of the event. Such extension of time or rescheduling of milestone/s shall be without prejudice to any other right or remedy of the parties in contract or in law; provided further that for concurrent delays under this sub clause and sub clause 5.2 to the extent the delay is covered under sub clause 5.2 the contractor shall be entitled to only extension of time and no damages.</p>
	5.4	<p>Request for rescheduling of Mile stones or extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed forms i.e. Form of application by the contractor for seeking rescheduling of milestones (Appendix-XVI) or Form of application by the contractor for seeking extension of time (Appendix -XVII) respectively to the authority as indicated in Schedule 'F'. The Contractor shall indicate in such a request the period by which rescheduling of milestone/s or extension of time is desired.</p> <p>With every request for rescheduling of milestones, or if at any time the actual progress of work falls behind the approved programme by more than 10% of the stipulated period of</p>

		completion of contract, the contractor shall produce a revised programme which shall include all details of pending drawings and decisions required to complete the contract and also the target dates by which these details should be available without causing any delay in execution of the work. A recovery as specified in Schedule 'F' shall be made on per day basis in case of delay in submission of the revised programme.
	5.4.1	In any such case the authority as indicated in Schedule 'F' may give a fair and reasonable extension of time for completion of work or reschedule the mile stones. Such extension or rescheduling of the milestones shall be communicated to the Contractor by the authority as indicated in Schedule 'F' in writing, within 30 days of the date of receipt of such request from the Contractor in prescribed form. In event of non-application by the contractor for extension of time E-in-C after affording opportunity to the contractor, may give, supported with a programme (as specified under 5.4 above), a fair and reasonable extension within a reasonable period of occurrence of the event.
	5.5	In case the work is delayed by any reasons, in the opinion of the Engineer-in-Charge, by the contractor for reasons beyond the events mentioned in clause 5.2 or clause 5.3 or clause 5.4 and beyond the justified extended date; without prejudice to right to take action under Clause 3, the Engineer-in-Charge may grant extension of time required for completion of work without rescheduling of milestones. The contractor shall be liable for levy of compensation for delay for such extension of time.
CLAUSE 6 Measurements of Work Done		<p>Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement, the value in accordance with the contract of work done.</p> <p>All measurement of all items having financial value shall be entered in Measurement Book and/or level field book so that a complete record is obtained of all works performed under the contract.</p> <p>All measurements and levels shall be taken jointly by the Engineer-in-Charge or his authorized representative and by the contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer- in-Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.</p> <p>If for any reason the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and the Department shall not entertain any</p>



	<p>claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.</p> <p>The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.</p> <p>Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available, then a mutually agreed method shall be followed.</p> <p>The contractor shall give, not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work, before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer-in-Charge's consent being obtained in writing, the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.</p> <p>Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.</p> <p>It is also a term of this contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or</p>
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	<p>material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.</p>
<p>CLAUSE 6A Computerized Measurement Book</p>	<p>Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract. All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages of A-4 size as per the format of the department so that a complete record is obtained of all the items of works performed under the contract.</p> <p>All such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative. After the necessary corrections made by the Engineer-in-Charge, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in-Charge for the dated signatures by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance.</p> <p>Whenever bill is due for payment, the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked/test checked from the Engineer-in-Charge and/or his authorized representative. The contractor will, thereafter, incorporate such changes as may be done during these checks/test checks in his draft computerized measurements, and submit to the department a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-Charge and/or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks/test checks.</p> <p>The final, fair, computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct, and no cutting or over-writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound, after getting the earlier MB cancelled by the department. Thereafter, the MB shall be taken in the Divisional Office records, and allotted a number as per the Register of Computerized MBs. This should be done before the corresponding bill is submitted to the Division Office for payment. The contractor shall submit two spare copies of such computerized MB's for the purpose of reference and record by the various officers of the department. The contractor shall also submit to the department separately his</p>

	<p>computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the “bill. Thereafter, this bill will be processed by the Division Office and allotted a number as per the computerized record in the same way as done for the measurement book meant for measurements.</p> <p>The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for checking of measurements/levels by the Engineer-in- Charge or his representative.</p> <p>Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.</p> <p>The contractor shall give not less than seven days’ notice to the Engineer-in-Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and/or test checking the measurement of any work in order that the same may be checked and/or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and/or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking</p> <p>measurements without such notice having been given or the Engineer-in-Charge’s consent being obtained in writing the same shall be uncovered at the Contractor’s expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.</p> <p>Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.</p> <p>It is also a term of this contract that checking and/or test checking the measurements of any item of work in the measurement book and/or its payment in the interim, on account</p>
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		<p>of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.</p>
<p>CLAUSE 7 Payment on Intermediate Certificate to be Regarded as Advances</p>		<p>No payment shall be made for work, estimated to cost Rs. One Lac or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs. One Lac, the interim or running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the Department in triplicate on or before the date of every month fixed for the same by the Engineer-in-Charge. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Schedule 'F', in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved. Engineer-in-Charge shall arrange to have the bill verified by taking or causing to be taken, where necessary, the requisite measurements of the work. In the event of the failure of the contractor to submit the bills, Engineer-in-Charge shall prepare or cause to be prepared such bills in which event no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in-Charge certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the Engineer-in-Charge. The amount admissible shall be paid by 10th working day after the day of presentation of the bill by the Contractor to the Engineer-in-Charge or his Asstt. Engineer together with the account of the material issued by the department, or dismantled materials, if any. In the case of works outside the headquarters of the Engineer-in-Charge, the period of ten working days will be extended to fifteen working days. In case of delay in payment of intermediate bills after 45 days of submission of bill by the contractor provided the bill submitted by the contractor found to be in order, a simple interest @ 10% per annum shall be paid to the contractor from the date of expiry of prescribed time limit which will be compounded on yearly basis.</p> <p>All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-Charge</p>

		<p>relating to the work done or materials delivered forming part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-Charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.</p> <p>Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the department to act under the terms of this contract for delay in the completion of work, if the extension of date of completion is not granted by the competent authority.</p> <p>The Engineer-in-Charge in his sole discretion based on a certificate from the Asstt. Engineer to the effect that the work has been completed up to the level in question make interim advance payments without detailed measurements for work done (other than foundations, items to be covered under finishing items) up to lintel level (including sunshade etc.) and slab level, for each floor working out at 75% of the assessed value. The advance payments so allowed shall be adjusted in the subsequent interim bill to be submitted by the contractor within 10 days of the interim payment. In case of delay in submission of bill by the contractor a simple interest @ 10% per annum shall be paid to the Government from the date of expiry of prescribed time limit which will be compounded on yearly basis.</p>
	Payments in composite Contracts	<p>In case of composite tenders, running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor component shall be made by the Engineer-in-Charge of the discipline of minor component directly to the main contractor.</p>
		<p>In case main contractor fails to make the payment to the contractor associated by him within 15 days of receipt of each running account payment, then on the written complaint of contractor associated for such minor component, Engineer in charge of minor component shall serve the show cause to the main contractor and if reply of main contractor either not received or found unsatisfactory, he may make the payment directly to the contractor associated for minor component as per the terms and conditions of the agreement drawn between main contractor and associate contractor fixed by him. Such payment made to the associate contractor shall be recovered by</p>

		Engineer-in-charge of major or minor component from the next R/A/ final bill due to main contractor.
CLAUSE 7A		No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-In-Charge.
CLAUSE 8 Completion Certificate and Completion Plans		Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice, the Engineer-in-Charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof, and not until the work shall have been measured by the Engineer-in-Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus material and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc., and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.
CLAUSE 8A Contractor to Keep Site Clean		When the annual repairs and maintenance of works are carried out, the splashes and droppings from white washing, color washing, painting etc., on walls, floor, windows, etc. shall be removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done: without waiting for the actual completion of all the other items of work in the contract. In case the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge

		shall have the right to get this work done at the cost of the contractor either departmentally or through any other agency. Before taking such action, the Engineer-in-Charge shall give ten days' notice in writing to the contractor.
CLAUSE 8B Completion Plans to be Submitted by the Contractor		<p>The contractor shall submit completion plan as required vide General Specifications for Electrical works (Part-I internal) 2005 and (Part-II External) 1994 as applicable within thirty days of the completion of the work.</p> <p>In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum of 0.1% of tendered value or limit prescribed in Schedule F whichever is more as may be fixed by the Deputy General Manager (Civil) concerned and in this respect the decision of the Deputy General Manager (Civil) shall be final and binding on the contractor.</p> <p>The contractor shall submit completion plans for Internal and External Civil, Electrical and Mechanical Services within thirty days of the completion of the work, provided that the service plans having been issued for execution by the Engineer-in-Charge, unless the contractor, by any other provision in the contract, is required to prepare such plans.</p>
CLAUSE 9 Payment of Final Bill		<p>The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the Engineer-in-Charge whichever is earlier. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-Charge, will, as far as possible be made within the period specified hereinunder, the period being reckoned from the date of receipt of the bill by the Engineer-in-Charge or his authorized Asstt. Engineer, complete with account of materials issued by the Department and dismantled materials.</p> <ul style="list-style-type: none"> <li>(i) If the Tendered value of work is up to Rs. 45 lacs: 2 months</li> <li>(ii) If the Tendered value of work is more than Rs.45 lac and up to Rs. 2.5 Crore: 3 months</li> <li>(iii) If the Tendered value of work exceeds Rs. 2.5 Crore: 6 months</li> </ul> <p>In case of delay in payment of final bills after prescribed time limit, a simple interest @ 10% per annum shall be paid to the contractor from the date of expiry of prescribed time limit which will be compounded on yearly basis, provided the final bill submitted by the contractor found to be in order.</p>

<p>CLAUSE 9A Payment of Contractor's Bills to Banks</p>		<p>Payments due to the Contractor may, if so desired by him, be made to his bank, registered financial, co-operative or thrift societies or recognized financial institutions instead of direct to him provided that the contractor furnishes to the Engineer-in-Charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank; registered financial, co-operative or thrift societies or recognized financial institutions to receive payments and (2) his own acceptance of the correctness of the amount made out as being due to him by Government or his signature on the bill or other claim preferred against Government before settlement by the Engineer-in-Charge of the account or claim by payment to the bank, registered financial, co-operative or thrift societies or recognized financial institutions. While the receipt given by such banks; registered financial, co-operative or thrift societies or recognized financial institutions shall constitute a full and sufficient discharge for the payment, the contractor shall whenever possible present his bills duly receipted and discharged through his bank, registered financial, co-operative or thrift societies or recognized financial institutions.</p> <p>Nothing herein contained shall operate to create in favor of the bank; registered financial, co-operative or thrift societies or recognized financial institutions any rights or equities vis-a-vis the MD, MMRC.</p>
<p>CLAUSE 10 Materials supplied by Government</p>		<p>Materials which Government will supply are shown in Schedule 'B' which also stipulates quantum, place of issue and rate(s) to be charged in respect thereof. The contractor shall be bound to procure them from the Engineer-in-Charge.</p> <p>As soon as the work is awarded, the contractor shall finalize the programme for the completion of work as per clause 5 of this contract and shall give his estimates of materials required based on drawings/or schedule of quantities of the work. The Contractor shall give in writing his requirement to the Engineer-in-Charge which shall be issued to him keeping in view the progress of work as assessed by the Engineer-in-Charge, in accordance with the agreed phased programme of work indicating monthly requirements of various materials. The contractor shall place his indent in writing for issue of such materials at least 7 days in advance of his requirement.</p> <p>Such materials shall be supplied for the purpose of the contract only and the value of the materials so supplied at the rates specified in the aforesaid schedule shall be set off or deducted, as and when materials are consumed in items of work (including normal wastage) for which payment is being made to the contractor, from any sum then due or which may therefore become due to the contractor under the contract or otherwise or from the security deposit. At the time</p>



	<p>of submission of bills, the contractor shall certify that balance of materials supplied is available at site in original good condition.</p> <p>The contractor shall submit along with every running bill (on account or interim bill) material wise reconciliation statements supported by complete calculations reconciling total issue, total consumption and certified balance (diameter/section-wise in the case of steel) and resulting variations and reasons therefore. Engineer-in-Charge shall (whose decision shall be final and binding on the contractor) be within his rights to follow the procedure of recovery in clause 42 at any stage of the work if reconciliation is not found to be satisfactory.</p> <p>The contractor shall bear the cost of getting the material issued, loading, transporting to site, unloading, storing under cover as required, cutting assembling and joining the several parts together as necessary. Notwithstanding anything to the contrary contained in any other clause of the contract and (or the CPWA Code) all stores/materials so supplied to the contractor or procured with the assistance of the Government shall remain the absolute property of Government and the contractor shall be the trustee of the stores/materials, and the said stores/materials shall not be removed/disposed off from the site of the work on any account and shall be at all times open to inspection by the Engineer-in-Charge or his authorized agent. Any such stores/materials remaining unused shall be returned to the Engineer-in-Charge in as good a condition in which they were originally supplied at a place directed by him, at a place of issue or any other place specified by him as he shall require, but in case it is decided not to take back the stores/materials the contractor shall have no claim for compensation on any account of such stores/materials so supplied to him as aforesaid and not used by him or for any wastage in or damage to in such stores/materials. On being required to return the stores/materials, the contractor shall hand over the stores/ materials on being paid or credited such price as the Engineer-in-Charge shall determine, having due regard to the condition of the stores/materials. The price allowed for credit to the contractor, however, shall be at the prevailing market rate not exceeding the amount charged to him, excluding the storage charge, if any. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to account for contravention of the terms of the licences or permit and/or for criminal breach of trust, be liable to Government for all advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach. Provided that the contractor shall</p>
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	<p>in no case be entitled to any compensation or damages on account of any delay in supply or non-supply thereof all or any such materials and stores provided further that the contractor shall be bound to execute the entire work if the materials are supplied by the Government within the original scheduled time for completion of the work plus 50% thereof or schedule time plus 6 months whichever is more if the time of completion of work exceeds 12 months, but if a part of the materials only has been supplied within the aforesaid period, then the contractor shall be bound to do so much of the work as may be possible with the materials and stores supplied in the aforesaid period. For the completion of the rest of the work, the contractor shall be entitled to such extension of time as may be determined by the Engineer-in-Charge whose decision in this regard shall be final and binding on the contractor.</p> <p>The contractor shall see that only the required quantities of materials are got issued. Any such material remaining unused and in perfectly good/original condition at the time of completion or determination of the contract shall be returned to the Engineer-in-Charge at the stores from which it was issued or at a place directed by him by a notice in writing. The contractor shall not be entitled for loading, transporting, unloading and stacking of such unused material except for the extra lead, if any involved, beyond the original place of issue.</p>
<p>CLAUSE 10 A Materials to be provided by the Contractor</p>	<p>The contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the Government.</p> <p>The contractor shall, at his own expense and without delay, supply to the Engineer-in- Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The contractor shall, if requested by the Engineer-in- Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received.</p> <p>The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and shall not make use</p>

		<p>of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.</p> <p>The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples or such tests at such time and to such place or places as may be directed by the Engineer-in-Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in-Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.</p> <p>The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.</p> <p>The contractor shall at his own expense, provide a material testing lab at the site for conducting routine field tests. The lab shall be equipped at least with the testing equipment as specified in schedule F.</p>
CLAUSE 10B	Secured Advance on Non-perishable Materials	(i) DELETED FOR THIS TENDER
	Mobilization Advance	(ii) Mobilization advance not exceeding 10% of the tendered value may be given, if requested by the contractor in writing within one month of the order to commence the work. Such advance shall be in two or more installments to be determined by the Engineer-in- Charge at his sole discretion. The

		<p>first installment of such advance shall be released by the Engineer-in-charge to the contractor on a request made by the contractor to the Engineer- in-Charge in this behalf. The second and subsequent installments shall be released by the Engineer- in- Charge only after the contractor furnishes a proof of the satisfactory utilization of the earlier installment to the entire satisfaction of the Engineer-in-Charge.</p> <p>Before any installment of advance is released, the contractor shall execute a Bank Guarantee Bond not more than 6 in number from Scheduled Bank for the amount equal to 110% of the amount of advance and valid for the period till recovery of advance. This (Bank Guarantee from Scheduled Bank for the amount equal to 110% of the balance amount of advance) shall be kept renewed from time to time to cover the balance amount and likely period of complete recovery</p> <p>Provided always that provision of Clause 10 B (ii) shall be applicable only when so provided in 'Schedule F'.</p>
	Plant Machinery & Shuttering Material Advance	(iii) DELETED FOR THIS TENDER.
	Interest & Recovery	(iv) The mobilization advance and plant and machinery advance in (ii) & (iii) above bear simple interest at the rate of 10 per cent per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced shall be made by the deduction from the contractors bills commencing after first ten per cent of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time eighty per cent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount up to the date of recovery of the installment.
		(v) If the circumstances are considered reasonable by the Engineer-in-Charge, the period mentioned in (ii) and (iii) for request by the contractor in writing

		for grant of mobilization advance and plant and equipment advance may be extended in the discretion of the Engineer-in-Charge.
CLAUSE 10 C Payment on Account of Increase in Prices/Wages due to Statutory Order(s)		DELETED FOR THIS TENDER
CLAUSE 10 CA Payment due to variation in prices of materials after receipt of tender		DELETED FOR THIS TENDER
CLAUSE 10 CC Payment due to Increase/Decrease in Prices/Wages (excluding materials covered under clause 10 CA) after Receipt of Tender for Works		DELETED FOR THIS TENDER
CLAUSE 10 D Dismantled Material Govt. Property		The contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work, etc. as Government's property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the Engineer-in-Charge.
CLAUSE 11 Work to be Executed in Accordance with Specifications, Drawings, Orders etc.		<p>The contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work signed by the Engineer-in-Charge and the contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in the standard specifications of Central Public Works Department specified in Schedule 'F' or in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication referred to elsewhere in the contract.</p> <p>The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including</p>

		for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.
CLAUSE 12 Deviations/ Variations Extent and Pricing		DELETED FOR THIS TENDER
CLAUSE 13 Foreclosure of contract due to Abandonment or Reduction in Scope of Work		<p>If at any time after acceptance of the tender or during the progress of work, the purpose or object for which the work is being done changes due to any supervening cause and as a result of which the work has to be abandoned or reduced in scope the Engineer-in-Charge shall give notice in writing to that effect to the contractor stating the decision as well as the cause for such decision and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.</p> <p>The contractor shall be paid at contract rates, full amount for works executed at site and, in addition, a reasonable amount as certified by the Engineer-in-Charge for the items hereunder mentioned which could not be utilized on the work to the full extent in view of the foreclosure;</p> <ul style="list-style-type: none"> <li>(i) Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation and water storage tanks.</li> <li>(ii) Government shall have the option to take over contractor's materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however Government shall be bound to take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over or to be taken over by Government, cost of such materials as detailed by Engineer-in- Charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.</li> </ul>

	<p>(iii) If any materials supplied by Government are rendered surplus, the same except normal wastage shall be returned by the contractor to Government at rates not exceeding those at which these were originally issued, less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor. In addition, cost of transporting such materials from site to Government stores, if so required by Government, shall be paid.</p> <p>(iv) Reasonable compensation for transfer of T &amp; P from site to contractor's permanent stores or to his other works, whichever is less. If T &amp; P are not transported to either of the said places, no cost of transportation shall be payable.</p> <p>(v) Reasonable compensation for repatriation of contractor's site staff and imported labour to the extent necessary.</p> <p>The contractor shall, if required by the Engineer- in-Charge, furnish to him, books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.</p> <p>The reasonable amount of items on (i), (iv) and (v) above shall not be in excess of 2% of the cost of the work remaining incomplete on the date of closure, i.e. total stipulated cost of the work as per accepted tender less the cost of work actually executed under the contract and less the cost of contractor's materials at site taken over by the Government as per item (ii) above. Provided always that against any payments due to the contractor on this account or otherwise, the Engineer-in-Charge shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of any tool, plants and materials and any other sums which at the date of termination were recoverable by the Government from the contractor under the terms of the contract. In the event of action being taken under Clause 13 to reduce the scope of work, the contractor may furnish fresh Performance Guarantee on the same conditions, in the same manner and at the same rate for the balance tendered amount and initially valid up to the extended date of completion or stipulated date of completion if no extension has been granted plus 60 days beyond that. Wherever such a fresh Performance Guarantee is furnished by the contractor the Engineer-in-Charge may return the previous Performance Guarantee.</p>
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<p>CLAUSE 14 Carrying out part work at risk &amp; cost of contractor</p>	<p>If contractor:</p> <ul style="list-style-type: none"> <li>(i) At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-Charge; or</li> <li>(ii) Commits default in complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by the Engineer-in-Charge.</li> </ul> <p>The Engineer- in-Charge without invoking action under clause 3 may, without prejudice to any other right or remedy against the contractor which have either accrued or accrue thereafter to Government, by a notice in writing to take the part work / part incomplete work of any item(s) out of his hands and shall have powers to:</p> <ul style="list-style-type: none"> <li>(i) Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or</li> <li>(ii) Carry out the part work / part incomplete work of any item(s) by any means at the risk and cost of the contractor.</li> </ul> <p>The Engineer-in-Charge shall determine the amount, if any, is recoverable from the contractor for completion of the part work/ part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the contractor, the liability of contractor on account of loss or damage suffered by Government because of action under this clause shall not exceed 10% of the tendered value of the work.</p> <p>In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the department are less than</p>
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		<p>the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.</p> <p>Any excess expenditure incurred or to be incurred by Government in completing the part work/ part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by Government as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to Government in law or per as agreement be recovered from any money due to the contractor on any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.</p> <p>If the contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the contractors' unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceeds of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.</p> <p>In the event of above course being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.</p>
<p>CLAUSE 15 Suspension of Work</p>		<p>(i) The contractor shall, on receipt of the order in writing of the Engineer-in-Charge, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:</p> <ul style="list-style-type: none"> <li>a. on account of any default on the part of the contractor or;</li> <li>b. for proper execution of the works or part thereof for reasons other than the default of the contractor; or</li> <li>c. for safety of the works or part thereof.</li> </ul> <p>The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-in-Charge.</p> <p>(ii) If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:</p>

		<p>a. the contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;</p> <p>b. If the total period of all such suspensions in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in- Charge may consider reasonable in respect of salaries and/or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-Charge within fifteen days of the expiry of the period of 30 days.</p> <p>(iii) If the works or part thereof is suspended on the orders of the Engineer-in-Charge for more than three months at a time, except when suspension is ordered for reason (a) in sub- para (i) above, the contractor may after receipt of such order serve a written notice on the Engineer-in-Charge requiring permission within fifteen days from receipt by the Engineer- in-Charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Government or where it affects whole of the works, as an abandonment of the works by Government, shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the Engineer-in-Charge. In the event of the contractor treating the suspension as an abandonment of the contract by Government, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to</p>
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		<p>such compensation, as the Engineer-in-Charge may consider reasonable, in respect of salaries and/or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-Charge within 30 days of the expiry of the period of 3 months.</p>
<p>CLAUSE 15 A Compensation in case of Delay of Supply of Material by Govt.</p>		<p>The contractor shall not be entitled to claim any compensation from Government for the loss suffered by him on account of delay by Government in the supply of materials in schedule 'B' where such delay is covered by the difficulties relating to the supply of wagons, force majeure or any reasonable cause beyond the control of the Government.</p> <p>This clause 15 A will not be applicable for works where no material is stipulated.</p>
<p>CLAUSE 16 Action in case Work not done as per Specifications</p>		<p>All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that 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.</p> <p>If it shall appear to the Engineer-in-charge or his authorized subordinates in charge of the work or to the Engineer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the Department for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs. 10 Lac and below except road work) of the completion of the work from the Engineer-in-Charge specifying the work,</p>

	<p>materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in- Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.</p> <p>In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in schedule 'F' may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.</p>
<p>CLAUSE 17 Contractor Liable for Damages, defects during defect liability period</p>	<p>If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after a certificate final or otherwise of its completion shall have been given by the Engineer- in-Charge as aforesaid arising out of defect or improper materials or workmanship the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer-in-Charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due or at any time thereafter may become due to the contractor, or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof. The security deposit of the contractor shall not be refunded before the expiry of twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed</p>

		<p>whichever is later. Provided that in the case of road work, if in the opinion of the Engineer-in-Charge, half of the security deposit is sufficient, to meet all liabilities of the contractor under this contract, half of the security deposit will be refundable after six months and the remaining half after twelve months of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later.</p> <p>In case of Maintenance and Operation works of E&amp;M services, the security deposit deducted from contractors shall be refunded within one month from the date of final payment or within one month from the date of completion of the maintenance contract whichever is earlier.</p>
<p>CLAUSE 18 Contractor to Supply Tools &amp; Plants etc.</p>		<p>The contractor shall provide at his own cost all materials (except such special materials, if any, as may in accordance with the contract be supplied from the Engineer-in-Charge's stores), machinery, tools &amp; plants as specified in schedule F. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-Charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement for examination at any time and from time to time of the work or materials. Failing his so doing, the same may be provided by the Engineer-in-Charge at the expense of the contractor and the expenses may be deducted, from any money due to the contractor, under this contract or otherwise and/or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof.</p>
<p>CLAUSE 18 A Recovery of Compensation paid to Workmen</p>		<p>In every case in which by virtue of the provisions sub-section (1) of Section 12, of the Workmen's Compensation Act, 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Government will recover from the contractor, the amount of the compensation so paid; and, without prejudice to the rights of the Government under sub-section (2) of Section 12, of the said Act, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise.</p>

		Government shall not be bound to contest any claim made against it under sub-section (1) of Section 12, of the said Act, except on the written request of the contractor and upon his giving to Government full security for all costs for which Government might become liable in consequence of contesting such claim.
CLAUSE 18 B Ensuring Payment and Amenities to Workers if Contractor fails		In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and of the Contract Labour (Regulation and Abolition) Central Rules, 1971, Government is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and the rules under Clause 19H or under the CPWD Contractor's Labour Regulations, or under the Rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by MMRCL Contractors, Government will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the Government under sub-section(2) of Section 20, and sub-section (4) of Section 21, of the Contract Labour (Regulation and Abolition) Act, 1970, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise Government shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of Section 21, of the said Act, except on the written request of the contractor and upon his giving to the Government full security for all costs for which Government might become liable in contesting such claim.
CLAUSE 19 Labour Laws to be complied by the Contractor		The contractor shall obtain a valid license under the Contract Labour (R&A) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, before the commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also comply with provisions of the Inter-State Migrant Workmen (regulation of Employment and Condition of Service) Act, 1979. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986.  The contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.

		Any failure to fulfil these requirements shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.
CLAUSE 19 A		No labour below the age of fourteen years shall be employed on the work.
CLAUSE 19 B Payment of Wages		<p>Payment of wages:</p> <ul style="list-style-type: none"> <li>(i) The contractor shall pay to labour employed by him either directly or through subcontractors, wages not less than fair wages as defined in the MMRCL Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.</li> <li>(ii) The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.</li> <li>(iii) In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with CPWD contractor's Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deductions from wages recovery of wages not paid and deductions unauthorisedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.</li> <li>(iv) (a) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified</li> </ul>

		<p>by their terms of the contract or non-observance of the Regulations.</p> <p><b>(b)</b> Under the provision of Minimum Wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labours and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge concerned.</p> <p>In the case of Union Territory of Delhi, however, as the all inclusive minimum daily wages fixed under Notification of the Delhi Administration No.F.12(162)MWO/DAB/ 43884-91, dated 31-12-1979 as amended from time to time are inclusive of wages for the weekly day of rest, the question of extra payment for weekly holiday would not arise.</p> <p>(v) The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen’s Compensation Act, 1923, Industrial Disputes Act, 1947, Maternity Benefits Act, 1961, and the Contractor’s Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made thereunder from time to time.</p> <p>(vi) The contractor shall indemnify and keep indemnified Government against payments to be made under and for the observance of the laws aforesaid and the MMRCL Contractor’s Labour Regulations without prejudice to his right to claim indemnity from his sub-contractors.</p> <p>(vii) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.</p> <p>(viii) Whatever is the minimum wage for the time being, or if the wage payable is higher than such wage, such wage shall be paid by the contractor to the workmen directly without the intervention of Jamadar and that Jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen as and by way of commission or otherwise.</p>
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		(ix) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workmen.
CLAUSE 19C		In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his own expense arrange for the safety provisions as per Safety Code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and provide necessary facilities as aforesaid, he shall be liable to pay a penalty of Rs.200/- for each default and in addition, the Engineer-in- Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the costs incurred in that behalf from the contractor.
CLAUSE 19 D		The contractor shall submit by the 4th and 19th of every month, to the Engineer-in-Charge, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively: - <ol style="list-style-type: none"> <li>1. the number of labourers employed by him on the work,</li> <li>2. their working yours,</li> <li>3. the wages paid to them,</li> <li>4. the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and</li> <li>5. the number of female workers who have been allowed maternity benefit according to Clause 19F and the amount paid to them.</li> </ol> Failing which the contractor shall be liable to pay to Government, a sum not exceeding Rs.200/- for each default or materially incorrect statement. The decision of the Divisional Officer shall be final in deducting from any bill due to the contractor, the amount levied as fine and be binding on the contractor.
CLAUSE 19 E		In respect of all labour directly or indirectly employed in the works for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by the MMRCL and its contractors.
CLAUSE 19 F		Leave and pay during leave shall be regulated as follows:- <ol style="list-style-type: none"> <li>1. Leave : <ol style="list-style-type: none"> <li>a. in the case of delivery - maternity leave not exceeding 8 weeks, 4 weeks up to and including the day of delivery and 4 weeks following that day,</li> </ol> </li> </ol>

		<p>b. in the case of miscarriage - upto 3 weeks from the date of miscarriage.</p> <p>2. Pay :</p> <p>a. in the case of delivery - leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on total wages earned on the days when full time work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rupee one only a day whichever is greater.</p> <p>b. In the case of miscarriage - leave pay at the rate of average daily earning calculated on the total wages earned on the days when full time work was done during a period of three months immediately preceding the date of such miscarriage.</p> <p>3. Conditions for the grant of Maternity Leave: No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than six months immediately preceding the date on which she proceeds on leave.</p> <p>4. The contractor shall maintain a register of Maternity (Benefit) in the Prescribed Form as shown in appendix -I and II, and the same shall be kept at the place of work.</p>
<p>CLAUSE 19 G</p>		<p>In the event of the contractor(s) committing a default or breach of any of the provisions of the CPWD Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and' Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government a sum not exceeding Rs.200/- for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to Rs.200/- per day for each day of default subject to a maximum of 5 per cent of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties. Should it appear to the Engineer-in-Charge that the contractor(s) is/are not properly observing and complying with the provisions of the CPWD Contractor's Labour Regulations and Model Rules and the provisions of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract</p>

		<p>Labour (R&amp; A) Central Rules 1971, for the protection of health and sanitary arrangements for work-people employed by the contractor(s) (hereinafter referred as “the said Rules”) the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people within a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and/observe the said Rules and to provide the amenities to the work-people as aforesaid, the Engineer-in-Charge shall have the power to provide the amenities hereinbefore mentioned at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/their own expense and to approved standards all necessary huts and sanitary arrangements required for his/their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said huts and sanitary arrangements be remodelled and/or reconstructed according to approved standards, and if the contractor(s) shall fail to remodel or reconstruct such huts and sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-Charge shall have the power to remodel or reconstruct such huts and sanitary arrangements according to approved standards at the cost of the contractor(s).</p>
CLAUSE 19 H		<p>The contractor(s) shall at his/their own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the camp) of the following specifications on a suitable plot of land to be approved by the Engineer-in-Charge.</p>
	(i)	<p>(a) The minimum height of each hut at the eaves level shall be 2.10m (7 ft.) and the floor area to be provided will be at the rate of 2.7 sq.m. (30 sq.ft.) for each member of the worker’s family staying with the labourer.</p> <p>(b) The contractor(s) shall in addition construct suitable cooking places having a minimum area of 1.80m x 1.50m (6’x5’) adjacent to the hut for each family.</p> <p>(c) The contractor(s) shall also construct temporary latrines and urinals for the use of the labourers each on the scale of not less than four per each one hundred of the total strength, separate latrines and urinals being provided for women.</p> <p>(d) The contractor(s) shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These bathing and washing places shall be suitably screened.</p>

	(ii)	<p>(a) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local materials as may be approved by the Engineer-in-Charge. In case of sun-dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be kutchra but plastered with mud gobri and shall be at least 15 cm (6") above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the Engineer-in-Charge and the contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.</p> <p>(b) The contractor(s) shall provide each hut with proper ventilation.</p> <p>(c) All doors, windows, and ventilators shall be provided with suitable leaves for security purposes.</p> <p>(d) There shall be kept an open space of at least 7.2m (8 yards) between the rows of huts which may be reduced to 6m (20 ft.) according to the availability of site with the approval of the Engineer-in-Charge. Back to back construction will be allowed.</p>
	(iii) Water Supply	<p>The contractor(s) shall provide adequate supply of water for the use of labourers. The provisions shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river, tanks which may be of metal or masonry, shall be provided. The contractor(s) shall also at his/ their own cost make arrangements for laying pipe lines for water supply to his/ their labour camp from the existing mains wherever available, and shall pay all fees and charges therefore.</p>
	(iv)	<p>The site selected for the camp shall be high ground, removed from jungle.</p>
	(v) Disposal of Excreta	<p>The contractor(s) shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the contractor(s) shall make arrangements for the removal of the excreta through the Municipal Committee/authority and inform it about the number of labourers employed so that arrangements may be made by such Committee/authority for the removal of the excreta. All charges on this account shall be borne by the contractor and paid direct by him to the Municipality/authority. The contractor shall provide one sweeper for every eight seats in case of dry system.</p>

	(vi) Drainage	The contractor(s) shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy.
	(vii)	The contractor(s) shall make necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers.
	(viii) Sanitation	The contractor(s) shall make arrangements for conservancy and sanitation in the labour camps according to the rules of the Local Public Health and Medical Authorities.
CLAUSE 19 I		The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractors' employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements. In respect of maintenance/repair or renovation works etc. where the labour have an easy access to the individual houses, the contractor shall issue identity cards to the labourers, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labour. AE/JE will display a list of contractors working in the colony/Blocks on the notice board in the colony and also at the service centre, to apprise the residents about the same.
CLAUSE 19J		It shall be the responsibility of the contractor to see that the building under construction is not occupied by any body unauthorizedly during construction, and is handed over to the Engineer-in-Charge with vacant possession of complete building. If such building though completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building/buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, a levy upto 5% of tendered value of work may be imposed by the Deputy General Manager (Civil) whose decision shall be final both with regard to the justification and quantum and be binding on the contractor. However, the Deputy General Manager (Civil), through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.
CLAUSE 19 K Employment of skilled/semi skilled workers		The contractor shall, at all stages of work, deploy skilled/semi skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/National Institute of construction Management and Research (NICMAR)/National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/Central Government. The number of such qualified tradesmen shall not

		<p>be less than 20% of total skilled/semi skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer in charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer in Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.</p> <p>Provided always, that the provisions of this clause, shall not be applicable for works with estimated cost put to tender being less than Rs. 5 crores.</p>
CLAUSE 19L Contribution of EPF and ESI		<p>The ESI and EPF contributions on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of the employer paid by the contractor shall be reimbursed by the Engineer-in-charge to the contractor on actual basis. The applicable and eligible amount of EPF &amp; ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment provided same are in order.</p>
CLAUSE 20 Minimum Wages Act to be Complied with		<p>The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to time and rules framed thereunder and other labour laws affecting contract labour that may be brought into force from time to time.</p>
CLAUSE 21 Work not to be sublet. Action in case of insolvency		<p>The contract shall not be assigned or sublet without the written approval of the Engineer-in - Charge. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-</p>

		in-Charge on behalf of the MD, MMRC shall have power to adopt the course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.
CLAUSE 22		All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.
CLAUSE 23 Changes in firm's Constitution to be intimated		Where the contractor is a partnership firm, the previous approval in writing of the Engineer-in- Charge shall be obtained before any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu undivided family business concern, such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of Clause 21 hereof and the same action may be taken, and the same consequences shall ensue as provided in the said Clause 21.
CLAUSE 24		All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.
CLAUSE 25 Settlement of Disputes & Arbitration		DELETED FOR THIS TENDER. However, provisions mentioned in Schedule F shall be applicable.
CLAUSE 26 Contractor to indemnify Govt. against Patent Rights		The contractor shall fully indemnify and keep indemnified the MD, MMRC against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under or action brought against Government in respect of any such matters as aforesaid, the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation that may arise therefrom, provided that the contractor shall not be liable to indemnify the MD, MMRC if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

<p>CLAUSE 27 Lumpsum Provisions in Tender</p>		<p>When the estimate on which a tender is made includes lump sum in respect of parts of the work, the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-Charge payable of measurement, the Engineer-in-Charge may at his discretion pay the lump-sum amount entered in the estimate, and the certificate in writing of the Engineer-in-Charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of the clause.</p>
<p>CLAUSE 28 Action where no Specifications are specified</p>		<p>In the case of any class of work for which there is no such specifications as referred to in Clause 11, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications. In case there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications, if not available then as per District Specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-Charge.</p>
<p>CLAUSE 29 Withholding and lien in respect of sum due from contractor</p>	<p>(i)</p>	<p>Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the Engineer-in-Charge or the Government shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract with the Engineer-in-Charge of the Government or any contracting person through the Engineer-in-Charge pending finalization of adjudication of any such claim.</p> <p>It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Engineer-in-Charge or Government will be kept withheld or retained as such by the Engineer-in-Charge or Government till the claim arising out of or under the contract is determined by the arbitrator(if the contract is governed by the</p>



		<p>arbitration clause) by the competent court, as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.</p>
	(ii)	<p>Government shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (i) of this clause or in any other manner legally permissible; and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Government to the contractor, without any interest thereon whatsoever.</p> <p>Provided that the Government shall not be entitled to recover any sum overpaid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Deputy General Manager (Civil) or Assistant General Manager (Civil) on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the Deputy General Manager (Civil) or the Assistant General Manager (Civil).</p>
<p>CLAUSE 29A Lien in respect of claims in other Contracts</p>		<p>Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or the Government or any other contracting person or persons through Engineer-in-Charge against any claim of the Engineer-in-Charge or Government or such other person or persons in respect of payment of a sum of money</p>

		<p>arising out of or under any other contract made by the contractor with the Engineer- in-Charge or the Government or with such other person or persons.</p> <p>It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Government will be kept withheld or retained as such by the Engineer-in-Charge or the Government or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.</p>
<p>CLAUSE 30 Employment of coal mining or controlled area labour not permissible</p>		<p>DEALTED FOR THIS TENDER</p>
<p>CLAUSE 31 Unfiltered water supply</p>		<p>The contractor(s) shall make his/their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions.</p> <ul style="list-style-type: none"> <li>(i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-Charge.</li> <li>(ii) The Engineer-in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in- Charge, unsatisfactory.</li> </ul>
<p>CLAUSE 31 A Departmental water supply, if available</p>		<p>Water if available may be supplied to the contractor by the department subject to the following conditions:-</p> <ul style="list-style-type: none"> <li>(i) The water charges @ 1 % shall be recovered on gross amount of the work done.</li> <li>(ii) The contractor(s) shall make his/their own arrangement of water connection and laying of pipelines from existing main of source of supply.</li> <li>(iii) The Department do not guarantee to maintain uninterrupted supply of water and it will be incumbent on the contractor(s) to make alternative arrangements for water at his/ their own cost in the event of any temporary break down in the Government water main so that the progress of his/their work is not held up for want of water.</li> </ul>

		No claim of damage or refund of water charges will be entertained on account of such break down.
CLAUSE 32 Alternate water arrangements	(i)	Where there is no piped water supply arrangement and the water is taken by the contractor from the wells or hand pump constructed by the Government, no charge shall be recovered from the contractor on that account. The contractor shall, however, draw water at such hours of the day that it does not interfere with the normal use for which the hand pumps and wells are intended. He will also be responsible for all damage and abnormal repairs arising out of his use, the cost of which shall be recoverable from him. The Engineer-in-Charge shall be the final authority to determine the cost recoverable from the contractor on this account and his decision shall be binding on the contractor.
	(ii)	The contractor shall be allowed to construct temporary wells in Government land for taking water for construction purposes only after he has got permission of the Engineer-in-Charge in writing. No charges shall be recovered from the contractor on this account, but the contractor shall be required to provide necessary safety arrangements to avoid any accidents or damage to adjacent buildings, roads and service lines. He shall be responsible for any accidents or damage caused due to construction and subsequent maintenance of the wells and shall restore the ground to its original condition after the wells are dismantled on completion of the work.
CLAUSE 33 Return of Surplus materials		Notwithstanding anything contained to the contrary in this contract, where any materials for the execution of the contract are procured with the assistance of Government either by issue from Government stocks or purchase made under orders or permits or licences issued by Government, the contractor shall hold the said materials economically and solely for the purpose of the contract and not dispose of them without the written permission of the Government 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 being paid or credited such price 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 element of storage charges. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to action for contravention of the terms of the licence or permit and/or for criminal breach of trust, be liable to Government for all

		moneys, advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach.
CLAUSE 34 Hire of Plant & Machinery	(i)	The contractor shall arrange at his own expense all tools, plant, machinery and equipment (hereinafter referred to as T&P) required for execution of the work except for the Plant & Machinery listed in Schedule 'C' and stipulated for issue to the contractor. If the contractor requires any item of T&P on hire from the T&P available with the Government over and above the T&P stipulated for issue, the Government will, if such item is available, hire it to the contractor at rates to be agreed upon between him and the Engineer-in-Charge. In such a case, all the conditions hereunder for issue of T&P shall also be applicable to such T&P as is agreed to be issued.
	(ii)	Plant and Machinery when supplied on hire charges shown in Schedule 'C' shall be made over and taken back at the departmental equipment yard/shed shown in Schedule 'C' and the contractor shall bear the cost of carriage from the place of issue to the site of work and back. The contractor shall be responsible to return the plant and machinery with condition in which it was handed over to him, and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation and otherwise during transit including damage to or loss of plant and for all losses due to his failure to return the same soon after the completion of the work for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.
	(iii)	The plant and machinery as stipulated above will be issued as and when available and if required by the contractor. The contractor shall arrange his programme of work according to the availability of the plant and machinery and no claim, whatsoever, will be entertained from him for any delay in supply by the Department.
	(iv)	The hire charges shall be recovered at the prescribed rates from and inclusive of the date the plant and machinery made over upto and inclusive of the date of the return in good order even though the same may not have been working for any cause except major breakdown due to no fault of the contractor or faulty use requiring more than three working days continuously (excluding intervening holidays and Sundays) for bringing the plant in order. The contractor shall immediately intimate in writing to the Engineer-in-Charge when any plant or machinery gets out of order requiring major repairs as aforesaid. The Engineer-in-Charge shall record the date and time of receipt

		of such intimation in the log sheet of the plant or machinery. Based on this if the breakdown before lunch period or major breakdown will be computed considering half a day's breakdown on the day of complaint. If the breakdown occurs in the post lunch period of major breakdown will be computed starting from the next working day. In case of any dispute under this clause, the decision of the Deputy General Manager (Civil) shall be final and binding on the contractor.
	(v)	The hire charges shown above are for each day of 8 hours (inclusive of the one hour lunch break) or part thereof.
	(vi)	Hire charges will include service of operating staff as required and also supply of lubricating oil and stores for cleaning purposes. Power fuel of approved type, firewood, kerosene oil etc. for running the plant and machinery and also the full time chowkidar for guarding the plant and machinery against any loss or damage shall be arranged by the contractor who shall be fully responsible for the safeguard and security of plant and machinery. The contractor shall on or before the supply of plant and machinery sign an agreement indemnifying the Department against any loss or damage caused to the plant and machinery either during transit or at site of work.
	(vii)	Ordinarily, no plant and machinery shall work for more than 8 hours a day inclusive of one-hour lunch break. In case of an urgent work however, the Engineer-in-Charge may, at his discretion, allow the plant and machinery to be worked for more than normal period of 8 hours a day. In that case, the hourly hire charges for overtime to be borne by the contractor shall be 50% more than the normal proportionate hourly charges (1/8th of the daily charges) subject to a minimum of half day's normal charges on any particular day. For working out hire charges for over time, a period of half an hour and above will be charged as one hour and a period of less than half an hour will be ignored.
	(viii)	The contractor shall release the plant and machinery every seventh day for periodical servicing and/or wash out which may take about three to four hours or more. Hire charges for full day shall be recovered from the contractor for the day of servicing/ wash out irrespective of the period employed in servicing.
	(ix)	The plant and machinery once issued to the contractor shall not be returned by him on account of lack of arrangements of labour and materials, etc. on his part, the same will be returned only when they are required for major repairs or when in the opinion of the Engineer-in-Charge, the work or a portion of work for which the same was issued is completed.

	(x)	Log Book for recording the hours of daily work for each of the plant and machinery supplied to the contractor will be maintained by the Department and will be countersigned by the contractor or his authorized agent daily. In case the contractor contests the correctness of the entries and/or fails to sign the Log Book, the decision of the Engineer- in-Charge shall be final and binding on him. Hire charges will be calculated according to the entries in the Log Book and will be binding on the contractor. Recovery on account of hire charges for road rollers shall be made for the minimum number of days worked out on the assumption that a roller can consolidate per day and maximum quantity of materials or area surfacing as noted against each in the annexed statement (see attached annexure).
	(xi)	In the case of concrete mixers, the contractors shall arrange to get the hopper cleaned and the drum washed at the close of the work each day or each occasion. a. In case rollers for consolidation are employed by the contractor himself, log book for such rollers shall be maintained in the same manner as is done in case of departmental rollers, maximum quantity of any items to be consolidated for each roller-day shall also be same as in Annexure to Clause 34(x). For less use of rollers, recovery for the less roller days shall be made at the stipulated issue rate.
	(xii)	The contractor shall be responsible to return the plant and machinery in the condition in which it was handed over to him and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation or otherwise or during transit including damage to or loss of parts, and for all losses due to his failure to return the same soon after the completion of the work for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.
	(xiii)	The contractor will be exempted from levy of any hire charges for the number of days he is called upon in writing by the Engineer-in-Charge to suspend execution of the work, provided Government plant and machinery in question have, in fact, remained idle with the contractor because of the suspension
	(xiv)	In the event of the contractor not requiring any item of plant and machinery issued by Government though not stipulated for issue in Schedule 'C' any time after taking delivery at the place of issue, he may return it after two days written notice or at any time without notice if he agrees to pay hire charges for two

		additional days without, in any way, affecting the right of the Engineer-in-Charge to use the said plant and machinery during the said period of two days as he likes including hiring out to a third party.
CLAUSE 35 Condition relating to use of asphaltic materials	(i)	The contractor undertakes to make arrangement for the supervision of the work by the firm supplying the tar or bitumen used.
	(ii)	The contractor shall collect the total quantity of tar or bitumen required for the work as per standard formula, before the process of painting is started and shall hypothecate it to the Engineer-in-Charge. If any bitumen or tar remains unused on completion of the work on account of lesser use of materials in actual execution for reasons other than authorized changes of specifications and abandonment of portion of work, a corresponding deduction equivalent to the cost of unused materials as determined by the Engineer-in-Charge shall be made and the material return to the contractors. Although the materials are hypothecated to Government, the contractor undertakes the responsibility for their proper watch, safe custody and protection against all risks. The materials shall not be removed from site of work without the consent of the Engineer-in- Charge in writing.
	(iii)	The contractor shall be responsible for rectifying defects noticed within a year from the date of completion of the work and the portion of the security deposit relating to asphaltic work shall be refunded after the expiry of this period.
CLAUSE 36 Employment of Technical Staff & Employees		Contractors Superintendence, Supervision, Technical Staff & Employees
	(i)	The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfilling of the obligations under the contract. The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than specified in Schedule 'F'. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the

	<p>contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-charge and shall be available at site before start of work.</p> <p>All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s) The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the Engineer-in-Charge and shall also note down instructions conveyed by the Engineer-in- Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/ checked measurements/ test checked measurements. The representative(s) shall not look after any other work. Substitutes, duly approved by Engineer-in-Charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.</p> <p>If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non- refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the Engineer-In-Charge as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are</p>
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		absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Engineers employed by him) alongwith every on account bill final bill and shall produce evidence if at any time so required bythe Engineer-in-Charge.
	(ii)	<p>The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.</p> <p>The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.</p> <p>The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer- in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.</p>
CLAUSE 37 Levy/Taxes payable by Contractor		<p>(i) GST, Building and Other Construction Workers Welfare Cess or any other tax, levy or cess in respect of input for or output by this contract shall be payable by the contractor and government shall not entertain any claim whatsoever in this respect as provided under clause 38.</p> <p>(ii) The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, stone, kankar, etc. from local authorities.</p> <p>If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Government of India and does not any time become payable by the contractor to the State Government, Local authorities in respect of any material used by the contractor in the works, then in such a case, it shall be lawful to the Government of India and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.</p>
CLAUSE 38		(i) All tendered rates shall be inclusive of any tax, levy or cess applicable on the last stipulated date of

<p>Conditions for reimbursement of levy/taxes if levied after receipt of tenders</p>		<p>receipt of tender including extension if any. No adjustment i.e. increase or decrease shall be made for any variation in the rate of GST, Building and Other Construction Workers Welfare Cess or any tax, levy or cess applicable on inputs.</p> <p>However, effect of variation in rates of GST or Building and Other Construction Workers Welfare Cess or imposition or repeal of any other tax, levy or cess applicable on output of the works contract shall be adjusted on either side, increase or decrease.</p> <p>Provided further that for Building and Other Construction Workers Welfare Cess or any tax (other than GST), levy or cess varied or imposed after the last date of receipt of tender including extension if any, any increase shall be reimbursed to the contractor only if the contractor necessarily and properly pays such increased amount of taxes/levies/cess.</p> <p>Provided further that such increase including GST shall not be made in the extended period of contract for which the contractor alone is responsible for delay as determined by authority for extension of time under Clause 5 in Schedule f.</p> <p>(ii) The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and/or the Engineer-in-Charge and shall also furnish such other information/document as the Engineer-in-Charge may require from time to time.</p> <p>(iii) The contractor shall, within a period of 30 days of the imposition of any such further tax or levy or cess, give a written notice thereof to the Engineer-in-charge that the same is given pursuant to this condition, together with all necessary information relating thereto.</p>
<p>CLAUSE 39 Termination of Contract on death of contractor</p>		<p>Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the Divisional Officer on behalf of the MD, MMRC shall have the option of terminating the contract without compensation to the contractor.</p>
<p>CLAUSE 40 If relative working in MMRCL then the</p>		<p>The contractor shall not be permitted to tender for works in the MMRCL responsible for award and execution of contracts in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Deputy General Manager (Civil) and Junior Engineer (both inclusive).</p>

contractor not allowed to tender		<p>He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted Officer in the MMRC or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department. If, however the contractor is registered in any other department, he shall be debarred from tendering in MMRC for any breach of this condition.</p> <p>NOTE: By the term “near relatives” is meant wife, husband, parents and grandparents, children and grandchildren, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.</p>
<p>CLAUSE 41 No Gazetted Engineer to work as Contractor within one year of retirement</p>		<p>No engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of India shall work as a contractor or employee of a contractor for a period of one year after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the contractor’s service, as the case may be.</p>
<p>CLAUSE 42 Return of material &amp; recovery for excess material issued.</p>		<p>DELETED FOR THIS TENDER</p>
<p>CLAUSE 43 Compensation during warlike situations</p>		<p>The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in- Charge, such payments being in addition to compensation upto the value</p>

		<p>of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Divisional Officer upto Rs.5,000/- and by the Deputy General Manager (Civil) concerned for a higher amount. The contractor shall be paid for the damages/destruction suffered and for restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.</p> <p>Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the A.R.P. Officers or the Engineer-in-Charge (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not intended for the work.</p> <p>In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Divisional Officer</p>
CLAUSE 44 Apprentices Act provisions to be complied with		<p>The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Deputy General Manager (Civil) may, in his discretion, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.</p>
CLAUSE 45 Release of Security deposit after labour clearance		<p>Release of Security Deposit of the work shall not be refunded till the contractor produces a clearance deposit after labour certificate from the Labour Officer. As soon as the work is virtually complete the contractor shall apply for the clearance certificate to the Labour Officer under intimation to the Engineer-in-Charge. The Engineer-in-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the contractor in respect of the work. If no complaint is pending, on record till after 3 months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Security Deposit will be released if otherwise due.</p>

## SAFETY CODE

1. Suitable scaffolds 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 mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and handhold shall be provided on the ladder and the ladder shall be given an inclination not steeper than  $\frac{1}{4}$  to 1 ( $\frac{1}{4}$  horizontal and 1 vertical.)
2. Scaffolding of staging more than 3.6 m (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends there of with only such opening 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.
3. Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.
4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm. (3ft.)
5. 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 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11½") for ladder upto and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least  $\frac{1}{4}$ " for each additional 30 cm. (1 foot) of length. Uniform step spacing of not more than 30 cm shall be kept. 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 as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the 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 cost which may be awarded in any such suit; action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person.
6.
  - a. Excavation and Trenching - All trenches 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100 ft.) in length or fraction thereof, Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or undercutting shall be done.
  - b. Safety Measures for digging bore holes:-

- i. If the bore well is successful, it should be safely capped to avoid caving and collapse of the bore well. The failed and the abandoned ones should be completely refilled to avoid caving and collapse;
    - ii. During drilling, Sign boards should be erected near the site with the address of the drilling contractor and the Engineer in-charge of the work;
    - iii. Suitable fencing should be erected around the well during the drilling and after the installation of the rig on the point of drilling, flags shall be put 50m around the point of drilling to avoid entry of people;
    - iv. After drilling the borewell, a cement platform (0.50m x 0.50m x 1.20m) 0.60m above ground level and 0.60m below ground level should be constructed around the well casing;
    - v. After the completion of the borewell, the contractor should cap the bore well properly by welding steel plate, cover the bore well with the drilled wet soil and fix thorny shrubs over the soil. This should be done even while repairing the pump;
    - vi. After the borewell is drilled the entire site should be brought to the ground level.
7. Demolition - Before any demolition work is commenced and also during the progress of the 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 or a cable or apparatus used by the operator 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.
8. All necessary personal safety equipment as considered adequate by the Engineer-in-Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned:- The following safety equipment shall invariably be provided.
- a. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
  - b. Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective goggles.
  - c. Those engaged in welding works shall be provided with welder's protective eyeshields
  - d. Stone breaker 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 active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast 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 boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measure are adhered to :-
    - i. Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.

- ii. At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
  - iii. Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.
  - iv. Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
  - v. Safety belt with rope should be provided to the workers. While working inside the manholes, such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
  - vi. The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day.
  - vii. No smoking or open flames shall be allowed near the blocked manhole being cleaned.
  - viii. The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.
  - ix. Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer-in-Charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.
  - x. Gas masks with Oxygen Cylinder should be kept at site for use in emergency.
  - xi. Air-blowers should be used for flow of fresh air through the manholes. Whenever called for, portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.
  - xii. The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole.
  - xiii. The workers shall be provided with Gumboots or non sparking shoes bump helmets and gloves non sparking tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing the limbs before working inside the sewer lines.
  - xiv. Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.
  - xv. If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.
  - xvi. The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.
- f. The Contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form. Wherever men above the

age of 18 are employed on the work of lead painting, the following precaution should be taken:-

- i. No paint containing lead or lead products shall be used except in the form of paste or ready made 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 is dry rubbed and scrapped.
  - iii. Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on the cessation of work.
9. An additional clause (viii)(i) of Safety Code (iv) the Contractor shall not employ women and men below the age of 18 on the work of painting with product containing lead in any form, wherever men above the age of 18 are employed on the work of lead painting, the following principles must be observed for such use :
  - a. White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.
  - b. Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.
  - c. Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
  - d. Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
  - e. Overall shall be worn by working painters during the whole of working period.
  - f. Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
  - g. Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man appointed by competent authority of MMRCL.
  - h. MMRCL may require, when necessary medical examination of workers.
  - i. Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.
10. When the work is done near any place where there is risk of drowning, all necessary equipments 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 obtained during the course of the work.
11. Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions :-
  - a. (i) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.  
(ii) 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.
  - b. 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 operator.
  - c. In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine



having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

- d. In case of departmental machines, the safe working load shall be notified by the Electrical Engineer- in-Charge. As regards contractor's machines the contractors 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 Electrical Engineer concerned.
12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.
13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, 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.
14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.
15. 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 Labour Officer or Engineer-in-Charge of the department or their representatives.
16. Notwithstanding the above clauses from (1) to (15), there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

# **Model Rules for the Protection of Health and Sanitary Arrangements for Workers Employed by MMRCL or its Contractors**

## **1. APPLICATION**

These rules shall apply to all buildings and construction works in charge of MMRCL in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

## **2. DEFINITION**

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work on any day during the period during which the contract work is in progress.

## **3. FIRST-AID FACILITIES**

- a. At every work place, there shall be provided and maintained, so as to be easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.
- b. The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment:-

- i. For work places in which the number of contract labour employed does not exceed 50 - Each first-aid box shall contain the following equipment:

1. 6 small sterilised dressings.
2. 3 medium size sterilised dressings.
3. 3 large size sterilised dressings.
4. 3 large sterilised burn dressings.
5. 1 (30 ml.) bottle containing a two per cent alcoholic solution of iodine.
6. 1 (30 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
7. 1 snakebite lancet.
8. 1 (30 gms.) bottle of potassium permanganate crystals.
9. 1 pair scissors.
10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
11. 1 bottle containing 100 tablets (each of 5 gms.) of aspirin.
12. Ointment for burns.
13. A bottle of suitable surgical antiseptic solution

- ii. For work places in which the number of contract labour exceed 50. Each first-aid box shall contain the following equipment:

1. 12 small sterilised dressings.
2. 6 medium size sterilised dressings.
3. 6 large size sterilised dressings.
4. 6 large size sterilised burn dressings.
5. 6 (15 gms.) packets sterilised cotton wool.
6. 1 (60 ml.) bottle containing a two per cent alcoholic solution iodine.
7. 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.

8. 1 roll of adhesive plaster.
  9. 1 snake bite lancet.
  10. 1 (30 gms.) bottle of potassium permanganate crystals.
  11. 1 pair scissors.
  12. 1 copy of the first-aid leaflet issued by the Director General Factory Advice Service and Labour Institutes /Government of India.
  13. A bottle containing 100 tablets (each of 5 gms.) of aspirin.
  14. Ointment for burns.
  15. A bottle of suitable surgical antiseptic solution.
- iii. Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.
  - iv. Nothing except the prescribed contents shall be kept in the First-aid box.
  - v. The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.
  - vi. A person in charge of the First-aid box shall be a person trained in First-aid treatment in the work places where the number of contract labour employed is 150 or more.
  - vii. In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance from the works. First-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
  - viii. Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

#### 4. DRINKING WATER

- a. In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- b. Where drinking water is obtained from an Intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- c. Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and waterproof.
- d. A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

#### 5. WASHING FACILITIES

- a. In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- b. Separate and adequate cleaning facilities shall be provided for the use of male and female workers.
- c. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

#### 6. LATRINES AND URINALS

- a. Latrines shall be provided in every work place on the following scale namely: -
  - i. Where female are employed, there shall be at least one latrine for every 25 females.

- ii. Where males are employed, there shall be at least one latrine for every 25 males.

Provided that, where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.

- b. Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.
- c. Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting nonabsorbent materials and shall be cement washed inside and outside at least once a year, Latrines shall not be of a standard lower than borehole system.
- d. (a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women Only" as the case may be.  
(a) The notice shall also bear the figure of a man or of a woman, as the case may be.
- e. There shall be at least one urinal for male workers upto 50 and one for female workers upto fifty employed at a time, provided that where the number of male or female workmen, as the case may be exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.
- f. (a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.  
(b) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.
- g. Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.
- h. Disposal of excreta :- Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).
- i. The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

#### 7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 metres (10 ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sq.m. (6 sq ft) per head. Provided that the Engineer-in-Charge may permit subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

#### 8. CRECHES

- a. At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and

the other as their bedroom. The rooms shall be constructed with specifications as per clause 19H (ii) a, b & c.

- b. The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.
- c. The contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the bed room.
- d. The contractor shall provide one ayaa to look after the children in the creche when the number of women workers does not exceed 50 and two when the number of women workers exceed 50.
- e. The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

#### 9. CANTEENS

- a. In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.
- b. The canteen shall be maintained by the contractor in an efficient manner.
- c. The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.
- d. The canteen shall be sufficiently lighted at all times when any person has access to it.
- e. The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour washed at least once in each year. Provided that the inside walls of the kitchen shall be lime-washed every four months.
- f. The premises of the canteen shall be maintained in a clean and sanitary condition.
- g. Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.
- h. Suitable arrangements shall be made for the collection and disposal of garbage.
- i. The dining hall shall accommodate at a time 30 per cent of the contract labour working at a time.
- j. The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square metre (10 sft) per diner to be accommodated as prescribed in sub-Rule 9.
- k. (a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.  
(b) Washing places for women shall be separate and screened to secure privacy.
- l. Sufficient tables stools, chair or benches shall be available for the number of diners to be accommodated as prescribed in sub-Rule 9.
- m.
  - i.
    - 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipment necessary for the efficient running of the canteen.
    - 2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.
  - ii.
    - 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.

2. A service counter, if provided, shall have top of smooth and impervious material.
  3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment.
- n. The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.
  - o. The charges for food stuffs, beverages and any other items served in the canteen shall be based on 'No profit, No loss' and shall be conspicuously displayed in the canteen.
  - p. In arriving at the price of foodstuffs, and other article served in the canteen, the following items shall not be taken into consideration as expenditure namely:-
    - i. The rent of land and building.
    - ii. The depreciation and maintenance charges for the building and equipments provided for the canteen.
    - iii. The cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery and utensils.
    - iv. The water charges and other charges incurred for lighting and ventilation.
    - v. The interest and amounts spent on the provision and maintenance of equipments provided for the canteen.
  - q. The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

#### 10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

11. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.

#### 12. AMENDMENTS

Government may, from time to time, add to or amend these rules and issue directions - it may consider necessary for the purpose of removing any difficulty which may arise in the administration thereof.

# CPWD Contractor's Labour Regulations

## 1. SHORT TITLE

These regulations may be called the CPWD Contractors Labour Regulations.

## 2. DEFINITIONS

- a. Workman means any person employed by MMRCL or its contractor directly or indirectly through a subcontractor with or without the knowledge of the MMRCL to do any skilled, semiskilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment are expressed or implied but does not include any person :-
  - i. Who is employed mainly in a managerial or administrative capacity : or
  - ii. Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercises either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature: or
  - iii. Who is an out worker, that is to say, person to whom any article or materials are given out by or on behalf of the principal employers to be made up cleaned, washed, altered, ornamental finished, repaired adopted or otherwise processed for sale for the purpose of the trade or business of the principal employers and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal employer.

No person below the age of 14 years shall be employed to act as a workman.

- b. Fair Wages means wages whether for time or piece work fixed and notified under the provisions of the Minimum Wages Act from time to time.
- c. Contractors shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a subcontractor.
- d. Wages shall have the same meaning as defined in the Payment of Wages Act.

## 3.

- a. Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.
- b. When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid over time for the extra hours put in by him at double the ordinary rate of wages.
- c.
  - i. Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules 1960 as amended from time to time irrespective of whether such worker is governed by the Minimum Wages Act or not.
  - ii. Where the minimum wages prescribed by the Government under the Minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 days.

- iii. Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day on one of the five days immediately before or after the normal weekly holiday and pay wages to such worker for the work performed on the normal weekly holiday at overtime rate.

4. DISPLAY OF NOTICE REGARDING WAGES ETC.

The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in a clear and legible condition in conspicuous places on the work, notices in English and in the local Indian languages spoken by the majority of the workers giving the minimum rates of wages fixed under Minimum Wages Act, the actual wages being paid, the hours of work for which such wage are earned, wages periods, dates of payments of wages and other relevant information as per Appendix 'III'.

5. PAYMENT OF WAGES

- a. The contractor shall fix wage periods in respect of which wages shall be payable.
- b. No wage period shall exceed one month.
- c. The wages of every person employed as contract labour in an establishment or by a contractor where less than one thousand such persons are employed shall be paid before the expiry of seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.
- d. Where the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.
- e. All payment of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
- f. Wages due to every worker shall be paid to him direct by contractor through Bank or ECS or online transfer to his bank account.
- g. All wages shall be paid through Bank or ECS or online transfer.
- h. Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.
- i. A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgment.
- j. It shall be the duty of the contractor to ensure the disbursement of wages through bank account of labour.
- k. The contractor shall obtain from the Junior Engineer or any other authorised representative of the Engineer-in-Charge as the case may be, a certificate under his signature at the end of the entries in the "Register of Wages" or the "Wage-cum-Muster Roll" as the case may be in the following form:-  
"Certified that the amount shown in column No .....has been paid to the workman concerned through bank account of labour on ..... at ....."

6. FINES AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES

- a. The wages of a worker shall be paid to him without any deduction of any kind except the following:-
  - i. Fines



- ii. Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
  - iii. Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to his neglect or default.
  - iv. Deduction for recovery of advances or for adjustment of overpayment of wages, advances granted shall be entered in a register.
  - v. Any other deduction which the Central Government may from time to time allow.
- b. No fines should be imposed on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.  
 Note :- An approved list of Acts and Omissions for which fines can be imposed is enclosed at Appendix-X
- c. No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.
  - d. The total amount of fine which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.
  - e. No fine imposed on any worker shall be recovered from him by instalment, or after the expiry of sixty days from the date on which it was imposed.
  - f. Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

## 7. LABOUR RECORDS

- a. The contractor shall maintain a Register of persons employed on work on contract in Form XIII of the CL (R&A) Central Rules 1971 (Appendix IV)
- b. The contractor shall maintain a Muster Roll register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971 (Appendix V).
- c. The contractor shall maintain a Wage Register in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971 (Appendix VI).
- d. The contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:
  - i. Full particulars of the labourers who met with accident.
  - ii. Rate of Wages.
  - iii. Sex
  - iv. Age
  - v. Nature of accident and cause of accident.
  - vi. Time and date of accident.
  - vii. Date and time when admitted in Hospital,
  - viii. Date of discharge from the Hospital.
  - ix. Period of treatment and result of treatment.
  - x. Percentage of loss of earning capacity and disability as assessed by Medical Officer.
  - xi. Claim required to be paid under Workmen's Compensation Act.

- xii. Date of payment of compensation.
  - xiii. Amount paid with details of the person to whom the same was paid.
  - xiv. Authority by whom the compensation was assessed.
  - xv. Remarks
- e. The contractor shall maintain a Register of Fines in the Form XII of the CL (R&A) Rules 1971 (Appendix-XI). The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omissions for which fines can be imposed (Appendix-X)
  - f. The contractor shall maintain a Register of deductions for damage or loss in Form XX of the CL (R&A) Rules 1971 (Appendix-XII)
  - g. The contractor shall maintain a Register of Advances in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIII)
  - h. The contractor shall maintain a Register of Overtime in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIV)
8. ATTENDANCE CARD-CUM-WAGE SLIP
- a. The contractor shall issue an Attendance card-cum-wage slip to each workman employed by him in the specimen form at (Appendix-VII)
  - b. The card shall be valid for each wage period.
  - c. The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work.
  - d. The card shall remain in possession of the worker during the wage period under reference.
  - e. The contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
  - f. The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself.
9. EMPLOYMENT CARD
- The contractor shall issue an Employment Card in Form XIV of the CL (R&A) Central Rules 1971 to each worker within three days of the employment of the worker (Appendix-VIII).
10. SERVICE CERTIFICATE
- On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a Service certificate in Form XV of the CL (R&A) Central Rules 1971 (Appendix-IX)
11. PRESERVATION OF LABOUR RECORDS
- All records required to be maintained under Regulations Nos. 6 & 7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge or Labour Officer or any other officers authorised by the Ministry of Urban Development in this behalf.
12. POWER OF LABOUR OFFICER TO MAKE INVESTIGATIONS OR ENQUIRY
- The Labour Officer or any person authorised by Central Government on their behalf shall have power to make enquires with a view to ascertaining and enforcing due and proper observance of Fair Wage Clauses and the Provisions of these Regulations. He shall investigate into any complaint regarding the default made by the contractor or subcontractor in regard to such provision.
13. REPORT OF LABOUR OFFICER
- The Labour Officer or other persons authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Assistant General Manager (Civil) concerned indicating the

extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages and other dues be paid to the labourers concerned. In case an appeal is made by the contractor under Clause 13 of these regulations, actual payment to labourers will be made by the Assistant General Manager (Civil) after the Deputy General Manager (Civil) has given his decision on such appeal.

- a. The Assistant General Manager (Civil) shall arrange payments to the labour concerned within 45 days from the receipt of the report from the Labour Officer or the Deputy General Manager (Civil) as the case may be.

#### 14. APPEAL AGAINST THE DECISION OF LABOUR OFFICER

Any person aggrieved by the decision and recommendations of the Labour Officer or other person so authorised may appeal against such decision to the Deputy General Manager (Civil) concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Assistant General Manager (Civil) concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

#### 15. PROHIBITION REGARDING REPRESENTATION THROUGH LAWYER

- a. A workman shall be entitled to be represented in any investigation or enquiry under these regulations by: -
  - i. An officer of a registered trade union of which he is a member.
  - ii. An officer of a federation of trade unions to which the trade union referred to in clause (a) is affiliated.
  - iii. Where the employer is not a member of any registered trade union, by an officer of a registered trade union, connected with the industry in which the worker is employed or by any other workman employed in the industry in which the worker is employed.
- b. An employer shall be entitled to be represented in any investigation or enquiry under these regulations by :-
  - i. An officer of an association of employers of which he is a member.
  - ii. An officer of a federation of associations of employers to which association referred to in clause (a) is affiliated.
  - iii. Where the employers is not a member of any association of employers, by an officer of association of employer connected with the industry in which the employer is engaged or by any other employer, engaged in the industry in which the employer is engaged.
- c. No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these regulations.

#### 16. INSPECTION OF BOOKS AND SLIPS

The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorised by the Central Government on his behalf.

#### 17. SUBMISSIONS OF RETURNS

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

#### 18. AMENDMENTS

The Central Government may from time to time add to or amend the regulations and on any question as to the application/Interpretation or effect of those regulations the decision of the Deputy General Manager (Civil) concerned shall be final.

# PART B

## MATERIAL AND QUALITY ASSURANCE

1. The contractor shall ensure quality control measures on different aspects of construction including materials, workmanship and correct construction methodologies to be adopted. He shall have to submit quality assurance programme within two weeks of the award of work. The quality assurance programme should include method statement for various items of work to be executed along with check lists to enforce quality control.
2. The contractor shall get the source of all other materials, not specified elsewhere in the document, approved from the Engineer-in-Charge. The contractor shall stick to the approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost. Similarly, the contractor shall submit brand/ make of various materials not specified in the agreement, to be used for the approval of the Engineer-in- Charge along with samples and once approved, he shall stick to it.
3. The contractor shall submit shop drawings of staging and shuttering arrangement, aluminum work, and other works as desired by Engineer In Charge for his approval before execution. The contractor shall also submit bar bending schedule for approval of Engineer –in – charge before execution.
4. Test Laboratories:
  - A. Laboratory at site:

The contractor shall establish a testing lab at site and provide testing equipment and materials for the field tests mentioned in the list of mandatory tests given in CPWD specifications 2009 Vol. 1 & 2. Nothing extra shall be payable to him on this account. The representatives of the department shall be at liberty to inspect the testing facilities at site and conduct testing at random in consultation with Engineer in charge. The contractor shall provide all necessary facilities for the purpose. The laboratory shall be equipped, inter alia, with the following equipment:

    - a. Balances:
      - i. 7 kg to 10 kg capacity, semi-self-indicating type – Accuracy 10 gm.
      - ii. 500 gm capacity, semi-self-indicating type Accuracy 1 gm.
      - iii. Pan Balance- 5 kg Capacity- Accuracy 10 gm.
    - b. Ovens- Electrically operated, thermostatically controlled upto 1100C- Sensitivity 10C.
    - c. Sieves: as per IS: 460
      - i. IS Sieves – 450 mm internal dia of sizes 100 mm, 80 mm, 63 mm, 50 mm, 40 mm, 25 mm, 20 mm, 12.5 mm, 10 mm, 6.3 mm, 4.75 mm, complete with lid and pan.
      - ii. IS Sieves – 200 mm internal dia (brass frame) consisting of 2.36 mm, 1.18 mm, 500 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns with lid and pan.
    - d. Sieve shaker capable of 200 mm and 300 mm dia sieves, manually operated with timing switch assembly.
    - e. Equipment for slump test- slump cone, steel plate, taping rod, steel scale, scoop.
    - f. Equipment for concrete testing
      - i. Concrete cube moulds 15x15x15cm. 18Nos.
      - ii. Pruning Rods 2Kg weight length 40cm and ramming face 25mm 1No.
      - iii. Extra Bottom plates for 15cm cube mould 6Nos.
      - iv. Standard Vibration table for cubes 1No
      - v. Dial gauges 25 mm travel- 0.01 mm/division Least count 1 No.

- vi. Compression testing machine of 100 tonne capacity 1 No.

Not less than 90% tests for material be performed at site lab with above stated equipment's, however at least 10% testing of materials shall be got done from external laboratories. However, for the tests to be carried out by the external laboratories, the contractor shall supply free of charge all the materials required for testing, including transportation. If the tests which were to be conducted in the site laboratory are conducted in other laboratories for any the reasons the cost of such tests shall be borne by the contractor.

B. Other Laboratories :

B1 The contractor shall arrange carrying out all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and shall bear all charges in connection therewith including charges for testing for all materials except cement for which separate condition is provided in tender document.

C. Sampling of Materials :

C1 Sample of building materials fittings and other articles required for execution of work shall be got approved from the Engineer-in-Charge. Articles manufactured by companies of repute and approved by the Engineer-in-Charge shall only be used. Articles bearing BIS certification mark shall be used in case the above are not available, the quality of samples brought by the contractor shall be judged by standards laid down in the relevant BIS specifications. All materials and articles brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work.

C2 The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-Charge.

C3 BIS marked materials except otherwise specified shall be subjected to quality test at the discretion of the Engineer-in-Charge besides testing of other materials as per the specifications described for the item/materials. Wherever BIS marked materials are brought to the site of work, the contractor shall if required, by the Engineer-in-Charge furnish manufacturers test certificate to establish that the material produced by the contractor for incorporation in the work satisfies the provisions of BIS codes relevant to the material and/or the work done.

C4 The contractor shall procure all the materials in advance so that there is sufficient time to testing and approving of the materials and clearance of the same before use in work.

C5 All materials brought by the contractor for use in the work shall be got checked from the Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use.

C6 The contractor shall be fully responsible for the safe custody of the materials issued to him even if the materials are in double lock and key system.

C7 The Stone aggregate/stone, sand shall be brought from any quarries subjected to the said materials confirm CPWD specifications.

5. The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard proforma by the Jr. Engineer-in-Charge of work and which shall be duly signed by the contractor or his authorized representative.
6. The contractor shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, audio-video recording etc. Nothing extra shall be payable to the contractor on this account and shall be submitted along with running account bills.
7. The contractor shall be fully responsible for the safe custody of materials brought by him issued to him even though the materials are under double lock key system.
8. Separate cement registers showing the receipt of the OPC and PPC shall be maintained at site. The contractor shall construct separate godowns for storage of OPC & PPC at site and nothing extra on this account shall be payable.
9. In case there is any discrepancy in frequency of testing as given in the list of mandatory tests and that in the individual sub-head of work as per CPWD specification 2009 Vol. 1 & 2 the higher of the two frequencies of testing shall be adopted.
10. Maintenance of Cement Register:
  - a. All the register of tests to be carried out at construction site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in- Charge in the same manner as being issued to CPWD field staff.
  - b. The test registers to be maintained by the contractor are :
    - i. Materials at site account register.
    - ii. Cement register.
    - iii. Master test registers.
    - iv. Cube test register.
    - v. Paint register.
    - vi. Inspection register.
    - vii. Drawing register.
  - c. All the entries in the register will be made by the designated engineering staff of the contractor and same should be regularly reviewed by concerned engineers of MMRCL.
  - d. Contractor shall be responsible for safe custody of all the test registers.
  - e. Submission of copy of all test registers, material at site register along with each alternate running account bill and final bill shall be mandatory.

### **Additional Conditions for Cement**

1. The contractor shall procure Portland Pozzolana Cement conforming to IS: 1489 (Part-I) or Ordinary Portland Cement conforming to IS 8112 (2013) as required in the work, from reputed manufacturers of cement, such as A.C.C., Ultratech, Vikram, Shri cement, Ambuja, Jaypee Cement, Century Cement, J.K. Cement, Birla Cementor from any other reputed cement Manufacturer having a production capacity not less than one million tonnes per annum as approved by ADG for the sub region. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. Supply of cement shall be made in 50 kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of the relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not confirm to the relevant BIS code the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so.
2. The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer-in-Charge. The cement godown of the capacity to store a minimum of 1000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made.
3. Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-charge or his authorized representative and the key of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.
4. The cement shall be got tested by the Engineer-in-Charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to test laboratories. The cost of tests shall be born by the contractor/department in the manner indicated below :
  - a. By the contractor, if the results show that the cement does not conform to relevant CPWD Specifications / BIS code or specification mentioned else where in the documents.
  - b. By the department, if the results show that the cement conforms to relevant CPWD Specifications / BIS code or specification mentioned else where in the documents.
5. The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions laid therein. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate show prescribed shall be made. In case of excess consumption, no adjustment need to made.
6. The cement brought to site and the cement remaining unused after completion of the work shall not be removed from site without the written permission of the Engineer-in-Charge.
7. The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-Charge. If he dose not do show within three days of receipt of such notice, the Engineer-in-Charge shall get it removed at the cost of the contractor.



### **Additional Condition for Steel Reinforcement**

1. The contractor shall procure TMT bars of Fe 500 D grade from primary steel producers such as SAIL, Tata Steel Ltd, RINL, Jindal Steel & Power Ltd and JSW Steel Ltd or any other producer as approved by MMRC who are using iron ore as the basic raw material/input and having crude steel capacity of 2.0 million tons per annum and above.
  - a. TMT bars shall meet the provisions of IS 1786: 2008 pertaining to Fe 500 D grade of steel.
2. The contractor shall have to obtain vouchers and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.
3. Samples shall also be taken and got tested by the Engineer-in-charge as per the provisions in this regard in the relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para 1.1 and 1.2 above, the same shall stand rejected and it shall be removed from the site of work by the contractor at his cost within a week time of written orders from the Engineer-in-charge to do so.
4. The steel reinforcement shall be brought to the site in bulk supply of 50 tons or more or as directed by the Engineer-in-charge.
5. The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent distortion & corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
6. For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random at frequency not less than that specified below:

Size of bar	For consignment below 100 tonnes	For consignment over 100 tonnes
Under 10 mm dia bars	One sample for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof
10 mm to 16 mm dia bars	One sample for each 35 tonnes or part thereof	One sample for each 45 tonnes or part thereof
Over 16 mm dia bars	One sample for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof

7. The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of tests shall be borne by the contractor.
8. The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by the conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to be made.
9. The steel brought to the site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge
10. Steel bars brought by the contractor for use in the work shall be got checked from the Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use.
11. In case the contractor brings surplus quantity of steel the same after completion of the work will be removed from the site by the contractor at his own cost after approval of the Engineer-in-Charge.
12. Reinforcement including authorised spacer bars and lappages shall be measured in length of different diameters, as actually (not more than as specified in the drawing) used in the work, nearest to a centimeter. Wastage and unauthorized overlaps shall not be measured.
13. The standard sectional weights referred to as in Table 5.4 under para 5.3.4 in CPWD specifications for works 2009 Vol. 1 will be considered for conversion of length of various sizes of MS bars, Tor steel bars and TMT bars into standard weight.
14. Records of actual sectional weight shall also be kept dia-wise & lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will

constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as derived actual weight.

15. If the derived weight as in para 14 above is lesser than the standard weight as in para 13 above, the derived actual weight shall be taken for payment. If the derived actual weight is found more than the standard weight then the standard weight as worked out in para 13 above shall be taken for payment. In such case nothing extra shall be paid for the difference between the derived actual weight and the standard weight.
16. Mixing of different type of steel/different grades of steel shall not be allowed in the same structural members as main reinforcement to satisfy clause 26.1 of IS:456.
17. Tolerances on Nominal Mass (individual sample) shall be as under:-

S. No.	Nominal size mm	Tolerances on the Nominal Mass, percentage
1	Upto and including 10	-8%
2	Over 10 upto & including 16	-6%
3	Over 16	-4%

## **General Terms & Condition**

1. The order of preference in case of any discrepancy as indicated in condition No. 8.1 under “Conditions of Contract” give in standard CPWD contract form may be read as the following:
  - a. Nomenclature of items as per schedule of quantities.
  - b. Particular specification and special condition, if any.
  - c. CPWD specifications.
  - d. Architectural Drawings
  - e. Indian standard specifications of B.I.S.
  - f. Sound Engineering Practice

A reference made to any Indian Standard specification in these documents, shall imply to the latest version of that standard. Including such revision/amendments as issued by the bureau of Indian standard upto last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian standard applicable to the work at site.

2. Except for the items, for which particular specifications are given or where it is specifically mentioned otherwise in the description of items in the schedule of quantities the work shall generally be carried out in accordance with the “CPWD specifications 2009 Vol. 1 and Vol. 2 (with upto date corrections slips). (Hereinafter to be referred to as CPWD specifications) and instructions of Engineer-in-Charge. Wherever CPWD specifications are silent the latest IS codes/specification shall be followed.
3. Unless otherwise provided in the Schedule of Quantities/Specifications, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the work and nothing extra shall be payable to him on account of the same. Extra payment for centering/shuttering, if required to be done for heights greater than 3.5 m shall however be admissible at the rates arrived at in accordance with clause 12 of the agreement, if not already specified.
4. The proposed building is a prestigious project and quality of work is paramount importance. Contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work. Many items like stone masonry & stone cladding works, stone flooring, structural glazing, PVDF coating aluminium composite panel and other specialized flooring work, Wood work will specially require engagement of skilled workers having experience particularly in execution of such items.
5. a) The contractor (s) shall inspect the site of work before tendering and acquaint himself with the site conditions and no claim on this account shall be entertained by the department.  
  
b) The contractor (s) shall get himself acquainted with nature and extent of the work and satisfy himself about the availability of materials from kiln or approved quarries for collection and conveyance of materials required for construction.
6. The contractor (s) shall study the soil investigation report for the site, available in the office of the Engineer-in-Charge and satisfy himself about complete characteristics of soil and other parameters of site. However, no claim on the alleged inadequacy or incorrectness of the soil data shall be entertained.
7. The tenderer shall see the approaches to the site. In case any approach from main road is required by the contractor, the same shall be made good, improved and maintained by the contractor at his own cost. No payment shall be made on this account.
8. The contractor (s) shall give to the Municipality, Police and other authorities all necessary notices etc. that may be required by law and obtain all requisite Licenses for temporary

- obstructions, enclosures etc. and pay all fee, taxes and charges which may be leviable on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain light and other illumination on for cautioning the public at night.
9. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night speed limit boards red flags, red lights and providing barriers. He shall be responsible for all dangers and incidents caused to existing / new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
  10. Contractor shall provide permanent bench marks and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings
  11. The contractor shall make his own arrangement for obtaining electric connection(s) if required and make necessary payments directly to the department concerned.
  12. Other agencies doing works related with this project may also simultaneously execute their works and the contractor shall afford necessary facilities for the same. The contractor shall leave such necessary holes, openings etc. for laying/burying in the work, pipes cables, conduits, clamps, boxes and hooks for fan clamps etc. as may be required for the other agencies. Nothing extra over the Agreement rates shall be paid for doing these.
  13. Some restrictions may be imposed by the security staff etc. on the working and for movement of labour, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on account of the same.
  14. The contractor shall fully comply with all legal orders and directions of the Public or local authorities or municipality and adhere by their rules and regulations and pay all fees and charges for which he may be liable in this regard. Nothing extra shall be paid/reimbursed for the same.
  15. The building work shall be carried out in the manner complying in all respects with the requirements of the relevant bylaws and regulations of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-charge and nothing extra shall be paid on this account.
  16. The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted by making his own arrangements for water supply, electricity etc. and nothing extra whatsoever shall be payable for the same.
  17. If as per local Municipal regulations, huts for labour are not to be erected at the site of work, the contractor shall be required to provide such accommodation at a place as is acceptable to the local body and nothing extra shall be paid on this account.
  18. It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard.
  19. The structural and architectural drawings shall at all times be properly co-related before executing any work. However, in case of any discrepancy in the item given in the schedule of quantities appended with the tender and Architectural drawings relating to the relevant item, the former shall prevail unless otherwise given in writing by the Engineer-in-charge.
  20. The contractor shall maintain in perfect condition, all portions executed till completion of the entire work allotted to him. Where however phased delivery of work is contemplated these provisions shall apply separately to each phase.
  21. The entire royalty at the prevalent rates shall have to be paid by the contractor on all the boulders, metals, shingle sand etc. collected by him for execution of the work, directly to the

Revenue authority or authorized agents of the State Government concerned or the Central Government, as the case may be.

22. PROGRAMME CHART

- a. The contractor shall prepare an integrated programme chart for the execution of work, showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfillment of the programme within the stipulated period or earlier as indicated in the mile stones under clause 5 of the contract and submit the same for approval to the Engineer-in-Charge within ten days of the award of the contract.
  - b. The program charts should include the following:-
    - i. Descriptive note explaining sequence of various activities.
    - ii. Network (PERT/CPM/BAR CHART)
    - iii. Programme for procurement of materials by the contractor
    - iv. Programme of procurement of machinery/equipment's having adequate capacity commensurate with the quantum of work to be done within the stipulated period by the contractor.
23. If it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above the contractor shall produce a revised programme showing the modifications to the approved programme to ensure completion of the work within the stipulated time for completion.
24. The submission for approval by the Engineer-in-Charge of such programme or the furnishing of such particulars shall not relieve the contractor of any of his duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in- Charge to take action against the contractor as per terms and conditions of the agreement.
25. If the work is carried out in more than one shift or during night no claim on this account shall be entertained.
26. Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.
27. The contractor shall be responsible for the watch and ward/guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. No extra payment shall be made on this account.
28. The contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by department.
29. Any cement slurry added over base surface for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable for extra cement considered in consumption on this account.
30. The contractor shall take instructions from the Engineer-in-charge for stacking of materials. No excavated earth or building materials etc. shall be stacked/collected in areas where other buildings, roads, services, compound walls etc. are to be constructed.
31. Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.
- a. The contractor shall submit for the approval of Engineer-in-Charge names of specialized agencies of repute along with their technical capacity proposed to be

engaged by him, who must have executed satisfactorily works of value as specified in mandatory conditions.

- b. The works shall be carried out in accordance with the Architectural drawings and structural drawings, to be issued from time to time by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings issued for the work and satisfy himself that the information available there of is complete and unambiguous. The discrepancy, if any shall be brought to the notice of the Engineer-in-Charge before execution of the work. The contractor alone shall be responsible for any loss or damage executing by the commencement of work on the basis of any erroneous and or incomplete information.
  - c. The contractor shall take all precautions to avoid accidents by, exhibiting caution boards day and night, speed limit boards, red flags, red light and providing necessary barriers and other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part.
  - d. Other agencies will also simultaneously execute and install the works of electrification, air conditioning, lifts, fire-fighting etc. for this work and the contractor shall provide necessary facilities for the same. The contractor shall leave such recesses, holes openings etc. as may be required for the electric, air-conditioning and other related works (for which inserts, sleeves, brackets, conduits base pinion, clamps etc. shall be supplied free of cost by the department unless otherwise specifically mentioned) and the contractor shall fix the same at time of casting of concrete, stone work & brick work, if required and nothing extra shall be payable on this account.
  - e. The contractor shall conduct work so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.
  - f. All Architectural drawings given in the tender other than those indicated in nomenclature of items are only indicative of the nature of the work and materials/fixings involved unless and otherwise specifically mentioned. However, the work shall be executed in accordance with the drawings duly approved by the Engineer-in-Charge.
32. Samples of all materials and fittings to be used in the work in respect of brand manufacturer and quality shall be got approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work. Articles bearing BIS certifications mark shall only be used unless no manufacturer has got BIS mark for the particular material. Any material/fitting whose sample has not been approved in advance and any other unapproved material brought by the contractor shall be immediately removed as soon as directed
- Unless otherwise specified in the schedule of quantities the rates for all items shall be considered as inclusive of pumping/baling out water, if necessary, for which no extra payment shall be made. Those conditions shall be considered to include water from any source such as inflow of flood, surface and sub-soil water etc. and shall apply to the execution in any season.
33. On completion of work, the contractor shall submit at his own cost four prints of “as built” drawings to the Engineer-in-Charge within 30 days of completion of work. These drawings shall have the following information:

- a. Route of all piping and their diameters including soil waste pipes & vertical stacks.
  - b. Ground and invert levels of all drainage pipes together with locations of all manholes and connections upto outfall.
  - c. Route of all water supply lines with diameters, location of control valves, access panels etc.
34. No extra payment will be made for operation/activity mentioned at Sl. No. 1 to 33 above unless specifically mentioned otherwise.
35. Condition regarding secured advance :-  
Secured advance shall be admissible only on those bonafide materials which are likely to be used in the work in a period not exceeding six months from the date of secured advance payment. If agency fails to use the material (in respect of which secured advance have been paid) in the work in this specified period of six month, the said component of secured advance shall be recovered from next running account bill paid to the agency. Secured advance on the same material shall not be paid again.

## CONSTRUCTION SPECIFICATON & SPECIAL CONDITION OF WORK

### A. SCOPE OF WORK

**Contractor's scope of works will be Renovation of Traffic Training Institute Building as per the details below:**

Site Location : Traffic Training Institute, Dr. B.A. Road, Hansraj Lane, Byculla East, Mazgaon, Mumbai, Maharashtra 400010

The scope of work includes Upgradation, renovation and interior designing works, finishing and furnishing for effective and judicious use of space of Traffic Training Institute, Byculla. The institute is a G+4 framed RCC structure having a built-up area of approximately 3000 sqm.

Improvement and Upgradation of Auditorium, lectures halls, exhibition halls, training rooms, Principal Room, Vice Principal Room, etc. are as mentioned in the drawings and interior designing/planning, finishing and furnishing work with following items as per requirement of MMRC. The scope includes the following works:

- Various Civil work such as Repair / replacement in existing concrete / plaster / masonry work, wood work, plumbing work, brick work, painting work, flooring work, removal of chokes, seepage, leakage, dampness; clearing malba, debris; dry wall, false ceiling, water proofing, raised flooring, sanitary blocks etc.
- Removing of dado/skirting.
- Acoustical arrangements, furniture fitting, civil work and all furnishings of Auditorium at Ground Floor including public announcement, HVAC, Projector & Screen, etc.
- All furnishing and Civil work in Canteen at ground Floor with kitchen and pantry including all items required in a kitchen, pantry.
- HVAC, electrical installation work, fire fighting, P.A system in various rooms etc.
- Interior designing of Principal Room, Vice Principal room, Training Rooms, Exhibition Rooms and other areas with provision of audio visual systems, stage lighting, etc.
- Electrical Installation scheme along with type of luminiare/other gadgets required if any for auditorium, training, exhibition and other rooms, etc.
- Internal and external Lighting and illumination work etc.

The contractor shall specifically be required to provide the complete planning/detailing for the following areas as per the details given below: -

Location	Tentative use of space.
Ground floor	Reception Area, Waiting Area, Auditorium, Canteen, Toilets, Lobby, etc. (The work will include civil works related to brick masonry, flooring, false ceiling, painting, upgradation of toilet blocks including demolishing existing toilets, wall cladding, in entrance porch area, construction of auditorium in existing building including stage, stepped flooring and interior related works, etc. as directed by E-in-C) Electrical and Allied works.



First floor	Traffic Educational Exhibition, Traffic Technical Exhibition, Simulators, Lobby, Toilets, etc. (The work at 1 <sup>st</sup> floor includes demolition of brick wall, making partition dry walls upto ceiling height, upgradation of toilet blocks including demolishing existing toilets, plastering, flooring, construction of exhibition rooms, etc. as directed by E-in-C) Electrical and Allied works.
Second floor	Harvard Style Training Room, Staff Room, Cabin, Lobby & Waiting Area, etc. (The work at 1 <sup>st</sup> floor includes demolition of brick wall, making partition dry walls upto ceiling height, upgradation of toilet blocks including demolishing existing toilets, plastering, flooring, construction of training rooms, raised flooring in Harvard style training room, etc. as directed by E-in-C). Electrical and Allied works.
Third Floor	Training Rooms, Cabins, Staff Rooms, Toilets, Lobby, etc. (The work at 1 <sup>st</sup> floor includes demolition of brick wall, making partition dry walls upto ceiling height, upgradation of toilet blocks including demolishing existing toilets, plastering, flooring, construction of training rooms, etc. as directed by E-in-C) Electrical and Allied works.
Fourth Floor	Digital Library, Technical Rooms, Principal Room, Vice Principal Room, Pas Room, ACP Room, Ante Rooms, Toilets, Lobby, Waiting Rooms, etc. (The work at 1 <sup>st</sup> floor includes demolition of brick wall, making partition dry walls upto ceiling height, upgradation of toilet blocks including demolishing existing toilets, plastering, flooring, construction of training rooms, Principal and Vice Principal Rooms, etc. as directed by E-in-C) Electrical and Allied works.
Terrace	Water Proofing of terrace
External Finishes	Painting all over external faces except full height structural glazing and aluminium composite panel cladding in front portion.

1. GENERAL

These Specifications contained herein shall be read in conjunction with other Bid documents.

The Work shall be carried out in accordance with the "Good for Construction" drawings and as duly approved and stamped by the Employer. The Contractor shall not take cognizance of any drawings, designs, specifications, etc. not bearing the signature and stamp of the Employer. Similarly, the Contractor shall not take cognizance of instructions given by any other Authority except the instructions given by the Employer in writing.

The specifications may have been divided into different sections / sub-heads for convenience only. They do not restrict any cross-references. The Contractor shall take into account inter-relations between various parts of works/trades. No claim shall be entertained on the basis of compartmental interpretations.

2. REFERENCE TO THE STANDARD CODES OF PRACTICE:

The Contractor shall make available at Site all relevant Codes of practice as applicable.

Legend:

CPWD      Central Public Works Department

IRS Indian Railway Standards  
IS Indian Standards  
MORT&H Ministry of Road Transport and Highways  
RDSO Guidelines for Railway Embankments

3. QUALITY ASSURANCE:

- (i) The work shall conform to high standards workmanship and aesthetically pleasing. The Contractor shall conform to the Quality standards prescribed, which shall form the backbone for the Quality Assurance system.
- (ii) The Contractor shall arrange for the proper stacking/storage of the construction materials at Site to ensure the quality requirement. The Contractor shall provide all the necessary equipment and qualified manpower to test the quality of materials, assemblies, etc., as directed by the Employer. The tests shall be conducted at specified intervals and the results of tests properly documented. In addition, the Contractor shall keep appropriate tools and equipment for checking alignments, levels, slopes and evenness of the surfaces.
  - a. The test shall be conducted at nominated Standard Laboratory selected by the Employer.
  - b. All testing shall be performed in the presence of Employer. Testing may be witnessed by the Contractor or his authorized representative if permitted by the Test House. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.

The Employer shall have the right at all times to inspect all operations including the sources of materials, procurement, layout and storage of materials, all equipment and the quality control system. Such an inspection shall be arranged and the Employer's approval obtained prior to starting of the particular item of work. This shall however, not relieve the Contractor of his responsibilities. All materials which do not conform to these specifications shall be rejected and shall be removed from the Site immediately. The Employer shall have the powers to cause the Contractors to purchase and use materials from any particular source, as may in the Employer's opinion be necessary for the proper execution of work.

4. DIMENSIONS:

- (i) Figured dimensions on drawings shall only be followed and drawings to a large scale shall take precedence over those to a smaller scale. Special dimensions or directions in the specifications shall supersede all others. All dimensions shall be checked prior to execution.
- (ii) The levels, measurements and other information concerning the existing Site as shown on the drawings are believed to be correct, but the Contractor shall verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any errors or omissions in the levels or the description of the ground levels or strata turning out different from what was shown on the drawings.

5. SETTING OUT OF WORKS:

The Contractor shall provide suitable stones or steel plates with flat tops and build the same in concrete for temporary bench marks. All the pegs, control pillars for setting out the works and fixing the levels required for the execution shall be built in masonry as directed by the Employer. The Contractor shall protect and preserve all bench marks and control pillars till completion of assigned job. The Contractor shall submit overall survey report and layout of work and get it checked from Employer prior to commencement of work. The cost of all operations of setting out including construction of bench marks is deemed to be included in the quoted rates / Bill of Quantities.

- (i) All the survey work except levelling work shall be carried out using total stations with minimum one second accuracy. The levelling work however, shall be carried out using Auto level.
- (ii) The triangulations points given by the Employer before start of work shall be maintained during execution and handed back to the Employer after completion of work.

6. MATERIALS:

(i) Source of Materials:

It shall be the responsibility of the Contractor to procure all the materials required for the construction and work completion according to the contract. The Contractor shall indicate in writing the source of materials well in advance to the Employer, after the award of the work and before commencing the work. If the material from any source is found to be unacceptable at any time, it shall be rejected by the Employer and the Contractor shall forthwith remove the material immediately from the Site as directed by the Employer.

(ii) Quality:

All materials used in the works shall be new and of the best quality of their respective kinds as specified herein, obtained from sources and suppliers approved by the Employer and shall comply strictly with the tests prescribed hereafter, or where tests are not laid down in the specifications, with the requirements of the latest issues of the relevant Indian Standards.

(iii) Sampling and Testing:

All materials used in the works shall be subjected to inspection and testing in addition to manufacturer's test certificates. Samples of all materials proposed to be used in the permanent works shall be submitted to the Employer at least 30 days in advance for approval before they are brought to the Site. Samples provided to the Employer for their retention are to be labelled and stored.

Materials or workmanship not corresponding in character and quality with approved samples will be rejected by the Employer. Samples required for approval and testing must be supplied sufficiently in advance for the fact that if the first sample is rejected further samples may be required. Delay to the works arising from the late submission of samples will not be acceptable as a reason for delay in completion of the works.

Materials shall also be tested on the Site and they may be rejected; if not found suitable in accordance with the specification, notwithstanding the results of quarry test certificates or any approval given earlier.

(iv) Dispatch of Materials:

Materials shall not be dispatched from the manufacturer's works to the Site without written approval from the Employer.

(v) Rejection:

Any materials that have not been found to conform to the specifications shall be rejected immediately and shall be removed from the Site by the Contractor at his own cost within two weeks or as instructed by the Employer.

7. STORAGE OF MATERIALS AT SITE:

All materials used in the works shall be stored on racks, supports, in bins, under cover, etc. as appropriate to prevent deterioration or damage from any cause whatsoever and to the entire satisfaction of the Employer.

The storage of materials shall be in accordance with IS 4082 “Recommendation on stacking and storage or construction materials on site” and as per IS 7969 “Safety code for handling and storage of building materials”.

The materials shall be stored in a proper manner at places at Site approved by the Employer. In case the place where material is stored by the Contractor is required by the Employer for any other purpose, the Contractor shall immediately remove the material from that place at his own cost and clear the place for the use of the Employer.

8. WATER:

(i) Water from approved source:

Potable water only shall be used for the works. The Contractor shall have his own source of water duly approved by Employer. The water shall be free from any deleterious matter in solution or in suspension and be obtained from an approved source. The quality of water shall conform to IS 456.

(ii) Storage:

The Contractor shall make his own arrangements for storing water, if necessary, in drums or tanks as approval by the Employer. Care shall be taken to see that water is not contaminated.

(iii) Testing:

Before starting any concreting work with new water source and wherever the source of water changes, the water shall be tested for its chemical and other impurities to ascertain its suitability for the use in concrete. No water shall be used until tested, and approved by the Employer. Cost of all such Tests shall be borne by the Contractor.

9. WORKMANSHIP:

(i) All works shall be true to level, plumb and square and the corners, edges and arises in all cases shall be unbroken and neat.

(ii) Any work not to the satisfaction of the Employer or his representative will be rejected.

(iii) Rejected work shall be removed and replaced or rectified with work of the required standard of workmanship at the discretion of Employer at no extra cost.

10. STRUCTURAL WORK:

(i) Unless specified, only controlled concrete with design mix and weigh batching shall be used for the work.

(ii) Minimum cement content specified in IS: 456-2000 specification is purely from durability point of view. Larger content of cement shall have to be provided if required by mix design.

(iii) Provision of cement slurry to create bond between plain / reinforced concrete surface and subsequent applied finishes shall not be paid extra.

(iv) Mix design using smaller aggregates of 10mm down shall also be done in advance for the use in the locations having congested reinforcement.

(v) Procedure of mixing the admixtures shall be strictly as per the manufacturer’s recommendation if not otherwise directed by the Employer.

(vi) All the water tanks and other liquid retaining concrete structures shall undergo hydraulic testing.

(vii) Special benches shall be provided at Site for stacking reinforcement bars of different sizes.

(viii) Formwork for beams of RCC areas shall be designed in such a way that the formwork of the adjacent structures can be removed without disturbing the props / supports of the beams.

(ix) Wherever there are tension / suspended concrete members which are suspended from upper level structural members, the shuttering / scaffolding of such members at lower level shall

have to be kept in place till the time the upper level supporting members gain minimum required strength. Cost of such larger duration of keeping in place the shuttering/scaffolding shall be deemed to be included in the rates quoted for respective structural members.

- (x) Formwork is required for full height at all locations. Special precaution for such tall formwork shall be taken to ensure its safety. Extra costs for such formwork shall be deemed to have been included in the rates quoted against relevant items.
- (xi) During the mobilization period, the Contractor shall carry out expeditiously and without delay the following works:
  - i. Material testing and mix designs of concrete as contemplated in the specifications.
  - ii. Any other pre-requisite items required for final execution.
  - iii. Site office for the use of the Employer staff.

**11. SUPPLY OF PROGRESS PHOTOGRAPHS AND ALBUMS:**

The work covers the supply of colour photographs and albums to serve as a permanent record of various stages/facets of work needed for an authentic documentation as approved by the Employer. The photographs shall be of acceptable quality and they shall be taken by a professionally competent photographer with camera having the facility to record the date of the photographs taken in the prints and the negative. Each photograph in the album shall be suitably captioned and dated. The photographs and materials including soft copy shall form a part of the records for the Employer and prints of the same cannot be supplied to anybody else or published without the written permission of the Employer.

**12. SURVEY WORK:**

The said work involves at the very start of work taking-over of reference point from the Employer, establishment of control points, triangulation points, bench marks, grid layout for all the structures maintaining horizontal and vertical control within the permissible limits, incorporating changes (if any), submission of full data in the tabulation form and survey drawings during the progress of work.

**13. BARRICADING:**

The work covers barricading for the work/site areas provided/allotted for construction of various works/structures/ storage and other working area. Barricading shall be done by the Contractor at his own cost. The detailed scope of work is as follows:

- a. Providing and installing the barricade as per the design and type as shown in the typical sketch furnished as per the approved plan to be installed firmly to the ground and maintaining it during the progress of work for the entire Contract period.
- b. Lateral shifting of barricading if required for satisfactory execution of various works at Depot.
- c. Dismantling of barricading and other temporary installations from the Site and cleaning the Site as per direction of Employer upon completion and acceptance of work.

**14. SUB-CONTRACTOR / SPECIALIZED FIRMS:**

Works as listed below and those dealing with proprietary materials/ products/equipment may be carried out by the Contractor through the Sub-Contractors / Specialized Firms as may be approved by the Employer in writing. The Sub-Contractors / Specialized Firms must be firms of repute and long standing, having adequate experience and have complete facilities to carry out all items of work required for completion as per Specifications and expected quality to the satisfaction of the Employer. Contractor shall obtain approval of Employer in advance prior to nominating their subcontracting, specialized firm for carrying out works.

List of Works to be executed by Specialized Agencies:

- (i) Water Proofing Works
  - (ii) Structural Glazing
  - (iii) Aluminum Composite Paneling
  - (iv) External Painting
15. APPLICABLE CODES, STANDARDS & PUBLICATIONS FOR EARTHWORK, STRUCTURAL & ARCHITECTURAL WORK:

The more important Codes, Standards and Publications to Contract are listed here under:

A. General

- IS:2720 - (Part-I to part-XXXII) –Method of test for soils
- SP 7 National Building Code of India
- SP 23 (S&T) Hand Book on Concrete Mixes

B. Bitumen

- IS:3384 Specification for bitumen primer for use in waterproofing and damp-proofing

C. Building Construction Practices

- IS: 1838 Parts I and II.  
Specifications for preformed fillers for expansion joint in concrete pavements and structures.
- IS: 11134 Code of Practice for setting out of buildings.
- IS: 11433 Parts I and II. Specifications for one part Gun grade poly-sulphide based joint sealant

D. Cement

- IS: 455 Portland Slag Cement
- IS: 650 Specification for standard sand for testing cement
- IS: 1489 (Part 1) Portland pozzolana cement: Fly ash based
- IS: 6925 Methods of test for determination of water soluble chlorides in concrete admixtures.
- IS: 8042 White Portland Cement
- IS: 8112 Specification for 43 grade ordinary Portland cement
- IS: 12269 Specification for 53 grade ordinary Portland cement
- IS: 12330 Specification for sulphate resistant Portland cement

E. Concrete

- IS:456 Code of practice for plain and reinforced concrete
- IS:460 (Parts I to III) Specification for Test Sieves
- IS:516 Methods of test for strength of concrete
- IS:1199 Methods of sampling & analysis of concrete
- IS:1200 Method of measurement of building and civil engineering

**LIST OF PREFERRED MAKES FOR CIVIL WORKS**

<b>Sr. No.</b>	<b>Material Description</b>	<b>Approved Manufacture/ Brand Name</b>
1	TMT bars – Fe 500D	SAIL, Tata Steel Ltd, RINL, Jindal Steel & Power Ltd. and Jindal Saw Ltd.
2	Cement (PPC/OPC)	A.C.C., Ultratech, Vikram, Shree cement, Ambuja, Jaypee Cement, Century Cement, Prism& J.K. Cement
3	Admixture	Fosroc, Sika, CICO
4	Ceramic/glazed Tiles	Kajaria, RAK, NITCO
5	White Cement	Birla White, J.K. White or equivalent
6	Primers, paints (Low VOC) (i/c water proofing cement paint) etc.	Nerolac, Asian, Burger, ICI
7	Putty	Birla, J.K. Putty
8	Wash Basin and WC PAN	Parryware, Hindware, Johnson, Jaquar
9	Clear glass	Modi Guard, Saint Gobain, AIS
10	G.I. pipes	Tata, Jindal (HISAR), Prakash Surya, APL Apollo
11	G.I. fittings	UNIK, NVR, Zoloto
12	Centrifugally Cast Iron Spun Pipes & fittings/Sand cast iron pipes	NECO, Electro Steel, SKF
13	DI Pipes & fittings	Kesoram, Electrosteel,Tata Ductura, Jindal
14	Brass / CP Brass fittings	Essco or equivalent
15	Aluminium sections	Hindalco, Jindal, Indian Aluminium Co.
16	Water proofing compound	WEBER, FOSROC, PIDILITE, CICO, Sika
17	Stainless steel sink	Neelkanth, Niral, Jayna, PRAYAG
18	Particle board i/c lamination	ECO BOARD, MERINO or equivalent
19	Plastic W.C. seat cover	Parryware, Hindware, Johnson
20	PVC tanks	Sintex, Vectus or as approved by Engineer-in-Charge.
21	Mirrors	Saint Gobain, Modi Guard
22	CP waste & flush pipes	As approved by Engineer-in-Charge
23	PVC flushing cistern	Parryware, Hindware, Johnson, Cera
24	Tile Fixer / Adhesive	As approved by Engineer-in-Charge
25	Vitreous Floor Tiles	Kajaria, RAK, NITCO
26	Acrylic Exterior Paint	Asian, Burger, Nerolac, Dulux
27	Flush door shutter	Century, TATA Marine, Kitply,vGreenply
28	Fire rated doors	Shakti metdoor, Navair, Bhawani firevdoors
29	False ceiling- Gypsum	Lafarge, Saint Gobain
30	False ceiling- Metal	Saint Gobain, Armstrong
31	False ceiling- Calcium silicate	Aerolite or equivalent as approved by Engineer-in-Charge
32	Floor spring	Dorma, Godrej, Hardwyn
33	Hermetically sealed performance glass & toughened glass	Saint Gobain, ASI
34	Fire rated vision panel	Pilkington, Schott, Ferilite
35	Friction stay	Earl Bihari (Ebco), Godrej
36	EPDM Gasket	Haru, Anand, Ravon, Zero
37	Silicon sealant	GE Plastics, Dow corning, Wacker
38	Steel items	Dorma, Doorset or equivalent

**CONTRACT FOR REMOVAL OF DEFECTS AFTER COMPLETION**  
**IN RESPECT OF WATER PROOFING WORKS**

The Agreement made this \_\_\_\_\_ day of \_\_\_\_\_ Two thousand and \_\_\_\_\_ between \_\_\_\_\_ son of \_\_\_\_\_ (hereinafter called the Guarantor of the one part) and the MD, MMRC (hereinafter called the MMRC of the other part).

WHEREAS THIS agreement is supplementary to a contract (hereinafter called the contract) dated \_\_\_\_\_ and made between the GUARANTOR OF THE ONE part and the MMRC of the other part, whereby the contractor, inter alia, undertook to render the buildings and structures in the contract recited completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structures will remain water and leak-proof for 10 (Ten) years from the date after the maintenance period prescribed in the contract.

NOW THE GUARANTOR hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the Guarantor will not be responsible for the leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose:

- a. Misuse of roof shall mean any operation which will damage proofing treatment, like chopping of firewood and things of the same nature which might cause damage to the roof.
- b. Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts.
- c. The decision of the Engineer-in –charge with regard to cause of leakage/seepage shall be final.

During this period of guarantee the guarantor shall make good all defects and in case of any defect being found, render the building water proof to the satisfaction of the Engineer-in– charge at his cost and shall commence the work for the rectification within seven days from the date of issue of the notice from the Engineer-in–charge calling upon him to rectify the defects failing which the work shall be done by the department by some other agency contractor at the GUARANTOR’s risk and cost. The decision of the Engineer-in–charge as to the cost payable by the Guarantor shall be final and binding.

That if guarantor fails to make good all defects or commits breach thereunder then the Guarantor will indemnify the principal and his successors against all loss, damage, cost expense otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the MMRC the decision of the Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligor \_\_\_\_\_ and by \_\_\_\_\_ and for and on behalf of the MD, MMRC on the day, month and year first above written SIGNED, SEALED AND delivered by

OBLIGOR in the presence of:

- 1. ....
- 2. ....

SIGNED FOR AND ON BEHALF OF THE MD, MMRC BY \_\_\_\_\_ in the presence of:

- 1. ....
- 2. ....



**TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF ALUMINIUM DOORS, WINDOWS VENTILATORS, STRUCTURAL GLAZING & PVDF COATED ALUMINIUM COMPOSITE PANEL WORKS**

The agreement made this \_\_\_\_\_ day of \_\_\_\_\_ Two Thousand and \_\_\_\_\_ between \_\_\_\_\_ son of \_\_\_\_\_ (hereinafter called the GURANTOR of the one part) and the MD, MMRC (hereinafter called the MD of the other part.)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated \_\_\_\_\_ and made between the GUARANTOR OF THE ONE PART AND the MMRC of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable, leak proof and sound material, workmanship, anodizing, colouring, sealing.

AND WHEREAS THE GURANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable, leak proof and guaranteed against faulty material and workmanship, defective anodizing, colouring, sealing and finishing for 2 (Two) years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable, leak proof and guaranteed against faulty material and workmanship, defective anodizing, colouring, sealing and finishing for two years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to nature and cause of defects shall be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's risk and cost. The decision of the Engineer-in-Charge as to the cost, payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects or commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the MMRC, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents, have been executed by the obligator \_\_\_\_\_ and \_\_\_\_\_ by \_\_\_\_\_ for and on behalf of the MD, MMRC on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of:

1. \_\_\_\_\_
2. \_\_\_\_\_

SIGNED FOR AND ON BEHALF OF THE MD, MMRC BY \_\_\_\_\_ in the presence of :

1. \_\_\_\_\_
2. \_\_\_\_\_

**TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER SUPPLY AND SANITARY INSTALLATIONS**

The agreement made this \_\_\_\_\_ day of \_\_\_\_\_ Two Thousand and \_\_\_\_\_ between \_\_\_\_\_ son of \_\_\_\_\_ (hereinafter called the GUARANTOR of the one part) and the MD, MMRC (hereinafter called the MD of the other part.)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated \_\_\_\_\_ and made between the GUARANTOR OF THE ONE PART AND the MMRC of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable workmanship, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty workmanship, finishing, manufacturing defects of materials and leakages, etc.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable after expiry of maintenance period prescribed in the contract for the minimum life of 02 (Two) year to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost, payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the MMRC, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents, have been executed by the obligator

\_\_\_\_\_ and \_\_\_\_\_ by \_\_\_\_\_ for and on behalf of the MD, MMRC on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of:

1. \_\_\_\_\_
2. \_\_\_\_\_

SIGNED FOR AND ON BEHALF OF THE MD, MMRC BY \_\_\_\_\_ in the presence of :

1. \_\_\_\_\_
2. \_\_\_\_\_

**Form of Performance Security (Guarantee)**

**Bank Guarantee Bond**

In consideration of the MD, MMRC (hereinafter called “The MMRC”) having offered to accept the terms and conditions of the proposed agreement between.....and ..... (hereinafter called “the said Contractor(s)”) for the work ..... (hereinafter called “the said agreement”) having agreed to production of an irrevocable Bank Guarantee for Rs. .... (Rupees ..... only) as a security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. We, ..... (hereinafter referred to as “the Bank”) hereby undertake to pay to the MMRC an amount not exceeding Rs. .... (Rupees..... Only) on demand by the MMRC.
2. We, ..... (indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the MMRC stating that the amount claimed as required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. .... (Rupees .....only)
3. We, the said bank further undertake to pay the MMRC any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.
4. We, ..... (indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the MMRC under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in- Charge on behalf of the MMRC certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.
5. We, ..... (indicate the name of the Bank) further agree with the MMRC that the MMRC shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the MMRC against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being

granted to the said Contractor(s) or for any forbearance, act of omission on the part of the MMRC or any indulgence by the MMRC to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
7. We, ..... (indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the MMRC in writing.
8. This guarantee shall be valid up to .....unless extended on demand by the MMRC. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. .... (Rupees .....) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the .....day of .....for.....(indicate the name of the Bank)

### Mile stones of the Contract

Sr. No.	Description of Item	Time Schedule
1	To plan and prepare work breakdown structure including Master programme, Milestone charts of the construction programme, Bar charts etc. and working drawings as per requirement of MMRCL for the said building after obtaining the consent of the department for this purpose time to time if any changes required in the planning what so ever be entertained. <b>Milestone 1</b>	2 Weeks
2	Removal of existing utilities, electrical works, doors, walls, drawings, dado, flooring as per etc <b>Milestone 2</b>	4 Weeks
3	Completion of all the civil works waterproofing, Electrical conduiting below flooring walls, dado, flooring, toilet fixtures, glazing and ACP cladding etc. <b>Milestone 3</b>	18 Weeks
4	Completion of dry wall framing, wall paneling framing, raised flooring framing and suspended ceiling framing etc. <b>Milestone 4</b>	4 Weeks
5	Completion of E&M works like HVAC ducting, Firefighting, DATA audio-visual system ducting-wiring and telecom ducting and wiring etc <b>Milestone 5</b>	8 Weeks
6	Completion of fixed furniture, doors, windows etc <b>Milestone 6</b>	3 Weeks
7	Completion of E&M works like light fittings, switches sockets, HVAC units, DATA audio-visual system telecom, cctv etc <b>Milestone 7</b>	10 Weeks
8	Completion of painting works, finishing works, polishing, touchups etc <b>Milestone 8 (completion of work)</b>	4 Weeks
9	On submitting completion report (Include Photography & videography of the progress of work) and issuance of as built drawings 10 nos. sets + CD's and handing over the building to the client Department.	2 Weeks

**SCHEDULE OF QUANTITY- CIVIL WORK**

**Name of Work: Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.**

S. No.	Item	Unit	Rate	Quantity	Amount
1	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge. In cement mortar	Cum.	842.75	90.00	75847.50
2	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead. For thickness of tiles 10 mm to 25 mm	Sqm.	31.55	2400.00	75720.00
3	Dismantling precast concrete or stone slabs in walls, partition walls etc. including stacking within 50 metres lead	Sqm.	119.95	800.00	95960.00
4	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 metres lead : 150 mm dia pipe	Rmt.	32.90	60.00	1974.00
5	Dismantling aluminium/ Gypsum partitions, doors, windows, fixed glazing and false ceiling including disposal of unserviceable surplus material and stacking of serviceable material within 50 metres lead as directed by Engineer-in-charge.	Sqm.	24.30	340.00	8262.00
6	Dismantling of flushing cistern of all types (C.I./PVC/Vitrious China) including stacking of useful materials near the site and disposal of unserviceable materials within 50 metres lead.	No.	391.20	46.00	17995.20
7	Dismantling W.C. Pan of all sizes including disposal of dismantled materials i/c malba all complete as per directions of Engineer-in- Charge.	No.	55.45	46.00	2550.70
8	Dismantling old plaster or skirting raking out joints and cleaning the surface for plaster including disposal of rubbish to the dumping ground within 50 metres lead.	Sqm.	22.40	1000.00	22400.00
9	Disposal of moorum/building rubbish/ malba/ similar unserviceable, dismantled or waste material by mechanical transport including loading, transporting, unloading to approved municipal dumping ground for lead upto 10 km for all lifts, complete as per directions of Engineer-in-charge. Note - item to be applicable in urban areas having	Cum.	209.90	150.00	31485.00

	directions for restricted hours for movement/ plying of load carrying motor vehicle of 3.5 cum or more.				
10	Providing and laying autoclaved aerated cement blocks masonry with 100 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand ). The rate includes providing and placing in position 2 Nos 6 mm dia M.S. bars at every third course of masonry work.	Cum.	6818.60	170.00	1159162.00
11	12 mm cement plaster of mix 1:4 (1 cement: 4 fine sand)	Sqm.	172.95	1000.00	172950.00
12	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. 35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	Sqm.	2488.95	164.00	408187.80
13	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embedding in cement concrete block 30x10x15cm 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20mm nominal size).	No.	118.60	498.00	59062.80
14	Providing and fixing bright finished brass tower bolts (barrel type) with necessary screws etc. complete: 250x10 mm	No.	313.20	45.00	14094.00
15	Providing and fixing bright finished brass night latch of approved quality including necessary screws etc. complete.	No.	794.55	45.00	35754.75
16	Providing and fixing chromium plated brass handles with necessary screws etc. complete: 125 mm	No.	211.85	54.00	11439.90
17	Providing and fixing 150 mm bright finished floor brass door stopper with rubber cushion, necessary brass screws etc. to suit shutter thickness complete	No.	211.15	45.00	9501.75

18	<p>Providing and fixing partition upto ceiling height consisting of G.I. frame and required board, including providing and fixing of frame work made of special section power pressed/ roll form G.I. sheet with zinc coating of 120 gms/ sqm(both side inclusive), consisting of floor and ceiling channel 50mm wide having equal flanges of 32 mm and 0.50 mm thick, fixed to the floor and ceiling at the spacing of 610 mm centre to centre with dash fastener of 12.5 mm dia meter 50 mm length or suitable anchor fastener or metal screws with nylon plugs and the studs 48 mm wide having one flange of 34 mm and other flange 36 mm and 0.50 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610 mm centre to centre by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall with suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm centre to centre, and fixing of boards to both side of frame work by 25 mm long dry wall screws on studs, floor and ceiling channels at the spacing of 300 mm centre to centre. The boards are to be fixed to the frame work with joints staggered to avoid through cracks, M.S. fixing channel of 99 mm width (0.9 mm thick having two flanges of 9.5 mm each) to be provided at the horizontal joints of two boards, fixed to the studs using metal to metal flat head screws, including jointing and finishing to a flush finish with recommended jointing compound, jointing tape, angle beads at corners (25 mm x 25 mm x 0.5 mm), joint finisher and two coats of primer suitable for board as per manufacture's specification and direction of engineer in charge all complete. 66mm overall thickness Partition with 8mm thick double skin Calcium Silicate Board made with Calcareous &amp; Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process with Compressive Strength 225 kg/sq.cm, Bending Strength 100 kg./ sq.cm</p>	Sqm.	1309.65	371.46	486482.59
19	<p>Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.</p>	No.	414.45	45.00	18650.25



20	Providing and laying rectified Glazed Ceramic floor tiles of size 300x300 mm or more (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick Cement Mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including pointing the joints with white cement and matching pigments etc., complete.	Sqm.	901.05	240.17	216403.56
21	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., Size of Tile 600x600 mm complete.	Sqm.	1119.40	2400.00	2686560.00

22	<p>Providing and Fixing 15 mm thick densified tegular edged eco friendly light weight calcium silicate false ceiling tiles of approved texture of size 595 x 595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanised steel sections (galvanising @ 120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and of size 24x38 mm made from 0.33 mm thick (minimum) sheet, spaced 1200 mm centre to centre, and cross "T" of size 24x28 mm made out of 0.33 mm (Minimum) sheet, 1200 mm long spaced between main 'T' at 600 mm centre to centre to form a grid of 1200x600 mm and secondary cross 'T' of length 600 mm and size 24 x28 mm made of 0.33 mm thick (Minimum) sheet to be inter locked at middle of the 1200x 600 mm panel to form grid of size 600x600 mm, resting on periphery walls /partitions on a Perimeter wall angle pre-coated steel of size(24x24X3000 mm made of 0.40 mm thick (minimum) sheet with the help of rawl plugs at 450 mm centre to centre with 25 mm long dry wall screws @ 230 mm interval and laying 15 mm thick densified edges calcium silicate ceiling tiles of approved texture in the grid, including, cutting/ making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required. Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25x35x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm G.I. adjustable rods with galvanised steel level clips of size 85 x 30 x 0.8 mm, spaced at 1200 mm centre to centre along main 'T', bottom exposed with 24 mm of all Tsections shall be pre-painted with polyster baked paint, for all heights, as per specifications, drawings and as directed by Engineer-in-Charge.</p>	Sqm.	1497.90	1540.00	2306766.00
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23	<p>Providing &amp; fixing false ceiling at all height including providing &amp; fixing of framework made of special section, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts &amp; bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of Raw plugs at 450mm centre, with 25mm long dry wall screws @ 230mm interval, including fixing of Calcium Silicate Board to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, including jointing &amp; finishing to a flush finish of tapered and square edges of the board with recommended jointing compounds, jointing tapes, finishing with jointing compounds in three layers covering up to 150mm on both sides of joints and two coats of primer suitable for boards, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in charge but excluding the cost of painting with 8 mm thick Calcium Silicate Board made with Calcareous &amp; Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process.</p>	Sqm.	916.75	700.00	641725.00
24	<p>Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.</p>	Sqm.	118.70	1500.00	178050.00

25	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface Water thinnable cement primer	Sqm.	36.95	2400.00	88680.00
26	Finishing walls with textured exterior paint of required shade: New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm	Sqm.	150.65	2600.00	391690.00
27	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade: Two or more coats on new work	Sqm.	84.45	2400.00	202680.00
28	Making the opening in brick masonry including dismantling in floor or walls by cutting masonry and making good the damages to walls, flooring and jambs complete, to match existing surface i/c disposal of mulba/ rubbish to the nearest municipal dumping ground, all complete as per direction of Engineer-in-Charge. For door/ window/ clerestory window	Sqm.	546.25	2.00	1092.50
29	Providing and fixing 16 mm M.S. Fan clamps of standard shape and size in existing R.C.C. slab, including cutting chase, anchoring clamp to reinforcement bar, including cleaning, refilling, making good the chase with matching concrete, plastering and painting the exposed portion of the clamps complete.	No.	259.50	25.00	6487.50
30	Removing dry or oil bound distemper, water proofing cement paint and the like by scrapping, sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete.	Sqm.	10.80	2370.00	25596.00
31	Repainting G.I. pipes and fittings with synthetic enamel paint with one coat of approved quality 50 mm dia pipe	Rmt.	12.45	125.00	1556.25

32	<p>Cleaning of underground sump, Over Head R.C.C. Tank (independent staging) including disposal of slit and rubbish, all as per direction of Engineer-in-Charge. The cleaning shall consist of the following operations:-</p> <p>(i) Tank shall be emptied of water by pumping &amp; bottom shall be cleaned of slit and other deposits.</p> <p>(ii) Entire surface area of the sump shall then scrubbed thoroughly with wire brush etc. and pressure washed with water.</p> <p>(iii) Chlorination of RCC internal surface by liquid chlorine.</p> <p>(iv) The treated surface shall be dried using air jetting and all loose particles shall be removal from the surface.</p> <p>(v) Finally, the surface shall be treated with ultraviolet radiation etc. as per direction of Engineer-in-Charge.</p>	Sqm.	40.70	200.00	8140.00
33	<p>Cleaning of chocked sewer line by diesel running vehicle mounting hydraulic operated high pressure suction cum jetting sewer cleaning machine fitted with pump having 4000 litres suction capacity and 6000 litres water jetting tank capacity including skilled operator, supervising engineer etc. for cleaning and partial desilting of manholes and dechocking of sewer lines. Dechocking and flushing of sewer line from one manhole to another by high pressure jetting system of 2200 PSI for sewer line from 150mm dia upto 300mm dia for all depth.</p>	Rmt.	217.80	25.00	5445.00
34	<p>Taking out existing wooden door shutter, repair by cutting, painting etc. and refixing of repaired door shutters to existing door frames, including replacement of hinges with screws, etc. as required, all complete as per the direction of the Engineer-in-charge.</p>	Each	176.40	10.00	1764.00
35	<p>Providing and fixing water closet squatting pan (Indian type W.C. pan ) with 100 mm sand cast Iron P or S trap, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required: White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests</p>	No.	3494.20	10.00	34942.00

36	Providing and fixing white vitreous china pedestal type water closet (European type) with seat and lid, 10 litre low level white vitreous china flushing cistern & C.P. flush bend with fittings & C.I. brackets, 40 mm flush bend, overflow arrangement with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required W.C. pan with ISI marked white solid plastic seat and lid	No.	4593.75	20.00	91875.00
37	Providing and fixing white vitreous china flat back half stall urinal 1 of size 580x380x350 mm with white PVC automatic flushing cistern, with fittings, standard size C.P. brass flush pipe, spreaders with unions and clamps (all in C.P. brass) with waste fitting as per IS : 2556, C.I. trap with outlet grating and other couplings in C.P. brass, including painting of fitting sand cutting and making good the walls and floors wherever required : Range of three half stall urinals with 10 litre P.V.C. automatic flushing cistern	No.	11694.90	30.00	350847.00
38	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 1.8 cm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth.	Sqmt	2831.95	15.00	42479.25
39	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.	Sqmt	3113.30	32.00	99625.60
40	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require: White Vitreous China Wash basin	No.	2298.55	39.00	89643.45

	size 630x450 mm with a pair of 15 mm C.P. brass pillar taps				
41	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS: 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required Kitchen sink with drain board 510x1040 mm bowl depth 250 mm	No.	4120.80	1.00	4120.80
42	Providing and fixing brass bib cock of approved quality: 15 mm nominal bore	No.	260.10	40.00	10404.00
43	Providing and fixing CP Brass Single lever telephonic wall mixer of quality & make as approved by Engineer in charge. (a) 15 mm nominal dia	No.	4715.75	11.00	51873.25
44	Providing and fixing C.P. brass shower rose with 15 or 20 mm inlet 150 mm diameter	No.	85.90	13.00	1116.70
45	Providing and fixing 8 mm dia C.P. / S.S. Jet with flexible tube upto 1 metre long with S.S. triangular plate to European type W.C. of quality and make as approved by Engineer - in - charge.	No.	254.80	32.00	8153.60
46	Providing and fixing P.V.C. low level flushing cistern with manually controlled device (handle lever) conforming to IS : 7231, with all fitting sand fixtures complete. 10 litre capacity - White	No.	831.50	32.00	26608.00
47	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete. Flexible pipe 32 mm dia	No.	73.25	40.00	2930.00
48	Providing and fixing in position 25 mm diameter mosquito proof coupling of approved municipal design.	No.	38.50	10.00	385.00
49	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	No.	817.95	39.00	31900.05
50	Providing and fixing toilet paper holder: C.P. brass	No.	385.35	32.00	12331.20
51	Providing and fixing soil, waste and vent pipes : 100 mm dia Centrifugally cast (spun) iron socket & spigot (S&S) pipe as per IS: 3989	Rmt.	921.65	140.00	129031.00
52	Providing and filling the joints with spun yarn, cement slurry and cement mortar 1:2 ( 1 cement : 2 fine sand) in S.C.I./ C.I. Pipes : 100 mm dia pipe	No.	85.95	50.00	4297.50

53	Providing and fixing M.S. holder-bat clamps of approved design to Sand Cast iron/cast iron (spun) pipe embedded in and including cement concrete blocks 10x10x10 cm of 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), including cost of cutting holes and making good the walls etc. : For 100 mm dia pipe	No.	167.35	30.00	5020.50
54	Providing and fixing bend of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete. 100 mm dia Sand cast iron S&S as per IS - 1729	No.	340.75	50.00	17037.50
55	Providing and fixing heel rest sanitary bend 100 dia pipe Sand cast iron S&S as per IS - 1729	No.	317.55	5.00	1587.75
56	Providing and fixing double equal junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete : 100x100x100x100 mm Sand cast iron S&S as per IS - 1729	No.	686.65	5.00	3433.25
57	Providing and fixing double equal plain junction of required degree 100x100x100x100 mm Sand cast iron S&S as per IS - 1729	No.	631.15	5.00	3155.75
58	Providing and fixing single equal plain junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete. 100x100x100 mm Sand cast iron S&S as per IS - 1729	No.	484.80	5.00	2424.00
59	Providing and fixing double equal plain invert branch of required degree: 100x100x100 mm Sand cast iron S&S as per IS - 1729	No.	666.00	10.00	6660.00
60	Providing and fixing sand cast iron S&S off sets as per IS: 1729 76 mm off sets with 100 mm dia pipe	No.	443.30	6.00	2659.80
61	Providing and fixing collar: 100 mm Sand cast iron S&S as per IS - 1729	No.	187.45	10.00	1874.50
62	Providing lead caulked joints to sand cast iron/centrifugally cast (spun) iron pipes and fittings of diameter :100 mm	No.	309.95	10.00	3099.50
63	Providing and fixing M.S. stays and clamps for sand cast iron / centrifugally cast (spun) iron pipes of diameter: 100 mm	No.	62.00	10.00	620.00
64	Providing and fixing trap of self-cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 100 mm inlet and 100 mm outlet Sand cast iron S&S as per IS: 3989	No.	1034.45	37.00	38274.65



65	Cutting chases in brick masonry walls for following diameter sand cast iron/ centrifugally cast (spun) iron pipes and making good the same with cement concrete 1:3:6 ( 1 cement : 3 coarse sand :6 graded stone aggregate 12.5 mm nominal size), including necessary plaster and pointing in cement mortar 1:4 (1 cement : 4 coarse sand) : 100 mm dia	Rmt.	355.70	100.00	35570.00
66	Providing and fixing PTMT Bottle Trap for Wash basin and sink. Bottle trap 31mm single piece moulded with height of 270 mm, effective length of tail pipe 260 mm from the centre of the waste coupling, 77 mm breadth with 25 mm minimum water seal, weighing not less than 260 gms	No.	293.95	39.00	11464.05
67	Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms.	No.	137.85	39.00	5376.15
68	Providing and fixing PTMT towel ring trapezoidal shape 215 mm long, 200 mm wide with minimum distances of 37 mm from wall face with concealed fittings arrangement of approved quality and colour, weighing not less than 88 gms.	No.	197.55	39.00	7704.45
69	Providing and fixing G.I. Pipes complete with G.I. fittings and clamps, i/c making good the walls etc. concealed pipe, including painting with anti-corrosive bitumastic paint, cutting chases and making good the wall: 15 mm dia nominal bore	Rmt.	285.70	100.00	28570.00
70	Providing and fixing G.I. Pipes complete with G.I. fittings and clamps, i/c making good the walls etc. concealed pipe, including painting with anti corrosive bitumastic paint, cutting chases and making good the wall 20 mm dia nominal bore	Rmt.	316.20	50.00	15810.00
71	8 mm thick fully perforated calcium silicate board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process to give stable crystalline structure with minimum compressive strength 225 kg/ sq. cm, bending strength 100 kg/sq. cm , of size 595x595 mm, having perforation of dia. 10 mm with minimum perforated area 18 % with non woven tissue on the back side, having an NRC ( Noise Reduction Coefficient) of 0.85, with 50 mm thick rockwool of 48 kg /cum backing.	Sqmt	916.75	796.00	729733.00

72	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	Sqmt	744.80	632.00	470713.60
73	Floor polishing on masonry or concrete floors with wax polish of approved brand and manufacture.	Sqmt	43.50	500.00	21750.00
74	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing , curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	Sqmt	2937.70	50.00	146885.00
75	Providing and fixing machine cut, mirror/ eggshell polished , Marble stone work for wall lining (vener work) including dado, skirting, risers of steps etc., in required design and pattern wherever required, stones of different finished surface texture, on 12 mm (average) thick cement mortar 1:3 (1 cement : 3 coarse sand) laid and jointed with white cement slurry @ 3.3 kg/sqm including pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing, polishing etc. all complete as per Architectural drawings, and as directed by the Engineer-in-Charge. 18 mm thick Italian Marble stone slab, Perlato, Rosso verona, Fire Red or Dark Emperadore etc.	Sqmt	6647.35	75.00	498551.25

76	Roller Blinds Type of Fabrics Blackout Composition of Fab. 100 % Polyester Blackout Rate 100% Weight 310 g/m2 (+-5 % ) Fabric Thickness 0.45 MM (+-0.05) Light Fastness 4 Grade Available Width 2.20 Mtr. Hanging Properties Excellent Tearing Strength Very High Coating Acrylic coating resistant to Cracking & Fraying, Cleaning Conditionally cleanable with damp cloth	Sqmt	2200.00	140.00	308000.00
77	25 mm wooden planking, tongued and grooved in flooring, including fixing with iron screws complete with second class deodar wood	Sqmt	2307.80	387.00	893118.60
78	Providing and fixing removable raised/false access flooring with system and its components of approved make for different plenum height with possible height adjustment upto 50 mm, comprising of modular load bearing floor panels supported on G.I. rectangular stinger frame work and G.I. Pedestal etc. all complete, as per the architectural drawings, as specified and as directed by Engineer-in-charge consisting of a) Providing at required spacing to form modular framework, pedestals made out of GI tube of thickness minimum 2 mm and 25 mm outer diameter, fully welded on to the G.I. Base plate of size 100mm x 100mm x 3mm at the bottom of the pedestal tube, G.I. pedestal head of size 75mmx75mmx3.5 mm welded with GI fully threaded stud 16mm outer diameter with two GI Check nuts screwed on the stud for level adjustment upto 50mm, locking and stabilizing the pedestal head in position at the required level. The pedestals shall be fixed to the subfloor (base) through base plate using epoxy based adhesive of approved make or the machine screw with rawl plug. b) Stringers system in all steel construction hot dipped galvanized of rectangular size 570x20x30x0.80mm thick having holes at both ends for securing the stringers on to the pedestal head using fully threaded screws ensuring maximum lateral stability in all directions, the grid formed by the pedestal and stringer assembly shall receive the floor panel, this system shall provide adequate solid, rigid support for access floor panel, the system shall provide a minimum clear uninterrupted clearance between the bottom of the floor for electrical conduits and wiring etc. all complete as per the				

	<p>architectural drawings, as specified and as directed by the Engineer-in-charge.c) Providing and fixing Access Floor panel of 600x600x32 mm medium grade Filled Steel anti static high pressure Lamination of 800H grade (FS800H). Access Floor panel shall be steel welded construction with an enclosed bottom pan with uniform pattern of 64 hemispherical cones. The top and bottom plates of Steel Gauges: top 0.6 mm and bottom 0.7 mm fused spot welded together (minimum 64 welds in each dome and 20 welds along each flange). The panel should be corrosion resistant epoxy coated for lifetime rust protection and cavity formed by the top and bottom plate is filled with Pyrogrip non-combustible Portland cementitious core mixed with lightweight foaming compound. The access floor shall be factory finished with Anti-static High Pressure laminate with Non Warp technology upto 1 mm thickness for superior adhesion and Surface flatness within 0.75mm.The panel is to withstand a Concentrated Load of 363 kgs applied on area 25mmx25mmwithout collapse in the centre of the panel which is placed on four steel blocks. The panel will withstand and Uniformly Distributed Load(UDL)minimum1250 kg/sqm and, an impact load of 50kg all complete as per the approved manufacturers specification and as per the direction of Engineer-in-charge. All specification must be printed on the side of the panel to ensure the quality of the product.</p>				
	300 mm Finished Floor Height (FFH)	Sqmt	4024.50	200.00	804900.00
	450 mm Finished Floor Height (FFH)	Sqmt	4275.40	100.00	427540.00
79	<p>Providing and fixing panelled or panelled and glazed shutters for doors, windows and clerestory windows, including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer-in-charge. 35 mm thick shutters</p>	Sqmt	2548.15	8.00	20385.20

80	<p>Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including:</p> <p>(a) Structural analysis &amp; design and preparation of shop drawings for pressure equalization or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.</p> <p>(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc. Code Description Unit Rate</p> <p>No. 406(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material &amp; labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items. The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete , as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as</p>	Sqmt	3405.90	200.00	681180.00
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	directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places."				
81	Fixed Furniture work at Harward style Conference hall with I) Wooden Top surface II) Vertical Wooden support III) Veneer with all leads & lifts including all labour rates & materials required complete	Sqmt	2520.00	70.00	176400.00
82	Providing and fixing stainless steel ( Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	kg	472.40	420.00	198408.00
83	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of: (i) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface. (ii) IInd course of 20 mm cement plaster 1:3 (1 cement: 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface. (iii) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area. (iv) IVth course of 400-micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/sqm).	Sqmt	505.90	215.00	108768.50

84	<p>Providing and laying in situ seven course water proofing treatment with APP (Atactic polypropylene) modified Polymeric membrane over roof consisting of first coat of bitumen primer @ 0.40 Kg per sqm, 2nd, 4th &amp; 6th courses of bonding material @ 1.20 Kg/sqm, which shall consist of blown type bitumen of grade 85/25 conforming to IS : 702, 3rd and 5th layers of roofing membrane APP modified Polymeric membrane 1.5 mm thick of 2.25 Kg/sqm weight consisting of five layers prefabricated with centre core as 20 micron HMHDPE film sandwiched on both sides with polymeric mix and the polymeric mix is protected on both side with 20 micron HMHDPE film. 7th, the top most layer shall be finished with brick tiles of class designation 10 grouted with cement mortar 1:3 (1cement:: 3 fine sand) mixed with 2% integral water proofing compound by weight of cement over a 12 mm layer of cement mortar 1:3 (1 cement : 3 fine sand) and finished neat (item of laying brick tiles shall be paid for separately).</p>	Sqmt	459.65	560.00	257404.00
85	<p>Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: (a) Structural analysis &amp; design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation &amp; drainage and protection against fire hazard including:</p> <p>(b) Fabricating and supplying serrated M.S. hot dip galvanised /Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimensional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/masonry/structural steel framework of building</p>	Sqmt	2409.90	200.00	481980.00

	<p>structure using stainless steel anchor fasteners/ bolts, nylon separator to prevent bimetallic contacts with nuts, sand washers etc. of stainless steel grade 316, of the required capacity and in required numbers.</p> <p>(c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment , including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass.</p> <p>(d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight(e) Making provision for drainage of moisture/water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete.</p> <p>This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&amp;P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified.</p> <p>The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge. The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge.</p>					
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<p>Note:- 1. The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places.</p> <p>Note:- 2. The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories), Department of Science &amp; Technologies, India. Cost of testing is payable separately.</p> <p>The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work. Performance Testing of Structural glazing system Tests to be conducted in the NBL Certified laboratories</p> <p>(1) Performance Laboratory Test for Air Leakage Test (-50pa to - 300pa) &amp; (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr</p> <p>(2) Static Water Penetration Test. (50pa to 1500pa) as per ASTM E- 331-09 testing method for a range up to 2000 ml.</p> <p>(3) Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range up to 2000 ml</p> <p>(4) Structural Performance Deflection and deformation by static air pressure test (1.5 times design wind pressure without any failure) as per ASTM E-330-10 testing method for a range upto 50 mm</p> <p>(5) Seismic Movement Test (upto 30 mm) as per AAMA501.4-09 testing method for Qualitative test. Tests to be conducted on site.</p> <p>(6) Onsite Test for Water Leakage for a pressure range 50kpa to 240 kpa (35psi) upto 2000 ml</p>				
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86	Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer-in-charge (Door handle, lock and stopper etc.to be paid separately).	Sqmt	4608.85	5.99	27583.97
87	Extra for forming cavity 5 cm to 11.5 cm wide in cavity walls with necessary weep and vent holes including use of cores and cost of providing and fixing bitumastic coated M .S. ties 300 mm long of 25x3 mm section at not less than 3 ties per sqm as per approved design.	Sqm	106.25	6.00	637.50
88	Extra for providing opening of required size & shape for wash basin/ kitchen sink in kitchen platform, vanity counter and similar location in marble/ Granite/ stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.	No.	427.95	39.00	16690.05
89	Providing and fixing C.P. brass angle valve for basin mixer and geyserpoints of approved quality conforming to IS:8931 15mm nominal bore each	No.	475.70	11.00	5232.70
90	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) and a top layer 6 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) finished rough with sponge.	Sqm	272.05	560.00	152348.00
91	Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers	No.	50.35	100.00	5035.00
				Total	17086266

# PART C

## **INFORMATION AND INSTRUCTIONS TO BIDDERS**

Main Contractor has to associate agencies for following packages as per eligibility criteria mentioned here under and in the terms and conditions of respective packages. Names and required eligibility documents of associate agencies for all packages have to be submitted by main firm 7 days before submitting Performance Guarantee. If the agencies are not found eligible, main firm has to submit the names of another associate agency (Eligible as per mentioned criteria) within next 15 days, failing which respective package work shall be withdrawn from the scope of work of the main firm and will be got executed by another agency at the risk and cost of the main firm. For clarifications or doubts of the intending tenderers or for modification on any condition of the contract, specification etc., same can be asked in writing on or before 22-05-2018 addressed to Advisor (Coordination) MMRCL. And necessary clarifications or changes, if required/deemed necessary by the department, shall be issued accordingly (in consultation with the Consultant/any other person deemed appropriate by department). There shall not be any change permissible in any item description, specifications, conditions etc. later on and contractor shall have to provide items as per schedule and specifications only.

In the event of non-compliance of tender specifications and schedule later on, the respective package work shall be withdrawn from the scope of work of the main firm and will be got executed by another agency at the risk and cost of the main firm.

Name of Work	Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.			
S. No.	Description/Type of work	The firm should be	Estimated Cost (Rs.)	Remarks
1	2	3	4	5
C1	Electrical	Registered with CPWD/State	Rs. 23,25,637.00	The firm should submit details of enlistment and valid Electrical License.
C2	Fire Fighting Works	PWD or other Govt. organizations	Rs. 6,95,122.50	The firm should submit details of enlistment.
C3	HVAC Works		Rs. 71,69,816.00	
C4	Other Services		Rs. 11,00,498.00	
		Total	Rs. 1,12,91,074	

### **SPECIAL CONDITIONS FOR E&M WORKS**

1. The 1st lowest tenderer (main firm) has to submit the following documents for association of eligible E&M contractors at least 7 days prior to depositing performance guarantee.
2. The applicant should submit the willingness from eligible E&M contractors to get associated with the applicant for execution of each E&M components of work in wholesome manner and as per the conditions set out in the MOU to be entered into between the one who is awarded the work and the associated eligible E&M contractors.
3. In support of the eligibility conditions of the proposed associated E&M contractors, copy of their registration documents, Electrical Contractor's License, Goods & Services Tax Documents, Work experience certificates and other documents as required in the eligibility conditions duly attested by the applicants (Main Contractor and associate contractors) shall be submitted to the DGM (Civil) who will submit these documents to the competent authority for deciding the eligibility within three days of receipt of the same. Each such an E&M contractor will certify that they are not debarred as on the day of application for sale of tender.
4. The main contractor will submit MOU (for each package) signed with eligible registered contractors of CPWD /specialized E&M contractors. The MOU in the enclosed form shall be signed by both the parties i.e. main contractor as 1st party and associated E&M contractor as 2nd party.
5. In the event of the concerned E&M agency not performing satisfactorily or failure of associate contractor to complete the E&M work, the main contractor on the written direction of the department, shall remove the Associate contractor deployed on the work and shall submit name of new associate who fulfill the conditions mentioned in NIT to execute the leftover work without any loss of time or variation in cost to the department in this regard. Such associates shall also enter into tripartite Agreement/Contract along with the main tenderer and the departmental officer and shall meet all the guarantee for the equipment's already supplied for which payment has been released by the Deptt. in part. If any equipment supplied for the work, during the currency of the earlier Associate contractor and paid partly by the Deptt., becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to Department. No change of E&M Contractor will be allowed without prior approval of the Engineer-in-charge of respective component.
6. Assistant General manager (Electrical) shall be the Engineer-in-charge as far as E&M works are concerned. Separate tender schedule and Conditions for E&M Works are appended with this tender It will be obligatory on the part of the contractor/tenderer to sign the tender documents for all the component parts. After award of the work, the contractor will have to execute separate agreements for E&M components of the work with Assistant General manager (Electrical), MMRCL.
7. The main contractor shall be responsible and liable for proper and complete execution of all the E&M works and ensure coordination and completion of both civil and E&M works.
8. The associate contractor shall attend the inspection of the work by the Engineer-in-Charge of E&M works as and when required.

## PROFORMA OF SCHEDULES

(Separate Proforma for Civil, Elect. & Hort. Works in case of Composite Tenders)

(Operative Schedules to be supplied separately to each intending tenderer)

### **SCHEDULE 'A'**

Schedule of quantities (See Pg. 254-274)

### **SCHEDULE 'B'**

Schedule of materials to be issued to the contractor.

S. No.	Description of Item	Quantity	Rate	Place of issue
1	2	3	4	5
-----NIL-----				

### **SCHEDULE 'C'**

Tools and plants to be hired to the contractor

S. No.	Description	Hire Charges per day	Place of issue
1	2	3	4
-----NIL-----			

### **SCHEDULE 'D'**

Extra schedule for specific requirements/document for the work, if any.

### **SCHEDULE 'E'**

Reference to General Conditions of contract: GCC 2014, CPWD form-7 as modified and corrected upto 31.03.2018

Name of work: Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.

Estimated cost of work : Electrical, HVAC, Fire Fighting and allied works  
₹1,12,91,074/-

(i) Earnest money	:	} Included in schedules of Civil component
(ii) Performance Guarantee	:	
(iii) Security Deposit	:	

### **SCHEDULE 'F'**

**GENERAL RULES & DIRECTIONS:** Officer inviting tender Advisor (Coordination)

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3.

Definitions:

2(5)	Engineer-in-Charge	Assistant General Manager (Electrical)
2(8)	Accepting Authority	Advisor (Coordination)
2(10)	Percentage on cost of materials and labour to cover all overheads	

	and profits.	<u>15%</u>
2(11)	Standard Schedule of Rates	MahaPWD Elec. DSR 2017-18
2(12)	Department	Planning Department, MMRCL
9(2)	Standard CPWD contract Form GCC 2014, CPWD Form 7 as modified & corrected upto	<u>Same as prescribed in civil component</u>

**Clause 1**

- (iii) Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance Same as prescribed in civil component
- (iv) Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (I) above Same as prescribed in civil component

**Clause 2**

Authority for fixing compensation under clause 2 Same as prescribed in civil component

**Clause 2A**

Whether Clause 2A shall be applicable Same as prescribed in civil component

**Clause 5**

Number of days from the date of issue of letter of acceptance for reckoning date of start: Same as prescribed in civil component

Mile stone(s) as per table given on Pg. 133

**Same mile stones shall be applicable for civil as well as electrical components of the work as attached. The Associate contractor will ensure that components of the work are executed in time without giving any chance for slippage of mile stones on account of delay in execution of associated works by him. However, in case mile stones are not achieved by the contractor for the project the amount to be withheld under clause 5 of the contract will be done by the Executive Engineer (C) only and not by Executive Engineer (E).**

**Clause 6A**

Clause applicable –

For this work Clause 6A (Computerized Measurement Book) is applicable. Clause 6 is not applicable to this work.

**Clause 7**

Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment

Not Applicable



**Clause 10A**

List of testing equipment to be provided by the contractor at site lab. See Pg. 162

**Clause 11**

Specifications to be followed for execution of work

For electrical works : }  
 For HVAC works : } Maha PWD Specification and other specifications  
 For firefighting works : } mentioned elsewhere in the tender.

**Clause 18**

List of mandatory machinery, tools & plants to be deployed  
 by the contractor at site:

See Pg. 162

**Clause 36 (i)**

Requirement of Technical Representative(s) and recovery Rate

S. No.	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical /Technical representative)	Minimum Experience (In Years)	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Fig.	Words
1	Graduate Engineer or Diploma Engineer	Electrical or Mechanical	Principal Technical Representative	2	1	₹ 15000 pm	Rupees Fifteen Thousand Only
				5	1		

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

**List of mandatory machinery, tools and plants & testing Equipment to be deployed by the contractor at site:**

1. Steel/Aluminum Ladder 1.5 m to 8 m. 2 Nos.
2. Chase cutting machines. 2 Nos.
3. Electrical wire drawing equipment. 2 Set.
4. Torque wrench for nut/bolt/screws. 2 Nos.
5. Conduit die set. 2 Set.
6. Pipe vice. 1 No.
7. Bench vice. 1 No.
8. L.T. Meggar 500/1000 volts. 1 No.
9. Tong Tester. 1 No.
10. Multimeter. 1 No.
11. Hydraulically operated & hand 1 No. operated crimping machine.
12. Earth tester. 1 No.
13. Portable Ordinary drilling machine. 2 Nos.
14. Portable Hammer drilling machine. 2 Nos.
15. Overhead conduit puller. 1 No.

MEMORANDUM OF UNDERSTANDING [M.O.U] BETWEEN

(TO BE SUBMITTED BEFORE AWARD OF WORK)

1. M/S [Name of the firm with full address)

Enlistment Status

Valid Upto:

[ Henceforth called the main contractor]

And

2. M/S [ Name of the firm with full address)

Enlistment Status

Valid Upto:

[ Henceforth, called Associated Electrical Contractor or Electrical Contractor]

Name of Work:- Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai of an estimated cost of ₹1,12,91,074/- [Electrical, HVAC, Fire Fighting and allied works Component only] as per schedule, specifications, terms and conditions of the tender.

We state that M.O.U. between us will be treated as an agreement and has legality as per Indian Contract Act (amended upto date) and the department (CPWD) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent of this MOU allows.

We have agreed as under:

1. The associated electrical contractor will execute all electrical works in the wholesome manner as per terms and conditions of the agreement. Any type of internal transaction between the electrical contractor and main contractor shall be as per their convenience and mutual understanding without involving the department. Security deposit shall be deducted as per agreement.
2. The electrical contractor shall be liable for disciplinary action and other legal actions as per agreement if he fails to discharge obligation as per this agreement besides forfeiture of the security deposit.
3. All the machinery and equipment, tools and tackles required for execution of the electrical works. As per agreement shall be the responsibility of the electrical contractor.
4. The site staff required for the electrical work shall be arranged by the electrical contractor as per terms and conditions of the agreement.

SIGNATURE OF MAIN CONTRACTOR

SIGNATURE OF ASSOCIATED  
ELECTRICAL CONTRACTOR

Date  
Place

**WILLINGNESS CERTIFICATE**

Name of Work- Upgradation, Improvement and Renovation including Civil, Interior, Electrical, HVAC, Firefighting works and other allied services to Traffic Training Institute (Mumbai Police HR Centre) Building at Byculla, Mumbai.

I hereby give my willingness to work as associated contractor for the above-mentioned work. I will execute the work as per specifications and conditions for the agreement and as per direction of the Engineer-in-charge. Also, I will employ full time technically qualified supervisor for the works. I will attend inspection of officers of the department as and when required.

Date:

Signature of Contractor

## **Specification for Electrical, Firefighting, HVAC and Other Services**

### **A. ADDITIONAL SPECIFICATION**

1. The work shall be carried out strictly in accordance with CPWD General Specifications for Internal Electrical Works 2013 & External Work-1994 and in accordance with Indian Electricity Rules, 1956, Indian Electricity Act, 2003 as amended upto date and as per instructions of the Engineer-in-Charge including as below and nothing will be paid extra.

- a. All materials along with cat/model no & technical details shall be got approved from Engineer-in-Charge before use. One sample flat/Bay shall be made for approval of final location of switch boards/ fittings etc. and then only work shall be executed in other flats/bays.

All damages done to the building during execution of Electrical work shall be the responsibility of the contractor and the same will be made good immediately at his own cost to the satisfaction of the Engineer-in-Charge. Any expenditure incurred by the department in this condition shall be recovered from the contractor and decision of the Engineer-in-Charge about recovery shall be final.

- b. All hardware items such as screws, thimbles, G.I. wires etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned. All hardware materials such as nuts/bolts/screws/ washers etc. to be used in the work shall be zinc/cadmium plated iron.
- c. CONDUIT LAYOUT shall be prepared by contractor and got approved before execution of work. In case contractor does not do so before start of work, recovery @ 2(two)% of tendered amount of I.E.I. works shall be made from the bill.

Minimum No. of Junctions to be kept, & if required junctions to be kept underneath the fitting locations in corridor/rooms so that junctions are not visible after fittings are fixed/in position. Drop of conduit shall be well planned w.r.t. location of fitting/D.B. and crisscrossing to be avoided. All chases in walls shall be cut using electrical chisels/cutters. For this purpose, electricity shall be arranged by contractor. In case contractor fails to do chase cutting by electrical chisels/cutters and resorts to manual methods, a recovery of Rs.50/- per point shall be made from contractor's bill.

Whenever point wiring items is executed in casing capping system PVC box of PRESTOTEAK or equivalent make shall be provided in place of MS box. In case cable in the lift shaft is also to be fixed, contractor shall have to liaison with CIVIL/Lift agency to make use of the scaffolding provided by them.

- d. Any conduit which is not to be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently . Nothing extra shall be paid for the same.

Copper wire upto 4 sqmm. may be single stranded or multi stranded whereas wires above 4 sqmm. shall be multi-stranded conductor. Termination of multi-

- stranded conductors shall be done using crimping type thimbles at both the ends. Nothing extra shall be paid for the same.
- e. All metal boxes to be applied primer and painted, then only should be installed else recovery @Rs.20/- per point should be made from contractor's bill. Boxes shall have socket arrangement for tightening screws, instead of simple holes in M.S. sheet. Boxes shall be again painted at the time of wiring.
  - f. For Submain Wiring, Colour Code for different phases and Neutral (R.Y.B. black) to be maintained. While circuit wiring, wiring for fan point, wiring for light point shall be done with different colours for easy identification. Wiring for neutral shall be done with black colour and all connections to fans & fittings wherever visible shall be made with white PVC insulated copper wire or wherever cover sleeve may be provided. At Switch board, Switch shall be fixed in a logical manner w.r.t. fittings layout.
  - g. Unless specifically approved by Executive Engineer (E.), loose wire box, above DB shall not be provided however DB's shall have loose wire box of same make. All connections to MCB's shall be made using thimble/lugs. All DB's i/c incoming & outgoing MCB's shall be suitably numbered with PAINT for location/circuits. DB shall be fixed in recess suitably (30 mm. approx. projected from unplastered wall) to ease opening of door. Top of DB to match with door frame height as per site conditions.
  - h. Phenolic laminated sheet shall be of Egg white colour, and shall be filed/rounded at edges and of minimum 3mm thick.
  - i. All fittings and fans should be properly earthed through the protective conductor. Provision of earth bars in main boards, earth terminal block in DB's & earth studs in all metal boxes shall be made, connection to this stud shall be crimped. A clamp type termination should be made in the termination of earth strips (where provided) to pipe electrodes to provide surface type contact.
  - j. The earthing shall be carried out in the presence of the Engineer-in-charge or his authorized representative.
  - k. The size at switch box for providing Modular Plate Type Switch/sockets shall be properly settled to take care of all necessary switches/screws/fan regulators. Blanking plate if required shall also be provided at no extra cost.
  - l. For point wiring in steel conduit all piano type switch or all modular type switches/sockets/telephone outlets/T.V. Outlets shall be of only one make.
  - m. Whenever supply items like fans & fittings etc. are also included in the Schedule of work, such items shall be executed only after completion of at least 75% of the wiring items.
  - n. The contractor shall make his own arrangement at his own cost for electrical/general tools and plants required for the work.
2. The work shall be carried out according to approved drawings/details which shall be subsequently issued to the successful tenderer for execution of work and as per instructions of the Engineer-in-Charge who will have the right to change the layout as per requirement at site and the contractor shall not have any claim due to change in layout.

The work shall be carried out in engineering like manner. The bad workmanship will not be accepted and defects shall be rectified at contractor's cost of the satisfaction of the Engineer-in-Charge. The programme of electrical works are to be co-ordinated in accordance with the building work and no claim for idle labour will stipulated in the tender, electrical work shall have to be completed alongwith completion of civil work. All the debris of the electrical works should be removed and the site should be cleared by the contractor immediately after the accruing of debris. Similarly any rejected material should be immediately cleared off from the site by the contractor. Watch and ward of the material/ equipment shall be the responsibility of the contractor till handing over of installation to the department.

The contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.

3. The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. However, if there is any delay in construction from the department side, the installation may be taken over in parts, but the decision on the same shall rest with Engineer-in-Charge which shall be a binding on the contractor.

Some of the items of work, if already executed: on that case the successful tenderer shall have to use these items for completing the work. For wiring, the existing conduit wherever required shall be used by the contractor. The recovery will be made for these items as accepted rate of similar items.

4. Prices: The prices quoted by the firm shall be inclusive of all taxes and duties. No concessional/exemption certificate will be issued. No Central/State Sales Tax/Contract Tax/Excise Duty etc. shall be separately paid by the department.
5. Material to be used in the work shall be ISI marked as applicable. The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications.
6. Contractor shall preserve the copies of invoices, test certificates, gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor. No Form-D, 31/32 (Road Permit) shall be issued by the department. The road permit shall be arranged by the tenderer on his own. Deduction of Income Tax & Contract Tax at source shall be made while releasing payment through running/final bills as applicable. A certificate specifying the rate and amount of deduction shall however be issued.
7. Test Certificate Test certificates including warranty/guarantee certificates of all the materials supplied for the work carried out shall also be submitted mentioning order date/ no/ lot no etc. failing which recovery @1% tendered amount & upto of Rs.1.0 lakh shall be made from final bill.
8. Panels: Drawing of panel/Feeder-pillar shall be submitted for approval along with make/ model/ cat no of switchgears/ accessories to be used within 30 days from award of work and fabrication to be taken up only after approval of such drawing. Before painting proper surface treatment shall be done and than powder coated. These shall be offered for inspection during fabrication.

9. Quantities indicated in Schedule of work are only tentative, contractor shall consult AE-in-Charge before procurement. Payment shall be made only for the quantities actually executed and measured.
10. Time Period: Contractor has to plan his activities, so that electrical work is to be carried out in close co-ordination with CIVIL work and in no case CIVIL work be delayed because of delay in electrical work and the work has to be completed accordingly.
11. The makes for items shall be strictly as per list of make attached.
12. Storage :- Responsibility for storage space for execution of work shall be of main contractor.
13. Power & Water Supply:- Responsibility for supply of power & water for execution of work shall be of main contractor.
14. Contractor is advised to visit site before quoting rates for determining site conditions. No claim or argument shall be entertained in this regard at later stage.
15. No inspection out side the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.



## **B. TECHNICAL SPECIFICATIONS**

1. All hardware items such as screws, thimbles, G.I. wires etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.
2. All hardware materials such as nuts/bolts/screws/washers etc. to be used in the work shall be zinc/cadmium plated iron.
3. Any conduit which is not be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.
4. While laying conduit, suitable junction boxes shall be left for pulling the wires.
5. Copper wire shall be FRLS PVC insulated multi-stranded conductor. Termination of multi-stranded conductors shall be done using crimping type thimbles at both the ends. Nothing extra shall be paid for the same.
6. Material to be used in the work shall be ISI marked. The makes of material have been indicated in the list of acceptable makes. No other make will be acceptable. The material to be used in the work shall be got approved from the Engineer-in-Charge before its use at site. The Engineer-in-Charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not as per specifications.
7. Where switches/sockets/telephone outlets are to be provided, the same shall be of only one make.
8. The MCB distribution boards shall be factory fabricated in the works of the manufacturer of the MCB's of any of the makes specified. The MCBs and the MCB distribution board shall be of the same make.
9. The earthing shall be carried out in the presence of the Engineer-in-Charge or his authorized representative.  
All fittings/fans will be earthed as per specifications.

## **C. SPECIAL CONDITIONS FOR I.E.I. WORKS**

### **1. GENERAL**

These special conditions are intended to amplify the General Conditions of Contract, and shall be read in conjunction with the same. For any discrepancies between the General Conditions and these Special Conditions, the more stringent shall apply.

### **2. SCOPE OF WORK**

The general character and the scope of work to be carried out under this contract are illustrated in Drawings, Specifications and Schedule of Quantities. The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the Engineers-in-charge/ site representative. The contractor shall furnish all labour, materials and equipment as listed under Schedule of Quantities and specified otherwise, transportation and incidental necessary for supply, installation, testing and commissioning of the complete electrical system as described in the Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings/Documents as being furnished or installed, but which are necessary and customary to be performed under this contract. The electrical system shall comprise of (but not limited to) the following:

- a. All conduit work including junction boxes, outlet boxes and wiring for lighting and power circuit.
- b. Switches, plug sockets, cover plates and other wiring accessories.
- c. Cables (LT), Mains and Sub-Mains.
- d. LT panel, Main Distribution / Sub Distribution panels & Final Distribution panels
- e. Cables on cable trays and / or within suspended ceiling spaces including installation, cable trays, hangers, supports, cable terminations and all fixing accessories.
- f. Earthing (Grounding) System.
- g. Advance Lightning Protection System.
- h. Supply and installation of Lighting Fixtures.
- i. Supply & installation of External Lighting Pole, cabling, feeder pillars, Earthing.  
Supply & installation of cabling for DATA and Telephone.

### **ASSOCIATED CIVIL WORKS**

Following major civil works associated with Electrical installation are excluded from the scope of this contract except for civil work like core cut, wall breaking, wall chasing by wall chaser, slab cutting, making holes etc. making good. These shall be executed by other agencies in accordance with approved shop drawings of, and under direct supervision of the electrical contractor.

- j. RCC Trenches inside Sub-station and LT panel room including cable supports for laying of LT cables.
- k. Air-tight fire doors shall be as per FIRE norms and requirement of CFO for Sub-Stations & LT panel room. However, these will be of minimum 2-hour fire rating as per I.E. Rules 1956.

### **3. EQUIPMENT PERFORMANCE GUARANTEE**

The contractor shall carry out the work in accordance with the Drawings, Specifications, Schedule of Quantities and other documents forming part of the Contract.

The contractor shall be fully responsible for the performance of the selected equipment (installed by him) at the specified parameters and for the efficiency of the installation to deliver the required end result.

The contractor shall guarantee that the Electrical system as installed shall perform to complete satisfaction of the Engineer-in-charge. The guarantee shall be submitted in the proforma given.

Complete set of architectural drawings is available in the Architect/Consultant's office and reference may be made to same for any details or information. The contractor shall also guarantee that the performance of various equipment individually, shall not be less than the quoted capacity; also actual power consumption shall not exceed the quoted rating, during testing and commissioning, handing over and guarantee period.

At the close of the work and before issue of final certificate of virtual completion, the contractor shall furnish written performance guarantee against defective materials and workmanship for a period of one years from date of testing, commissioning and handing over. The guarantee shall be submitted in proforma given. The Contractor shall hold himself fully responsible for reinstallation or replacement, free of cost the following:

- a. Any defective work or material supplied by the Contractor.
- b. Any material or equipment damaged or destroyed as a result of defective workmanship by the Contractor.

#### 4. BYE-LAWS AND REGULATIONS

The work shall be carried out to the satisfaction of the Engineers-in-charge/ site representative and in accordance with the Specifications, Regulations of the Electric Supply Authority, Indian Electricity Rules and Regulations, latest Indian Standards and as per the requirements of the Chief Fire Officer.

#### 5. FEES AND PERMITS

The Contractor shall pay any and all fees and obtain permits required for the installation of this work. On completion of the work, if required, the contractor shall obtain and deliver to the Engineer-in-charge, certificate of final inspection and approval by the local electricity authority (CFO/ Municipal, State/Central govt. whichever is applicable)

#### 6. DRAWINGS

The Electrical Drawings issued with tenders, are diagrammatic only and indicate arrangement of various systems and the extent of work covered in the contract. These Drawings indicate the points of supply and of termination of services and broadly suggest the routes to be followed. Under no circumstances shall dimensions be scaled from these Drawings. The architectural/interiors drawings and details shall be examined for exact location of equipment, electrical points & fixtures.

The contractor shall follow the tender drawings in preparation of his shop drawings, and for subsequent installation work. He shall check the drawings of other trades to verify spaces in which his work will be installed. Maximum headroom and space conditions shall be maintained at all points. Where headroom appears inadequate, the

contractor shall notify the Architect/Consultant/Engineers-in-charge/ site representative before proceeding with the installation. In case installation is carried out without notifying, the work shall be rejected and contractor shall rectify the same at his own cost.

The contractor shall examine all architectural, structural, plumbing, HVAC and other services drawings and check the as-built works before starting the work and report to the Engineers-in-charge/ site representative any discrepancies and obtain clarification. Any changes found essential to coordinate installation of his work with other services and trades, shall be made with prior approval of the Architect/Consultant/ Engineers-in-charge/ site representative without additional cost.

#### 7. SPECIFICATIONS

The Specifications shall be considered as part of this contract. The Drawings indicate the extent and general arrangement of power distribution, location of lighting fixtures, controlling switches, wiring system, cabling and earthing. These drawings are essentially diagrammatic. The Drawings indicate the point of termination of conduit runs and broadly suggest the routes to be followed. The work shall be installed as indicated on the Drawings. However, any change found essential to coordinate the installation of this work with other trades shall be made without any additional cost.

The data given herein and on the Drawings is as exact as could be secured, but its complete accuracy is not guaranteed. The drawings are for the guidance of the contractor, exact locations, distances and levels shall be governed by the site conditions and the Architectural & Interior layouts.

#### 8. SHOP DRAWINGS

a. All the shop drawings shall be prepared on computer through Autocad System based on Architectural Drawings, site measurements and Interior Designer's Drawings. Within one month of the award of the contract, contractor shall furnish, for the approval of the Engineer-in-Charge/ Architect/ Consultant, two set of detailed shop drawings of all equipment and materials including layouts for all conduit layouts, distribution panels, switch boards, cabinets, special pull boxes, cable trays and any other requirement to be fabricated or purchased by the contractor.

b. These shop drawings shall contain all information required to complete the Project as per specifications and as required by the Architect/Consultant/Engineers-in-charge/ site representative. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/ materials/ works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings.

Each item of equipment/material proposed shall be a standard catalogue product of an established manufacturer strictly from the manufacturers listed in Appendix-III. When the Architect/ Consultant makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the

amendments duly incorporated along with check print, for approval. The contractor shall submit further six sets of shop drawings to the Engineers-in-charge/ site representative for the exclusive use by the Engineers-in-charge/ site representative and all other agencies. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/ equipment/installation.

- c. Shop drawings shall be submitted for approval sufficiently in advance of planned delivery and installation of any material to allow Architect/Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved programme.
- d. Manufacturers drawings, catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each item in each set shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.
- e. Samples of all materials like conduits, accessories, switches, wires, control cables etc. shall be submitted to the Engineers-in-charge/ site representative prior to procurement. These shall be submitted in two sets for approval and retention by Engineers-in-charge/ site representative and shall be kept in their site office for reference and verification till the completion of the Project.
- f. Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.
- g. Where the contractor proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundation, wiring or any other part of the mechanical, electrical or architectural layouts; all such re-design, and all new drawings and detailing required therefore, shall be prepared by the contractor at his own expense and gotten approved by the Architect/ Consultant/ Engineers-in-charge/ site representative.
- h. The contractor shall extend full cooperation to HVAC contractor in preparation of his coordinated services drawings. He shall issue soft copy and hard prints of his shop drawings to HVAC contractor well in advance to complete the coordinated services drawings in accordance with schedule prepared. Where the work of the contractor has to be installed in close proximity to, or will interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Engineers-in-charge/ site representative, the contractor shall prepare composite working drawings and sections at a suitable scale, not less than 1:50, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs

his work before coordinating with other trades, or so as to cause any interference with work of other trades, he shall make all the necessary changes without extra cost.

- i. Within four weeks of approval of all the relevant shop drawings, the contractor shall submit four copies of a comprehensive variation in quantity statement, and itemized price list of recommended (by manufacturers) imported and local spare parts and tools, covering all equipment and materials in this contract.

#### 10. ACCESSIBILITY

The Contractor shall verify the sufficiency of the size of the shaft openings, clearances in wall cavities and suspended ceilings for proper installation of his conduits cables, cable trays, panels etc.. His failure to communicate insufficiency of any of the above, shall constitute his acceptance of sufficiency of the same. The Contractor shall locate all equipment which must be serviced, operated or maintained in fully accessible positions. The exact location and size of all access panels, required for each concealed control damper, valve or other devices requiring attendance, shall be finalized and communicated in sufficient time, to be provided in the normal course of work. Failing this, the Contractor shall make all the necessary repairs and changes at his own expense. Access panel shall be standardized for each piece of equipment / device / accessory and shall be clearly nomenclatured / marked.

#### 11. MATERIALS AND EQUIPMENT

All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be strictly in conformity with list of approved manufacturers as per Appendix - III. The Contractor shall be responsible for the safe custody of all materials and shall insure them against theft or damage in handling or storage etc. A list of items of materials and equipment, together with a sample of each shall be submitted to the Engineers-in-charge/ site representative within 15 days of the award of the contract. Any item which is proposed as a substitute, the contractor shall state the credit, if any, due to the department in the event the substitution is approved. All changes and substitutions shall be requested in writing and approvals obtained in writing from the Engineers-in-charge/ site representative.

#### 12. MANUFACTURERS INSTRUCTIONS

Where manufacturer has furnished specific instructions, relating to the material and equipment used in this project, covering points not specifically mentioned in these documents, manufacturer's instructions shall be followed in that case.

#### 13. COMPLETION CERTIFICATE

On completion of the electrical installation, a certificate shall be furnished by the Contractor countersigned by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local, state/central govt./ municipal / fire authorities concerned.

#### 14. INSPECTION AND TESTING

The Engineer-in charge or his representative may carry out inspection and testing at manufacturer's works as per CPWD specifications/ tender specifications. No equipment shall be delivered without prior written confirmation from the Engineers-in-

charge/ site Engineer. In case factory inspection is carried out then all travelling and lodging expenses of engineer-in-charge shall be borne by the Department, however all testing arrangements shall be in the scope of contractor firm. Tests on site of completed works shall demonstrate the following:

That the equipment installed complies with specification in all respect and is of the correct rating for the duty and site conditions.

That all items operate efficiently and quietly to meet the specified requirements.

That all circuits are fully protected and that protective devices are properly coordinated.

That all non-current carrying metal parts are properly and safely grounded in accordance with the specification and appropriate Codes of Practice.

The contractor shall provide all necessary instruments and labour for testing, shall make adequate records of test procedures and readings, shall repeat any tests requested by the Engineer-in-charge and shall provide test certificate signed by an authorized person. Such test shall be conducted on all materials and equipment and tests on completed work as called for by the Engineer-in-charge at contractor's expenses unless otherwise called for.

If it is proved that the installation or part thereof is not satisfactorily carried out then the contractor shall be liable for the rectification of the same. Engineer-in-charge's decision as to what constitutes a satisfactory installation shall be final.

#### 15. COMPLETION DRAWINGS

Upon completion of the work and before issuance of certificate of virtual completion the contractor shall submit to the Engineers-in-charge/ site representative four set of layout drawings in progressive manner for individual systems drawn at approved scale indicating the complete wiring system as installed. Drawing shall be prepared on AUTO-CAD (latest version). Along with the hard copies, the contractor shall submit copies of all drawings on CD and one set of all drawings on RTF shall also be submitted. These drawings must provide:

- a. Substation equipment layout & all power distribution panel layout.
- b. Single line power distribution diagram including control wiring.
- c. Cable Trays with number and size of cables installed.
- d. Run and size of conduits, inspection, junction and pull boxes.
- e. Raceways and Junction Boxes.
- f. Number and size of conductors in each conduit with phase identification.
- g. Location and rating of sockets and switches controlling the lighting and power outlets.
- h. Location and details of distribution boards/panels, mains, switches along with phase balancing details.
- i. A complete wiring diagram as installed and single line diagrams showing all connections in the complete electrical system.
- j. Location of all earthing stations, route and size of all earthing conductors manholes.
- k. Layout and particulars of all LT cables.

1. Instruction, maintenance and operation manuals including maintenance schedule for all equipment. Testing & commissioning reports of all electrical equipment.

#### 16. OPERATING INSTRUCTION & MAINTENANCE MANUAL

Upon completion and commissioning of part Electrical system the contractor shall submit a draft copy of comprehensive operating instructions, Maintenance Manual/schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of typewritten operating instructions and maintenance manuals; one each for retention by Consultant and Engineers-in-charge/ site representative and two for Owners Operating Personnel.

These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 4 year period of maintenance of each equipment.

#### 17. ON SITE TRAINING

Upon completion of all work and all tests, the Contractor shall furnish necessary operators, labour and helpers for operating the entire installation for a period of thirty (30) working days of ten (10) hours each, to enable the Engineers-in-charge/ staff to get acquainted with the operation of the system. During this period, the contractor shall train the Engineers-in-charge/ personnel in the operation, adjustment and maintenance of all equipment installed.

#### 18. MAINTENANCE DURING DEFECTS LIABILITY PERIOD

##### a. Complaints

The Contractor shall receive calls for any and all problems experienced in the operation of the system under this contract, attend to these within 24 hours of receiving the complaints and shall take steps to immediately correct any deficiencies that may exist.

##### b. Repairs

All equipment that require repairing shall be immediately serviced and repaired. Since the period of Mechanical Maintenance runs concurrently with the defects liability period, all replacement parts and labour shall be supplied promptly free of- charge.

#### 19. UPTIME GUARANTEE

The contractor shall guarantee for the installed system an uptime of 98%. In case of shortfall in any month during the defects liability period, the Defects Liability period shall get extended by a month for every month having shortfall. In case of shortfall beyond the defects liability period, the contract for Operation and Maintenance shall get extended by a month for every month having the shortfall and no reimbursement shall be made for the extended period.

The Contractor shall provide log in the form of diskettes and bound printed comprehensive log book containing tables for daily record of all temperatures, pressures, humidity, power consumption. Starting and stopping times for various equipment, daily services rendered for the system alarms, maintenance and record of



unusual observations etc. Contractor shall also submit preventive maintenance schedule.

Each tenderer shall submit along with the tender, a detailed operation assistance proposal for the Engineers-in-charge/ site representatives / Consultant's review.

This shall include the type of service planned to be offered during Defects Liability Period and beyond. The operation assistance proposal shall give the details of the proposed monthly reports to the Management.

The tenderer shall include a list of other projects where such an Operation Assistance has been provided.

#### 20. SITE INFORMATION

Location : Traffic Training Institute, Dr. B.A. Road, Hansraj Lane,  
Byculla East, Mazgaon, Mumbai, Maharashtra 400010

## **D. Additional Specification for Electrical, HVAC, Firefighting and Other Services**

### ELECTRICAL SYSTEM

#### 1. LIGHTING SYSTEM SPECIFICATIONS: -

##### A. SCOPE

Supply, installation, commissioning of indoor light fittings, fixtures and accessories including all necessary supports, brackets, down rods and painting etc. as required specified in the bill of quantities.

##### B. OBJECTIVE

The main lighting objectives are:

###### a) Safety and health

The lighting should enable the occupant to see sufficiently well to work and move about in safety, both under normal condition and in the event of emergency involving a power failure. The lighting must not create conditions which are injurious to health, requiring for example, the elimination of harmful radiation, the prevention of eye strain and prevention of glare.

###### b) Performance

Visual performance is the term used to describe both the speed at which the eyes function and the accuracy with which the visual task can be carried out.

###### c) Appearance and comfort

The way in which a space is illuminated can affect its character and the object with in it. Where the creation of mood or atmosphere is predominant this must be the prime lighting objective, but some consideration should be given to this factor in all the designs.

###### d) Energy and cost effectiveness

Significant saving in energy consumption, and therefore cost of providing lighting without reducing standards can be achieved by applying an energy-effective-design approach to lighting installation, the cost of owning and installation can be divided as follows:

###### i. Investment Cost

The investment cost for a particular installation can be split up as follows:

- (i) Luminaries cost, including control gear and very often the initial lamp costs
- (ii) Lighting control system
- (iii) Mounting accessories
- (iv) Electrical wiring
- (v) Installation cost

Where a number of alternative lighting solution based upon similar luminaries arrangement have been proposed, all of them satisfy the quality criteria, the difference in the cost of electric wiring and the installation is considerably less as compared to total system cost whereas, use of different luminaries and mounting accessory would make substantial difference in investment costs. Different luminaire choice has direct implication on the running cost either in the energy cost or the cost of maintenance. Also, the luminaries chosen and the way these are arranged and mounted can affect the cost of wiring.

ii. Running Costs

The most important running costs are those involving

- (i) Energy
- (ii) Lamp replacement
- (iii) Maintenance of system

Maintenance costs represent a relatively small part of the total annual costs. This is particularly important in environments where disturbance to the work routine should be avoided. The major running cost factor is the cost of energy. This means that the lighting, apart from meeting all the other demands likely to be placed upon it, must also be as efficient as possible so as to keep electricity consumption to a minimum.

C. STANDARDS AND CODES

The scope of work shall cover the supply, installation, testing, and commissioning of lighting system comprising light fittings (LED, chokes, control gear, lamps, fixing arrangement etc. as per specified standard.

The LED lighting and their associated accessories such as lamps, reflectors, housings, control modules etc., shall comply with the latest applicable standards, more specifically the following:

1	IS 3646 (All 3 parts)	Code of practice for interior Illumination
2	IS 16102 Part-1	Self-ballasted LED lamps for general lighting services.(Part1-Safety Requirements)
3	IS 16102 Part-2	Self-ballasted LED lamps for general lighting services.(Part2-Performance Requirements).
4	IS 16103 Part-1	LED modules for general lighting.(Part 1 Safety Requirements).
5	IS 16103 Part-2	Self-ballasted LED lamps for general lighting services.(Part2-Performance Requirements).
6	IS 16104	Method of measurement of lumen maintenance of solid state light (LED) sources.
7	IS 16105	Method of measurement of lumen maintenance of solid state light (LED) sources.
8	IS 16106	Method of electrical & photometric measurements of solid state lighting products.
9	IS 16107 Part-1	LED Luminaire performance general Requirements.
10	IS 16107 Part-2	LED Luminaire performance particular Requirements.

11	IEC 55015/EN 55015	Limits and method of Measurements of radio disturbance characteristics of electrical lighting and similar equipment.
12	IEC 60529/EN 60529	Specification of degrees of protection provided by enclosures (IP code).
13	IEC 60555/EN 60555	Disturbances in supply systems caused by household appliances and similar electrical equipment.
14	IEC 60947-4-1/EN 60947-4-1	Specification for low – voltage switchgear and control – gear, Contractors, motor – starters, electromechanical contractor and motor-starters.
15	IEC 60555, EN 55015	Electromagnetic Compatibility: Emission
16	IS 16108	Photo-biological safety of lamps & lamps system.
17	BS 646	Cartridge fuse- links (rated up to 5 amperes) for AC/DC service.
18	IEC 60742/ EN 60742/BS 3535	Isolating transformers and safety isolation transformers.
19	IS 3646 Part 1 & 2	Code of Practice for Interior Illumination.
20	IS 1777 – 1978	Industrial luminaire with metal reflectors
21	IS 10322 (All Parts)	Specification for Luminaires
22	NBC 2016	National Building Code India
23	NLC 2010	National Lighting Code
24	IE Rules	Indian Electricity Act and Rules issued there under
25	IS 16101	General lighting - LED's and LED modules – Terms and condition
26	IS 15885: (Part-2 Section-13	Safety of Lamp, Control Gear Part2 Particular requirements section-13. DC supplied electronic control gear for LED module.

All codes and standards mean the latest. Where not specified otherwise the installation shall generally follow the Indian Standard Codes of Practice or the relevant British Standard Codes of Practice in the absence of Standard

#### D. LIGHT FITTING GENERAL REQUIREMENTS

- a) All fixtures shall be complete with accessories necessary for installation whether so detailed under fixture description or not.
- b) Fixture housing frame or canopy shall provide a suitable cover for the fixture outlet box or fixture opening.
- c) Fixture shall be installed at mounting heights as detailed on the drawings or instruction on site by the site engineer.
- d) Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture highly secured to a fixture stud in the outlet box. Extension pieces shall be installed where required to facilitate proper installation. Design of hangers and method of fastening other than shown on the drawings or here in specified shall be submitted to the site engineer for approval.

e) Pendant fixture within the same room or area shall be installed plumb and at a uniform height from the finished floor. Adjustments of height shall be made during installation as per instructions of site engineer.

f) Flush mounted and recessed fixtures shall be installed so as to completely eliminate light leakage within the fixture and between the fixture and adjacent finished surface.

g) Fixture shall be completely wired and constructed to comply with the regulations and standards for Electric light fixtures, unless otherwise specified. Fixture shall bear manufacturer's name and the factory inspection label unless otherwise approved.

h) Fixture with visible frames shall have concealed hinges and catches. Pendant fixtures and lamp holder shall be provided with ball type aligners or similar approved means. Recessed fixtures shall be constructed so as to fit into an acoustic tile ceiling or plaster ceiling. Flanges shall be provided for plaster ceiling. Fixtures with hinged diffuser doors shall be provided with spring clips or other retaining device to prevent the diffuser from moving.

i) Detailed catalogue cuts for all fixtures or if so required by the site engineer sample fixtures shall be submitted for approval to the site engineer before orders for the fixture are placed.

Shop drawings for non-standard fixture types shall be submitted for approval to site engineer.

j) Recessed fixtures shall be constructed so that all components are replace-able without removing housing from the ceiling.

k) Each fitting shall have a terminal block suitable of loop out connection by 1100V PVC Insulated copper conductors wires. The internal wiring should be completed by manufacturer by means of standard copper wire and terminated on the terminal block.

l) Each light fitting shall be provided with an Earthing terminal. All metal or metal enclosed parts of the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture.

#### E. LED LUMINAIRE TECHNICAL REQUIREMENT

##### a) LED Luminaire

This specification covers for supply of Light Emitting Diode (LED) lighting that shall be used as general lighting in system. The product should be latest state of art and compliant to relevant IEC 60598-1, 2, 3, IEC 62031 and IEC/PAS 62612 or their latest edition depending on the type of luminaire. In addition to the above luminaire shall adhere to relevant BIS standards IS 15885, 16101, 16102, 16103, 16104, 16105, 16106, 16107 (Part I & II) as per the application. The supplier shall have proven design capabilities and should provide type test certificate / performance certificate from an NABL accredited laboratory. The manufacturer shall have at least five years' experience of design and manufacturing of similar products. The proposed products from the proposed manufacturing unit shall have established their satisfactory performance and reliability for three years in minimum. The product and its major components shall be state of art and of proven design.

##### b) Fixture

i. The fixture shall be suitable to work under following ambient conditions.

Maximum ambient temperature of 50° C.

Atmosphere - The product shall be designed to work in coastal, humid, salt laden and corrosive atmosphere.

ii. Housing, if not used as a heat sink shall be made of at least 0.5 mm thick sheet Steel/ extruded Aluminium (minimum 2 mm thickness) or pressure die cast (minimum 2 mm thickness), conforming to relevant standards, polyester powder coated of at least 40 microns) and high U.V. & corrosion resistance.

iii. Heat sink used should be extruded Aluminium or Pressure Die-Cast Aluminium having high conductivity preferably ADC 12 or LM 6.

iv. Luminaire should be covered with suitable Glass or diffuser with High Transitivity. Outdoor luminaire shall be with clear toughened glass or clear polycarbonate cover.

v. Lighting fixtures and accessories shall be designed for continuous trouble free operation under diverse atmospheric conditions without deterioration of materials. Degree of

protection of enclosure shall be at least IP-65 for outdoor fixtures. However, down lighter and other internal fixture shall be provided with at least IP-20 protection.

vi. The fixture should conform to applicable IS 10322 / IEC 60598 (All parts & amendments) and should have the associated LM-79 and LM-80 report from accredited lab. Test report shall be submitted along with relevant catalogues.

c) LED Makes : -

Approved makes are Philips-Lumileds, Osram, Nichia, Cree, LG or Approved Equivalent and IS certified.

High lumen efficacy LEDs suitable for the application along with following features shall be used:

i. LED Efficacy at the chip level shall > 120 lumen/watt (For High power LED')

(i) The efficiency of the LED at 85°C junction temperatures shall be more than 85%.

(ii) The system luminous efficacy of LED luminaire' shall be as under

Efficacy > 75 lumen/Watt for low wattage luminaries (<45W); and

Efficacy > 85 lumen/watt for high wattage luminaries (>45W)

ii. Adequate heat sink with proper thermal management shall be provided.

iii. Minimum view angle of the LED shall not be less than 120 °.

iv. Power factor of complete fitting shall be more than 0.9

v. LED shall be surface mounted type duly soldered to PCB by Reflow system or COB type. The Solder used shall be ROHS compatible for environment friendliness.

- vi. Input frequency range shall be between 50Hz  $\pm$  3%.
- vii. Minimum Color rendering index CRI  $\geq$ 80 unless specified in item description.
- viii. Correlated Color Temperature shall be in the range of 3000 K - 6500 K.

d) LED Driver

LED driver shall have following features:

- i. Input voltage Range within 160V (RMS) to 270V (RMS) o Driver shall be designed to withstand surges of at least 1.5 KV.
- ii. Output voltage of the driver shall be designed to meet the Power Requirement of the system.
- iii. Output voltage ripple should be within 3%
- iv. Output over voltage protection 125 V DC
- v. Full Load Efficiency  $\geq$  85%
- vi. Total Harmonic Distortion
  - For 0- 50 W for shall be less than 25%
  - Above 50 W rating shall be less than 15%.
- vii. Current waveform should meet EN 61000-3-2
- viii. LED Driver shall withstand voltage of 350V for 2 hours and restore normal working when normal voltage is applied
- ix. The driver should comply with CISPR 15 for limits and methods of measurement of Radio disturbance characteristics.
- x. The equipment should comply with IEC 61547 for EMC immunity requirements.
- xi. The control gear should be compliant to IEC 61347-2-13, IEC 62031 and IEC 62384.

e) General

The lumen maintenance of the LED lightings shall not be less than 70% after 50,000 hours. The supplier shall provide evidence that the LED chipset manufacturer has the patent right to produce the supplied LED chipset to avoid infringement of white LED patent. Free warranty shall commence after delivery and end at 60 months after delivery. The warranty of replaced item shall re-start from date of attending defect / replaced.

Test reports for various parameters i.e. flux, power, efficacy, chromaticity, temperature, protection etc. issued by an NABL accredited laboratory shall be furnished. Estimation on product's life and performance shall also be furnished.

Client reserves the right of testing of products for its conformity in accordance with above specifications.

## F. LIGHTING LUX LEVELS

### GENERAL LUX LEVEL REQUIREMENTS

The Contractor shall Design, supply, install and commission a high efficiency lighting system for all area and buildings of the Depot including emergency lighting system Light fittings for all areas shall be selected to suit various architectural design and finishes and the Contractor shall allow for the design co-ordination process that this shall entail. The light fittings and all associated accessories shall be subject to the approval by site engineer.

The Contractor shall engage a specialist lighting system consultant for carrying out a detailed review of the lighting design proposed by the Contractor in order to meet the following objectives:

- a) State of art, LED lighting system with modern smart luminaires;
- b) Energy efficiency;
- c) Integration with Architectural design and finishes including signage's;
- d) Aesthetic appearance.

Lighting fixtures shall be manufactured locally by approved factory or imported.

The design of mounting details of the light fitting shall take into consideration the ease of maintenance. Where light fittings are mounted at high levels, the Contractor shall provide suitable means to enable the light fittings be maintained without the use of portable ladders or other portable equipment with minimum interruption to the building operation.

The Contractor shall design, supply, install and commission of light fittings for all areas.

Contractor shall verify and demonstrate the achieving of the light level as per the table confirms to IS 3646: -

<b>Sr. No</b>	<b>Room Type</b>	<b>Illumination Level (Lux)</b>
1	Corridor/Passage Areas	100
2	Office Area	300
3	Lobby	200
4	Staircase	100
5	Pump Room	200
6	Plant Room	200
7	Training Room	300
8	Porch	200
9	Toilets	100
10	Canteen	200
11	Conference	300
12	Auditorium	300



## G. INSTALLATION OF LIGHT FIXTURES

The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the Engineer. Pendant fixtures specified with overall stem lengths

are subject to change and shall be checked with conditions on the job and installed as directed. All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instructions and to the approval of the engineer.

## H. LIGHT FITTING TYPES: -

### a) SURFACE MOUNTED LIGHT FITTING

- i. Only single and/or two LED tube lamps with accessories shall be used in any one fixture.
- ii. Surface mounted fixtures longer than two feet shall have one additional point of support besides the outlet box fixture stud when installed individually. Pendant, individually fixtures four feet long and smaller shall be provided with twin stem/conduit hangers. Stems shall have ball aligners or similar devices and provided for a minimum of 25 mm vertically adjustment. Stems shall be of appropriate length to suspend fixtures at require mounting height.
- iii. Light fitting housing shall be CRCA sheet steel, powder coated and minimum IP 20 protection required
- iv. Lamps shall maximum energy savings and a minimum guaranteed of 50000 burning hours and a lumen output of 4000 lm. colour shall be cool white or approved from site engineer.
- v. The surface mounted light fitting shall be using without false ceiling area like pump room, Electrical room, staircase, stores etc.

### b) RECESS MOUNTED LIGHT FITTING

- i. Where ever false ceiling will come like office area, staff room, canteen, toilet etc., using that recess mounting LED light fitting with supporting arrangement.
- ii. Light fixtures lamps shall be maximum energy savings and a required maximum guaranteed of life burning hours and fitting selection, lumen output based on the lux level requirement
- iii. Light fitting housing shall be CRCA sheet steel, powder coated.
- iv. For 600 x 600 mm ceiling tile LED panel light of 600 x 600 mm suitable wattage shall be installed. With the required fixing arrangement to meet the site requirements.
- v. Recess led Downlighter can be either square or round shaped of suitable wattage to meet the site requirements.

## 2. CEILING FAN: -

Supplying and erecting Ceiling fan of specified sweep with all accessories and necessary materials,

erected in provided hook/clamp.

Material:

Ceiling Fan:

Electric Ceiling fan capacitor type with double ball bearing complete with capacitor, 300 mm down rod, canopies, shackles, reel insulator, half threaded bolts of 9.53 mm (3/8”) dia 62.5 mm (2-1/2”) to 88 mm (3-1/2”) long and 7.94 mm (5/16”) dia 44.5 mm (1-3/4”) to 57 mm (2- 1/4”)

long with nuts, with lock type split pin, spring & plate washers, etc.; three number blades made of Aluminum alloy, suitable for single phase, AC 210 volts, 50 Hz supply and conforming to class I of IS: 374/1979 with amendment no 1 to 6 except for performance parameters to the extent modified as details in general requirements. The down rod shall be capable to withstand a tensile load of 1000 kg without breakdown and a torsion load of 500 kg.cm without breakage as per Clause 10.14.1 of IS: 374/1979 with amendment no.1 to 6. Electrical motor should be single phase permanent capacitor type with no. of poles 12/14/16/18 (As per sweep), Class-I with basic insulation. Class of insulation shall be B class. The winding wire used for fan should be synthetic enameled of 30 to 38 SWG. Connection wire: Flat / round Two core flexible stranded copper wire cord 24/0.2mm ISI marked. Paint: Superior quality enamel paint of specified colour for marking Sr. No and date of reaction.

Table 2.6/1

Performance Parameters for Fans suitable for Rated Voltage

S. No.	Performance Parameters	Maximum Input Power in watts	Air delivery in m3/minute at Rated Voltage	Minimum Service Value at 180 V
1	900mm	42	140	3.4
2	1200mm	50	215	4.3
3	1400mm	60	270	4.5

Method of Construction:

Blades of ceiling fan shall be properly fixed. Down rod, clamp shall be carefully fixed with nut bolt and split pin. Canopies shall be tightened on down rod keeping sufficient clearance. Wiring connections shall be made with required wire leads. Regulator of fan shall be erected on provided switchboard with required wire leads.

Testing:

After erection fan shall be tested by connecting to supply at all positions of regulator. Also steadiness of fan shall be checked at full speed, so that there is no wobbling.

3.MCBs: -

Supplying MCB of specified poles, current rating, and either of B or C series with required wiring connections & lugs etc. and erecting in provided enclosure /distribution board.

General Specifications for MCB's

- MCB's shall be of current limiting type, ISI marked confirms to IS 8828 – 1996.

- The power loss per pole shall be low and shall be in accordance with IS 8828 – 1996.
- All cable entries shall be either from bottom or top.
- MCB's shall be of C- curve characteristic & shall have quick make & break non-welding self-wiping silver alloy contacts for 10 kA short circuit both on the manual & automatic operation.
- All the active, live parts of MCB's should be out of human reach, ensuring safety & confirms to IP:

55 degree of protection.

- The MCB's must house transparent label holder to ensure circuit identification.
- The MCB's must have fully insulated safety shutters.
- The MCB's shall have lockable switching lever.
- The Minimum electrical endurance shall be 20,000 operations.
- The housing of the MCB shall be mounted self-extinguishing DMC (Dough Moulding Compound).
- The short circuit Current shall be brought to zero within 4 to 5 milliseconds from the time they are established.
- All MCB's shall have a minimum short circuit Capacity of 10kA RMS.

Material:

Single Pole / Single pole with Neutral / Double Pole / Triple pole / Four pole: MCB, ISI marked as per IS 8828: 1996 (IEC 60898) with hammer trip and watch mechanism 15 arc plates, 10 KA capacity with nominal rating of 240/415V.

4.RCCB: -

General Specifications for RCCB- RCCBs shall be ISI marked as per IS 12640 (part 1) – 2000 and Confirming to IEC 61008-1. It shall work on residual current energy, having 30 milliamp sensitivities and shall protect against earth leakage. Tripping time shall be maximum 30 milliseconds. Breaking capacity shall be 20 kA. RCCB shall operate for rated leakage at nominal Ten volts AC, and also in both, Neutral Open & Snapping condition. RCCBs shall have trip free mechanism with quick make & break non-welding self-wiping silver alloy contacts for 20 KA short circuit current both on the manual & automatic operation. Test knob facility shall be provided. All the active, live parts of RCCBs should be out of human reach, ensuring safety & confirms to IP20 degree of protection. The RCCBs must house transparent label holder to ensure circuit identification. The RCCBs must have fully insulated safety shutters. The Minimum electrical endurance shall be 20,000 operations.

Material: 2 Pole / 4 pole, RCCB, ISI marked as per IS: 12640-2000 (IEC 61008-1) with hammer trip and watch mechanism 15 arc plates, 20 KA breaking capacity of specified rating suitable for 240/415V.

Method of Construction: 2 / 4 Pole RCCB shall be erected in provided enclosure & connected with leads, with necessary testing

#### 5.LT CABLES: -

Providing armored cable of specified voltage level, size & specified conducting material

(Aluminum / Copper) as per Table no. 7/3 including required material, hardware's for erection and erecting on wall, ceiling, RCC slab or drawing the same through pole, pipe, laying in provided conduit, trench, ducts, trays as per approved method of construction including glands, lugs, etc.

Material:

Cables:

Cables shall be PVC for LT/MP and XLPE for HT as per Table no. 7/3 and of required construction, color, shall carry ISI mark, IS No, manufacturer's name, size, duly embossed / screen printed at every meter and having the total count of progressive length in meter at each mark.

Earth wire: Galvanized Iron (G I) wire of appropriate gauge as per Table No 7/1.

Saddles: Saddles fabricated from GI sheet of required gauge and size depending on diameter of cable either galvanized or painted with superior quality enamel black paint with necessary shearing mechanical strength, semicircular shaped with extended piece having suitable holes for fixing.

G I Strip: 22 g x 25 mm width G I Strip.

Clamps: MS Clamps fabricated of required length and shape, having the size of 3/6 mm thick mild steel having 25/50 mm width (as per size of cable), rounded ends with wooden / resin cast grip for holding the cable.

Identification tags: For identifying root, connection position GI strip with identification mark / name embossed / painted with arrangement to tie should be fix on cable or arrangement of ferrules to be done.

Hardware: Sheet Metal (SM) screws of required sizes, plugs / wooden gutties, etc.

Method of Construction: General:

a) Irrespective of method of construction the cable ends shall be terminated with appropriate size & type of glands with lugs duly crimped, as directed by Site engineer.

b) Wherever the cable has to be bent, the turning radius shall be as mentioned in Table No 7/2.

Grouping of cables shall be done with adequate distance between cables as mentioned in IS so as to minimize de-rating. Cables shall be tagged/ferruled with identification name / mark at the point from where distribution starts and at ends. Bare earth wire of appropriate size as per Table

no. 7/1 shall run along with the cable. Earth wire running with the cable shall be terminated at the earth terminal nearest to cable termination.

**Erection of Cable on Surface:**

Erection shall be done as per the routes and layout finalized, in perfect level and in plumb. Before fixing the cable shall be straightened as far as possible for good aesthetics look, continuous bare GI earth wire of required gauge as per Table No 7/1 shall be run. Cable with G I wire shall be fixed by saddles firmly clipped on cable and shall be fixed to wall with minimum 50 x 8 mm SM screws with plugs/wooden gutties, etc. (Distance between two supports / saddles shall be maximum 450 mm). Wooden gutties shall be used wherever required (Especially for stone wall). The entries made in wall, floor slab, etc for laying the cable shall be made good by filling and finishing with plastering the same.

**Laying of Cable in provided Trench/Pole:**

While laying Cable along with bare GI earth wire, utmost care shall be taken to prevent damage to the insulation of the cable and to the open end. Cable shall be brought out from trench vertically straight (minimum 1.0 metre above G L). Care shall be taken to inspect the trench so that depth of cable shall not be less than as shown in Table No 7/4. Suitable size of cable loops shall be provided near termination point at adequate depth.

**Erecting cable in constructed Trench / duct:**

Erection of cable/s in constructed trench / duct, shall be as per guide lines of IS 1255.

**Erection of cable/s on trays:**

Cable/s shall be tied with PVC tags on GI trays. At bending point care shall be taken so that sharp edges of sheet will not damage insulation of cable.

**Dismantling**

Cable laid underground, or fixed on any surface shall be dismantled carefully without damaging

complete with all its accessories, making coil and stored as directed. The surface of the dismantled cable shall be made clear by removing of unwanted material, cement mortar, etc. When cable is dismantled from trench refill back the trench and making the surface proper.

Size of Bare GI Earth wire to be used with LT Cables upto 1.1 kV		
S. No.	Size of cable	Size of bare GI Earth wire to be used with cable
1	2.5 Sqmm to 50 Sqmm of all cores.	12 SWG
2	70 Sqmm to 95 Sqmm of all cores	10 SWG
3	120 Sqmm and above of all cores.	8 SWG

Minimum bending Radius for Cables				
S. No.	Voltage level of cables	Single core	Multi core Unarmoured	Multi core Armoured
1	Upto 11 KV	20D	15D	12D

Note: D diameter of cable. Wherever possible, 25 percent larger radii than the specified above should be used.

Current Rating (In Ground) for PVC/ XLPE Insulated 1.1 kV Grade								
Nominal area of conductor (Sqmm)	Aluminum Conductor				Copper Conductor			
	Single Core		Multi Core		Single Core		Multi Core	
	PVC	XLPE	PVC	XLPE	PVC	XLPE	PVC	XLPE
10	51	55	46	50	65	71	60	65
16	66	74	60	68	85	95	77	87
25	86	98	76	90	110	125	99	115
35	100	118	92	108	130	150	120	138
50	120	137	110	126	155	175	145	161
70	140	172	135	158	10	220	175	202
95	175	204	165	187	220	260	210	239

Minimum laying Depth of cables (IS: 1255)		
S. No.	Volatge levels of Cables	Depth from top of the cable
1	Upto 1.1 Kv	750 mm

#### 6.DISTRIBUTION BOARD: -

Supplying of MCBDB suitable for 230 V / 415 V, horizontal/vertical, with/without door of specified ways (poles), surface / flush mounting to house incoming and outgoing MCB's, and erected on iron frame/ GI frame.

General Specifications for MCB DB's: -

- DB's shall be prewired and shall be fabricated as per IS: 8623. Suitable for flush mounting & surface mounting, with 100 A copper bus bar (For Horizontal type DB), neutral bar, earth bar & cable ties for cable management.
- In case of Vertical DB the bus bar shall be of 200 A rating.
- DB's shall be of IP – 43 degree of protection.

All the MCB distribution boards shall be fabricated out of 18 SWG thick sheet steel duly rust inhibited through a process of degreasing, pickling, phosphating & powder coating to an approved colour over primer & shall be of the totally enclosed dust proof type suitable for wall mounting. All components shall be mounted on DIN rails & covered totally with a sheet steel cover rendering it finger-safe.

Access to the internal connections shall be only through removing the cover sheet.

- All DB's shall be internally prewired using copper insulated high temperature PVC wires.
- Bus bars & neutral bar shall be fully insulated with standard colour code.
- Bus bar withstanding capacity shall be 10kA. DB's must have facility of reversing door without

modification, pan assembly for ease of installation & convertible locking.

Material: -

Horizontal/Vertical type MCBDB: ISI marked as per IS 8623, of specified ways (poles), surface/flush mounting, with/without door, suitable for 230 V / 415 V.

Lugs – Copper lugs of suitable size as per (CB-CL/CU) in chapter 7.10 for Cable

Iron work: Suitable size of angle/flat.

Hardware: SM screws, rawl plug, gutties, etc

Method of Construction:

MCBDB shall be erected at designated location and directed by site engineer and terminating the

provided wires by copper lugs (crimping type) and connecting the same.

7.Socket outlet:

- i. Socket outlet modular type shall be 6 pin 6/16 A.
- ii. The third pin shall be connected to earth through protective (loop earthing) conductor. 5 pin sockets shall not be permitted to use.
- iii. Conductor connecting electrical appliances with sockets outlets shall be flexible type with an earthing conductor for connection to the earth terminal of plug & the metallic body of the electrical appliance.
- iv. Socket for the power outlets of rating above 1KW shall be of industrial type with associated plug top & controlling MCB.
- v. Where specified, shutter type (interlocking type) of socket shall be used.
- vi. Every socket outlet shall be controlled by a switch or MCB, as specified. The control switch/MCB shall be connected on the 'live 'side of the line.
- vii. 6/16A socket outlets shall be installed at the following positions, unless otherwise specified.
  - a. Non-residential building-23 cm above floor level.
  - b. Kitchen-23 cm above working platform & away from the likely of stove & sink.

c. Bathroom- No socket outlet is permitted for connecting a portable appliance thereof. MCB/IC switch may be provided above 2m for fixed appliances, and at least 1m away from shower.

viii. Unless & otherwise specified, the control switches for the 6/16A socket outlets shall be kept along with socket outlets.

Control switch for point: -

i. Switch box shall be hot dip galvanized, factory fabricated, suitable in size for surface/recess mounting & suitable in size for accommodating the required numbers of switches & accessories (where required to be used for applications other than modular switches/sockets).

Switch box also can be of non-metallic material. The technical sanctioning authority will approve specified makes of reputed quality & specification.

Stop/Start Pushbutton: -

Push buttons for start & stop shall be of green & red colour respectively. Each push button shall have one normally open & one normally closed contact & all units shall be identified & interchangeable. Stop push button shall be mushroom type with stay put feature & lockable in pressed position. Additional NO/NC

8.PVC Conduit: -

Providing specified PVC Conduits and erecting as per approved Method of Construction; on surface of wall / ceiling, etc. including entries through walls / slabs / flooring as per requirement, and with all necessary hardware, accessories such as Spacers, Saddles, Bends, Tees, Junction boxes, Check-nuts, etc.; making conduits erection work rigid and duly finishing, removing debris from site.

PVC pipe minimum 20mm dia and above depending on No. of wires to be drawn (refer Table No. 1/2) ISI mark, HMS grade (2mm thick), accessories for PVC pipes of the same make that of pipe; such as Spacers & Saddles, Couplers, Bends, inspection or non-inspection type Elbows, Tees, Junction boxes of required ways and resin / adhesive to make all joints rigid. Black pipe shall not be used for surface type wiring.

Hardware Sheet Metal (SM) screws of sizes specified in Method of Construction, washers, rawl / PVC / fill type plugs, wooden gutties, etc.

Wires: Mains / Sub-mains / Circuit mains (comprising phase and neutral wires)

PVC insulated wire of specified size, FRLS grade insulation, copper conductor of electrolytic tough pitch (ETP) grade, having insulation of 1.1 kV grade, ISI marked, of appropriate colour coding as per Table No 1/5

Earth Continuity Wire:

PVC insulated wire FRLS grade insulation copper conductor of electrolytic grade, having insulation of 1.1 kV grade, of green or green yellow colour, ISI marked, of specified size but not less than 2.5 Sqmm as per Table No 1/5.



Other material: Rubber grommet, bush, flexible PVC conduit, gland etc

Method of Construction: -

Erection PVC Conduits for Surface type wiring General: Erection shall be done as per the final approved layout, in perfect level and plumb. Conduits shall be firmly fixed on spacers with saddles. Fixing of spacers shall be equidistant and at ends, bends, elbows, junction boxes, couplings, boards. CSK screws of minimum 35x8 mm and suitable plugs shall be used for fixing spacers and 12x5 mm, round headed screws for fixing saddles on spacers. In case of stonewalls wooden gutties shall be grouted in wall for fixing of spacers. Distance between 2 spacers shall not be more than 600mm. Size of conduit shall be correct depending on number of wires to be drawn (as per Table No. 1/2 for PVC conduits). Separate pipe shall be used for each phase in 1-ph distribution and for power and light distribution. Also for wiring for other utilities like data, telephone, TV cabling distance between pipes shall not be less than 300 mm. or ant electrostatic partition/separate pipe should be used. Adequate use of conduit accessories shall be made at required locations. Entries in wall shall be at level of surface and with colour coding conduit (For visual identification) as per Table No. 1/4. Flexible conduits shall be used at expansion joints. Especially for PVC Conduits of surface type wiring:

In addition to general instructions above, all joints shall be made rigid with resin / adhesive. Wherever offsets are necessary, it shall be done with bending spring. Size of conduit shall be as per Table No. 1/2 for number of wires to be drawn through the conduit.

Drawing of wires:

General Wires shall be drawn with adequate care. Correct colour coding as per Table No. 1/5, shall be used for phase, neutral and earth. Wires shall not have intermediate joint in between terminals of the accessories. Earth-wire and Return wire (neutral) may be looped only within circuit. For lighting load or single-phase distribution wires of two different phases shall not be drawn in single pipe. Lead wires of sufficient extra length shall be provided and shall be terminated in the terminals of accessories only, with appropriate type and size of lugs.

Drawing of wires: through PVC conduits for surface type wiring: -

Insulated Earth wire of green or green-yellow colour of minimum 2.5 sq mm or as per specified shall be drawn through conduit. Number of wires shall not exceed with respect to size of pipe as per Table No. 1/2. At the termination end flexible PVC conduit shall be used with gland as per required.

Table No. 1/2

Maximum Number of Single Core 1.1 kV Cables That Can Be Drawn In Rigid Non-Metallic Conduits							
Size of cable mm <sup>2</sup>		Size of conduit mm					
Nominal Cross-sectional area	No. and dia. of wires	16	20	25	32	40	50
1	1 / 1.12 Cu	5	7	13	20		
1.5	1 / 1.4	4	6	10	14		
2.5	1 / 1.8 3 / 1.06 Cu	3	5	10	14		
4	1 / 2.24 7 / 0.85 Cu	2	3	6	10	14	

Table 1/5

Type	Colour
Phase	Red/ Yellow /Blue
Neutral	Black
Earth	Green

9.POINT WIRING: -

Scope:

Point wiring (Surface type): Providing all required approved specified material including hardware and erecting wiring on surface of wall, ceiling from switch board to outlet for light / fan / bell / independent plug point, in rigid steel / PVC conduit or PVC trunking as specified; fixing one board with a 1 way switch for one way point or two boards with a 2 way switch on each board, in case of 2 way point; for controlling power supply and one board / block with accessory for outlet of light / fan / plug and terminating wires within as per approved Method of Construction; removing all debris and testing the installation for safety and beneficial use.

Material: Point wiring (Surface)

PVC conduit:

PVC pipe of minimum 20mm dia and above depending No. of wires to be drawn (refer Table No 1/2); ISI mark, HMS grade (2mm thick), accessories for PVC pipes of the same make that of pipe; such as Spacers & Saddles, Couplers, Bends, inspection or non inspection type Elbows, Tees, Junction boxes of required ways and resin / adhesive to make all joints rigid. Black pipe shall not be used for surface type wiring.

Wires: Phase and Neutral: -

PVC insulated wires of specified size, 1.1 kV, & FRLS grade insulation, electrolytic tough pitch (ETP) copper conductor, ISI marked, of required colour coding as per Table No 1/5.

Earth Wire:

PVC insulated FRLS grade copper wires of electrolytic grade, having insulation of 1.1 kV grade, of green / green-yellow colour, ISI marked, 2.5 Sqmm or bare copper wire of 14g.

Accessories: Switch:

1 or 2-way Piano type 6/10 A, 1 or 2 way Modular type switch 6/10A.

Outlet: 6A angle / batten lamp holder or 3 plate ceiling-rose or Bakelite / porcelain three-way connector or if plug point, 6A, 3-pin plug socket.

Boards:

Switchboards shall comprise of; concealed type box of required modules made of sheet metal or Polypropylene material, mounting plate and cover plate. The required modules shall be

worked out on the basis of points, plug socket/sockets, step type fan regulator, etc are to be fixed. For every blank module, 1-way blank plate shall be fixed. All the above accessories shall be of same make, as that of switch.

#### Hardware:

Sheet Metal (SM) screws of sizes specified in Method of Construction, washers, rawl / PVC / fill type plugs / wooden gutties, 'U' nails, plumbing nails, steel binding wire, fish wire 20g, rubber / PVC bushes etc.

Other material for Surface finishing: Sand, Cement, water etc.

#### Method of Construction:

Point wiring (Concealed): Concealing of conduits: General: Work shall be done in co-ordination with civil work and to suite final approved layout. Size of conduit shall be correct depending on number of wires to be drawn. (Table No. 1/1 for Page 22 of 189 Steel conduits & Table No 1/2 for PVC conduits) Separate pipe shall be used for each phase in 1-ph distribution and for power and light distribution and also for wiring for other utilities like data, telephone, TV cabling, etc. The distance between pipes shall not be less than 300 mm. Adequate use of conduit accessories shall be made at required locations. Entries in wall shall be at level of corresponding conduit with colour coding as per Table No. 1/4. (For Visual identification) Flexible conduits shall be used at expansion joints. Erection shall be done as per the layout finalized, with minimum sharp bends, with junction boxes at angular junctions and for straight runs at every 4.25m, in such manner so as to facilitate drawing of wires. All the bends shall be done with Bending Spring.

#### Concealing of conduits:

In RCC work shall be commenced after fixing of steel (re-enforcement) on centering material. Conduits shall be firmly fixed on steel of RCC work by binding wire. Fixing of conduits shall be such that it will remain rigid during casting of slab, beam, and column even after use of vibrator. Deep junction boxes and other draw-in boxes shall be such that their open end and centering material will not have gap in between so as to avoid concrete entering inside even after fixing covers to steel re-enforcement; and be filled with dry sand. Open ends of conduits; to be concealed in walls, shall be provided with couplers / sockets at ends and be flush with bottom of beam, and at located at the center of the beam. As far as possible bunching / grouping of conduits shall be avoided so that it will not affect strength of RCC work especially in beams. Suitable steel fish wire shall be drawn through in the conduits for drawing of wires later on.

#### Concealing of Conduits in walls:

Chases shall be made in walls of adequate width, with cutter and chiseling through it. Necessary finishing of the surface shall be done. Conduits of adequate size shall be erected with use of appropriate accessories and 'U' nails.

#### Drawing of wires:

Use of Steel fish wire shall be made for drawing of wires. Wires shall be drawn with adequate care. Correct color coding shall be used for phase, neutral and earth. Wires shall not have intermediate joint in between terminals of the accessories. Earth-wire and Return wire (neutral) may be looped within circuit only. For lighting load distribution, wires of two different phases shall not be drawn in single pipe. Wires shall be terminated in the terminals of accessories only. Adequate extra length shall be left at termination points. In case of 2-way point wiring additional wires of phase conductor shall be provided between the 2-way switches.

Fixing Switchboards and accessories:

Control switchboards shall generally be erected at 1.35m height or as specified and fixed with minimum 2 Nos. of screws of length not less than 50 x 8mm, Boards shall be in line and plum and shall be in level with wall surface so as to fix mounting plate flush with wall, Termination of wires shall be done in switch and other accessories only by carefully inserting all strands in terminals and proper tightening. Switches shall be provided on phase wire only. Bare wire shall not be used for looping incoming supply to switches. Phase wire shall be routed through switch only. For plug socket phase wire shall be connected in right side terminal when seen from front. Proper termination of earth wire in Earth terminal shall be ensured. All blank modules shall be plugged with blanking plates.

Testing:

Insulation resistance test: All wiring shall be tested with 500V Meggar between phases, phase – neutral and to Earth. IR value shall not be less than 1M-ohm.

Earth continuity:

Earth continuity shall be ensured at all earth terminals of plug outlets and at earth terminals of metal enclosures.

Polarity test:

Polarity test shall be carried out for ensuring the correct polarity in the plug.

DISMANTLING POINT WIRING: -

Electrical installation of point wiring along with circuit mains from DBs shall be dismantled with adequate care without damaging surface of wall, ceiling, and flooring. The holes shall be refinished to match with the surrounding surface. Site shall be made clean by removing debris. Dismantled material shall be retained by the agency.

11.CABLE GLAND: -(CB-GL)

Scope:

Termination of cable ends with cable glands for preparing and fixing the cable leads for connection. Cable glands shall be of Flange type.

Material:

Cable glands: Flange type heavy duty. Made of high purity brass metal, with brass washers, rubber rings, threaded stud with washers and nuts.

#### Method of Construction

Before erection of gland, the cable end shall be prepared by removing the outer PVC insulation up to the point where gland to be fixed, by assessing the length of leads required. Bottom portion of gland shall be inserted over the steel armoring, and then armor strips shall be bent for the length of collar of gland, remaining length of armoring shall be cut. The cable end shall then be, inserted through the entry of plate where the cable is to be terminated. The top portion of gland with washer shall be then inserted in such a manner that the bent armor strip should be touching the surface of the entry. The nuts shall be tightened with spring washers over the projected stud portion. Fixing of gland shall be at right angle to the gland plate. Tightening shall assure continuity of earth. Hole to the gland plate shall be punched / knocked out, of correct diameter with respect to gland size.

#### 12.Cable Lugs (Aluminum & Copper):-

Crimping of lugs, and fixing to the terminals with nuts and bolts, etc.

#### Material:

Lug: Lug shall be of high purity aluminum / copper / bimetallic of required type, with required size of hole and smooth finished both from inside and outside.

Hardware: Brass or Cadmium plated mild steel nuts and bolts, bimetallic washers.

Anti-Oxide paste: Paste of superior quality manufactured by reputed manufacturer.

#### Method of Construction:

Before fixing of lugs to the cable end, the cable end to the equivalent length of the lug shall be prepared by removing the outer PVC insulation along with the steel armoring and then, the inner PVC insulation. The paste shall be applied to the cable lead and inside the lug prior to the inserting of lug on the cable lead. The lug shall then be crimped with hydraulic / mechanical type heavy duty crimping tool. The crimping shall be done in such a manner that there shall be no air gap. Then the crimped portion shall be wrapped with the PVC insulation tape. (Color of tape shall be of that of cable lead) The above method shall be carried out for all the cores. The cable end with lug shall then be terminated into the terminal and then be tightened with either brass nuts or Cadmium plated nuts as directed by Engineer in-charge.

#### 13.EARTHING SYSTEM: -

Plate type Earthing (With or Without CI Cover, Funnel, etc) (EA-EP)

#### Scope:

Supplying and erecting galvanised cast iron / copper earth plate type / G.I. pipe type earthing with / without C.I. cover as per instructions from the site engineer.

Material:

Earth Plate: Galvanized cast iron / Copper earth plate or G.I. pipe as per specifications given in Table No 9.1/1.

CI Cover: As per specifications given in Table No 9.1/1.

Earthing Conductor: Copper/G.I strip/Annealed bare copper wire/G.I. earth wire of size as per specifications given in Table No 9.1/1.

Hardware: Screw / nut bolts with required washer of dimensions, Rawl plug / clip/ 'U' nails and material as per specifications given in Table No 9.1/1.

Filling material: Coal /Charcoal/ salt as per specifications given in Table No 9.1/1.  
as per specifications given in Table No 9.1/1.

Method of construction:

Pit is to be dug of required dimension and depth for the earthing at site, and laying of Galvanized cast iron / Copper earth plate or G.I. pipe shall be as per Table No 9.1/1. The earth connection to equipment/ switch gear and earthing electrode shall be connected as shown in the diagram and as per IS 3043 amended up to-date. The connections shall be made either by strip or double run of earth wire with drilling, welding, riveting, brazing and nut bolting to plate or pipe, where ever required in an approved manner. As far as possible continuous strip shall be used, but where ever jointing of strip is unavoidable, the overlap portion must not be less than 2 1/2 times the width of the strip either welded/ brazed/soldered by all sides or 6 inches overlap with two nut bolts/ riveting of adequate size with required washer and covered by anti-corrosive paint as per approved jointing practice in the industry and as per directives from site engineer in charge. Pit shall then be filled with screened soil with alternate layer of coal and salt, and if, necessary brick masonry work ( Where ever applicable) shall be done as specified in IS: 3043, with laying wires in PVC/ G.I. pipe and watering arrangement as per drawing no EA-1 and covered with C.I. Cover ( Where ever applicable). Where ever requires or as specified by Site Engineer, a Test link shall be provided for facilitating the testing of resistance of earth electrode.

Testing:

The value of each earth electrode shall be measured by earth tester in presence of site Engineer and record to be submitted.

Table No 9.1/1 Detailed Specifications of various types of Earthing

Typr of Earthing		Galvanised cast iron earth plate type without C.I cover	Copper earth plate type with C.I cover	Galvanised cast iron earth plate type with C.I cover	Pipe type earthing with out C.I cover
S. No.	Particular				

1	Depth from top of plate Up to Ground level	1.5 m	1.5 m	1.5 m	1.5 m
2	Size & type of material for pipe / Plate type earthing.	Cast iron earth plate size 60x60x0.6 cms	Copper earth plate size 60x60x0.6 cms	cast iron earth plate size 60x60x0.6 cms	B' grade G.I. pipe 40mm. dia. 2.5 mtr. Long or 20 mm dia. G.I. Rod
3	Salt/charcoal	30 Kg. charcoal and salt each	30 Kg. charcoal and salt each	40 Kg. charcoal and salt each	NA
4	Type of Wire	Double G.I. wire 8 SWG	Double G.I. wire 8 SWG	Double G.I. wire 8 SWG	Double G.I. wire 8 SWG
5	Wire enclosure	12mm. dia. G. I. pipe 2.5 mtr. Long	12mm. dia. G. I. pipe 2.5 mtr. Long	12mm. dia. G. I. pipe 2.5 mtr. Long	NA
6	Nut bolts	12 mm dia. Cadmium / GI	13 mm dia. Cadmium / GI	14 mm dia. Cadmium / GI	NA
7	Washers	GI	GI	GI	NA
8	Lugs	Yes	Yes	Yes	Yes

## **E. STANDARD TECHNICAL SPECIFICATIONS FOR FIREFIGHTING WORKS**

### **1.1 Booster Pumps**

Specification No. (FF-MFP/BP)

Scope:

Supplying, installing, testing, perfect aligning, proper levelling and commissioning of Fire service main/jockey/booster pump single/multi stage having specified discharge and head with required HP or similar to with minimum parameters, confirming to IS: 1520 with specified size of suction and delivery pipes, coupled with squirrel cage. A.C. Induction motor. The pump set shall be erected in alignment on cement concrete foundation. The Main Fire pumps should be able to deliver minimum operating pressure of 3.5kg/cm<sup>2</sup> at highest and farthest hydrant.

Material:

Pump Body:

The centrifugal pumps shall conform to IS 1520. The pump casing shall be of heavy section close grained cast iron and designed to withstand 1.5 times the working pressure. The casing shall be provided with shaft seal arrangement as well as flanges for suction and delivery pipe connections as required.

Impeller:

The impeller shall be bronze. This shall be shrouded type with machined collars. Wear rings, where fitted to the impeller, shall be of the same material as the impeller. The impeller surface shall be smooth finished for minimum frictional loss. The impeller shall be secured to the shaft by a key.

Shaft:

The shaft shall be of EN-8/C-40 and shall be accurately machined. The shaft shall be balanced to avoid vibration at any speed within the operating range of the pump.

Shaft Sleeve:

The shaft sleeve shall be of bronze.

Bearing:

The bearing shall be of stainless steel and of ball or roller type suitable for duty involved. These shall be grease lubricated and shall be provided with grease nipples /cups. The bearings shall be effectively sealed against leakage of lubricant or entry of dust or water.

Shaft seal:

The shaft seal shall be mechanical type so as to allow minimum leakage. A drip well shall be provided beneath the seal.

Motor:



Suitable HP squirrel cage induction motor, TEFC (totally enclosed fan cooled) synchronous speed 2900 RPM, suitable for operation on 415 volts, 3 phase 50 Hz AC with IP 55 protection for enclosure, horizontal foot mounted type with Class-“F” insulation, conforming to IS-325.

Body: Cast iron

Rotor Shaft: EN-8/C-40

Bearing: Refer specification for bearing under Pump above.

Winding: Class “F” insulated copper winding.

Base plate: Fabricated from Mild steel, foundation bolts etc.

Anti-Vibrating Pads: Made from high quality rubber of specified grade and strength.

Hardware: Mild Steel

Method of Construction:

The surface of the pump foundation should be chipped with pneumatic hammer or sharp pointed chisel. The teak wood box of appropriate size shall be placed and filled with cement concrete in 1:2:4 ratios with 20 x 25 mm stone metal and required size and strength of foundation nut & bolts. The necessary curing and finishing shall be done in approved manner. The M.S. fabricated base plate of suitable size and strength should be fixed with anti-vibration rubber pads. Proper levelling and alignment shall be observed before tightening of foundation bolts. Both the pump and motor shall be placed on common base plate frame with perfect alignment, proper levelling. The pump should be connected to pipe line with M.S. flanges, caskets, nut bolt etc. and shall be checked for the leakages. The coupling guard shall be provided with nut bolts of required size. The pump shall be tested for 3.5 kg/cm<sup>2</sup> pressure at highest and farthest point of the building for minimum 2 hours. The necessary test certificate from manufacturer of pump and motor shall be produced. The motor should have efficiency more than 90% and power factor above 0.80.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.2 Butterfly valves:

Specification No. (FF-VL/BFV)

Scope:

Supplying & installing cast iron double flange butterfly valve of size 75/80mm. dia conforming to IS: 13095 having cast iron body. FG 220 Nitrite rubber replaceable seat with Moulded “O” ring, C.I. powder coated disc flow control complete & instead to 1.5 times of working pressure in an approved manner.

Method of Construction:

The double flange butterfly valve shall be fitted with provided flange, gaskets. Nut, bolts etc. to be fitted to pipe, accessories with washers, spring washers, check nuts as required with

proper alignment so as to be leak proof including necessary labour and required tools and plants.

Mode of Measurement:

Executed quantity shall be measured on number basis.

### 1.3 Non Return Valves:

Specification No. (FF-VL/NRV)

Scope:

Supplying & installing double flange NRV of specified diameter conforming to IS: 5312 (Part-1), ISI mark, having cast iron body and gun metal working parts with nut bolts, gaskets etc. and tested to 1.5 times of working pressure in an approved manner. Method of Construction: The double flange NRV shall be fitted to pipe with provided flange, gaskets, and nut bolts etc. accessories with washers, spring washers, and check nuts as required with proper alignment so as to be leak proof including necessary labour and required tools and plants.

Mode of Measurement:

Executed quantity shall be measured on number basis.

### 1.4 Hydrant Valves (Landing Valves)

Specification No. (FF-VL/HV)

Scope:

Supplying and installing gun metal single outlet, hydrant valve Morris pattern, oblique type, conforming to IS:5290, ISI mark, with G.M. blanks cap and M.S. or G.I. chain in an approved manner. Method of Construction: The hydrant valve shall be connected with provided flange, gaskets, Nut bolts etc. with use of required tools and plants. The water discharge shall be not less than 900 lpm for single head and 1800 lpm for double head valves at 7kg/cm<sup>2</sup>.

Mode of Measurement:

Executed quantity shall be measured on number basis.

### 1.5 Hose Reel Drum

Specification No. (FF-FFA/HRD)

Scope:

Supplying and installing wall mounting swinging Hose reel drum as per IS:884 and fitted with 19mm dia. 30 meter long high pressure polypropylene (Polyhose) pipe as per IS: 444 (type III) G.M. chrome plated nozzle and 19 mm dia. And G.M. gate valve on the inlet pipe with necessary M.S. Bracket for holding Hose reel drum fitted in position with wall fasteners, in an approved manner.

Material:

Hub and sides: Aluminum Alloy/Mild steel/Aluminum sheet.

Wall Bracket: Cast iron/Mild steel

Hose tube (20mm): Thermoplastic (Textile Reinforced) Type-2, (Nominal internal dia) as per IS-12585

Nozzle with branch Pipe: Brass as per IS 8090

Stop Valve (Ball Valve): Gun metal

Method of Construction:

The wall mounting swinging Hose reel drum with Gun Metal Nozzle, gate valve, shall be connected on M.S. bracket with provided flange, gaskets, Nut bolts etc. with use of required tools and paints.

The water flow rate shall be not less than 24 LPM and the range of jet shall be not less than 6 meter.

Mode of Measurement:

Executed quantity shall be measured on number basis.

#### 1.6. R.R.L. Hose Pipe

Specification No. (FF-FFA/RRL)

Scope:

Supplying firefighting R.R.L. Hose pipe, conforming to IS: 636 (Type-B) 15 meter length, fitted

With male and female G.M. coupling conforming to IS: 993, with ISI mark.

Material:

Hose pipe material: Rubber lined woven jacketed & 63mm in dia., the lining and the cover shall be of uniform thickness, reasonably concentric and free from air blisters, porosity and splits. The tensile strength shall be minimum 5.00 MPa and shall withstand pressure of 10.2kg/cm<sup>2</sup>

Coupling: Gun metal

Method of Construction:

Hose pipe of 15 meter length with male and female Gun metal coupling shall be connected as per direction.

Mode of Measurement:

Executed quantity shall be measured on number basis.

#### 1.7 Nozzles

Specification No. (FF-FFA/NZ)

Scope:

Supplying G.M. branch pipe of 63 mm diameter with specified length fitted with 20 mm

diameter detachable hexagonal nozzle confirming to IS: 903, ISI mark.

Material:

Nozzle: Chrome plated Gun metal.

Method of Construction:

Gun metal hexagonal nozzle fitted with required tools and plants including necessary labor, Material etc.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.8 Hose Box

Scope:

M.S./CRCA cabinet for housing Floor Hydrant valve, hose pipe, hose reel and branch pipe (size

1000 mm x 736mm x 736 mm.) made from 16 SWG sheet and angle iron 25 mm. x 25 mm. x 4

mm. having front doors with viewing glass (8"x6") and locking arrangement with necessary fixing material such as rubber bidding etc. duly painted in post box red colour.

Method of Construction:

Hose box fitted with required tools and plants including necessary labour, material etc.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.9 Pipes

Specification No. (FF-PP)

Scope:

Supplying erecting C class (Heavy Duty) galvanized iron pipe, ISI mark of specified diameter with screwed sockets, Joints & necessary G.I. fittings such as sockets, check nuts, elbows, bends,

tees, reducers, enlarger, plugs, flanges etc. including electric resistance welding (ERW), fixing with clamps and all connected works such as excavation, drilling holes in wall, slabs, backfilling

& making good the damages.

Material:

The galvanized iron pipes shall be of type and diameter as specified and shall comply with

I.S.1239-1973 and 1969 for the specified type. The specified diameter of the pipes shall refer to

the inside diameter of the bore pipes. The fittings of which the galvanizing has been damaged shall not be used. For the fire fighting works, the C Class (Heavy Duty) pipes and accessories shall be used.

**Pressure Testing:**

All piping shall be tested to hydrostatic test pressure of at least one and a half times the maximum operating pressure, but not less than 10 kg/cm<sup>2</sup> for a period not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified to the satisfaction of the Engineer-in charge. Piping repaired subsequent to the above pressure test shall be re-tested in the same manner. System may be tested in sections and such sections shall be securely capped. Pressure gauges may be capped off during pressure testing of the installation.

**Method of Construction:**

Galvanized iron pipes of specified diameter and type and galvanized iron fittings with ERW shall be erected on MS angle support with one coat of red oxide primer and two coats of Post Office fire red enamel paint duly tested to 1.5 times of working pressure. Excavating and back filling trenches including dewatering, cutting through walls, floor etc. and making site good. Laying, jointing, and fixing the pipe with the fittings including cutting pipes, wastage and threading the ends. At all the road crossings the pipes shall be laid lower than the crust of the road. During excavation if, any other service pipes (Water, electric, telephone, etc.) come across, these shall be carefully protected and supported. Any damages done shall be made good. The pipe shall be laid on a well compacted bed in the trench. The trench after laying the pipe shall be refilled except at the joints in layers and manually rammed. Care shall be taken to see that no earth, etc. gets inside the pipes. The filling shall be kept raised by about 5cm. for subsequent settlement. Bedding and cushioning of murrum, good earth, or sand shall be provided for the pipe in case of trench through rock. The trench at the joints shall be filled similarly after satisfactory testing of the pipe. Any surplus excavated stuff shall be disposed of satisfactorily without causing nuisance.

**Mode of Measurement:**

Measurement shall be for running metre of each type and diameter of pipe laid complete with Fittings, clamps etc. as specified. The lengths shall be measured net on the straight and bends along the centre line of the pipes and fittings correct up to a cm.

**1.10 End line strainer**

Specification No. (FF – VL/ELS)

**Scope:**

Supplying and installing and liner strainer of specified diameter as per IS: 907, fabricated out of brass perforated sheet of 14 SWG (2.0mm thick) duly with brazing to flange or pipe with nut bolts, gaskets, washers etc. in position for only suction in an approved manner.

**Method of Construction:**

End line strainer with strainer shall be fitted with provided flange, gaskets, nut bolts etc. and to be erected at the end of suction pipe, including labour and required tools and plants.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.11. Siamese connection (Fire service inlet)

Specification No. (FF-FFA/SMC)

Scope:

Supplying and installing fire brigade Header (Siamese Connection) of 150mm F G.I. 'C' class pipe

having 2 Nos. of 100mm 'T' outlet with 100mm F flange, fitted with 2 Nos. of G.M. Male inlets

with spring type NRV for supplying water to Wet riser.

Material:

Pipe material: G.I. 'C' class

Branching inlet: Gun metal

Male inlet: Gun metal

Non Return Valve: As per (FF-VL/NRV) above

Method of Construction:

In order to facilitate feeding of water in the system by fire service, a 4 way 63mm diameter

Collecting head shall be provided and connected with each riser/down corner and the ring main with Non return valve and with provided butterfly/slucice valve. This should be located at a place where Fire brigade tender can reach.

The whole unit is placed in provided MS box made of 2 mm thick MS sheet with open-able glass

Cover.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.12. Air Release Valve:

Specification No. (FF-FFA/ARV)

Scope: Supplying and erecting Air release cock of 20/25mm F made from G.M. with necessary G.I.

Coupling for fixing on top of Air vessel or on wet riser.

Material: Air release Valve: Gun metal

Coupling: G.I.

Method of Construction: Air release Valve with necessary GI coupling shall be fixed on top of wet riser with required labour, tools etc.

Mode of Measurement:

Executed quantity shall be measured on number basis.

#### 1.13 Fire Buckets & Fire Extinguishers.

The fire Buckets shall be made up of galvanized Iron Sheets of approved thickness and painted Red with Letter of "FIRE" written on it. 3 such buckets shall form one set and they shall be hung by means of hook arrangement from a stand prepared out of Round steel bars with supporting frame. This frame work shall also be painted "RED". The fire buckets shall be filled with clean, dry and peddle free sand ready for immediate use for extinguishing fires.

The number of Fire Extinguishers shall be as per the insportate. These shall be CO2 type and shall be tested at least once in a year on the site, after erection. This shall be as per relevant Indian Standards of minimum 4.5 kgs.

Mode of Measurement:

Executed quantity shall be measured on number basis.

#### 1.14 Fire Alarm Control Panel

Local Control Panel

Specification Nos: - Fire Alarm Control Panel (FF-FAAS/FACP)

Local control Panel (FF-FAS-LCP)

Scope:

Supplying, erecting, testing & commissioning of Fire Alarm Control Panel with all accessories.

Material:

Panel: Microprocessor based Conventional Main Fire Alarm Control Panel (FACP) with necessary Test Certificate from ERTL (Electronics Regional Test Laboratory) as per IS 2189-1999 provided with SMPS (Switch Mode Power Supply) of suitable battery (2x12V) 24V, 24 AH capacity maintenance free battery as standby supply to switch over automatically for a period of 8 hours in case of A.C. supply failure to panel with 7 AH capacity battery charger, panel shall have following features.

- a) Visual zone indication in which fire has emerged
- b) Audio alarm devices
- c) Acknowledge reset and test devices
- d) Visual indication (2x20 character LCD display) incorporating following indications
  - i) Fire condition
  - ii) Fault condition

- iii) A.C. Pilot indication
  - iv) Low battery indication
  - v) Blown fuse indication A.C. as well as D.C.
  - vi) Built in electronic hooters of 2 tone round for fire condition and single tone for fault condition.
  - vii) Open and short circuit fault
  - viii) Push button switch for checking each zone.
  - ix) Push button to disable audio alarm
  - x) Reset push button.
- e) Fire protection and alarm circuit shall have modular design using electronic plug in type printed circuit boards (PCB) with spare cards.
- f) Main fire alarm control panel should be with P A system, P A Auto Manual, Alert, Evacuate facility, Zonal PA Hooter selector, inbuilt heavy duty power supply to operate all hooters at the same time.

Method of Installation:

The microprocessor based main fire Alarm control panel designed as per IS 2189-1999 with ERTL (Electronics Regional Test Laboratory) Test certificate shall be fixed at accessible place so that security or fire personal can attend to the fault immediately.

Testing:

The control shall be tested for following features:

- 1) Alarm cancel Test
- 2) Reset 1 lamp
- 3) Fire Test
- 4) Open Test (for detector & hooter)]
- 5) Short circuit Test (for detector & hooter)
- 6) Walk Test(one man test)
- 7) Sounder Test

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.15 Pill Box (Manual Call Point [MCP]

Specification No. (FF-FAAS/MCP)



Scope:

Supplying, erecting, testing, and commissioning pill box with break glass, push button. MCP is

manually operated device used to initiate an alarm signal.

Material:

Push Button: Plastic

Enclosure: CREAMS with 100/150mm round/square with Glass cover.

Hammer with chain: Brass

Enamel paint: Superior quality Post Office red colour.

Hardware: S.M. Screw

Plugs: Plastic

Method of Construction:

The pill box with break glass cover, push button in circular/square enclosure with push button kept inside per set with a glass outside marked "IN CASE OF FIRE BREAK GLASS" provided with a small hammer and chain fixed to the pill box shall be mounted on wall or any other place as directed and provided with cable entry with suitable terminal inside and painted with two coats of red oxide and two coats of post office red enamel paint.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.16 Hooter:

Specification No. (FF-FAAS/HTR)

Scope:

Supply and erecting hooters with speaker facility in CRCA enclosure duly connected to main Amplifier to radiate two tone sounds for public.

Material:

Hooter: Electronic type, 6W output speaker with Line matching transformer

Enclosure: CRCA sheet of 14 SWG with perforation

Enamel paint: Superior quality Post Office red colour

Hardware: S.M. Screw

Plugs: Plastic

Kitties: Wooden

Method of Construction:

The electronics hooter with Line matching transformer shall be enclosed in suitable size perforated CRCA enclosure and installed as per instructions and shall be connected and fixed at suitable site to ensure that the alarm is heard anywhere in the protected area. The minimum sound level shall be 80 dB.

Mode of Measurement:

Executed quantity shall be measured on number basis.

1.17 FRLS Armored cables

Specification No. (CB-LT/CU)

Scope:

Providing FRLS Armored cable of specified voltage level, size & specified conducting material Copper, including required material, hardware's for erection and erecting on wall, ceiling, RCC slab or drawing the same through pole, pipe, laying in provided conduit, trench, ducts, trays as per approved method of construction including glands, lugs, etc.

Material:

Cables:

Cables shall be FRLS and of required construction, color, shall carry ISI mark, IS No. manufacturer's name, size, duly embossed/screen printed at every meter and having the total count of progressive length in meter at each mark.

Earth wire: Galvanized iron (GI) wire of appropriate gauge

Glands: As per specification

Lugs: As per specification (CB-CL/CU)

Saddles: Saddles fabricated from GI sheet of required gauge and size depending on dia of cable either galvanized or painted with superior quality enamel black paint with necessary shearing mechanical strength, semicircular shaped with extended piece having suitable holes for fixing.

Clamps : MS Clamps fabricated of required length and shape, having the size of 3/6mm thick mild steel having 25/50mm width (as per size of cable), rounded ends with wooden/resin cast grip for holding the cable.

Identification tags: For identifying root, connection position GI strip with identification mark/name embossed/painted with arrangement to tie should be fix on cable or arrangement of ferrules to be done.

Hardware: Sheet Metal (GM) screws of required sizes, plugs/wooden gutties, etc.

Method of Construction:

General:

a) Irrespective of method of construction the cable ends shall be terminated with appropriate size & type of glands with lugs duly crimped, as directed by Site engineer.

b) Wherever the cable has to be bent, the turning radius shall be as mentioned in Table No.7/2.

Grouping of cables shall be done with adequate distance between cables as mentioned. In IS so as to minimize de-rating. Cables shall be tagged/ferruled with identification name/mark at the point from where distribution starts and at ends. Bare earth wire of appropriate size shall run along with the cable. Earth wire running with the cable shall be terminated at the earth terminal nearest to cable termination.

## F. VRF/ VRV System

### 1. SCOPE OF WORK

- a) Scope of work under this contract shall include but not limited to the design, manufacture, testing at manufacturer's workshop, supply, storage, erection, site testing and commissioning of the Air-conditioning & Ventilation System mainly comprising of:
- b) Outdoor and indoor units of VRV / VRF / High performance air-conditioning system along with refrigerant piping and drain piping etc.
- c) Ventilation fans
- d) Air distribution system
- e) Drain Piping
- f) Electrical works
- g) Any other item required to complete the work except the specified items mentioned under para "works & services to be arranged by other than HVAC Contractor".
- h) Scope of work shall also include the following: The Contractor shall include the supply of entire materials in accordance with this specification and the whole of the work necessary for the complete installation as set down in this Specification and with the accompanying schedules and drawings. Materials and components not specifically stated in the specifications and/or bill of materials or noted on the drawings but which are necessary for satisfactory installation and operation of the system shall be deemed to have been included in the scope of work.
- i) The Variable Refrigerant Volume / Flow system shall be provided for Workshop & Central Store Building. The complete VRF system including outdoor units, indoor units, copper piping and controls and shall be provided in Duty + Standby configuration for 24 x 7 operating rooms. For non 24 x 7 operating rooms running units shall be provided.
- j) The VRF units shall be air cooled, split type multi system air conditioner consisting of one or multiple outdoor units and combination of indoor units, each having capability to cool independently for the requirements of the rooms.
- k) The VRF indoor units shall be specially designed for 240Volts/1 phase/ 50 Hz electrical systems and meet the room temperature and humidity level.
- l) The refrigerant piping shall be capable of extending up to 300 mtr with 50 mtr level difference without any oil traps and the total pipe length up to 1000 mtr.
- m) The Variable Refrigerant Volume / Flow system shall have Variable Digital Screw compressors to provide proportional power consumption as per actual load requirement. It should also be provided with duty cycling for multiple / variable compressor switching starting sequence of multiple outdoor unit.
- n) The unit shall be provided with its own microprocessor control panel.
- o) The outdoor unit should be fitted with low noise, aero spiral design fan with grill for spiral discharge air flow to reduce pressure loss and should be fitted with DC fan motor for better

efficiency. The unit should also be capable to deliver external static pressure to meet proper exhaust of condensing Air.

p) Centralised remote controller shall be provided for controlling, sequencing, scheduling the complete VRF system and to monitor the operation of units and its various parameters. The central remote controller shall be interfaced with VAC BMS system through Bacnet/ Modbus protocol.

#### 2 Quantum of Materials to be ordered

a) The Schedule of Quantities shall not be used as a basis for ascertaining the quantum of materials to be ordered and these are for guidance only. The Contractor shall assess the quantities of materials to be ordered as per requirement and shall be entirely responsible for the same. The design/drawings of the layouts/system shall be submitted by the DDC of the Contractor and got approved from the Employer's representative.

#### 3 WORKS & SERVICES TO BE EXECUTED BY OTHER AGENCIES

a) The following associated works and services are excluded from scope of this contract and shall be executed by other agencies in accordance with contractors approved shop drawings.

b) Insulation to exposed roofs with 50mm thick expanded polystyrene or equivalent insulation.

c) Civil works of providing foundations for major equipment – chillers, pumps and cooling towers.

d) Provision of 415 volt, 3 phase power near each outdoor units and 220 volt single phase supply near each indoor units for VRV system.

e) Provision of 415 volt, 3 phase power near each outdoor units for high performance unit.

f) False ceiling work.

#### 4 QUALITY CONTROL

Reference Codes and Standards:

Standard no Description

ARI Air-conditioning and Refrigeration Institute

ARI Standard 210 Unitary Air-Conditioning and Air-Source Heat

Pump Equipment UL Requirements

Codes and regulations of the jurisdictional authorities.

#### 5 Technical and Installation Requirements

##### a. General

Units shall be of minimum vibration and noise level during operation. Additional vibration isolators and sound attenuators shall be provided at Contractor's expense if noise and vibration are found excessive. Provide units completely piped, wired,

charged, and factory tested as a package. All components shall be dehydrated, sealed and shipped with holding charge/refrigerant.

b. Compressor

The compressor shall be highly efficient Screw type and should be capable of varying the capacity from 100% to 10% load. It shall change the speed/ loading in accordance to the variation in cooling load requirement. All outdoor units shall have multiple steps of capacity control to meet load fluctuation and indoor unit individual control. All parts of compressor shall be sufficiently lubricated stock. Proper lubrication may also be employed. Oil heater shall be provided in the compressor casing.

c. Heat exchanger

The heat exchangers shall be constructed with copper tubes mechanically bonded to Aluminium fins to form a cross fin coils. Aluminium fins shall be covered by anti-corrosion resin film. The unit shall be provided with necessary number of direct driven low noise level propeller type fans arranged for vertical discharge. Each fan shall have a safety guard.

d. Refrigerant circuit. The refrigerant circuit shall include liquid and gas shut off valves and solenoid valves at condenser end.

All necessary safety devices shall be provided to ensure the safely operation of the system. All refrigerant piping for the air conditioning system shall be constructed from hard drawn seamless copper refrigerant pipes with copper fittings and silver-soldered joints. The refrigerant piping arrangements shall be in accordance with good practice within the air conditioning industry, and are to include expansion valves, charging connections, suction line insulation and all other items normally forming part of proper refrigerant circuits.

The suction line pipe size and the liquid line pipe size shall be selected according to the manufacturer's specified outside diameter. All refrigerant pipes shall be properly supported and anchored to the building structure using still hangers, slotted angle tray, anchors, brackets and supports which shall be fixed to the building structure by mean of inserts or expansion shields of adequate size and numbered to support the load imposed thereon. The supports shall be of rigid type.

The Outside diameter and wall thickness of copper refrigerant piping shall be as recommended by the manufacturer.

e. Safety devices

All necessary safety devices including single-phase preventer etc. shall be provided to ensure safe operation of the system.

Following safety devices shall be part of the outdoor unit; High Pressure Switch , Fuse, Fan drive overload Protector , Fusible Plug , Over Load relay, Overload Protection for inverter.

The Refrigerant used shall be CFC free.

f. Indoor unit- General

Indoor unit shall be either ceiling mounted cassette type, or ceiling mounted duct able type or floor standing type or wall mounted Hi wall type. Each unit shall have electronic control valve to control refrigerant flow rate respond to load variations of the room. The address of the indoor unit shall be set automatically in case of individual and group control. The fan shall be dual suction, aerodynamically designed turbo, multi blade type, statically & dynamically balanced to ensure low noise and vibration free operation of the system. The fan shall be direct driven type, mounted directly on motor shaft having supported from housing. The cooling coil shall be made out of seamless copper tubes and have continuous aluminium fins. The fins shall be spaced by collars forming an integral part. The tubes shall be staggered in the direction of airflow. The tubes shall be hydraulically/mechanically expanded for minimum thermal contact resistance with fins. Each coil shall be factory tested at 21kg/sqm air pressure under water.

Unit shall have cleanable type filter fixed to an integrally moulded plastic frame. The filter shall be side away type and neatly inserted. Each indoor unit shall have computerized PID control for maintaining design room temperature. Each unit shall be provided with microprocessor thermostat for cooling or cooling and heating. Each unit shall have wireless LCD type remote controller. The remote controller shall memorize the latest malfunction code for easy maintenance. The controller shall have self – diagnostic features for easy and quick maintenance and service. The controller shall be able to change fan speed and angle of swing flap individually as per requirement.

g. Ceiling mounted cassette type unit (multi flow type)

The unit shall be ceiling mounted type. The unit shall include pre-filter, fan section and DX- coil section. The housing of the unit shall be powder coated galvanized steel. The body shall be light in weight and shall be able to suspend from four corners. The fan shall be aerodynamically designed diffuser turbo fan type. Unit shall have an external attractive panel for supply and return air. Unit shall be four way supply air grilles on sides and return air grille in centre. Each unit shall have high lift drain pump, fresh air intake provision. All the indoor units regardless of their difference in capacity should have same decorative panel size for harmonious aesthetic point of view. It should have provision of connecting branch ducts.

h. Ceiling mounted ductable type unit

Unit shall be suitable for ceiling suspended arrangement above false ceiling. The unit includes pre filter, fan section & DX coil section. The housing of unit shall be light weight powder coated galvanized steel with secondary drain pan.

i. High wall mounted units

The units shall be wall-mounted type. The unit includes filter, fan section, & DX coil section. The housing of unit shall be light weight powder coated galvanized steel. Unit shall have an attractive external casing for supply and return air.

## 6 SPLIT AIR CONDITIONERS

### GENERAL

The contractor shall supply and install split system air conditioner wherever indicated or required. The system shall be complete in all respects and comply with the specifications as given. The system will work at 240V, 1-Phase, 50 Hz, AC supply. The unit shall be operated by remote control and should show temperature on the cooling units.

## CONDENSING UNITS

- a. Each condensing unit shall be complete unit with compressor/s, air cooled condenser, condenser fans with motors, internal piping, switches and internal wiring and shall be enclosed in a weather proof outdoor type housing.
- b. The compressor shall be hermetic, with enclosed gas cooled motor. The compressor shall be suitable for R-22.
- c. The condenser coil shall be air cooled type with aluminium sine wave fins and copper tubes and necessary refrigerant connections. The copper tubes shall not be less than 1/2" O.D.
- d. The condenser air fans shall be propeller type direct driven, each complete with motor. The air quantity and area of the condenser shall be adequate for working in the specified outdoor conditions.
- e. The casing shall be fabricated from galvanized steel and finished with powder coated paint. The casing shall make the whole unit fully weather proof Suitable for outdoor installation.
- f. The necessary charge of refrigerant gas and lubricated oil shall be provided to run the system.

## COOLING UNIT

- a. The cooling unit shall be matched to the respective condensing unit and shall consist of cooling coil, blower, filters, outer casing, drain pan, accessories etc.
- b. The cooling coil shall have copper tubes of not less than 1/2" O.D. and continuous aluminium sine fins with integral collars. The tubes shall be staggered in the direction of the air flow.
- c. The fan section shall comprise of 1 No. statically and dynamically balanced centrifugal blower, motor, drive package, mounting arrangement etc.
- d. The unit shall include a remote-control assembly with thermostat and starter and speed switches.
- e. The unit casing shall be made of galvanized steel, the casing shall be insulated to lower the noise level and eliminate condensation.

## REFRIGERANT PIPING

- a. The condensing unit and evaporator unit shall be interconnected by type 'L' seamless copper Refrigerant liquid and suction lines using flared or brazed fittings. Necessary accessories shall be incorporated in the circuit. This includes the entire piping work as required.
- b. The suction and liquid line shall be insulated with 13 mm thick expanded polyethylene/ Nitrile rubber insulation.
- c. Necessary chases and holes in walls and floor etc for laying the piping work shall be done by contractor, after completion of work necessary repair work shall be done by contractor and brought to its original finish.

## MISCELLANEOUS

- a. The unit shall have control panel, housing the starting switches, contractor, relays etc.
- b. Isolation pads shall be provided under the units.
- c. Insulated drain line shall be provided from indoor unit upto drain trap.



- d. Suitable M. S. channel supporting frame shall be provided for the condensing unit and supporting arrangement for the indoor units.
- e. Interconnecting power and control cabling shall be provided between condensing unit and evaporator unit.
- f. PVC flexible sleeves shall be provided to cover the insulated refrigerant piping and electrical cabling from indoor to outdoor units.

#### INSTALLATION

- a. The split type air conditioner shall be mounted on vibration isolators and installed in accordance with the manufacturer's recommendation such that no disturbing vibration or noise is being transmitted to the nearby structure.
- b. Refrigerant pipes that exposed to outdoor shall be covered with UV coating to protect insulation from direct UV exposure.
- c. All galvanized support beams, galvanized legs, galvanized hangers, anchor bolts, vibration isolators, duct works and shall be provided for the installation of the units.
- d. The MS frame required for mounting outdoor condensing units onto the wall or the floor shall be provided by Contractor as required, and after due approval of shop drawings by Employer.

#### TESTING AND COMMISSIONING

- a. After installations are completed, all air handlers shall undergo test run. Any adjustments that are needed shall be made to assure that all air handlers will operate either the required performance. Report forms to contain following minimum data listings shall include design and actual conditions for each Item mentioned below: Date and time of test. Air handling unit and fan coil unit make, type, name and serial number. Fan rpm. Fan motor amperage Rated motor amperage, starter number and ampere rating. Fan CFM Fresh air CFM in case of duct table units Outside conditions (DB and WB) Entering coil conditions (mixing) (DB and WB) (10) Leaving coil conditions (DB and WB)
- b. During test run, the air filters of testing sets shall be used.

#### Motor Operated Dampers (MOD)

- a. All motor operated dampers shall be suitable for installation in either a vertical plane or a horizontal plane.
- b. The dampers shall be operated by electric actuators and shall be readily assembled on Site from modular panels. Each motor operated damper panel shall be of the multiple-parallel-blade type, with an independent channel frame; and shall be factory-assembled complete with frames, blades, shafts, bearings, seals, linkage, and all accessories required to erect the panels into composite dampers. Motor operated dampers shall be provided with all structural support members and hardware required for installation with additional framing or trims as required to complete the installation.
- c. Motor operated damper actuator shall be mounted outside of the damper frame.
- d. Spring-return type damper actuator shall be provided either to open or close damper as required in the event of power failure.
- e. All motor operated dampers shall be the product of a single manufacturer; and all like components shall be provided by a single supplier.

- f. Motor operated damper module assembly shall have a net free face area of not less than 80% measured to the inside of the frames.
- g. Dampers shall be based on standard air having a density of 1.20 kg/m<sup>3</sup>. This shall apply to MOD and MSFD/MFD.
- h. The motor operated damper manufacturer shall carry out factory tests to verify that when the dampers are fully-closed and holding against a differential pressure of 1000 Pa, air leakage through the damper will not exceed 0.1 m<sup>3</sup>/s per square metre of net damper face area.
- i. When the dampers are in the fully-open position and air is flowing across the damper at a uniform velocity of 10 m/s and the static-pressure drop across the damper shall not exceed 38 Pa.
- j. The motor operated dampers and their associated structural-supporting systems shall, when the dampers are in the fully - closed position, be capable of withstanding a differential pressure across the dampers of not less than 1.5 kPa.
- k. The motor operated damper blade and shaft assemblies shall be supported at each end by means of heavy duty, permanent self-lubricating bronze or stainless steel bearings.
- l. All motor operated damper-blade seals and damper-frame seals shall be fabricated of a flexible material suitable for the specified operating conditions as Approved. The seals shall be factory installed in dovetail grooves incorporated for this purpose in the design of the blade and frames to facilitate a tight closure between the blades, and between the blades and frame. All seals shall sit securely in the closed damper position. Alternative design of the seals will be subject to the Approval of the Engineer. Noise due to resonance of spring-type seals or any other source shall be rejected.
- m. Each module of damper with only two operating positions should have one limit switch with two contacts to monitor its open/closed status. If anyone module of the damper fails to operate, the damper shall be considered not functioning properly. For each module of damper with three operating positions, two or more limit switches shall be provided.
- n. Motor operated damper linkage shall consist of stainless steel (SS-316), extending through bearings inserted in brackets fabricated of stainless steel. The linkage bearings shall be fabricated from bronze or other material suitable for the specified operating conditions as Approved. The linkage brackets shall either be attached to the damper-blade shafts or be side-mounted and mechanically inter-connected with the shafts. Set screws shall not be used in the linkage assembly.
- o. Motor operated damper frames shall be a channel cross-section with not less than a 100 mm web and 50 mm flanges, and shall be fabricated of hot-dipped galvanised steel plate (min. 275 GSM) to BS EN 10142. Reinforcing bosses and dove-tail grooves for mounting frame seals shall be integral parts of the channel configuration. The corners of the frames shall be either welded or reinforced by means of riveted gusset plates.
- p. All screws, bolts, nuts, washers, expansion anchors, and/or other hardware required to complete the installation shall be fabricated from stainless steel grade 316, and all intermediate supports, framing members, and hardware required for assembly/installation of the damper shall be fabricated of hot-dipped galvanised steel to BS 729.
- q. The motor operated dampers shall be installed using fastening devices and structural support elements herein specified, and in accordance with the published instructions of the damper manufacturer.

- r. Motor operated damper blades shall have an aerofoil cross-section, and shall be fabricated of hotdipped galvanised steel plate (min. 275 GSM) to BS EN 10142 extruded to a minimum thickness of 2 mm. The width of the blades, measured in the direction of airflow shall not be less than 100 mm and shall not be greater than 200 mm.
- s. Motor operated damper-blade shafts shall be fabricated of stainless steel SS-316. The design of the shafts shall incorporate the devices required for securely locking the blades onto the shafts.
- t. All VCDs, and MDs shall comply with above specifications. VCDs shall have provision to set & lock the damper at any desired position, whereas, MDs shall have a two-position set and lock facility only. These would be made of GSS (275 GSM) with 2 mm frame and blades.

#### Motorized Smoke and Fire Dampers (MSFD/MFD)

- a. MSFD/MFD shall comply with the following requirements.
- b. MSFD/MFD frames and other components made of steel shall be hot-dipped galvanised to BS EN 10142 and shall not be painted. Damper blades shall be fabricated of galvanised steel to BS EN 10142. All unprotected edges shall be touched up with an Approved paint-on type zinc-based protective coating.
- c. MSFD/MFD design and construction materials shall be submitted for Approval before manufacturing.
- d. MSFD/MFD shall comply with BS 476: Part 20 and UL 555, UL 555S. MSFD/MFD shall be tested in accordance with the procedure specified in UL 555S with respect to the requirements of elevated temperature and air leakage of the MSFD/MFD.
- e. MSFD/MFD shall have a minimum fire rating to match with the building structural elements where the MSFD/MFD is mounted.

## **G. OTHER SERVICES**

### **PUBLIC ADDRESS SYSTEM**

#### 1. General Description

The contractor shall supply, install, test, connect and commission a high quality fast-acting Public Address and Voice Alarm System complying strictly with BS 5839 part 8 and EN60849 and shall be TUV or Equivalent Agency approved. The Public Address and Voice Evacuation System shall comprise of Audio Matrix Units, High quality speakers, Audio rack all mounted on a 19" Rack and fully connected and integrated on the fire alarm loop. The system shall be used for Professional Sound Reproduction for all the areas where possible special events take place.

Prior to placing order for any equipment, the contractor shall submit comprehensive document comprising working drawings, catalogues and descriptive literature of components, acoustic calculation to meet with BS5839 part8 RASTI (Room Acoustic Speech Transmission Index) requirements of 0.5 on the STI scale and 0,7 on the CIS scale. The contractor shall be required to train and instruct client's personnel in the correct use, operation and supervision of the system, preferably prior to the handing over of the project.

In order to ensure whole site integration capability, the fire and voice alarm system will be awarded to a single specialist local supplier who will be responsible for the design, global operation, management and interfacing of the system. The contractor shall make sure that all power tapping of the speakers must be carried out as specified, even if the acoustic calculations indicate less power tapings. The contractor must ensure minimum of 10dB above the ambient noise levels are achieved.

The system shall be fully programmed to accommodate fire alarm and voice communication zones as indicated on the drawings and schematics. The system shall be configured to allow on site modifications with the minimum of disruption using the PC based software to facilitate future changes or alterations to the buildings.

#### APPLICABLE STANDARD:

EVAC Compliant with IEC/EN60849

Loudspeakers -Rated power IEC 60286-Part 5

Tested in accordance with BSEN60268-5

Acoustic models ready for CATT, ULYSSES & EASE Compliant with BS5839 Part 8

Battery backup/charger compliant with EN54 part 4

#### 2. Scope of Work

The scope of work under this head shall include designing supplying and installing of Public Address System. The work under this system shall consist of furnishing all materials, equipment's and appliances and labour necessary to install the said system, complete with Speakers, Amplifiers, Microphone, Zone Selection Panel for interfacing with other systems. The PA system is designed to serve the dual purpose of making general announcement and Voice Evacuation at the time of Fire alarm activation.

### 3. System Design

The PAVA system shall be connected on the same Fire Alarm loop with in-built isolators to protect the system in case of any cable faults. The system shall be de-centralized in nature, each distributed rack DAU (Distributed Amplifier Unit) shall have all the DSP (Digital Signal Processing), messages, amplifiers, monitoring in such a way that can work in a standalone mode in case the master rack is faulty or down.

The Man Machine Interface (MMI) shall be connected back to the control room, to monitor and control the entire PAVA system. The MMI shall be fully BS5839 part 8 and EN60849 compliant and TUV approved. The DAU shall play background / Foreground music and in case of Fire Alarm / Paging announcement, the system shall go to full power as programmed to provide the enough SPL (Sound Pressure Level) levels to comply with BS5839 part8, with minimum of 10dB above the noise levels.

All system components shall be digitally monitored including and not limited to, Messages, Amplifiers, and back up amplifiers, Speaker Circuits, Audio Matrix units, Paging Microphone, Battery Charger and the 230VAC line. Each amplifier / line circuit shall be monitored individually and shall report any faults back to the Master Audio Matrix Unit as well as the Paging Microphone.

The system shall be capable of sending messages automatically to any zone at any time interval, without affecting the music in the other areas. Each Zone and circuit speaker shall have separate amplifier, system sharing two amplifiers to multiple circuit speakers are not acceptable. There shall be one back up amplifier for every eight amplifiers, the system shall automatically change over to the back up in case of any amplifier failure, and the backup amplifiers shall be monitored as well. In case of any system component failure, the paging microphone shall override any defective unit and provide paging to the required zone. The System can provide any Cause & Effect programs after integrating with the Fire Alarm System, thus Alert/Evacuate messages can be programmed and delayed as well as played on any zone / floor as per the Cause & Effect approved by the Engineer.

The Battery Backup shall provide 24 hours of back up and 30 min of alarm operation. The power supply /charger must comply with EN54 part 4 and shall be 19” rack mounted. Battery calculation must strictly comply with BS5839 part 8 and shall be based on the amplifier size and not the speaker circuit load. The PAVA system shall be properly integrated with the fire alarm system. The integrated PAVA system shall cover all normally accessible areas including the car parks. All stair cases shall have dedicated zone riser. The system shall be capable of being used for everyday background music and public announcement duties with the fire alarm initiated emergency announcements overriding all other facilities. Initiation of voice alarm shall take immediate priority and shall cancel all other PA operations.

In addition, a FIRE DRILL, BOMB ALERT, EARTHQUAKE ALERT and an ALL CLEAR message shall be incorporated into the operation. A fire alarm broadcast signal shall cancel any public-address operation and shall override it. When a fireman’s microphone is operated, this shall override any automatic voice alarm signal being transmitted to the zone selected. The Alert and Evacuate pre-recorded messages will be maintained in other zones while live voice fire announcements are being broadcast to selected loudspeaker zones.

All amplifier gain shall be monitored and measured for open, short or earth faults. The Entertainment Rack shall be located in the Control/Security Room enabling the operator to select music from the CD player, FM tuner or the double cassette deck to transmit music to selected zones or all the zones in the building from the touch screen paging microphone. A public address announcement shall override the music transmission to selected zones or all zones. Paging any zone shall not interrupt music in other zones. The Speakers shall be distributed in the entire floor and shall be configured in different zones. The announcement can be made zone wise or to all the speakers simultaneously in ALL CALL mode. Fire Alarm shall be announced immediately on receipt of Fire signal from the panel to all zones or group of Zones.

System shall have following functions:

Voice Evacuation and Public Address system integration includes paging system and background music system. Monitoring of microphone, controller, amplifier, fireman microphone, source modular, and amplifier changeover, AC&DC power Supply, Loudspeaker Line and Volume Control. The Amplifier shall be used only Class-D with Digital switching power technology system shall have facility for Backup amplifier for at least one backup amplifier over working Amplifier.

#### 4. Amplifiers

All amplifiers shall be power amplifier with High quality speech and Music broadcast. The power amplifiers shall have adequate continuous (RMS) power output to meet the requirement of the configuration. The unit shall be capable of delivering the rated output power with less than 0.1% harmonic distortion in the design bandwidth. The amplifier shall have a broad band frequency response of 40 Hz to 20 KHz. The output voltage and impedance shall meet with the system requirements. Amplifiers shall be protected against over loads and output shorts and a special thermal overload on the heat sink. The Amplifier shall be Class –D Amplifier have one channel, Two Channel, Three Channel and four channels' each channel have rated power 120/240 or 500W. The Amplifier shall have switch power technology for power electricity saving, Separate PFC design for highest reliability, separate power supply system for each channel, Separate cooling system, sleep mode is automatically enabled when no signal input is detected. Amplifier shall have AC 100V or 230V power supply and DC 24V input, having separate fuse for each channel. The Amplifier shall be connected through balanced audio input and shall work on 100V Speaker Line.

#### Technical Specifications

Rated Output Voltage(RMS): 120/240/500W or 2x120/2x240/2x500 or 4x120/4x240/4x500W

Amplification : Class-D

Battery Voltage : 24VDC (max 10% deviation)

Frequency Response : 40Hz to 20KHz

S/N Ratio : >90 d

Total Harmonic Distortion : <0.1% @ 1kHz

Power Efficiency : >80%

## 5. Speakers

1. Speakers shall be especially designed for broadcasting high quality, integrated emergency fire alarm signals and voice communications and approved by an appropriate authority for use in such situations.
2. Speakers shall be ceiling, wall mounted or Horn Speaker as shown in the schedule of work and shall be completed with mounting brackets accessories etc. Speakers shall be in metal enclosures only.
3. Speakers shall be of high efficiency providing maximum output at minimum power across 120 – 14000 Hz frequency range for Indoor Speakers. Speakers shall have a line matching transformer for direct connection to amplifiers with multiple taps.
4. Speaker external appearance shall be approved by the Architects.
5. Speakers shall be interconnected in the zone configuration.

### 5.1 6W Ceiling Mounted Speaker

The ceiling mounted 6 W 3'' speakers shall be installed as depicted in the drawing. The speakers support EASE, CATT or ULYSSES models for acoustic studies. This mean the acoustic model can be designed to simulate the sound quality and distortion prior to installation. The Speaker should be in compliance BS/EN 60065, 2003 and EMC (BS EN 61000-6-Part 1/2/3/4). The Ceiling speaker shall work on 100V line so that it can reduce line losses over long distance and allow easy parallel connection of multiple loudspeakers. The Speaker shall have multiple tapping for different application according to room size and ambient noise environment. The Speaker shall have aluminium grille and metal baffle and shall have spring clip clamp for easy installation.

a) Technical Specifications

b) Rated power : 6 W

c) Tapings 100V line : 6/3/1.5W

d) Operation Voltage : 100V or 70V

Effective frequency range : 120 ~ 14kHz (10% Variation allowed)

e) SPL @ 1W/m : >91 dB

f) S.P.L. ,@Full power/ 1m, dB : >100 dB

g) Colour : White

h) Ceiling Cut-out : 170mm

i) Dimensions : 200 mm x 55 mm (10% Variation allowed)

### 5.2 6W Wall Mount Speaker

The Wall mounted 6 W speakers shall be installed as depicted in the drawing. The speakers support EASE, CATT or ULYSSES models for acoustic studies. This mean the acoustic model

can be designed to simulate the sound quality and distortion prior to installation. The Speaker should be in compliance BS/EN 60065, 2003 and EMC (BS EN 61000-6-Part 1/2/3/4).

The speaker shall work on 100V line so that it can reduce line losses over long distance and allow easy parallel connection of multiple loudspeakers. The Speaker shall have multiple tapping for different application according to room size and ambient noise environment. The Speaker shall have Metal grille and ABS Enclosure and shall be closed cabinet.

#### Technical Specifications

Rated power : 6 W

Tapings 100V line : 6/3/1.5W

Operation Voltage : 100V or 70V

Effective frequency range : 90 ~ 18kHz (10% Variation allowed)

e) SPL @ 1W/m : >90 dB

f) S.P.L., @ Full power/ 1m, dB : >98 dB

g) Colour : White

h) Dimensions : 285mm x 200mm x 85mm

(10% Variation allowed)

#### 5.3 15W Horn Speaker

The Horn speakers with 15W Output shall be installed as depicted in the drawing. The speakers support EASE, CATT or ULYSSES models for acoustic studies. This mean the acoustic model can be designed to simulate the sound quality and distortion prior to installation. The Speaker should be in compliance BS/EN 60065, 2003 and EMC (BS EN 61000-6-Part 1/2/3/4). The Horn speaker shall work on 100V line so that it can reduce line losses over long distance and allow easy parallel connection of multiple loudspeakers. The Speaker shall have multiple tapping for different application according to room size and ambient noise environment. The Speaker shall have aluminium grille and metal baffle and shall have spring clip clamp for easy installation.

#### Technical Specifications

Rated power : 15 W

Tapings 100V line : 15W/7.5/3.75W

Operation Voltage : 100V or 70V

Effective frequency range : 250 ~ 8kHz (10% Variation allowed)

e) SPL @ 1W/m : >103 dB

f) S.P.L. @ Full power/ 1m, dB : >115 dB

g) Colour : White

h) IP Rate : IP 66



i) Dimensions : 221 x 165 x 235mm (10% Variation allowed)

#### 5.4 Remote Paging Microphone

1. Digital voice evacuation system remote paging microphone.
2. Each microphone of 8 zone capacity.
3. Zone expansion by connection with expansion unit.
4. System indicators of AC, DC, fault, Mic status and test.
5. 6 inputs & mic/line selection buttons.
6. 8 zone selection buttons with three-coloured indicators.
7. Reset/Cancel, All Call & Call buttons.
8. Two RJ45 ports for input and link output.
9. CAT5 or CAT6 cable communication up to 600 meters.
10. AC 230V and DC24V battery inputs.
11. Built-in monitor speaker.

#### 6. Voice Alarm Controller

1. Digital voice evacuation system all in one amplifier.
2. Specifications meet the standards of BS EN54-32 & EN608409.
3. EN54-16 standards certificate is under taken.
4. Built-in 240W & 500 8 zone class-D amplifier.
5. Integration of EVAC system, paging system, PA system & BGM system together.
6. Built-in two separate players for EVAC and alert voice message by SD card.
7. Built-in 8 zone AB speaker line low impedance supervision.
8. Built-in amplifier auto changeover into standby when fault.
9. With external amplifier input to expansion the power.
10. Capacity of connection 8 unit's remote microphone.
11. Red button EVAC message push to activate with priority except fireman mic.
12. 8 zone speaker outputs with separate zone volume control.
13. 8 zone separate indicator for EVAC, fault, music/paging & select.
14. System indicators of AC, DC, fault and indicators for EVAC, alert & fireman mic.
15. Zone capacity of 96 zones by cascaded 11 unit's router.
16. With 8 programmable control inputs and 8 programmable control outputs for voice evacuation system.

17. With Fault, EVAC outputs and Reset input for third party system integration.
18. With fireman microphone of highest priority.
19. Priority level: fireman mic, EVAC, input 1, remote microphone, timer & BGM.
20. Two combo inputs for mic/line, 4 line inputs and one REC output.
21. Two RJ45 for cascade router, two RJ45 for remote microphone input and two RJ45 for LAN/WAN/Internet network.
22. IP network module for optional to buy. The IP network
23. AC 230V and DC24V battery input. Auto switch into the battery backup when AC fails.

**Technical Specification:**

Description	8 Zone Voice Evacuation Amplifier
Rated Power Output	500W
Fireman Microphone	5Mv, 600Ω
Line 1-2 Inputs	385mV, 10kΩbalanced Combo
Line 3-6 Inputs	350mV, 10kΩ, RCA
Frequency Response	80Hz~20kHz
THD	< 1% at RMS,1KHz
S/N Ratio	>70dB
Speaker Output	100V AB 8 zone speaker outputs
REC Output	200mV
Control Input & Output	8 programmable control inputs: Max 3.3V (voltage mode) or 0V closed contact
	8 programmable control outputs: 0V closed contact Control output for fault & EVAC: 0V closed contact Reset control input: 0V closed contact
Voice Message	MP3 or WMA format, two separate players of SD card with protection cover, programmable voice message up to 255, 10 years valid
Event Record	HEX format, Hard Flash memory, events up to 1000 records, 10 years valid
Operation Environment	Operation Temp: +5°C ~ +40°C Store Temp: -20°C ~ +70°C Operation Humidity: <95%
Power Consumption	600W
Power Supply	AC230V or 115V & DC24V battery inputs, 50-60HZ
AC Fuse	250V/6.3A, slow type and restorable fuse
Dimension	484(W)×132(H)×449(D) mm
Weight	24kg

7. Software

PAVA Software with following Features: Should be connected with CAT5 Cable, shall provide Zone control, status monitor, Offline Program, Event Recording, System Configuration, User Management. Software shall allow automatically playing and timing function to achieve timing

programmed playing in the designated zones for unattended operation, Built-in Automatic Timing Corrector. Support Export and Import easily to save Data.

#### 8. Digital AM/FM Tuner

The digital AM/FM table top and rack mount design with aluminium alloy panel. It shall have clearly visible LDC display, microcomputer control and touch-button operation. FM/AM two band receive option, FM receiving frequency 76MHz – 108MHz, AM receiving frequency 520Hz – 1708 KHz. Radio frequency automatic search and memory function, memory up to 99 bands and a power off memory functions. Using vehicle dedicated digital radio module, integrated radio tuner module, with a small size good performance and strong anti – interference etc. Built in High fidelity wideband monitor Speaker, Sound full and clear, and a monitor with adjustable volume knob.

Technical Specifications:

- a) Power Supply: 220V/50Hz
- b) Power Consumption: 8W
- c) 1 Channel audio signal left and right channel output

#### 9. CD/DVD Player

The CD/DVD player shall be capable playing MP3 audio tracks from USD or DVD or CD.

Technical Specifications:

D/A converter 24 bit, 192 kHz

Frequency response 30-20000 Hz

Signal to noise ratio > 90

Distortion and Noise (1kHz) > 65 dB

Crosstalk (1kHz) > 70 dB

Dynamic Range (1kHz) > 80 dB

Sound System Dolby Digital

Playback Media

- o CD
- o MP3-CD
- o MP3-DVD o WMA-CD o CD-R/RW o Audio CD

Compression format

- o MP3
- o Dolby Digital
- o PCM

- o WMA MP3 bit rates

- o 32 - 320 kbps

#### 10. Rack

The equipment shall be housed in a standard rack of suitable height, with Plexiglas door or metal mesh and lock. Ventilation panels of 1U height shall be provided between each item of equipment.

Details of the proposed equipment shall be forwarded to the Consultant with performance specifications, dimensions, construction and finish for approval.

Rack should comply with ANSI/EIA RS-310-D; DIN41491; DIN41494; IEC297-2; and GB/T3047.2-92. The Rack should have DIN Rail Mounted Terminal Blocks for termination of Speaker Zone cables on the rear.

All cables coming from Speaker zones, Call Stations, Power supply should enter from Bottom. Rack should be installed at location which has minimum 600mm space from front & back for accessing it easily.

Rack should be installed in well ventilated room preferable Air conditioned. The unit should have Fans from top. The unit should have Lockable Glass door at front.

#### Dimensions

a) Height : as per the Quantity of PA Processor & Amplifiers

b) Depth : 600mm Deep

c) Width : 19”

#### 11. Speaker Cables

All cables associated with PA system shall be of following specifications:

The 2 core speaker cable will be connected to the speakers by screw terminals before which it shall be crimped using 1.5 sq. mm. bootlace lugs. Care has to be taken for avoiding any single strand of wire shall not come out of Lug & screw terminals to avoid noise & leakage.

Speaker cables used should be Multi-conductor stranded type Flexible copper conductor of cross section 1.5 Sq. mm/2.5 Sq.mm insulated, PVCFRLS sheathed control Cable as per IS 694.

These Cables shall be laid in G.I. Conduits concealed/surface.

#### 12. Call Station Cables

Call station cables should be 4pair CAT6 STP (Shielded Twisted Pair) type, It should be crimped by RJ45 Shielded Male Connectors.

13. Approved Makes

ATEIS – IDA8

BOSCH Presideo

HEINRICH DVA8/6

14. Testing PAVA System

Sr. No.	Description	Visual	Test Readings	Documentation
1	All cables are tested for continuity, insulation, resistance etc.			√
2	System installation proper as per drawing	√		
3	Carry out visual checks on all speakers & Processors are free from any mechanical damage, cables, inter phase modules etc.to ensure they are properly installed.	√		
4	Check for proper termination of bootlace lugs & feruling	√		
5	Check Input A/C Supply Voltage		√	
6	Check location / spacing of loudspeakers as in drawing.	√		√
7	Check Distribution of Zones as per Drawing.	√		√
8	Check full load speaker sound quality & measure Sound pressure level (SPL) in dB.	√	√	
9	Check if local loudspeakers overrides by voice messages in case of emergency evacuation.	√		√
10	If power fails, whether Voice evacuation system is working on battery supply if yes for what time		√	
11	Check if recorder messages are CLEAR, free from any noise distortion & easy to understand with Room acoustic speech transmission Index (RaSTI) value >0.5.	√	√	
12	Processor LED's and all keys are working properly	√		
13	Check for Microphone locations & the sensitivity by paging	√		√
14	Play a soft music & check sound quality	√		

## NETWORKING AND TELECOMMUNICATION SPECIFICATION

### 1. UTPCAT 6a Cable

#### F/UTP COMPONENT (CAT6A)

Cable Unshielded twisted pair cabling system, TIA / EIA 568-C.2 addendum Category, 6A

Cabling system

Networks should Support for Fast Ethernet and Gigabit Ethernet, 10G, IEEE. 802.3/5/12, Voice, ISDN, 155 Mbps ATM, Broadband, 100 Mbps TPPMD, analog and VOIP, 23AWG bare solid copper, CAT-6A F/UTP cabling system, 25 year systems warranty; Warranty to cover Bandwidth of the specified and installed cabling system, and the installation costs 23 AWG solid bare copper, CAT-6A F/UTP Cable, Foiled to prevent alien crosstalk, Meets EIA/TIA 568-C.2 Category 6A specifications, CM Rated, Worst Case Cable Skew: 45 nsec/100 meters MAX. @ 250MHz maximum, Characteristic Impedance:  $100 \pm 15\%$ , 1-500 MHz, Insulation polyethylene, Conductor resistance 6.65ohm / 100m maximum, Solid Cable should be compliance to RoHS. Sheath Fire resistant OR LSZH, PAIRS

Colour code: Blue / White-Blue, Orange / White-Orange Green / White-Green, Brown /

White – Brown

#### ELECTRICAL CHARACTERISTICS:

Input Impedance (250-500 MHz):  $100 \pm$  Polycarbonate, 94V-0 rated, IDC Contact: DC Capacitance: 5.6 nF/100 mtr. Standard Phosphor bronze 50 micron" gold, Jack contacts: Beryllium copper with thick gold and minimum thick nickel under plate, Panel: Black, powder coated steel, Approvals: UL,

ETL and 3P, Termination, Pattern: TIA / EIA 568 A and B, Performance Characteristics: Attenuation, NEXT, PS NEXT, FEXT and Return Loss

### 2. UTPCAT 6a IO

Information outlets with single faceplate 1G STP Jacks Type – Unshielded Twisted Pair, Category 6A, TIA / EIA 568-C.2, 10G, PCB based shielded jack, Durability Modular Jack 750 mating cycles, Wire terminal 200 termination cycles, Should use standard OEM tools kit Approval UL, Housing Zinc Alloy, Wiring blocks Polycarbonate, 94V-0 rated, Jack contacts : Beryllium copper with thick gold and minimum thick nickel under plate, Performance Characteristics Attenuation, NEXT, PS NEXT, FEXT and Return Loss, IDC Contact: Phosphor bronze 50 micron" gold: ROHS compliant Faceplate 1-port, White, Material ABS / UL 94 V-0 No. of ports One with shutters, High Impact Plastic Body ABS material 86mm x 86mm with label and label covers

### 3. UTPCAT 6a Patch Cord

Patch cords shall be of multi strand copper cable with Matching coloured snag-less, elastomer polyolefin boot 50 micron" gold over nickel. Patch cord with LSZH sheath. Plug housing clear polycarbonate; 2.8 Patch Cord Length 1 meter, 2 meters, 3 meters, 5 meters and 10 meters. Assembled with short body RJ45 50u gold plate to minimize untwists pair length. Designed for high speed transmission and RoHS Compliant Improved PS -NEXT, ELFEXT and Return

Loss performance. Back-ward-compatibility with all current Cat.5 and Cat.6 products and applications.

#### 4. Access Point

Support for the latest high-speed wireless standards including 802.11ac and 802.11n Access Point Centrally controlled wireless, No local configuration of access points required automated channel optimization for maximum performance, Complete threat protection for wireless clients, Quick voucher-based guest access customizable with your brand, Choose from a range of access points and firewalls with integrated wireless, Supports Microsoft Lync and VoIP

#### 5. Cabling

Cables shall be installed in unbroken segments from NW Point switch to individual Communication outlet locations. At each work space location cables shall be terminated in a wall mounted TIA/EIA 568A compliant communications outlet from specified manufacturers. All installed cabling runs shall be tested for flow meter compliance with specified parameters, documentation provided, and both ends of each cable run shall be labelled.

##### Concealed Cabling

All cabling shall be installed inside walls or ceiling spaces wherever possible. Within office spaces any exposed cable-run must be closed in appropriate raceway, as described below.

##### 1. Raceways

Cable that cannot be run inside a protected space must be enclosed in protective raceway Protective raceways must be permanently attached to underlying wall surfaces with appropriate wall anchors.

##### 2. Wall Penetrations

Cable penetrations of walls or floors are to be sleeved PVC conduit.

## CCTV SPECIFICATIONS

IP Based CCTV system shall be provided for the entire premises for the purpose of security surveillance, and shall be broadly divided in to

- Internal surveillance for the Monitoring the Server Aisles, Entrance to Critical Spaces, and Corridors leading to critical spaces; and also for general surveillance in the office floors.
- External Surveillance for monitoring the External Periphery of the Data Centre Building Premises, and utility areas such as the DG Area, the Main entry Gate, rear side of the building and Service Gates etc.

### 1. General Specifications

The CCTV Vendor shall supply install and commission an IP Camera based CCTV system with the objective shall be to provide High degree of Electronic surveillance system to the entire premises.

The purpose is to monitor & supervise the entire area for security purposes, as well as the record and inform officials on unwanted, untoward incidents. It is also essential to have recorded images to be stored at least for 90 days of all critical areas to facilitate investigations of a reported case.

The Hardware required for the System including servers, workstations, monitors, networking components, cables, connectors, conduits, power supplies etc. shall be in vendor's scope. Development of independent LAN network for IP CCTV shall be Scope CCTV vendor. Further, the CCTV system shall provide the direct interface with the Access Control Systems. This shall be achieved either by offering a unified database for the IBMS, or by suitable SDK/API's middleware solution to enable the seamless transfer of data between disparate systems.

Should the Bidder need IT or Networking hardware more than what is provided for in the tender Bill of quantities, then the Bidder needs to inform the tender committee / Consultants in writing on the same along with the Tender BID and include the same in his/her bid price.

Any additions to the Take-off Quantities given in the tender, if required by the Bidder at the tender Stage shall need to be spelt out by the Bidder at the time of the Bid itself. It is expected that the Bidder provides a system configuration wherein Main Directory shall be loaded on the Main Server hardware located in the Security/ CCTV Monitoring Room at Ground Floor; and the Failover directory shall be loaded on the failover Servers, again kept at the same location.

### 2. Power Quality at Site:

- a. Note that AC Power Quality Available on the Site shall be 230 V AC +/- 5%, 50 Hz +/- 5%.
- b. While there are No Main UPS and Redundant UPS should be considered if required, the Electrical system shall deliver this power after switchover to the CCTV Equipment.
- c. For the internal and external surveillance of the Data centre Premises, strategically placed video surveillance cameras shall provide continuous monitoring of all parts of the premises.
- d. All equipment and materials used shall be standard components that are regularly manufactured and used in the system.



- e. All systems and components shall have been thoroughly tested and proven in actual use.
- f. A minimum of 20 cameras shall be configurable with video analytics, of which, approx. 7-8 shall be for external surveillance analytics, and rest for other critical areas, reception area etc., within the premises.
- g. Offered analytics shall have the flexibility to be deployed on any of the cameras across the complete system as per directions from the customer/consultant during the execution/operations phase of the project without any additional hardware/software requirement.

3. Technical Specifications:

2.0 MP Fixed IR DOME

Parameters	Specification
Image Sensor	1/2.8" Progressive CMOS
Maximum Resolution	1920x1080 (2MP)
Lens Type	Fixed-focal
Focal Length	f = 2.8 mm
Aperture	F1.8
Field of View	110° (Horizontal)
	64° (Vertical)
	135° (Diagonal)
Shutter Time	1/5 sec. to 1/32,000 sec.
WDR Technology	WDR
Day/Night	Removable IR-cut filter for day & night function
Minimum Illumination	0.06 Lux @ F1.8 (Colour)
	0.001 Lux @ F1.8 (B/W)
Pan/tilt/zoom Functionalities	ePTZ:
	48x digital zoom (4x on IE plug-in, 12x built in)
IR Illuminators	Built-in IR illuminators, effective up to 30 meters
	with Smart IR
	IR LED*8
On-board Storage	Slot type: MicroSD/SDHC/SDXC card slot
	Seamless Recording
Video Compression	H.264 & MJPEG
Maximum Frame Rate	30 fps @ 1920x1080
	In both compression modes
Maximum Streams	4 simultaneous streams
S/N Ratio	58Db
Dynamic Range	100Db

Audio Capability	Two-way audio (full duplex)
Compression	G.711, G.726
Interface	Internal microphone input External line output
Users	Live viewing for up to 10 clients
Network Interface	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X, UDP, ICMP, ARP, SSL, TLS
Video Motion Detection	Five-window video motion detection
Alarm Events	Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection, audio Event notification using digital output, HTTP, SMTP, FTP and NAS server, SD Card File upload via HTTP, SMTP, FTP, NAS server and SD card
Connectors	RJ-45 cable connector for Network/PoE Audio input Audio output DC 12V power input Digital input*1 Digital output*1
LED Indicator	System power and status indicator
Power Input	DC 12V IEEE 802.3af/at PoE Class 0
Power Consumption	Max. 9 W
Safety Certifications	CE, LVD, FCC Class B, VCCI, C-Tick

## 2MP 30x IR Speed Dome Outdoor PTZ Camera

Parameters	Specification
Image sensor	1/2.8" Progressive CMOS
Maximum Resolution	60 fps @ 1080p Full HD
Lens Type	30x optical zoom, auto focus
Focal Length	4.3 ~ 129 mm
Aperture	F1.2 (Maximum)
Auto-iris	DC-Iris
Field of View	2.3° ~ 64° (Horizontal)
	1.3° ~ 36° (Vertical)
	2.6° ~ 73° (Diagonal)
Shutter Time	1/1 sec. to 1/10,000 sec.
WDR Technology	WDR
Day & Night	Yes
Minimum Illumination	0.4 lux in Color
	0.03 lux in B/W
Pan speed	0.05° – 320°/s
Pan range	360 degree
Tilt speed	0.05° – 240°/s
Tilt range	220 degree
Preset Locations	256 preset locations
Pan / Tilt / Zoom	48x digital zoom (4x on IE plug-in, 12x built in)
	Auto pan mode
	Auto patrol mode
On-board Storage	SD/SDHC/SDXC card slot
Video Compression	H.265, H.264, MJPEG
	H.265 : 60 fps @ 1920x1080
	H.264 : 60 fps @ 1920x1080
Maximum Frame Rate	
Maximum Streams	3 simultaneous streams
S/N Ratio	Above 60 db With adjustable 2DNR & 3DNR
Dynamic Range	Above 100db
IR Illuminators	Recognition: 150M
	Detection: 200M
	Adjustable resolution, quality and constant bit rate control
	Time stamp, text overlay, flip & mirror
	Adjustable image size, quality and bit rate
	Configurable brightness, contrast, saturation, sharpness, white balance, exposure control, gain, backlight compensation, privacy masks (Up to 24)
Image Settings	Scheduled profile settings

	External microphone input, audio output (Full
Compression	AAC
	G.711
	G.726
Interface	External microphone input External line output
Users	Live viewing for up to 10 clients
Network Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X
Interface	10 Base-T / 100BaseTX Ethernet (RJ-45)
	Supported, specification available at <a href="http://www.onvif.org">www.onvif.org</a>
Video Motion Detection	Triple-window video motion detection
Auto-Tracking	Auto-tracking on moving object
Alarm Triggers	Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection ,audio detection, advanced motion detection
Alarm Events	Event notification using digital output, HTTP, SMTP, FTP and NAS server
	File upload via HTTP, SMTP, FTP and NAS server
Connectors	RJ-45 cable connector for Network/PoE
	Audio input
	Audio output
	DC 48V
	Digital input*4
	Digital output*2
	RS485
LED Indicator	System power and status indicator
Power input	DC 48V
	95W UPoE
Casing	IK10, IP67, NEMA 4X
Safety Certifications	CE, LVD, FCC Class A, VCCI, C-Tick, UL,
Operating Temperature	Wide Temperature:
	Working Temperature: -40°C ~ 55°C

## 1. High Configuration Network Video Storage Servers

Server shall be of 19" rack mounting or any of the branded with CCTV OEM make. Quad core Intel Processor at 2.4 GHz 12M Cache, 8GB or more RAM, Microsoft Windows 2008 R2 64 bit pre-installed embedded OS. SQL Express 2008 or better as required by the application.

Minimum 12 hot swappable drive slots. 10 X 2.5TB = 25TB raw RAID 5 configured storage for 30 days of storage. Complete with one spare drive. Calculated @ H.264 Compression, 15fps @ 720p, 40 days of recording.

DVI Graphics Card to support minimum 3 multiplexed monitors, with different possibility on each of the monitor i.e. Multiplexed, Alarm, Maps, sequence or any combination. Also support Drag-n-Drop of images by using connected mouse device. Embedded Gigabit network cards with fault tolerant configuration, Redundant Power Supply, Standard video display adapter, Minimum 3 Years Next Day Business Day on Site Warranty from OEM.

## 2. Applicable Standards

Original Equipment Manufacturer Standard

### APPROVALS

All the cameras should be

A. CE Compliant and

B. UL Listed and

C. FCCB

## 3. NETWORK FOR IP CCTV SYSTEM:

The IP CCTV Vendor shall setup an independent IP Network for the use of IP CCTV system.

### EDGE SWITCHES:

i. All networking equipment shall be as minimum of 2 Layer and as a minimum shall support IGMP Snooping Version 2 or later. It should have minimum two 1000 baseT copper ports and minimum two slots for 1000baseT fibre modules.

ii. The IP network shall support multicasting between all ports and shall allow for Multicast streams to be routed between networks.

iii. All the edge switches should be minimum Layer-2. All Layer-2 switches must finally be brought together using 1000baseT ports to central Layer-3 switch. Connection to the servers and clients must be 1000baseT from 10/100/1000baseT ports. Connection between Layer-2 and Layer-3 switch should use fibre backbone.

iv. Uplink port should have sufficient speed to avoid network congestion, preferably network should not be loaded more than 70% at any stage.

v. All these Edge switches should provide IEEE 802.3af compliant PoE on all the ports simultaneously.

### CORE SWITCHES:

- i. All the Main and Redundant Core switches should be minimum Layer-3.
- ii. All these Edge switches should be connected to Core switches using Gigabit or 10G connectivity depending on the load on that part of network.
- iii. All the Core switches should support and be enabled with IGMP querier.

4. DIGITAL VIDEO MANAGEMENT SERVER SOFTWARE:

- The DVM Software shall be DVM application software.
- The DVM software shall consist of an MS-SQL 2008 or better based Main and Redundant Directory Database Server, Archive Server for audio and video, Failover recording, Redundant recording, Digital Virtual Matrix, Incident Reports, Alarm Management, Scheduled backup application, reporting tools and Watchdog modules. All the related software licenses should be the part of the offered system.

- The DVM should support any of the following Video Analytics Features on user defined cameras.

- Trip wire detection
- Illegal parking
- Loitering detection
- Stolen object detection
- Object left / Removal detection
- Crowd Detection
- Directional Motion (Adaptive Motion),
- Camera Sabotage
- Object Counting
- Vibration Removal

- The DVM Server shall maintain a catalogue of settings for all the client, servers, and IP cameras in the system The DVM shall enable the client to dynamically create connections between any camera on the digital monitors (audio, video, serial ports and digital I/Os) The DVM shall provide the client seamless operation of all cameras available in the system regardless of the actual connection to different archive servers.
- The DVM shall detect signal loss and have the capability to alert the systems administrator. The DVM Archive Server shall offer the capability to be install multiple servers' software on multiple Computer Servers to enable distributed archiving architecture on the LAN or WAN.
- The DVM Archive Server, for video and audio, shall support and manage Camera connections from IP cameras each at 25FPS PAL at custom defined resolutions.

- The offered solution shall not load more than 100 cameras per server during normal functioning of the system to ensure designed server capacity can easily accommodate all the cameras recording at minimum resolution of 1280 x 720 @ 25FPS.
- If the Bidder's solution needs additional servers to fulfil this requirement, then they shall quote for additional servers accordingly.
- The DVM shall be able to set each camera frame rate, bit rate and resolution independently from other cameras in the system, and altering these settings shall not affect the recording and display settings of other cameras.
- The DVM shall utilize multicast network communication for video monitoring.
- The DVM shall offer privileged protected privacy masking feature on all the field cameras so as only the users with specific rights can unmask the picture during live or playback. It shall also support the password protection for such mask on exported videos.
- The DVM shall not allow to login in monitoring application on multiple clients using same login ID to avoid the misuse of the subsystem.
- The DVM shall have the capability to raise the alarm in case any of the video files are being deleted from video storage location.
- Offered cameras and software should be from the same make, or should be fully integrity tested and proven in the market place, considering the high level of complexities involved in IP system and future maintenance and upgrade issues.
- Unicast based equipment shall not be considered as an approved equal for alternate system.
- The DVM shall include a federated architecture, allowing clients on the host system with the right user rights to view video sources belonging to multiple independent video management systems simultaneously as if they were on the same system.
- The DVM shall contain recording servers used for recording video feeds and for communicating with cameras and other devices. The recording servers shall process the recordings and playback the video streams.
- The DVM shall contain a management server that shall be the central manager of the system and control recording servers, cameras, devices and users. The management server shall handle the initial client login, system configuration and logging.
- The DVM shall include an alarm management function that shall provide central overview, control and scalability in any number of federated video management system installations.
- It shall be possible to generate alarms based on internal system-related events, for example motion, or archiving problems or external integrated events, for example analytics events or third-party developed plug-in events.
- Generated alarm shall appear in an alarms list in the viewing client, and it shall be possible for operators to get an overview of, and to delegate and handle alarms from the alarm list.
- The management server shall allow access to a management client from where the administrator can configure and manage all servers, cameras and users.

- The system shall allow the management server and the event server to be installed on multiple servers within a cluster of servers ensuring that another server in the cluster automatically takes over in case the first server fails.
- The DVM shall support installation and the ability to run on virtualized Windows servers.
- The DVM shall support high availability of recording servers. A failover option shall provide standby support for recording servers with automatic synchronization to ensure maximum uptime and minimum risk of lost data.
- The DVM shall support a versatile rule system including scheduled or event-driven actions with numerous options, including support for time profiles.
- The DVM software shall include multicast and multi-streaming support.
- The DVM shall include automatic camera discovery.
- The DVM shall support archiving for optimizing recorded data storage through data storage solutions that must combine performance and scalability with cost efficient long-term video storage.
- The video management system shall incorporate a fully integrated video-sharing functionality for distributed viewing of video from any camera in the system on any computer with the viewing client.
- The DVM shall incorporate intuitive map functions allowing for multi-layered map environment. The map functionality shall allow for the interactive control of the complete video management system, at-a-glance overview of system integrity, and seamless drag-and-drop integration with a video wall application option.
- The DVM shall support a video wall application, which shall be flexible and hardware independent to allow for seamless integration with the management client and viewing client.
- The DVM shall support 56-bit DEA encryption and 128-, 192- and 256-bit AES encryption of video for export purposes.
- The DVM shall support full two-way audio between clients and remote devices. Two- way audio integration shall support the following features and functions:
  1. Microphone inputs to clients shall transmit audio streams to speakers attached to remote IP devices.
  2. Audio from remote IP devices equipped with microphones shall be transmitted to and recorded by the recording server. The audio shall be relayed to clients equipped with speakers.
  3. Operator audio to IP devices shall be recorded by the recording server.
- By default, each speaker and microphone shall be assigned to the same device that it is connected to the speaker and microphone shall have the capability to be assigned to other devices as well.
- The DVM software shall provide fast evidence export by exporting video in various formats, including video from multiple cameras in an encrypted native database format with an included standalone viewing client. It shall be possible to write a digital signature to the native database



files containing recorded data. This shall allow the viewing client and the standalone viewing client to verify that the contents of imported and opened databases have not been tampered with and that no database files have been removed.

- The DVM shall provide full awareness of the system through a system monitoring feature that shall monitor important system components such as recording servers, failover servers and hardware devices, and shall also include system logs and show user activity through comprehensive audit logs.
- The DVM shall include support a transactional data application designed to integrate with Point of Sale (POS), or Automated Teller Machine (ATM) data and time-link video recordings with POS, or ATM transactions.
- The DVM shall support a solution that makes it possible to integrate multiple third- party video content analysis applications seamlessly into viewing client environments.
- The DVM shall include a Software Development Kit (SDK) that offers important capabilities for integrating the video management system with third party software and applications.
- The DVM shall include a standalone viewing client application to be included with video exported from the viewing client application. The standalone viewing client application shall allow recipients of the video to browse and playback the exported video without installing separate software on their computers.
- The DVM shall include support for Active Directory to allow users to be added to the system. Use of Active Directory requires that a server running Active Directory, acting as a domain controller is available on the network.
- The DVM shall be designed to support each component on the same computer for efficiency in smaller systems, or each component on separate computers for large system deployments.

## 5. DETAILED SYSTEM SPECIFICATION

- All the vendors shall attach the point by point compliance for below specification in their technical bid.
- Offers without the compliance shall not be considered
- The product described in this specification is (IP) based Digital Video Management (DVM) System.
- The proposed solution shall not require proprietary computer, server, and network or storage hardware.
- The proposed system shall be of a manufacturer with as minimum of five (5) years of experience and offerings in the IP network video software market, the letter stating the same should be submitted by the manufacturer. OEM for the offered cameras & software shall have a direct presence in India with sales and support facilities.
- The DVM database and video storage shall use SQL database for their operations.
- Considering this system is being deployed for Tier 3 datacentre, offered DVM system shall compulsorily offer below resiliency and failover functionalities. System shall have the priority

setting per camera basis with top 10% cameras nominated as “Most Critical”, another 10% as “Critical” and rest of the cameras as “Normal” cameras.

o Failover Management shall be a basic feature of the DVM and should be included in offer. This functionality shall ensure the availability of past, present and future recording with near seamless continuity.

o The system should be capable to switching between Main to Failover Server in case of a failure of any one of them; and from one recording server to the next recording server in case of failure of the former – in microseconds – to ensure near continuous surveillance capability.

o Above failover mechanism shall be designed to achieve highest level of resiliency in the system with optimum system components.

- The DVM system shall be based on the latest in software programming technology Microsoft . NET 3.5 frame work or better.

- The DVM approved IP cameras shall provide the ability to be powered by power over Ethernet (PoE) 802.3af option.

- If required, Outdoor PTZs shall be powered by redundant mode Solid State Power Supplies, which shall have inline filters and surge protection circuitry to enable safe operable power to the Cameras.

- The DVM should support any of the following Video Analytics Features on user defined cameras.

Trip wire detection

Illegal parking

Loitering detection

Stolen object detection.

Object left / Removal detection

Crowd Detection

Directional Motion (Adaptive Motion)

Camera Sabotage

Object Counting

Vibration Removal

- The DVM video storage shall be capable of storing video for a period of 90 days available for on line access – The Bidder shall budget for unlimited storage capability in the Tender Bid. By Addition of Additional Storage Space, M/s AURIC should be able to expand the archival from 90 days to beyond, without any additional charges to be paid to the Bidder.

- The DVM Storage solution shall be as minimum set at RAID-5 configuration

o Storage system shall be of RAID5 configured Direct Attached Storage (DAS) / Storage Area Network (SAN) Systems / Internal storage system.

- The DVM shall be based on high quality Dual / multiple H.264 stream IP cameras.
- Any other image based video compression JPEG, MJPEG, MPEG4, Wavelet, or shall not be considered as approved equal due to the high network bandwidth associated with these types of digital video compression.
- Offered cameras and software should necessarily support ONVIF interface.
- Each Camera shall provide dual video streaming technology providing independent settings per stream.
- The DVM shall have a capacity to switch and control all the current cameras. DVM Software should be expandable to unlimited cameras in future, without any additional cost to M/s Netmagic
- The system shall allow the recording, live monitoring, playback of archived video audio, and data simultaneously
- The DVM shall provide file export tool for export the native video format with all video protections (e.g. watermark, encryption) and the ability to play this video on a standard computer.
- The native file format video player shall show the status of the video authentication as available with the original file format.
- The IP Based DVM shall provide file export tool for export of single frames of video in JPEG and BMP file formats and for export of motion video files in AVI file format for transport and playback on computers utilizing a Windows environment.
- The Client Reserves the right to, at a later date, depending on their sourcing economies, provide the required computers for the DVM client and servers, these computers shall be of the most current state of the art technology available at the time of installation and as minimum shall be better than the minimum requirements specified by DVM system manufacturer as well as tender specifications.

#### 6. DVM Client MONITOR Application:

- The Client Monitor application shall allow for live monitoring of video and audio.
- The Monitor shall enable view of 1 to 32 video tiles simultaneously on a single SVGA (1024x768) monitor at up to 30fps per camera.
- The Monitor shall enable view of up to 32 video tiles simultaneously on a single monitor and shall provide the ability to connect up to Four (4) monitors to a single computer supporting multiple SVGA (1024x768) monitor outputs.
- The IP based DVM shall provide as minimum on each of the VGA monitors independently the following tile views:

- Full screen, Quad, 3x3, 4x4, 5x5, 6x5, 1 + 9 (One large and 9 small view), 1+11 (One large and 11 small view), 1+12 (One large centre tile and 12 small view),1+15 (One large and 15 small view), And more.
- The DVM Monitor application shall allow operators to view an instant replay of any camera.
- The operator shall be able to define the amount of time he wishes to go back from a predefined list or through a custom setup period.
- The operator shall be able to control the playback with play, pause, forward, and speed buttons.
- The DVM Monitor application shall allow operators to add bookmarks to recorded clips of video or audio.
- The operator shall be able to choose and trigger an action from a list of available actions included but are not limited to:

View camera in a video tile

View camera on a Decoder (analog monitor)

View Map or procedure in a video tile

Starting/stopping PTZ patten

Go to PTZ Pre-set.

Sending alert messages

Send/receive messages through a serial data stream

- The DVM Monitor application shall be able to display all cameras attached to the system regardless of their physical location on the network.
- The DVM Monitor application shall be able to display all camera sequences created in the system.
- The DVM Monitor application shall allow for unlimited cameras sequences, which may be run independently of each other on either digital monitor tiles or analog CCTV monitors.

Technical Specifications for Security Systems

- The DVM Monitor application shall allow operators to control (Pause/Play, skip forwards, skip backwards) Camera Sequences, without affecting other operators' ability to view and control the same sequence.
- The DVM Monitor application shall display all cameras, sequences and analog monitors in a logical tree.
- The DVM Monitor application operator shall be able to drag and drop a camera from a tree of available cameras into any video tile or an analog monitor icon for live viewing.
- The DVM Monitor application shall support Graphical Site Representation (Maps) functionality, where digital maps are used to represent the physical location of cameras and

other devices throughout facility.

- The DVM Maps shall have the ability to contain hyperlinks to create a hierarchy of interlinked maps.
- The DVM Maps shall be able to import maps from any graphical software supporting BMP, JPEG and/or GIF image formats.
- The DVM Monitor application operator shall be able to drag and drop a camera from a map into a video tile for live viewing.
- The operator shall be able to click on an icon in a map to initiate PTZ camera pre-set, run PTZ pattern, view camera in an analog monitor or send an I/O stream.
- The DVM Monitor application shall support the procedure functionality, where procedures can be triggered to appear during a certain event and can be used to provide detail written or verbal instructions to the operator as to the actions to be taken.
- The DVM Monitor application shall support digital zoom on a fixed camera's live and recorded video streams
- The DVM Monitor application shall support digital zoom on a PTZ camera's live and recorded video streams
- The DVM client shall provide the following video analytics alarm options:

Trigger alarms or events to draw the user attention Provide a meaningful text description of the event. Provide OSD graphics to depict the analytics event, including the participating objects, event location, motion directions and more.

Provide the above OSD graphics on live video, archived video and JPEG images The Client Workstation shall have dual redundant 1 G (1000Mb) network interface and shall operate on 100/1000 Ethernet networked and shall be of the most current technology available by a major brand name manufacturer of computers and servers.

#### Technical Specifications for Security Systems

- The DVM Monitor application shall provide management and control over the system using a standard PC mouse, keyboard and CCTV Joystick controller. The vendors should provide joystick controller as an integrated part of each client workstation.
- The DVM client shall be able to use multiple CCTV keyboards to operate the entire set of cameras throughout the system, including cameras of various manufacturers' brands, including their PTZ functionalities (i.e.: one keyboard manufacturer controls another manufacturer's dome or vice-versa).
- The DVM client shall allow for a CCTV keyboard to be attachable directly to the PC running the DVM client application via its serial port.
- The DVM client CCTV Keyboard Interface shall provide full PTZ control.
- The operator shall be able to control pan-tilt-zoom, iris, focus, dome relays and dome patterns

- The DVM client software shall allow the operator to access the PTZ configuration menus with no need of additional hardware.
- This shall prioritize which operator has control over a camera vs. another operator trying to control the same camera at the same time.
- The DVM client CCTV Keyboard Interface shall provide full video matrix operations.

#### 7. Integration Interface

- DVM should provide well defined SDK/API for integration development possibilities with third party ACS, FAS, BMS system.
- Development of integration module shall be in the scope of BMS system OEM, whereas DVM vendor should provide the requisite SDK/API for the same. Cost of the same should be included in the offer.

**LIST OF PREFERRED MAKES FOR ELECTRICAL, HVAC,  
FIREFIGHTING AND OTHER SERVICES**

S. no.	Details of Materials / Equipment	MAKES OF MATERIALS / PRODUCTS
<b>LIST A – CORE ELECTRICAL ITEMS INCLUDING UPS, DG, EOT CRANE AND AIR COMPRESSOR</b>		
1.	LV Switchboards	Tricolite Electrical industries, L&T, GE, Schneider, Unilec, Neptune, Adlec, Suddhir Genset Ltd, ABB, Siemens
2.	Air Circuit Breaker (ACB's)	L&T, Siemens, ABB, Schneider, Legrand, GE
3.	Moulded Case Circuit Breaker (MCCB)	L&T, Siemens, ABB, Merlin Gerin, Legrand, GE, Schneider
4.	Distribution Board	L&T Hager, Legrand, Siemens, ABB, Havells, GE, Tricolite, Schneider, Unilec, Neptune, Adlec, Sudhir Genset Ltd.
5.	ELCB/RCBO/RCCB	L&T Hager, Legrand, Siemens, Schneider, ABB, GE, Havells
6.	Miniature Circuit Breaker (MCB)	L&T Hager, Legrand, Siemens, Schneider, ABB, GE, Havells
7.	Switch Fuse Units with HRC Fuses	L&T, GE, Siemens, Control & Switchgear Ltd, ABB, Schneider Electric, Crompton –Greaves
8.	Protective relays	Alstom (AREVA), ABB, L&T, Siemens, Schneider, GE
9.	Capacitors	Crompton, Mehar (Schneider), L&T, Siemens, Ducati, ABB, GE
10.	Current Transformer (Epoxy Cast Resin)	AE, Kappa, Control & Switchgear, Precise, G&M (Gilbert & Maxwell), Volt-amp
11.	Electronic Digital Meters (A/V/PF/Hz/KW/KWH) with LED Display	MECO, DUCATI, Allen Bradely, Motwane, AE, Enercon, HPL, Schneider, L&T Secure
12.	Selector Switch, Toggle switch	Kaycee, L&T (Salzer), BCH, Teknic, Schneider, ABB
13.	Indicating Lamps LED type, Push Button	L&T, BCH, Vaishno, Siemens, Teknic, RAAS, Schneider
14.	APFC Relay	Enercon, L&T, Ducati, Epcos, Emerson, Schneider
15.	Contactors	ABB, Siemens, Schneider, L&T, Telemechanique
16.	Motor Starters	Schneider, Siemens, Socomec, ABB, Havells, BCH
<b>MV CABLING</b>		
17.	XLPE aluminium / copper conductor Armoured MV Cables (FRLS)	Finolex, Asian/RPG, KEI, Havells, Cords cable, Scot innovation, Bonton, Polycab, Universal, NICCO,

<b>S. no.</b>	<b>Details of Materials / Equipment</b>	<b>MAKES OF MATERIALS / PRODUCTS</b>
18.	Copper / Aluminium (Crimping type) Cable lugs for 1100V grade cables	Dowell's, Jainson, Universal
19.	Compression glands for 1100V grade cables	Peeco, Comet
20.	Copper conductor FR PVC insulated wires ISI marked.	KEI, Finolex, Havells, Bonton, Polycab, Lapp Kabel, Universal, RR Kabel
21.	Terminal Blocks & Cage clamps	ELMEXX, PHOENIX, WAGO, CONNECTWEL
22.	Cable Trays / Raceways	Bharti, Unitech, Steelways, MEM, BEC, OBO, VPL, Legrand, Slottco, Hireach, Fitwell
<b>CONDUIT WIRING &amp; ASSOCIATED ACCESSORIES</b>		
23.	GI Conduit ISI Marked	BEC, AKG, Steel Kraft,
24.	GI Conduit accessories	Conforming to BIS/IS as per approved samples
25.	Modular system, switches, socket outlets and wiring accessories with moulded cover plates	Crabtree, MK Electric, CPL Legrand, Schneider, SSK, ABB
26.	Industrial Sockets	GE, Siemens, BCH, Hensel, Mennekes, Balls, Schneider
<b>UNINTERRUPTED POWER SUPPLY (UPS) &amp; INVERTER</b>		
27.	UPS System	Tata Liebert, Numeric, APC, Seimens, Piller, Schneider, GE, Aros-PCI, Emerson, Hitachi, Mitsubishi
28.	UPS Battery	Exide, Furukawa, Standard, Panasonic, Amara Raja, HBL-Nife
29.	Inverter	Luminous, Micro Tek, Su-Kam



S. no.	Details of Materials / Equipment	MAKES OF MATERIALS / PRODUCTS
<b>LIST B – OTHER ELECTRICAL / VAC / FIRE-FIGHTING / GENERAL ITEMS</b>		
<b>INTELLIGENT ADDRESSABLE FIRE DETECTION &amp; ALARAM SYSTEM</b>		
1.	FACP	Notifire, Simplex (Tyco), Apollo, Cerberus, Schrek or equivalent
<b>FIRE HYDRANT &amp; FIRE FIGHTING SYSTEM</b>		
2.	Pumps	Kirloskar, Mather & Platt, Grundfos or equivalent
3.	Motors	Kirloskar. ABB, Siemens, NGEF, GEC, Alshthom, Jyoti, Crompton greaves or equivalent
4.	Pressure Switch	Indfoss, Switzer, Morley, System Sensor, Danfoss, or equivalent
5.	Pressure Gauge	H Guru, Fiebig, Newage, Sukan, waaree, wika or equivalent
6.	Pipes (MS & GI)	TATA, Jindal Hissar, or equivalent
7.	MS/GI forged steel fittings	Vs, Suru, B&M or equivalent
8.	MS/GI butt welded ERW fittings	Deccan metal or equivalent
9.	Sluice valve	Kirloskar, Leader or equivalent
10.	Gunmetal stainless-steel valves (full way & check valves)	
A.	Class- i	Zoloto, Leader or equivalent
B.	Class –ii	Leader, Sant or equivalent
C.	Non-return valves	Kirloskar, Leader, Audco or equivalent
D.	Butterfly valve	Audco, KSB, Leader or equivalent
E.	Hydrant valve	Newage, Minimax or equivalent
11.	Hose reel tube (Thermoplastic Synthetic reinforced)	KESARA PLAST, SYNTEX or equivalent
12.	Hose pipe (RRL Type)	Jaayshree, Newage, CRC, Jyoti, Maruti Dunlop, Minimax, Safex, Zenith or equivalent
13.	Branch pipe with nozzle	Newage, Safeguard, Minimax or equivalent
14.	Hose Box	Safegaurd, Newage or Reputed make as per IS specification subject to MMRC approval
15.	Paints exposed pipes	Asian paints, Berger, Shalimar or equivalent
16.	Anchor Fasteners	Hilti, hi-tech supports, Fischer or equivalent
17.	Wrapping & coating materials for underground pipes	IWL (pypkote), Grace Industries or equivalent.
18.	Primer paints for painting for above ground pipes	Shalimar bitumanstic paints or equivalent
19.	Y-type suction strainer	Kirloskar, Leader or equivalent
20.	Foot valve with strainer	Kirloskar, Leader, Zoloto, Sarkar or equivalent

21.	Alarm Valve (installation Valve)	HD fire, Mather & platt, Spraysafe, Central or equivalent
22.	Water motor gong & trims	HD fire, Mather & platt, Spraysafe, Central or equivalent
23.	Flow switches	Switzer, Forbes, Marshall, Viking, Gem, Macdonald, Grinnel, System sensors, morlay IAS, or equivalent
24.	Air release valve	Newage, Kirloskar or equivalent
25.	Ball valve	TBS, IBP or equivalent
26.	Cast iron non-return valve double flanged	Kirloskar, Leader, Kalpana or equivalent
27.	Rubber gasket	Reputed make as per IS specification subject to MMRC approval
28.	Portable fire extinguisher	Minimax, Niti, Safex, Zenith, Safeguard or equivalent
29.	Welding Electrode	Advani oerlikon, L&T or equivalent
<b>AIR-CONDITIONING AND VENTILATION SYSTEM</b>		
30.	Circulator fans / Exhaust fans/ Inline Fans	Crompton Greaves, Orient, Khaitan, Alstom, Almonard, Systemaire (Sweden) – Kanalfakt, Nuaire (UK) or equivalent
31.	Air Conditioning system	Carrier, Blue Star, LG, Daikin, Toshiba, Hitachi or equivalent
32.	VRV/ VRF	Daikin, Mitsubishi, York, Hitachi, LG, Toshiba, Bluestar, Panasonic, Voltas or equivalent
33.	AHU	Waves Aircon, Systemair India, ETA, Blue Star or equivalent
34.	GI Sheet	Tata, Jindal or equivalent
35.	Prefabricated Duct	Rolastar, Zeco, Techno fab, Technoaircon, or equivalent
36.	Manual Damper	Systemair India, Rolastar or equivalent
37.	Volume control Damper	Systemair India, Greenheck, Ruskin Titus, Trox, Air master or equivalent
38.	Grills	Systemair India, Caryaire, Waterloo Ravistar, Air Master, Dynacraft, MAPRO or equivalent
39.	Diffuser	Systemair India, Caryaire, Waterloo Ravistar, Air Master, Dynacraft, MAPRO or equivalent
40.	Fire Rated Paint	Firespray International Ltd. or equivalent
41.	Insulation (Non-fire rated)	UP Twiga or equivalent
42.	Insulation (fire rated)	Rockwool India Pvt. Ltd., Lloyd Insulation Ltd. or equivalent
43.	Duct & Pipe Insulation (EPDM)	Armacell, Aeroflex or equivalent
44.	MS & GI pipes	Jindal, Tata or equivalent
45.	Balancing Valve	Advance India, Danfoss, T&A Hydronics or equivalent
46.	Check Valve	Advance India, Kirloskar or equivalent
47.	Butterfly Valve (Non-Motorised)	Advance India, Kitz Japan or equivalent
48.	PICV- AHU	Flowcon, Danfoss or equivalent
49.	Y- Strainer	Emerald, Sant or equivalent
50.	Axial Flow Fans	Kruger, Systemair or equivalent
51.	Propeller Fan	Kruger, Systemair or equivalent

52.	Flexible Coupling	Resistoflex or equivalent
53.	ECS sound attenuator	Systemair, Ruskin or equivalent
54.	Motor	ABB, Crompton, Siemens, Alstom or equivalent
55.	Temperature Gauge	Waree, Fiebig or equivalent
56.	Pressure Gauge	Waree, Fiebig, H Guru, Newage, Sukan, Wika or equivalent
57.	VFD	ABB, Danfoss or equivalent
58.	Vibration isolator	Flexionics (USA), Resistoflex or equivalent
<b>LIGHTING &amp; FANS</b>		
59.	LED Light Fittings	Philips, Bajaj, Keselac-Schreder, Instapower, Crompton Greaves, Wipro, Havells, Surya, or equivalent
60.	Ceiling Fan	Crompton greaves, Orient, Khaitan, Alstom or equivalent
61.	Lighting Poles	Paruthi, Bajaj or equivalent
62.	LED Chips	Philips, Nitchia, Cree, Seoul semiconductors or equivalent
<b>LV SYSTEM</b>		
63.	Switches / Sockets / Tv, Telephone Socket, Etc. (Modular)- Cat A	Anchor (Rider), Legrand(Myling) or equivalent
64.	Switches / Sockets / Tv, Telephone Socket, Etc. (Modular)- Cat B	Anchor (Roma) / Legrand (Arterier/ Mirus/ Mylinc) / or equivalent As Per Approved By Elect. Incharge
65.	Telephone Wire / Cables	Finolex / Tata (Lucent) / Itl / Skytone / Grandlay / Gemscab / Delton / National / L&T / Delton / Polycab or equivalent
66.	Network Cable	Digisol / Schneider / Avaya/ Systemec / Finolex / Legrand or equivalent
67.	EPBAX	Avaya / Nec / Lg Aria / Siemens / Alcatel or equivalent
68.	Telephone Instrument	Bpl / Tata / Siemens /Avaya / Nec or equivalent
69.	Telephone Tag Box	Itl Or Equivalent make
70.	Control Cables and Other Cables	Finolex, Polycab, Gloster, R.R. Cable or equivalent
71.	Ip - Cctv Camera	Vivotek / Axis / Sony /Hikvision or equivalent
72.	Servers, Workstation	Dell/Hp/Ibm or equivalent
73.	Networked Attached Storage	Promise/ Ibm/Hp/Dell or equivalent
74.	Network Switches	Cisco/ Hp / Dell or equivalent

**Eligibility condition for Associate agency for execution of Electrical,  
HVAC, Fire Fighting and Other Services**

The associate agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- a. Three similar works each of value not less than Rs. 45,16,430/-

OR

- b. Two similar works each of value not less than Rs. 67,74,644/-

OR

- c. One similar work each of value not less than Rs. 90,32,859/-

Similar work shall mean works of Civil, Interior, and Supply, Installation, Testing and Commissioning of Electrical, Firefighting and HVAC works for non-residential buildings (Institutional & Commercial) along with allied services.

1. The values of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of interest of 7% per annum, calculated from the date of completion to the last date of receipt of application for tender.
2. Specialized firm shall enclose self-attested copies of the following documents (not required for enlisted contractors of CPWD).
  - a. Solvency Certificate issued by a Nationalized / Scheduled Bank for Rs. 1 Lakh or more, issued after 31.10.2017. (original solvency to be submitted)
  - b. The bidder should not have incurred any loss in more than two years during the immediate last five consecutive financial years duly certified by the Chartered Accountant.
  - c. Certificate that the firm has an "Average Annual Financial Turn-Over" of not less than Rs. 2.40 Lakhs during the immediate last three consecutive financial years ending 31.10.2017. (Audited Balance sheet to be submitted)
  - d. Copies of GST, Electrical License, WCTC, if required.
3. The firm should be registered with GST.
4. Self-attested copies of completion certificate(s) issued by the officer of the client department, not below the rank of Executive Engineer or equivalent, for works executed in Government and in cases of private works certificates signed by the consultant in charge and counter-signed by the owner of the building for whom the work has been carried out, will have to be furnished along with the application. The completion certificate must clearly indicate :-
  - a. Name of Work
  - b. Stipulated date of start and actual date of completion.
  - c. Value of audio video system work.
  - d. That the work has been completed satisfactorily.

- e. Full address of the client, officer issuing certificate and location, where work is executed.
  - f. TDS. (for private works only)
5. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he consider himself eligible and he is in possession of all the documents required.
  6. Information and Instructions for bidders posted on website shall form of bid document.

**SCHEDULE OF QUANTITIES – Electrical**

<b>E</b>	<b>ELECTRICAL</b>				
<b>S. No.</b>	<b>Description</b>	<b>Unit</b>	<b>Qty.</b>	<b>Rate</b>	<b>Amount</b>
<b>E.01</b>	<p><b>Supply, Installation, testing &amp; commissioning of LED light fixtures.</b></p> <p><b>1) Luminance of LED fittings shall not be less than 90 lumens/watt (resultant efficacy after losses in housing, driver, heatsink, optics)</b></p> <p><b>2) CRI shall be more than 85.</b></p> <p><b>3) Colour temperature shall be as required between 4000K-6500K.</b></p> <p><b>4) THD shall adhere to the Standards applicable.</b></p> <p><b>5) Beam angle shall be as per site requirement.</b></p> <p><b>6) Fixture shall be supplied with suitable driver</b></p>				
1.1	Supplying and erecting square shaped CRCA / die-cast aluminium powder coated housing LED Panel light 600X600mm of PREMIUM RANGE suitable for upto 36 W with provision for plane front frame with translucent cover fixed to the housing complete.	nos	154	3348	515,592.00
1.2	Supplying and erecting square shaped CRCA / die-cast aluminium powder coated housing LED Panel light 200X200mm of PREMIUM RANGE suitable for upto 12 to 15 W with provision for plane front frame with translucent cover fixed to the housing complete.	nos	60	1141	68,460.00
1.3	Supplying and erecting LED square / circular 13 to 18 W PREMIUM RANGE downlighter having pressure die-cast aluminium housing with white front frame with opal translucent cover with provision for spring loaded mounting clips complete.	nos	296	1277	377,992.00

1.4	Supplying and erecting square / rectangular shaped CRCA /die-cast aluminium powder coated housing LED Panel (slim edge-lit) light suitable for 25 to 32W with provision for plane front frame with translucent cover fixed to the housing complete.	nos	43	2762	118,766.00
1.5	Supplying & erecting ready to use Retrofit T8 LED 18 / 20 tube light with polycarbonate body, heat sink, integrated HF electronic driver complete & compatible to T8 / T12 LED luminaire by disconnecting starter & ballast if necessary.	nos	22	593	13,046.00
1.6	Supplying& erecting 20W LED PAR (30 Lamp E-27 Base, SPOTO series) lights by making necessary arrangement/recess in wall to make it flush with surface.	nos	15	5029	75,435.00
<b>E.02</b>	<b>Supply, Installation, testing &amp; commissioning of Fans</b>				
2.1	Ceiling fan 1200mm sweep without regulator but with all accessories for installation as per IS 374.	nos	24	1498	35,952.00
<b>E.03</b>	<b>Supply, Installation, testing &amp; commissioning of Distribution board.</b>				
	<b>Surface/recess mounting, TPN vertical type,415v,Prewired TPN MCB distribution board of sheet steel, dust protected, duly phosphatized &amp; powder painted, inclusive of 100 A tinned copper busbars, common neutral link, earth bar,din bar for mounting, CB's, detechable and/knock out plate,&amp; with built in loose wire box,&amp; superior make terminal connectors for all incoming &amp; outgoing circuits, duly prewired with adequate size of FRLS PVC insulated copper conductor upto terminal connector/netural link &amp; ready for installation of following was(but without MCB's &amp; incomer) as required.</b>				

3.1	8 way (4+24) double door-G. f to 4th floor	nos	5	6598	32,990.00
3.2	12 way (Vertical TP-0/G DB) for HVAC outdoor unit	nos	1	7925	7,925.00
<b>E.04</b>	<b>Supply, Installation, testing &amp; commissioning of MCBs/RCCBs</b>				
<b>E.04.01</b>	<b>5 amps to 32 amps rating,240 V,"C"-series 10KA miniature circuit breaker suitable for lighting, power &amp; other loads of following poles in the existing MCB DB complete with connections as required</b>				
4.1.1	Single pole, 10/16/20/32 Amps	nos	120	152	18,240.00
<b>E.04.02</b>	<b>40 amps to 100 amps rating,415 V,"C"-series 10KA miniature circuit breaker suitable for lighting, power &amp; other loads of following poles in the existing MCB DB complete with connections as required</b>				
4.2.1	Triple pole,40/63/100 Amps	nos	14	925	12,950.00
4.2.2	TPN MCB, 63/100 Amps	nos	6	1139	6,834.00
<b>E.04.03</b>	<b>Double pole (single phase &amp; neutral),240 Residual current circuit breaker(RCCB), having a sensitivity current upto 300 milliamperes in the existing MCB DB complete with connections, as required.</b>				
4.3.1	63 amps	nos	15	2447	36,705.00
<b>E.05</b>	<b>Supply, Installation, testing &amp; commissioning of Circuit / Sub circuit Wiring</b>				
	<b>Supply and wiring wall / floor etc. / recessed / surface as per colour code with the following size PVC Insulated 1100V copper wire along with given earth wire for phase neutral and earth conductor with standard colour coding, through ISI marked rigid PVC conduit of given size with all accessories. The rate includes the cost of complete wiring from switch box to switch box.</b>				



5.1	2R x 2.5 Sqmm and earth wire 1.5 sqmm FRLS PVC Copper wire with in 20 mm dia conduit (for lighting main circuit, HVAC indoor units)	mtr	2500	123	307,500.00
5.2	2R x 4 Sqmm and earth wire 2.5 sqmm PVC FRLS Copper wire with in 20 mm dia conduit (for power sockets)	mtr	1000	148	148,000.00
5.3	3C*6 sqmm FRLS copper armored cable for HVAC Outdoor unit along with termination by providing double compression gland & suitable lugs.	mtr	200	263	52,600.00
<b>E.06</b>	<b>Supply, Installation, testing &amp; commissioning of Point wiring</b>				
6.1	Primary point wiring light point/fan point/exhaust fan point using 3Rx1.5 sqmm FRLS PVC wire 1100 V grade for switch controlled primary light in 20 mm dia PVC conduit including saddles/hanger etc. for surface conducting and/or cost of cutting & filling chase for recessed conducting & including the supply & fixing modular grid plate mounted surface/recess mounted 240 V 6 amps control switch of approved quality & color housed in PVC/metallic box with moulded cover plate	nos	92	493	45,356.00
6.2	Secondary point wiring using 3Rx1.5 sqmm FRLS PVC wire 1100 V grade in 20mm PVC conduit, flexible conduits (for dropping) including cost of providing saddles.	nos	560	156	87,360.00
6.3	Supplying & installation of stepped type electronic fan regulator on the existing modular plate switch box including connection but excluding modular plate etc. as required.	nos	24	332	7,968.00

6.4	Supply & installation of metal box of metal/PVC box with modular plate and cover in front on surface or in recess, including providing and fixing of 6 pins 6/16 Amps modular socket outlet & 16A modular switch connection, painting etc. as required. (3 nos of switch box per circuit)	nos	40	441	17,640.00
6.5	Supply & installation of metal box of metal/PVC box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos 6 pin 6/16 Amps modular socket outlet & 2 nos of 16A modular switch connection, painting etc. as required. (2 nos of switch box per circuit)	nos	30	559	16,770.00
6.6	Supply & installation of metal box of metal/PVC box with modular plate and cover in front on surface or in recess, including providing and fixing 3 nos 6 pin 6/16 Amps modular socket outlet & 2 nos of 16A modular switch connection, painting etc. as required (1 nos of switch box per circuit)	nos	18	644	11,592.00
6.7	Supply & installation of metal box of metal/PVC box with modular plate and cover in front on surface or in recess, including providing and fixing 1nos of 6 pin 6/16 Amps modular socket outlet & 1 nos of 16A modular switch connection, painting etc. as required (1 nos of HVAC Indoor unit-2 switch box per circuit)	nos	60	644	38,640.00
<b>E.07</b>	<b>Supply, Installation, testing &amp; commissioning of Industrial power socket</b>				-
7.1	Supply & installation of industrial socket(IP-65) with plug controlled by 40 A, TPN ELMCB/RCBO (for HVAC outdoor unit capacity of 14HP&16HP)	nos	8	1946.25	15570.00
7.2	Supply & installation of industrial socket(IP-65) with plug controlled by 50 A ELMCB/RCBO (for HVAC outdoor unit capacity 18HP)	nos	1	16300	16300.00

7.3	Supply & installation of industrial socket(IP-65) with plug controlled by 63 A ELMCB/RCBO (for HVAC outdoor unit capacity 20HP)	nos	2	8150	16300.00
<b>E.08</b>	<b>Supply &amp; Installation of cable along with termination using double compression gland &amp; suitable lugs</b>				
8.1	4C*16 sqmm Al.ar cable	mtr	300	170	51,000.00
8.2	PVC ar.4 core 4sqmm copper conductor (For Fire Pump Local control panel to start/stop push button)	mtr	80	245	19,600.00
<b>E.09</b>	<b>Supply, Installation, testing &amp; commissioning of Earthing system</b>				
9.1	UL certified/CPRI tested maintenance free earthing comprising of electrode of 17.2mm dia low carbon steel with 250-micron molecular copper bonded earthing rod of length 3m along with 25kg carbon based environment friendly back fill ground enhancing compound required to fill up the excavated earth with required quantity as per specification Mahastra PWD-EA-MOBI	nos	4	12531	50,124.00
9.2	25*6 mm GI strip	kgs	95	178	16,910.00
9.3	10 SWG GI wire	kgs	10	143	1,430.00
9.4	12 SWG GI wire (for HVAC outdoor unit)	kgs	15	143	2,145.00
9.5	Providing MET using 25*6 cu strip with bolt & spring washer @4th floor for HVAC units at terrace.	Kgs	5	670.00	3,350.00
9.6	Providing MET using 25*6 cu strip with bolt & spring washer @ G.F for earthing floor DB's	Kgs	5	670.00	3,350.00
<b>E.10</b>	<b>Supply, Installation, testing &amp; commissioning of Lightning Protection as per IS 2309</b>				
10.1	Conventional spike type air termination suitable to carry lightning stroke made up of heavy gauge 40mm dia copper pipe of standard length with 5 nos copper spikes fixed on copper ball as air terminal duly threaded in copper pipe erected on	nos	3	4245	12,735.00

	provided foundation in an approved manner.				
10.2	25*3 mm thick GI strip horizontal & vertical conductor on surface/wall/parapet complete with joints & other fixing accessories & clamping with earth termination.	kgs	142	178	25,276.00
10.3	Providing & back filling earth conductivity enhancing mineral earthing compound of 25kg bag complete	nos	2	4955	9,910.00
<b>E.11</b>	<b>Supply, Installation, testing &amp; commissioning of Fire Pump control panel</b>				
11.1	Automatic control panel for 3ph, 415V, A.C centrifugal pump set upto 20HP consisting of star delta starter having relay 28-42 Amp, S.P.P., combined ammeter/voltmeter, phase indicating lamp enclosed in CRCA powder coated vibration proof encloser with IP-54 protection. Control panel should offer single phasing, phase reversal, phase imbalance etc. Similar to LT model no: MUG20H/CAT NO: SS95975	Each	1	13639	13,639.00
11.2	Emergency start/stop push button station weather proof for fire pump at terrace/ground level.	Each	1	1105	1105.00
<b>E.12</b>	<b>Dismantling of the existing E&amp;M services</b>				
12.1	Dismantling the existing light, fan, bell, clock, independent plug point, wiring including circuit mains of all types along with accessories	nos	300	7	2,100.00
12.2	Dismantling of existing fluorescent fittings of any type & size	each	300	13	3,900.00
12.3	Dismantling the existing ceiling fan /exhaust fan / cabin fan /bracket fan complete with accessories, GI down rod Frame etc. & making the site clear	each	200	31	6,200.00
12.4	Dismantling the existing switchgears, DB, and Bus bar of any size complete with/without board or angle iron frame	each	5	76	380.00
<b>TOTAL OF ELECTRICAL SYSTEM</b>				<b>Rs.</b>	<b>2,325,637</b>

**SCHEDULE OF QUANTITIES – Fire Fighting**

S. No	Description	Unit	Qty.	Rate	Amount
<b>F</b>	<b>FIRE SYSTEM</b>				
<b>F.01</b>	<b>FIRE HYDRANT SYSTEM</b>				
<b>1.1</b>	<b>Fire Pump</b>				
	Supply, erection, testing & commissioning of electrical motor driven Booster Pump of 900 LPM at average 40 m Head, 12.5 HP either Monoblock or of suitable HP with suitable Stages.	Nos.	1	48256	48,256.00
<b>1.2</b>	Supplying & Installing, testing & commissioning cast iron double flange butterfly valve of size 100 mm dia.	Nos.	2	3310	6,620.00
<b>1.3</b>	Supplying & Installing, testing & commissioning cast iron double flange butterfly valve of size 150 mm dia.	Nos.	1	5104	5,104.00
<b>1.4</b>	Supplying and installing, testing & commissioning double flange NRV of size 100 mm dia.	Nos.	2	7962	15,924.00
<b>1.5</b>	Supplying and installing, testing & commissioning gun metal single outlet hydrant valve fitted with necessary accessories.	Nos.	6	7494	44,964.00
<b>1.6</b>	Supplying and erecting M.S./CRCA cabinet for housing Floor Hydrant valve, hose pipe, hose reel and branch pipe (size 1000 mm x 736mm x 736 mm.) made from 16 SWG sheet and angle iron 25 mm. x 25 mm. x 4 mm. having front doors with viewing glass (8"x6") and locking arrangement with necessary fixing material such as rubber bidding etc. duly painted in post box red colour.	Nos.	6	13094	78,564.00
<b>1.7</b>	Supplying and installing, testing of Stainless steel branch pipe of 63 mm dia. Fitted with 20mm dia. ISI marks IS 903 complete in all respect.	Nos.	6	1827	10,962.00

1.8	Supplying and installing, testing of firefighting R.R.L. Hose pipe, 63mm dia,15m in length, fitted with necessary accessories complete.	Nos.	12	4596	55,152.00
1.9	Supplying and installing, testing & commissioning wall mounting swinging Hose reel drum fitted with 19 mm dia. 30m high pressure polypropylene (Polyhose) long fitted with necessary accessories.	Nos.	5	6066	30,330.00
<b>F.02</b>	<b>INTERNAL PIPING</b>				
2.1	Supplying and installing, testing & commissioning G.I. pipe above ground of 'C' class ERW of size 75/80 mm dia with necessary fittings.	RMT	6	911	5,466.00
2.2	Supplying and installing, testing & commissioning G.I. pipe above ground of 'C' class ERW of size 100 mm dia with necessary fittings.	RMT	42	1251	52,542.00
2.3	Supplying and installing, testing & commissioning G.I. pipe above ground of 'C' class ERW of size 150 mm dia with necessary fittings.	RMT	12	1790	21,480.00
2.4	Supplying and installing, testing & commissioning 150 mm dia end line strainer for +ve suction.	Nos.	1	8084	8,084.00
2.5	Supplying and installing fire brigade Header (Siamese Connection) of 150 mm Ø for supplying water to wet riser system.	Nos.	1	9771	9,771.00
2.6	Supplying and erecting, testing & commissioning 20/25mm Ø G.M.air release cock, with necessary G.I. coupling to be fitted on top of riser.	Nos.	1	683	683.00
<b>F.03</b>	<b>PORTABLE FIRE EXTINGUISHERS</b>				
3.1	Supplying & erecting, testing Carbon Dioxide (CO2) fire extinguisher of 4.5 kg. Capacity Cartridge type conf. To IS 2878 Complete erected with necessary clamp made front 50x6 mm. M. S. flat with nut & bolts grouted in wall complete.	Nos.	25	10208	255,200.00

3.2	Providing round bottom FIRE Bucket of 9 Litres capacity as per IS: 2546 made out of 24-gauge G.I. sheet with extra handle at bottom duly painted white inside and red outside with FIRE Mark, on provided stand/ wall hook.	Set	4	627	2,508.00
<b>F.04</b>	<b>FIRE ALARM SYSTEM</b>				
4.1	Supplying, erecting, testing and commissioning the 8 Zones Microprocessor based conventional Fire Alarm Control Panel (FACP) with standard accessories. RS. 15870x1.25= RS. 19837.50	Nos.	1	19837.50	19,837.50
4.2	Supplying, erecting, testing and commissioning Manual Call Point (Pill box) with break glass push button in metal enclosure.	Nos.	5	486	2,430.00
4.3	Supply and erecting, testing & commissioning hooters with CRCA enclosure complete.	Nos.	5	569	2,845.00
4.4	Supplying and erecting FRLS armored cable 2 core 1.5 sq.mm. copper conductor complete erected on wall/ ceiling.	RMT	200	92	18,400.00
<b>TOTAL OF FIRE SYSTEM</b>				<b>Rs.</b>	<b>695,122.50</b>

## SCHEDULE OF QUANTITIES – HVAC

S.No	Description	Unit	Qty.	Rate	Amount
<b>H.01</b>	<b>VRF AIRCONDITONING SYSTEMS</b>				
1.1	Supply, Installation, testing and commissioning of Air Cooled Variable Refrigerant Flow System suitable for R410A and 415 ± 10%, 50 Hz, AC supply. The unit shall consist of indoor units and external condensing units and other accessories as listed below complete in all respects. The unit shall be fully charged with gas and oil.				
<b>1.1.1</b>	<b>Outdoor Unit</b>				
	Supply, installation, testing and commissioning of Modular type outdoor condensing units equipped with highly efficient hermetic type scroll / DC twin rotary compressors with full inverter technology, special acrylic pre-coated heat exchanger, low noise condenser fan with motor, auto check function for errors in display panel, auto address setting, as per specifications and capacities as mentioned below. (The unit shall be fully charged with gas and oil. Price shall include Lifting, Shifting, Positioning of Units at respective location, pressure testing & commissioning).				
	Capacity shall be as under				
1.1.1.1	40 HP (32 TR Nominal Capacity)	Nos	1	622000	622,000.00
1.1.1.2	30 HP (24 TR Nominal Capacity)	Nos	1	473000	473,000.00
1.1.1.3	24 HP (19 TR Nominal Capacity)	Nos	2	422000	844,000.00
<b>1.1.2</b>	<b>Indoor Units</b>				
	Supply, installation, testing and commissioning of ceiling mounted type 4 Way Cassette Indoor units each complete with coil, pre-filter, Front panel Etc & wall mounted split type indoor units and 220-volt, 1 phase, 50 Hz, AC supply all as per specifications.				
	The capacities shall be as follows:				
1.1.2.1	1.6 TR Nominal Capacity Cassette Unit with 618 Cfm	Nos	9	33600	302,400.00



1.1.2.2	2.0 TR Nominal Capacity Cassette Unit with 758 Cfm	Nos	10	34900	349,000.00
1.1.2.3	2.5 TR Nominal Capacity Cassette Unit with 777 Cfm	Nos	7	39200	274,400.00
1.1.2.4	3.2 TR Nominal Capacity Cassette Unit with 1159 Cfm	Nos	10	41600	416,000.00
1.1.2.5	1.0 TR Nominal Capacity wall Mounted Split type unit with 353 Cfm	Nos	2	35535	71,070.00
1.1.2.6	1.3 TR Nominal Capacity wall Mounted Split type unit with 494 Cfm	Nos	3	35535	106,605.00
1.1.2.7	1.6 TR Nominal Capacity wall Mounted Split type unit with 494 Cfm	Nos	2	36435	72,870.00
1.1.2.8	2.0 TR Nominal Capacity wall Mounted Split type unit with 600 Cfm	Nos	16	38794	620,704.00
1.1.3	Supply, installation, testing and commissioning of Cordless Remote controllers for operation of indoor units.	Nos	37	4800	177,600.00
1.1.4	Supply, installation, testing and commissioning of Central Remote controller for complete system including all VRF indoor and outdoor units. (Standard CRC)	Nos	1	38666	38,666.00
1.1.5	Supply, installation, testing and commissioning of Imported fittings Y-joints, T-joints, distributor and headers for all Indoor units for all the floors layout as per layout drawings.	Nos	53	4500	238,500.00
<b>H.02</b>	<b>Refrigerant Piping</b>				
	Supply, installation, testing and commissioning of Interconnecting refrigerant pipe work with elastomeric nitrile rubber/closed cell expanded polythene tubular insulation between each set of indoor & outdoor units as per specifications, all piping should be laid on Galvanised/Powder Coated tray supported by Galvanised M S Hangers & Clamps.				
2.1	41.3 mm O.D. (insulation: 19 mm)	Rm	41	2172	89,052.00
2.2	34.9 mm O.D. (insulation: 19 mm)	Rm	121	2119	256,399.00
2.3	28.6 mm O.D. (insulation: 19 mm)	Rm	41	2067	84,747.00
2.4	22.2 mm O.D. (insulation: 13 mm)	Rm	62	1399	86,738.00
2.5	19.1 mm O.D. (insulation: 13 mm)	Rm	121	1183	143,143.00
2.6	15.9 mm O.D. (insulation: 13 mm)	Rm	299	938	280,462.00
2.7	12.7 mm O.D. (insulation: 13 mm)	Rm	81	809	65,529.00

2.8	9.5 mm O.D. (insulation: 13 mm)	Rm	299	636	190,164.00
2.9	6.4 mm O.D. (insulation: 13 mm)	Rm	81	540	43,740.00
<b>H.03</b>	Supply, installation, testing and commissioning of control cum transmission wiring of 2 core x 1.5 sqmm copper in suitable GI conduits between indoor and outdoor units.	Rm	660	481	317,460.00
<b>H.04</b>	Supply, installation, testing and commissioning of power cables from isolator MCB to outdoor unit.	Rm	15	670	10,050.00
<b>H.05</b>	3 PIN TO IDU - 3C x 2.5Sqmm Flexible Cable.	Rm	110	140	15,400.00
<b>H.06</b>	Supply, Fabrication & installation of M.S. angle iron frame work for outdoor unit including P.O. painting of the same is also included in the above scope.	Set	4	20000	80,000.00
<b>H.07</b>	<b>DX Wall mounted Split Unit</b>				
	Providing, fixing, testing and commissioning of Hi wall split unit air conditioning air cooled type with evaporator coil, fan and fan motor, air cooled condenser with hermetically sealed rotor compressor, condenser coil and complete with electrical Wiring as required (Voltage stabilizers are not to be provided)				
	Note: Providing and fixing of M.S. angle iron frame work for outdoor unit including P.O. painting of the same is also included in the above scope. Contractor to submit design/Scheme for Iron frame and obtain approval of engineer-in-charge before proceeding further.				
7.1	Nominal capacity 1.5 TR Inverter Type ( <b>3 Star Rating of R410A</b> )	Nos	1	40500	40,500.00
<b>H.08</b>	Providing, fixing and testing of copper refrigerant piping of appropriate sizes duly insulated with nitrile rubber insulation of 9 mm thickness for all types of split AC units. The pipes plus nitrile rubber insulation are to be covered with PVC flexible conduits for protection.	Rmt	20	900	18,000.00

<b>H.09</b>	<b>Condensate Drain Piping:</b>				
	Providing, fixing and testing UPVC Type drain piping for condensate from indoor unit to nearest suitable drain system as per site conditions as per instructed at site engineer complete with all required fittings and providing clean out plug at suitable location when required complete with elastomeric nitrile rubber insulation.:				
	( Chisselling works & minor Civil Work shall be part of HVAC Scope of work) - To consider accordingly) which shall be as per site conditions.				
9.1	40mm Dia.	RM	140	306	42,840.00
9.2	32mm Dia.	RM	200	219	43,800.00
9.3	25mm Dia.	RM	120	178	21,360.00
<b>H.10</b>	<b>Cable Tray for Refrigerant Pipe :</b>				
	Supply, fabricating and installing following size of perforated GI cable trays including horizontal and vertical GI bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with MS suspenders and including painting etc. complete as reqd				
10.1	600mm x 50 mm Cable Tray Without Cover	RMT	90	850.5	76,545.00
10.2	200mm x 50 mm Cable Tray without Cover	RMT	80	349	27,920.00
10.3	300mm x 50 mm Cable Tray without Cover	RMT	200	428	85,600.00
10.4	200mm x 50 mm Cable Tray without Cover	RMT	210	349	73,290.00
10.5	100mm x 50 mm Cable Tray without Cover	RMT	220	213.75	47,025.00
<b>H.11</b>	Providing, fixing and testing of External Drain pump for VRF wall Mounted splits units with necessary electrical & interlocking arrangements for proper drainage of condensate drain water as per the site requirements.	Nos	19	16000	304,000.00
<b>H.12</b>	<b>VENTILATION SYSTEM</b>				

	Supply, installation, testing and commissioning of following equipment .				
12.1	cabinet type fan with centrifugal blower driven by motor. The motor shall be suitable for 220 Volts $\pm 6\%$ 1 Phase 50 HZ AC supply.				
	Capacity 1000 CFM (1700 CMH Fresh Air Supply fan)	No	1	47000	47,000.00
12.2	Supply, installation, testing and commissioning of Propeller fan of following Sizes				
12.2.1	Exhaust fan of light duty 250 V A.C. 50 cycles 300mm dia size	No	17	1264	21,488.00
12.2.2	Exhaust fan of light duty 250 V A.C. 50 cycles 225 mm dia size	No	6	1126	6,756.00
<b>H.13</b>	<b>AIR DISTRIBUTION SYSTEM</b>				
13.1	Supplying, fabricating, installing and testing of factory / Machine fabricated G.I. Sheet metal ducts with flanges complete with supports, vanes, dampers, links, levers and quadrants etc. as per specifications and drawings. The rates shall include all materials of the duct and labour for suspension and supporting arrangement for plenums, ducts, complete with fire retardant flexible connection as required and specifications.				
	0.63 MM (24 Gauge) for ventilation duct	Sqm	55	430	23,650.00
13.2	Grilles and Dampers				
	Providing and fixing, testing and commissioning of powder coated extruded aluminium section grills with dampers for supply air terminal.	Sqm	2	5913	11,826.00
13.3	Providing and fixing, testing and commissioning of GI volume control damper for duct complete with linkages, levers, fittings, supports, all accessories and any other item required to make the system complete.	Sqm	2	4300	8,600.00
				Total	7,169,899.00

**SCHEDULE OF QUANTITIES – Other Services**

S. No.	Item	Unit	Rate	Quantity	Amount
1	Supply, installation, commissioning and testing of projector screen motorized - specification: • 1 Brightness 4000 Lumens • Contrast Ratio minimum 2000: • Aspect Ratio 16.10 (WXGA) Input Two HDMI, One VGA Resolution Minimum 1280*800 and higher preferable • Screen 5 FEET X 7 FEET 100 INCH DIAGONAL MOTORISED 100" MATT WHITE PROJECTION SCREEN FOR ULTIMATE PROJECTION FOR HOMW AND OFFICE Features: Durable squareshaped steel housing with powder coated. Universal mounting bracket with endcap making installation easy whether it is mounted on a wall, suspended or recessed above the ceiling. Hand switch, IR or RF Remote control at option including all labours and materials as required.	Each	16500	2	33000.00
2	Supply, commissioning and testing of Hand-held Wireless Microphone Minimum Specification Required- Working Range-91m (300ft) Line of Sight Audio Frequency Response- 50 to 15,000 Hz, Total Harmonic Distortion- Ref. ±33 kHz deviation with 1 kHz tone 0.5%, typical Dynamic Range 100 dB, Aweighted, typical, Gain Adjustment Range- 10 dB RF Transmitter Output- 10 mW, typical varies by region, Power Requirements- 2 LR6 AA batteries, 1.5V, alkaline RF Sensitivity -105 dBm for 12 dB SINAD, typical	Each	13500	2	27000.00
3	Supply, laying, commissioning and testing standard ISI advanced high speed HDMI cable 1.4V with nylon mesh 22 AWG & suppression core - 20 mtrlength including all labours and materials as required.	Each	2025	2	4050.00

4	Supply, laying, commissioning and testing standard ISI advanced highspeed HDMI cable 1.4V with nylon mesh 22AWG & suppression core in 10mtr. Length (Male / Female) including all labours and materials as required.	Each	1200	2	2400.00
5	Supply, installation, commissioning and testing of Ceiling Speaker - Input power- 15w RMS, Power Taps- 15/10/5w on 100v, Freq. Resp. - 55-16000Hz, Speaker- 8" SPL (1w/1m) - 93dB, including all labours and materials as required.	Each	2825	27	76275.00
6	Supply, installation, commissioning, testing of Digital Professional Mixer live 18 + 4 unbalance Channels Minimum Specification Required with AD/DA Card Must have High-Performance 16+2 input small format analogue mixers with on board effects OR better Must have 2- in/2-out USB audio playback and recording OR better Must have Switchable Hi-Z inputs for guitars, basses and other instruments Must have Hi-Pass Filters (low-cut) and 48V Phantom Power on all mic channels Must have Internal universal power supply	Each	59350	1	59350.00
7	Supply, laying and testing of Speaker Cable with Casing All cables feature Electrolytic Tough Pitch (ETP) virgin copper, including all labours and materials as required.	Rmt	650	202	131300.00
8	(A) Supply and testing of Portable PA Amplifier: - Power Output: 160W Max., 120W RMS at 10% THD, 105W RMS at 5% THD, 95W RMS at 2% THD Output Regulation: $\leq 2$ dB, no load to full load at 1kHz. Input Channels: 5 $\times$ Mic 0.65mV/4.7k $\Omega$ , 2 $\times$ Aux 100mV/470 k $\Omega$ . Frequency Response: 50-15,000Hz $\pm 3$ dB. Signal to Noise Ratio: 60dB. Tone Controls: Bass: $\pm 8$ dB at 100Hz, Treble: $\pm 8$ dB at 10kHz. Output: Preamp 200mV/600 $\Omega$ , Line 1V/1k $\Omega$ . Speaker Outputs: 4 $\Omega$ , 8 $\Omega$ , 16 $\Omega$ , 70V & 100V. Digital Player: MP3 Player	Each	12000	2	24000.00

	with USB, SD and MMC Card Reader. Power Supply: AC: 220-240V 50/60Hz DC: 12V (12V Car Battery). Power Consumption: AC: 250VA DC: 5.5A. Weight: 11-15 kg				
9	(B) Supply and testing of PA Speaker Systems: - Input Power: 50W Max. Power Taps:30/20/10W at 100V; Frequency Response: 55-16,000 Hz Low Frequency Speaker: 2 x 8", Ø0.75" Voice Coil; SPL at (1W/1m): 96dB; Max. Rated SPL:113dB. Nominal Impedance: 16Ω / 333/500/1kΩ. Input Connectors: Two nos. of Terminal Strip in parallel. Weight: 8-10 kg.	Each	4000	8	32000.00
10	Supply, termination and testing of Copper wire for speaker	Rmt	30	200	6000.00
11	Supplying & Laying UTP networking Cat-6 cable suitable for LAN / WAN Computer net-working as per specification No. WG-COC/NC (as per technical specification with all accessories complete as required.)	Rmt	47	800	37600.00
12	Supplying and fitting unbreakable concealed type modular switch box with Single & Double mounting IO Face plate for 1 module duly erected flush to wall with required chiselling and finishing with cement mortar / POP as per required to match the background in an approved manner. (for LAN- 350) (as per technical specification with all accessories complete as required.)	Each	202	100	20200.00
13	Supplying and fixing 3-meter length, UTP Patch cord of Cat 6 type in position as	Each	339	25	8475.00

	per specification No. WG-COC/PC (UTP CAT6 Patch Cord 7Fit. -350)				
14	Supplying and fixing 1 meter length, UTP Patch cord of Cat 6 type in position as per specification No. WG-COC/PC (UTP CAT6 Patch Cord 3Fit. -100) (as per technical specification with all accessories complete as required.)	Each	279	75	20925.00
15	Testing and commissioning of all Networking system (Tagging, Dressing, Testing Point to Point and Reporting DATA Sheet)	Job	30000	1	30000.00
16	Supplying and erecting FR grade, PVC armoured multimode armoured multimode Optical Fibre Cable with 6 fibres, with core dia. 50/125 µm (OM3) suitable for 1 Gbps Ethernet distance at 850 nm of wavelength, on wall/ceiling or laid in provided pipe/trench as per specification No. WG-COC/OFC LSZH	Rmt	247	200	49400.00
17	Supply and laying of HDPE pipe, ISI branded with required bends and couplers	Rmt	68	300	20400.00
18	(Digging and laying of HDPE pipe shall be done at a depth of 4 Ft. in a horizontal directional digging mode), Hard/soft Soil digging and properly refilling of the same Road cutting and digging trench and resurfacing with cement concrete / similar materials (on as it is basis)	Rmt	75	100	7500.00
19	SC type Multimode Fibre Splicing & Termination Point to Point Testing	Each	400	100	40000.00
20	Supply, erection, installation of 16U Wall Mount Rack required minimum one no. of Cable Manager and 2 Self 1 pkt. Of Mount Vented Rear Door Glass Front Door, Basic Frame + Front Perforated Door + Rear Split Perforated Door + Side Panels + Castors & Feet + M6 screw pack + PDU) 2 Site Full perforated cable tray and Cable Brush entry in Rack Bottom including all labours and materials as required. (as per Specification ISI / ISO approved)	Each	12500	1	12500.00



21	Supply, installing, testing & commissioning of Communication Server with minimum 4 PRI, 6 CO, 24 Digital Extensions & 128 Analog Extensions expendable up to 300 ports and system also have a Boss-Secretary features. Minimum warranty of EPABX system is 1 year.	Each	319125	1	319125.00
22	Supply, laying, termination and testing of telephone cable 2 pair with 0.5 mm dia. FRLS PVC insulated provided in PVC casing / conduit as per specification No. WG-TW and including all labours and materials as required.	Rmt	20	800	16000.00
23	(A)- Supply, installation of Junction box suitable for 100 pairs with one anti rust coat of primer and two finished coats of epoxy paint, made out 2.03 mm (14 gauge) sheet steel with hinged and lockable door, detachable gland plate at the bottom/top connection of incoming/outgoing hole for 2P cables, 50P cable with gland, including all labours and materials as per specification No. WG-TW	Each	2936	1	2936.00
24	(B)- Supply, installation, termination & punching, commissioning Krone module of 10 pairs including all labours and materials as required as per specification No. WG-TW (ISI/ISO approved)	Each	270	10	2700.00
25	(A)- Supply, installation of MDF suitable for 200 pair with one anti rust coat of primer and two finished coats of epoxy paint, made out 2.03mm (14 gauge) sheet steel with hinged and lockable door, detachable gland plate at the bottom/top connection of incoming/outgoing 2P cables, 1 no. 50P cable with gland, including all labours and material as required as per specification.	Each	9638	1	9638.00
26	Providing and fixing modular type telephone socket one gang with safety shutter ISI mark approved make duly erected on provided plate and box with wiring connections, supplying, installation, termination and	Each	82	36	2952.00

	testing including all labours and materials as required.				
27	Providing and fixing unbreakable concealed type modular switch box with double mounting plate for 1 module duly erected flush to wall with required chiselling and finishing with cement mortar / POP as per required to match the background in an approved manner including all labour and materials as required. (for Tele. socket).	Each	202	36	7272.00
28	Supply, installing, testing & commissioning of Panasonic Server Reception Phone with Keypad	Each	24800	1	24800.00
29	Testing and commissioning of EPABX system with associated accessories including numbering/tagging/ferruling and dressing of cables.	Job	23000	1	23000.00
30	Supply, laying, testing of Jelly filled armoured telephone cable 50 pair with 0.5 mm coper dia. Including termination at both end of MDF and all labours and materials as required and provided trench.	Rmt	347	100	34700.00
31	Interfacing of proposed EPABX system with existing Panasonic TDA 100D (EPABX) installed in building, MMRCL through PRI on optical fibre cable in vendor's scope including all labours and materials as required (Optical Fibre cable media will be provided by MMRC)	Job	15000	1	15000.00
					1100498.00

## **APPENDICES**

All relevant appendices published by CPWD General Conditions of Contract shall be applicable.

FORM 'A'

FINANCIAL INFORMATION

1. Financial Analysis – Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Years

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- b. Gross Annual turnover on construction works.
- c. Profit/Loss.
2. Financial arrangements for carrying out the proposed work.
3. Solvency Certificate from Bankers of the bidder in the prescribed Form "B".

Signature of Chartered Accountant with Seal

Signature of Bidder(s).

FORM 'B'

FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s./ Sh..... having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement upto a limit of Rs..... (Rupees.....)

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)  
For the Bank

NOTE:

1. Bankers certificates should be on letter head of the Bank, sealed in cover addressed to tendering authority.
2. In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

**FORM 'C'**

**DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST FIVE YEARS ENDING LAST DAY OF THE MONTH .....**

S. No.	Name of work/project and location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation/ Arbitration cases pending/in progress with details*	Name and address / telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10

\* Indicate gross amount claimed and amount awarded by the Arbitrator.

Signature of Bidder(s)

**FORM 'D'**

**PROJECTS UNDER EXECUTION OR AWARDED**

S. No.	Name of work/project and location	Owner or sponsoring organization	Cost of work (in crores of rupees)	Date of commencement as per contract	Stipulated date of completion	Upto date percent age progress of work	Slow progress if any and reasons thereof	Name and address / telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10

Certified that the above list of works is complete and no work has been left out and that the information given is correct to my knowledge and belief.

Signature of Bidder(s)

FORM 'E'

PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "B" & "C"

1. Name of work/project & location
2. Agreement no.
3. Estimated cost
4. Tendered cost
5. Date of start
6. Date of completion
  - a. Stipulated date of completion
  - b. Actual date of completion
7. Amount of compensation levied for delayed completion, if any
8. Amount of reduced rate items, if any
9. Performance Report
  - a. Quality of work Very Good/Good/Fair/Poor
  - b. Financial soundness Very Good/Good/Fair/Poor
  - c. Technical Proficiency Very Good/Good/Fair/Poor
  - d. Resourcefulness Very Good/Good/Fair/Poor
  - e. General Behaviour Very Good/Good/Fair/Poor

Dated:

Executive Engineer or Equivalent

FORM 'F'

STRUCTURE & ORGANISATION

1. Name & address of the bidder
2. Telephone no./Telex no./Fax no.
3. Legal status of the bidder (attach copies of original document defining the legal status)
  1. An Individual
  2. A proprietary firm
  3. A firm in partnership
  4. A limited company or Corporation

4. Particulars of registration with various Government Bodies (attach attested photocopy)

**Organisation/Place of registration**

**Registration No.**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

5. Names and titles of Directors & Officers with designation to be concerned with this work.
6. Designation of individuals authorized to act for the organization
7. Was the bidder ever required to suspend construction for a period of more than six months continuously after he commenced the construction? If so, give the name of the project and reasons of suspension of work.
8. Has the bidder, or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion? If so, give name of the project and reasons for abandonment.
9. Has the bidder, or any constituent partner in case of partnership firm, ever been debarred/black listed for tendering in any organization at any time? If so, give details
10. Has the bidder, or any constituent partner in case of partnership firm, ever been convicted by the court of law? If so, give details.
11. In which field of Civil Engineering construction, the bidder has specialization and interest?
12. Any other information considered necessary but not included above.

Signature of Bidder(s)

FORM 'G'

DETAILS OF TECHNICAL & ADMINISTRATIVE PERSONNEL TO BE EMPLOYED FOR THE WORK

S. No	Designation	Total Number	Number available for this work	Name	Qualifications	Professional experience and details of work carried	How these would be involved in this work	Remarks
1	2	3	4	5	6	7	8	9

Signature of Bidder(s)

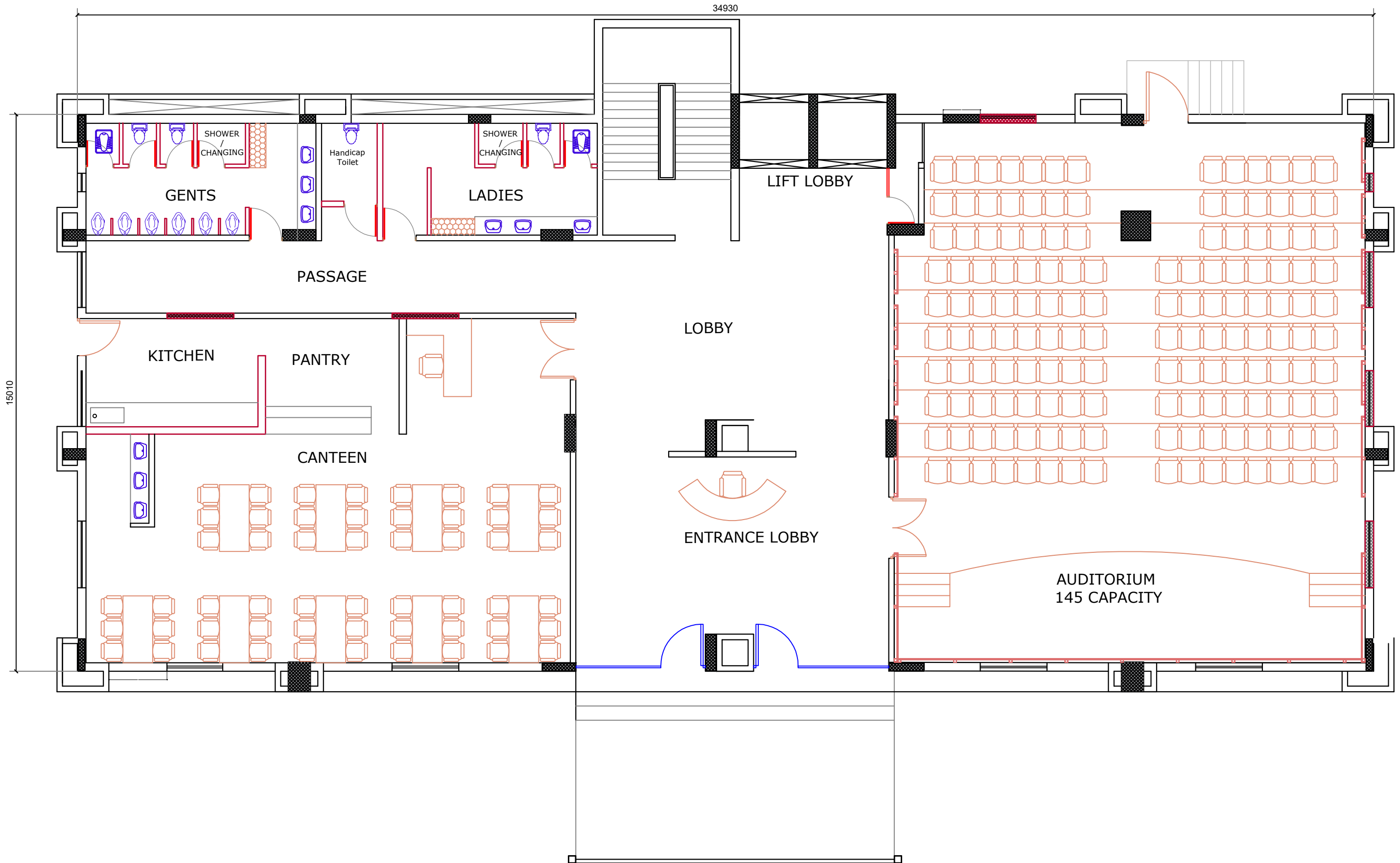
FORM 'H'

DETAILS OF CONSTRUCTION PLANT AND EQUIPMENT LIKELY TO BE USED IN CARRYING OUT THE WORK

S. No.	Name of equipment	Nos.	Capacity or type	Age	Condition	Ownership status			Current location	Remarks
						Presently owned	Leased	To be purchased		
1	2	3	4	5	6	7	8	9	10	11



# **TENDER DRAWINGS**



**GENERAL CONSULTANCY SERVICES**  
**FOR MUMBAI METRO RAIL PROJECT, LINE No. 3**  
**COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY SP	
DESIGN BY DG	
CHECKED BY KT	
APPROVED BY AK	

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-AR-001

FACILITY	OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE	ARCHITECTURAL LAYOUT: GROUND FLOOR
DATE	12-04-2018
SCALE	1:100 (A3)

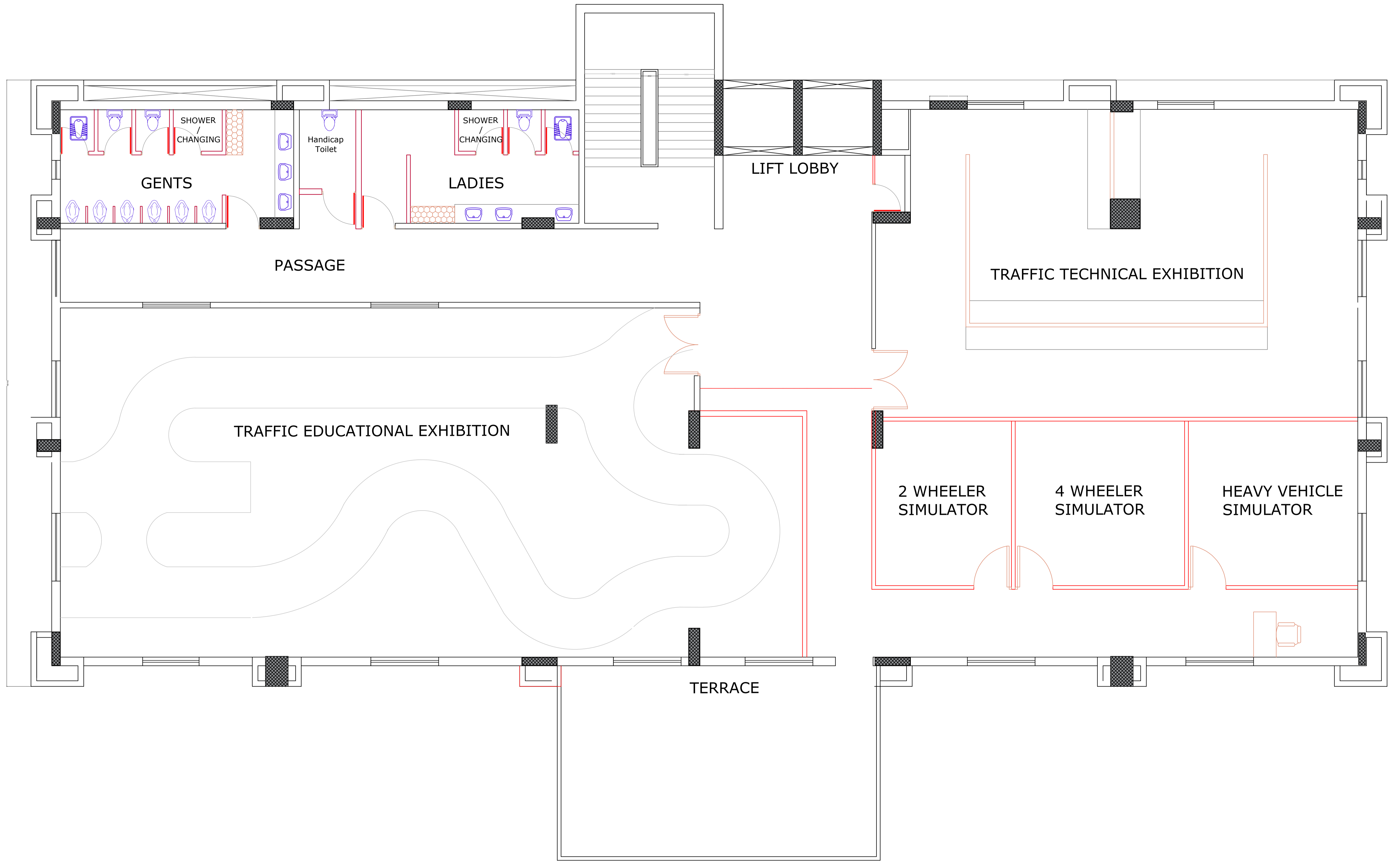
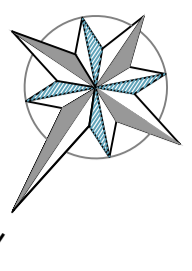


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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION	NAME	SIGN
					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	KT
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA	
DRAWING NO	MML3-GC-TR-AR-002		

FACILITY		OTHER PROJECTS / OFFICE INTERIORS	
DATE		12-04-2018	
DRAWING TITLE		ARCHITECTURAL LAYOUT: FIRST FLOOR	
SCALE		1:100 (A3)	

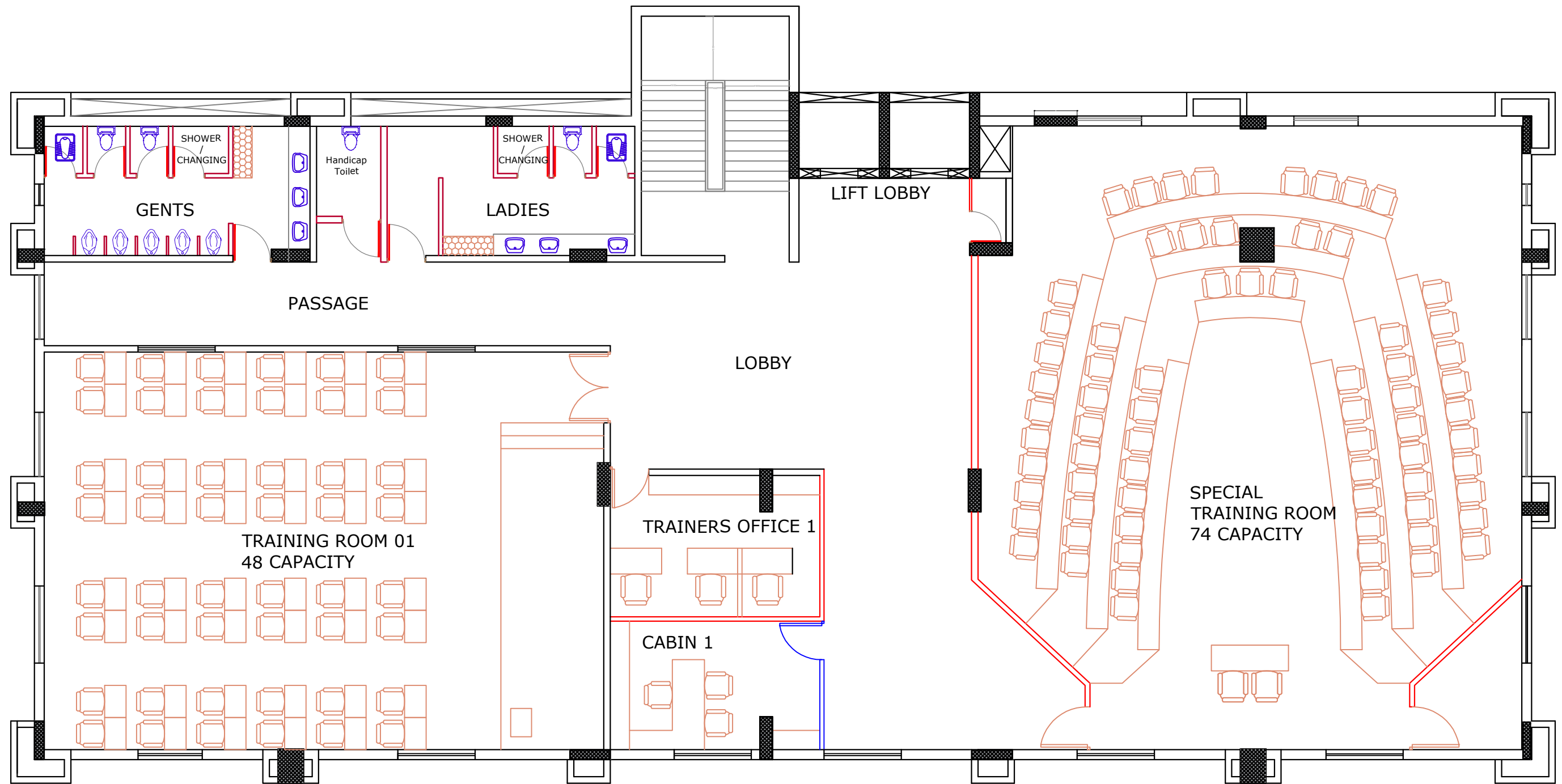


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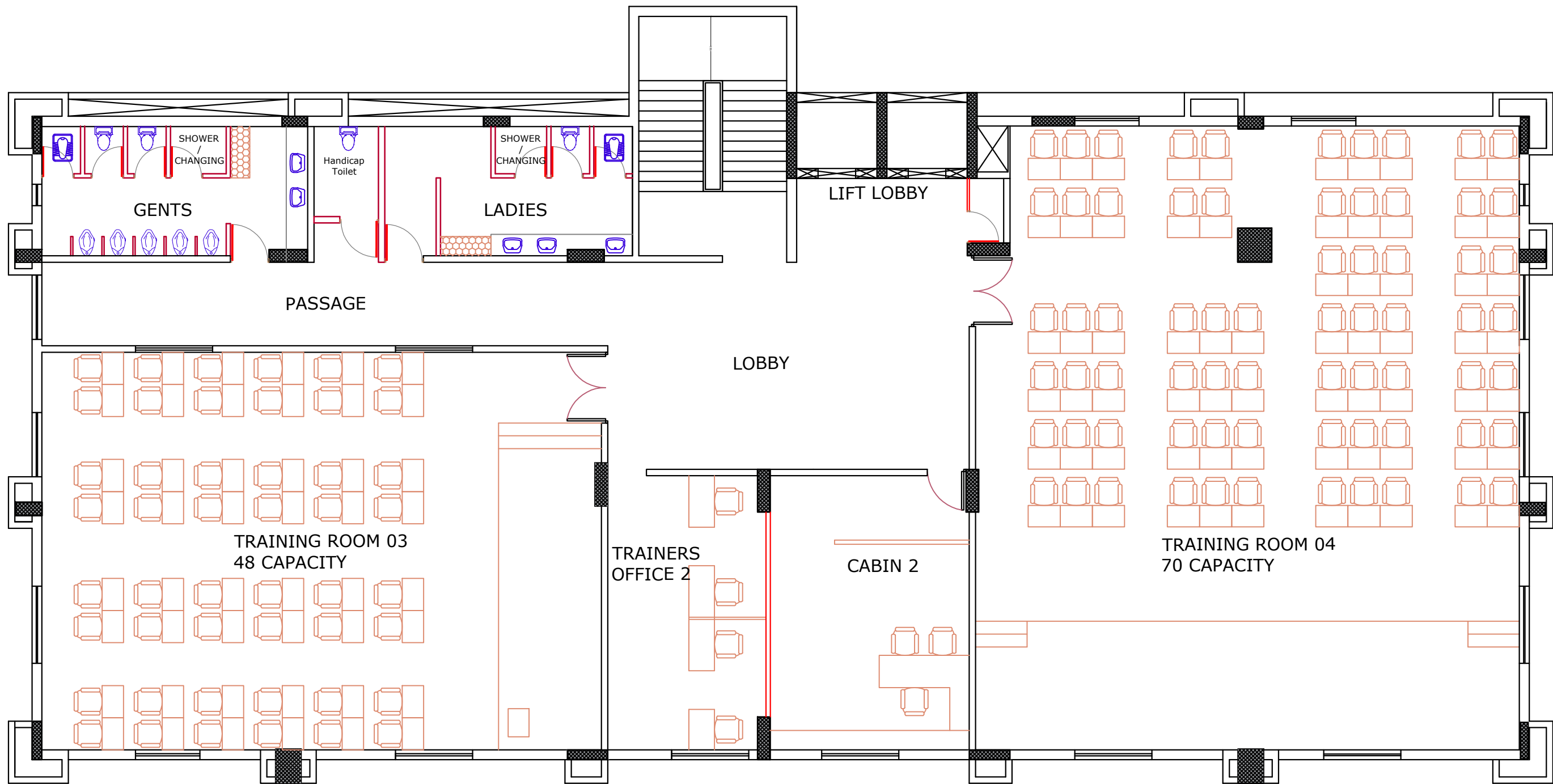



REV.	DATE	PREP.	APPROVED	DESCRIPTION

	NAME	SIGN
DRAWN BY	SP	
DESIGN BY	DG	
CHECKED BY	KT	
APPROVED BY	AK	

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-AR-003

FACILITY	OTHER PROJECTS / OFFICE INTERIORS	DATE	12-04-2018
DRAWING TITLE	ARCHITECTURAL LAYOUT: SECOND FLOOR	SCALE	1:100 (A3)




**GENERAL CONSULTANCY SERVICES**  
 FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
 COLABA- BANDRA-SEEPZ

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY SP	
DESIGN BY DG	
CHECKED BY KT	
APPROVED BY AK	

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-AR-004

FACILITY	OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE	ARCHITECTURAL LAYOUT: THIRD FLOOR
DATE	12-04-2018
SCALE	1:100 (A3)

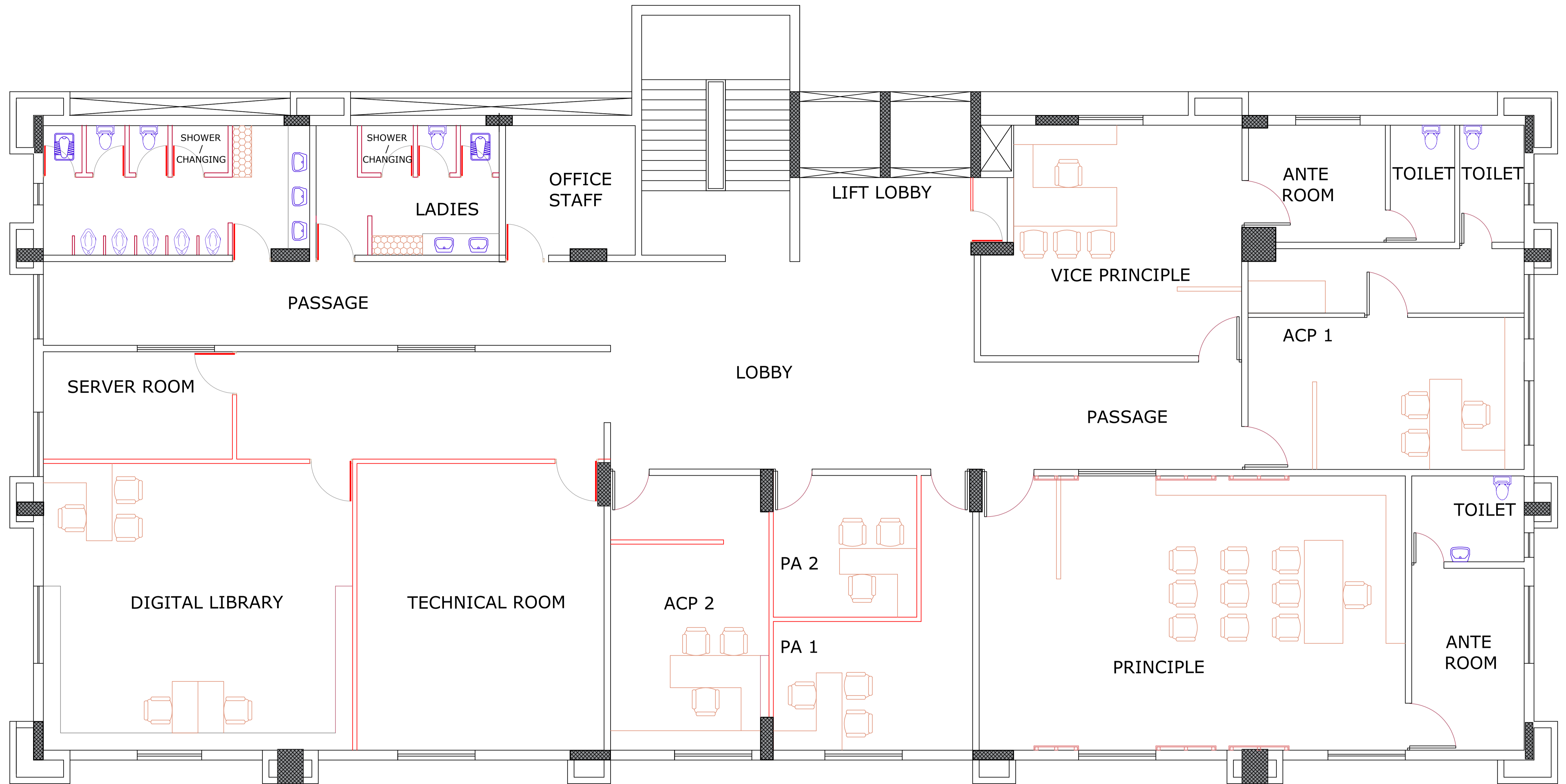
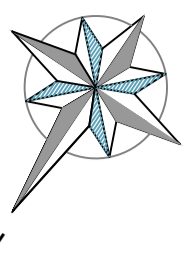

**maple**  
 MUMBAI METRO LINE-3  
 GENERAL CONSULTANT

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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION	NAME	SIGN
					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	KT
					APPROVED BY	AK

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-AR-005

FACILITY	OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE	ARCHITECTURAL LAYOUT: FOURTH FLOOR
DATE	12-04-2018
SCALE	1:100 (A3)

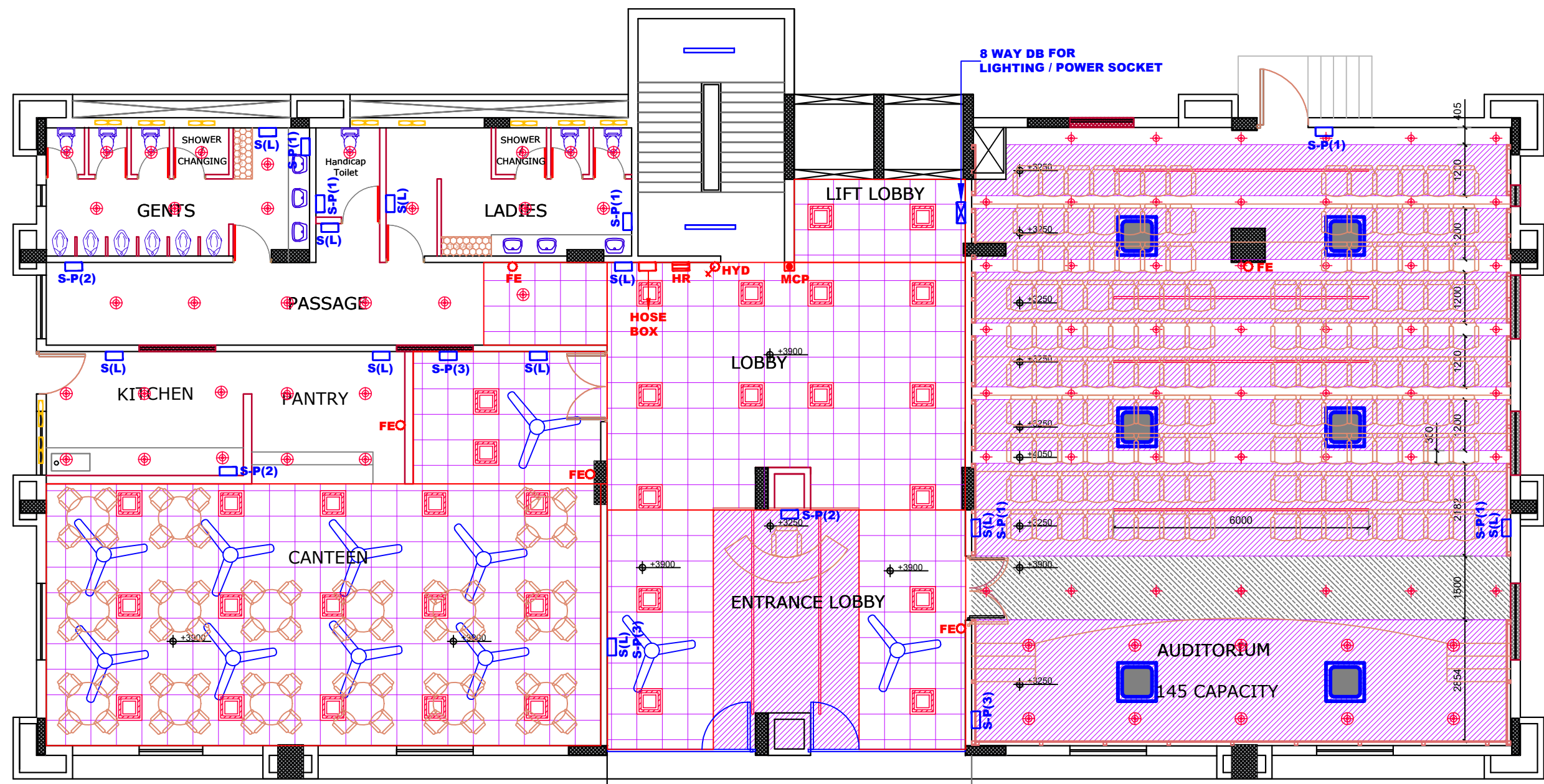


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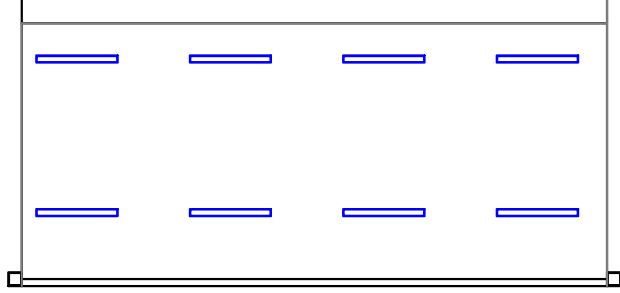
C

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SYMBOL	TYPE	QTY.
	600 X 600 LED PANEL (36 W LED)	33 Nos.
	2250 LED PANEL (18 W LED)	40 Nos.
	COB LIGHTS (15 W LED)	48 Nos.
	LED SLIM PANEL LIGHT (32 W LED)	28 Nos.
	LED TUBE LIGHTS (21.5 W LED)	10 Nos.
	HYDRANT	1 Nos.
	HOSE REEL	1 Nos.
	HOSE BOX	1 Nos.
	FIRE EXTINGUISHER	5 Nos.
	MCP MANUAL CALL POINT WITH HOOTER	1 Nos.
	SWITCH FOR LIGHTING / CEILING FAN	10 Nos.
	6 PIN 6/16A POWER SWITCH	5 Nos.
	6 PIN 6/16A POWER SWITCH	4 Nos.
	6 PIN 6/16A POWER SWITCH	3 Nos.



	CASSETTE INDOOR
	SPLIT INDOOR
	FAN
	600 X 600 GRID CEILING
	CALCIUM SILICATE
	CALCIUM SILICATE

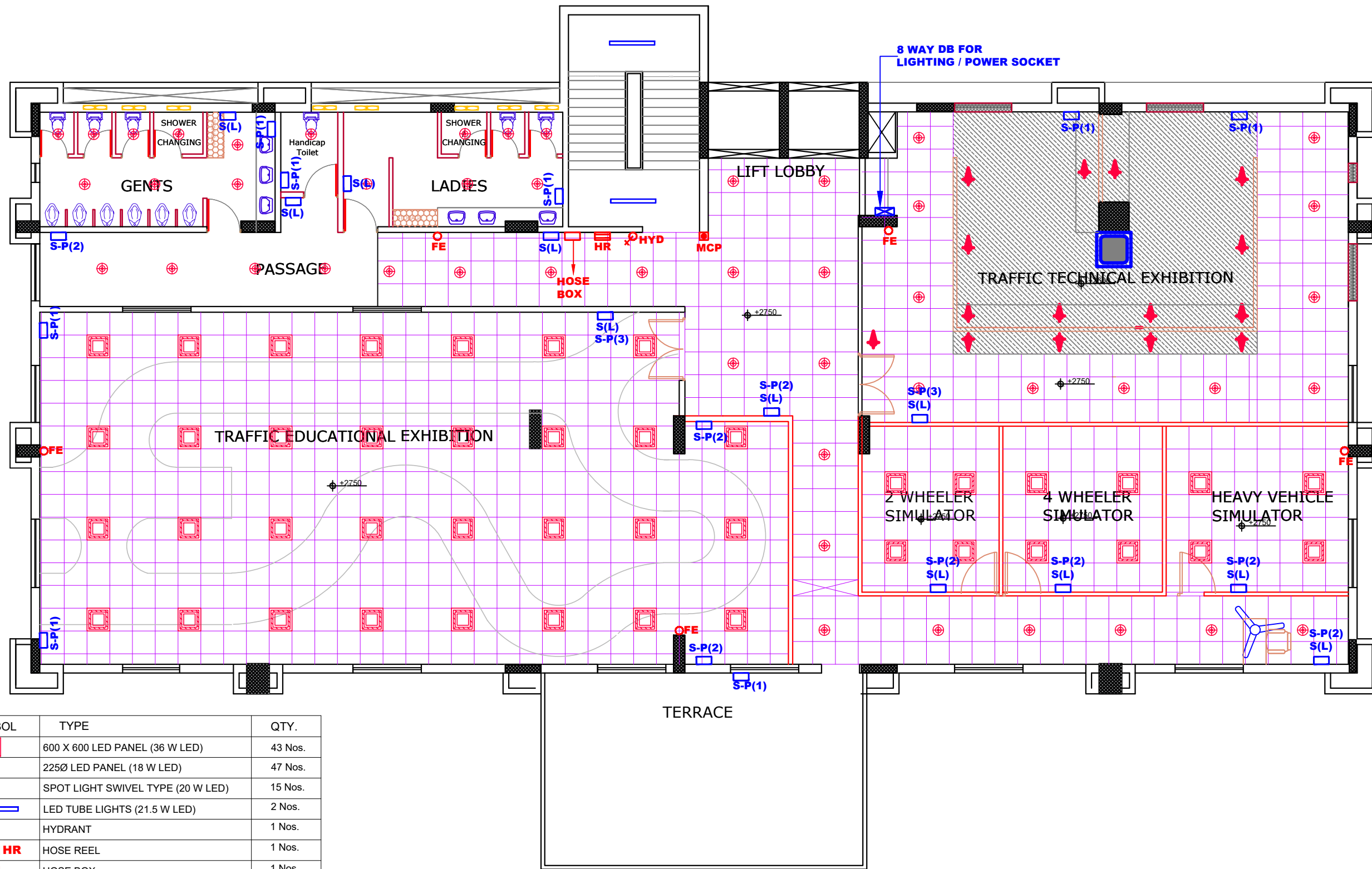
- S(L) = SWITCH FOR LIGHTING / CEILING FAN - 10 Nos. - BOX (t1)
- S-P(1) = 6 PIN 6/16A POWER SWITCH 5 PIN - BOX (6.4)
- S-P(2) = 6 PIN 6/16A POWER SWITCH - 3Nos. - BOX (6.5)
- S-P(3) = 6PIN 6/16A POWER SWITCH - 3Nos. - BOX (6.6)

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY	SP
DESIGN BY	DG
CHECKED BY	RK
APPROVED BY	AK

PROJECT	FACILITY	DATE
MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	OTHER PROJECTS / OFFICE INTERIORS	12-04-2018
TITLE	DRAWING TITLE	SCALE
MUMBAI POLICE HR CENTER AT BYCULLA	ELECTRICAL LAYOUT: GROUND FLOOR	NTS
DRAWING NO	MML3-GC-TR-EL-001	



SYMBOL	TYPE	QTY.
	600 X 600 LED PANEL (36 W LED)	43 Nos.
	2250 LED PANEL (18 W LED)	47 Nos.
	SPOT LIGHT SWIVEL TYPE (20 W LED)	15 Nos.
	LED TUBE LIGHTS (21.5 W LED)	2 Nos.
	HYDRANT	1 Nos.
	HOSE REEL	1 Nos.
	HOSE BOX	1 Nos.
	FIRE EXTINGUISHER	5 Nos.
	MCP MANUAL CALL POINT WITH HOOTER	1 Nos.
	SWITCH FOR LIGHTING / CEILING FAN	11 Nos.
	6 PIN 6/16A POWER SWITCH	08 Nos.
	6 PIN 6/16A POWER SWITCH	08 Nos.
	6 PIN 6/16A POWER SWITCH	02 Nos.

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY	SP
DESIGN BY	DG
CHECKED BY	RK
APPROVED BY	AK

PROJECT	FACILITY	DATE
MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	OTHER PROJECTS / OFFICE INTERIORS	12-04-2018
TITLE	DRAWING TITLE	SCALE
MUMBAI POLICE HR CENTER AT BYCULLA	ELECTRICAL LAYOUT: FIRST FLOOR	NTS
DRAWING NO	MML3-GC-TR-EL-002	

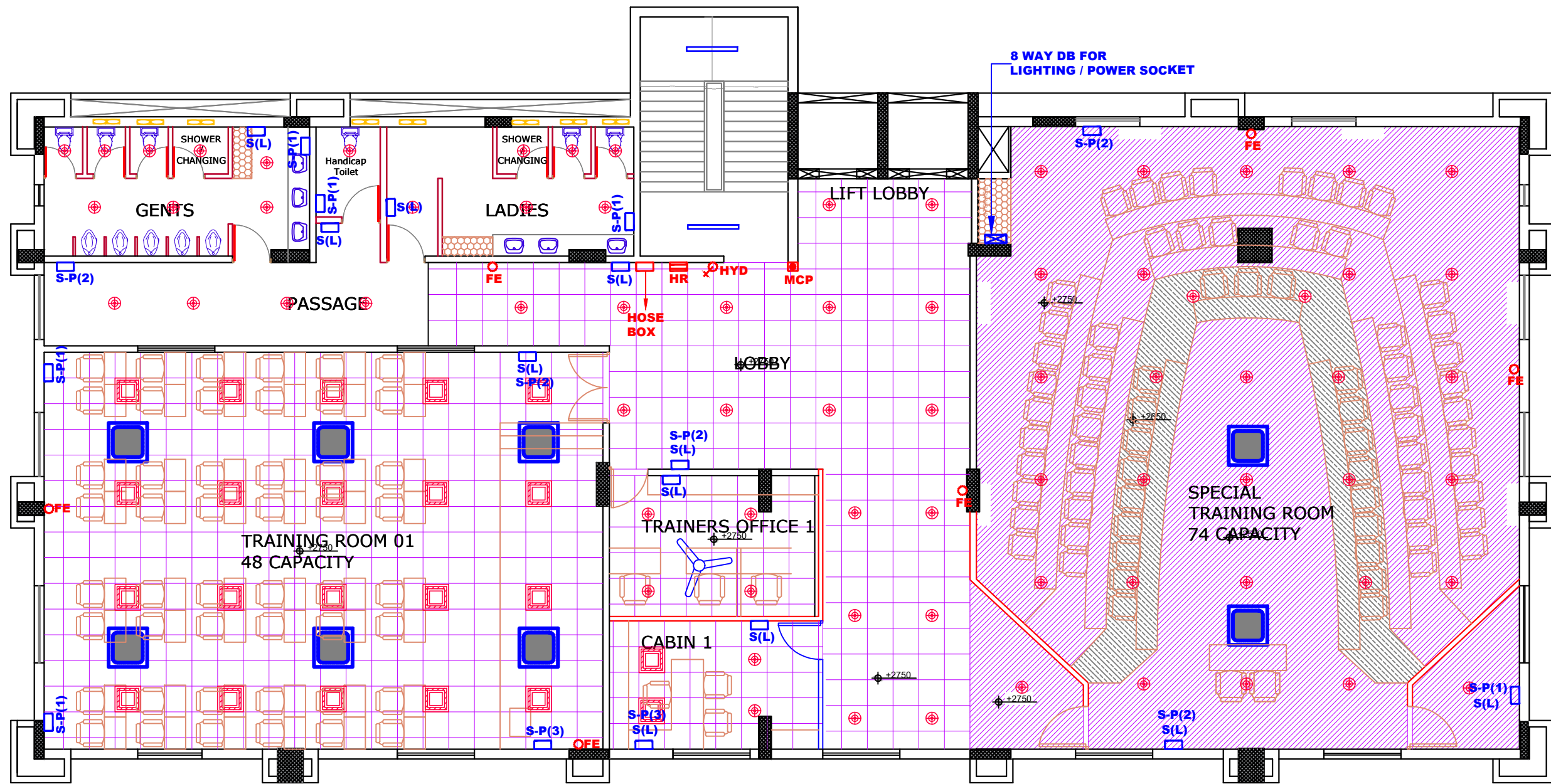
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SYMBOL	TYPE	QTY.
	600 X 600 LED PANEL (36 W LED)	22 Nos.
	225Ø LED PANEL (18 W LED)	73 Nos.
	LED TUBE LIGHTS (21.5 W LED)	02 Nos.
	HYDRANT	1 Nos.
	HOSE REEL	1 Nos.
	HOSE BOX	1 Nos.
	FIRE EXTINGUISHER	5 Nos.
	MCP MANUAL CALL POINT WITH HOOTER	1 Nos.
	SWITCH FOR LIGHTING / CELING FAN	10 Nos.
	6 PIN 6/16A POWER SWITCH	30 Nos.
	6 PIN 6/16A POWER SWITCH	05 Nos.
	6 PIN 6/16A POWER SWITCH	02 Nos.

**GENERAL CONSULTANCY SERVICES**  
 FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
 COLABA- BANDRA-SEEPZ

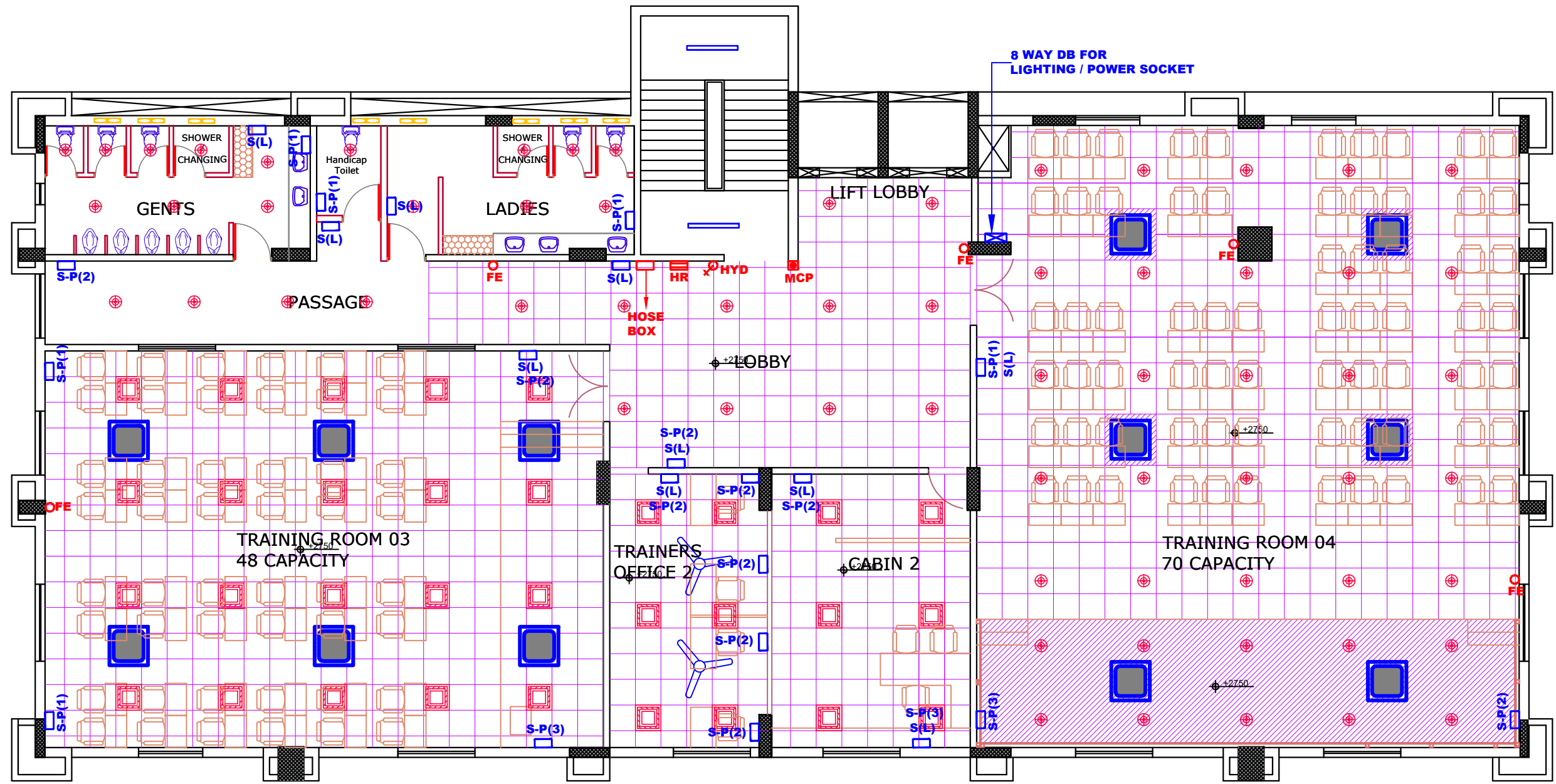
REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY	SP
DESIGN BY	DG
CHECKED BY	RK
APPROVED BY	AK

PROJECT	FACILITY	DATE
MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	OTHER PROJECTS / OFFICE INTERIORS	12-04-2018
TITLE	DRAWING TITLE	SCALE
MUMBAI POLICE HR CENTER AT BYCULLA	ELECTRICAL LAYOUT: SECOND FLOOR	NTS
DRAWING NO	MML3-GC-TR-EL-003	





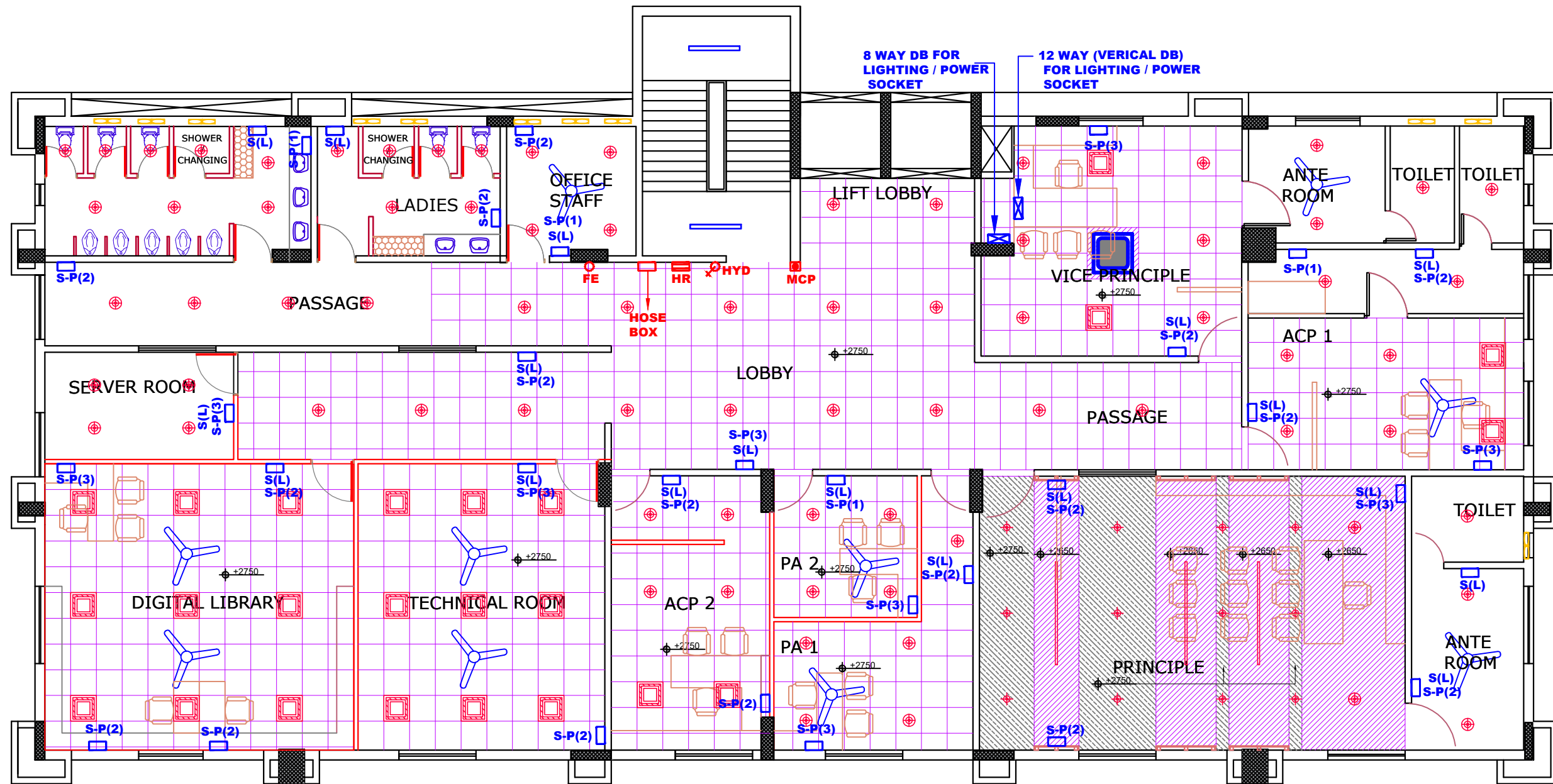
SYMBOL	TYPE	QTY.
	600 X 600 LED PANEL (36 W LED)	32 Nos.
	225Ø LED PANEL (18 W LED)	64 Nos.
	LED TUBE LIGHTS (21.5 W LED)	02 Nos.
	HYDRANT	1 Nos.
	HOSE REEL	1 Nos.
	HOSE BOX	1 Nos.
	FIRE EXTINGUISHER	5 Nos.
	MCP MANUAL CALL POINT WITH HOOTER	1 Nos.
	SWITCH FOR LIGHTING / CELING FAN	10 Nos.
	6 PIN 6/16A POWER SWITCH	04 Nos.
	6 PIN 6/16A POWER SWITCH	12 Nos.
	6 PIN 6/16A POWER SWITCH	03 Nos.

**GENERAL CONSULTANCY SERVICES**  
**FOR MUMBAI METRO RAIL PROJECT, LINE No. 3**  
**COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN	PROJECT	FACILITY	DATE
DRAWN BY	SP	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	OTHER PROJECTS / OFFICE INTERIORS	12-04-2018
DESIGN BY	DG	TITLE	DRAWING TITLE	SCALE
CHECKED BY	RK	MUMBAI POLICE HR CENTER AT BYCULLA	ELECTRICAL LAYOUT: THIRD FLOOR	NTS
APPROVED BY	AK	DRAWING NO	MML3-GC-TR-EL-004	





SYMBOL	TYPE	QTY.
	600 X 600 LED PANEL (36 W LED)	24 Nos.
	225Ø LED PANEL (18 W LED)	72 Nos.
	COB LIGHTS (15 W LED)	12 Nos.
	LED SLIM PANEL LIGHT (32 W LED)	06 Nos.
	LED TUBE LIGHTS (21.5 W LED)	02 Nos.
	HYDRANT	1 Nos.
	HOSE REEL	1 Nos.
	HOSE BOX	1 Nos.
	FIRE EXTINGUISHER	5 Nos.
	MCP MANUAL CALL POINT WITH HOOTER	1 Nos.
	SWITCH FOR LIGHTING / CEILING FAN	22 Nos.
	6 PIN 6/16A POWER SWITCH	05 Nos.
	6 PIN 6/16A POWER SWITCH	16 Nos.
	6 PIN 6/16A POWER SWITCH	09 Nos.

**GENERAL CONSULTANCY SERVICES**  
 FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
 COLABA- BANDRA-SEEPZ

REV.	DATE	PREP.	APPROVED	DESCRIPTION

NAME	SIGN
DRAWN BY	SP
DESIGN BY	DG
CHECKED BY	RK
APPROVED BY	AK

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-EL-005

FACILITY	OTHER PROJECTS / OFFICE INTERIORS	DATE	12-04-2018
DRAWING TITLE	ELECTRICAL LAYOUT: FOURTH FLOOR	SCALE	NTS

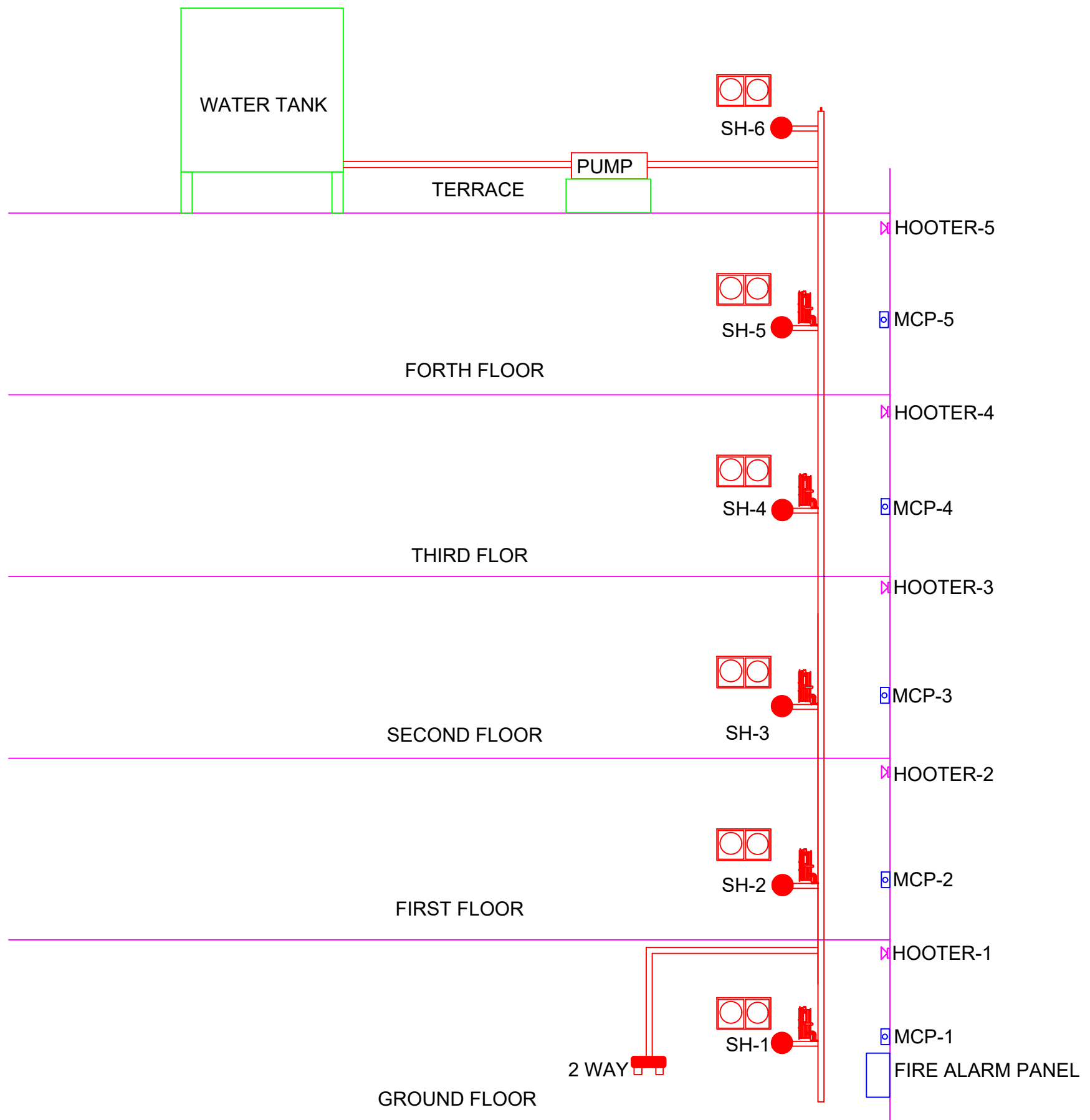
**maple**  
 MUMBAI METRO LINE-3  
 GENERAL CONSULTANT

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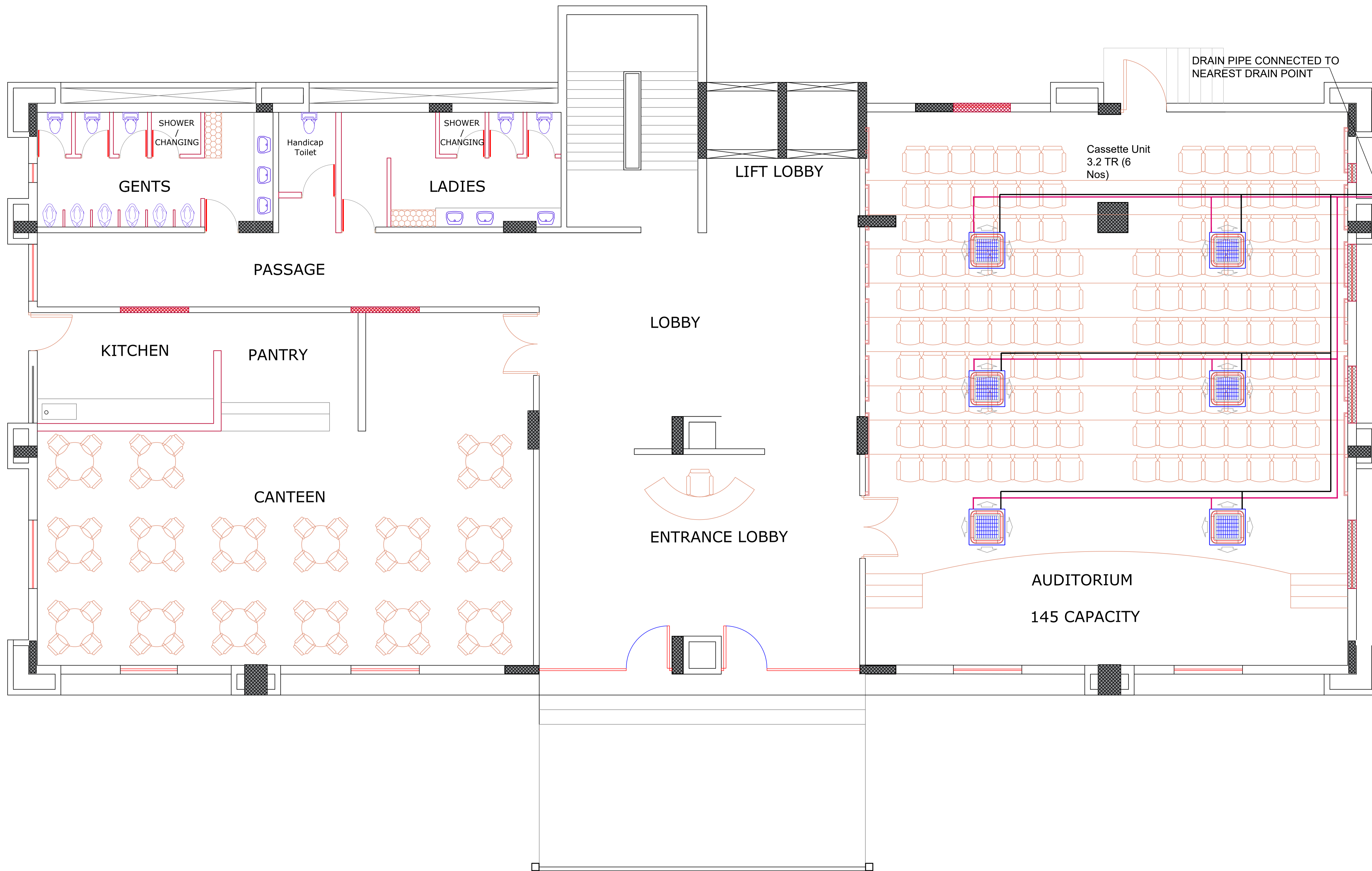
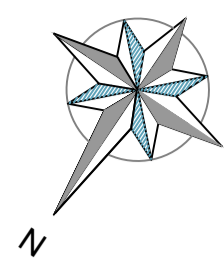
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REV.	DATE	PREP.	APPROVED	DESCRIPTION

DRAWN BY: SP DESIGN BY: DG CHECKED BY: RK APPROVED BY: AK	NAME: SP SIGN: DG RK AK	PROJECT: MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ TITLE: MUMBAI POLICE HR CENTER AT BYCULLA DRAWING NO: MML3-GC-TR-FF-001	FACILITY: OTHER PROJECTS / OFFICE INTERIORS DRAWING TITLE: CONCEPTUAL FIRE FIGHTING SYSTEM SECTION	DATE: 12-04-2018 SCALE: NTS
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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION	NAME	SIGN
					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-HV-001	

FACILITY		OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE		CONCEPTUAL HVAC LAYOUT - GROUND FLOOR
DATE	12-04-2018	
SCALE	NTS	

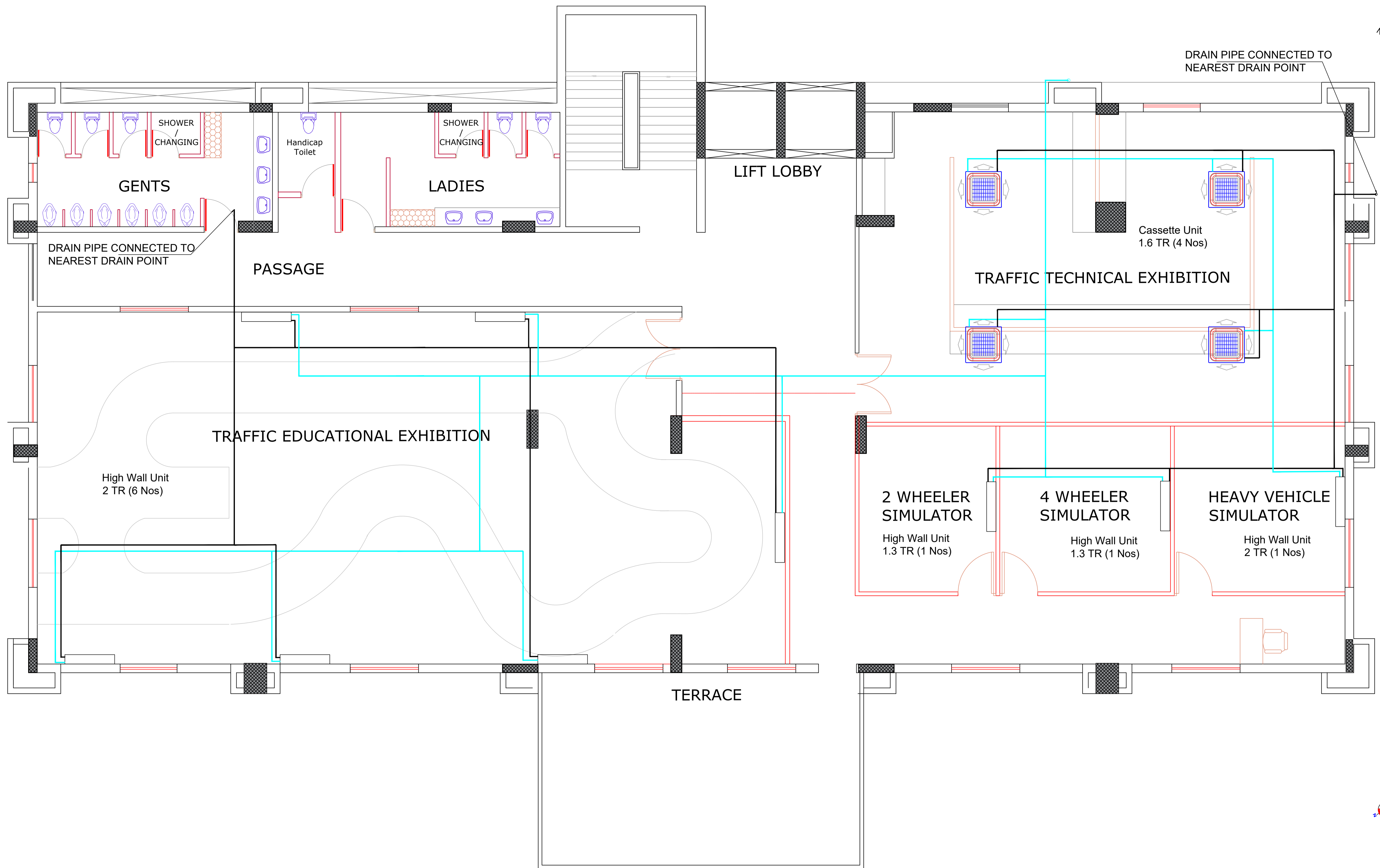
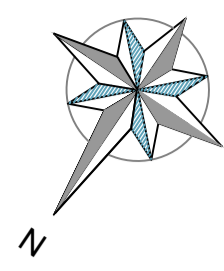


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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION	NAME	SIGN
					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-HV-002	

FACILITY		OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE		CONCEPTUAL HVAC LAYOUT - FIRST FLOOR
DATE	12-04-2018	
SCALE	NTS	

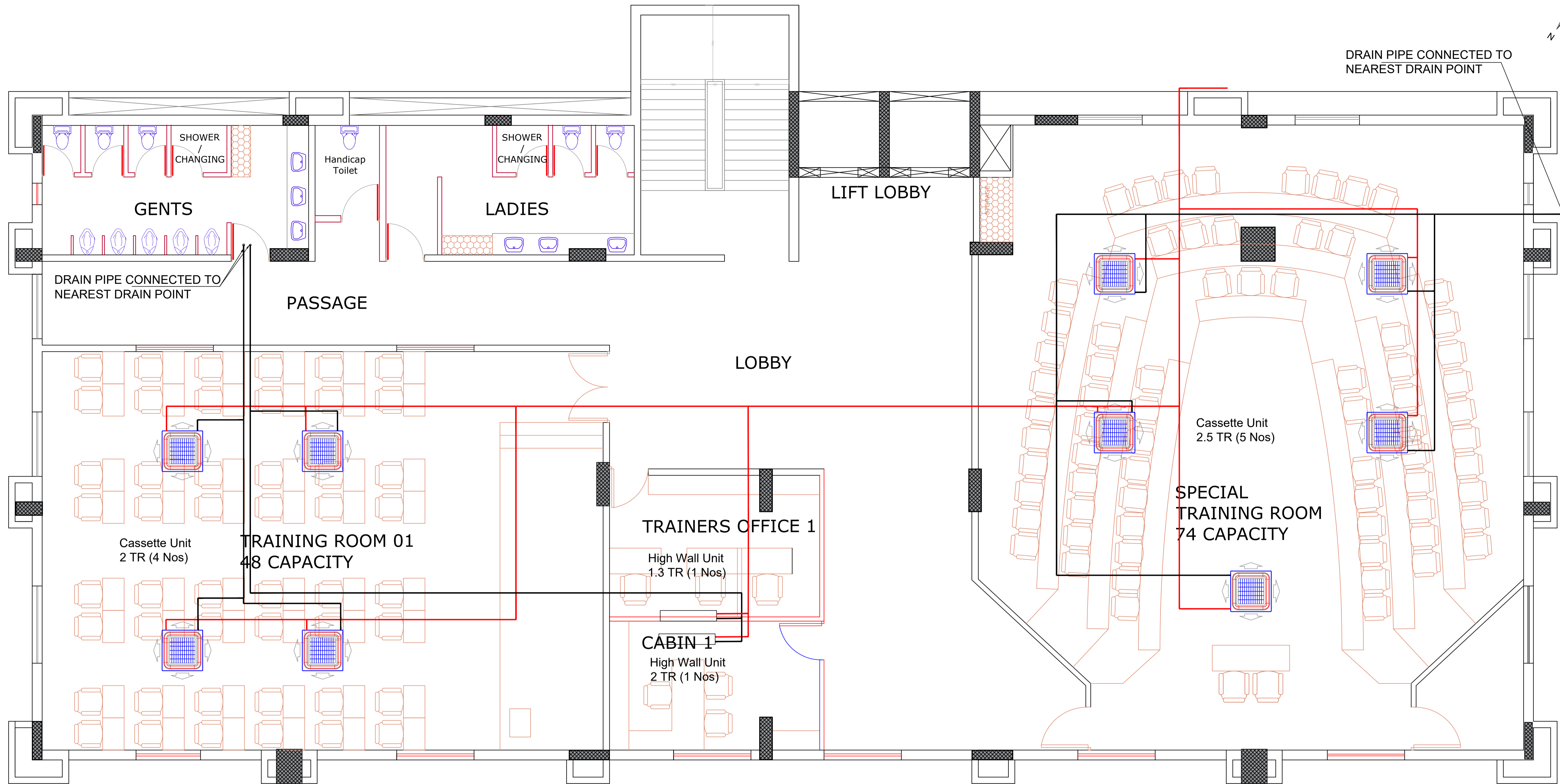
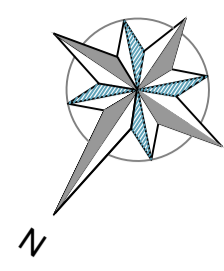


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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

REV.	DATE	PREP.	APPROVED	DESCRIPTION	NAME	SIGN
					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA	
DRAWING NO	MML3-GC-TR-HV-003		

FACILITY		OTHER PROJECTS / OFFICE INTERIORS	
DRAWING TITLE		CONCEPTUAL HVAC LAYOUT - SECOND FLOOR	
DATE	12-04-2018	SCALE	NTS

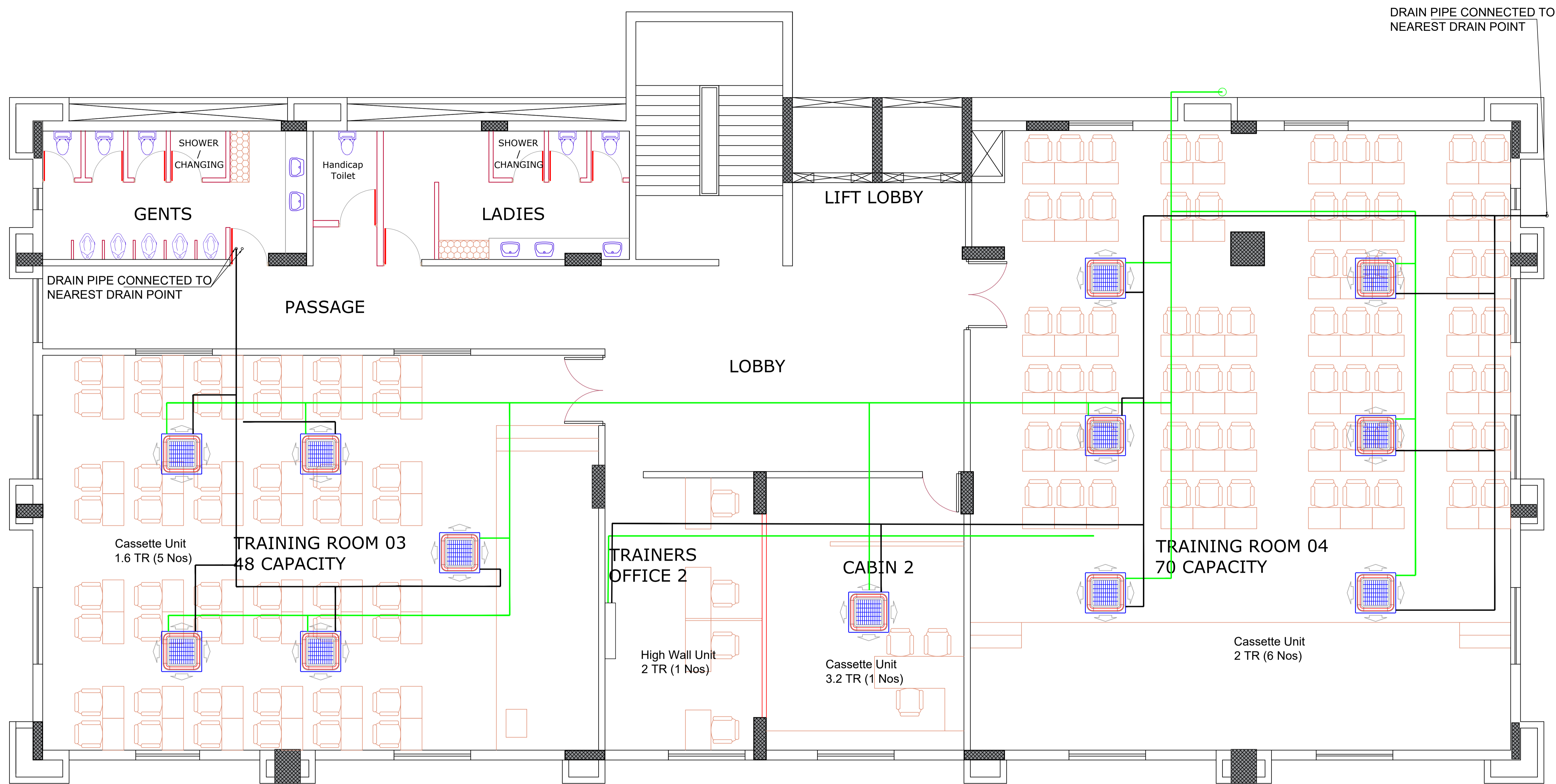
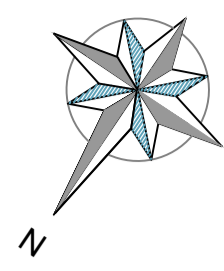


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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

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					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-HV-004	

FACILITY	OTHER PROJECTS / OFFICE INTERIORS	DATE	12-04-2018
DRAWING TITLE	CONCEPTUAL HVAC LAYOUT - THIRD FLOOR	SCALE	NTS



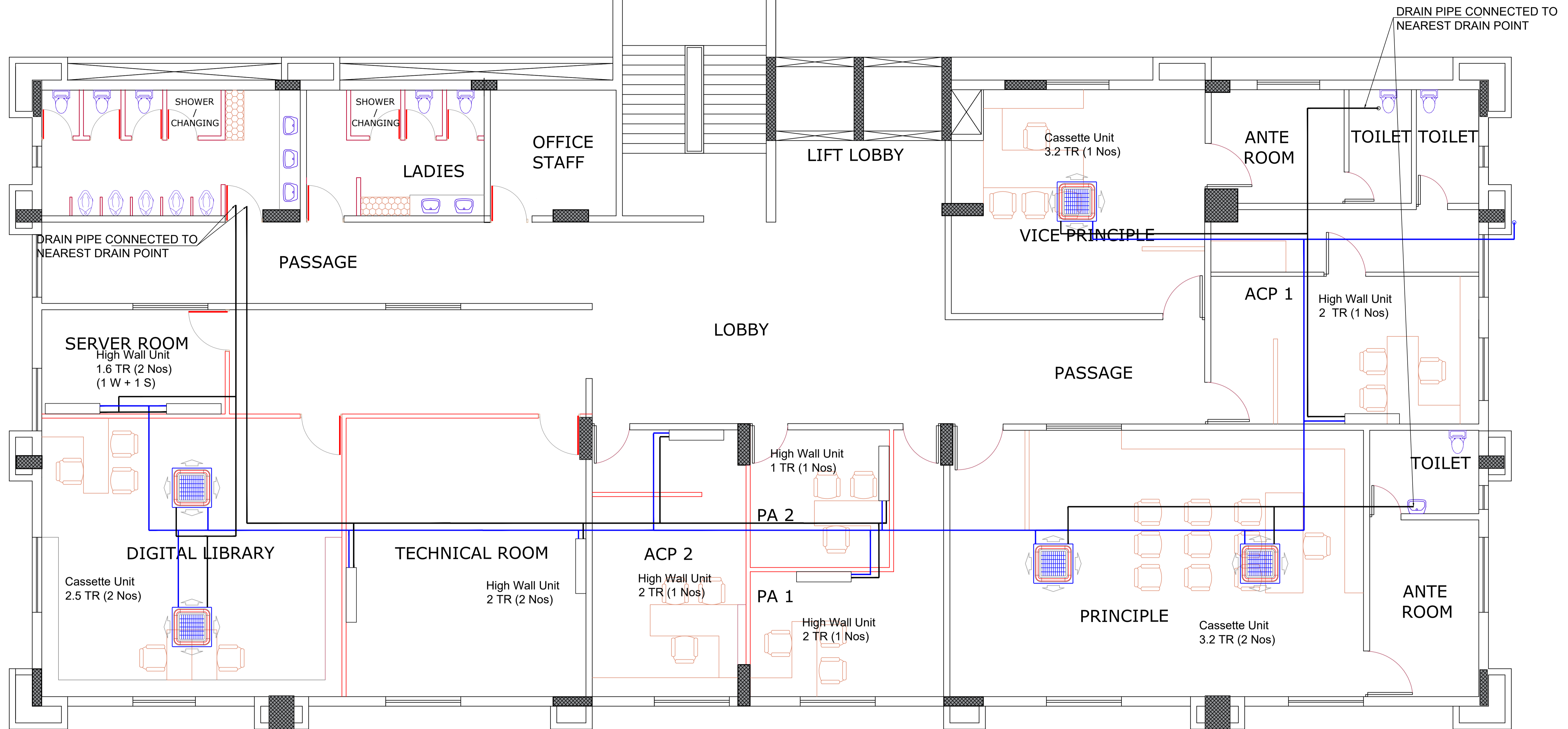
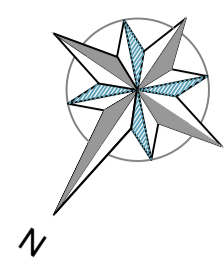
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**GENERAL CONSULTANCY SERVICES  
FOR MUMBAI METRO RAIL PROJECT, LINE No. 3  
COLABA- BANDRA-SEEPZ**

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					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
TITLE	MUMBAI POLICE HR CENTER AT BYCULLA
DRAWING NO	MML3-GC-TR-HV-005

FACILITY	OTHER PROJECTS / OFFICE INTERIORS
DRAWING TITLE	CONCEPTUAL HVAC LAYOUT - FOURTH FLOOR

DATE	12-04-2018
SCALE	NTS

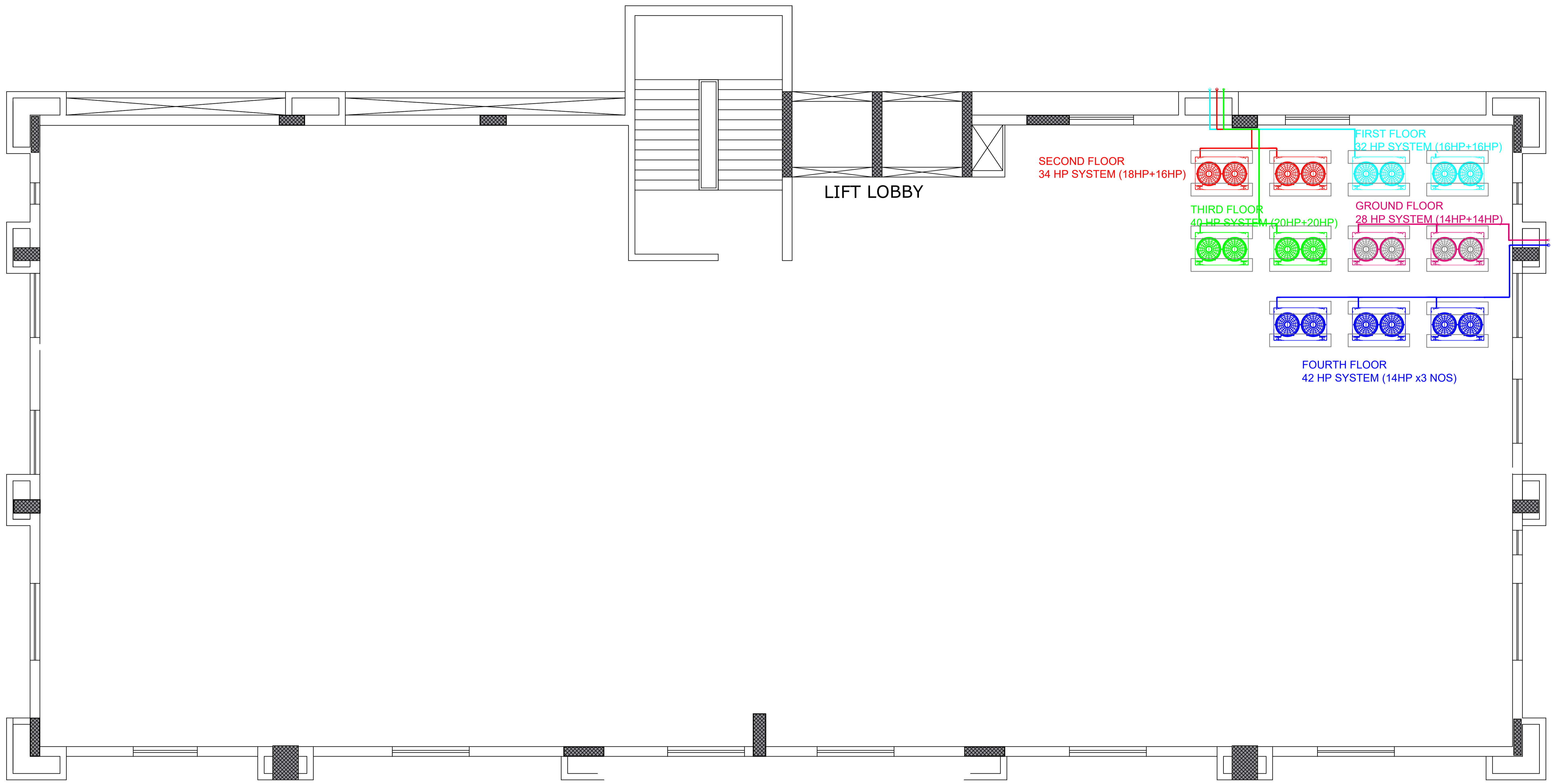
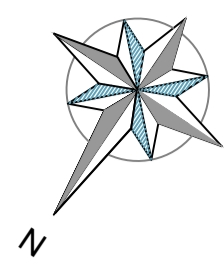


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**GENERAL CONSULTANCY SERVICES  
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COLABA- BANDRA-SEEPZ**

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					DRAWN BY	SP
					DESIGN BY	DG
					CHECKED BY	RK
					APPROVED BY	AK

PROJECT		MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ	
TITLE		MUMBAI POLICE HR CENTER AT BYCULLA	
DRAWING NO	MML3-GC-TR-HV-006		

FACILITY		OTHER PROJECTS / OFFICE INTERIORS	
DATE		12-04-2018	
DRAWING TITLE		CONCEPTUAL HVAC LAYOUT - TERRACE FLOOR	
SCALE		NTS	



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