MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

1. A tender is invited for the work as mentioned in Appendix 'A' to this **NOTICE INVITING TENDER (NIT).**

2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate, however, is not a guarantee and is merely given as a rough guide and if the work cost more or less, a tenderer / bidder will have no claim on that account. The tender shall be based on as mentioned in aforesaid Appendix 'A'.

3. The work is to be completed within the period as indicated in aforesaid Appendix 'A' in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be on or about two weeks after the date of Acceptance of tender.

4. Normally contractors whose names are on the MES approved list for the area in which the lies, and within whose financial category the estimated amount would fall, may tender / bid but in case of term contracts, contractors of class SS to E may tender / bid. In case, where the tender amount is in excess of the financial limit of the contractor and the Accepting Officer decides to accept the tender / bid, in which event the tenderer / bidder would be required to lodge additional security deposit as notified by the Accepting Officer in term of conditions of contract. Contactors whose names are on the MES approved list of any MES Formation and who have deposited standing security and have executed standing security bond may also tender / bid without depositing Earnest Money along with the tender / bid and if the tender / bide submitted by such a tenderer / bidder is accepted, the contractor will be required to lodge with the Controller of Defence Accounts concerned the amount of ' Individual security deposit' within thirty days of the receipt by him of notification of acceptance of his tender / bid, failing which this sum will be recovered from 1st RAR payment or from the first final bill. In the case of term / running contracts, remaining sum shall be submitted / uploaded by one contractor or one firm of contractors. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender / bid for the same contract as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejections.

5. The **CWE(AF) Agra** will be the Accepting Officer herein after referred to as such for purpose of the contract.

6. The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the tenderer/bidder on or before the date and time mentioned in NIT. A scanned copy of DD with enlistment details / documents shall be uploaded as packet 1 / cover-1 ('T' bid) of the tender / bid on e-tendering portal. DD is refundable in case T bid is not accepted resulting in non-opening of 'Q' bid'. The applicant contractor shall bear the cost of bank charges for procuring and en-cashing the DD and shall not have any claim from Government whatsoever on this account.

7. Tender form and conditions of contract and other necessary documents shall be available on https://www.defproc.gov.in site for download and shall form part of contract agreement in case the tender / bid is accepted.

8. **PERFORMANCE SECURITY**:

(a) The tenderers shall note that the successful bidder shall lodge performance security of an amount equivalent to 5% of contract sum within 28 days from the date of receipt of letter of Acceptance (AOC) in the form of FDR or he may choose to submit BGB or Govt. securities. However the tenderer will be allowed to avail provision of reduced Performance Security of an amount equal to 3% of contract amount by submitting a certificate as below.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

(a) I/We declare that there are no outstanding recoveries against my / our firm.

(b) I/We confirm that I/ We do not intend to abandon the subject work after availing the relief of reduction of performance security from 5% to 3% of the value of contract.

Date : Signature of Contractor
Place :

(b) If the performance security is provided by the successful Contractor in the form of Bank Guarantee. It shall be issued by Nationalized/Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.

(c) Failure of the successful contractor to comply with the requirements of sub clause8 (a) shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

(d) All bidders shall be exempted from submission of EMD in all tenders except those who are ineligible from such exemption vide Para 8(e) below.

(e) All bidders shall be required to sign the **Bid Securing declaration** as below :-

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

I/We hereby understand and accept that if I/We withdraw or modify my/ our bids during the period of validity, or if I/We are awarded the contracts and on being called upon to submit the Performance Security / Security Deposit, fail to submit the Performance Security/ Security Deposit before the deadline defined in the request for bid documents/ Notice Inviting Tender, I/We shall be debarred from exemption of submitting Bid Security/ Earnest Money Deposit for a period of 6 (Six) months, from the date. I/We are declared disqualified from exemption from submission of Earnest Money Deposit/ Security Deposit, for all tenders issued by MES during this period.

Date : Signature of Contractor

(f) In the event of contract being **CANCELLED** under condition 52, 53 & 54 of General Conditions of Contract as per IAFW-2249 the Performance Security**@ 5%** shall be **FORFEITED** in full and shall be credited into Consolidated Fund of India.

9. A contractor who is not enlisted for the area in which the work lies but whose name is in the MES approved list of any MES formation and who has deposited standing security and executed standing security Bond may bid without depositing earnest money along with the tender, but if the Accepting Officer accepts the tender / bid, the contractor will be required to lodge with the Controller of Defence Accounts concerned the amount of 'Individual Security Deposit' within thirty days of the receipt by him of notification of acceptance of his tender / bid, failing which this sum will be recovered from 1st RAR payment or from the final bill. In case of term / running contracts, remaining sum shall be recovered from subsequent bill (s) of the contractor.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

10. A contractor who has executed standing security Bond but not corresponding to the appropriate class as mentioned above, shall lodge with the Accepting Officer, Additional Security Deposit as notified by the Accepting Officer within thirty days of the receipt of his notification of acceptance of his tender / bid, failing which this sum will be recovered from the first RAR payment or from the first final bill. In the case of term / running contracts, remaining sum shall be recovered from subsequent bill(s) of the contractor. However, in case where any payment is made to the contractor within thirty days of the receipt by him of notification of acceptance of tender /bid, the amount of additional security deposit shall be recovered from such payment.

11. The AGE will return the Earnest Money wherever applicable to all unsuccessful tenderers / bidders by endorsing an authority on the deposit-at-call receipt for its refund, on production by the tenderer , bidder a certificate of the Accepting Officer that a bonafide tender / bid was received and all documents were returned.

12. The AGE(I) will either return the Earnest Money to the successful tender / bidder by endorsing an authority on the deposit-at-call Receipt for refund on receipt of an appropriate amount of Security Deposit or will retain the same in part or full on account of security deposit if such a transition is feasible.

13. Copies of the drawings and other document pertaining to the work signed for the purpose of identification by the Accepting Officer or his accredited representatives, sample of materials and stores to be supplied by the contractor will also be available for inspection by the tenderer / bidder at the office of Accepting Officer and concerned AGE(I) Sonegaon during working hours.

14. The tenderers / bidders are advised to visit the site of work by making prior appointment with AGE(I) Sonegaon who is also the Executing Agency of the work (see Appendix ‘A’). The tenderers / bidders are deemed to have full knowledge of all relevant documents, samples, site etc., whether they have inspected them or not.

15. Any tender / bid which proposes any alteration to any of the conditions laid down or which proposes any other condition or prescription whatsoever, is liable to be rejected.

16. The uploading of bid implies that bidder has read this notice and the Conditions of Contract and has made himself aware of the scope and specification of work to be done and of the conditions and rates at which stores, tools and plants etc. will be issued to him and local conditions and other factors having bearing on the execution of the work.

17. Tenderers / bidders must be in possession of a copy of the MES Standard Schedule of Rates (See Appendix ‘A’) including amendments and errata thereto.

18. Invitation for e-tender does not constitute any guarantee for validation of ‘T’ bid and subsequent opening of finance bid of any applicant / bidder, even of enlisted contractors of appropriate class, merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the ‘T’ bid and no open the finance bid of any applicant / bidder. ‘T’ bid validation shall be decided by the Accepting Office based on, inter alia, capability of the firm as per criteria given in Appendix ‘A’ to this NIT. The applicant contractor / bidder will be informed regarding non-validation of his ‘T’ bid assigning reasons thereof through the https://www.defproc.gov.in website. The applicant contractor / bidder if he so desires may appeal to the next higher Engineer authority viz Chief Engineer (AF) Allahabad Zone Allahabad on email id cezafa2-mes@nic.inwith a copy to the Accepting Officer on email before the scheduled date of opening of Financial Bid. The decision of the Next Higher Engineer Authority (NHEA) shall be final and binding. The contractor / bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

19. The Accepting Officer reserves the right to accept a tender submitted by a Public Under taking, giving a price preference over other Tender(s) / bids which may be lower, as are admissible under the Government Policy. No Claim for any compensation or otherwise shall be admissible from such tenderer / bidder whose tender / bid is rejected.

20. Accepting Officer does not bind himself to accept the lowest or any tender / bid or to give any reason for not doing so.

21. This **Notice Inviting Tender (NIT)** including Appendix 'A' shall form part of the contract.

Signature of Contractor **For Accepting Officer**
Dated…….

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)
(For works costing less than Rs 50 crores)

1.	Job No & Name of Work	**44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON**
2.	Estimated cost	**Rs 142.29 Lakh** (At Par Market)
3.	Period of completion	270 (Two Hundred Seventy days)
4.	Cost of tender documents	**Rs 1000/- (One Thousand Only)** in the form of DD/Bank cheque from any Schedule/Nationalized bank in favour of **AGE(I) Sonegaon**, payable at **Nagpur** (copy shall be uploaded online and original to be submitted offline before due date of opening of cover No 1)
5.	Website/portal address	https://www.defproc.gov.in & https://www.mes.gov.in
6.	Type of contract	The tender shall be based on IAFW-1779-A (Revised 1955) and GCC (IAFW-2249). Item rate with Schedule 'A' (list of items of work) to be priced by tenderer.
7.	Timeline details:	
	(a) Bid Submission Start Date	Ref Critical Dates published on https://www.defproc.gov.in
	(b) Bid Submission End Date	
	(c) Date of Bid Opening	
8.	Eligibility Criteria	
	(a) For MES enlisted contractors	Contractors shall be enlisted with MES in **Class 'B'** and above and category **a(iii)** or **a(v)** subject to satisfactory remarks w.r.t. performance in respect of works in hand as reflected in Work Load Return (WLR) or any other report circulated by competent engineer authority.
	(b) For contractors not enlisted with MES	(i) Contractors not enlisted with MES should meet the enlistment criteria of **'B' Class & a(iii)** or **a(v)** category contractor with regard to satisfactorily completion of requisite value of works with Central/State Government/ Central/ state PSUs/ AWHO/ AFNHB/ CGEWHO/ DGMAP, Annual turnover, Bank Solvency, working capital and other requirements given in Para 1.4 & 1.5 of section 1 of MES Manual of Contracts 2020. (ii) Not carrying adverse remarks in Work Load Return(WLR) or any other similar report circulated by competent authority, if already working in MES. (iii) Not suspended/debarred/blacklisted (either permanently or temporarily) from participating in any bid or for business dealings by any Central/State Government Department or any Central/ State PSU or any Autonomous Body under Central/ State Government or any Local Body as on the bid submission end date.
9.	Tender issuing and Accepting Officer	SHRI SHYAM NARAIN SHUKLA, IDSE SE, CWE (AF) Agra Phone No. 0562-2971807 Email ID : **dcweafkhej3-mes@gov.in**
10.	Executing agency	AGE(I) Sonegaon
11.	Earnest Money	**Rs 2,17,290.00** in favour of AGE(I) Sonegaon payable at Nagpur in the form of Deposit at call receipt from any Scheduled / Nationalized Bank , **FDR NOT ACCEPTABLE**.
12.	Performance security and Defect Liability period	Within **28 days** of receipt of the letter of Acceptance, the successful contractor shall deliver to the Accepting Officer a **Performance Security** for an amount equivalent to **3%** of contract sum in the form of Bank Guarantee in prescribed form /Government Securities /FDR or any other Government Instrument's as per condition 19 of IAFW-2249. **Defect liability Period** of the work is **Three Years (03 Years)** from the actual date of completion of work in terms of condition 46(b) of IAFW-2249.

NOTICE INVITING TENDER (NIT)
APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)
(For works costing less than Rs 50 crores)

NOTES:

1. After opening of Cover 1, if the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT are less than 7 (Seven). Applications in respect of contractors one class or two classes (in case of remote and difficult areas to be decided as per list circulated by CE command/ADG) below the eligible class shall also be considered subject to fulfilment of other eligibility criteria given in the NIT. Therefore MES contractor's one class below (two classes below in case of remote and difficult areas) may also bid for this tender. However contractors of one/two classes below the eligible class shall not be considered in case their present residual work in hand is more than **FIVE TIMES** of their present tendering limit. Such bidders shall upload in their Cover-1 bid details of works in hand showing names of work, Names of Accepting Officers, Contract amounts, dates of commencement and completion (stipulated) and progress as on bid submission date. These details shall be verified by the Tender Issuing Authority from concerned formations in case bids of such contractors are considered for evaluation.

2. In case after opening of Cover-1, the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT are 7 (Seven) or more, applications of only those one class below the eligible class bidders shall be considered, who have previously completed similar works satisfactorily and are meeting the criteria of upgradation in respect of past experience of completed works (individual work experience and/or average annual turnover as applicable) and financial soundness (solvency/financial soundness and working capital) as per details given in Manual on Contracts. Therefore such contractors shall upload the requisite information / documents in the Cover-1.

3. Unenlisted contractor shall be considered provided he meets the criteria. Foreign firms shall not be eligible for this tender. However Indian Firms having foreign national / Indian nationals staying abroad / Indian national having taken foreign citizenship as director (s) shall be considered subject to security clearance from the concerned authorities.

4. Contractors enlisted with MES will upload following documents in Cover 1 for checking eligibility:-

(a) Application for tender on Firm's letterhead.
(b) Enlistment letter issued by the Registering Authority **duly renewed** for the cycle period in vogue.
(c) Scanned copy of DD/ Bankers Cheque toward cost of tender and EMD instrument in case SSD bond is not signed at the time of registration.
(d) Employees Provident Fund Code Number
(e) GST Registration No.
(f) Bid Securing declaration as mentioned in Para 8(e) of NIT
(g) Scanned copy of undertaking for No Ban or Slow progress in any Govt or other deptt
(h) Any other document required as described in this Appendix.

5. Contractors not enlisted with MES will be required to upload following documents in Cover1 along with documents as referred in Para 1.4 for of manual on contract-2020 checking eligibility.

(a) Application for tender on Firm's letterhead.
(b) Scanned copy of DD / Bankers Cheque toward cost of tender and Earnest Money Deposit (EMD) instrument.
(c) Copy of police verification report/Police Clearance Certificate/ Character Certificate from the Police Authority of the area where the registered office of the firm is located/notarized copy of valid passport of Proprietor/ each Partner/each Director.
(d) All documents required for enlistment in MES for the class mentioned in Para 8(b) of Appendix 'A' to NIT above as per Para 1.5 of Section 1 of MES Manual on Contracts 2020.
(e) Details of works being executed in MES, if any.
(f) Scanned copy of Employees Provident Fund Registration/ Code Number.
(g) Scanned copy of GST Registration.
(h) Scanned copy of undertaking for No Ban or Slow progress in any Govt or other deptt
(j) Bid Securing declaration as mentioned in Para 8(e) of NIT
(k) Any other document required as described in this Appendix.

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)

6. Tenders not accompanied by scanned copies of requisite DD / Bankers Cheque towards cost of tender and earnest money (as applicable) in Cover 1 shall not be considered for validation of 'T' bid and their Financial Bids will not be opened. In case of re-issue of tenders, no additional cost of tender documents is required from the contractor who had quoted in the previous call. Only the new applicants shall pay the cost of tender documents.

7. Contractors should ensure that their original physical DDs and Earnest Money Deposit (EMD) instruments (as applicable) reach the office of Accepting Officer within 05 days of bid submission end date failing which following action shall be taken.

(a) In case of tenders from an enlisted contractor of MES where scanned copies of requisite DD / Bankers Cheque towards cost of tender have been uploaded in cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will be opened. However, non-submission of physical copies of cost of tender shall be considered as wilful negligence of the tenderer with ulterior motives and such tenderer shall be banned from bidding for a period of six months commencing from the date of opening of Financial Bid (Cover 2).

(b) In case of tenders from unenlisted contractor, where scanned copies of requisite DD / Banker Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will not be opened. Name of such contractors along with complete address shall be circulated for not opening of their bids for a period of six months commencing from the date of opening of Financial bid (Cover 2).

(c) In case of tenders from enlisted and unenlisted contractors, where scanned copies of instruments for Earnest Money Deposit (as applicable) have been uploaded in Cover 1 ut the same are not received in physical from within stipulated period, such tenders shall not qualify for opening of financial bid (Cover 2).

8. Contractor will not be allowed to execute the work by subletting or through power of attorney to a third party / another firm on his behalf. However a contractor can execute the work through power of attorney to sons / daughters / spouse of Proprietor / Partner/Director and firm's own employees, director, project manager **provided they are not having a separate enlisted firm in MES in their name as Proprietor / Partner /Director**.

9. After opening of Cover 1 and during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderers as per NIT, a communication in the form of e-mail/SMS/Speed Post etc. shall be sent to the contractor to rectify the deficiency within a period of seven days from date of communication failing which their financial bid (Cover 2) shall not be opened and contractor shall not have any claim on the same.

10. Invitation for e-tender does not constitute any guarantee for validation of Technical bid and subsequent opening of financial bid of any applicant / bidder merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the Technical bid and not to open the financial bid of any applicant / bidder. Technical bid validation shall be decided by the Accepting Officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/ bidder will be informed regarding non–validation of his Technical bid assigning reasons therefore through tender evaluation report which shall be uploaded on the website. Such tenderer, if desire may appeal to the Next Higher Engineer Authority (NHEA) viz HQ CE (AF) Allahabad on email id cezafa2-mes@nic.in with copy to the Accepting Officer on email before the scheduled date of opening of Cover 2. NHEA shall decide the matter within a period of seven working days from the date of receipt of appeal. The decision of the NHEA shall be final and binding. The tenderer / bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

11. In case the BOQ is revised through the corrigendum and the bidder has failed to quote on revised BOQ (i.e. he has quoted on pre revised BOQ), such bid shall be treated as wilful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases the lowest tender shall be determined from amongst the valid/ bonafide bids only. Accepting Officer may decide whether to re-tender or consider the lowest bonafide tender for acceptance.

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)

12. In case an un-enlisted contractor is already executing works in MES, he shall not be considered eligible for the subject tender if the total value of such works is more than twice the tendering limit of the MES Class of contractor for which it is eligible. For this purpose, details of the works being executed by such a contractor shall be uploaded in the Cover-1 of the bid and shall be checked / verified by the Accepting Officer.

13. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after opening of Cover 2 shall be considered as a wilful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an un-enlisted tenderer, Earnest Money deposited by him shall be forfeited. In case of MES enlisted tenderer having deposited the Standing Security Bond an amount equal to the earnest money stipulated in the NIT shall be notified to the tenderer for depositing through MRO and consideration of such tenderer in tender evaluation for future works shall remain suspended till the aforementioned amount is deposited in the Government treasury. No other disciplinary / administrative action shall be taken against such tenderers. In such a situation the next lowest offer shall not be considered for acceptance. Instead retendering shall be resorted to in a transparent and fair manner and the defaulting tenderer and his related firm if any shall not be eligible for this tender in second call or subsequent calls.

14. Tender to related firms shall not be issued simultaneously. Firm shall be termed as related if Proprietor / one or more Partners / Directors are common. Decision of Accepting Officer on issue / deny the tender to any one of the related firms shall be final and binding.

15. **JURISDICTION OF COURTS:** Court of the place from where tender has been issued shall alone have jurisdiction to decide any dispute arising out of or in respect of this tender. After acceptance of tender, Condition-72 of IAFW-2249 shall be applicable for this contract.

Signature of Contractor

For Accepting Officer

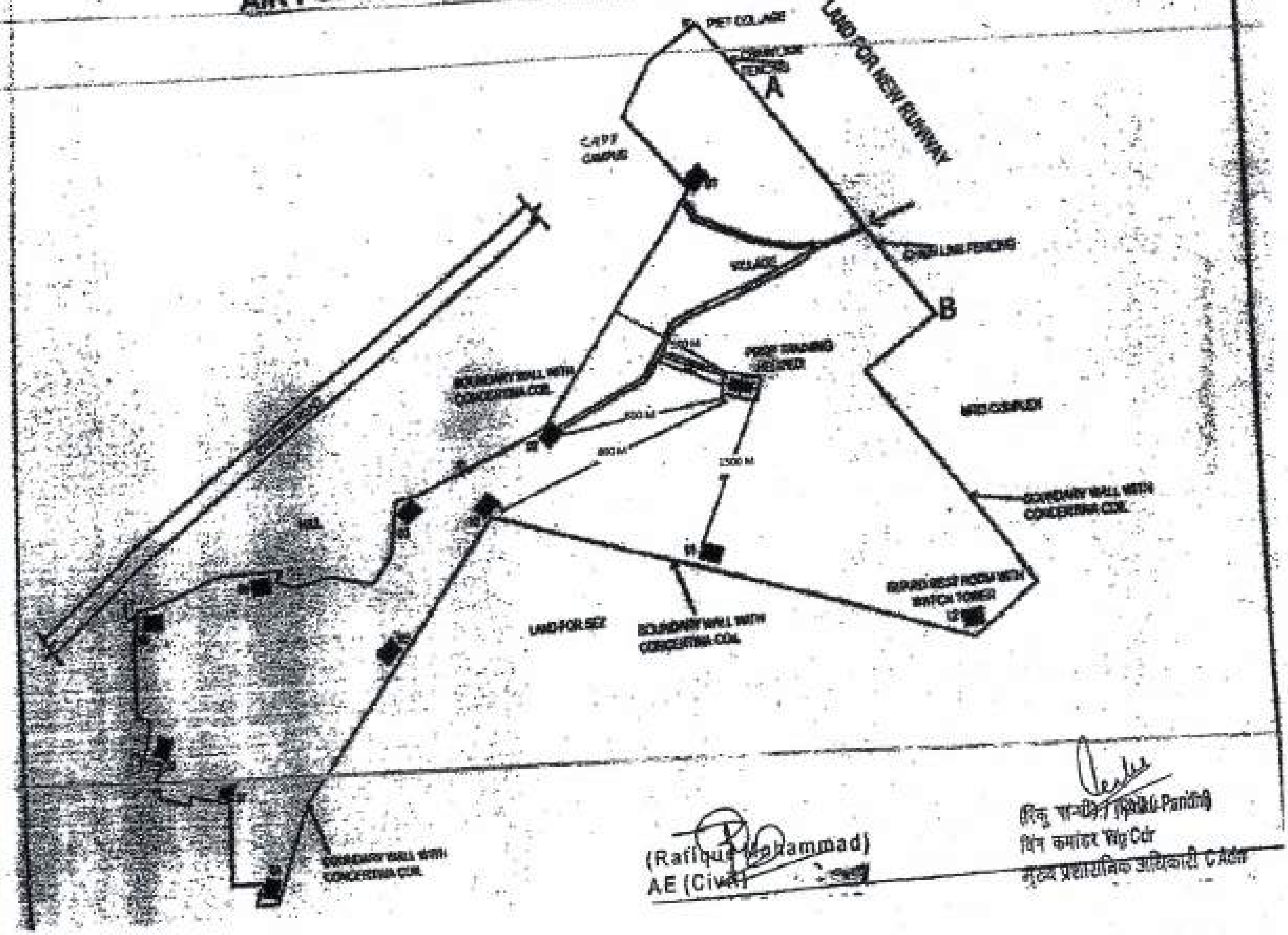
File No: 80022-05/ /E8

Dated_____

HQ Commander Works Engineer
(Air Force), Agra- 282008

Dated: Jan 2023

PROP SITE PLAN OF TRAINING HELIPAD AT AIR FORCE STN SONEGAON NAGPUR

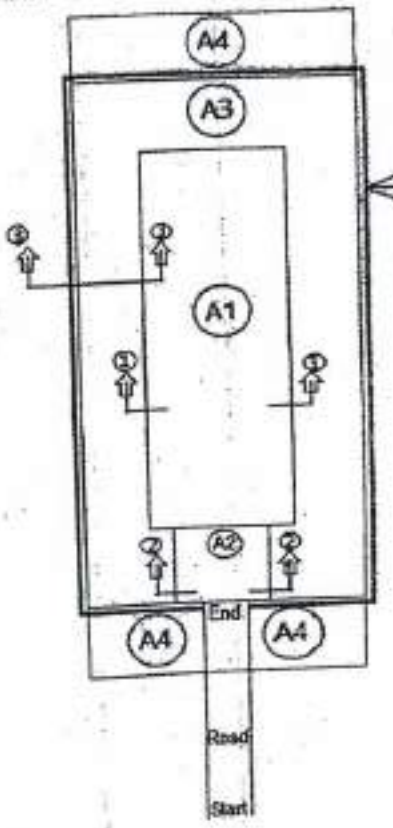


(Rafique Mohammad)
AE (Civil)

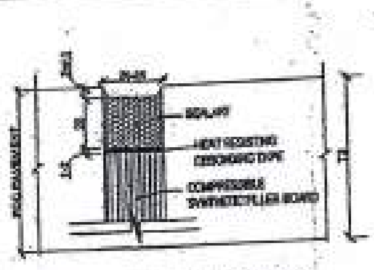
रिंकु पाण्डेय / (Rinku Pandey)
विंग कमांडर Wg Cdr
मुख्य प्रशासनिक अधिकारी CAdm

LEVEL	AREA
+0.50 m	A1 : 50m X 30m
+0.50 m	A2 : 7.5m X 15 m
+0.50 m	A3 : (65m X 35m) - (A1)- (A2)
0.00 m	A4 : (125m X 35m) - (A1) - (A2) - (A3)
Start 0.30 m End+0.50 m	Road : 115 m X 6.75 m Dimension

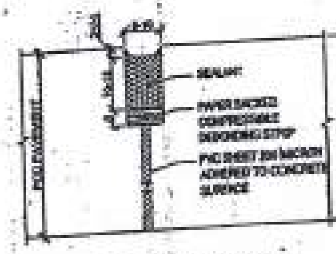
Note : Level 0.00 means GL



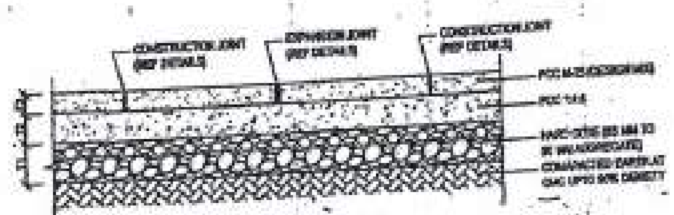
All around drainage of total length = 198.29 m centerline dimension



DETAILS OF EXPANSION JOINT

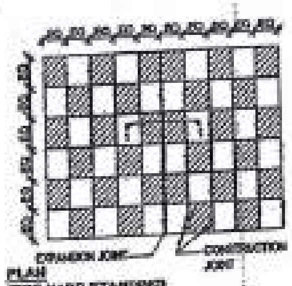


DETAILS OF CONSTRUCTION JOINT



SECTION THROUGH 1-1

VEHICLE LOAD IN TON	LAYER THICKNESS IN MM		
	T1	T2	T3
5.1T TO 15T	200	100	150
15.1T TO 20T	200	200	200
20.1T TO 30T	250	250	200
30.1T TO 40T	300	250	250



PLAN
(PCC HARD STANDING)

NOTES

1. CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS [illegible] EXECUTION OF THE WORK.
2. FIGURED DIMENSIONS SHALL BE FOLLOWED.
3. ALL DIMENSIONS ARE GIVEN IN MM UNLESS OTHERWISE SPECIFIED.
4. A MILD SLOPE SHALL BE GIVEN TO HARD STANDING FOR [illegible] DRAINAGE OF STORM WATER AS PER ENGR-IN-CHARGE INSTRUCTION.
5. [illegible]
6. [illegible]
7. [illegible]
8. [illegible]
9. [illegible]
10. [illegible]
11. [illegible]
12. [illegible]
13. THE GRADE OF CONCRETE SHALL BE M-25 [illegible]
14. THE EXPANSION JOINTS SHALL BE PROVIDED [illegible] DIRECTED BY ENGR-IN-CHARGE.

SNO	DATE	DESCRIPTION	INITIAL
REVISION			

PCC HARD STANDING/APRON FOR GARR (FOR HEAVY VEHICLES)

PLAN, SECTION & DETAILS

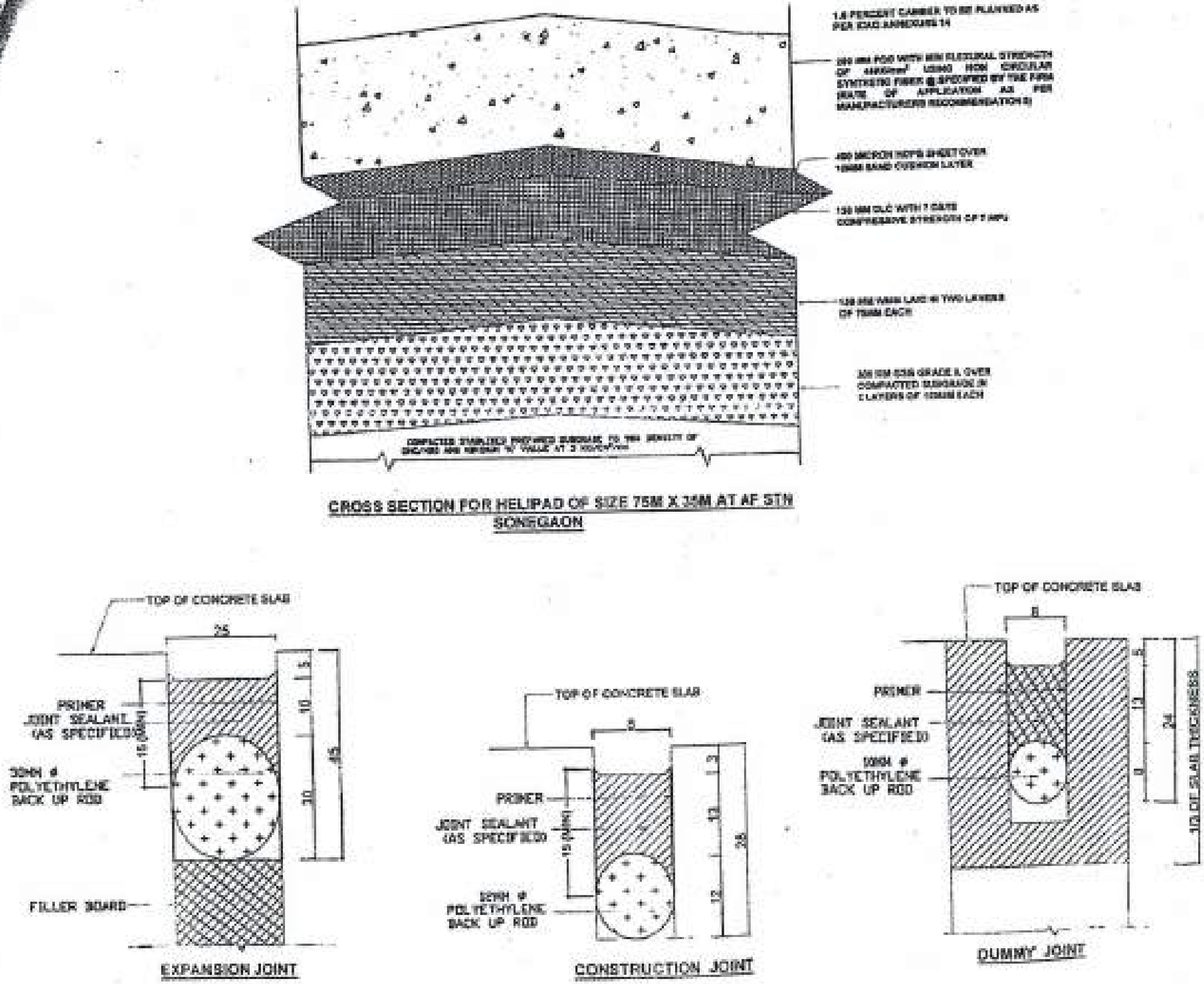
CHIEF ENGINEER (AIR FORC ALLAHABAD

ASST DIR (DES) DIRECTOR FOR CHIEF E

DRN : N B BHOSALE | SCALE - AS SHOWN | DATE- 11-2-

Drg. No. CEWAB/D-232-ST | Sheet No. 1/1 | Rev.No

(Rafique Mohammad)



CROSS SECTION FOR HELIPAD OF SIZE 75M X 35M AT AF STN SONEGAON

NOTES

REFERENCE TO DRAWINGS

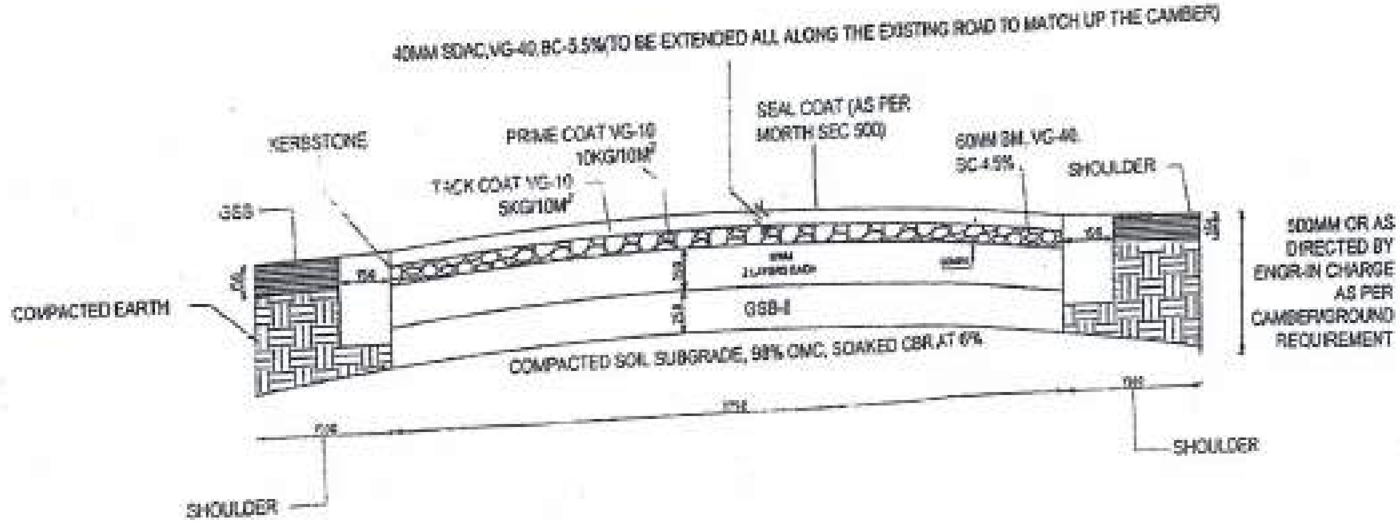
REVISION

CHIEF ENGINEER (AIR FORCE) ALLAHABAD

Sheet No. 1/1

Rev. No.

KERBSTONE	150MM WIDE & 350MM DEEP
SHOULDER	1.5M OR AS DIRECTED BY ENGR-IN CHARGE



DETAILS OF ROAD OF WIDTH 3.75M

REFERENCE TO DRAWINGS

SL NO	DRG NO	SHEET NO	DESCRIPTIONS
1	[illegible]		[illegible]
2	[illegible]	1/1	[illegible]

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.
2. FIGURED DIMENSIONS SHALL BE FOLLOWED.
3. MIN 40MM TH. BITUMINOUS LAYER SHOULD BE LAID WITH MECHANICAL PAVER/PAVER FINISHER.
4. DESIGN THICKNESS OF GRANULAR MATERIAL BE ARRIVED AS PER TPC AND SOIL PARAMETERS.
5. IRC GUIDELINES SHALL BE FOLLOWED (IRC- 37:2018)
6. THE SUB GRADE WHETHER IN CUT OR FILL SHOULD BE WELL COMPACTED TO UTILIZE ITS FULL STC AND TO ECONOMIZE THEREBY ON THE OVERALL THICKNESS OF PAVEMENT REQUIRED. THE CURRENT MORTH SPECIFICATION FOR ROAD AND BRIDGE WORKS RECOMMENDED THAT THE SUB GRADE SHALL BE COMPACTED TO 98% OF DRY DENSITY ACHIEVED WITH HEAVY COMPACTION IS 2720 (PART 8)
7. TOTAL THICKNESS OF THE PAVEMENT HAS BEEN DESIGNED AT ASSUMED/TENTATIVE CBR VALUE OF SUB GRADE AT 6. EXECUTIVE TO VERIFY ACTUAL CBR VALUE AT SITE LOCATION WITH SOIL REPORT BEFORE COMMENCEMENT OF WORK, IN CASE ANY VARIATION, EXECUTIVE SHALL REFER BACK TO THIS HQ. CONSTRUCTION CAN NOT BE EXECUTED SOLELY ON THE BASIS OF THIS DRG.

SNO	DATE	DESCRIPTION	INITIAL

REVISION

PROVN OF TRAINING HELIPAD AT NEW LOCATION OF AF STN SONEGAON

PERIMETER ROAD

DETAILS OF PERIMETER ROAD & OTHER DETAILS

CHIEF ENGINEER (AIR FORCE)
ALLAHABAD

SO1 (DESIGN)

DRWN: NK ANURAJ CM	SCALE : NTS	DATE 01 NOV 2021
... CEWALD/ ... -ST	Sheet No. 1/1	Rev No.

(Rafique Mohammad)
AE (Civil)
AGE (I) AF Sonegaon

MILITARY ENGINEER SERVICES
CONTENTS

NAME OF WORK:-PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON

DRAWING: _____ SHEETS TOTAL_____ PAGES

SIGNATURE OF CONTRACTOR FOR ACCEPTING OFFICER

** These documents are not attached with the tender but same can be seen in the office of HQ CWE (AF) Agra/AGE(I) Sonegaon during working hours on any working day*.

Tele (Civ): 0562-2971807

REGISTERED/ACK DUE
Headquarters
Commander Works Engineers (AF)
Military Engineer Services
Agra (UP) PIN - 282008

80021-39/ /E8 Jan 2023

M/S_____

_____

NAME OF WORK: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON

Dear Sir,

1. Tender documents in respect of above work are uploaded on the site https://www.defproc.gov.in. The tender is on single stage two cover e-tendering system. The contents of Cover I & Cover II are specified in NOTICE INVITING TENDER.

2. Bids will be received online by ACCEPTING OFFICER up to the date and time mentioned in the NOTICE INVITING TENDER (NIT). No tender / bid will be received in physical form and any tender / bid received in such manner will be treated as non bonafide tender / bid.

3. Bid will be opened on due date and time fixed for opening in the presence of tenderers / bidders or their authorised representatives, who have uploaded their quotation bid and who wished to be present at the time of opening the bids.

4. Your attention is also drawn to instruction on filling and submission of tender attached herewith.

5. Un-enlisted contractors are required to submit the scanned copies (in pdf file) of documents required as per eligibility criteria mentioned in instructions for filling the tender documents and Appendix 'A' to NIT along with EARNEST MONEY DEPOSIT (EMD) and tender fee on e-procurement portal and submit the physical documents in the office of Commander works Engineer (Air Force) Agra within time limit specified in NIT. Inadequacy / deficiency of documents shall make the bid liable for rejection resulting in disqualification for opening of finance bid.

6. (a) Contractor having not executed standing security bond and standing security deposit in any MES formation shall upload scanned copy of EARNEST MONEY DEPOSIT (EMD) mentioned in Notice of Tender and shall ensure receipt of hard copy of EMD in the office of tender issuing authority before date and time fixed for this purpose. In case of failure to abide by any of these two requirements, the finance bid will not be opened.

(b) Contractor having not executed standing security bond and standing deposit any MES formation would be required to deposit individual security deposit on acceptance of tender which will be calculated with reference to the tendered cost as per scales laid down by MES for calculation of "EARNEST MONEY" enhanced by 25% subject to maximum of Rs. 1875000/- (Rupees Eighteen Lakh Seventy Five Thousand Only).

7. Enlisted contractors of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentioned in Appendix 'A' to NIT on e-procurement portal and submit physical documents in the office of **CWE(AF) Agra** before date & time fixed for this purpose.

Contd.....

8. The contractor must ensure that the tender / bid on the proper form is uploaded in time as the Accepting Officer will take no cognizance of any quotations / offer received in any other electronic or physical form like email / fax / by hand / through post from tenderer / bidder even if they are received in time.

9. In view of delays due to system failure or other communication related failures, it is suggested that the tender / bid be uploaded, if necessary, sufficiently in advance of the last due date and time fixed.

10. General Conditions of Contracts (IAFW-2249) (1989 Print) and errata and amendments thereto, Schedule of minimum fair wages and MES SSR (Part-I and Part-II) are not enclosed with these documents. These are available for perusal in the Office of **AGE(I) Sonegaon**.

11. ***ANY TENDERER, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITION, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR ANY NEW CONDITION, WHATSOEVER, IS LIABLE TO BE REJECTED.***

12. (a) Contractor having not executed standing security bond and standing security deposit in any MES formation shall upload scanned copy of EARNEST MONEY DEPOSIT (EMD) mentioned in Notice of Tender and shall ensure receipt of hard copy of EMD in the office of tender issuing authority before date & time fixed for this purpose. In case of failure to abide by any of these two requirements, the finance bid will not be opened.

(b) Contractor having not executed standing security bond and standing security deposit in any MES formation would be required to deposit individual security deposit on acceptance of tender which will be calculated with reference to the tendered cost as per scales laid down by MES for calculation of "EARNEST MONEY" enhanced by 25% subject to maximum of Rs.18,75,000/-(Rupees Eighteen Lakh Seventy Five Thousand Only).

13. The tenderer shall evaluate their rate(s) for each item & **Schedule of the BOQ (Schedule 'A')** based on market rates for materials, labour wages as per market and accounting overheads and profits inclusive of all taxes / duties, labour welfare tax, Goods and Services Tax applicable as per Government / competent authority orders on the matter and other factors insert the figures in BOQ after satisfying himself the provisions stipulated in the tender documents.

14. Tenderer is advised to cross check his quotation in BOQ after uploading and before the Bid closing time and date. If he fails to quote the rate for any item, in terms of amendment 21(c) (ii) to condition **6A**.(A) of IAFW-2249, his overall quotation shall deem to include cost of execution of these items for the quantity mentioned in BOQ. No representation on this account shall be entertained.

Yours faithfully,

Signature of Contractor
Dated……

For Accepting Officer

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER

1. **EARNEST MONEY DEPOSIT (EMD)**

1.1 Contractor(s) who are not enlisted with MES / who are enlisted but have not executed the Standing Security Bond shall submit Earnest Money Deposit as detailed in Notice of Tender in one of the following forms, along with their tender /bid:-

(a) Deposit at Call Receipt from a Scheduled Bank in favour of Asst Garrison Engineer concerned i.e**. AGE (I) Sonegaon**.

(b) Receipted Treasury Challan, the amount being credited to the Revenue Deposit **AGE(I) Sonegaon.**

1.2 It is advisable that Earnest Money is deposited in the form of deposit call receipt from an approved Schedule Bank for easy refund. In case the tenderer / bidder wants to lodge EARNEST MONEY DEPOSIT' in any other form allowed by MES, a confirmation about its acceptability will be obtained from the Accepting Officer well in advance of the bid submission end date and time. Earnest Money Deposit shall be submitted in the name of concerned GE.

1.3 All bidders shall be exempted from submission of EMD in all tenders except those who are ineligible from such exemption vide Para 1.4 below.

1.4 All bidders shall be required to sign the **Bid Securing Declaration** as below :-

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

I/We hereby understand and accept that if I/We withdraw or modify my/ our bids during the period of validity, or if I/We are awarded the contracts and on being called upon to submit the Performance Security / Security Deposit, fail to submit the Performance Security/ Security Deposit before the deadline defined in the request for bid documents/ Notice Inviting Tender, I/We shall be debarred from exemption of submitting Bid Security/ Earnest Money Deposit for a period of 6 (Six) months, from the date. I/We are declared disqualified from exemption from submission of Earnest Money Deposit/ Security Deposit, for all tenders issued by MES during this period.

Date : Signature of Contractor

NOTES: - Earnest Money Deposit (EMD) in the form of cheque / Bank Guarantee etc will not be accepted. NON-SUBMISSION OF EARNEST MONEY DEPOSIT (EMD) (scanned copy along with Technical Bid & hard copy before the date and time fixed for opening of BOQ) WILL RENDER THE BID DISQUALIFIED FOR OPENING OF COVER II (FINANCE BID).

2. **PERFORMANCE SECURITY**

2.1 The Standing Security Deposit (SSD) given by the enlisted contractor shall serve the purpose of exemption from Earnest money deposit only.

2.2 The tenderers shall note that the successful bidder shall lodge performance security of an amount equivalent to 5% of contract sum within 28 days from the date of receipt of letter of Acceptance (AOC) in the form of FDR or he may choose to submit BGB or Govt. securities. However the tenderer will be allowed to avail provision of reduced Performance Security of an amount equal to 3% of contract amount by submitting a certificate as below:-

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER(Contd..)

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

(a) I/We declare that there are no outstanding recoveries against my / our firm.

(b) I/We confirm that I/ We do not intend to abandon the subject work after availing the relief of reduction of performance security from 5% to 3% of the value of contract.

Date : Signature of Contractor
Place :

2.3 The Performance Security shall be in favour of Accepting Officer and shall be in any of the forms mentioned above. Work Order No. 1 shall be placed only after submission of Performance Security of adequate value by the contractor. In case a fixed deposit receipt of any bank is furnished by the contractor to the Government as part of the Performance Security 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.

2.4 The period of validity of the bank guarantee bond against Performance Security shall be initially valid up to the stipulated date of expiry of defects liability period plus minimum 60 days beyond that. In case final bill is not paid during this period, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time required for payment of final bill.

2.5 If the performance security is provided by the successful Contractor in the form of a Bank Guarantee, it shall be issued by Nationalized/ Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.

2.6 Failure of the successful contractor to comply with the requirements of sub-clause 2.2 shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

2.7 All compensation or other sums of money payable by the contractor to the Government under the terms of this contract or under any other contract with Government may be deducted from, or paid by the sale of a sufficient part of the Performance Security or from the interest arising there from or from any sums which may be due or become due to the contractor by the Government on any account whatsoever and in the event of his Performance Security being reduced by reason of any such deduction, or sale as aforesaid, the contractor shall within ten days thereafter make good in cash or securities, endorsed as aforesaid, any sum or sums which may have been deducted from or realized by the sale of his Performance Security or any part thereof. Government shall not be responsible for any loss of securities or any depreciation in the value of securities while in their charge nor for loss of interest thereon.

2.8 In the event of contract being cancelled, under Condition 52, 53 & 54 of General Conditions of Contract, the Performance Security **@ 5%**shall be forfeited in full and shall be credited into Consolidated Fund of India.

3. BANK GUARANTEE BOND AGAINST PERFORMANCE SECURITY

3.1 Condition 19.1 of IAFW-2249 provides for submission of Performance Security by the successful contractor in the form of Bank Guarantee Bonds or Govt. Securities, FDR or any other form of deposit stipulated by the Accepting Officer.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER(Contd..)

3.2 The Performance Security shall be in favour of Accepting Officer and shall be in any of the forms mentioned above. Work Order No. 1 shall be placed only after submission of Performance Security of adequate value by the contractor. In case a fixed deposit receipt of any bank is furnished by the contractor to the Government as part of the Performance Security 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.

3.3 If the Performance Security is provided by the successful contractor in the form of a Bank Guarantee, it shall be issued by Nationalized/ Scheduled Indian Bank but its confirmation shall be done only from the Head office of the Bank.

3.4 Form for Bank Guarantee Bond against Performance Security Deposit shall be same as the prescribed format as given in ***Appendix 2.1*** of Manual of Contracts 2020; which should be in favour of Accepting Officer from any Bank Listed in 2nd Schedule of RBI Act 1934.

3.5 The period of validity of the bank guarantee bond against Performance Security shall be initially valid up to the stipulated date of expiry of defects liability period plus minimum 60 days beyond that. In case final bill is not paid during this period, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time required for payment of final bill.

3.6 If in case at a later stage, on account of delay in completion of work due to any other reason, it is considered that the validity date stipulated in the Bank Guarantee against Performance Security should be extended, then the contractor shall be directed by the Accepting Officer of the contract to have the validity extended before the date of validity expires. If the contractor fails to do so the Bank Guarantee shall be encased before expiry.

3.7 If any recovery is outstanding against the contractor, release of Bank Guarantee is subject to compliance of the procedure for effecting recovery/ withholding the due amount as stipulated in condition 67 of IAFW-2249.

4. **DEFECT LIABILITY PERIOD**:-The performance security mentioned in above condition of contracts may be refunded to the contractor after expiry of the defect liability period of 03 (Three) Years by the **AGE(I) Sonegaon** provided always that contractor shall first have been paid the final bill and have rendered a “No Demand certificate (IAFW-451)”.

5. **GENERAL INSTRUCTIONS FOR COMPLIANCE**

5.1 The bids received only in the electronic form will be considered. All bids shall be submitted on https://www.defproc.gov.inportal. Documents should be scanned and forwarded in ‘pdf’ form and ‘xls’ form as indicated.

5.2 Bids shall be uploaded on https://www.defproc.gov.in portal on or before the bid closing date mentioned in the tender. No tender /bid in any other electronic or physical form like email /fax / by hand /through post will be considered.

5.3 Bid should be DIGITALLY signed using valid DSC. All pages of tender documents, corrections/alterations shall be signed / initialled by the lowest bidder after acceptance.

5.4 Drawings, if issued in physical form, must be returned duly initialled by the tenderer/bidder in separate envelope indicating his name and address.

5.5 The tender shall be signed, dated and witnessed at all places provided for in the documents after acceptance. All corrections shall be initialled. The Contractor shall initial every page of tender and shall sign all drawings forming part of the tender. Any tender /bid, which proposes alterations to any of the conditions whatsoever, is liable to be rejected.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER(Contd..)

5.6 In the technical bid, a scanned copy of Power of Attorney in favour of the person uploading the bid using his / her DSC shall be uploaded. In case, the digital signatory himself is the sole proprietor, scanned copy of an affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' form. In case of partnership concern or a limited company, digital signatory of the bid / tender shall ensure that he is competent to bind the contractor (through partnership deed, general power of attorney or Memorandum and Articles of Association of the Company) in all the matters pertaining to the contracts with Union of India including arbitration clause. A scanned copy of the documents confirming of such authority shall be attached with the tender /bid in 'pdf' form, if not submitted earlier. The person uploading the bid on behalf of another partner(s) or on behalf of a firm or company using his DSC shall upload with the tender / bid a scanned copy (in 'pdf' form) of Power of Attorney duly executed in his favour by such other or all of the Partner(s) or in accordance with constitution of the company in case of company, stating that he has authority to bind such other person for the firm or the Company, as the case may be, in all matters pertaining to the contract including the Arbitration Clause.

5.7 Even in case of Firms or Companies which have already given Power of Attorney to an individual authorizing him to sign tender in pursuance of which bids are being uploaded by such person as a routine, fresh Power of Attorney duly executed in his favour stating specifically that the said person has authority to bind such partners of the Firm, or the Company as the case may be, including the condition relating to Arbitration Clause, should be uploaded in 'pdf' form with the tender /bid; unless such authority has already been given to him by the firm or the company. It shall be ensured that power of attorney shall be executed in accordance with the constitution of the company as laid down in its Memorandum & Article of Association.

5.8 Hard copies of all above documents should be sent by the contractor to the Tender issuing authority well in advance to be received before the date and time fixed for the same.

5.9 Bid (Cover 1&2) shall be uploaded online well in time.

5.10 The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to special condition 3 referred hereinafter and also conditions 25& 26 of IAFW 2249 (General Conditions of contract).

5.11 Tenderers/bidders who uploaded their priced tenders / bids are desirous of being present at the time of opening of the tenders / bids, may do so at the appointed time.

5.12 The tenderer / bidder shall quote his rate on the BOQ file only. No alteration to the format will be accepted; else the bid will be disqualified and summarily rejected.

5.13 In case the tenderer / bidder has to revise / modify the rates quoted in the BOQ (excel sheet) he can do so only in the BOQ, through eprocuremes.gov.in site only before the bid closing time and date.

5.14 In case the BOQ is revised by the department and the bidder has failed to quote in revised BOQ(i.e. he has quoted in previous BOQ), such bid shall be treated as wilful negligence by the bidder and his quotation shall be considered non-bonafide.

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER(Contd..)

6. **REVOCATION / REVISION OF OFFER UPWARD / OFFERING VOLUNTARY REDUCTION, AFTER CLOSING OF BID SUBMISSION DATE& TIME**

6.1 In the event of lowest tenderer / bidder revoking his offer or revising his rates upward / offering voluntary reduction, after closing of bid submission date & time, his offer will be treated as revoked and the Earnest Money deposited by him shall be forfeited. In case of MES enlisted Contractors, amount equal to the Earnest Money stipulated in the Notice of tender, shall be notified to the tenderer/bidder for depositing the amount through MRO. Bids of such Contractors / bidders shall not be opened till the aforesaid amount equal to the earnest money is deposited by him in Govt Treasury. In addition, bids of such tenderer / bidder and his related firm shall not be opened in second call or subsequent calls. Reduction offered by the tenderer /bidder on the freak high rates offered for review shall not be treated as voluntary reduction.

7. **CPM (CRITICAL PATH METHOD)**

7.1 The Project planning for work covered in the scope of tender is based on CPM.

7.2 The tender/ bidder is expected to be fully conversant with the CPM technique and employ technical staff who can use the technique in sufficient details. Sufficient books and other literature on the subject are widely available in the market which the tenderer / bidder may make use of.

7.3 The tenderer's/bidder's attention is drawn to special condition of the tender regarding preparation of the detailed network analysis and time schedule for the work and his liability for employing sufficient resources to adhere to this schedule. Any inability on the part of the tenderer/bidder in using the technique will be taken as his technical inefficiency and will affect his class of enlistment and future prospect/invitation to tenders for future works.

8. Department may issue amendments / errata in form of CORRIGENDUM to tender / revised BOQ to the tender documents. The tender / bidder is requested to read the tender documents in conjunction with all the errata / amendments / corrigendum, if any issued by the department.

9. These instructions shall form part of the contract documents.

(Signature of Contractor)
Dated……..

For Accepting Officer

IN LIEU OF IAFW 1779A (REVISED 1955)
(To be used in conjunction with General Conditions of contracts IAFW 2249, 1989 Print)

MILITARY ENGINEER SERVICES

Tele : 0562-2971807

Headquarters
Commander Works Engineers
Military Engineer Services
Agra (UP)
Pin - 282008

No: 80021-39/ /E 8

Jan 2023

TENDER AND ITEM RATE CONTRACT FOR WORKS BY MEASUREMENT REQUIRED IN THE EXECUTION WORK : 44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON

1. Shri/S'Shri/M/S……of …….. is/are hereby authorized to tender for the above work. The quoted tender shall be uploaded by the bidder on https://www.defproc.gov.inon the date and time as per NIT. The quoted tender shall be opened on or after the date and time as per NIT in respect "**CA NO: CWE(AF)AGR/SNG/ /OF 2022-23**: **WORK SERVICES FOR 44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON**at the office of the **COMMANDER WORKS ENGINEERS (AF),MILITARY ENGINEER SERVICES, AGRA (UP) PIN - 282008**.

2. Any correspondence concerning this tender should be addressed as indicated at the top of this sheet quoting reference as given.

3. "THE PRESIDENT OF INDIA DOES NOT BIND HIMSELF TO ACCEPT THE LOWEST OR ANY TENDER AND RESERVES THE RIGHT TO ACCEPT THE TENDER AS A WHOLE OR IN PARTS AS HE MAY DECIDE"

Signature of Officer issuing the documents

Signature of Contractor

FOR ACCEPTING OFFICER
(For and on behalf of President of India)

Date :_____

SCHEDULE 'A' NOTES
(IAFW-1779A –REVISED 1955)
LIST OF WORKS

NAME OF WORK & JOB NO : 44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON

NOTES: -

1. **SCOPE OF WORK :-** The work under this contract comprises "**44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON**" as specified in BOQ and detailed in tender documents .The tenderers are, however, advised to visit the site in consultation with AGE(I) to ascertain the actual locations of works, nature of work and quantum of work etc. involved, restrictions etc imposed on the entry/exit of labour including requirement of verification of antecedents of labour/supervisors/work men and issue of passes etc in respect of such people to be employed for the work by the contractor and/or any other factors which may affect his rates. The contractor shall be deemed to have visited the site and acquainted himself with all these important aspects mentioned here-in-before, irrespective of the fact whether he actually visits the site or not and no claim what-so-ever shall be entertained on this account at a later date"

2. Descriptions of items given in BOQ are in brief. Unit rates shall be deemed to allow for provision of materials, labour, process, operations and all special requirements and tests etc. detailed in the tender documents and shall be amplified and read in conjunction with special conditions, particular specifications, specifications of materials and workmanship and conditions in relevant trade specifications of MES standard schedule of rates Part I & II and working conditions, contract drawings and other documents forming part of the contract documents.

3. The contractor shall calculate his own details; insert unit rates in figure only in BOQ.

4. The quantities shown in BOQ are approximate and are inserted as guide only. These shall, however not be varied beyond the limits laid down in condition 7 of IAFW-2249, (General Conditions of Contracts) forming part of this contract. The quantities against similar items under various activities have been clubbed and shall be executed under various activities (locations) as detailed in BOQ.

5. Unit rate quoted by the contractor against various items shall, inter-alia, be deemed to include for any minor details of construction which are obviously and fairly intended and which may not have been specifically included in the tender documents but which are essential for the execution and completion of works. In case of difference of opinion between the contractor and the **AGE(I) Sonegaon** as to whether or not, any item of work constitutes 'Minor details of construction', the decision of Accepting officer shall be final, conclusive and binding.

6. Method of measurement of all works shall be as described as in MES schedule, unless otherwise specified in these documents.

7. Where consolidation or rolling is specified in the description of items in BOQ, the 'unit' of measurement given in BOQ, shall be deemed to be for the compacted /consolidated quantities of work done. The quantities given in BOQ against these items is in solid contents i.e. after compaction/consolidation.

8. Unless specifically mentioned otherwise such as labour only/fixing only, the unit rates for all items of works shall be deemed to be including cost of all materials, labour, tools and plants, testing and commissioning work in position complete as required for entire completion of work.

9. The total amount arrived at the end of BOQ is not firm but will be treated as the "CONTRACT SUM" referred in IAFW-2249.

SCHEDULE 'A' NOTES (Contd...)

10. The work under this contract shall be executed in restricted area where working hours and routes are restricted by the authorities controlling the area for security purpose. This being vital factor regarding loss of man hours etc. should be considered by the contractor while quoting his rates for this work. Govt. shall not entertain any claim whatsoever on this account.

11. **PERIOD OF COMPLETION**

11.1 The entire work under this contract shall be completed within **270 (Two Hundred Seventy days)** from the date of commencement of work as given in WO No 1.

11.2 The defects liability period mentioned in condition 46 of IAFW-2249 shall commence from the date of completion of the entire work under the contract.

12. The work is to be carried out in various/different locations under **AGE(I) Sonegaon.** This being vital factor regarding loss of man hours, etc should be considered by the contractor while quoting his rates for the work. Govt shall not entertain any claim what so ever on this account.

13. The following abbreviation wherever occurs in tender documents shall have the meaning as indicated against each:-

(a)	RM,M,m	-	Running Metre
(b)	CM,cm	-	Centimetre/Cement mortar
(c)	MM,mm	-	Milimetre
(d)	CUM,cum,cuM	-	Cubic Metre
(e)	SQM,Sqm	-	Square Metre
(f)	M/L, M&L	-	Material and Labour
(g)	S/F,S&F	-	Supplying and fixing
(h)	C/O,CO	-	Carried over
(j)	B/F,BF	-	Brought forward
(k)	Kg	-	Kilogram
(l)	x Sqm/ X Sqm	-	10 Sqm
(m)	x RM/ X RM	-	Ten RM
(n)	N.B.	-	Nominal Bore
(o)	Drg/Drgs/drg/drgs	-	Drawing/ Drawings/ drawing/ drawings
(p)	Cucm/CUCM	-	Cubic Centimetre
(q)	PQC	-	Pavement quality concrete
(r)	Pbw	-	Part by Weight

14. The unit rates quoted by the tenderer shall be inclusive of all taxes, Such as GST, Octroi, sales tax, service tax on works contracts, duties, construction labour welfare tax, other statutory levies and the like.

15. Unless otherwise indicated in the description of the items, rate quoted by the tenderer shall be deemed to include for materials and labour complete and shall also deemed to include for corresponding specification given in particular specification and MES Sch Part I 2009 and Part II 2020.

16. The tenderers are advised to visit the site of work and see the condition of site where the work is to be carried out. The work lies in **restricted area**. The samples of various items and material to be incorporated in this work have been displayed by the AGE(I) for contractors for quoting their rates accordingly. The tenderers are advised to visit the site/ sample room along-with **AGE(I) Sonegaon** before quoting the rates. Please note that any claim whatsoever on account of misunderstanding or non-visit of site/ sample room shall not be entertained.

17. All precautions shall be taken by the contractor in demolition/dismantling of items. Any damage to existing structure/fittings during course of demolition/dismantling shall be made good by the contractor at his own cost and without any extra cost to the Govt.

SCHEDULE 'A' NOTES (Contd...)

18. The location of plant, labour camp, contractor's site office & lab and routes to follow to reach the plant and site shall be as approved by Station authorities/AGE. Contractor shall not be allowed to follow any other route. Changes may, however, be made in the route on any later date. Nothing extra shall be paid to the contractor in this regard.

19. All the works pertaining to this contract shall be supervised by **AGE(I) Sonegaon.**

20. Reference condition 10 of IAFW 2249 General Conditions of Contract. All tests as directed by the AGE(I) shall be carried out by the contractor from the authorised laboratories, Govt Engineering Colleges or CME etc as approved by the **AGE(I) Sonegaon**. The cost of materials consumed in testing, packing, labour, transportation of samples to approved laboratories including cost of testing shall be borne by the contractor.

21. **DEMOLITION / DISMANTLING**

(a) Old materials obtained from taking down/dismantling/demolition shall be Government property except for which credit given in schedule of credit and serviceable materials shall be deposit to MES store yard and unserviceable materials removed from the site of work by the contract all as directed by Engineer-in-Charge. The contractor is required to inspect/verify the quantity of materials becoming his property. Deduction of credit will be made for the quantities actually obtained at site at the rate inserted by MES in Credit of Schedule. No extra payment shall be admissible on this account AGE's decision whether any materials serviceable or unserviceable shall be final and binding.

(b) The materials obtained from demolition/dismantling shall not be used in the work under this contract unless otherwise provided in the tender document. These materials shall be removed from site of work after measurement in respect thereof have been recorded in measurement book and signed by both parties and after making suitable recoveries from contractor`s bill. The measurement of each material for the purpose of credit shall be the same as per the corresponding demolition/dismantling/taking down materials. Proper inventory showing materials handed over to the contractor shall also be kept on record duly signed by contractor and Engineer-in-Charge

(c) The demolition/dismantling as required for executing the work as per CA provisions shall be carried out with due care. In case at the time of demolition, if any damage occurs in the building/structure, the contractor shall made good as per existing surfaces/finishes without any extra cost to Govt.

22. Unit rates quoted by the tenderer shall inter-alia be inclusive of all taxes levied by Central Govt/State Govt/Local Bodies inclusive of all charges such as under :-

(a) GST, Octroi, Central Tax, Excise duty, service tax etc.
(b) Insurance, if any
(c) Packing and unpacking.
(d) Transport and delivery.
(e) Entire supply, erection/installation and execution of work including commissioning testing all as specified.
(f) Labour Cess

23. While submitting the financial bid, contractors are requested to go through the corrigendum published by department, if any and take the same into consideration while quoting their rates. Also corrigendum including revised BOQ (if any) should be watched invariably on website to ensure that rates are quoted on revised BOQ only. If the bidder does not quote his rates on revised BOQ, their tender/bid shall be treated as non bonafide and same shall be rejected. No claim whatsoever shall be entertained on this account subsequently.

SCHEDULE 'A' NOTES (Contd...)

24. QUALITY OF MATERIALS

24.1 The materials to be incorporated under this contract shall be ISI marked and not their equivalents or those complying with IS particularly when ISI marked materials are available. Where specific makes/brands has been mentioned in Schedule `A'/Particular specifications, then these shall take precedence to ISI marked items and if specified make/brands are manufactured with both i.e. with ISI marking and without ISI marking, then only ISI marked make/brand shall be acceptable/incorporated.

24.2 All manufactured materials required to be incorporated in the work under this contract shall be ISI marked. The provision of conforming to relevant ISs wherever mentioned in specifications, MES Standard Schedule of Rates or elsewhere in the contract documents shall be amended to read as "ISI marked". However the manufactured materials which are not being manufactured ISI marked, shall conform to the relevant IS specifications.

24.3. In case specifications of any materials needed for incorporation in the work included under this contract are not given in Schedule "A", particular specifications, MES Standard Schedule of Rates or in relevant ISs, referred to therein or in any other documents forming part of the contract, the specifications for such materials given in any appropriate ISs, BSs, standard codes of practice, standard books etc., as decided and approved by the AGE(I) shall be followed. In absence of the specifications for such materials in any appropriate ISs, BSs, standard codes of practice, standard books etc., the specifications as decided and approved by the Accepting Officer shall be followed. The rates quoted by the contractor shall be deemed to have included this element and nothing extra shall be admissible to the contractor on this account. The decision of Accepting Officer shall be final and binding in this regard.

25. PERFORMANCE SECURITY (REFER CONDITION 19 OF IAFW 2249 GENERAL CONDITIONS OF CONTRACT):

25.1 Within **28 days** of receipt of the letter of Acceptance, the successful contractor shall deliver to the Accepting Officer a Performance Security in any of the forms given below for an amount equivalent to **3%** of the contract sum.

(a) A Bank Guarantee in the prescribed form.

(b) Government Securities, FDR or any other Government Instruments stipulated by the Accepting Officer.

25.2 If the performance security is provided by the successful Contractor in the form of Bank Guarantee, it will be issued by Nationalized/Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.

25.3 Failure of the successful contractor to comply with the requirements shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

25.4 All compensation or other sums of money payable by the contractor to the Government under the terms of this contract or under any other contract with Government may be deducted from, or paid by the sale of a sufficient part of the Performance Security or from the interest arising there from or from any sums which may be due or become due to the contractor by the Government on any account whatsoever and in the event of his Performance Security being reduced by reason of any such deduction or sale as aforesaid, the contractor shall within ten days thereafter make good in cash or securities, endorsed as aforesaid, any sum or sums which may have been deducted from or realized by the sale of his Performance Security or any part thereof. Government shall not be responsible for any loss of securities or any depreciation in the value of securities while in their charge nor for loss of interest thereon

SCHEDULE 'A' NOTES (Contd...)

25.5 In the event of contract being **CANCELLED** under condition 52, 53 & 54 of General Conditions of Contract as per IAFW-2249; the Performance Security**@ 5%** shall be **FORFEITED** in full and shall be credited into Consolidated Fund of India.

26. **REFUND OF PERFORMANCE SECURITY**:- The performance security mentioned in above condition of contracts may be refunded to the contractor after expiry of the defect liability period of 03 (Three) Years by the **AGE(I) Sonegaon** provided always that contractor shall first have been paid the final bill and have rendered a "**No Demand certificate (IAFW-451)**".

27. **DEFECT LIABILITY PERIOD**:- The defect liability of the contract shall be 36 (Thirty Six) calendar months from the certified date of completion of the entire work under the contract (herein after referred to as the defect liability period).**(Refer condition 46 of IAFW-2249 (amended vide amendment No 48 of IAFW-2249).**

28. **T&P/MACHINERY &TRANSPORT':-** Please note that you will be required to strictly ensure engagement of engineers and deployment of 'T&P/Machinery & Transport' as required in the contracts. Inadequate engagement of engineer/deployment of 'T&P/Machinery & Transport' as per contract conditions shall be considered as serious lapse attracting ban/removal/downgrading/ debarment of your firm. If additional machinery/plant/equipment other than these is required at any point of time for smooth execution and timely completion of the work the same shall be arranged by the contractor without any extra cost to the government.

29. **STAR RATES**:

(a) In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition of 62 of IAFW-2249. Irrespective of whatever has been specified elsewhere in these tender documents, pricing of the deviation order (s), if any, shall be done as per Condition 62 of IAFW-2249 (General conditions of Contracts).

(b) In the event of a deviation order involving fixation of special (Star) Rate, Draft Rate shall be prepared by AGE(I) (within period of 30 days) while initiating the proposal for deviation seeking approval of Accepting Officer and notified to contractor. While notifying the Draft Rate, it will be clearly stipulated that the same is merely an estimated rate and firm rate shall be fixed based on actual and receipt of supporting documents from contractor such as vouchers/literature of product/test certificates etc (as applicable) on completion of the work involving Star Rate. Any objection to the method of fixing Star Rate will be dealt as per Condition 7 of IAFW-2249.

(c) Draft Star Rate shall be made based on market enquiry through telephonic enquiry/quotations/email /rate lists/internet based sources, material & labour constants available in various civil engg books and record available in respect of Star rates approved in the past for similar items of work etc. Contractor may also assist AGE's office in preparation of draft Star Rate.

(d) The Draft Star Rate shall be purely a draft rate and shall not be used for claiming final payment during execution of work. However AGE(I) shall allow part payment to the tune of 80% during execution to avoid any financial hardship to contractor.

(e) After completion of the item of work involving Star Rate, contractor shall submit the vouchers/literature of product/ test certificates (as applicable), decision of GE being final in case of any disagreement for finalisation of Star Rate. The Star Rate shall be technically checked by DCWE (C) / Director (C) depending upon the financial effect & approved by competent authority within a period of one month from submission of the relevant documents by contractor as mentioned above.

SCHEDULE 'A' NOTES (Contd...)

STAR RATES (CONTINUE.....):

(f) The star rate as approved by competent authority after technical check by DCWE (C)/ Director (C) depending upon the financial effect shall be referred as "the rate decided by GE" under Para 62 (G) of IAFW-2249.

30. **REQUIREMENT OF ELECTRICAL LICENSE FOR CARRYING OUT ELECTRICAL WORKS**:-

(a) No electrical installation work including additions, alterations, repairs and adjustments to existing installations except such replacement of lamps, fans, fuses, switches, low voltage domestic appliances and fittings as in no way alters its capacity or character shall be carried out upon the premises of or on behalf of any consumer, owner or occupier, for the purpose of supply to such consumer, owner or occupier except by an electrical contractor licensed in this behalf by the State Government and under the direct supervision of a person holding a certificate of competency and by a person holding a permit issued and recognized by the State Government.

(b) For execution of electrical works/electrical component of works requiring **Electrical Licence** in accordance with Rule 29, the contractor shall have valid Electrical Licence issued by the concerned State/Union Territory in the name of the Firm or get the work executed through an agency having valid Electrical Licence. Items of works under category (c) including its sub categories (i) to (vii) and category (d) (v) shall also be executed in this manner to the extent Rule 29 is applicable to such items. In addition, supervisor for execution of electrical works/electrical components of work employed by the contractor shall possess supervisor certificate of competency issued by the concerned State/Union Territory and the workers/tradesman for execution of electrical works/electrical components of work shall hold

(c) Prior to commencement of electrical work/electrical component of works as mentioned here-in before,, copy of valid Electrical Licence in the name of the contractor or copy of agreement with agency having valid Electrical Licence along with agency's Electrical Licence shall be **submitted by the contractor to the Accepting Officer through AGE**. In case contractor does not possess valid Electrical Licence and he intends to get such work executed through agency having valid electrical licence and with whom he has agreement, **prior approval of such agency in all contracts shall be got done from Accepting officer**. Copy of licence shall be kept on record by AGE as well as CWE for future reference. AGE(I) to ensure all aspects given in letter No 66546/EL/Manual/53/E8 dated 01 Feb 2020, circulated by E-in-C Branch, New Delhi.

31. **PRESENTATION BY CONTRACTOR AFTER ACCEPTANCE OF TENDER**

31.1 The contractor shall give a presentation of Accepting Officer in presence of AGE(I) within 04 weeks of acceptance of tender. The presentation shall cover the following:-

(a) Detailed date wise CPM chart.
(b) Contractor's planning for material scheduling including submission of samples for approval.
(c) Detailed calculations and quantities of steel, cement and other buildings materials required for completion of this work.
(d) Tools and plants requirement for this work at various stages indicating dates/ stage when these T&P are planned to be brought at site.
(e) Brief scope of work with specifications.
(f) Any clarifications/ ambiguities / delays anticipated in the project.
(g) Skilled manpower/ labour projections for the work.
(h) Testing of samples as required as per CA and agency / agencies where these will be carried out.
(j) List of building materials / equipment for which samples is required to be approved in this work.
(k) Quality assurance plan for concrete work

SCHEDULE 'A' NOTES (Contd...)

PRESENTATION BY CONTRACTOR AFTER ACCEPTANCE OF TENDER (Contd…)

31.2 A list of equipment / instruments with their brief details viz, capacity / size, least count as applicable shall be submitted by the contractor to AGE for approval within 4 weeks of acceptance of work. Any suggestion/ comments of Accepting officer/ AGE considered necessary to complete the work in time shall also be discussed and decision of Accepting Officer regarding requirement of T&P at any time, material scheduling etc., shall be final and binding. No extra claim on this account shall be entertained.

Signature of Contractor For Accepting Officer
Dated……

BOQ Pages Ser No. (17 to 27 = TOTAL 11)

SCHEDULE 'B'

(LIST OF MATERIALS TO BE ISSUED TO THE CONTRACTOR)
(See condition 10 of IAFW-2249)

Srl No	Particulars	Rate which materials will be issued to the Contractor		Place of issue (by Name)	Remarks
		Unit	Unit rate (Rs.)		
1	2	3	4	5	6
		……NIL……..			

SCHEDULE 'C'

LIST OF TOOLS AND PLANTS OTHER THAN TRANSPORT
WHICH WILL BE HIRED TO THE CONTRACTOR
(See conditions 15, 34 and 35 of IAFW-2249)

Sl No	Quantity	Particulars	Details of MES crew supplied	Hire charges per unit per working day	Standby charges per unit per off day	Place of issue by name	Remarks
1	2	3	4	5	6	7	8

……NIL……....

SCHEDULE 'D'

(TRANSPORT WHICH WILL BE HIRED TO THE CONTRACTOR)
(See conditions 15, 16 and 35 of IAFW-2249)

Srl No	Quantity	Particulars	Details of MES crew supplied	Hire changes per unit per working day	Standby changes per unit per off day	Place of issue by name	Remarks
1	2	3	4	5	6	7	8

……NIL……....

----- Digitally Signed-------

Signature of Contractor
Dated:-

For Accepting officer

SCHEDULE OF CREDIT & SUMMARY OF SCHEDULE 'A'

NAME OF WORK: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON

NOTE:-

1. Rate for credit for old materials are firm as fixed by MES, are given as under and recovery for old materials as retrieved from taking down / dismantling shall be made accordingly and shall be effected in RAR's & Final bills. Old serviceable materials received other than mentioned in credit schedule shall be taken on charge.

2. During dismantling & demolition work all debris shall be disposed of to the distance as directed by Engineer in Charge.

3. Demolition/Dismantling shall be carried as specified and as directed by Engineer in Charge.

4. Proper care shall be taken during demolition /dismantling. Any damage which occurs due to negligence of contractor or his workman shall be made good by the contractor without any extra cost to the government.

5. Contractor is requested to visit site or work before quoting his tender with regard to condition of materials. The materials obtained from demolition /dismantling shall be properly of the contractor for which recovery shall be affected from the contractor payment as per credit schedule. Material obtained from demolition /dismantling other than mentioned in credit schedule as under shall be properly of government and the same shall be handed over to the Engineer-in-Charge.

6. In terms of Para 370 of RMES old materials credit shall be recorded in measurement book duly signed by contractor & Engineer in Charge.

Srl. No.	Description of Item	Unit	Qty	Rate fixed by MES (Rs)	Amount (Rs)	Remarks
1	**2**	**3**	**4**	**5**	**6**	7
----------NIL----------						

SUMMARY OF SCHEDULE A

(a) Quoted amount as per BOQ Srl Page No.27 Rs…….

(b) Credit amount as per Srl Page No. 29(above) (-) Rs **NIL**

Net Sum Rs

(In words Rupees……..

……)

Signature of Contractor **ForAccepting Officer**
Dated :

TENDER

To

THE PRESIDENT OF INDIA

Having examined and perused the following documents: -

1. Particular specifications signed by DCWE (Contracts) on behalf of the Accepting Officer.

2. Drawings detailed in the list of drawings.

3. Schedule 'A' (BOQ), 'B', 'C' and 'D' attached herewith.

4. MES Standard Schedule of rates 2009 (Part-I) specifications and SSR Part-II 2020 (rates) (hereinafter and in IAFW-2249 referred to as the MES Schedule) together with amendment No 1(a), 1(b), 2 & 3 for Part I (SSR-2009)as applicable to the above said schedule.

5. General Conditions of Contracts (IAFW-2249 - (1989 Print) together with Errata No 1 to 20 and amendments No. 1 to 48 for English version only.

6. Water condition 31 of IAFW-2249, General Condition of Contracts. Water will not be supplied by the MES and contractor will arrange water under his own resources.

7. **SHOULD THIS TENDER BE ACCEPTED I/WE AGREE**:-

(a) That the sum of **Rs 2,17,290.00 Rupees Two Lakh Seventeen Thousand Two Hundred Ninety Only)**forwarded as Earnest Money shall either be retained as a part of security deposit or refunded by the Government on receipt of the appropriate amount of security deposit all as per condition 22 of IAFW-2249.

(b) To execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein or referred to thereupon and as detailed in the General summary and to carry out such deviations as may be ordered vide condition 7 of IAFW-2249 up to maximum of ***10% (Ten percent)***. Further agree to refer all disputes, as required by condition 70 to the sole arbitrator of a serving officer having degree in Engineering or equivalent or having passed final/direct final examination in Subdivision-II of Indian Institution of Surveyors (India) recognised by Government of India to be appointed by the Chief Engineer Central Command, Lucknow or in his absence the officer officiating as Chief Engineer Central Command, Lucknow whose decision shall be final, conclusive and binding.

(c) I/We also agree to refer the disputes as required by scope of conciliation of the special condition for conciliation to the sole conciliation of serving officer not below the rank of Director /Col/ Director (Contracts) (having done at least one executive tenure of minimum two years or having at least two years experience of handling contract matters) to be appointed by the Chief Engineer Central Command, Lucknow or in his absence the officer officiating as Chief Engineer Central Command, Lucknow, whose decision shall be final, conclusive and binding.

*** To be deleted where not applicable.

TENDER (CONTD....)

Signature_____

(Name of Signatory_____) in the capacity of _____

Duly authorized to sign the tender for and on behalf of _____

(IN BLOCK CAPITALS)

Witness _____

(Name _____)

Address _____

_____

Date _____

Postal Address _____

_____

Telegraphic Address _____

Tel No _____

ACCEPTANCE

_____Alterations have been made in this document and as evidence that these alterations were made before the execution of the contract Agreement, these have been initialled by the Contractor and Accepting Officer.

The above tender was accepted by me on behalf of the President of India at the item rate contained in BOQ for Rs _____

(Rupees _____

_____ Only)

on the date _____day of _____2022.

Signature of Contractor_____

(Name_____)

Dated _____

Signature_____

(S N Shukla, IDSE)

SE

CWE (AF) Agra

Accepting Officer

(**FOR AND ON BEHALF OF THE PRESIDENT OF INDIA**)

GENERAL CONDITIONS OF CONTRACT (IAFW-2249) 1989 PRINT
ITEM RATE CONTRACTS (IAFW-1779-A)

1. It is hereby agreed by me/us* that the General Conditions of Contract, including Condition 70 pertaining to the settlement of disputes by Arbitration IAFW-2249 (1989 Print) containing 33 pages (Sl page No 33 to 65) with errata Nos 1 to 20 and amendment Nos 1 to 48 there to form part of the tender documents containing 28 pages (Sl page No 66 to 93).

2. The tender submitted by me/us* is subject to the aforesaid General Condition of contracts in IAFW-2249, an amended copy of which has been supplied to me/us* and is in my/our* possession and which I/We* have read and fully understood, before submission of the tender.

3. My/Our* signature hereunder is in token of my/our* having accepted the aforesaid General Condition of contracts together with Errata and amendments (IAFW-2249 –1989 Print) and the clause relating to Arbitration forming part of this tender.

Note:-DISPUTE IN INTERPRETATION DUE TO WORDINGS OF ENGLISH AND HINDI VERSIONS It is clarified that in case of difference on interpretation due to wordings of English and Hindi versions, the English version will prevail as per Article 348 of the Constitution of India as clarified vide CS/MS - 17 letter No. 96019 / GS / MT - 17 dated 13 Oct 89.

----- Digitally Signed-------

Signature of Contractor

DCWE (Contracts)
For Accepting Officer

Dated:

SCHEDULE OF MINIMUM WAGES

It is hereby agreed that the “Schedule of Minimum Wages” as published by Government of India or provincial Government’s Notification whichever is higher issued up to date of submission of tender shall form part of these tender documents.

My/our signature hereunder amounts to my/our having signed the aforesaid documents forming part of the tender.

NOTE:- “Schedule for minimum wages” referred to above is available for reference, in the office of HQ CWE (AF) Agra / **AGE(I) Sonegaon.**

----- Digitally Signed-------

Signature of Contractor

DCWE (Contracts)
For Accepting Officer

Dated:

SPECIAL CONDITIONS

1. GENERAL

1.1 These special conditions shall be read in conjunction with General Conditions of Contracts, IAFW-2249 including Errata/amendments there to. If any provisions in these special conditions are at variance with the provisions of above mentioned documents the provisions given in these special conditions shall take precedence there over.

1.2 The work under this Contract shall be carried out in accordance with Schedule `A', Particular Specifications, drawings and other provisions made in MES Schedule.

1.3 The term `General Specifications' referred to herein before/ here in after as well as referred to in IAFW-2249. (General Conditions of Contracts), shall mean the Specifications contained in MES Schedule.

1.4 General rules, Specifications, special conditions and all preambles in MES Schedule shall be deemed to apply to the works under this Contract unless specified otherwise in these tender documents, in which case the provisions in these tender documents shall be deemed to take precedence over the provisions made in MES Schedule.

2. VISIT TO SITE BY CONTRACTOR

2.1 The tenderers shall contact concerned AGE(I) for the purpose of inspections of site(s) and examination of relevant documents other than those sent herewith, who will extend reasonable facilities for the purpose. The tenderers shall also make themselves familiar with working conditions, accessibility to site (s), availability of materials and other cogent conditions which may affect the entire completion of work under this contract.

2.2 In case of a tender containing an offer is submitted, the tenderers shall be deemed to have visited the site (s) and made themselves familiar with the working conditions etc. irrespective of whether they actually inspect the site or not.

3. MINIMUM WAGES PAYABLE

3.1 Refer Condition 58 of IAFW-2249. The contractor shall not pay wages lower than minimum wages for labour as fixed by the Government of India/State Govt/Union territory, whichever is higher.

3.2 Contractor's attention is also drawn, amongst other things to the 'explanations' to the schedule of minimum wages referred to above.

3.3 The fair wages referred to in condition 58 of IAFW-2249 will be deemed to be the same as the minimum wages, referred to above as upto date from time to time.

3.4 Schedule of minimum wages is not enclosed along with tender documents. However contractor shall be deemed to have verified the minimum fair wages payable as on the last due date of receipt of tender.

3.5 The contractor shall have no claim whatsoever, if on account of local factor and or regulations, he is required to pay the wages in excess of minimum wages as described above during the execution of work.

4. LABOUR REGULATION AND ABOLITION ACT

Contract labour (Regulation and Abolition) Act 1970 is applicable to MES contractors. Rates quoted by the contractor shall be deemed to take into account the cost/extra expenditure etc required to comply with the provisions contained in the said Act and the rules framed regarding labour from time to time by Central/State Govt.

SPECIAL CONDITIONS (Contd.....)

5. The works under this contract lies in **RESTRICTED AREA**.

5.1 CONDITIONS FOR WORKING IN RESTRICTED AREA

5.1.1 **VISIT TO SITE WITHIN THE RESTRICTED AREA:** Permission to enter the restricted area at the time of submission of tenders can be obtained through the Asst Garrison Engineer. Tenderers are advised to send prior intimation of visit of their agents, representatives etc. If any, as regards to dates and time of their proposed visit so that necessary arrangements may be made by AGE(I) to secure admission. Whether a tenderer visit the site or not, he shall be deemed to have full knowledge of the restrictions of entering into /exiting from the site of works, for working within the Restricted Area.

5.2 ENTRY / EXIT

5.2.1 The Contractor, his agent(s) representatives, workmen etc and his materials, carts, trucks or other means of transports etc will be allowed to enter through and leave from only such gate(s) and at such times as the AGE(I) or authorities in charge of the Restricted Area(s) may at their sole discretion permit to be used. The Contractor's authorized representative is required to be present at the place of entry and exit for the purpose of identifying his workmen carts, trucks etc to the person in charge of the security of Restricted Area.

5.2.2 The contractor and his agents, employees and work people shall observe all the rules promulgated by the authorities controlling the installation, area in which work is to be carried out e.g. prohibition of smoking and lighting, fire precautions, search of persons on entry and exit, keeping to specific routes, observing specified timing etc. Nothing extra shall be admissible for any man-hours etc. lost on this account.

5.3 **IDENTITY CARDS OR PASSES**: The contractor, his agent and representatives are required individually to be in possession of an identity card or pass which will be examined by the security staff at the time of entry into or exit from the restricted area at any time or number of times inside restricted area.

5.4 IDENTITY OF WORKERS

5.4.1 Every worker shall be in possession of an identity card. The identity card will be issued after thorough investigation of the antecedents of the labourers by the Contractor and attested by the Officer-in-Charge of the unit concerned in accordance with the standing rules and regulation of the units.

5.4.2 Contractor shall be responsible for the conduct and action of his workers, agents or representatives.

5.4.3 Contractor and his workmen will have to surrender their identity passes/permits after completion of work or as and when demanded by Air Force Authorities.

5.4.4 **SEARCH:** Thorough search of all persons and transport shall be carried out at each gate and as many times as the gate is used for entry/exit and may also be carried out any number of times at the site within the restricted area.

5.5 **FEMALE SEARCHER**: If the Contractor desires to employ female labours on works to be carried out and a female searcher is not borne on the authorized strength for the establishment the contractor may be asked for employment of a female searcher (Class IV/Gp 'D') for the calculated period. The cost incurred by the Contractor in doing so shall not be reimbursed to him. The Contractor is deemed to have ascertained from GE, before quoting, whether a female searcher is held on the authorized establishment or not. No subsequent claim on this aspect shall be entertained.

SPECIAL CONDITIONS (Contd.....)

5.6 **WORKING HOURS**:

5.6.1 The units controlling restricted area, usually work during six days in the week and remain closed, on 7th day. The working hours available to Contractor's labour and Staff are however appreciatory reduced because of time of entry and exit during working hours.

5.6.2 The exact working hours, working days and non working days observed for the restricted area, where works are to be carried out, shall be deemed to have been ascertained by the contractor before submitting his tender. The tenderer attention is invited to the fact that the total number of working hours for an unit are prescribed in regulations and they cannot be increased by the Asst Garrison Engineer or authorities controlling the restricted area.

5.6.3 The definition of "working days" as given under condition 1 (t) of IAFW-2249 does not apply in case where the works are carried out in restricted area.

5.7 **WORK ON HOLIDAYS INSIDE RESTRICTED AREA:** The Contractor shall not carry out any work on gazetted holidays, weekly holidays and other non-working days except when he is specially authorized in writing to do so by the GE. The AGE(I) may at his sole discretion declare any day as holidays or non-working day without assigning any reason for such declaration.

5.8 **ACCESS TO RESTRICTED AREA AFTER COMPLETION OF WORKS**: After the works are completed and surplus stores etc removed, the Contractor, his agent/representatives or workers etc may not be allowed to have access to the restricted area except for attending to rectification of defects pointed out to him by the GE.

5.9 **FIRE PRECAUTIONS**:

5.9.1 The contractor, his agents, representatives, workers etc. shall strictly observe the orders pertaining to fire precautions prevailing within the restricted area.

5.9.2 Motor transport vehicles, if any allowed by authorities to enter the restricted area must be fitted with serviceable fire extinguishers.

6. **SECURITY OF CLASSIFIED DOCUMENTS**

6.1 Contractor's special attention is drawn to conditions 2A and 3 of General Conditions of Contract IAFW-2249. The contractor shall not communicate any classified information regarding works either to sub-contractor or others without prior approval of the Engineer-in-Charge. The contractor shall also not make copies of the design/ drawings and other documents furnished to him in respect of works and he shall return all documents on the completion of the works or earlier on determination of the contract. The contractor shall along with the final bill attach a receipt from the Engineer-in-Charge in respect of his having returned the classified documents as per condition 3 of General Conditions of Contracts IAFW2249.

7. **MATERIALS AND SAMPLES**

7.1 Material listed in Appendix `A` to special condition will only be accepted if they bear ISI certification marking. Material having only embossing of IS number can be rejected. Materials listed in Appendix `A` will not be accepted even if they are conforming to relevant IS but not having IS marking. In case of deviation price adjustment @ 10% of the cost of article (on minus side only) shall be made for the articles/ materials not having ISI marking. Materials listed in Appendix `C` to Particular Specification are the products which are manufactured by number of firms and are generally superior to certified products though they do not bear the ISI mark. Such materials shall be accepted if they are conforming to the relevant IS.

SPECIAL CONDITIONS (Contd.....)

7.2 Materials other than listed in condition 7.1 above required to be provided by the contractor for incorporation in this work shall unless otherwise specified in the particular specification, comply with the relevant Indian standard as specified in MES SSR Part-I subsequently amended or revised. Preference shall be given for ISI marked materials in such cases also. Materials required to be incorporated in the work to be procured by the contractor will be preferred in following order of preference :-

(a) Materials with ISI marking.
(b) Materials superior to ISI standards but not ISI marked.
(c) Materials conforming to relevant IS.
(d) Materials conforming to the samples kept in the AGE's office.

7.3 The contractor shall produce samples of all materials, articles fittings, accessories etc. that he proposes to use and get them approval in writing by the Asst Garrison Engineer. The materials, articles, etc. as approved shall be signed by the Engineer-in-Charge and the contractor's representative. These samples shall be kept in the custody of the Engineer-in-Charge. Contractor's quoted rates shall be deemed to include the cost of materials and labour for this purpose.

7.4 The brands of all materials, articles, fittings etc. approved together with the names of the manufacturers and firms from which supplies have been arranged shall be recorded in the materials passing register.

The materials for which IS do not exist or which are specified in these particular specifications to conform to the samples kept in the GE`s office, shall comply with the requirement of these samples. The contractors are advised to inspect the sample which shall remain open for inspection with AGE(I) during working hours. The contractor shall be deemed to have full knowledge of the samples whether he inspects them or not. **List of IS codes and relevant IRC No for standards of procedures and of materials is given at Appendix 'E' to Particular Specifications**.

7.5

7.6 The contractor shall submit two samples of each item requiring approval of the AGE(I) so that an approved sample can be kept in the site office/ incorporated in the sample quarter and other in the AGE(I) office. The contractor shall place order only after approval of the sample by the AGE(I).

7.7. All the codes of Practices/IS Codes/BIS Codes/Standards and specifications shall be of latest edition along with up to date correction with correction slip, revision, amendment and errata if any shall be followed.

8. RECORD OF MATERIALS

8.1 The quantity of materials such as paints, water proofing compound and the like, as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in the works), shall be recorded in measurement books and signed by the contractor and the Engineer-in-Charge as a check to ensure that the required quantity has been brought to site for incorporation in the work.

8.2 Materials brought to site shall be stored as directed by the Engineer-in-Charge recorded in Measurement Book and shall be suitably marked for identification.

8.3 The contractor shall, on demand, produce to the AGE(I) original receipted vouchers in respect of the supplies. Vouchers so produced and verified shall be stamped by Engineer-in-Charge indicating contract number. The contractor shall ensure that the materials are brought to site in original sealed containers/packing; bearing manufacturer's marking except in the case of the requirement of material(s) being less than smallest packing.

SPECIAL CONDITIONS (Contd.....)

8.4 Contractor shall produce original vouchers from the manufacturers and/or their authorised agents for the full quantity of the following materials, as applicable as a prerequisite before submitting for payment for any advances on account of the work done and/or materials collected in accordance with condition 64 of General Conditions of Contracts IAFW-2249.

(a) Chemicals for Anti-termite Treatment. (b) Paints, Distempers and Snowcem.
(c) Cement base paint, Synthetic Enamel Paint. (d) Sanitary fittings.
(e) Pre painted steel windows & shutters (f) **Road marking paint.**
(g) **Bitumen.** . (h) Salt glazed stoneware/RCC pipes
(j) Electrical and water supply fittings/fixtures where names of manufacturers/brands are specified or approved, GI Pipe. (k) Thermoplastic paint.
(l) Cement (m) Steel items.
(n) Paver Block & Kerb Stones. (o) For all materials lying at site for which contractor claims payment in RAR.

9. **REIMBURSEMENT/REFUND ON VARIATION IN "TAXES DIRECTLY RELATED TO CONTRACT VALUE"**

9.1 The rates quoted by the contractor shall be deemed to be inclusive of all taxes including GST on materials GST on works Contracts, turn over tax, Labour welfare Cess/tax, Royalties and other levies payable under the respective Statutes. No reimbursement/refund for variation in rates of taxes, Royalties, and other levies, and/or imposition/abolition of any new/existing taxes, Royalties and other levies shall be made except as provided in 9.1(a) to 9.1(d) here in below :-

(a) The taxes which are levied by Govt at certain percentage rate of contract sum/Amount shall be termed as "taxes directly related to contract value" such as GST on works Contracts, Turnover Tax Labour Welfare cess/tax and like but excluding Income tax. The tendered rates shall be deemed to be inclusive of all "taxes directly related to contract value" with existing percentage rates as prevailing on last due date for receipt of tenders. Any increase in percentage rates of "taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders shall be reimbursed to the contractor and any decrease in percentage rates of "taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders shall be refunded by the contractor to the Govt/deducted by the Govt from any payments due to contractor. Similarly imposition of any new "taxes directly related to contract value" after the last due date for receipt of tenders shall be reimbursed to the contractor and abolition of any "taxes directly related to contract value" prevailing on last due date for receipt of tenders shall be refunded by the contractor to the Govt/deducted by the Govt from any payments due to contractor.

(b) The contractor shall, within a reasonable time of his becoming aware of variation in percentage rates and/or imposition of an further "taxes directly related to contract value", give written notice thereof to the AGE(I) stating that the same is given pursuant to this Special Condition, together will all information relating thereto which he may be in a position to supply. The contractors shall submit the other documentary proof/information as the AGE(I) may require.

(c) The Contractor shall for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly authorized representative of Govt and shall further, at the request of the AGE(I) furnish, verified in such a manner as the AGE(I) may require, any documents so kept and such other information as the AGE(I) may require.

(d) The contractor shall, for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly authorized representative of Govt, and shall further, at the request of the AGE(I) furnish, verified in such a manner as the AGE(I) may require, any documents so kept and such other information's as the AGE(I) may require.

SPECIAL CONDITIONS (Contd.....)

10. CONTRACTOR'S REPRESENTATIVES, AGENTS & WORKMEN

10.1 Refer condition 25 of IAFW-2249. The contractor shall employ only Indian Nationals as his representative, servants and workmen and verify their antecedents and loyalty before employing them for the work. He shall ensure that no person of doubtful antecedents and nationality is, in any way associated with the work. If for the reasons of technical collaboration or other consideration the employment of foreign national is unavoidable, the contractor shall furnish the particulars to this effect, to the Accepting Officer at the time of submission of tender.

10.2 The AGE(I) shall have full powers and without giving any reason to order the contractor immediately to cease to employ, in connection with this contract any representative, any agents, servants and workmen or employees whose continued employment is, in his opinion undesirable. The contractor shall not be allowed any compensation on this account.

11 **SITING OF BUILDINGS** There may be some changes in location/ siting of building shown in site (layout) plan(s) to suit local conditions and/or departmental requirements. The contractor shall have no claim what-so-ever consequent to such changes in the location/siting of works.

12. PERIOD FOR KEEPING THE TENDER OPEN

12.1 The tender shall remain open for acceptance for a period of **60 days** from the date of receipt back of tender specified (or amended through subsequent amendments if any) excluding the date of submission.

13. SIGNING OF CONTRACT DOCUMENTS

13.1 The person signing the tender on behalf of another or on behalf of a Firm shall attach with the tender a proper power of attorney duly executed in his favour by such other persons or by all the partners stating that he has authority to bind such other persons or the Firm as the case may be in all matters pertaining to the contract including the arbitration clause.

14. CRITICAL PATH NETWORK

14.1 The time and progress chart to be prepared as per Condition 11 of IAFW-2249 (General Conditions of Contracts) shall consist of detailed network analysis and a time schedule. The AGE(I) and the contractor will draw the critical path network jointly soon after acceptance of the tender. The time scheduling of the activities will be done by the contractor so as to finish the work within the stipulated time. On completion of the time schedule a firm calendar date schedule will be prepared and submitted by the contractor to the AGE(I) who will approved it after due scrutiny. The schedule will be submitted in four copies within two weeks from the date of handing over of site.

14.2 During the currency of the work contractor is expected to adhere to the time schedule and this adherence will be part of the contractor's performance under the contract. During the execution of the work, contractor is expected to participate in the review and updating of the network undertaken by the GE.

14.3 These reviews may be under taken at the discretion of the AGE(I) either as periodic appraisal measure or when the quantum of work ordered on the contractor is substantially changed through deviation order or amendments. Any revision of the schedule as a result of the reviews will be submitted by the contractor to the AGE(I) within a week who will approve it after due scrutiny. The contractor shall adhere to the revised Schedule thereafter. In case of contractor not agreeing to revised schedule, the same will be referred to the Accepting Officer whose decision will be final, conclusive and binding. GE`s approval to the revised Schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time. Extension of time shall be considered and decided by the appropriate authorities mentioned in condition 11 of IAFW-2249 and separately regulated.

SPECIAL CONDITIONS (Contd.....)

CRITICAL PATH NETWORK (Contd…)

14.4 Contractor is expected to mobilize and employ sufficient resources to achieve the detailed schedule within the broad frame work of the accepted methods of working and safety.

14.5 No additional payment will be made to the contractor for any multiple shift work or other incentive method contemplated by him in his work schedule even though the time schedule is approved by the department.

15. CO-OPERATION WITH OTHER AGENCIES

15.1 The contractor shall permit free access and afford normal facilities and usual convenience to other agencies or departmental workmen, etc, to carryout works of services under separate arrangement. The contractor shall not be allowed any extra payment on this account.

16. **CLEANING DOWN:**(Refer Condition 49 of IAFW-2249: General Conditions of Contracts):- The contractor shall clean all floors, walls, remove cement, lime or paint drops, clean the joinery, glass panes etc., touch up all paint 79 and carryout all other necessary items of work in connection therewith and have the whole premises in clean and tidy condition to the entire satisfaction of Engineer-in-Charge before handing over items/works. No extra payment shall be admissible to the contractor for this operation

17. **WATER** (Refer condition 31 General Conditions of Contracts IAFW-2249)

17.1 **Water will not be supplied by MES**.

17.2 The contractor will arrange water under own resources and it will be ensured by him that the water is free from injurious quantities of acids, alcohol salt, oil, organic, matters or other impurities specified in the relevant is and water is clean, potable and suitable for mixing mortar, for washing aggregate, for curing concrete and plaster etc. The water shall be got tested under contractor own arrangement from government approved test laboratories and the test report shall be kept on Asst Garrison Engineers record.

18. ELECTRIC SUPPLY

18.1 In case the contractor desires to buy electricity from MES, it will be supplied at point up to 03 KM away from site of work shown on site plan./or as decided by the GE.

18.2 Electric supply shall be 415/230 volts, 50 cycles, three phase AC supply at upto 05 KW.

18.3 The contractor shall be charged for the electric energy consumed at Rupees **12.32 per unit (KWH)** for lighting and power.

18.4 The above rate is all in cost rate. Duties and / or taxes if any, levied by State Govt. and/or any Electricity Undertaking and the like on the electricity charges will be borne by the Department.

18.5. Main switches and KWH meter to register the power supplied shall be provided and installed by MES. All other fittings, cable switch, connection etc. for distribution and supply of electricity from main switch to work site shall be arranged by the contractor at his own according to Indian Electricity Rules and along with the routes approved by the GE. The AGE(I) shall have free access to inspect all installations, connections, devices for consuming the electricity and if these are not found satisfactory the AGE(I) shall have the power to get these disconnected.

SPECIAL CONDITIONS (Contd.....)

ELECTRIC SUPPLY (Contd....)

18.6 Supply of electricity shall be during the hours as decided by the GE. However MES does not constitute any guarantee for the continuity of supply and no compensation shall accrue to the contractor for the supply becoming intermittent or if there is any breakdown for any reason. **No extension of time will be granted for reasons of non-availability of electricity**. Contractor shall have provision of sufficient stand by supply under their own arrangement to ensure that no delay occurs on account of no or intermittent supply from the MES.

18.7 It is the responsibility of contractor to maintain the unit power factor of electric supply. For this, contractor shall provide capacitor of appropriate capacity for each connection for installation of his construction equipment.

19. NET WORK ANALYSIS

19.1 The time and progress chart to be prepared as per condition 11 of General Conditions (IAFW-2249) shall consist of detailed network analysis and a time Schedule. The critical path network will be drawn jointly by the AGE(I) and the contractor soon after acceptance of tender. The time scheduling of the activities will be done by the contractor so as to finish the work within the stipulated time. On completion of the time schedule a firm calendar date Schedule will be prepared and submitted by the contractor to the AGE(I) who will approve it after due scrutiny. The schedule will be submitted in four copies within two weeks from the date of handing over of site.

19.2 During the currency of work, the contractor will adhere to the time schedule and this adherence will be a part of the contractor's performance under the contract. During the execution of the work the contractor is expected to participate in the reviews and updating of the network under taken by the GE. These reviews may be undertaken at the discretion of the AGE(I) either as a periodical appraisal measure or when the quantum of work ordered on the contractor is substantially changed through deviation orders or amendments. Any revision of the time schedule as a result of the review will be submitted by the contractor to AGE(I) within a week for the approval after due scrutiny by the authority concerned.

19.3 The contractor shall adhere to the revised time schedule thereafter. In case of contractor disagreeing with revised schedule the same will be referred to the Accepting Officer whose decision shall be final, conclusive and binding. AGE's approval to the revised schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time. Extension of time shall be considered and decided by the appropriate authority mentioned in condition 11 of IAFW-2249 and separately regulated.

19.4 Contractor shall mobilize and employ sufficient resources to achieve the detailed schedule within broad framework of the accepted method of working and safety. No additional payment will be made to contractor for any multiple shift work or other intensive methods contemplated by him in his schedule, even though the time schedule is approved by the GE.

20.ADVANCES ON ACCOUNT AGAINST MATERIALS (REFER CONDITION 64 OFIAFW-2249)

20.1 Add the following in continuation of para 8 of Condition 64 of IAFW-2249:-
Provided further, the contractor may be paid advance on account to the full value of the under mentioned materials only, brought on the site, on his furnishing Guarantee Bond(s), from a Scheduled Bank for the amount of the retention money which should otherwise be recoverable from him under the contract. The contractor shall produce genuine purchase Vrs for the materials so procured when demanded by the Engineer in Charge any fittings, fixtures & other manufactured items which do not lose their identity as approved by GE.

SPECIAL CONDITIONS (Contd.....)

ADVANCES ON ACCOUNT AGAINST MATERIALS (REFER CONDITION 64 OF IAFW-2249) (Contd....)

(a) Factory made Panelled/flush shutters/Gauged shutters	(b) Factory made Steel Windows & Ventilators
(c) Iron Mongery & Fittings	(d) Steel (for reinforcement & structural steel)
(e) Cement	(f) Water Supply Pipes & Fittings, Taps & Valves
(g) Electric Cables; Conduits its accessories and fittings; Electrical Switch gears; Electric light fittings of all types	(h) Factory made Electric Panels; Electric Poles, Power Transformer, DG Set, HT,LT Steel and PCC pole
(j) Sanitary Appliances and Sanitary Fittings	(k) Floor/Wall Tiles
(l) Factory made PVC door shutter & frame	(m) Aluminium section
(n) APP membrane	(o) Galvalume Sheet & Steel tubular pipe

20.2 The Bank Guarantee Bond (s) shall be executed for a period of six months and on a form as directed by the Accepting Officer. The contractor shall further arrange to extend the period of Guarantee Bond (s) if and when necessary, as directed by the Accepting Officer or shall furnish fresh Guarantee Bond (s) of similar value in lieu.

20.3 It shall be noted that, advance on account to the full value against Bank Guarantee is permissible only in respect of fittings and fixtures and other manufactured items which do not lose their identity.

21.**ROYALTIES.** Delete the existing description of condition 14 of IAFW-2249 and insert the following: -"No quarries on defence land are available".

22**. OUT OF POCKET EXPENSES.** No out of pocket expenses incurred by the tenderer in submitting his tender shall be reimbursed whether his tender is accepted or not.

23. **CONTRACTORS PLANTS/EQUIPMENT AT SITE**.

23.1 The Contractor along with his labour return shall furnish to the Engineer-in-Charge every morning distribution return of his plants/equipment on the site of work stating following particulars:-

(a) Particular of plants/equipment, their make, manufacturer's model No. if any, Registration No., if any, capacity, year of manufacture and year of purchase etc.
(b) Total No. of (Quantity) on site of work.
(c) Location indication No. (quantity) at each location on the site of work.
(d) For the purpose of this condition, purchase value on the date of purchase for plant/equipment and vehicle No. of trucks and lorries shall be furnished. However neither the workman's tools nor manually operated tools/equipment shall be given. The Engineer-in Charge shall record the particulars supplied by the contractor in the works diary and sent the return to the AGE(I) for record in his office.

24. **DAMAGE TO EXISTING WORKS**

Any damage to the existing structures, any existing road etc., during the execution of work shall be made good by the contractor at his own expense. Rectification, replacement, making good and touching up etc. shall be carried out, conforming to the materials and workmanship originally provided and to the satisfaction of the Engineer-in-Charge. In case of any dispute on this account, the decision of the AGE(I) shall be final, binding and conclusive.

SPECIAL CONDITIONS (Contd.....)

25. MINOR CONSTRUCTION DETAILS

25.1 Unit rates offered by the Contractor in Schedule 'A' shall be deemed to include for all minor details of construction which are obviously and fairly intended and which may not have been referred to in these documents but these are essential for the execution of work and services in workmen like manner and sound construction.

25.2 In case of difference of opinion as to whether or not a certain item of work constitutes minor details of construction included in the contractor's quoted rates, the decision of the Accepting Officer shall be final, conclusive and binding.

26. RECORD OF PROPRIETARY BRANDED MATERIALS WHICH LOOSE IDENTITY AFTER INCORPORATION

26.1 Proprietary/branded materials such as all types of bitumen, cement, steel, sealing compounds, glass grid, SAMI, paints, bonding agents etc, the quantity of which cannot be checked after incorporation in the work, shall when collected at site, be recorded in Measurement Book with reference to voucher No, make, brand and rate charged by manufacturer/supplier, and signed both by the MES representative and the contractor.

26.2 The contractor shall obtain proprietary/branded materials direct from the manufacturer(s) or from their authorised stockiest where such authorised stockiest have been appointed. Contractor shall produce original purchase voucher/bill/invoices for full quantities of materials showing quantity and quality of the materials before claiming advance on account payment or before incorporating these materials into the work to satisfy the Engineer-in-Charge that materials comply with the I.S. specifications. These vouchers shall be endorsed, dated and initialled by the Engineer-in-Charge giving the contract number and name of work and a certified copy of each such voucher signed both by Engineer-in-Charge and the contractor shall be kept in MES record.

27. STORAGE OF MATERIALS

The contractor shall not be provided any storage accommodation at the site by MES. The contractor shall make his own arrangement as per condition 10 of IAFW-2249 and as directed by the Engineer-in-Charge.

28. RETENTION MONEY/COMPENSATION FOR DELAY

For the purpose of calculating retention money under condition 64 of IAFW-2249 and compensation for delay in completion of work under condition 50 of IAFW-2249, income tax (at source) and like, the value of contract as revised by price variation under condition 63 of IAFW-2249 shall be taken into account.

29. BANK GUARANTEE BOND

In case the contractor desires to furnish Bank Guarantee in lieu of retention money/security deposit, the guarantee bond shall be executed as per specimen prescribed by the Govt. of India, Min. of Defence on non-judicial stamp papers of appropriate value from schedule Bank. In case of the BGB is executed from a non-scheduled Bank the same shall be supported with cover from Reserve Bank of India. Guarantee Bond shall come into force after the same is accepted by the Accepting Officer.

30. LAND FOR TEMPORARY WORKSHOP, STORES ETC

Delete. The following from line 5 to 9 of sub para 1 of condition 24 of IAFW-2249 reading "In the event of area of land allotted to him" and insert as under:-

"The contractor shall be allotted the area as marked on the layout plan(s) for the purpose of erecting temporary workshop, stores etc. Plot of land so allotted shall not be used for accommodation for labour and canteen, for which the contractor shall make his own arrangements at his own expense. For this purpose, a token rent of Rs. 1/- per year or part of a year will be recovered from the contractor in respect of each and every separate area of land allotted to him. The area so occupied shall be vacated by the certified date of completion and site of work shall be cleared as stipulated in condition 49 of IAFW-2249"

SPECIAL CONDITIONS (Contd.....)

31. TESTING OF MATERIAL(REFER CONDITION 10 OF IAFW-2249)

31.1 For works costing more than one crore it will be mandatory for the contractor to establish his own laboratory at his own cost at site on commencement of work to carry out test of level 'A' specified in Appendix 'A' to Special Condition here in after. In case the cost of work is less than Rs. 1 crore it will be at the option of the contractor to set up site laboratory. All equipment of the laboratory will be got calibrated by the contractor from the authorised test house at commencement of work and thereafter on yearly basis and test certificate produced to the AGE. The contractor shall employ a full time, competent technical representative having diploma in Civil Engineering for carrying out tests in site laboratory. This will be in addition to Engineer (s) employed for supervision of works as required vide condition 25 of IAFW -2249.

31.2 Contractor will be responsible for carrying out all the tests specified in Appendix 'A' to Special Condition for level 'A', level 'B' and level 'C' and all others tests specified elsewhere in tender documents such as test for cement, steel etc. The cost of material and transportation for all the tests will be borne by the contractor.

31.3 There will be no recovery by the department for the tests of level "A" carried out in the site lab established by the contractor. For level 'B' or any other tests carried out in zonal lab, testing charges will be recovered at the rates given in Appendix 'A' to Special Condition. The recovery for the tests carried out in National test house/Engineering college/SEMT wing, CME, Pune etc. shall not be affected by the department and the testing charges for such tests will be borne by the contractor himself.

31.4 The test in site lab shall be carried out in the presence of Engineer-in-Charge

31.5 The percentage/ selective checks as desired by the Accepting Officer/AGE shall be got done independently in the Zonal labs. The testing charges only for such tests shall be borne by the department. Cost of material shall be borne by the contractor. In case test results are found at variance from the results of site lab, the results obtained from the Zonal lab will be final and binding

31.6 For the works costing less than 1 Crore in case contractor does not opt to establish site lab, level 'A' tests shall also be got carried out by the contractor in Zonal lab and recovery shall be affected as specified in Appendix 'A' to Special Condition.

31.7 In case the same is got carried out from other Govt approved/Engg College, the cost of materials, transportation as well as testing charges will be borne by the contractor

32. HANDING OVER OF SITE

Site for execution of work will be available as soon as the work is awarded. In case it is not possible to make the entire site available on the award of work, the contractor will have to arrange his working programme accordingly. No claim whatsoever, for not giving entire site on award of work and for giving site gradually, will be tenable.

33. WATCH, WARD AND LIGHTING

33.1 The Contractor shall provide and maintain all necessary watch, ward and lighting arrangements to keep the traffic off the trenches. Necessary boards and sign posts shall be provided and set up to the entire satisfaction of the Engineer-in-charge.

33.2 The Contractor shall reimburse the loss to the Govt. on account of any damage that may occur on this account.

SPECIAL CONDITIONS (Contd.....)

34. **PRECAUTION AGAINST RISKS**

The Contractor shall be responsible at his own expense in taking precaution to prevent any damage from what so ever cause arising, other than out of accepted risks and to minimise the amount of any such loss or damage and for adoption of necessary protective measures required for the purpose in compliance with Condition 38 of IAFW-2249 and Rule 5 of the MES SAFETY CODE vide (Annexure `B') of IAFW-2249 until the works have been handed over duly completed to the Engineer-in-charge.

35**. SECURITY AGAINST LOSS OR DAMAGE:** The contractor shall furnish to the Engineer-in-Charge every morning distribution return of his plants/equipment on the site of work stating the following particulars: -

(a) Particulars of plants/equipment, their make manufacture Model No; if any, registration No if any, capacity, year of manufacture and year of purchase etc.

(b) Total No (Quantity) on site of work.

(c) Location, indication No. quantity at each location of site of work.

(d) Purchase value on the date of purchase. For the purpose of the condition, plant / equipment, shall be given vehicle No i.e. trucks and lorries but neither the workman's tools nor any manually operated tools/equipment. The Engineer-in-Charge shall record the particulars supplied by the contractor in the works diary and send the return to the AGE(I) for record in his office.

Note :- However this will not absolve the contractor of his responsibility for safe custody of plants, equipment etc. even though the work is to be executed in restricted area.

36. **OCTROI, SALES TAX AND OTHER DUTIES:** Contractor's rates shall be deemed to be inclusive of all duties and taxes such as Octroi, GST, excise, VAT etc as referred in condition 10 of IAFW-2249 (General Conditions of Contract) and state Govt sales tax on works contracts payable under respective statutes pursuant to the Constitution (Forty sixth amendment) Act 1982. Any condition stipulated by the tenderer regarding sales tax on works contracts will not be considered and such tender shall be liable for rejection.

37. **CONSTRUCTION LABOUR WELFARE TAX:** The quoted rates by the tenderers shall be deemed to be inclusive of construction labour welfare tax and no extra payment shall be admissible to the contractor on this account.

38. **MATTERS ARISING BETWEEN VARIOUS AGENCIES WORKING AT SITE :** The contractor shall permit free access and afford reasonable facilities to other agencies or departmental workmen, If any engaged by Govt to carry out their part of work in the area No extra payments shall, however be made to the contractor on this account what so ever. The decision of AGE(I) shall be final and binding on the contractors in all matters arising between the various contractors working at site simultaneously. The various agencies/contractors working contemporaneously at the site are required to work in close co-ordination.

39. **FORCE MAJEURE**

39.1 Should any force majeure circumstances arise, each of the contracting party shall be excused for the non-fulfilment or for the delayed fulfilment of any of its contractual if the affected part within 15 days of its occurrence informs the other party in writing.

39.2 Force Majeure shall mean fires, floods, natural calamities or other acts such as war, turmoil's, strikes (as not limited to be establishment of the seller), sabotage, explosions, quarantine restrictions beyond the control of either party.

SPECIAL CONDITIONS (Contd.....)

FORCE MAJEURE (Contd...)

39.3 It is understood and agreed between the parties hereto that the right and obligations of the parties shall be deemed to be in suspension during the continuance of the force majeure event as aforesaid and the said rights and obligations shall automatically revive upon the cessation of the intervening forces majeure vent the period within the rights and obligation of the parties shall be in suspension due to force majeure event shall not be considered as a delay with respect to the period of deliver and/or acceptance of delivery under the contract or other to the detriment of either party.

39.4 Notwithstanding the provisions of the immediately for clauses it is further understood and agreed between the party hereto that in the event of any force majeure persisting for uninterrupted period exceeding (06) six months, on their part reserves the right to terminate this contract upon giving prior written notice of 30 (thirty) days to the other party of the intention terminate without any liability other than reimbursement on the terms provided in their agreement for the goods received.

40. **APPROACHES**

40.1 The Contractor shall make arrangements for and provide at his own cost all temporary approaches, if required to the site(s), after obtaining approval in writing of the AGE(I) to the layout of such approaches.

41. **RELEASE OF ADDITIONAL SECURITY DEPOSIT**

41.1 Additional security deposit when deposited by the Contractor as per Condition 22 of the IAFW-2249 shall be released in two stages as under:-

(a) 50% of the additional security deposit shall be released on payment of final bill provided there are no claims outstanding against the contractor in respect of the contract in which the additional security is lodged and the final bill is not minus. In the event of departments claims against the contractor becoming and / or the final bills under Condition 66 of IAFW-2249 becoming minus the amount of the security deposit shall be adjusted against the claim due to Government and the balance if any will be released to the contractor.

(a) Balance 50% of the additional security deposit will be released to the contractor after expiry of defects liability period as per Condition 68 of IAFW-2249 Provided the contractor shall first have to render a No Demand Certificate (IAFA-451).

(c) In order to implement the above procedure, the contractor is advised to deposit the additional security in two equal parts so as to facilitate its release.

(d) The above clause is not applicable to release of earnest money/ security deposit by a contractor who has not executed the security bond with the department.

42. **PROPRIETORY MATERIAL/ ARTICLES**

42.1 The proprietary articles such as anti-termite chemical, bitumen, base felt, water proofing compound, paint, etc when brought to site shall be inspected and approved by the **AGE(I) Sonegaon.**

42.2 The quantity of proprietary articles brought to site shall be recorded in measurement book (IAFW-2261) and signed by the contractor and the Engineer-in-Charge as a check to ensure that required quantity has been brought to site for incorporation in the works.

42.3 The proprietary materials shall be stored as directed. Those already recorded in the measurement book shall be marked suitably for identification.

SPECIAL CONDITIONS (Contd.....)

42.4 The contractor, shall on demand, produce to the **AGE(I) Sonegaon**, original receipt vouchers/ invoices in respect of the supplies, to ensure that the contractor has actually brought the articles of required quality and quantity from the authorised agent/manufacturer/ supplier and also to find out the rates thereof.

42.5 Bitumen for road, roof treatment and mastic filling to be used in the work shall be purchased directly from manufactures stockiest or their authorised dealers only. These vouchers/invoices shall be defaced by the **AGE(I) Sonegaon** /Engineer-in-Charge, indicating reference to the contract number, under his dated signature, and CTC thereof shall be kept on record so as to avoid their being used again. Test certificate from the manufacturer shall also be produced by the contractor along with purchase voucher of materials.

42.6 The chemical required for anti-termite treatment shall be purchased from manufactures / authorised dealers only and contractor shall produce the cash voucher etc to prove the genuineness of the same. **AGE(I) Sonegaon** will also ensure that proper quality/ quantity of chemicals are brought and incorporated in the works.

42.7 Purchase vouchers of following proprietary and branded materials from manufacturer/dealer shall be produced by the contractor to Engineer-in-Charge. Defaced copies of voucher shall be held on record by the Engineer-in-Charge. Details of vouchers of proprietary material shall be entered in MB. Ref Para 8.4 also for the list of items.

(a) Bitumen
(b) Cement
(c) Road marking paint
(d) Thermoplastic paint
(e) Cement base paint
(f) Paver Block
(g) All proprietary and branded materials for which contractor claims payment in RAR.

42.8 The Vouchers/ Invoices will clearly indicate the **Contract Number** and the **IS No** specific alternative to which the material conforms in case of various alternatives given in IS.

42.9 Contractor shall produce original purchase vouchers/ Invoices challans along with **Test Certificates** wherever applicable from the manufacturers and or their authorised agents for the full quantity of the materials as applicable as a pre requisite document before submitting claims for payment for advance on account of the work done and or materials collected, in accordance with Condition 64 of IAFW-2249, General Conditions of Contracts.

42.10 Sample of all materials shall be got approved by the contractor from AGE(I) Sonegaon before incorporation in the work. Materials/Articles provided by the contractor for in-corporation in the works shall unless otherwise specified in the particular specifications, comply with the requirements of the relevant Indian standards (IS) of the year of publication/ edition specified in the MES Schedule Part-I and shall have IS certification marking, in particular, the following items as applicable:-

(a) Cement, Bricks
(b) Aggregate for WBM/BM/ASDC
(c) Sand
(d) Boulder/ Quarried stone for soling
(e) Paver Block, Kerb Stones
(f) Speed Bumps, Convex Mirror, PVC(SWR) Pipe, Delineators.

SPECIAL CONDITIONS (Contd.....)

43. **ACCEPTANCE QUALITY OF WORK AND FINISHES** To determine the acceptable standard of materials and work man ship, the AGE(I) will order to the contractor to execute sample works and shall select a portion of building as sample building in which all the works as per contract agreement will be carried out before in corporate in the whole building. The comments / suggestion received from users / visitors will be implemented firstly on sample quarter and then may be implemented in the whole building based on approval of competent authority. The workmanship of the sample quarters / works shall serve as guiding sample for the remaining works.

44. **RECORD OF CONSUMPTION OF CEMENT**

44.1 For the purpose of keeping a record of cement consumed in the works, the Contractor shall maintain a pucca bound register with serially numbered pages duly initialled by Engineer-in-Charge, showing daily receipt, quantity used in works and balance in hand at the end of each day. This register shall be signed daily by the Contractors representative and MES representative in token of their verification of its correctness. This register shall be checked by Engineer-in-Charge at least once a week and on the day; cement is brought by the contractor.

44.2 The register shall be kept at site in the safe custody of the Contractor during progress of the work and he shall on demand produce the same for verification of inspecting Officer. On the completion of the work, cement register shall be handed over to the Engineer-in-Charge for record with MES.

45. **SPECIAL CONDITIONS FOR CONCILIATION**

45.1 The following disputes between the parties to the contract shall after written notice by either party to the contract be referred to the “Sole conciliator”. This is an serving officer not below the rank of superintending Engineer / Superintending Engineer (QS&C) having degree in Engineering or equivalent or having passed final /direct final Examination of sub division II of Institution of Surveyor (India) recognized by Govt of India to be appointed by the Engineer in Chief, Army Head Quarters, New Delhi or in his absence the officer officiating as Engineer in chief or Director General of works specifically delegated by the Engineer in chief.

45.2 The scope of conciliation shall be restricted to the following types of disputes with financial limits as 2.00 lacs (Rupees two lacs only) for each claim in dispute.

(a) Disputes relating to levy of compensation for delay in completion.

(b) Disputes relating to technical examination of works.

(c) Disputes relating to interpretation of the provisions of the contract with reference to their application to parties.

(d) Disputes relating to non-return of schedule “B” stores over issued to the contractor.

(e) Any other dispute having fair chances of being resolved by conciliation and consider fit to be referred to conciliation by the parties.

45.3 If the other party rejects the invitation, there will be no conciliation proceedings. If the party initiating conciliation does not receive a reply within 30 days from the date on which he sends or within such other periods of time as specified in the invitation, he may elect to treat this as a rejection of the invitation to conciliate and if he so elects, he shall inform in writing the other party accordingly.

45.4 The party initiating conciliation shall send to the other party a written invitation to conciliate, briefly identifying the subject of the dispute. The conciliation proceedings shall commence when the other party accepts in writing the invitation to conciliate.

45.5 If the conciliator so appointed resigns his appointment or vacates his office or is unable or unwilling to act due to any reason whatsoever, the authority appointing him may appoint a new Conciliator to act in his place.

45.6 The parties shall not initiate during the conciliation proceedings in respect of a dispute that is the subject matter of conciliation proceedings except that a party may initiate arbitral or judicial proceedings where in his opinion such proceedings are necessary for preserving his rights. The failure of conciliation shall in no way absolve the right of the parties to invoke arbitration for the disputes referred to for the conciliation.

SPECIAL CONDITIONS (Contd.....)

SPECIAL CONDITIONS FOR CONCILIATION (Contd...)

45.6 The conciliation proceedings shall be governed as per the Arbitration and Conciliation Act 1996.

45.7 The settlement agreement signed by the parties as a result of conciliation proceedings shall have the same status and effect as it is an arbitral award on agreed terms.

46. **BLASTING**

Blasting in any form is prohibited.

47. **SITE DOCUMENTS**

47.1 In addition to the site documents which are normally maintained for works , the following additional documents (as applicable for this work) shall be maintained at site and signed by AGE(I) / his authorised representative and the Contractor :-

Mix design for quality concrete for rigid pavement.

(a) Sieve analysis and silt test of sand
(b) Sieve analysis of stone aggregates of different sizes
(c) Water absorption test of stone aggregates of different sizes
(d) Impact value of stone aggregates of different sizes
(e) Crushing value of stone aggregates of different sizes
(f) Flakiness index of stone aggregates of different sizes.
(g) Rolling hours
(h) Daily work register
(j) Register of materials daily arrived at site
(k) Materials approved register
(l) Aggregate abrasion value register
(m) Cement consumption register
(n) Register for soundness test
(o) Register for temperature control at boiler out at paver
(p) Register for clay, silt and impurities in aggregate test.
(q) Cube testing register
(r) Beam testing register

48. **VALUATION OF DEVIATIONS**

Condition 62 of General Conditions of Contracts (IAFW-2249) shall be referred.

49. **OFFICIAL SECRET ACT**

In reference to condition 2 A of General Conditions of Contracts IAFW-2249, the contractor shall be bound by the Indian Official Secret Act-1923 and particularly section 5 thereof.

50. **CONSTRUCTION AND LABOUR WELFARE TAX / CESS**

The lump sum/unit rate quoted by the tenderers shall be deemed to include the element of tax consequent to building and construction workers (Regulation of employment and condition of services) welfare cess act-1996.

51. **TAX ON WORKS CONTRACT CONSEQUENT UPON CONSTITUTION (FORTY SIXTH AMENDMENT) ACT 86**

The tendered rates shall be deemed to be inclusive of all taxes & levies payable under the respective statues including the GST imposed by Central Govt/ State Govt consequent upon constitution (Forty Sixth) amendment Act 1986. All orders notifications in connection with tax on works contracts issued shall be considered by the tenderer & nothing extra on this account shall be paid/reimbursed by the Department.

SPECIAL CONDITIONS (Contd.....)

52. **INDEMNITY BOND FOR PAYMENT OF LABOUR, WORK MAN EMPLOYED ON WORKSOR OTHER MONEYS OF TENDER PAYMENTS:-**The contractor shall execute indemnity bond with the AGE(I) for enforcement of various enactments like wages act 1936, minimum wages act 1948, employees liability act 1938 , workmen's compensation act 1923 or any other act or enactments related to indirectly or directly labour employed on works and rate framed there under from time to time being in the force. In case of non-compliance of any of the enactments by the contractor, the AGE(I) shall be empowered to exercise the power vested in him as the principle employer to deduct amounts so not paid to the labour /workman to be deducted from the sum becoming due under the contract or from the other contracts in terms of condition 67 of IAFW 2249.

53. **SECURITY PROVISIONS**: Contractor must read the following security provision before quoting their rate as the same is mandatory and will be followed strictly:-

(a) **IDENTIFICATION OF LABOUR**. All man power (including casual labour) employed by contractor is required to be in possession of valid any one of the identification i.e. PAN Card, AADHAR Card, Voter ID, Gram Panchayat certificate or any other valid ID as recognized by Govt. Labour not in possession of one of these IDs, will not be allowed to enter in Air Force premises.

(b) **USE OF MOBILE PHONE**. Man power employed by the Contractor, will not be permitted to carry mobile phone inside the Air Force premises. Violation of these instructions will be dealt with as per the rules /discretion of Air Force authority.

(c) **USE OF VEHICLE, PLANT & MACHINERIES**. All vehicle, plant & machinery brought by Contractor for purpose of execution of Contract, will be checked by Air Force authority and escorted to work site. Unloading of vehicles will be monitored by Air Force authorities.

(d) **SITE CLEARANCE.** Provision of space for storage, establishment of plant / machinery, labour camp etc. will be purely on the discretion of Air Force authorities. In case any such construction is permitted on Air Force land, the same will be demolished and debris cleared under site clearance prior to completion of Contract.

(e) **WORKING HOURS**. Working hours will be approved by Air Force Authority and are subject to change without prior intimation based on the security threat perception. Working hours might also be reduced if the situation so demands. However, in case extra working hours are required due to technical reasons, the same will be processed on a case-to-case basis with Air Force Authorities.

SPECIAL CONDITIONS (Contd.....)

54. **T&P, MACHINERY & TRANSPORT (Refer Condition 15,16 & 34 IAFW-2249)** For smooth execution of work the contractor shall be engage adequate quantities of T&P, machinery & transport as listed below :-

S. No	T&P, Machinery and Transport
(a)	Vibratory Rollers
(b)	Slip form Sensor Paver
(c)	Pneumatic Wheeled Roller
(d)	Paver Finisher
(e)	Bitumen Sprayer
(f)	Truck / Tipper
(g)	Automatic Thermoplastic Paint Applicator
(h)	Contractor will be liable to deploy at site any other tool or machine required as directed by Engineer in charge / AGE to execute specified nature of work or as per manufacturer's instructions

55. Please note that the contractor will be required to strictly ensure engagement of engineers and deployment of "T&P" Machinery & Transport" as stipulated in the contract. Inadequate engagement of engineers / deployment of T&P, Machinery & Transport as per contractor condition shall be considered as serious lapse attracting ban / removal / downgrading / debarment of firm / company. The above provision shall be deemed to be included in quoted rate of contractor and nothing extra shall be admissible. No extension of time will be granted for failure of any tool and plant incorporated in this work.

56. **ROAD ROLLER (**Refer condition 15 of IAFW-2249)

(a) Where road roller (s) are hired by the Department to the contractor a log book for each road Roller shall be maintained by the Department Recording hours of working of the road roller. In case, however, when the contractor procures road roller (s) from source other than the Department a log book for each road roller shall be maintained by him for recording areas of working of the Road Roller. Entries in the log book shall be signed by the contractor or his authorized representative and by the Engineer-in-Charge.

(b) To ensure proper consolidation, road roller must work for at least the number of days assessed on the basis of output here under:-

Sl No	***OUTPUT OF ROAD ROLLER PER DAY OF 8 HOURS***	
(i)	Consolidation of formation surfaces/ sub grade	1850 Sqm
(ii)	Consolidating of stone soling 23cm thick	518 Sqm
(iii)	Consolidation of stone soling 15cm thick	800 Sqm
(iv)	Consolidation of WBM (Stone metal) 11cm compacted thickness including spreading and consolidation with binding material	248 Sqm
(v)	Consolidation of WBM (Stone metal) 7.5cm compacted thickness Including spreading and consolidation with binding material	372 Sqm
(vi)	Consolidation of 30mm thick dense asphaltic concrete	480 Sqm
(vii)	Consolidation of bituminous macadam surface upto 75mm thick	320 Sqm
(viii)	Consolidation of 40mm thick dense asphaltic concrete	460 Sqm
(ix)	Consolidation of single coat surface dressing	774 Sqm
(x)	-do- two coat surface dressing	558 Sqm
(xi)	Consolidation of 2.5 cm thick premixed carpet including seal coat.	600 Sqm
(xii)	Consolidation of 2 cm thick premixed carpet including seal coat.	774 Sqm

SPECIAL CONDITIONS (Contd.....)

(c) If the roller has not worked for the number of days so assessed, recovery shall be affected from the contractor for the number of days falling short of the days assessed on the basis of output stipulated above. The recovery shall be affected as under:-

(i) Where road roller is hired by the contractor only from sources other than the Department at Rs 3513.00/- working days of 8 hours.

(d) The above provision shall not absolve the contractor of his responsibility for properly consolidating surfaces as required under the provisions of the contract.

57. **ARBITRATION:** The existing descriptions of Condition 70 of IAFW-2249 shall be substituted by the revised description as under:-

"70. ARBITRATION

(a) **Arbitration where applicability of Section 12 (5) of the Arbitration and Conciliation Act has been waived off:-**

All disputes, between the parties to the Contract (other than those for which the decision of the CWE or any other person is by the Contract expressed to be final and binding) shall, after written notice by either party to the Contract to the other of them, be referred to the Arbitral Tribunal of a Sole Arbitrator (in case of contract sum less than or equal to Rs 100 Crore) or to Arbitral Tribunal of three Arbitrators (in case of contract sum exceeding Rs 100 Crore) from MoD Panel of Arbitrators. The officers so considered for appointment of Arbitrator, either as sole Arbitrator or for Arbitral Tribunal, shall be having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Subdivision II of Institution of Surveyor (India) or similar other Institutes recognised by the Government of India.

In case of arbitration by Sole Arbitrator, the Arbitrator shall be appointed by the Authority mentioned in the contract document within a period of thirty days of having received the notice from any of the parties to Contract, out of MoD Panel of Arbitrators. In case of Arbitral Tribunal consisting of panel of three Arbitrators, both the parties will be asked by the Appointing Authority to suggest at least two names out of MoD Panel of Arbitrators within thirty days. The Appointing Authority will appoint two Arbitrators, one Arbitrator each out of the suggested names. The two Arbitrators so appointed will select one Arbitrator from the MoD Panel of Arbitrators who will be the 'Presiding Arbitrator'. The Serving Officer(s) so appointed as Arbitrator(s), either as Sole Arbitrator or as one of the three Arbitrators in the Arbitral Tribunal, can continue as Arbitrator even after retirement, provided both the parties to the Contract give written consent to this effect. In such case, however, the Arbitrator shall not be entitled for any fee even after retirement.

(b) Arbitration where applicability of Section 12 (5) of Arbitration & Conciliation Act has not been waived off :-

All disputes, between the parties to the Contract (other than those for which the decision of the CWE or any other person is by the Contract expressed to be final and binding) shall, after written notice by either party to the Contract to the other of them, be referred to the Arbitral Tribunal of a Sole Arbitrator (in case of contract sum less than or equal to Rs 100 Crore) or to Arbitral Tribunal of three Arbitrators (in case of contract sum exceeding Rs 100 Crore). The Officers so considered for appointment as Arbitrator, either as Sole Arbitrator or for Arbitral Tribunal, shall be having degree in Engineering or equivalent or having passed Final/Direct Final Examination of Sub Division II of Institution of Surveyor (India) or similar other Institutes recognised by the Government of India.

SPECIAL CONDITIONS (Contd.....)

ARBITRATION (Contd...)

In case of arbitration by sole Arbitrator, the Arbitrator shall be appointed by the authority mentioned in the contract document from the MoD Panel of Arbitrators within a period of thirty days of having received the notice from any of the parties to Contract. In case of Arbitral Tribunal consisting of panel of three Arbitrators, both the parties shall be asked by the Appointing Authority to suggest at least two names out of MoD Panel of Arbitrators within thirty days. The Appointing Authority will appoint two Arbitrators, one Arbitrator each out of the suggested names. The two Arbitrators so appointed shall select one Arbitrator from the MoD Panel of Arbitrators who will be the 'Presiding Arbitrator'.

(c) Common for all Arbitration:-

Unless both parties agree in writing, such reference shall not take place until after the completion or alleged completion of the works or termination or determination of the contract under Condition Nos 55, 56 and 57 hereof. Provided that in the event of abandonment of the works or cancellation of the Contract under Condition No 52,53 or 54 hereof, such reference shall not take place until alternative arrangements have been finalized by the Government to get the works completed by or through any other Contractor or Contractors or Agency or Agencies.

Provided always that commencement or continuance of any arbitration proceeding hereunder or otherwise shall not in any manner militate against the Government's right of recovery from the Contractor as provided in Condition 67 hereof.

If the sole Arbitrator or one or more Arbitrators of the Arbitral Tribunal so appointed resign(s) from his/her appointment or vacate(s) his/her office or in unable or unwilling to act due to any reason whatsoever, the Authority appointing him/her will appoint a substitute Arbitrator to act in his/her place in the manner specified hereinabove. In case the Arbitrator resigning in this manner is the Presiding Arbitrator, the other two Arbitrators of the Arbitral Tribunal shall appoint the substitute Presiding Arbitrator.

The Arbitral Tribunal may proceed with the arbitration, exparte, if either party, in spite of a notice from the arbitrator fails to take part in the proceedings.

The Arbitral Tribunal may from time to time with the consent of the parties, enlarge the time for making and publishing the award subject to the limit laid down in the Arbitration & Conciliation Act 1996 as amended upto the date on which arbitration proceedings commence.

The Arbitral Tribunal shall make the award within the period as provided in the Arbitration & Conciliation Act 1996 (as amended upto the date on which arbitration proceedings commence) from the date of entering on the reference or within the extended period as the case may be on all matters referred to it and shall indicate findings along with sums awarded separately on each individual item of dispute. The Arbitral Tribunal shall give reason for the award in each and every case irrespective of the value of claims or counter claims.

The venue of Arbitration shall be such place or place or places as may by fixed by the Arbitral Tribunal in its sole discretion.

"**The Award of the Arbitral Tribunal shall be final and binding on both parties to the Contract."**

---Digitally signed-----

Signature of Contractor For Accepting officer

SPECIAL CONDITIONS [CONTD. /.]
APPENDIX'A' TO SPECIAL CONDITION
MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

Srl No	Material	Tests	Method of testing	Frequency of tests			Level of test	Rate per test Rs.	Remarks
1	2	3	4	5			6	7	8
1.	Fly ash Brick	1) Compressive strength	IS-3495 (Part-II)	As per IS-5454 as given under:-			A	330/-	Checks for visual and Dimensional
		2) Water Absorption 3) Efflorescence	--Do– ---Do… (Part-I)	Lot Size. 1001 to 10000 10001 to 35000 35001 to 50000	sample Size 5 10 15	permissible Nos of defective bricks 0 0 1	A A	330/- 330/-	as per IS:5454 Legend A-Site Lab B-Zonal Lab/Govt Engg college. C-National test house/SEMT WING/Engg. College.
2.	Coarse Aggregate	1) Sieve Analysis	IS:2386(Part-I)	One test for every 100 cum of aggregates or part thereof brought to site.			A	600/-	
		2) Flakiness Index	---do--				A	250/-	
		3) Estimation of deleterious materials	---do–	One test for every 100 cum of aggregate or part thereof.			A	600/-	
		4) Organic impurities	---do--	One test per source of supply			C	275/-	
		5) Moisture content	IS:2386(Part-II)	Regularly as Reqd.			A	330/-	
		6) Specific gravity	--do--	One test for each source of supply.			B	330/-	

CONTD. /.

SPECIAL CONDITIONS [CONTD. /.]APPENDIX 'A' TO SPECIAL CONDITION

MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

Srl No	Material	Tests	Method of testing	Frequency of tests	Level of test	Rate per test Rs.	Remarks
1	2	3	4	5	6	7	8
3.	Fine aggregate	1) Sieve Analysis	(IS:2386Pt-I)	One test for every 100 cum of FA or part thereof when brought to site.	A	660/-	
		2) Test for clay, silt and impurities.	--do–	--do--	A	500/-	
		3) Specific gravity	--do. But (Part-II)	One for each source of supply	B	330/-	
		4) Test for organic impurities	--do--	One test for each source of supply.	C	330/-	
		5) Moisture content	-do-	Regularly as required subject to 2 tests/ per day when being used.	A	275/-	
4.	Cement	1) Setting time	IS-4031-63 Reaffirmed 1980	Once for each consignment or as and when Reqd.	B	500/-	
		2) Soundness	--do--	--do--	C	550/-	
		3) Compressive strength	--do--	--do--	B	275/-	
		4) Fineness	--do--	--do--	C	120/-	
5.	Structural concrete	1) Slump test or compacting factor time or VEE-BEE test	IS-1199	The Min frequency of sampling of concrete of each grade shall be as under :-	A	300/-	(1) Random sample shall be carried out to cover all mix units.
		2) Compressive strength	IS-516	Qty of Conc. IN THE work(M^3) 1 – 5 — No of samples 1	A	900/- per sample	(2) Refer IS-456-2000 Clause. 15.2 for frequency of sampling.
				6 -15 — 2 16-30 — 3 31-50 — 4 51 and above — 4 + 1 for each additional 50 Cum or part thereof			
6.	Water for constn purpose	1) Test for acidity 2) Test for alkalinity 3) Test for solid content	IS:456 & 3025 -do- -do-	Once at the stage of approval of source of water	B B C	500/- 500/- 500/-	Refer relevant clause of IS-456:2000

CONTD. /.

SPECIAL CONDITIONS [CONTD. /.]APPENDIX 'A' TO SPECIAL CONDITION
MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

1	2	3	4	5	6	7	8
7.	Paver Block	1) Water absorption	IS:1237-1980 (Appendix 'D')	6 Tiles out of 18	B	180/-	Samples: 18 Tiles from each source of supply selected at Random.
		2) Wet Transverse strength	-do-(Appendix "E")	-do-	B	144/-	
		3) Resistance to wear	-do- (Appendix 'F')	-do-	C	540/-	
8.	Wood/Timber	1) Specific gravity and weight	IS:1708-1960	Minimum 3 sample from a lot of 4 Cum or 250 pieces of seasoned timber	B	120/-	
		2) Moisture content	-do-	-do-	A	120/-	
9	Timber paneled and Glazed door/window Shutters (including Factory made shutters)	(a) Dimensions Sizes workmanship And finish	IS-1003 (Part-I)	Frequency of sampling from each lot shall be as under:-	A	180/-	
				Lot size / Sample size 26 to 50 / 05 51 to 100 / 08 101 to 150 / 13 151 to 300 / 20 301 to 500 / 32 501 to 1000 / 50 1000 & above / 80			
		(b) Strength test 1. Slamming	IS: 1303				
		2. Impact indentation	-do-				
		3. Shock resistance	-do-				
		4.Edge loading	-do-				
10.	Plywood (IS:303)	(a) Moisture content	IS:1734 (Part-I)	Six test pieces cut from each of the board selected as per table I shall be subjected to test	C	240	Sampling shall be as per IS :7835-1975 table-2

CONTD. /.

SPECIAL CONDITIONS [CONTD. /.]
APPENDIX 'A' TO SPECIAL CONDITION
MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

1	2	3	4	5	6	7	8
11.	Wood particle board (Medium density IS: 3097)	(a) Density	IS:2360 (Part III)	Three test specimens from each sample (size 150 mm x 75 mm)	A	60	Sampling shall be as per IS :3487 table-with moisture meter
		(b) Moisture content	-do-	-do-	A&B	60	
		(c) Water absorption	-do- (Part16)	-do- (size 300mm x 300 mm)	A	60	
		(d) Swelling due to surface absorption	-do- (Part17)	-do- (size 125 mm x 100 mm)	A	60	
		(e) Swelling water	-do-	-do- (size 200 mm x 100 mm)	A	60	
		(f) Modulus of rupture	-do- (Part 4)	Three test specimens as per IS : 2380	B	90	
		(g) Screw withdrawl strength	-do- (Part 4)	Three test specimens as per IS : 2385	C	120	
12	Reinforcement Steel	(a) Physical tests upto 16mm dia (normal mass, tensile elongation, bend and rebend)	IS : 1708-1960	One sample (Three specimens) for each test for every 35 tonnes or part thereof	B	2500/-	
		(b) More than 16mm dia	-do-	One sample (Three specimens) for each test for every 45 tonnes or part thereof	A	2750/-	
13.	Cement flooring tiles / Terrazzo tiles	(a) Water absorption	IS-1237 (Appendix 'D')	6 Tiles out of 18	B	330/-	
		(b)Wet Transverse strength	-do- (Appendix "E")	-do-	B	660/-	
		(c) Resistance to wear	-do- (Appendix 'F')	-do-	C	1000/-	
14	Welding of steel work	Visual inspection Test	IS:822-1970 Clause-7.1	100% by visual inspection	Work site	360/-	Specialised tests, their method and frequency to be decided on consideration of their importance by the Accepting Officer

PARTICULAR SPECIFICATIONS

1. GENERAL

1.1 The work under this contract shall be carried out in accordance with Sch 'A', particular specifications, drawings where applicable, general specifications and other provisions in MES Standard Schedule of rates (here-in-after called MES schedule) Part I & Part II read in conjunction with each other.

1.2 The term general specifications referred to in Para 1.1 here in before as well as referred to in IAFW-2249 (General Conditions of contracts) shall mean the specifications contained in MES Schedule.

1.3 General Rules, specifications, Special Conditions and all preambles in the MES Schedule shall be deemed to be applicable to the work under this contract unless specifically stated otherwise in these documents, in which case the provisions in these documents shall take precedence over the aforesaid provision in the MES schedule. The term "as specified" wherever appears in these tender documents and drawings relates to relevant particular specifications and in its absence general specifications. All references to MES Schedule (Standard schedule of rates) in these specifications relate to Part I of MES schedule unless otherwise mentioned. Reference to only some paragraphs of MES schedule has been made in these particular specifications but other paragraphs and provisions as applicable are also to be followed for all parts of schedule 'A' even though not particularly mentioned here-in- after.

1.4 Where specifications for any item of work are not given in MES schedule or in these particular specifications, specifications as given in relevant Indian Standard or code of practice shall be followed.

1.5 Specifications of materials and workmanship shall be all as described in MES Schedule except where specifically mentioned otherwise in this document. General rules, preambles to various sections/rates, special conditions, method of measurements etc. given in the MES Schedule shall also apply to this contract unless otherwise mentioned in the tender documents.

2. SCOPE OF WORK

2.1 This contract covers all the works described in Schedule `A' and as specified hereinafter.

3. MATERIALS

3.1 Refer condition10 IAFW- 2249 (General Conditions of contracts)

3.2 All materials to be supplied by contractor for incorporation in the work shall conform to relevant specifications. In case specification of any materials needed for incorporation in work is not contained in any of the contract documents, the specification of such materials proposed to be incorporated in the work shall be got approved in writing from the AGE(I) before their incorporation in the work.

3.3 As far as practical, all manufactured materials/ articles other than those manufactured in contractor's workshop at site shall bear IS certification mark. In case any articles not bearing the IS certification mark, but conforming to relevant specification is proposed to be incorporated in the work, samples of the same shall be got approved in writing from the AGE(I) before incorporation in the work. The contractor shall submit sufficient evidence to the AGE(I) to show that such article conform to the relevant specifications.

3.4 Manufactured materials/articles shall be brought at site in original sealed containers/packing bearing manufacturer's marking unless the quantity required is in a fraction of smallest packing.

Contd …...

PARTICULAR SPECIFICATIONS

MATERIALS (Contd…)

3.5 The materials of proprietary nature such as cement, steel sections, water proofing compound, paint etc. quantity of which cannot be checked after incorporation in work shall be measured and recorded in measurement book and shall be signed by the Engineer-in-Charge and the authorized representative of the contractor. The contractor is required to obtain this material direct from the manufacturer or their authorised dealers and submit to the Engineer-in-Charge original stamped receipt bill along with relevant invoice from the manufacturers or their authorized dealers in support of having brought full quantity required for incorporation in the work.

3.6 The contractor shall carry out such instructions as are given to him in writing by the Engineer-in-Charge to ensure that full quantity of such materials goes into work.

3.7 Material when collected at site shall be recorded in MB (for record purpose only) and signed by the both the MES representative and contractor giving reference to purchase vouchers/invoice, Name of Manufacturer/dealer from whom material has been purchased.

3.8 Material brought at site shall be stored as directed by Engineer-in-Charge and those already recorded in MB shall be suitably marked for identification

4. DISMANTLING/DEMOLITION/TAKING DOWN

4.1 The contractor shall identify the items which are to be dismantled/demolished before commencing the work at site as per the directions of the Engineer-in-Charge and before dismantling prior intimation shall be given to Engineer-in-Charge to enable him to measure jointly to avoid dispute at later date. Contractor shall not commence dismantling/demolition work without the prior permission of Engineer-in-Charge.

4.2 The contractor shall take all safety precaution to safeguard his labour, men & materials around the building. Contractor shall also take suitable precaution for not to damage the existing structure while demolishing/dismantling the items. The contractor shall replace and make good the structure if any damaged during execution without any extra cost to department and contract will not have any claim on this account. Any salvaged materials which are not covered under schedule of credit shall become property of Govt and the same shall be returned to MES store yard without any extra cost.

4.3 All demolished and disposal materials which is not in usable condition, as mentioned in Sch ‘A’ shall be removed, all as directed by the Engineer-in-Charge. Rubbish shall be cleared away the site from time to time as directed. **Unless the debris is removed from site completely to the entire satisfaction of AGE; payment for relevant items of demolition/ dismantling will not be made.**

5. EXCAVATION & EARTH WORK

5.1 Excavation shall be carried out all as specified in the respective Sch ‘A’ Items. Rate quoted by the contractor shall be deemed to include for bailing, pumping & dewatering of foundation, trenches if water is met with or accumulated from any source other than that specified in Clause 3.1 of MES Schedule Part I. No price adjustment shall be made on this account. Filling in trenches, in embankment etc. shall be done in layer as specified here-in-after with approved earth / soil obtained from excavation of foundation and excavation over areas. All surplus soil from excavation shall be disposed of at a distance as mentioned in the respective item of Sch ‘A’ and as directed by the Engineer-in-charge.

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5.2 **DEWATERING**

No extra payment over the rates quoted by tenderer shall be admissible for dewatering, if water is met with or accumulated in the foundations or any other excavations due to any cause, whatsoever, and for excavation in mud, bailing and pumping of water if required, shall be done as described in Para 3.17 of MES Schedule Part-I.

5.3 **DISPOSAL OF SURPLUS EXCAVATED EARTH**

All surplus soil / debris obtained from excavation for shall be disposed of to a distance as specified and as directed by Engineer-in-Charge, deposited, spread and levelled as specified in MES Schedule.

5.4 **TIMBERING** In case timbering to excavation is required and specifically ordered by AGE in writing this shall be paid as a deviation.

5.5 **FILLING** All filling shall be spread in layers not exceeding 25 cm thickness, watered and consolidated.

5.6 **MOORUM / RED BAJRI FILLING** Moorum shall be as specified in clause No 3.21 and shall be spread and levelled as specified in clause No 3.21.4 of SSR Part I 1991.

5.7 **HARD CORE**

Refer Clause 3.27 of MES Schedule Part- I. Hard core shall be of broken stone of gauge not exceeding 63 mm, well graded to provide dense and compact sub base. Hard core filling shall be spread, levelled in layers not exceeding 15 cm thick well rammed, watered and consolidated. Moorum may be used to fill interstices in hard core. Thickness wherever shown on drawings/schedule of finishes shall be treated as consolidated thickness.

5.8 **SAND BED** Sand bed shall be carried out in the locations and to a thickness all as shown on respective structural drawings. Sand shall be clean, free from dust organic and other extraneous matter. It shall not contain more than 5 % of clay/silt.

5.9 **PIPE CULVERTS** Reinforced Concrete pipes in culverts shall be non-pressure pipes, class NP 2, as indicated in Schedule 'A', conforming to "IS – 458- 2003 Specification for Concrete Pipes with or without Reinforcement" and shall be laid and jointed as specified with collars and as per the drain work in Sec 18 of SSR Part – I.

6. **CONCRETE**

6.1 **MATERIALS**

6.1.2 **CEMENT**

6.1.2.1 Refer clause 4.3 on page 51 of MES Schedule Part -I.

6.1.2.2 **PROCUREMENT AND TESTING OF CEMENT**

(a) In this work all cement required for completion of this contract shall be **Ordinary Portland Cement 43 Grade conforming to IS: 8112-1989** and each bag shall be ISI certification mark and manufacture date.

(b) Before commencement of work the contractor will intimate type of cement to be used and get the same approved by AGE(I) separately. **Portland Pozzolana Cement shall not be used in the work.**

(c) All cement required for completion of this contract shall be procured by the contractor, under his own arrangement directly from the manufacturers. The cement shall be procured from the following manufacturers:-

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Srl No	COMPANY NAME	BRAND NAME	ADDRESS	MARKETING SET UP	REMARKS (Type & Grade)
1	2	3	4	5	6
(i)	Cement Manufacturing Company Ltd	STAR	Mayur Garden, 2nd Floor, Opp-Rajuv Bhawan, GS Road, Guwhati-781005 Ph-0361-2462215/216/513 Fax :0361-2462217 Email:cmclghy@cml.co.in	-	OPC 43,OPC- 53 Gde & PPC
(ii)	OCL India Ltd	KONARK	Rajgangpur, Dist-Sundargarh Orissa, Pin-770017 Ph-0361-2668504, Fax-2662131 Website :www.calcom.co.in	-	OPC 43 Gde & PPC
(iii)	Dalmia Cement (Bharat) Ltd	DALMIA CEMENT	Dalmiapuram, Distt: Tiruchirappalli, Tamil Nadu – 621651	-	All
(iv)	Wonder Cement Ltd.	WONDER CEMENT	17,Old Fatehpura SevaMandir Road,Udaipur-313004Rajsthan(India), Tel- +91-294-33991133 Fax-+91-294-3006333 Email:Corp office@wondercement.com	-	(i)OPC 43, (ii)OPC 53 (iii) PPC
(v)	Ultra Tech Cement	Brand: ULTRATECH	'B' Wing, 2nd Floor, Mahakali Caves Road Andheri (East), Mumbai-400093	-	All
(vi)	Saurashtra Cement	SAURASHTRA	Gala No A-1, Ground Floor, Udhyog Sadan No 3 MIDC, Central Road, Andheri (East), Mumbai-400093 Ph 022 32955557/67 MO 9320290081	-	All
(vii)	The Associated Cement Companies Ltd	Brand: ACC	414-421, Splendor Forum (4th Floor), 3, Distt Centre, Jasola,New Delhi-110044 Ph-011-46583600	-	All
(viii)	Grasism Industries Ltd	Brand: GRASIM	Birlagram, Nagda, Madhya Pradesh, Pin-456331 Ph-07366246760/246766	-	All
(ix)	The India Cement	-	Dhun Building, 827, Anna Salai, Chennai-600002	-	All

PARTICULAR SPECIFICATIONS

Srl No	COMPANY NAME	BRAND NAME	ADDRESS	MARKETING SET UP	REMARKS (Type & Grade)
1	2	3	4	5	6
(x)	Andhra Cement Ltd	-	Durga Cement Works Durgapuram, Dechepalli Guntur, AP, Pin-522414 Ph-0863257429	-	All
(xi)	Century Cements	CENTURY	Industry House, 159 Chruch gate Reclamation, Mumbai-400020 Ph-022-22023936	-	All
(xii)	Binani cement Ltd	BINANI	Mercantile Chambers, 12 J.N Heredia Marg, Ballard Estate, Mumbai-400001 022-22690506/10	-	All
(xiii)	Mangalam Cement Ltd	MANGLAM	PO-Adityanagar,Morak,Dist-Kota, Rajasthan-326520 Mob-9351468076	-	All
(xiv)	Birla Corporation Ltd	BIRLA	Birla Building (3rd & 4th Floor) 9/1 R.N Mukherjee Road Kolkata-700001 Ph-033-30573700	-	All
(xv)	Orient Cement	ORIENT	5-9-22/57/D, 2nd and 3rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad-500063 Ph-04423688600	-	All
(xvi)	Shree Cement	SHREE	Bangur Nagar, Beawar, Distt-Ajmer, Rajasthan-305901 Ph-01462228101/06	-	All
(xvii)	JK Lakshmi Cement Ltd	J K LAKSHMI	Jaykaypuram, Dist-Sirohi, Rajashthan Ph-02971 244409/10	-	All
(xviii)	Jaypee Rewa Cement	JAYPEE	Japee Nagar P.O. Japee Nagar,Rewa-486450(M.P.)	-	All
(xix)	Ambuja Cement Ltd	AMBUJA	Kodinar, PO-Ambujanagar, Taluka-Kodinar, Distt-Junagadh,Gujrat-362715 Ph-02795237000	-	All
(xx)	M/S My Home Industries Ltd	1.Maha for OPC 43 2.Maha Shakthi for PPC 3. Maha Shakti for PSC	9th Floor,Block-3,My Home Hub,Madhapur,Hydrabad-500081 Ph-040-6692-9696 Fax -040-66929797/98	-	OPC 43 Gr,PPC & PSC
(xxi)	M/S Sanghi Industries Ltd.	SANGHI	10th Floor,kataria Arcade Off SG Highway,PO-Makarba,Dist-Ahmedabad,Pin-380051,Ph-079-26838000	-	OPC 53 Gr & PPC

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Srl No	COMPANY NAME	BRAND NAME	ADDRESS	MARKETING SET UP	REMARKS (Type & Grade)
1	2	3	4	5	6
(xxii)	Nuvoco Vistas Corporation Ltd.(Formerly Lafarge Cement)	NUVOCO	Equinox Business Park Tower-3,East Wing, 4th Floor ,LBS Marg,Kurla(West),Kurla Mumbai,Maharashtra-400070	-	All
(xxiii)	JK Cement	JK Cement	Kamla tower Kanpur - 208001	-	OPC 43 Gde & PPC

(Note:- Contractor can procure cement from those makes/ brand makes/ brand approved by the AHQ E-in-C's Branch even during currency of work

(d) The contractor shall furnish the particulars of the manufacturer of cement along with the date of manufacture to the Asst Garrison Engineer for every lot of cement separately. The cement so brought shall be fresh and in no case older than 90 days from the date of manufacture. The AGE(I) shall verify the document in support of the purchases of cement. Before placing order for supply of cement by the contractor, he shall obtain written approval from the AGE(I) regarding name of manufacturer, quantity of cement etc. Cement shall be procured for minimum requirement of one month and not exceeding the requirements of the same for more than two months at a time. The cement shall be consumed in the work within three months after receipt. Cement shall conform to the requirement of IS Specification and each bag of cement shall bear relevant ISI mark. The weight of each consignment shall be verified by the AGE(I) and recorded. The content of cement shall be checked at random to verify the actual weight of cement per bag. However, the content of cement per bag shall be 50 Kg only subject to tolerance given in Clause 9.2.1.1 and Annexure 'B' of IS - 8112 and Clause 10.2.1.1 and Annexure 'B' of IS -1489 for OPC and PPC respectively

6.1.2.3**TESTING**

(a) The manufacturer is required to carry out inspections and testing of cement in accordance with the relevant BIS provisions. The contractor shall submit the Manufacturer's Test Certificate in original along with the test sheet giving the result of each physical test as applicable and chemical composition of the cement or authenticated copy thereof duly signed by the manufacturer, with each consignment. The Engineer-in-Charge shall record these details in the cement Acceptance/Rejection Register as appended here in below after due verification.

(b) The AGE(I) may organise independent testing as per IS: 3635 (method of sampling hydraulic cement) and IS: 4001-1995 (Method of Physical test for hydraulic cement) and IS: 4030-1985 (Methods of chemical analysis of hydraulic cement) of random sample of cement drawn from each lot of the consignment from the National Test House, SEMT Wing, CME, Govt Engineering college, IS approved laboratories and Zonal lab etc.

(c) The contractor shall make available required quantity of cement and other facilities for testing of cement by AGE(I) as specified here-in-before and shall bear the cost of cement and testing thereto irrespective of whether sample passes or fails. AGE(I) shall make payment to the testing house lab and direct the contractor to deposit the amount in Govt. treasury in favour of AGE(I) concerned and submit the treasury challan to the AGE(I) within 10 days of the letter issued by the AGE(I) for payment of cost of testing of cement. If contractor fails to do so, the testing charges shall be recovered from the dues of the contractor.

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(d) Cement brought by the contractor shall be allowed to be incorporated in the work after satisfactory test results of sample sent for testing. AGE(I) shall inform the contractor, about the test results and permission to incorporate in the work, in writing. AGE(I) shall ensure that word “pass” is embossed on both sides of the cement bags of lot, which has been found as per specification as per test result. The cost of embossing as indicated herein above shall be borne by contractor.

(e) In case the sample got tested by the AGE(I) from the institutions/ laboratories, mentioned here in before, fails, the concerned lot of cement shall stand rejected. The AGE(I) shall emboss a mark ‘X’ on both sides of each bag of the rejected lot. The AGE(I) will inform the contractor in writing about the test result and direct him to remove the rejected cement from the site of works within two days of the order by the Engineer-in-charge. Contractor shall have no claim whatsoever on account of rejection and removal of cement.

(f) It shall be the responsibility of the contractor to arrange cement well in advance, to facilitate it’s testing before use in the work. The contractor shall submit the program of procurement of cement to the AGE(I) before the date of commencement of the work indicating date of procurement and quantity.

6.1.2.4 **STORING**

(a) Cement shall be stored in covered godown over dry platform at least 20 cm high in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. In case of store room the stack should be atleast 20cm away from floors and 60 cm from walls. The stacking of cement shall be done as specified in relevant IS. The storage accounting and preservation of cement supplied by the contractor shall be done as per standard Engineering practice till the same is incorporated in the work and the cost of the same shall be deemed to be included in the unit rate/amount quoted by the tenderer. The Engineer-in-charge (EIC) shall inspect once a day to verify that cement lying at site is stored, accounted, preserved and maintained as per the norms. The cement shall be stored so as to differentiate each tested and untested consignment separately with distinct identification. If the AGE(I) is not satisfied with the storage/preservation of cement , he may order for any test (s) of cement as applicable for that consignment to ensure its conformity to the quality mentioned in the in the manufacturer’s test certificate. The contractor shall bear the cost of necessary testing (s) in this regard and no claim whatsoever shall be entertained.

(b) Stacking of cement shall be done as per relevant IS and as under :-

(i) Each cement consignment shall be stacked separately and removal shall be made on the basis of First in First out.
(ii) Adequate top cover will be provided.
(iii) Stacks in no case shall be higher than 12 bags. The maximum width of each stack shall be 3.00 m. If the stack is more than 7 or 8 bags high, the bags shall be arranged in header and stretcher fashion, i.e. alternatively lengthwise and crosswise so as to pile together and avoid topping over.
(iv) Adequate space shall be kept between two stacks.

(c) Cement godown shall be provided with two locks on each door. The key of one lock at each door shall remain with EIC or his representative and that of the other lock with the contractor’s authorized agent at site of works so that cement is removed from the godown only according to daily requirement with the knowledge of both the parties. During the period of storage, if any cement bag (s) is found to be in damaged condition due to whatsoever reason, the same shall be removed from the cement godown on written orders of the AGE(I) and suitable replacement for the cement bag (s) so removed shall be made and no claim whatsoever shall be admissible on this account.

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(d) In case more than one type of cement is used in the work ie Ordinary Portland cement or Portland Pozzolana Cement, both type of cement shall be stored separately as directed by the Engineer-in-Charge to avoid mixing of these type of cement. Separate record shall be maintained including the location/items where these type of cement are used.

(e) Cement shall be removed from the store only according to daily requirement with the knowledge of both the parties and the Engr-in-Charge and the contractor shall record daily consumption of cement in cement consumption register, which shall be signed. Cement constants given in Appendix 'A' to E-in-C's branch letter No. 19280/E8 dated 03 May 1976 shall from the basis of consumption of cement for various items of works unless specifically indicated otherwise.

(f) In case the consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to whatsoever reason, the contractor shall not have any claim whatsoever for such excess consumption of cement

6.1.2.5**SCHEDULE OF SUPPLY**

The contractor shall procure the cement timely as required in accordance with CPM chart agreed between AGE(I) and the contractor. The contractor will forfeit his right to demand extension of time if the supply of cement got delayed due to his failure in placing order in time to the manufacturer.

6.1.2.6**MEASUREMENTS AND PAYMENT OF CEMENT**

(a) The entire quantity of cement shall also be suitably recorded in the measurement book for record purposes as Not to be abstracted before incorporation in the work and shall be signed by the EIC and the contractor.

(b) The payment shall only be allowed after production of original purchase voucher, certified copies of test certificates from manufacturer for each consignment and results of testing carried out in laboratory on receipt of cement (7 days compressive test) are found satisfactory after testing at site as per condition 64 of IAFW-2249. Rate of payment given in SSR shall be applicable for cement irrespective of type of grade of cement specified for use in the work.

6.1.2.7**DOCUMENTATION**

(a) The contractor shall submit original vouchers, test certificates and test sheets from the manufacturer/producers for the total quantity of cement supplied under each consignment to be incorporated in the work. The AGE(I) along with the relevant documents before sample is taken for the testing shall inspect all consignments received at the work site. The original vouchers and test certificates (original/authenticated) shall be defaced by the Engineer-in-Charge and photocopy of the same shall be kept on record in the office of the AGE(I) duly authenticated and with cross reference to the control number recorded in the cement acceptance/rejection register. The cement acceptance /rejection register shall be signed by (JE Civil), Engineer-in-Charge, AGE(I) and the Contractor. The Accepting Officer may order a Board of Officers for verification of connected documents produced by the contractor. The entire quantity of cement shall also be recorded in the measurement book (not to be abstracted) for record purpose before incorporation in the work and shall be signed by the Engineer-in-Charge and the contractor.

(b) Record of cement brought by the contractor shall be maintained on the format given in Appendix 'A' to Particular Specification.

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6.1.3 **LIME** Lime for mortar in concrete shall be hydraulic lime (Class 'A') conforming to IS :712 -1984 in the form of quick lime . Lime shall be conforming to approved samples kept in AGE's office

6.1.4 **AGGREGATES**

6.1.4.1 **FINE AGGREGATE**

Fine aggregate (sand) for concrete work shall conform to materials specifications and grading within the limits of grading Zone I to III as specified in Clause 4.4.1 to 4.4.6 and 4.4.7(2) of MES Schedule Part-I and shall conform to approved sample kept in the office of GE. Mixing of sand for obtaining specified grading from two different sources shall not be permitted.

6.1.4.2 **COARSE AGGREGATE**

(a) Coarse aggregate (stone aggregate) for all cement concrete work such as PCC/RCC shall be of approved quality all as specified in clause 4.4.1 to 4.4.7 (1) of MES Schedule Part-I. Mixture of two types of stones shall not be permitted.

(b) Coarse aggregate (stone aggregate) 20 mm and below shall be machine crushed and above 20mm may be hand broken.

(c) Grading of coarse aggregate (stone aggregate) unless specified otherwise in the specifications hereinafter in various locations/work i.e. PCC/RCC shall be as specified in MES Schedule Part I.

(d) Coarse aggregate for lime concrete shall however be brick aggregate as specified in clause 4.5 of MES Schedule Part I.

(e) Stone for lean concrete in foundation shall be sand stone conforming to IS: 383 from approved source. Unless otherwise specified in Schedule 'A' stone for all RCC/ PCC/PQC/WMM work shall be crushed Granite/Trap/ Basalt or any other igneous rocks stone from approved source irrespective of any distance from site of work.

6.1.5 **WATER**

Water to be used in this work shall be all specified in IS : 456 of 2000 and in clause 4.9 of SSR Part I (specification). When the water is not issued by the department, the water shall be got tested in Govt. approved laboratory and test certificate shall be submitted to GE. The water shall be used in the work only after receipt of satisfactory test results as per IS.

6.1.6 **SURKHI**

Surkhi shall be as specified in clause 4.7 of MES schedule Part I.

6.1.7 **BATCHING, MIXING, DEPOSITING AND RAMMING**

(a) Controlled concrete materials shall be batched by weight only. Combined batching with digital weighing system and mixing plant with auto cut off and computer print out facility shall be used for concreting. The capacity of mini batching plant provided at site shall be adequate enough to execute the work as per the CPM, or otherwise the contractor shall provide single batching plant of higher capacity or more number of batching plants of adequate capacities as required at site, as asked by the AGE(I). No claim what so ever arising out on this account is admissible. The decision of AGE(I) in this regard shall be final and binding. The plant/plants shall have the digital system of adding specified quantity of water into concrete mix as per the design mix requirement.

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(b) Water shall be measured either by volume in calibrated tanks or weighed. All measuring equipments shall be kept in a clean serviceable condition and their accuracy checked periodically.

(c) Provisions as in clause 4.11.3.2 to 4.11.3.5 of MES Schedule Part-I shall be followed. All batching of concrete and accuracy of batching shall be as per Clause 10.2 of IS-456: 2000.

(d) The mixing shall be done for at least 2 minutes and until a uniform colour and consistency is achieved.

(e) Quantity of concrete mixed in any one batch shall not exceed the rated capacity of the mixer. The whole of the mixed batch shall be removed before materials for fresh batch enter the drum. Concrete mix as approved shall not be modified by addition of water or otherwise in order to facilitate handling for any other purpose. On ceasing of work and other stoppage exceeding 20 minutes, the mixer and other plants used for handling wet mix shall be thoroughly washed with clean water. Pick up and throw over blades in the drum of the mixer which are worn down 20mm or more in depth shall be replaced with new blades.

(f) All cement concrete, both plain and reinforced shall be mixed in mechanical mixer as specified in para 4.11.5 and 4.11.5.1 of MES Schedule Part-I. However for small quantity of concreting (other than RCC works) i.e., the quantity of concrete required being less than one batch of mix, the contractor may after obtaining written approval of Engineer in charge which shall be exceptional, adopt hand mix subject to addition of 10% extra cement without price adjustment where hand mixing permitted, it shall be carried out on a concrete platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

(g) All cement concrete, both plain and reinforced shall be mixed in mechanical mixer as specified in para 4.11.5 and 4.11.5.1 of MES Schedule Part-I. However for small quantity of concreting (other than RCC works) i.e., the quantity of concrete required being less than one batch of mix, the contractor may after obtaining written approval of Engineer in charge which shall be exceptional, adopt hand mix subject to addition of 10% extra cement without price adjustment where hand mixing permitted, it shall be carried out on a concrete platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

(h) All cement concrete both plain and reinforced concrete, shall be deposited and compacted all as specified in Clause 4.11.10 and 4.11.11 of MES Schedule Part-I. However, RCC work in columns, foundation, beams walls, chajjas and slabs etc., shall be compacted using mechanical vibrator, compaction of lean concrete shall be carried out by ramming and consolidated by tamping and rodding as specified. In the event of breakdown of mechanical mixer and vibrator, the contractor must have arrangements for standby mechanical mixer and vibrator.

6.1.8 **DESIGN MIX CONCRETE**

6.1.9 Grade of design mix concrete shall be as specified here-in-before and shall be as referred to in IS-456-2000 and as specified hereinafter. Design mix concrete may also be referred to as controlled concrete. Mix design shall be done as per IS-10262 of 1982 (Recommended guidelines for design mix concrete) and as described in SP-23 of 1982 (an IS publication).

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DESIGN MIX CONCRETE (Contd….)

6.1.10 The requirement of cement per cubic meter of controlled concrete of grade M25/M-30 shall be as per IS-456 of 2000. The actual requirement of cement for the controlled concrete shall be ascertained by the tests as specified hereinafter. The design mix for M25 concrete shall be carried out for MODERATE environment conditions and good quality control; however design mix for M30 concrete shall be carried out for SEVERE environment conditions and good quality control. The tenderer shall ascertain the quantity of cement required and quote the lump sum accordingly. No claim whatsoever arising on account of quantity of actual cement incorporate in the work on account of design mix is admissible.

6.1.11 (a) Contractor shall use liquid admixtures (Super plasticizers) to achieve the workability and to reduce the water content in design mix. Admixtures shall confirm to IS 9103: 1999 shall be from approved manufacturers as given in list of makes.

(b) Para 5.5 of IS 456: 2000 be also referred for quality of admixtures.

(c) For maximum dose of admixtures, please refer para 10.3.3 of IS 456: 2000. (d) Various tests as specified in IS 9103: 1999 shall be carried out for each batch of Admixtures at contractor's cost.

(e) Contractor shall submit original purchase voucher and test certificate of manufacturer for complete quantity of admixtures used in the work before claiming payment for the same.

(f) Complete quantity of admixtures including name of manufacturer, its brand name, date of manufacturing, date of expiry, voucher No. and details of test certificates shall be entered in MB as " Not to be abstracted " duly signed by JE, Engineer-in-Charge, AGE(I) and representative of contractor before making payment in RAR."

6.1.12 As soon as possible after receiving the work order to commence the work, the contractor shall submit samples of the materials required for preparing design mix concrete viz cement, coarse aggregate, fine aggregate and admixtures for approval of AGE(I), the place out of the following where they propose to carry out the design mix and preliminary tests RCC M-15 to M-30 grade concrete:-

(a) Command Test Lab (CTL), Lucknow
(b) Any Indian Institute of Technology (IIT)
(c) Any National Institute of technology (NIT)
(d) Any Govt Engineering college.
(e) National Test House

6.1.13 The cement used in the work shall be as specified here in before. Coarse aggregate shall be crushed stone aggregate. The gradation shall be followed as per clause 4.2 table 2 of IS 383 to obtain maximum density.

6.1.14 After the samples of all the materials are approved by AGE(I) in writing sufficient quantities of these materials shall be forwarded by AGE(I) at contractor's expense for carrying out design mixes.

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6.1.15 **PRELIMINARY TESTS**

Preliminary tests are tests conducted on the trial mixes of concrete produced in the laboratory with the object of:-

(a) Designing concrete mixes before the actual concreting operation starts.

(b) Determining the adjustments required in the design, when there is change in the materials used during execution of work.

(c) Verifying the strength of concrete mix at 28 day.

6.1.16 The preliminary tests shall consist of 3 separate sets of tests covering possible variation of gradation of aggregates and each set of test using a minimum 7 cubes of size 150 mm x 150 mm x 150 mm and one slump test. Three cubes shall be tested at 7 days to get indication of minimum strength of 28days. Other 03 cubes shall be tested at 28 days and 01 cube shall be preserved for Government use for subsequent testing. The compressive strength tests of cubes shall be performed as per IS-516. Casting of cubes and testing of these cubes shall be carried out in the presence of contractor's representative, AGE(I) / AGE(I)'s representative. It will be contractor's responsibility to ensure that design mix is carried out at the earliest. Contractor shall ensure that design mix calculations, supporting trial mix (03 Nos) details and test results of trial mixes along with recommended trial mix are submitted to AGE(I) at the earliest for his further action. Based on test results, the design mix shall be approved by Accepting Officer. The testing charges for the design mix and the tests conducted shall be borne by the contractor. The cost of materials, labour and transport shall also be borne by the contractor.

6.2 **WORK TEST**

6.2.1 The work tests shall be carried out at site Lab/Zonal lab of Chief Engineer, AF Allahabad Zone / Command Test Lab (CTL), Lucknow only.

6.2.2 Work test shall be conducted as per clause 15 of IS-456 of 2000. At the commencement of the concreting, samples of concrete shall be taken on each day as specified in clause 15 of IS-456 of 2000 and specimens made at the work site out of the concrete being used in the works, for the purpose of testing compressive strength.

6.2.3 From each of these samples, 7 test cubes of size 150 x 150 x 150 mm shall be taken to test 3 specimens at 7 days and 3 specimens at 28 days in authorised MES laboratory. CA No., date of casting and location where concrete is being used shall be marked on each concrete cube. One test cube of preliminary and work test shall be preserved duly marking the date of casting and CA No. for verification / subsequent testing, if required. The cube will be preserved by the AGE(I) / Engineer-in-Charge until the defects liability period of the work is over.

6.2.4 The testing charges for the work tests conducted in the Zonal Laboratory/Command Test Lab (CTL) shall be at the rate mentioned in **Appendix 'A' to Special Conditions** and the same shall be effected from the payments due to the contractor in RAR / Final bill whichever is earlier. The cost of materials, labour and transport shall be borne by the contractor. The lump sum quoted shall include the cost of testing the concrete cubes both for design mix / volumetric mix. .

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6.2.5 In the event of contractor setting up the laboratory at site as specified here in before in Special Conditions, the contractor shall carry out cube testing in site lab, in presence of Engineer-in-Charge and as specified here in before. However, random testing up to 5 percent of total tests to check the compressive strength of cube shall be carried out in zonal lab for which testing charges shall be recovered from the contractor at the rate mentioned in **Appendix 'A' to the Special Conditions**. Contractor shall include this aspect while quoting his rates.

6.2.6 The Engineer-in-Charge shall maintain the record for all the tests carried out in Site lab /zonal lab /CTL separately. The cost of testing including material, labour etc., incurred shall be borne by the contractor and the lump sum quoted shall be deemed to include this.

6.3 MIXING

6.3.1 The mix design and also execution of work shall be carried out by weigh batching. The quantum of cement for execution of work by weigh batching shall be as per mix design.

6.3.2 It shall be ensured that the grading characteristics as adopted in the mix design are followed throughout. Wherever the type and/or batch of cement/aggregate is changed, a fresh mix design shall be carried out. Nothing extra is payable on this account.

6.3.3 **The contractor during the progress of work shall not change the mix design without the prior recommendation of AGE(I) and approval of the Accepting Officer.**

6.3.4 Engineer-in-Charge shall maintain a record of actual consumption of cement in proper register (other than the cement register mentioned in special conditions) and initial the entry for every day of quantity of materials used by contractor. The register shall be got checked and signed by AGE(I). In case the consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to what so ever reason, the contractor shall not have any claim, whatsoever for such excess consumption of cement.

6.4 WATER CEMENT RATIO

6.4.1 It is most important to maintain the water cement ratio constant and to its correct value. To this effect determination of moisture content in both fine and coarse aggregate should be made as frequently as possible. The frequency for a given job shall be determined by the Engineer-in-Charge. According to weather conditions the amount of water to be added shall be adjusted to compensate any variations in the aggregate, IS-2386 method of test for aggregate, for concrete, Part II specific gravity, density, voids, absorption and bulking of aggregates due to variation in their moisture contents shall apply. The maximum quantity of water to be added shall be determined by mix design to be carried out as specified herein before.

6.4.2 Workability of concrete shall be checked at frequent intervals. The slump test or where facilities exists; the compacting factor test in accordance with IS-1199 may be adopted for this purpose.

6.4.3 The slump for M-25 shall be between 25 to 75 mm and for M30 grades concrete (except for piles) 50mm to 100mm for medium degree workability as given in clause 7 of IS-456-2000.

6.4.4 Curing shall be carried out all as specified in MES Schedule Part I.

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6.4.5 Acceptance Criteria: As per Clause 16 of IS-456: 2000.

6.5 NOMINAL MIX/VOLUMETRIC MIX

Wherever nominal mix concrete is specified, it shall be as per IS: 456. The periodicity of mix design and other tests on materials/mix shall be as decided by the AGE(I).

6.6 MIXING

All concrete shall be mixed in mechanical concrete mixer. Where only small quantity of plain cement concrete is involved, hand mixing may be adopted if approved by the Asst Garrison Engineer. The contractor should arrange to wash out and clean the mixing drum on completion of work and or on stoppage of work if stoppage is for more than 20 minutes.

6.7 TRANSPORTING, DEPOSITING AND COMPACTING

Transporting depositing and compacting generally shall be carried out as specified in Clause 4.11.9, 4.11.10 and 4.11.11 of SSR Part I 2010.

6.8 PROTECTION AND CURING OF CONCRETE

This shall be carried out in accordance with specifications, given in clause No. 4.11.13 and 4.11.14 of MES Schedule Part I 2010.

6.9 PRECAST CEMENT CONCRETE

Lintels (without chajja) with a span of less than 1.5 m clear and PCC bed blocks, copings and the like may be precast at the discretion of the contractor all as specified in Clause 4.20 of SSR Part I as applicable. All precast articles shall be set in CM (1:3) with joint to match.

6.10 STRIPPING TIME FOR FORM WORK

The contractor's attention is invited to the stipulation in Clause 4.11.6.3 of SSR Part I regarding stripping of form work. The periods stipulated therein are for concrete using ordinary Portland cement. In case PPC cement used in the work, stripping time of form work applicable as per relevant IS.

6.11 LEAVE/FORM HOLES AND CHASES

The contractor as the work proceeds should Leave/form holes/chases in concrete/masonry and RCC where and as directed by the Engineer-in-Charge and make good in cement and sand mortar (1:3) when ordered to do so.

6.12 FINISH TO CONCRETE SURFACES

(Refer clause4.11.16, 4.11.16.1, 4.11.16.2(a),(b).(c),(d), (e) and 4.11.16.3 of MES Schedule Part-I.)

(a) Exposed surfaces of RCC chajjas, cantilevers and the like (bottom, sides) and soffits and sides of beams, soffit of RCC roof slab/floor slab/waist slab of stairs, sides of isolated column, shelves, RCC parapets, fins/fascia's and the like RCC walls shall be plastered not less than 5mm thick with cement mortar (1:3) and finished fair and even without using extra cement after removal of form work.

(b) Exposed surfaces of RCC columns, beams, lintels, and bands etc. which are continuous with plastered surfaces of walls shall be plastered & finished in the same specifications as for adjoining wall surfaces.

(c) Exposed surface of columns, beams, lintels, bands and similar items which are not covered under clause 9.1 (a) and 9.1(b) above shall be finished with a thin layer of 5 mm thick plaster in cement mortar (1:3) and finished fair and even without using extra cement after removal of form work.

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(d) If thickness of plaster in cement mortar (1:3) as specified above is required to be increased in excess of 5 mm to achieve fair and even surfaces, it shall be provided by the contractor without any extra cost to Government and the same shall be deemed to have been included in the lump sum amount quoted by the contractor against Schedule 'A' Part I.

(e) Surfaces of concrete which are required to be plastered as indicated above after removal of formwork shall be roughened with wire brush and hacked out closely.

6.13 FORM WORK (FOR RCC/PCC WORK)

(a) Refer to clause 4.11.6.1 to 4.11.6.5 and relevant clauses of 7.15 of MES Schedule Part I. Formwork shall be of steel with adjustable telescopic steel vertical props and other steel accessories confirming to IS 14687:1999 (Guide lines for false work for concrete structure). Release agents shall be applied so as to provide a thin uniform coating to the finished flat surface of shuttering before laying RCC for slabs. Deformed steel sheets shall not be permitted for use as formwork. However for the purpose of pricing DOs, the rates given in MES Schedule Part II for fair finished surfaces for concrete using steel Formwork shall be applicable.

(b) Where steel shuttering is not feasible in locations such as soffits and sides of lintels, beams, chajjas and other locations as decided by GE, the plywood board of adequate strength may be used after written permission of GE.

(c) Wooden Ballies/ Bamboo & planks shall not be allowed as formwork.

6.14 SAMPLING AND TESTING OF CONCRETE

6.14.1 Refer Clause No. 4.11.17 of MES Schedule Part I.

6.14.2 Tests will be carried out on 15 cm cubes all as per IS: 516. Minimum Six cubes per sample shall be supplied by the contractor for testing.

6.14.3 For relatively small and unimportant works even though testing may be waived off by the GE, the contractor shall be responsible to achieve the desired strength of concrete.

6.14.4 The contractor shall provide all necessary materials (including moulds etc.) and labour for mixing and casting of cubes, transporting the cubes to the testing laboratory and bringing back in same and any other assistance that may be required for getting the samples tested in the laboratory without any extra cost. The charges for testing of cubes shall be borne by the contractor. The testing charges shall be as indicated in Appendix 'A' to Special Condition. In case the tests are concluded in site laboratory set up by contractor, the recovery for testing charges shall not be effected.

6.14.5 The concrete which is not upto the desire strength shall be rejected and the same shall be made good by the contractor without any extra cost to Government.

7. IMPORTANT REQUIREMENT OF REINFORCED CEMENT CONCRETE / PLAIN CEMENT CONCRETE

(a) All the materials, workmanship inspection and testing for the cement concrete shall be as per requirements given in IS-456-2000.

(b) The contractor shall provide all facilities for casting, curing and conveyance of test cubes of cement concrete to an authorized laboratory as approved by the AGE(I) for testing as laid down in IS-456- 2000 at no extra cost to Government.

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(c) Engineer-in-Charge shall maintain a record of actual consumption of cement in proper register (other than the cement register mentioned in special condition) for all design mix and initial the entry for every change in quality of cement bag.

All cement concrete, both plain and reinforced shall be mixed in concrete batching plant. However, in case of small quantity (i.e.) the quantity of concrete required being less than one batch of mix, the contractor may, after obtaining written permission of the Engineer-in-Charge, be allowed hand mixing without any price adjustment. Where hand mixing is permitted, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency. However all design mix concrete shall be weigh batched and volumetric conversion will not be permitted.

7.2 COMPACTION

Concrete should be thoroughly compacted and fully worked around the reinforcement, embedded fixtures and into corner of the form work. Internal vibrators (needle vibrator) shall be used for compaction of RCC beams, columns and the slabs of thickness more than 150mm.Forslabofthicknessupto150mm,screedvibrator(surfacevibrator)shallbeusedforeffective compaction. Cost of all such testing charges is to be borne by the contractor.

7.3 BATCHING AND MIXING CONCRETE

The proportioning of cement, aggregates and water for concrete shall be determined by mass all as per IS-456. The concrete shall be produced by semi-automatic weigh batcher of adequate capacity with computer printout facility all as approved by AGE(I). **Tenderers shall keep this aspect in view while quoting and no extra claim shall be admissible on this account**. The accuracy of mass measurement shall be within $\pm$ 2 %. The system shall be designed to have control to admit any desired quantity of water for each batching.

7.4 TMT BARS AND STRUCTURAL STEEL/ IRON WORKS

All steel and iron work shall be as per details shown on drawings and shall be carried out as described in MES Schedule Part I and as specified here-in-after.

7.5 PROCUREMENT AND TESTING OF STEEL

(a) **REINFORCEMENT STEEL**

All steel for reinforcement to be used in the work shall be contractor's supply. The contractor shall procure steel for reinforcement (TMT bars) directly from the following main producers of steel:-

Srl No	COMPANY NAME	BRAND NAME	ADDRESS	Type of Steel	REMARKS
1	2	3	4	5	6
(i)	Rashtriya Ispat Nigam Limited (RINL),	RINL	Visakhapatnam Steel Plant Visakapatnam-530031, India Tel: (91891) 518226, 518376 Fax: (91891) 518316 E-mail: cmdvsp@itpvis.ap.nic.in	All grades/ size	
(ii)	Tata Iron & Steel Company (TISCO, or Tata Steel),	TATA	Bombay House,2, 4, Homi modi Street Mumbai-400001, India Tel: (9122) 2049131 Fax: (9122) 2049522, 2770840 E-mail: corpcomm@jsr.tatasteel.com (Br office for North: Jeevan Tara Bldg, Patel Chowk, New Delhi)	-do-	

PARTICULAR SPECIFICATIONS

Srl No	COMPANY NAME	BRAND NAME	ADDRESS	Type of Steel	REMARKS
1	2	3	4	5	6
(iii)	Steel Authority of India Limited, (SAIL)	SAIL	Central Marketing Organization, Northern Region 17th Floor, scope Minar, Laxmi Nagar Distt Centre, Delhi-110092	All grades/ size	
(iv)	M/S Jai Balaji Industries Ltd.,	Balaji Shakti	5 Bentek Street, Kolkata – 700001 Delhi Office 510, Block-B, Navraung House, 21 Kasturba Gandhi Marg, New Delhi-110001 Tel: (011) 43620219, 43620220 Mob: 7838272772, 9958936103 E-mail: info@jaibalajigroup.com	-do-	
(v)	M/S Shyam Steel Industries Ltd	SHYAM	Shyam Towers EN-32, Sector-V, Salt Lake, Kolkata-700091 Tel: (033) 40074007 Fax: (033) 40074010 E-mail: marketing@shyamsteel.com	-do-	
(vi)	M/S Steel Exchange India Ltd.,	SIMHADRI TMT	My Home Laxminivas Apartments, Ameerpet, Hyderabad-500016, A.P. Tel: (040) 23403725 Fax: (040) 23413267, E-mail: info@seil.co.in	-do-	
(vii)	M/S Jindal Steel and Power Ltd.	JINDAL PANTHER	OP Jindal Road, Hissar , Haryana -125005, Tel: +91 166 2222471-84 Fax: +91 166 220476	-do-	
(viii)	M/S SRMB Srijan Ltd.,	SRMB	SRMB House, 7, Khetra das lane Kolkata-700012 Tel: 033-6600 6600 Fax: 033- 22110483	-do-	
(ix)	M/S ET TMT, Industries Ltd	ET, TMT	-	TMT Bars of Gde Fe 500 Fe 500D (Size 8-36 mm)	
(x)	M/S Shri Bajrang Power & Ispat Ltd.,	GOEL TMT	Vill- Borjhara, Urla Industrial Area, Raipur-493 221, Chhattisgarh Tel: 0771 4288019/29/39	All grades/ size	
(xi)	M/S JSW Steel Ltd.,	NEOSTEEL	JSW Centre,Bandra Kurla Complex, Bandra (Eat) Mumbai- 400051, Maharashtra Phone :022-42861000 Fax: 022-42863000	All grades/ size	

PARTICULAR SPECIFICATIONS

Srl No	COMPANY NAME	BRAND NAME	ADDRESS	Type of Steel	REMARKS
1	2	3	4	5	6
(xii)	M/S Shyam Metalics & Energy Ltd,	SEL	Viswakarma, 1st Floor, 86 C, Tapsia Roas, Kolkata - 700046 Ph: 91 33 2285 2212 Website: www.shyamgroup.com	TMT Bars of Fe 500D (Size 8-32 mm) only	
(xiii)	M/S Kamachi Industries Ltd.	KAMACHI	ABC Trade Centre, 3rd Floor (Inside Devi Theatre Complex) Old No. 50, New No. 39, Anna Salai, Chennai- 600002, India Tel: +91-044-42961100 Fax: +91-044-42961122 E-mail: sales@kamachitmt.com Website: www.kamachitmt.com	All grade Size	
(xiv)	M/S Nakoda Industries Ltd	NAKODA TMT	-	TMT Bars of Gde Fe 500 Fe 500D (Size 8-32mm)	
(xv)	M/S Gallantt Metal Ltd	GALLANTT TMX	Ward 10BC, Plot No. 123, Ground Floor, Gandhi Dham Kutch, Gujarat - 370201 Tel: +91-2836-228164 Fax: +91-2836-235787 E-mail: gml@gallantt.com Website: www.gallantt.com	TMT Bars of Gde Fe 500 Fe 500D CRS (Size 8-32mm)	
(xvi)	M/S Rashmi Metaliks Ltd	RASHMI TMT	Premlata Building, 39, Shakespeare Sarani, 6th Floor, Kolkata - 700017 Tel: 033-22894255/56 Fax: 033-22894254 E-mail: mkt.domesticdip@rashmigroup.com Website: www.rashmigroup.com	TMT Bars of Gde Fe 500 (Size 8-25mm) Fe 500D, Fe550D (Size 8-25mm)	
(xvii)	M/S Real Ispat & Power ltd	G K TMT	Vrindavan, Near IDBI Bnk Civil Lines Raipur - 492001, C.G. Tel: +91-771-4224000 Fax: +91-771-4224010 E-mail: real@realispat.com Website: www.realispat.com	TMT Bars of Gde Fe 500 Fe 500D (Size 8-36mm)	

PARTICULAR SPECIFICATIONS

Srl No	COMPANY NAME	BRAND NAME	ADDRESS	Type of Steel	REMARKS
1	2	3	4	5	6
(xviii)	M/S Super Smelters Ltd. Kolkata	SUPER SHAKTI	Premlata, 39, Shakespeare Sarani, 3rd Floor, Kolkata - 700017 Tel/Fax: + 91-33-2289-2734/36 E-mail: info@supershakti.in Website: www.supershakti.in	TMT Bars of Gde Fe 500 Fe 500D, Fe 550 (Size 8-32mm)	
(xix)	M/S Rashtriya Ispat Nigam Limited (RINL)	RINL	Visakhapatnam Steel Plant Visakhapatnam - 530 031, India Tel: (91 891) 518226,518376 Fax: (91 891) 518316 E-mail: cmdvsp@itpvis.ap.nic.in	Structural Steel (Angle, Beam, Column, Channel, Plate)	
(xx)	M/S Tata Iron & Steel Company (TISCO, or Tata Steel)	TATA	Bombay House, 2, 4 Homi Modi Street Mumbai - 400 001, India Tel: (91 22) 204 9131 Fax: (91 22) 204 9522, 287 0840 E-mail: corpcomm@jsr.tatasteel.com (Br office for North : Jeevan Tara Bldg, Patel Chowk, New Delhi)	Steel (Angle, Beam, Column, Channel, Plate)	
(xxi)	M/S Steel Authority of India Limited (SAIL)	SAIL	Central Marketing Organization, Northern Region 17th Floor, scope Minar, Laxmi Nagar Distt. Centre, Delhi - 110092	Steel (Angle, Beam, Column, Channel, Plate)	
(xxii)	M/S Jindal Steels and Power Ltd.	JINDAL	Jindal centre, Plot No 2, Sector- 32, Gurgaon- 122001, Haryana Tel: 0124 661 2000 Fax: 0124 661 2125 Website: www.jindalsteelpower.com	Steel (Angle, Beam, Column, Channel, Plate)	
(xxiii)	M/S SPS steel rolling mills Ltd	ELEGANT TMT	Elegant tower, 68A Ballygunge circular Road, Kolkata- 700019 Tel: 033-2895160/67 Fax- 033- 22894386 E-mail: spsdelhi@spsgroup.co.in	TMT bars of Gde Fe 500 Fe 500D, Fe 550	

Note: Contractor can procure TMT bars from the primary producer approved by the AHQ E- in-Cs Branch even during currency of the contract work.

(b) The documents in support of purchase of steel shall be furnished to AGE(I) for verification. The particulars of the manufacturers of steel shall be furnished by the contractor for every lot of steel separately as per the Performa given in Annexure-I

PARTICULAR SPECIFICATIONS

(c) **GALVANISED STEEL SHEETS & FABRIC REINFORCEMENT FOR CONCERETE** These shall be procured directly from main producers/BIS marked manufacturers as approved here-in-before at the option of Contractor without any minus price adjustment.

(d) Reinforcement steel, structural steel and Galvanised steel sheets & fabric reinforcement for concrete may be permitted to be procured from authorized dealers of main producers in case the total requirement of steel is less than 5 tonnes and specifically approved by Accepting Officer in writing.

(e) Steel sections for railings, gates, fencing, guard bars, grills, steel chowkhat, holdfasts etc, which do not constitute structural members, can be procured from main producers/ secondary producers/ BIS marked manufacturers or their authorized dealers at the option of Contractor without any minus price adjustment. Tests will not be insisted upon for such steel sections.

(f) The documents in support of purchase of steel shall be furnished to AGE(I) for verification. The particulars of the manufacturers of steel shall be furnished by the contractor for every lot of steel separately as per the Performa given in Annexure-I.

7.6 **TESTING OF STEEL**

(a) The contractor shall submit the manufacturer's Test certificate in original along with the test sheet giving their results of each mechanical test as applicable and the chemical composition of the steel or authenticated copy thereof duly signed by the manufacturer with each consignment. The Engineer-in-Charge shall record these details in a steel Acceptance Register after due verification.

(b) It will be mandatory for the AGE(I) to carry out simple field test and record the findings before the contractor is allowed to use steel in the work. CWE may also carry out random checks and record his remarks in the Steel Test Register. Such simple testing includes sand papering the cross section of the TMT bar and dipping it in chemical solution to give a clearly defined annular ring of tempered steel. Cost of all such facilities for test shall be borne by the contractor.

(c) The Accepting Officer may order a board of Officers for random check of steel and verification of connected documents. In case of such check, if it is found that steel brought on site/incorporated in work does not meet the requirements laid down in the contract, such steel/work in which such steel has been incorporated shall be rejected or devalued based on the defects. In this regard decision of the Accepting Officer shall be final and binding. Contractor shall have no claim whatsoever on account of such rejection.

(d) Independent testing of steel by the AGE(I) from random samples of steel drawn from various lots from National Test House, SEMT, CME, Regional Research Labs, Govt Engineering College, Zonal Lab or Govt approved Labs etc, as per the recommended frequency given here-in-after shall be optional at the discretion of the AGE(I) in case of procurement of steel from main producers and testing charges shall be borne in accordance with Condition 10 A of IAFW-2249 i.e. testing charges shall be borne by the Deptt, if the test results are found in order otherwise these shall be borne by the Contractor.

(e) Independent testing of steel by the AGE(I) from random samples of steel drawn from various lots from National Test House, SEMT, CME, Regional Research Labs, Govt Engineering College, Zonal Lab or Govt approved Labs etc as per the recommended frequency given here-in-after shall be mandatory in case of procurement of steel from secondary producers and testing charges shall be borne by the contractor irrespective of the outcome of test results.

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(f) In both the cases at sub Para 7.6 (d) & (e) above, the Contractor at his cost shall provide all facilities required for the testing and cost of materials consumed in tests shall also be borne by the Contractor.

(g) The elongation of reinforcement steel shall not be less than 18%.

7.7 **FREQUENCY OF NORMAL MASS, TENSILE, BEND AND REBEND TESTS OF STEEL**

Ser No	NOMINAL SIZE	QUANTITY
(a)	**STEEL REINFORCEMENT**	
(i)	Bars size less than 10mm	One sample (three specimens) for each test for every 25 tonnes or part thereof).
(ii)	Bars size 10mm to 16mm	One sample (Three specimens) for each test for every 35 tonnes or part thereof).
(iii)	Bars size over 16mm.	One sample (Three specimens) for each test for every 45 tonnes or part thereof
(b)	**STRUCTURAL STEEL**	
(i)	Tensile test including % age elongation	One test for every 25 tons of steel or part thereof).
(ii)	Bend test	One test for every 10 tons of steel or part thereof.

NOTE: - APPLICABLE FOR ALL TESTS.

7.8 For various tests, acceptance criteria, tolerance etc. refer to steel supply/Acceptance form given Appendix 'D' to Particular Specification and relevant BIS Codes.

7.9 **DOCUMENTATION**

(a) The contractor shall submit original purchase vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignments received at work site shall be inspected by the AGE(I) along with relevant documents before acceptance. The original vouchers and the test certificates shall be defaced by the Engineer-in-Charge and photocopy of the same shall be kepton the record in the office of AGE(I) duly authenticated and with cross reference of control number recorded in the steel Acceptance Register and will be signed by JE (Civil), Engineer-in- Charge, AGE(I) and the contractor duly endorsed CA No & Year.

(b) The entire quantity of all steel items shall be recorded in Measurement Book indicating size, quantities, voucher numbers, dates brought on site for record purposes as "not to be abstracted" and signed by Engineer-in-Charge and the contractor before incorporation in the work.

(c) Irrespective of what is shown in drawings or specified elsewhere, steel reinforcement to be used in this project shall be Thermo Mechanically Treated steel bars.

7.9.1 **STEEL FOR REINFORCEMENT**

(a) High strength deformed steel bars produced by thermo mechanical treatment process (TMT steel bars of grades Fe-500 /Fe 500D/Fe550/Fe550D) meeting all other requirements of IS-1786.

Note :- For Swimming pool, Diving pool, Balancing tank , Hazardous tank, RCC over Head water tank , High strength corrosion resistant deformed steel bars (from primary producers as approved by E-in-C's Branch) produced by Thermo Mechanical Treatment process (TMT steel bars) of grade Fe-500 /500Dmeeting all other requirements of IS- 1786, shall be used. Minimum elongation shall be 18%.

(b) Mild steel bars shall conform to IS-432 (Part-I) and Grade-I.

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7.9.2 STRUCTURAL STEEL

(a) Structural steel standard quality shall conform to IS-2062-2006 (sixth revision) and Grade Fe- 410-W (Gde E-250), quality A.

(b) Structural Steel ordinary quality shall be used for structures not subjected to dynamic loading. This steel shall not be used where welding is used in fabrication and in earth quake zone where severe damage is expected and design of structure based on plastic theory. The steel shall conform to IS-2062-2006 (sixth revision) and Fe-290 (Gde E-165).

(c) Structural steel ordinary quality shall be used in railing, gates, fencing, guard bars, grills, holdfasts, door and window frames etc., and shall conform to IS-2062-2006 (sixth revision), Fe-290 (Gde E-165).

(d) **Galvanised Steel Sheets (Plain and Corrugated)**:Conforming to IS-277.

(e) Structural steel: Standard quality Fe410-W (Gde E-250) quality-A As (other than mentioned in MES Schedule. general purposes).

(f) MS round bars for: IS-432(Part I) reinforcement Gde I mild steel / twisted bars and as mentioned in MES Schedule 6 mm can be wire drawn quality.

(g) TMT Bars: TMT bars Fe 500/Fe 500d/Fe 550d conforming to reinforcement IS 1786-1985.

(h) Steel (general purpose): Ordinary quality Fe 290 (Gde E-165).

(j) Fabric reinforcement for concrete: Conforming to IS -1566.

7.10 The steel shall be procured and brought to the site one month before it is required to be incorporated in the work taking into account the time required for it's inspection and acceptance as specified here-in-before.

7.11 Contractor shall be responsible for proper storage, preservation and maintenance of steel at site till it is consumed in the work. Steel rejected shall be stacked separately, so marked and removed as directed by AGE(I).

7.12 REINFORCEMENT

(a) Reinforcement of mild steel and deformed cold twisted bars shall be of TMT bars in lieu thereof without change of any spacing as specified by the Engr-in-Charge and in accordance with the provisions of IS: 456 of 2000 without any extra cost to Govt.

(b) Reinforcement shall be fabricated, placed in position specified by the Engr-in-Charge and specified in Clause 10.17 to 10.22 of MES Schedule Part- I.

(c) Laps and crossing shall be tied with mild steel wire (annealed) (soft drawn) of diameter not less than 0.90mm. Laps shall be staggered.

(d) Irrespective of whether corner reinforcement is indicated or not in RCC plan showing reinforcement of slabs, corner reinforcement shall be provided as shown in TD (typical drawings).

(e) The contractor shall be responsible for accurate fixing of reinforcement as specified by the Engr-in-Charge, and shall not pour any concrete until the reinforcement has been inspected in position and approved in writing by the AGE(I). The contractor shall take necessary precaution to prevent any displacement of reinforcement bars during concreting.

PARTICULAR SPECIFICATIONS

8. HELIPAD / ROAD / PAVEMENT EARTH WORK AND EXCAVATION

Excavation shall consist of excavation, removal & satisfactory disposal of materials as included in relevant schedule and with all lift necessary for the construction of Helipad, hard standing, taxi tracks, existing roads, aprons, bituminous shoulders and other works meeting requirements of specifications here-in-after and lines, grades and cross sections or as indicated/directed. This works shall include the hauling and stacking of or hauling to sites of embankment and sub grade construction of suitable cut materials in the specified manner and the trimming and finishing of the ground to the specified dimensions & as directed. Construction operations shall be as under: -

8.1 **SETTING OUT** After the site has been cleared, the limits of excavation shall be set true to lines, curves, slopes, grades and sections as shown on the drawings or as directed. The contractor shall provide all labour, survey instruments and materials such as strings, pegs, nails etc, required in connection with setting out of works and the establishment of benchmarks. The contractor shall be responsible for the maintenance of benchmarks and other marks of stakes for the period as directed by the AGE(I).

8.2 **SURFACE DRESSING** As directed at site, the top soil including grass existing over sites of excavation shall be dressed not exceeding a depth of 15 cm and excavated material shall be disposed as ordered and there after new levels shall be taken for working purpose.

8.3 **EXCAVATION**

Existing levels of the area will be taken using total station survey equipment jointly by the contractor and the department. Desired profile after completion of survey work shall be provided by the contractor as per slope specified by the Engr-in-Charge in consultation with AGE(I), accordingly all excavation shall be carried out in the conformity with the directions laid hereunder and in a manner approved by AGE(I). The work shall be so done that suitable materials available from excavation are satisfactorily utilized as decided by AGE(I) beforehand. While planning or executing excavations, the contractor shall take all adequate precautions against soil erosion, water pollutions etc as directed by AGE(I). The excavation shall conform to the lines grades, sides slopes and levels, shown on the drawing and as directed by AGE(I). The contractor shall not excavate outside the slopes or below the established grades or loosen any material outside the limits of excavation subject to the permitted tolerance. Any excess depth excavated below the specified levels shall be made good at the cost and arrangement of the contractor with suitable material of similar characteristics and compacted to the requirements as decided and directed by AGE(I). All debris and loose material on the slopes of cuttings shall be removed all as directed. No back filling shall be allowed to obtain required slopes except that when boulders or soft materials are encountered in cut slopes these shall be excavated to the approved depth as directed and the resulting cavities filled with suitable material and thoroughly compacted as directed.

8.4 **DISPOSAL OF EXCAVATED MATERIAL**

Where the excavated materials is directed to be used in the construction of embankment, it shall be directly deposited at the required location complying with the requirements of embankment and sub grade that the capacity of cutting, haulage and compaction equipment is nearly the same.

8.5 **PREPARATION OF CUT FORMATION**

The cut formation, which serves as a foundation base, shall be prepared to proper line and level as directed by AGE(I). Any loose pockets shall be well compacted. Any unsuitable material encountered at the formation level shall be removed to a depth indicated by the AGE(I) and replaced with suitable material as approved and directed by AGE(I) and compacted in accordance with embankment and sub grade construction.

PARTICULAR SPECIFICATIONS

8.6 **FINISHING OPERATION**

Finishing operation shall include the work of properly shaping and dressing all excavated surfaces. The finished cut formation surface shall not vary from those calculated with reference to the profile as directed by the AGE (I) not beyond the tolerance of 20mm to 25mm.

8.7 **METHODS, TOOLS AND EQUIPMENT**

Only such methods, tools and equipment as approved by AGE(I) shall be adopted/used in the work as directed by the GE, the contractor shall demonstrate the efficiency of the type of equipment to be used before the commencement of work**.**

8.8 **MEASUREMENT FOR PAYMENT**

Earthwork in excavation shall be measured by taking cross sections at intervals as decided by AGE(I) in writing in the original position before the work starts and after its completion and computing the volumes in cubic metres by method of Prismoidal rule. However, this interval shall not exceed more than 3 (three) metre. Where it is not feasible to compute volumes by this method because of erratic location of isolated deposits, the volumes shall be computed by other accepted methods as approved by AGE(I). The contractor shall leave depth indicators during excavations of such shape and size and in such positions as directed so as to indicate the original ground level as accurately as possible. The contractor shall be responsible to keep these intact till the final measurements are taken. Works involved in the preparation of sub-grade on cut formation shall be considered, as incidentally to this item and no extra payment shall be made on this account to the contractor.

8.9 **SOIL STABLISATION FOR SUB BASE**

(a) Providing and laying stabilized mixture of max 98% excavated earth and min 2% of cement(or as per design mix to achieve requirement) by weight of earth in layers in the surface of sub grade , mixing with mechanical plants/rotellier, watering the mixture properly to enable the excavated earth and cement to react, banking the mixture in layers not exceeding 25 cm in thickness (each layer) on the prepared sub-grade, rolling each layer with soil compactor/ tandem vibratory roller as directed by the Engineer-in-Charge under optimum moisture content to achieve density of at least 95% of the maximum modified standard proctor density at optimum moisture content, complete including levelling and fine dressing the top layer to the required grade, camber and slope etc. complete as per Technical Specification and as directed by AGE(I) . Payment to be made for compacted quantity only.

(b) The “k” value and CBR value shall be tested on completion of compaction of stabilized soil and minimum “k” value of 4 kg/cm/cm2 for rigid portion and soaked CBR value of 8% shall be achieved at the top of sub base layer (stabilized soil).If ‘K’ value of soil 4 kg/Sq cm/cm and above are obtained at bed level of subgrade, then accepting officer will decide whether to do soil stabilization or not.

(c) The soil samples to be stabilized shall be tested in laboratory and proportion of cement shall be determined to yield soaked CBR value of 8% in terms of IS:2720 and sub grade reactions ‘K’ value of 4 kg per sq cm/cm and Unconfined Compressive Strength shall be tested in accordance with IS:9214 in the field.

8.9.1 Soil Testing Agencies as per E-in-C’s Branch list of consultant for ‘k’ value is given as below:-

(a) M/s Genstru Consultants Pvt Ltd, B-145, Ganga Osian Square, Survey No 249/250, Mankar Chowk Wakad, Pune-411057.

(b) M/s Kailtech Test & Research Centre (P) Ltd, Plot No 141C, Electronic Complex, Pardespura, Indore-452010.

(c) M/s Geo Designs & Research (P) Ltd, B-10, Krishna Industrial Estate, Opp. BIDC, Gorwa Estate, Vadodara-390016.

(d) M/s S.M. Consultants, H No-11A, Sector 7, Dwarka, New Delhi-075.

(e) Any other consultant approved by the E-in-C’s Branch under category – K on the day of testing.

(f) NIT / IIT / Govt Engineering Colleges.

(g) SEMT Pune.

PARTICULAR SPECIFICATIONS

9. MATERIALS

9.1 MATERIALS TO BE STABILIZED

(a) The excavated earth shall be used for stabilization. Any vegetation, organic impurities shall be removed from the excavated earth. Samples of soil to be used for stabilization shall be tested in laboratory for the following properties:-

(i) Sieve analysis.
(ii) Liquid limit.
(iii) Plastic limit.
(iv) Modified proctor density and corresponding optimum moisture content.
(v) Natural moisture content.
(vi) Deleterious constituents.
(vii) Soaked CBR in Lab.

(b) The soil shall be free from harmful salt like soluble sulphate. The soluble sulphate shall not exceed 0.2% by weight and organic matter shall not exceed 1%. If the material passing 425 micron sieve in plastic, it shall have a liquid limit not greater than 45% and plasticity index not greater than 20% determined in accordance with IS:2720 (Part V).

9.2 PROPORTION OF CEMENT MIX

In case the laboratory tests prescribe cement proportion in excess of 2% of total weight of dry soil then the prescribed higher percentage of cement shall be used without any price adjustment. The rates quoted shall be deemed to be inclusive of eventual excess use of cement and in case the cement requires less than 2% cement of total weight of dry soil, the same shall be regularized with minus adjustment at the rate given under Srl item No. 1.38 of BOQ.

9.3 Mix Design for soil stabilization as per MORTH para 403.2.5 and 403.2.6.

10. CONSTRUCTION OPERATION WEATHER LIMITATIONS

Stabilization shall not be done when the air temperature in the shade is less than 10°C.

10.1 DEGREE OF PULVERISATION

For stabilization, the soil before addition of cement as stabilizer, shall be pulverized mechanically using power road roller, and/or agricultural machineries such as disc, harrows rotavators etc. The degree of pulverization should be such that it passes the requirement of Table 400-7 of MORTH.

10.2 DETERMINATION OF DEGREE OF PULVERISATION

Degree of Pulverization shall be checked as per SSR Part 1 clause 20.A.15.B.6.2.1.

11. EQUIPMENT FOR CONSTRUCTION

Stabilized soil sub-bases shall be constructed by central plant mixing of construction or as otherwise approved by the Engineer-in-charge. Manual Mixing shall not be permitted except for the places where the width of laying is not adequate for mechanically operations. The equipment used for central plant mixing construction shall be a soil stabilizing plant for similar approved equipment capable of mixing the soil, cement and water to specified degree and of achieving the desired degree of mixing and uniformity of the stabilized material. If so desired by the Engineer-in-charge, trial runs with the equipment shall be carried out to establish its suitability for work.

PARTICULAR SPECIFICATIONS

11.1 CENTRAL PLANT MIXING METHOD OF CONSTRUCTION

11.1.1 **SOIL**: Before deploying the equipment, the soil after it is made free of undesirable vegetation of other deleterious matter, pulverize it until 100 percent passes a 26.5 mm sieve. Ensure that at least 80 percent of the soil, excluding any stone or gravel, passes through 5.6 mm sieve. Have enough stockpile material meeting the requirements of for at least one day of base construction before operations begin.

11.1.2 **CEMENT**: Measure cement by weight. Uniformly add cement into the mixture. The cement incorporated, per ton of soil, shall be within ±5 percent of the amount prescribed by the Engineer. Perform cement checks that compare the actual percent cement in the mixture with the required percent cement specified in the approved Mix Design for the Project on each of the first two tankers supplying cement to the plant. If these checks are within the specified tolerance, one cement check per day will be required.

11.1.3 **MIXING**: Measure proportions of soil, cement, and water separately and accurately before mixing. Charge all materials into the mixer together. Begin mixing immediately. Mix until a homogeneous and uniform mixture is produced. If the final blend of materials is not homogeneously mixed or does not meet the moisture range specified in “Moisture Control,” cease plant operations until corrections are made in the plant or to the materials.

11.1.4 **HAULING**: Deliver soil-cement material to the Project. Spread soil-cement material so that compaction can begin within 45 minutes after the soil, cement, and water have been charged into the mixer. Protect the mixture in transit by using a securely fastened waterproof cover large enough to extend down over the sides and the end of the bed of each haul vehicle

11.1.5 **SPREADING**: Use an approved mixture spreader to obtain the specified thickness. Spread the mixture the full width of the area to be covered. Ensure that trucks and other construction equipment, including motor graders, do not travel over the material until compaction equipment has made initial passes over the mixture. Ensure that less than 30 minutes elapse between the placements of cement-treated material in adjacent lanes at any location, unless longitudinal joints are specified.

11.1.6 **THICKNESS:** The earth layer to be stabilized with cement shall be spread in two layers of uniform thickness not exceeding 20 cm in each layer

12. COMPACTING AND FINISHING

12.1 Test Section: Construct a test section at cost of contractor of 50 m long and 12 m width. Before constructing a test section, submit a Construction Work Plan to the Asst Garrison Engineer for approval. The Construction Work Plan must indicate proposed equipment and compaction procedures. If the Construction Work Plan is approved, the Engineer-in-Charge will evaluate the Work Plan during test section construction. The Engineer-in-Charge will evaluate compaction, moisture, homogeneity of mixture, thickness of course, and laminations or compaction planes (scabbing). If the Engineer- in- Charge determines that the Work Plan is not satisfactory, revise the compaction procedure and augment or replace equipment, as necessary, to complete work according to the Specifications.

12.2 Time Limits: Begin compaction within 45 minutes of the time water is added to the soil-cement mixture. Complete compaction within 2 hours. Complete all operations in four hours, from adding cement to finishing the surface.

12.3 Moisture Control: During compaction, ensure a uniform moisture content of the mixture that is between 100 and 120 percent of the optimum moisture content. If the moisture content exceeds the tolerance at any time, cease operations immediately and make the adjustments necessary to bring the moisture content within tolerance.

PARTICULAR SPECIFICATIONS

13. ROLLING AND COMPACTION

Immediately after spreading, grading and leveling of the mixed material, each layer shall be compacted with soil compactor and /or sheep footed roller/vibratory roller as approved by Engineer-in-Charge, preceded by a few passes of light roller, if necessary, immediately after the mix is laid and spread to grade. Successive layers shall not be placed until the lower layer has been thoroughly compacted to satisfy the density requirements, and all quality control tested as per requirement of the specifications. Rolling shall commence at edges and progress towards the center, except at super elevated portions where it shall commence at the inner edge and progress towards outer edge. During rolling the surface shall be frequently checked for grade and cross fall (camber) and any irregularities corrected by loosening the material and removing/adding fresh material. Compaction shall continue until the density/achieved is at least 98 per cent of the maximum dry density for the material determined in accordance with IS:2720 (Part-VIII). Care shall be taken to see that the compaction of cement stabilized material is compacted within two hours of its mixing or such shorter period as may be found necessary in dry weather. During rolling it shall be ensured that roller does not bear directly on hardened or partially hardened treated material previously laid other than what may be necessary for achieving the specified compaction a the joint. The final surface shall be well closed, free from movement under compaction planes, ridges, cracks or loose material. All loose or segregated or otherwise defective areas shall be made good to the full thickness of the layer and re-compacted. The filed density of compacted layer shall be measured by “Sand replacement Method” as specified in IS: 2720 (Part-XXVIII).

14. CONSTRUCTION JOINTS

Form a straight transverse joint at the end of each day’s construction or when the work is interrupted so that the material cannot be compacted within the time limit specified in this Subsection. Create the straight transverse joint by cutting back into the completed work to form a true vertical face free of loose or shattered material. Form the joint at least 600 mm from the point at which the strike-off plate of the spreader comes to rest at the end of the day’s work, or at the point of interruption. Form a longitudinal joint as described above if the soil-cement mixture is placed over a large area where it is impractical to complete the full width during one day’s work. Use the procedure for forming a straight transverse joint. Ensure that waste material is removed from the compacted base.

14.1 CURING

As per MORTH clause 403.3.6

14.2 SURFACE FINISH

The finished surface shall be as per SSR Pt 1 clause 20.A.15B.6.9.

14.3 HORIZONTALALIGNMENT

Horizontal alignments shall be as per SSR Pt 1 clause 20.A.15B.6.9.1.

14.4 LONGITUDINALPROFILE

Longitudinal profile shall be as per SSR Pt 1 clause 20.A.15B.6.9.2.

PARTICULAR SPECIFICATIONS

14.5 SURFACE REGULARITY OF SUBGRADE AND PAVEMENT COURSES

The surface regularity of completed sub-grade and sub-base shall be as per SSR Pt 1 clause 20.A.15B.6.9.3 and as per permitted tolerance table given here in after:-

TABLE 5.2

PERMITTED TOLERANCE OF SURFACE REGULARITY FOR SUBGRADE AND SUB-BASE

Sl No	Type of Construction	Longitudinal profile with 3 meter straight edge					Cross-profile
		Maximum permissible undulation	Maximum number of undulations permitted in any 300 meters length exceeding				Maximum permissible variation from specified Profile under camber template (mm)
			Mm				
			10	12	10	6	
1	2	3	4	5	6	7	8
(i)	Earthen Sub-grade	24	30	-	-	-	15
(ii)	Granular Sub-base	15	-	30	-	-	12

14.6 RECTIFICATION OF SUBGRADE IRREGULARITY

When the surface regularity falls outside the specified tolerance, the Contractor shall be liable to rectify these in the manner described below and to the satisfaction of the Engineer-in-Charge.

14.7 HIGH SURFACE

Where surface is high, it shall be trimmed in such a way that the materials below are not disturbed due to this operation.

14.8 LOW SURFACE

For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material is less than 2 hours, the surface shall be scarified to a depth of 50mm supplemented with freshly mixed materials as necessary and re-compacted to the relevant specification. When the time is more than 2 hours, the full depth of the layer shall be removed from the pavement and replaced with fresh material laid to Specification.

14.9 QUALITY CONTROL TEST DURING CONSTRUCTION

14.9.1 The material supplied and the works carried out by the Contractor shall conform to the specification for ensuring the requisite quality of construction, the materials and works shall be subjected to quality control tests, as described hereinafter. The testing frequencies in Table 5.3 are the desirable minimum and the Engineer shall have the full authority to carry out additional tests as frequently as he may deem necessary, to satisfy himself that the materials and works comply with the appropriate specifications.

14.9.2 Where no specific testing procedure is mentioned, the tests shall be carried out as per the prevalent accepted engineer practice to the directions of the Engineer-in-Charge.

PARTICULAR SPECIFICATIONS

14.9.3 Following quality control tests shall be carried out at frequencies noted against each:-

(a) GOOD EARTH

Table 5.3

Sl No	TEST	TEST METHOD	FREQUENCY
(i)	Sieve Analysis (Gradation)	IS:2720 (Part-IV)	1 test per 250 cum of good earth.
(ii)	Sand Content	IS:2720 (Part-V)	2 tests per 3000 cum of good earth.
(iii)	Plasticity Test	IS:2720 (Part-V)	2 tests per 3000 cum of good earth.
(iv)	Density Test	IS:2720 (Part-VIII)	2 tests per 3000 cum of good earth (Each soil type).
(v)	Deleterious Content Test	IS:2720 (Part-XXVII)	As and when required by Engineer-in-Charge.
(vi)	Moisture Content	IS:2720 (Part-II)	1 test for every 250 cum of good earth.

(b) CEMENT STABILIZED SOILSUB-BASE

Sl No	TEST	FREQUENCY (MINIMUM)
(i)	Quality of Cement	One test for each consignment subject to a minimum of one test per 5 tonnes.
(ii)	Cement Content	Regularly through procedural checks.
(iii)	Degree of pulverization	Periodically as considered necessary by the Engineer-in-Charge.
(iv)	CBR (IS:2720 Part XVII)on soaked/uncooked samples	One test per 3000 cum. Mean of 3 samples shall constitute one test result.
(v)	Moisture Content Prior to Compaction (IS:2720 Part-II)	One test per 250 Sqm.
(vi)	d Density of Compacted Layer (IS:2720 Part XXVIII)	One test per 500 Sqm.
(vii)	Surface Accuracy	Regularly.

14.10 **MEASUREMENTS**

The initial levels shall be taken at a fixed interval of 3 meter or less as directed by the Engineer-in- Charge longitudinally as well as transversally. These levels shall be recorded in field books and plotted in plan before start of work both duly signed by the Engineer-in-Charge and the Contractor in token of acceptance. After completion of work, the final levels shall be taken at grid points, where previously the ground levels were taken, in the presence of Contractor or his authorized representative and his dated signatures obtained on the level book in token of his acceptance. These levels shall make the basis of payment. The quantity shall be computed in cubic meters from cross-sections after compaction. No deduction shall be made for voids. The quantity for payment shall be the theoretical quantity (based on formation levels) or actual quantity (based on actual levels) whichever is less.

14.11 **RATES**

The rate shall include the cost of all materials, plant, machinery and labour required for all the operations described above including all cartage leads and lifts. The contract unit rate shall include payment in full for carrying out the following operations:-

(a) Bringing all materials to be incorporated in the item of work including all royalties, fees etc. where ever necessary for all lifts and all leads.
(b) All labours, tools, plants and machinery, equipment and incidentals to complete the work to the specifications.
(c) Carrying out the work in Part width where directed by the Engineer-in-Charge.
(d) Carrying out the required tests for quality control, and Making arrangement for traffic, diversions etc. complete during the period of construction.

PARTICULAR SPECIFICATIONS

15. FORMING EMBANKMENT

15.1 GENERAL

Embankment work shall be carried out all as described in the clause 3.22 of MES SSR Part-I and hereinafter.

15.2 SCOPE

The work shall consist of laying and compacting a sub-base in single or more layers with approved good soil available at site and approved good earth brought from outside MD land in conformity with the specifications and as directed by the GE. Successive layers shall not be placed until the lower layer has been thoroughly compacted to satisfy the density requirements. Samples of good earth intended to be used for embankment in sub base shall be tested in the laboratory and on side as a routine as per Table 5.3-A here-in-before for the following properties. These tests shall be carried out in accordance with the procedure laid down in IS: 2720 (Relevant part) “Method of tests for soils”:

(a) Sieve analysis
(b) Liquid limit
(c) Plastic limit
(d) Determination of the modified standard proctor density and corresponding optimum moisture content.
(e) Natural moisture content
(f) Deleterious constituents.
(g) Field dry density &moisture
(h) Soaked Lab CBR

15.3 Expansive clay exhibiting marked swell and shrinkage properties (“free swelling index” exceeding 50 percent when tested as per IS:2720–Part40) shall not be used as a fill material. Where expansive clay with acceptable “free swelling index” value is used as a fill material, sub-grade and top 500 mm portion of the embankment just below sub-grade shall be non-expansive in nature.

15.4 Any fill material with a soluble sulphate content exceeding 1.9 grams of sulphate (expressed as SO3) per litre when tested in accordance with BS:1377 Test 10, but using a 2:1 water soil ratio shall not be deposited within 500 or other distance described in the contract, of concrete, cement bound materials or other cementations materials forming part of the Permanent Works. Materials with a total sulphate content (expressed as SO3) exceeding 0.5 percent by mass, when tested in accordance with BS :1377 Test 9 shall not be deposited within 500mm, or other distances described in the Contract, of metallic items forming part of the Permanent Works.

15.5 The size of the coarse material in the mixture of earth shall ordinarily not exceed 75mm when being placed in the embankment and 50mm when placed in the sub-grade. However, the Engineer may at his discretion permit the use of material coarser than this also if he is satisfied that the same will not present any difficulty as regard s the placement of fill material and its compaction to the requirements of these specifications. The maximum particle size shall not be more than two-thirds of the compacted layer thickness. Ordinarily, only the materials satisfying the density requirements given in Table 300-1 of MORT&H specifications(fifth revision) or as per subsequent revisions from time to time shall be employed for the construction of the embankment and the sub-grade In addition to tests prescribed hereinbefore samples of soil to be used in the top 50 cm of the embankment shall be tested in the laboratory for the determination of CBR value at 100% maximum modified proctor density and optimum moisture content, after soaking the samples in water for four days.

PARTICULAR SPECIFICATIONS

15.6 **SURFACE PREPARATION**

Contractor shall prepare surfaces to provide earth filling after removing all type of vegetation and shrubs if any arises after initial surface dressing done under preliminary work (levelling work).

COMPACTION REQUIREMENTS FOR EMBANKMENT AND SUBGRADE

Sl No.	Type of work/ material	Relative compaction as percentage ofmax laboratory dry density as per IS:2720 (Part 8)
(a)	Sub-grade and earthen shoulders	Not less than 98.
(b)	Embankment	Not less than 95
(c)	Expansive Clays	Not allowed.
(d)	Sub-grade and 500mm portion just below the sub-grade	Not less than 90.
(e)	Remaining portion of embankment	-

15.7 Earthwork for embankment and sub-grade to be placed against sloping ground : Where an embankment /sub-grade is to be placed against sloping ground, the latter shall be appropriately benched or ploughed / scarified as required in Clause 305.4.1 of MORT&H Specifications (Fifth revision) or as per subsequent revision from time to time before placing the embankment/sub-grade material. Extra earthwork involved in benching or due to ploughing/scarifying etc. shall be considered incidental to the work. For wet conditions, benches with slightly inward fall and subsoil drains at the lowest point shall be provided as per the drawings, before the fill is placed against sloping ground. Where the contract requires construction of transverse subsurface drain at the cut-fill interface, work on the same shall be carried out to Clause 309 of MORTH Specifications (Fifth revision) or as per subsequent revision from time to time in proper sequence with the embankment and sub-grade work as approved by the Engineer.

15.8 **ROLLING AND COMPACTION**

Immediately after spreading, grading and leveling of the material, each layer shall be consolidated with vibratory roller of 80 to 100 KN static weight with plain or pad foot rum or hereby pneumatic tyred roller of adequate capacity capable of achieving required compaction as approved by AGE(I) immediately after the mix is laid and spread to grade. Successive layers shall not be placed until the lower layer has been thoroughly compacted to satisfy the density requirements and all quality control shall be tested as per requirement of the specifications. Rolling shall commence at edges and progress towards the center, except at super elevated portions where it shall commence at the inner edge and progress outer edge. During rolling the surface shall be frequently checked for grade and cross fall (camber) and any irregularities corrected by loosening the material and removing/adding fresh material. Compaction shall continue until the density/achieved is at least 98% of the maximum dry density for the material determined in accordance with IS 2720 (Part VIII). During rolling it shall be ensured that roller does not bear directly on hardened or partially hardened treated material previously laid other than water may be necessary for achieving the specified compaction at the joint. The final surface shall be well closed, free from movement under compaction planes, ridges, cracks or loose material. All loose or segregated or otherwise defective areas shall be made good to the full thickness of the layer and re compacted. The field density of compacted layer shall be measured by “measured by “Nuclear density gauge/Sand Replacement Method” as specified in IS 2720 (Part XXVIII).

PARTICULAR SPECIFICATIONS

15.9 **SURFACE FINISH**

The finished surface shall be true to level and conform to the lines, grades, camber and dimension as directed. The finished surface shall be true to level, grade and camber, when a straight edge of 3 metre length is placed longitudinally or transversally. The maximum undulations shall not be more than 15mm longitudinally and 12mm in the transverse direction. The maximum number of undulations exceeding 18mm in any 300 metres length shall not exceed 30. Undulations of size bigger than that specified above shall be made good after loosening the area and adding/removing materials and re- compacting to the required density under OMC conditions.

15.10 **BLANK.**

15.11 **SURFACE REGULARITY OF SUB GRADE AND PAVEMENT COURSE**

The surface regularity of completed sub grade and sub base in the longitudinal and transverse directions shall within the tolerance indicated below in the table. The longitudinal profile shall be checked with a 3 metre long straight edge, at the middle of each 3 metre longitudinal strip along a line parallel to the center-line of that particular type of construction. The transverse profile shall be checked with a set of camber boards at intervals of 10metres.

15.12 **PERMITTED TOLERANCE OF SURFACE REGULARITY FOR SUB GRADE AND SUB BASE.**

Sl No	Type of Construction	Longitudinal profile with 3 meter straight edge			Cross-profile
		Maximum permissible undulation (mm)	Maximum number of undulations permitted in any 300 meters length exceeding		Maximum permissible variation from specified Profile under camber template (mm)
			Mm		
			10	12	
1	2	3	4	5	8
(a)	Earthen Sub-grade	24	30	-	15
(b)	Moorum Sub-base	15	-	30	12

15.13 **COMPACTION CONTROL**

Control shall be exercised by taking at least one measurement of density for each 1000 square metres of compacted area, or closer as required to yield the minimum number of test results for evaluating a day's work on statistical basis. The determination of density of shall be in accordance with [IS:2720 (Part XXVIII)]. Test locations shall be chosen only through random sampling techniques. Control shall not be based on the result of any one test but on the mean value of a set of 5-10 density determinations. The number of tests in one set of measurements shall be five as long as it is felt that sufficient control over borrow material and the method of compaction is being exercised. If considerable variations are observed between individual density results, the minimum number of tests in one set of measurement shall be increased to 10. The acceptance of work shall be subject to as per table 300-2 of MORT&H Specifications (reprinted Apr 2005) or as per subsequent revision from time to time.

Rate:- The quoted rates of relevant items of schedule shall deemed to inclusive of the cost of all materials, plant machinery and labour required for all the operations described above including all cartridges, leads and lifts.

PARTICULAR SPECIFICATIONS

15.13 **COMPACTION CONTROL(Contd…)**

(a) **MEASUREMENT** The initial levels shall be taken at fixed interval of 10 metre or less as directed by the AGE(I) longitudinally as well as transversally. The quantity shall be computed in cubic metres from cross-sections after compaction. The quantity for payment shall be the theoretical quantity (based on formation levels) or actual quantity (based on actual levels) whichever is less.

15.14 **GRANULAR SUB BASE**

The material to be used for the work shall be natural sand, moorum, gravel, crushed stone, or combination thereof depending upon the grading required. Materials like crushed slag, crushed concrete, brick metal and kankar may not be allowed only with the specific approval of the Engineer-in-Charge. The material shall be free from organic or other deleterious constituents and conform to one of the three grading given in the Table here-in-after. The grading to be adopted for a project shall be as specified here-in-before.

15.15 **PHYSICAL REQUIREMENTS**

The water absorption value of the coarse aggregate shall be determined as per IS: 2386 (Part 3); if this value is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS:383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 per cent. Aggregate Impact value shall be<40.

TABLE : GRADING FOR CLOSE GRADED GRANULAR SUB BASE MATERIALS

Sl No	IS Sieve Designation	Grading II Table 400.1 of MORTH.
(a)	75.0 mm	-
(b)	53.0 mm	100
(c)	26.5 mm	70 – 100
(d)	9.50 mm	50-80
(e)	4.75 mm	40 – 65
(f)	2.36 mm	30-50
(g)	0.425 mm	10-15
(h)	0.075 mm	< 5
(j)	CBR Value (Min)	30

Note :- Physical requirements of material of GSB will be as per Table 400-2 and QC test frequency will be as per Ser No 1 of Table 900 -3 of MORTH-Specifications for road and bridge works(Fifth Edition).

15.16 **STRENGTH OFSUB-BASE**

It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirement of Liquid.

PARTICULAR SPECIFICATIONS

16. CONSTRUCTION OPERATIONS

16.1 PREPARATION OF SUBGRADE

Immediately prior to the laying of sub-base, the sub- grade already finishedhere-in-beforeasapplicableshallbepreparedbyremovingallvegetationandotherextraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80 – 100 KN smooth wheeled roller.

16.2 SPREADING AND COMPACTING

(a) The sub-base material of grading specified in the Contract shall be spread on the prepared sub-grade with the help of a motor grader of adequate capacity, its blade hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer-in- Charge.

(b) When the sub-base material consists of combination of materials mixing shall be done mechanically by the mix-in-place method. The equipments used for mix-in-place construction shall be a rotavator or similar approved equipment capable of mixing the material to the desired degree shall be carried out to establish its suitability for the work.

(c) Moisture content of the loose material shall be checked in accordance with IS : 2720 (Part 2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controller quantities to variable widths of surface or other means approved by the Engineer-in-Charge, so that, at the time of compaction, it is from 1 per cent above to 2 percent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, motivators until the layer is uniformly wet.

(d) Immediately thereafter, rolling shall start, if the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 120 KN weight may be used. For a compacted single layer upto 200 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 120 KN static weight with plain drum or pad foot drum or heavy pneumatic tyred roller of minimum 200 to 300 KN weight having a minimum tyre pressure of 0.7 MN/m2 or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional cross- fall and super elevation and shall commence at, the edges and progress towards the centre for portions having cross fall on both sides. Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass, During rolling, the grade and cross-fall (chamber) shall be checked and any high spots or depressions, which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour. Rolling shall be continued till the density achieved is at latest 98 per cent of the maximum dry density for the material determined as per IS:2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

(e) Test reports of all the constituents viz coarse/ fine aggregates, crushed screening, water and cement etc approved for the construction of GSB/WMM/DLC/PQC & RCC WORK shall form part of their Design Mix if source/ make of any constituent is changed by the contractor then redesigning of said course/ item is required. Onus of the delay due to redesigning which hamper progress of work lies with the contractor.

PARTICULAR SPECIFICATIONS

16.3 **WET MIXED MACADAM**

(a) 40 mm graded aggregate shall be crushed stone as per sieve designation mentioned in clause No 16.4 here-in-after. The coarse aggregate shall be hard and durable and shall be free form excess of flat, elongated, soft and disintegrated particles, dirt and other objectionable matter. Coarse aggregate shall be tested as per IS:2386(Part- IV) to check the physical requirements and strength . WMM shall be laid in layers as specified in Sch'A'. Screening shall be of the same materials as of coarse aggregate.

(b) Coarse aggregate shall conform to the following:-

SrlNo	TEST	TEST METHOD	REQUIREMENT
(i)	Los Angeles Abrasion Value	IS-2386(Schedule 'A'-IV)	40% Max
(ii)	Aggregate impact value	IS-2386(Schedule 'A'-IV) or IS 5640	30% Max
(iii)	Combined Flakiness and elongation	IS-2386(Schedule 'A'-I)	35% Max

Note:To determine this combined proportion, the flaky stone from a representative sample should first be separated out. Flakiness index is weight of flaky stone metal divided by weight of stone sample . Only the elongated particles be separated out from the remaining (non -flaky) stone metal. Elongation index is weight of elongated particles divided by total non-flaky particles. The value of flakiness index and elongation index so found are added up. If the water absorption value of the coarse aggregate is greater than 2%, soundness test shall be carried out as per IS-2386(Part-5).

16.4 **GRADING REQUIREMENTS**

(a) The aggregate shall conform to the grading 1 as per IRC: 109-1997 given below:-

Sl No	IS sieve designation	Percent by weight passing the IS sieve
(i)	53.00 mm	100
(ii)	45.00 mm	95-100
(iii)	26.50 mm	-
(iv)	22.40 mm	60-80
(v)	11.20 mm	40-60
(vi)	4.75 mm	25-40
(vii)	2.36 mm	15-30
(viii)	600 micron	8-22
(ix)	75 micron	0-5

(b) Material finer than 425 micron shall have plasticity Index (PI) not exceeding6.The final gradation approved within these limits shall be well graded from course to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice-versa. Coarse aggregate and screening specified above shall be stacked closely packed on level and hard surface' after 'level' and shall be measured and recorded in MB before incorporation. A deduction of $1/13^{th}$ from the stack measurements shall be made for unevenness of the ground.

16.5 **PREPARATION OF BASE**

The surface of the sub grade/sub-base/base to receive the Wet Mix Macadam course shall be prepared to the specified lines and cross fall (camber) and made free of dust and other extraneous material. Any ruts or soft yielding places shall be corrected in an approved manner and rolled until firm surface is obtained if necessary by sprinkling water. Any sub- base/base/base surface irregularities where predominant, shall be made good by providing appropriate type of profile corrective course (levelling course).

PARTICULAR SPECIFICATIONS

16.6 PROVISION OF LATERAL CONFINEMENT OF AGGREGATE

While constructing wet mix macadam, arrangements shall be made for the lateral confinement of wet mix. This shall be done by laying materials adjoining shoulder along with that of wet mix macadam.

16.7 PREPARATION OF MIX

(a) Wet mix macadam shall be prepared in a continuous mixing plant of suitable capacity having provision for controlled addition of water and forced positive mixing arrangement like pug mill or pan type mix of concrete batching plant.

(b) Optimum moisture for mixing shall be determined in accordance with IS: 2720 (Part 8) after replacing the aggregate fraction retained on 22.4 mm sieve with material of 4.75 mm to 22.4 mm size. While adding water, due allowance should be made for evaporation losses. However, at the time of compaction, water in the wet mix should not vary from the optimum value by more than limits as approved by the Engineer-in-Charge. The mixed material should be uniformly wet and no segregation should be permitted.

16.8 SPREADING OF MIX

(a) Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared sub grade/sub-base/base in required quantities. In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed stretch be permitted.

(b) The mix will be spread by a paver finish. For portions where mechanical means cannot be used, manual means as approved by the Engineer-in-Charge shall be used.

(c) The paver finisher for WMM shall be self-propelled, having the following features:-

(i) Loading hoppers and suitable distribution mechanism.
(ii) The screed shall have tamping and vibrating arrangement for initial compaction the layer as it is spread without rutting or otherwise marring the surface profile.
(iii) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes. The surface of the aggregate shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregate as may be required. The layer may be tested by depth blocks during construction. No segregation of larger and fine particles should be allowed. The aggregates as spread should be of uniform gradation with no pockets of fine materials

16.9 COMPACTION

(a) After the mix has been laid to the required thickness, grade and cross fall/camber the same shall be uniformly compacted, to the full depth with suitable roller.

(b) In portions having unidirectional cross fall /super elevation, rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the center line of the WMM, uniformly over-lapping each of the preceding track by at least one third width until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least one metre away from any preceding stop.

(c) In portions in camber, rolling should begin at the edge with the roller running forward and backward until the edges have been firmly compacted. The roller shall then progress gradually towards the center parallel to the center line of the WMM uniformly overlapping each of the preceding track by at least one third width until the entire surface has been rolled.

PARTICULAR SPECIFICATIONS

COMPACTION (Contd…)

(d) Any displacement occurring as a result of reversing of the direction of a roller or fro any other cause shall be corrected at once as specified and/or removed and made good.

(e) Along forms, kerbs, walls or other places not accessible to the roller, the mixture shall be thoroughly compacted with mechanical tempers or a plate compactor. Skin patching of an area without scarifying the surface to permit proper bonding of the added material shall not be permitted.

(f) Rolling should not be done when the sub grade is soft or yielding or when it causes a wave like motion in the sub base/base course or sub grade. If irregularities develop during rolling which exceed 12 mm when tested with a 3 metre straight edge, the surface should be loosened and premixed material added or removed as required before rolling again so as to achieve a uniform surface conforming to the desired grade and cross fall. In no case should the use of unmixed material be permitted to make up the depressions.

(g) Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density or the material as determined by the method outlined in IS-220 (Part 8).

(h) Longitudinal joints and edges shall be constructed conforming to IRC:109-1997.

(j) After completion, the surface of any finished layer shall be well closed, free from movement under compaction equipment or any compaction planes sags, cracks and loose material. All loose, segregated or otherwise defective area shall be made good to the full thickness of the layer and re-compacted.

16.10 **SETTING AND DRYING**

After final compaction of wet mix macadam course, the surface shall be allowed to dry for 24 hours. Preferably no vehicular traffic of any kind should be allowed on the finished wet mix macadam surface till it has dried and the wearing course laid.

16.11 **RECTIFICATION OF SURFACE IRREGULARITY**

Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances as laid down in IRC or where the course is otherwise defective due to sub grade soil getting mixed with the aggregate ,the full thickness of the layer shall be scarified over the affected area, reshaped with added premixed material or removed and replaced with fresh premixed material as applicable and re compacted. The area treated in the aforesaid manner shall not be less than 5 m long and 2 m wide. In no case shall depressions be filled up with unmixed and ungraded material or fines equipment for determining the maximum dry density as per IS shall be provided by the contractor and cost of the same and conducting the test shall deemed to be included in the quoted rates.

16.12 **DRY LEAN CONCRETE(M-15 GRADE DESIGN MIX)**

(a) The work shall consist of construction of dry lean concrete sub-base for cement concrete Pavement in accordance with the requirements of these specifications and in conformity with the lines, grades and cross-sections shown on the drawings or as directed by the AGE. The work shall include furnishing of all plant and equipment, materials and labour and performing all operations, in connection with the work, as approved by the AGE.

(b) The design parameters of dry lean concrete sub-base, viz., width, thickness, grade of concrete, details of joints, if any, etc shall be as specified in MORTH Specifications Fifth Revision (2013) or as per subsequent revision from time to time.

PARTICULAR SPECIFICATIONS

17 MATERIALS

17.1 SOURCE OF MATERIALS

The contractor shall submit the sample of materials indicating source of AGE(I) with relevant test data to be used in the lean concrete work sufficiently in advance and the approval of the AGE(I) for the same shall be obtained at least 15 days before the scheduled commencement of work of laying dry lean concrete. If the contractor later proposes to obtain the materials from a different source, he shall notify the AGE(I) for his approval at least 15 days before such materials are to be used. In no case materials shall be used at site without written approval of AGE(I).

17.2 CEMENT

Cement as specified here-in-before shall be procured by the contractor as specified. In case the sub grade is found to consist of soluble sulphate in a concentration more than 0.5 percent, cement used shall be sulphate resistant and shall conform to IS:6909.

17.3 AGGREGATES

Aggregates for lean concrete shall be natural material comply with IS : 383. The aggregates shall not be alkali reactive. The limits of deleterious materials shall not exceed the requirements set out in IS :383. In case the Engineer-in-Charge considers that the aggregates are not free from dirt, the same may be washed and drained for a least 72 hours before batching , as directed by the Engineer-in-Charge.

17.4 COARSE AGGREGATE

Coarse aggregate shall consist of clean, hard, strong, dense, non-porous and durable pieces of crushed stone or crushed gravel and shall be avoid of pieces of disintegrated stone, soft, flaky, elongated, very angular or splintery pieces. The maximum size of the coarse aggregate shall be 26.5mm. Aggregate which has water absorption of more than 2% shall be tested for soundness in accordance with IS-23186 (Part-5). After 5 cycles of testing, the loss shall not be more than 12 percent if sodium sulphate solution is used and not more than 8 percent if magnesium sulphate solution is used. Los Angeles Abrasion value shall not exceed 35 percent. The combined flakiness and elongation index of the aggregate shall not be more than 35percent.

17.5 FINE AGGREGATE

(a) The fine aggregate shall consist of clean, natural sand and shall conform to IS : 383. Fine aggregate shall be free from soft particles, clay, shale, loam, cemented particles, mica, organic and other foreign matter. Aggregates which have water absorption of more than 3 % shall not be used. Deleterious substance should not exceed the requirements set out in table 600-2 of MORTH specifications (Fifth Revision).

(b) The gradation of DLC will conform to Table 600-1 of MORTH-Specifications for Road and Bridge Works(Fifth Edition).

17.6 HANDLING OF AGGREGATES

(a) Stockpiles shall be made immediately on receipt of aggregates. Aggregates shall be stacked separately according to the nominal sizes of the single sized coarse aggregates. For fine aggregates separate stocks should be made for different grading zones, if required

(b) Aggregates shall be stacked on hard surfaces so as to exclude the possibility of soil or grass being mixed up. When stacks are in close proximity the stockpiles shall be separated by the baulk heads to prevent the aggregates from mixing together. Special care shall be taken to clean and wash the last layer of aggregate in contact with ground surface before use.

PARTICULAR SPECIFICATIONS

(c) Before batching, the aggregates shall have been stockpiled for at least 24 hours to allow for draining of water, if any. Contractor shall make adequate provisions for stock piling aggregates to an extent sufficient to meet the needs of the work taking into account the availability of supplies and rate of delivery, etc, and he shall include in his tender for necessary double handling and transportation of materials from stock piles to mixing plant etc.

17.7 **WATER** Water used for mixing and curing of concrete shall be clean and free from injurious amount of oil, salt, acid, vegetable matter or other substances harmful to the finished concrete. It shall meet the requirement stipulated in IS :456.

17.8 **STORAGE OF MATERIALS**

All efforts must be made to store the materials in proper places so as to prevalent their deterioration or contamination by foreign matter and to ensure their satisfactory quality and fitness for use in the work. The storage place must also permit easy inspection, removal and storage of materials. All such materials even though stored in approved go downs must be subjected to acceptance test immediately prior to their use.

17.9 **PROPORTIONING OF MATERIALS FOR THE MIX**

The mix shall be proportioned with a maximum aggregate cement ratio of 15:1. The water contents shall be adjusted to the optimum as specified here-in-after for facilitating compaction by rolling. The strength and density requirements of concrete shall be determined in accordance with clause 18.3.6.4 here in after by making trial mixes.

17.10 **MOISTURE CONTENT**

(a) The right amount of water for the lean concrete shall be decided so as to ensure full compaction under rolling and shall be assessed at the time of rolling the trial length. Too much water will cause the lean concrete to be heaving up before the wheels and picked up on the wheels of the roller and too little will lead to inadequate compaction, a low in situ strength and an open textured surface.

(b) The optimum water content shall be determined and demonstrated by rolling during trial length construction and the optimum moisture content and degree of compaction shall be got approved from the GE. While laying in the main work, the lean concrete shall have a moisture content between the optimum and optimum + 2 percent, keeping in view the effectiveness of compaction achieved and to compensate for evaporation losses.

17.11 **CEMENT CONTENT**

The minimum cement content in the lean concrete shall not be less than as specified in the Schedule. If this minimum cement content is not sufficient to produce concrete of the specified strength, it shall be increased as necessary without additional cost/compensation to the contractor.

17.12 **DESIGN MIX AND CONCRETE STRENGTH**

The design mix complying with the above clauses shall be got approved from the AGE(I) and demonstrated in the trial length construction. The DLC (M-15 grade design Mix) shall be tested all as specified in IS:456(2000). Testing and frequency of tests of DLC will be as per clause 903 and acceptance of trial bay and regular work will be as per clauses contained in Section 600 of MORTH-Specifications road and bridge works (Fifth Edition).

17.13 **SUBGRADE** : As per the provisions given in the 601.4 of MORTH specifications.

17.14 **DRAINAGE LAYER** : As per the provisions given in the 601.5 of MORTH specifications.

18. **CONSTRUCTION**

18.1 **GENERAL** The pace and programme of the lean concrete sub-base construction shall be matching suitably with the programme of construction of cement concrete over it. The sub-base shall be overlaid with cement concrete pavement only after 7 days after sub-base construction.

PARTICULAR SPECIFICATIONS

18.2 **BATCHING AND MIXING**

18.2.1 The batching plant shall be capable of proportioning the materials by weight each type of material being weighed separately. The cement from bulk stock shall be weighed separate from the aggregates. The capacity of batching and mixing plant shall be at least 25 percent higher than the proposed capacity for laying arrangements. The batching and mixing shall be carried out preferably in a forced action central batching and mixing plant having necessary automatic controls to ensure accurate proportioning and mixing. Other types of mixers shall be permitted subject to demonstration of their satisfactory performance during the trial length. The type and capacity of the plant shall be approved by AGE(I) before commencement of the trial length. The weighing balances shall calibrated by weighing the aggregates, cement, water and admixtures physically either by weighing with large weighing machine or in a weigh bridge. The accuracy of weighing scales of the batching plant shall be within $\pm$2 percent in the case of aggregates and $\pm$ 1 percent in the case of cement and water.

18.2.2 The design features of batching plant should be such that the shifting operations of the plant will not take very long time when they are to be shifted from place to place with the progress of the work.

18.3 **TRANSPORTING** Plant mixed lean concrete shall be discharged immediately from the mixer, transported directly to the point where it is to be laid and protected from the weather by covering the tippers/dumpers with tarpaulin during transit. The concrete shall be transported by tipping trucks, sufficient in number to ensure a continuous supply of material to feed the laying equipment to work at a uniform speed and in an uninterrupted manner. The lead of the batching plant to paving site shall be such that the travel time available from mixing to paving as specified in clause 601.6.5.2 of MORTH Specifications will be adhered to. The Engr-in-Charge is to ensure that the tipping truck shall not have old concrete sticking to it. Each tipping truck shall be washed with water jet before next loading as and when required after inspection by the Engr-in-Charge.

18.4 **PLACING** Dry lean concrete shall be laid / placed with paver and sensor as per sch. The equipment shall be suitable of laying the material in one layer in an even manner without segregation, so that after compaction the total thickness is as specified. The paving machine shall have high amplitude tamping bars to give good initial compaction to the sub-base. The provisions of clause 601.6.4 of MORTH specifications to be complied with.

18.4.1 DLC layer will be laid /constructed in a manner that it is at least 750mm wider than the proposed width of PQC on both sides. This is provided so that PQC paver moves on dry lean concrete. Cost of extra width is deemed to be included in cost of work quoted by contractor and no Deviation Order will be admissible for the same.

18.5 **COMPACTION**

(a) The compaction shall be carried out immediately after the material is laid and levelled. In order to ensure thorough compaction which is essential, rolling shall be continued on the full width till there is no further visible movement under the roller and the surface is closed. The minimum dry density obtained shall be 97 percent of that achieved during the trial length construction as specified here-in- after. The densities achieved at the edges i.e. 0.5m from the edge shall not be less than 95 percent of that achieved during the trial construction vide clause as specified hereinafter.

(b) The spreading, compacting and finishing of the lean concrete shall be carried out as rapidly as possible and the operation shall be so arranged as to ensure that the time between the mixing of the first batch of concrete in any transverse section of the layer and the final finishing of the same shall not exceed 90 minutes when the concrete temperature is above 25^0C and below 30^0C and 120 minutes if less than 25^0C. This period may be reviewed by the Engineer-in-Charge in the light of the results of the trial run but in no case shall it exceed 2 hours. Work shall not process when the temperature of concrete exceeds 30^0C. If necessary, chilled water or addition of ice may be resorted to for bringing down the temperature. It is desirable to stop concreting when the ambient temperature is above 35^0C. After compaction has been completed, roller shall not stand on the compacted surface for the duration of the curing period except during commencement of next day's work near the location where work was terminated the previous day.

PARTICULAR SPECIFICATIONS

COMPACTION (Contd...)

(c) Double drum smooth wheeled vibratory roller of minimum 80 to 100 KN static weight are considered to be suitable for rolling dry lean concrete. In case any other roller is proposed, the same shall be got approved from the GE, after demonstrating its performance. The number of passes required to obtain maximum compaction depends on the thickness of the lean concrete, the compatibility of the mix, and the weight and type of roller etc, and the same as well as the total requirement of rollers for the job shall be determined during trial run by measuring the in situ density and the scale of the work to be undertaken.

(d) In addition to the number of passes required for compaction there shall be a preliminary pass without vibration to bed the lean concrete down and again a final pass without vibration to remove roller marks and to smoothen the surface. Special care and attention shall be exercised during compacting near joints, kerbs, channels, side forms and around gullies and manholes,. In case adequate compaction is not achieved by the roller at these points, use of plate vibrator shall be made, if so directed by the Engineer-in-Charge.

(e) The final lean concrete surface on completion of compaction and immediately before overlaying shall be well closed, free from movement under roller and free from ridges, low spots, cracks, loose material, pot holes, ruts and other defects. The final surface shall be inspected immediately on completion and all loose, segregated or defective areas shall be corrected by using fresh lean concrete material laid and compacted as per specification. For repairing honeycombed surfaces, concrete with aggregates of size 10 mm and below shall be spread and compacted. It is necessary to check the level of the rolled surface for compliance. Any level/thickness deficiency should be corrected after applying concrete with aggregates of size 10 mm and below after roughening the surface. Similarly the surface regularity also should be checked with 3 m straight edge. The deficiency should be made up with concrete with aggregates of size 10 mm and below.

(f) Segregation of concrete in the dumpers shall be controlled by premixing each fraction of the aggregates, by moving the dumper back and forth while discharging the mix on it and other means. Even paving operation shall be such that the mix does not segregate.

18.5.1 **JOINTS** The construction and longitudinal joints shall be provided as per the drgs given.

18.6 **CURING**

As soon as the lean concrete is compacted, curing shall commence. Curing shall be done by covering the surface by gunny bags /Hessian cloth, which shall be kept moist for 7days by sprinkling water. Further other methods of curing can be as per the clause 601.6.7 of MORTH specifications and as specified and directed by the Engr-in-Charge

18.7 **TRIAL MIXES**

(a) The mix shall be proportioned with a maximum aggregate cementious material ratio of 15:1.The contractor shall make trial mixes of dry lean concrete with moisture contents like 5.0, 5.5, 6.0, 6.5 and 7.0 percent using cement content specified and the specified aggregate grading but without violating the requirement of aggregate cement ratio specified in clause 5.31 here-in-before. Optimum moisture and density shall be established by preparing cubes with varying moisture constants. Compaction of the mix shall be done in three layers with vibratory hammer fitted with a square or rectangular foot. After establishing the optimum moisture, a set of six cubes shall be cast at that moisture for determination of compressive strength on the 3rdand the 7th day. Trial mixes shall be repeated if the strength is not satisfactory either by increasing cement content or using higher grade of cement. After the mix design is approved, the Contractor shall construct a trial section in accordance with para 18.8 here-in-after.

PARTICULAR SPECIFICATIONS

TRIAL MIXES (Contd…)

(b) If during the construction of the trial length, the optimum moisture content determined as above is found to be unsatisfactory , the contractor may make suitable changes in the moisture contents to achieve a satisfactory mix. The cube specimens prepared with the changed moisture content should satisfy the strength requirement. Before production of the mix, natural moisture content of the aggregate should be determined on a day-to-day basis so that the moisture content could be adjusted. The mix finally designed should neither stick to the rollers nor become too dry resulting in ravelling of surface.

18.8 **TRIAL LENGTH OF DLC**

(a) The trial length will be constructed as per clause 601.8 of "MORTH Specifications of Roads & Bridge works (Fifth Edition)" and references thereof

(b) In order to determine and demonstrate the optimum moisture content which results in the maximum dry density of the mix compacted by the rolling equipment and the minimum cement content that is necessary to achieve the required strength, trial mixes shall be prepared as per clause 18.7 here-in-before.

(c) After construction of trial length, the in-situ density of the freshly laid materials shall be determined by sand replacement method with 20 cm dia density cone. Three density holes shall be made at location equally spaced along a diagonal that bisects the trial length; average of these density shall be determined. These main density holes shall not be made in strip 50 cm from the edges. The average density obtained from the three samples collected shall be the reference density and is considered as 100 percent. The field density of regular work will be compared with these reference density in accordance with clauses 601.6.5.1 and 903.5.1.2 of MORTH specifications. A few cores may be cut as per the instruction of the AGE(I) to check segregation or any deficiency.

(d) The hardened concrete shall be cut over 3 m width and reversed to inspect the bottom surface for any segregation taking place. The trial length shall be constructed after making necessary changes in the gradation of the mix to eliminate segregation of mix. The lower surface shall not have any honey combing and the aggregates shall not be held loosely at the edges.

(e) The trial length shall be outside the main works. The main work shall not start until the trial length has been approved by the AGE(I). After approval has been given, the materials, mix proportion, moisture content, mixing, laying, compaction plant and construction procedure shall not be changed without the approval of AGE(I). Cost of trial length shall be borne by the contractor.

18.9 **TRAFFIC** No heavy commercial vehicles like trucks and buses shall be permitted on the lean concrete sub-base after its construction. Light vehicles if unavoidable may, howeverbeallowedafter7daysofits construction with prior approval of AGE(I).

18.9.1 **RATE** The unit rate quoted by the contractor for dry lean concrete sub-base shall include carrying out the required operation including full compensation for all labour, materials and equipment, mixing, transport, placing, compacting, finishing, curing, testing and incidentals to complete the work as per specifications, all royalties, fees, storage and rents where necessary and all leads and lifts.

PARTICULAR SPECIFICATIONS

18.10 **TACK COAT** The binder shall be heated to its appropriate temperature and applied uniformly over the prepared surface with the help of either self propelled or towed pressure sprayer with self heating arrangement and spraying nozzles, a system capable of spraying bitumen at specified rates and temperatures so as to provide a uniform & even spread of bitumen. The tack coat shall be applied just immediately before spreading the mix. The rate of tack coat shall depend upon the surface and should be as per MORTH specifications (Fifth Revision 2013) and subsequent revisions from time to time. The temperatures of application of binder shall be between 165°C to 180 °C.

18.11 **APPLICATION OF TACK COAT**

(a) Paving bitumen VG-10 grade shall be used as binder for tack coat. Content of tack coat shall be as indicated in Sch 'A' Refer Clause 20.A.24 of SSR Part-I for other requirements. The application of the coating will be with paving bituminous primer VG-10 penetration applied by mechanical sprayer @ 10kgs/10sqm of surface area.

(b) The preparation and methods of application shall be as per MES SSR Part-I.

(c) Following tests shall be carried out:-

TACK COAT

(i) Binder temperature for application - At regular class intervals.

(ii) Rate of spread of binder - Two per day.

18.12 **HDPE SHEET 400 MICRON THICK**

Film shall be Uniform in colour, Texture & Finish, Substantially free from Pin holes & Un-dispersed Raw Materials, Streaks & Particles of Foreign Matter, no other visible defects such as melt fracture, holes, tears or blisters & marking as per resp. size, batch no & grade film shall be free from any objectionable odour& confirming IS : 10889/2004 and BIS : 2508 : 2016 upto date Amendments with grade of film grade-I

Tolerance on thickness % +/-	Visual appearance & Marking	Density at 27 °C Kg/M3	Index Gm/10 Minute	% Carbon black content carbon	Black dispersion	Tensile strength at Break Kg/cum Cm	% Elongation at Break	High Impact Resistance
-10%	Satisfactory	Comply	944	0.6	2.55	M.D* 345, T.D* 290	570, 640	Pass

* MD : Machine Direction, T.D : Transverse Direction

PARTICULAR SPECIFICATIONS

19. PAVEMENT QUALITY CONCRETE

(a) Pavement quality concrete shall be design mix concrete and shall have flexural strength of 45 Kg/cm^2 Lower Control Limit (LCL) (to be achieved in field) ,as per IS 456 - 2000 and design mix with approved admixtures (if required necessary at contractor's option without any price adjustment) conforming to IS:9103 and IS:6925 shall be permitted to be used. The total amount of chloride content in the admixture mixed concrete shall satisfy the requirement of IS 456-2000. The design criteria for pavement quality concrete will be flexural strength of 45 Kg/Sqcm to be achieved at site.

(b) The concrete mix design with or without admixture shall be carried out by the contractor through one of the following laboratories / test houses which will be approved by Accepting Officer.

(i) Any IIT. (ii) Any NIT/Engineering College. (iii) S E MT Pune College
(iv) CRRI New Delhi. (v) CTL, Lucknow

(c) The various ingredients for mix design, laboratory tests shall be sent to the lab/test houses through the Engineer-in-Charge and the samples of such ingredients sent shall be preserved at site till completion of work or change in Design Mix whichever is earlier, The samples shall be taken from the approved materials, which are proposed to be used in the work.

(d) The contractor shall submit the mix design report from approved laboratory for approval of CWE through AGE(I) within 30 days from the date of commencement of work as mentioned in work order No. 1 based on 07 days strength.

(e) The contractor shall make cubes and test beams of trial mixes as per approved mix design at site laboratory for all grades of concrete in presence of the Asst Garrison Engineer using same ingredients as adopted for design mix, prior to commencement of concreting and get them tested in presence of Engineer- in-Charge for 7 days and 28 days strength. For each design mix, a set of six cubes and six test beams shall be prepared from each of the three consecutive trial mixes. Three cubes and test beams from each set shall be tested at the age of 7 days and three cubes and test beams at the age of 28 days. The cubes and test beams shall be made, cured, transported and tested strictly in accordance with IS specification. The average strength of nine cubes and test beams at the age of 28 days shall exceed the specified target mean strength for which design mix has been approved. No concreting shall be done until the mix design is approved. Tests shall be done at the site laboratory/ Zonal lab. Water to be used for concreting shall be tested as per relevant IS standard.

(f) For each change of source or quality / characteristic properties of the ingredients during the currency/progress of work, from that approved & used in the concrete mix , a fresh mix design shall be got done by the contractor. Revised trial mix test shall be conducted and shall be submitted by the contractor. In case of any unforeseen eventuality, alternate mix design for different quarry to be got approved in advance and kept ready as reserve to avoid delay. The cost of packaging, sealing, transportation, loading, unloading cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

(g) The cost of packaging, sealing, transportation, loading, unloading cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

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(h) The item of design mix cement concrete shall be inclusive of all the ingredients including admixtures if required, labour, machinery, T&P etc. including shuttering required for a design mix concrete of required strength and workability. The rate quoted by the contractor for the mix design items shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like cement, sand, aggregates and admixtures etc. as per the approved mix design. The use of PPC / Fly ash / mineral based admixtures in design mix concrete shall not be permitted. Admixtures other than above are permitted**.**

(j) Minimum cement content for required Concrete strength is 360 Kg/cum as per IRC-44 (Only 43 grade of OPC in PQC) for pavement quality concrete (as given in schedule). However in case quantity of cement used is more than 400 Kg/Cum or admixture (super plasticizer) is recommended to be used in design mix to achieve specified properties, the contractor shall provide increased quantity of cement including admixture; if any, and nothing extra shall be payable to the contractor on this account.

PRODUCTION OF CONCRETE USING RMC PLANT

19.1 **BATCHING, MIXING, DEPOSITING AND RAMING**

Controlled concrete materials shall be batched by weight only. The contractor shall bring concrete from following **RMC Plant** at site installed by contractor/ or outside from the M.D land by direct manufacturer of concrete. The model / manufacturers and parameter of RMC plant will be approved by CWE (AF) Agra.

(a) L&T
(b) AC
(c) RMC India Ltd
(d) Any other manufacturer, as approved by Accepting Officer.

19.1.1 Engr-in-Charge shall be depute a JE at batching plant during the execution of concrete work to monitor & maintain record / register for RMC plant duly signed by Contractor & Engr-in-Charge. Record/ register shall be kept on record.

19.1.2 Water shall be measured either by volume in calibrated tanks or weighed. All measuring equipments shall be kept in a clean serviceable condition and their accuracy checked periodically.

19.1.3 Provisions as in clause 4.11.3.2 to 4.11.3.5 of MES Schedule Part-I shall be followed. All batching of concrete and accuracy of batching shall be as per Clause 10.2 of IS-456:2000.

19.1.4 The mixing shall be done for at least 2 minutes and until a uniform colour and consistency is achieved.

19.1.5 Quality of concrete mixed in any one batch shall not exceed the rated capacity of the mixer. The whole of the mixed batch shall be removed before materials for fresh batch enter the drum. Concrete mix as approved shall not be modified by addition of water or otherwise in order to facilitate handling for any other purpose. On ceasing of work and other stoppage exceeding 20 minutes, the mixer and other plants used for handling wet mix shall be thoroughly washed with clean water. Pickup and throw over blades in the drum of the mixer which are worn down 20mm or more in depth shall be replaced with new blades.

19.1.6 All cement concrete,both plain and reinforced shall be mixed in mechanical mixer as specified in para 4.11.5 and 4.11.5.1 of MES Schedule Part-I. However for small quantity of concreting (other than RCC works) i.e the quantity of concrete required being less than one batch of mix, the contractor may after obtaining written approval of Engineer in Charge which shall be exceptional, adopt hand mix subject to addition of 10% extra cement without price adjustment where hand mixing permitted, it shall be carried out on a concrete platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

19.1.7 All cement concrete both plain and reinforced concrete, shall be deposited and compacted all as specified in Clause 4.11.10 and 4.11.11 of MES Schedule Part-I. However , RCC work in columns, foundation, beams walls, chajjas and slabs etc., shall be compacted using mechanical vibrator, compaction of lean concrete shall be carried out by ramming and consolidated by tamping and rodding as specified. In the event of break down of mechanical mixer and vibrator, the contractor must have arrangements for standby mechanical mixer and vibrator.

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19.2 WORK STRENGTHTEST

19.2.1 TEST SPECIMEN

Work strength test shall be conducted in accordance with IS : 516of 1959 on random sampling. Each test shall be conducted on six specimens, three of which shall be tested at 7 days and remaining three at 28 days. If required additional samples shall be prepared as per direction of Asst Garrison Engineer for testing samples cured by accelerated method as described in IS : 9103.

FREQUENCY- The minimum frequency of sampling as per IRC / MORTH shall be followed.

19.2.2 ACCEPTANCE CRITERIA

(a) **ACCEPTANCE OF PAVEMENT QUALITY CONCRETE**

Concrete shall only be accepted if it satisfies the following main conditions:-

(i) LCL of every lot (at least 30 samples) is not less than specified value
(ii) Co efficient of variation is not greater than10%
(iii) Tolerance level factor is1.5
(iv) There is no honey combing in the concrete

For determination of LCL at least 3 beams for every slab will be cast and tested for flexure as per IS:516 of 1959. After at least 30 samples have been cast for slab laid in similar conditions their results should be tabulated and LCL determined as follows:-

$$LCL = X - t.v$$

Where LCL = Lower control limit (minimum flexural strength)
X = Mean flexural strength from the samples tested
t= Tolerance level factor
v = Standard deviation of the samples tested

LCL so determined should not be less than specified value i.e. 45 Kg/Sqcm. Along with the beams, cubes will also be cast and tested for compression as IS:516 of 1959. The compressive strength will be tabulated along with the corresponding flexural strength to establish correlation between flexural and compressive strength.

(b) **CRITICAL EXAMINATION OF TEST DATA**

In case LCL of a lot is less, then the following procedure shall be adopted before core tests are undertaken:-

(i) Omit the slab having lowest average strength and revaluate the remaining test data of the samples.

(ii) If the revaluated data conforms to the above acceptance criteria, accept the lot less the slab omitted.

(iii) In case of unsatisfactory result, repeat the process by omitting the next lowest till all weak slabs are segregated for further testing by core cutting and the Part lot gets specified value.

19.2.3 CORE TESTS

In case the concrete fails in flexure test i.e. the LCL is less than specified for a particular lot, then concrete shall not be rejected unless it also fails in core test. In core test, at least two cores of the same will be cut per slab. The crushing strength of this core is then determined. The crushing strength should not be less than 0.8 times the corresponding crushing strength of 15 cm cubes. The crushing strength determination will be as per IS:516 of 1959. In case the H/D ratio of the core is between 1 and 2, then the crushing strength of the cube will be reduced. The correction will be carried out as per the formulae given below:-

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$$f = 0.11n + 0.78$$

Where f = correction factor

$$n = \frac{H}{D} \text{ ratio}$$

In case these concrete fails the flexure (LCL) test, but is found satisfactory is core test, it shall be accepted as the core test takes the precedence over the flexure test, However, in case the concrete fails both flexure as well as core test then it shall be rejected and replaced.

19.2.4 **MIX PROPORTION AND STRENGTH**

It shall be all as specified in PS clause 19.2.13 here in after.

19.2.5 **PAVEMENT UNIFORMITY**

The finished cement concrete pavement surface shall be such that when tested with 3m long straight edge placed anywhere within the same or adjoining slab in any direction on the surface, there is no gap greater than 3 mm between the bottom of the surface of pavement. Surface irregularity exc 3mm but not greater than 6 mm may be rectified by bump cutting or scrabbling or grinding using approved equipment. When required by the GE, areas which have been reduced in level by the above operations shall be retextured in an approved manner either by cutting grooves (5 mm deep) or roughening the surface by hacking the surface. If high areas in excess 6 mm or low areasinexcessof3mmoccur,ifthecontractorcannotrectify,theslab shall be demolished and reconstructed at the contractor's expense and in no case the area removed shall be less than the full width of the lane in which the irregularities occurs and full length of the slab. If deemed necessary by the GE, any section of the slabs, which deviates from the specified levels and tolerances, panel between construction/dummy/expansion joints shall be demolished and reconstructed at the contractor's expense.

19.2.6 **PRODUCTION OF PAVEMENT QUALITY CONCRETE**

Pavement quality concrete (design mix) shall be produced using RMC fully automatic Central Batching & Mixing Plant installed outside from M.D land by direct manufacturer of quality concrete / or shall installed at site.

19.2.7 **MATERIAL FOR PAVEMENT QUALITY CONCRETE**

(a) **CEMENT**

Cement required shall be all as specified in Para 6.1.2.2 to Particular Specifications.

19.2.8 **AGGREGATES**

Aggregates shall be as specified here-in-after in clause 19.2.9. The maximum size of coarse aggregates shall be 40 mm.

19.2.9 **HANDLING OF AGGREGATE**

(a) Stock piles shall be made immediately on supply of aggregate at the site of work. Aggregate of each nominal size shall be stacked separately. For fine aggregate, separate stacks shall be made.

(b) Aggregate shall be stacked on a hard surface so as to exclude the possibility of soil or grass being got mixed up. When stacks are in close proximity, the stock piles shall be separated by bulk heads. Special care shall be taken to clean and wash the bottom layer of aggregate in contact with ground surface, before use.

(c) Before batching, the aggregate shall be stocked /piled for at least 24 hours to allow for drainage of water, if any. Contractor shall make adequate provision for stock piling work taking into account the availability of supplies and rate of delivery, etc and he shall include in his tender for necessary double handling and transportation of materials from stock piles to mixing plant etc.

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19.2.10 **GRADING OF AGGREGATE FOR FINAL MIX**

(a) The grading of single size aggregate shall be in accordance with IS-383 of 2016 and shall conform to the following grading :-

IS SIEVE % PASSING FOR SINGLE SIZED AGGREGATE FOR NOMINAL SIZE

SIEVE/SIZE	40mm	20mm	16mm	12.5mm	10mm
80 mm	-	-	-	-	-
63 mm	100	-	-	-	-
40 mm	85-100	100	-	-	-
20 mm	0-20	85-100	100	-	-
16mm	-	-	85-100	100	-
12.5 mm	-	-	-	85-100	100
10 mm	0-5	0-20	0-30	0-45	85-100
4.75 mm	-	0-5	0-5	0-10	0-20
2.36mm	-	-	-	-	0-5

(b) Aggregate shall be stored in single size in separate bins or piles on area covered with lightly laid wooden planks, sheet metal or hard clean surfaces, which shall be self-draining.

(c) The fine aggregates shall be natural sand (river sand) and shall conform to IS-383.Only natural river sand shall be used in this work. The fine aggregates shall have a sand equivalent value of not less than 50 when tested in accordance with the requirement of IS:2720 (Part 37).The grading of fine aggregate shall conform to Zone II of table IV of IS-383-2016 which is as shown below :-

IS SIEVE	% PASSING BY WEIGHT
31.5mm	100
26.5mm	85-95
19mm	68-88
9.5mm	45-65
4.75mm	30-55
600 Micron	8-30
150 Micron	5-15
75 Micron	0-5

(d) The sieve analysis test of the mixed aggregate shall be carried out at random and results recorded to ensure that the grading lies within the specified percentage for each size as given above. The proportioning of coarse and fine aggregate require adjustment in case it does not satisfy this grading for any subsequent change in grading the contractor shall have no claim whatsoever on this account.

19.2.11**WATER**

Water shall confirm to the requirement stipulated in IS 456:2000 and as per Clause 4.9 of MES Schedule (Part-I) 2009."

19.2.12**TEST ON CONSTITUENT MATERIALS OF CONCRETE (PQC)**

Test shall be carried out as laid down hereinafter.

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19.2.13 **MIX PROPORTION AND STRENGTH**

(a) The strength of pavement quality concrete shall be as specified here in after:-

The strength to be achieved	Not less than 44 kg per Sq cm flexural strength for pavement quality concrete
Aggregate/cement ratio by weight	As per Mix Design
Water/Cement ratio	As per Mix Design
Slump for concrete	Not more than 25mm ±10mm
Compacting factor test	0.78 ± 0.02 for PQC
Degree of quality control	Very Good (PQC)
Exposure	Moderate
Maximum size of aggregate	31.5mm
Type of Aggregate	Crushed stone aggregate
Type of cement	As per clause here-in-before

(b) The design mix shall be carried out without adding synthetic fibres

19.2.14 **TRIAL MIX**

(a) At the time of tendering, the contractor after taking into account the type of aggregate, plant and method of laying concrete he intends to use/adopt, shall allow in his tender for aggregate/and water cement ratio which he considers will achieve the strength required specified.

(b) As soon as possible after receiving the order to commence work, the contractor shall make trial mixes to satisfy the Engineer-in-Charge that the strength specified is obtained.

(c) From approved design mix, nine numbers of preliminary test beams and 9 cubes shall be made and tested in accordance with IS-516 and IS-1199, for the flexural strength and compressive strength. For compaction in moulds for beams, the following procedure shall be adopted. The test specimens shall be made as soon as practicable after mixing and in such a way as to produce full compaction of the concrete with neither segregations nor excessive laitance. The concrete shall be filled in the mould in layers of 5 cm. While filling the scoop shall be moved around the top edge of the mould to distribute the concrete uniformly. Each layer of concrete shall be compacted fully by the use of the tapping bar/vibrator all as per IS-516. The number of strokes per layer required to produce the specified condition will vary according to the type of concrete, but in no case shall the concrete be subjected to less than 15 strokes per layer for 10 cm specimens. The strokes shall penetrate into the underlying layer and the bottom layer shall be rodded throughout its depth. Three of these beams shall be tested at seven days (i.e., on the 8^{th} day) from the date of casting and another set of three beams at 28 days (i.e., 29^{th} day) from the date of casting. The remaining three beams shall be preserved by the Asst Garrison Engineer for one year after certified date of completion of the work for any subsequent check. The test after 7 days (i.e. on the 8^{th} day) is intended only to give early indication of the strength likely to be achieved. The strength achieved should be 70 to 75% of the 28 days strength specified hereinbefore. In case the strength achieved is less than 75% the mix shall be suitably re-designed.

(d) The acceptance criteria for the design mix for RCC works shall be all as per IS-456 : 2000 and as approved by the AGE. Acceptance criteria for PQC shall be as per clause 19.2.2 of PS.

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TRAIL MIX (Contd…)

(e) Whenever there is any change in the types of grading or material or change in quality of cement or method of laying etc., the tests as enumerated above shall again be conducted for ascertaining the suitable design mix for obtaining the specified flexural strength.

(f) On the results of the above tests, the mix actually to be used shall be agreed to and approved by the Asst Garrison Engineer. The approval of Asst Garrison Engineer shall not relieve the contractor of his responsibility for obtaining the required minimum strength of the quality concrete in the works.

(g) All tests recorded in support of mix design shall be maintained as Schedule 'A' of the records under the contract.

19.2.15 **NON CIRCULAR SYNTHETIC FIBRE**

Synthetic fibres with cut length 6/12mm +1 mm, tensile strength>48 Mpa, melting point>2400°C,specific gravity 1.34-1.40 and effective diameter 30-35 micron shall be used which will be independently tested from CTL/SEMT/NIT/IIT and approved by the Accepting Officer in writing.

19.2.16 **TESTING OF NON CIRCULAR SYNTHETIC FIBRE**

(a) The contractor shall submit manufacturer's test certificate in original for verification of GE/Engineer- in-Charge. One copy of defaced Test Certificate shall be kept by AGE(I) for record please and submitted during the final bill.

(b) Besides manufacturer's Test Certificate at least 3 sample from each lot (brought at site) selected randomly will be got tested independently by AGE(I) from CTL/SEMT and dulyapproved by the Accepting Officer in writing.

19.2.17**TRIAL LENGTH**

(a) Trial bays will comprise of all layers of pavement viz Cement stabilized soil, GSB, WMM, DLC & PQC.

(b) Trial bays of dimension **15 m x 7.62** m having at least one expansion joint one construction joint and required dummy joints and of the same thickness as that of design of work will be constructed at the contractor's expense at a suitable location away from the main site of work. Method of mixing spreading, compacting, testing and acceptance shall be same as laid down in Para 11 of IRC 15-2001 and section 400-600 of "MORTH specifications of roads & Bridge works (Fifth Edition)" and references thereof. Upon non acceptance of trial bays, further trial bays will be constructed by contractor until acceptable standard, strength, working drills are achieved. No extra payment will be admissible to the contractor for the same.

(c) The contractor shall produce the specified surface finish ie., broom finish in trial bays for approval by the Asst Garrison Engineer. This approved surface finish is thereafter to be reproduced uniformly throughout the concrete pavement. The joint cutting trials shall also be done on trial slab starting 24 hours after completion of trails slab and with 04 hours interval so as to finalized the joint cutting time in actual work.

(d) Actual concreting for the pavement work shall conform to the method of mixing, spreading, compacting, finishing as adopted in the finally approved trial bay.

(e) No extra payment shall be made for the above. The unit rates quoted by the tenderer under Schedule 'A' shall include for the same.

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19.2.18 BLANK

19.2.19 **CONSTRUCTION BY SLIP FORM PAVER**

(a) The slip form paving train shall consist of a power machine which spreads compacts and finishes the concrete in a continuous operation. The slip form paving machine shall compact the concrete by internal vibration and shape it between the side forms with either a conforming plate or by vibrating and oscillating finishing beams. The concrete shall be deposited without segregation in front of slip form paver across the whole width and to a height which at all times is in excess of the required surcharge. The deposited concrete shall be struck off to the necessary average and differential surcharge by means of the strike off plate or a screw auger device extending across the whole width of the slab. The equipment for striking-off the concrete shall be capable of being rapidly adjusted for changes of the average and differential surcharge necessitated by change in slab thickness or crossfall. Provision as given in the Clause 602.9.5 of MORTH Specifications shall be complied with and as further directed by the AGE(I).

(b) Clause 602.8.3 for use of guidewires shall be complied as specified in MORTH Specifications.

19.2.20 **PLACING AND COMPACTION OF CONCRETE**

(a) Concrete shall be transported without delay and incorporated in work as per MES SSR Part I clause 20.B.7.8 to 20.B.8.2 at the position of laying within 20 minutes from the time of discharge from the transit mixer. Concrete shall be deposited and spread to such depths that when compacted and finished, it shall conform to the grade and cross section required and to ensure the thickness required. Contractor is free to use dumper at his discretion.

(b) Concrete shall be deposited in such a manner as to require as little handling as possible. Spreading, compacting and finishing shall be completed within a period not exceeding one hour from the time the mixing starts. In case of dry and hot weather, this time shall not exceed 45 minutes. If the air temperature exceeds 40 degrees Centigrade or 35 degrees Centigrade with relative humidity less than 25% and or wind velocity higher than 10 KM per hour, concreting precautions as required vide IRC – 61 or 76 shall be taken.

c) Concrete shall be spread paved, compacted and finished by approved mechanical plant. The contractor shall only use fixed form paver to commensurate with overall period of completion of the work. Compaction of top layer shall be carried out mechanically by means of approved mechanical paver in accordance with the instructions of the manufacturer of paver. Needle vibrators shall be used all over the area for obtaining initial compaction of concrete. These should be of diameter not less than 40mm. If the vibrators are pneumatic, the pressure shall not be below 4 kg/Sq cm. If electrically operated, they shall have a minimum frequency of 3,500 to 4,500 vibrations per minute and amplitude under no load state (operation in air) measured in accordance with IS-2506,shall not be less than 1.5 mm and forward speed travel 60 cm per minute. The initial compaction shall be carried out by manual labour employing needle vibrator all as specified here in after.

(d) There shall be at least three needle vibrators working for each area under concreting. Vibrating screed consisting of a steel section or timber section weighing not less than 15 Kg/m with a tapering edge of not less than 7cm width and having a vibrator mounted there may be used in addition to needle vibrators to obtain full compaction. The face of the timber tapering edge of the screed shall be lined with a mild steel plate rigidly fixed by means of counter sunk screws. The final compaction, final finish and levels shall however be obtained by rollers and vibrators mounted on concrete paver which will follow and run over initially compacted concrete mass.

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19.2.20 **PLACING AND COMPACTION OF CONCRETE (Contd...)**

(e) Mounted vibrators, on mechanical paver and vibrating screed paver shall be of a frequency of not less than 3600 impulses per minute and amplitude not less than 0.4 mm and be of sufficient capacity to agitate the concrete for a width of 25 cm on either side of its position. Where screed vibrators are used for compaction, a stand by unit shall always be kept ready for use, should the other one go out of order. At the discretion of the Engineer-in-Charge for compaction of edges and joint, vibrators may be supplemented by hand tamping and rodding for securing satisfactory results. In no circumstances honey combing of concrete at joints or elsewhere shall be permitted.

(f) Concreting shall be carried out in one operation between the expansion joints and construction joints without any break at the dummy joints.

(g) Workmen shall not be allowed to walk on freshly laid concrete.

(h) A minimum of one day shall be allowed to harden the poured concrete slab before adjacent slabs are laid. Otherwise, the vibration caused by the equipment used for the concreting on unhardened concrete may disturb the edges.

19.2.21**JOINTS IN CONCRETE**

Joints in concrete pavements shall be provided as per IRC-15(2001) read in conjunction with IRC-57(2006). Joints shall be of the types of dimensions and spacing specified and shall be located in all cases as indicated in the drawing or as directed. Sealing compound shall be as in detailed in Schedule 'A'. Being specialized work the priming, filling the sealing compound to be carried out under the supervision of manufacturer or his Authorized agents/representative. All joints shall be sealed after minimum 28 days of placing of the concrete in the slabs.

19.2.22**CUTTING JOINT**

Normally in summer when ambient temperature is more than 30°C initial cutting may be carried out after 4-8 hours of laying and in winter when ambient temperature is less than 30° C, initial cut may be done after 8-12 hours of laying. Subsequent widening of joint groove will be done after 14-16 days of casting concrete pavement. First cut in above time frame should be by using 4 mm circular diamond blade up to depth as shown on drawing or as directed across the width (For Dummy Joint).

19.2.23**TRANSVERSE CONTRACTION JOINTS OR DUMMY JOINTS**

These are the dummy groove type and the width of dummy joint shall be described in Schedule 'A' and shall be extended vertically from the surface of slab to a depth as detailed in Schedule 'A' /drawings. The joint shall be formed by sawing the concrete with diamond saw joint cutting machine of the approved design within 4-8 hours of laying when the ambient temperature is more than 30°C as in summer and within 8-12 hours of laying in winter when ambient temperature is less than 30°C and when concrete has sufficiently hardened. In all cases except where cutting is done with saw, the joint edge shall be bull nosed. Care shall be taken that the edges of the joints are not damaged. The edge will not stand proud of the concrete slab.

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19.2.24 CONSTRUCTION JOINTS

(a) The construction joints shall be straight and vertical through the full thickness of the slab. The vertical edge of the concrete on the side of the joint shall be treated with a coat of epoxy tar before the adjacent bay is concreted. A groove of size as mentioned in Sch 'A' shall be cut at the top surface of the joint to receive the sealing compound. This groove will be formed in the same manner as that for a dummy joint by using diamond saw cutting machine.

(b) The construction operation shall be so planned that the location of the construction joint coincides with either a expansion joint or a dummy joint. Construction joints shall be provided at locations where concreting has to be suspended due to unforeseen reasons. If the joint is at the location of expansion joint, regular expansion joint shall suffice.

19.2.25 EXPANSION JOINT

(a) Expansion joint shall be provided both longitudinally and transverse direction at spacing as directed by Engineer-in-Charge.

(b) The transverse expansion joint shall be continuous from edge to edge of the pavements constructed at the same or different times.

(c) The expansion joint shall be straight and extend through the full thickness of the slab and shall be of the shape and dimension as shown on the drawings and specified. The slab edges adjacent to the joint shall be formed truly vertical. The joints shall be filled as described in Sch 'A'. The groove to receive the sealing compound may be formed by keeping the depth of filler board 25 mm more than the thickness of slab at the time of casting of adjacent slab and tearing off the excess depth before joint filling. A cut in filler board should be made at appropriate height just before placing the same between two slabs to facilitate easy and accurate tearing off the same as described above. Care should be taken that the edges of the grooves are not damaged and that no bridging or plugging of the joint with concrete occurs, also that joint is of uniform width from top of slab to top of the joint filler.

(d) For longitudinal expansion joints, the same procedure as followed for transverse expansion joint shall be adopted.

19.2.26 JOINT SEALING COMPOUND –SEALANT (DOUBLE COMPOUND)

Polyurethane/poly sulphide cold joint sealant shall be used confirming to BS 5212(Part 2)/IRC SP-57 2010 having movement accommodation factor ± 30%,flexible,resistance to age hardening ,fuel resistance, heat and durable with 10 years warranty as approved by E-in-Cs Br Kashmir house, New Delhi. The cold applied joint sealant shall meet the requirement as per B S-5212, BS-4254 and EN-141875-2003(for hydrolysis/water resistance test). It shall be procured from any one of the following manufactures:-

(a) M/S Choksey Chemicals Pvt Ltd. 111, Industrial Area, Sion East, Mumbai

(b) M/S Fosroc Chemicals

(c) M/S Supreme Bituchem India Pvt. Ltd

(d) M/S Cipy Polyurethanes Pvt Ltd. T-127, MIDC, Bhosari,Pune-26

(e) M/S Sika India PvtLtd. 505/506, 5th Floor, Elegance Tower, Jasola, New Delhi-110025

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JOINT SEALING COMPOUND –SEALANT (DOUBLE COMPOUND) (Contd…)

(f) M/S STP Ltd

(g) M/s Maruti Bitumen Pvt Ltd

19.2.27Contractor shall note that joint sealant with primer shall be applied on ground by engaging specialist agency from whom the joint sealant has been procured. The frequency of testing for hydrolysis/water resistance test and moment accommodation shall be done for every 5MT and got tested from Indian Rubber Manufacturers Research Association Laboratory or any reputed testing laboratory possessing NABL accreditation. Test reports, test certificates, original purchase vouchers shall be submitted to the department for the payment purpose. The following procedure shall be adopted while execution:-

(a) The joint shall be made dry and free of dirt and vacuum cleaned by a mechanical device as well as free of oil, vegetation and other debris.

(b) Two coats of primer should be applied with a thin brush by the forward and backward moment at an interval of 30 of minutes before pouring the sealant (i.e. one side will be brushed twice forward and backward) with adequate quantity of primer as per manufacture's instruction.

(c) The application temperature of the sealants should be strictly adhered to as per the manufacture's instruction.

(d) The pneumatic pressure, while application should not be too high which causes high speed flow and results in over filling of joints. Too low pressure form small bubbles, which can be starting point of cohesive failures. Every air bubble that appeared on the surface should be immediately popped with a levelling tool.

19.2.28 **PRIMER**

Primer shall be procured from the same manufacturer of joint sealant procured as mentioned in "clause 19.2.26".

19.2.29 **BACK-UP MATERIAL**

Closed cell Polyethylene Rod or Sheet (Foam) is recommended as Back-up material to prevent three sided adhesion and to control sealant depth. In case joint depth is insufficient, Bond Breaker tape may be used as back-up. Back-up material should fit tightly into joint to prevent seepage of sealant through joint edges. Rod diameter or sheet (foam) width should be 20 to 25% more than joint width.

19.2.30 **SEALANT AND PRIMER APPLICATION**

Sealant shall be applied by machine. The process of joint sealing shall be carried out strictly in accordance to steps and methods recommended by the manufacturers of sealing compound and primer which shall involve following steps:-

(a) Joint Inspection
(b) Joint preparation
(c) Masking tape application
(d) Insertion of Back-up material
(e) Primer application
(f) Mixing of two part sealant
(g) Application of sealant
(h) Masking tape removal
(j) Final surface touch up
(k) Cleanup

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19.2.31 **SOME MISCELLANEOUS ASPECTS**

The sealant are sensitive to temperature while in storage as well as during mixing. Temperatures for all phase of handling of the sealing compounds viz mixing placing and curing conditions must be in accordance with manufacturer's recommendations. All safety precautions during handling and application of these sealants as prescribed by the manufacturers shall also be strictly adhered to.

19.3 **GUARANTEE FOR JOINT SEALING COMPOUND**

(a) The main contractor shall submit guarantee to the Govt for a period of **Ten Years** from the certified date of completion of the work for the effectiveness of the sealing compound in favour of Asst Garrison Engineer in writing.

(b) If the AGE(I) at any time during construction or reconstruction or prior to the expiry of the Guarantee period, finds that the joints have cracked from the pavement or any type of adhesive, cohesive and material failure is noticed, the contractor shall, on demand in writing from the AGE(I) specifying the joints complied of, not withstanding that the same may have been inadvertently passed certified and paid for, undertake to carryout forthwith such treatment as may be necessary to render the paver from damage/crack at his own expense, till expiry of the guarantee period. In the event of his failure to do so, within the period to be specified by the AGE(I) in his demand aforesaid, the AGE(I) may undertake such treatment at the risk and expense in all respect, of the Contractor. The liability of the Contractor under this condition, however shall not extend beyond the period of TEN YEARs from the certified date of completion, unless the AGE(I) had previously given notice to the contractor to rectify the defects.

(c) The amount of security deposit to be held back from the Contractor's bill against the guarantee for joint sealing compound shall be calculated on the amount of joint sealing compound at contract rates as per the scales given below enhanced by 1.25 times of the amount so calculated. This shall be worked out by AGE(I) and intimated to the Contractor. This amount shall be refunded to him after the expiry of the guarantee period. Alternatively, the Contractor may give a separate interest bearing security deposit to AGE(I) valid for 10 Years for this amount.

SI NO	COST AT CONTRACT RATE	AMOUNT OF SECURITY DEPOSIT
(i)	Upto Rs. 50 Lakhs	2% of the amount subject to a minimum of Rs.5000/-
(ii)	Over Rs. 50 Lakhs and Upto Rs.100 Lakhs	Rs. 1,00,000/- + 1.50% of amount exceeding Rs 50 Lakhs
(iii)	Over Rs. 100 Lakhs and Upto Rs.500 Lakhs	Rs. 1,75,000/- + 1% of amount exceeding Rs 100 Lakhs
(iv)	Over Rs. 500 Lakhs and Upto Rs.1500 Lakhs	Rs. 5,75,000/- + 0.5% of amount exceeding Rs 500 Lakhs
(v)	Over Rs. 1500 Lakhs	Rs. 10,75,000/- + 0.50% of amount exceeding Rs 1500 Lakhs subject to a maximum of Rs15 Lakhs

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19.4 **GUARANTEE OF JOINT SEALANT FROM THE MANUFACTURER**

The contractor shall obtain Guarantee for **10 years** for joint sealant from the manufacturer and submit to the AGE(I) after completion. Any defect observed during this period notified by the AGE(I) in writing shall be made good by the contractor through the manufacturer or their authorized applicator to the entire satisfaction of AGE(I) within a reasonable period, failing which, the defects shall be got rectified at contractor's risk and cost. The defects liability period mentioned purpose of this condition. All the expenditure incurred in getting the defects rectified shall be borne by the contractor.

19.5 **POT HOLES**

(a) Preparation of surface shall be carried out as specified in clause No.20.A.23.3, 20.A.24.2, 20.B.4.1 of MES SSR Part-I

(b) Pot holes shall be drained of with water etc and cut to regular shape with vertical sides to depth as directed; all loose and disintegrated material shall be removed to a distance as directed by Engineer-in-Charge.

(c) Pot holes shall be 100% checked by Engineer-in-Charge.

(d) The stone aggregate and chipping for filling pot holes shall be all same material as in the existing surface or as directed by Engineer-in-Charge.

20. **FINISHING ON CONCRETE**

20.1 **FLOATING**

As soon as practicable after the concrete has been struck off and compacted, it shall be further smoothened and compacted by means of floating system provided with the paver finisher. If any manual correction is required it shall be carried out from a bridge between the rails generally part of these paving machines. A longitudinal float 1,200 mm long 75mm wide may be used.

20.2 **STRAIGHT EDGING**

(a) After the longitudinal floating has been completed, the excess water has disappeared, but while the concrete is still plastic, the slab surface shall be tested for trueness with a 3 metre (10 Ft) straight edge swung from handles. The straight edge shall be held in successive positions parallel to the pavement centre line in contact with the surface and the whole area gone over from one side of the slab to the other. Advance along the pavement be in successive stages of not more than one half length of the straight edge. Any depressions found shall be filled immediately with freshly mixed concrete, struck compacted and refinished. High areas shall be cut down and refinished. The straight edging and re-floating shall continue until the entire surface is found to be free from observable departure from the straight edge and the slab has the required grade and cambers.

(b) The slab surfaces shall be retested for trueness before the concrete begins to set, with the 3 metre master straight edge and the wedge gauge (as per IRC 43/72). The straight edge shall be placed on the surface in successive positions, parallel to the centre line. Irregularities shall be measured with the help of the wedge more transversely at various points until it touches both the straight edge and the concrete surface. At any point tested, the concrete shall not show a departure from the true surface, greater than 3mm if at any place the said departure is greater than 3 mm, not more than 3 passes of the vibrating machine shall be allowed and the surface tested again in the specified manner, if the irregularity still exceeds the limit aforesaid, the concrete shall be removed to depth of50mm.

(c) The area of concrete to be removed shall be that represented by the length of the straight edge in the position of measurement across the full width of the slab. Where the point of measurement in default is less than4.5 mm from the transverse expansion joint, the whole area up to the joint shall be removed to the required depth. The concrete so removed shall not be reused in the work.

(d) Fresh concrete shall be placed, compacted and finished in the manner already described in these specifications and shall again be subjected to test for accuracy of finish.

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(e) The forgoing procedure shall be adopted at each shifting of the straight edge and the whole area shall be done over from one side of the slab to the other. The straight edge shall advance longitudinally in successive stages of not more than one half the length of the straight edge.

(f) No extra payment shall be made for the removal of the rejected concrete and for laying fresh concrete. Although the concrete is to be removed immediately, following measurement of the irregularity and while it is still wet, this shall not mean any waiver from complying with the requirements of this clause if for any reasons the concrete to be removed has hardened.

(g) After straight edging of the surface, it shall be finished by belting or brooming or by combination of both, in manner specified here-in-after.

20.3 BROOMING

(a) After belting and as soon as surplus water if any, has raised to the surface the pavement shall be given a broom finish with an approved steel or fibre broom not less than 45 cm wide. The broom shall be pulled gently over the surface of the pavement from edge to edge. Adjacent strokes shall be slightly over lapped. Brooming shall be perpendicular to the corrugations thus produced are uniform in character and width and not more than 1.5 mm deep. The brooming shall be done as per clause 602.9.11.2 of MORTH specification (Fifth Revision).

(b) Brooming shall be completed before concrete reaches such stage that surface is likely to be unduly roughened by the operation. The broomed surface shall be free from porous or rough spots, irregularities, depression and all pockets such as may be caused by accidental disturbing of particles of coarse aggregate embodied near the surface.

20.4 EDGING

After belting / brooming has been completed but before the initial set of the concrete the edges of the slabs shall be carefully finished with a edging tool of 6 mm radius and the edges left smooth and to true to alignment.

20.5 HONEY COMBING

As soon as the side forms are removed, any minor honey combed areas shall be filled with mortar composed of one part of cement to two parts of fine aggregate however these repairs shall be carried out only after the clearance from the site executives. Major honey combed areas or segregated concrete or other defective work or areas damaged by rain or any other reasons whatsoever shall be considered as defective work and the entire affected slab shall be removed and replaced by the contractor at his own expense. The total area of honey combed patches each more than 2.5 Sq cm area shall not exceed 4 percent of the area of the slab thickness. This decision as to what constitute major honey combing shall rest entirely with the Asst Garrison Engineer but in any case honey combing exceeding 300 sq cm in area at any one location shall be considered as major honey combing. AGE's decision whether the concrete is defective or not shall be final and binding. Every slab shall bear an impression on top of slab not exceeding 3mm in depth comprising the number allotted to the slab and the date on which it was cast. This impression shall be formed by the contractor when the concrete is green so as to leave a permanent mark on setting.

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20.6 CURING AND PROTECTION OF CONCRETE

(a) Initial curing shall be done immediately after the surface texturing, the surface and the sides of the slab shall be cured by the application of approved resign based aluminized reflective curing compound with the help of mechanical sprayer as per manufacturer's instruction and as directed by Engr-in-Charge. Curing compound shall contain sufficient aluminium flakes in a finely divided dispersion to produce a complete coverage of the sprayed surface with a metallic finish. The curing compound shall become stable and impervious to evaporation and shall be as approved by the GE. The curing compound shall have a water retention index of 90 percent in accordance with BS-7542 or ASTM-C-309-81, Type II/relevant IS/IRC code. After initial curing the concrete shall be kept under wet condition with Hessian cloth in position for concrete shall subsequently be cured by making earthen bunds (as approved by GE) of 8 to 10cm high at the edges as well as longitudinally and transversely at about one meter interval to form ponds to cover the pavement surface with water up to 28 days. After completion of 28 days period, the contractor shall clean and sweep the surface so that it is dirt free.

(b) The workmen shall not be allowed to walk over the prepared clean surface either prior to or during the concreting operations. Walking over concrete being laid, compacted or finished shall also be prohibited. All operations on prepared cleaned surface including laying, compacting with needle vibrators, floating and straight edging shall be done from appropriate wooden bridges spanning the width of the slab being laid. Adequate number of such wooden bridge shall be provided.

(c) The contractor shall appoint chowkidars at his own expense to prevent workmen, cattle etc., straying on to the pavement concrete for a minimum of three days after laying concrete.

(d) Concrete shall not be subjected to any load or weight of any plant until at least 28 days after laying. Concentrated loads or sharp objects like iron wheels of concrete mixers and any vehicular traffic including construction traffic shall not be allowed on the concrete surface for 28 days.

20.7 CONCRETING DURING RAINS

To prevent damage to previously laid concrete during monsoon or sudden rains the contractor shall have an adequate stock of tarpaulins or other water proof cloth which shall be spread over the concrete as directed. Any concrete damaged by rains shall be removed and replaced by the contractor at his own expense as directed by Engineer-in-Charge. Two temporary shelters of size 36m and required width for concreting (PQC) to be erected on rails.

20.8 TESTING OF PAVEMENT QUALITY CONCRETE

Testing of controlled concrete (pavement quality concrete) shall be done as per frequency specified. Expenses for samples, supply and transporting of samples etc., including assistance in testing shall be borne by the contractor. The following tests shall be carried out during the progress of work in addition, if any, to these specified here-in-after. The contractor at his own expenses will establish a lab at site to conduct all relevant tests. The lab equipment shall be calibrated and certificate should be made available along with equipment.

20.9 COMPACTING FACTOR TEST AS PER IS-1199

A compacting factor test shall be taken at frequencies as specified here-in- after. Any batch from which compacting factor is being made shall not be transferred to the place of laying until the compacting factor test has been completed. Any batch which gives compacting factor that is in excess of that specified shall be rejected and removed from the site.

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20.10 **FLEXURAL TEST**

(a) The concrete shall be sampled at the place of deposit. Sampling and testing shall be as per IS:1199 and IS:516. The frequency of sampling shall be as specified in IS. One sample consists of 9 (nine) beams. All the 9 (nine) beams of the same sample shall be cast at the same time. Samples shall be made at well spaced intervals so as to represent entire slab from different batches. A slab shall mean the pavement bounded by expansion and construction joint.

(b) For the purpose of subsequent identification, the test beam samples and the slab to which these pertain shall be cross referred and record of this maintained, duly signed by the Engineer-in- Charge and contractor.

(c) Moulds for the test beams shall conform to IS-516 and shall be supplied by the contractor. Beams shall be prepared by the contractor as specified/as directed. The size of the mould for the test beam shall be 15cm x 15cm x 70 cm. The test beam samples shall be maintained and cured under conditions as specified in IS-516. The compaction will be done as specified, Flexural strength test results shall be signed both by the Engineer-in-Charge and the contractor.

(d) The slab shall stand rejected if the average flexural strength of three specimen of any sample is less than specified.

20.11 **TEST**

(a) During the currency of the contract, the contractor may demand conducting of core tests/sinusoidal tests of the concrete in respect of such of these slabs which stand rejected as well as such of these slabs which are proposed to be accepted subject to devaluation. Decision of the Asst Garrison Engineer with regard to the type of test to be conducted shall be final and binding.

(b) All necessary requirements, machinery, labour and arrangements for taking out cores for conducting core tests and/or sinusoidal tests shall be provided by the contractor from his own sources without any additional cost to the Govt.

(c) Three cores each of 15 cm dia for every 30 cubic metre of concrete which is required to be verified shall be cut from each affected slab. If the depth of any core cut is more than the thickness of the concrete provided under the contract for the corresponding slab, the depth of core shall be suitably modified to correspond to the thickness of the concrete laid, by carefully cutting out the extra portion with a diamond edged saw so that in no case the height to diameter ratio of core shall exceed two. In case, when the depth of the concrete laid in a particular slab under the contract exceeds 20 cm, the core cut out of such a slab shall be modified as described here in before, so that the height/diameter ratio shall not exceed two.

(d) All cores for tests shall be cut and taken out in the present of the Garrison Engineer/Engineer-in- Charge and the contractor's representative. Testing of cores shall be done in a laboratory as approved by GE. Expenses for such testing shall be borne by the Contractor.

(e) The compressive strength of the cores shall be determined as per IS-516. A correction factor as given here under according to the height/diameter ratio of core samples shall be applied to the average of three compressive strengths so determined :-

$F = 0.11\ n + 0.78$ (Where F is correction factor)
$n = H/D$ (ranging from 1 to 2)

PARTICULAR SPECIFICATIONS

TEST(Contd...)

(f) The product of the correction factor and the compressive strength (average) shall be known as the corrected compressive strength (this being the equivalent strength of a cylinder having height/diameter ratio of two). The cube strength of concrete shall be determined by multiplying the corrected cylinder compressive strength by 5/4. This shall be further corrected for age factor, if applicable, as under. The cube strength thus determined shall be divided by the age factor as given in the table below, to obtain the equivalent cube strength at 28 days(ECS).

Age of Slab in Month(s)	Age Factor
1	1.0
3	1.10
6	1.15
12 and above	1.20

(g) If equivalent cube strength so calculated is K Kg/Sq cm or more, the concrete of the corresponding slab shall be accepted for strength requirement, irrespective of whether the concrete stood rejected/was proposed to be accepted subject to devaluation.

(h) It the equivalent cube strength of the concrete of a particular slab ranges between 0.9 K Kg/Sqcm to K Kg/Sqcm the concrete of the corresponding slab shall be considered for acceptance subject to devaluation as stipulated hereinafter.

20.12 **ACCEPTANCE OF CONCRETE SUBJECT TO DEVALUATION**

(a) The decision of CWE whether concrete shall be accepted subject to devaluation or not shall be final, conclusive and binding. In case CWE decides not to accept concrete subject to devaluation, the slabs casted with such concrete shall be replaced and re-laid as per contract specification by the contractor at his own expense.

(b) Acceptance of concrete (with regard to strength) subject to devaluation shall be regulated asunder:-

(i) Up to an extent of 5% (five percent) of the total quantity of the concrete provided under the contract be accepted subject to devaluation by allowing payment for such concrete at a reduced rate(as compared to the contract rate), the reduced rate being in direct proportion to the strength as given below:-

$$\text{The reduced rate payable shall be equal to :- Contract rate X } \frac{\text{AFS}}{44}$$

OR

$$\text{Contract Rate X } \frac{\text{ECS}}{\text{K}} \text{ (if core testing is resorted to)}$$

Where,

AFS = Average flexural strength pertaining to a slab in Kg/Sqcm of the sample.

ECS = Equivalent cube strength as defined.

(ii) Concrete in excess of 5% (five percent) of the quantity provided under the contract, but not exceeding 10% (Ten percent) may also be accepted, subject to devaluation but in respect of such concrete, the reduced rate payable to the contractor shall be:-

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$$\text{Contract rate X } \frac{(2 \times AFS - 44)}{44}$$

OR

$$\text{Contract Rate X } \frac{(2 \times ECS - K)}{K} \quad \text{(if core test is resorted to)}$$

Where
K = Characteristic compressive strength of cubes obtained from cubes cast from approved design mix concrete (meeting flexural strength criteria of 45 Kg/Sqcm). K & ECS shall have same unit i.e. Kg/Sqcm

(iii) For calculating the quantity of concrete that may be accepted subject to devaluation as stipulated in preceding (tests) Clauses, the affected slabs in the order of casting (date wise) shall be taken into account. No sooner the limit of five percent has been reached, than acceptance of concrete of the remaining slabs, to an extent of a further five percent, subject to devaluations shall be governed by the stipulations given in preceding clauses (TESTS).

20.13 **REPLACEMENT OF REJECTED SLABS**

Concrete in the slabs which stands rejected shall be replaced by the contractor. The concrete cast in replacement shall satisfy the strength requirement all as mentioned here in before. If due to operational or other reasons (the decision of the Asst Garrison Engineer in this aspect shall be final, conclusive and binding) rejected slabs are not to be replaced, the cost of demolition and cost of replacement of such slabs including the affected joints shall be recovered from the contractor at the contract rates, irrespective of whether such slabs are subsequently actually replaced by Govt or not.

20.14 **COMMUNICATION FACILITIES**

Efficient communication facility for executives and contractor's representative shall be made available by the contractor regarding site control, safety precautions, quality control and to ensure smooth execution of work.

20.15 **SEPARATION MEMBRANE**

A separation membrane shall be used between the concrete slab and the sub base and on exiting surface as directed by GE. HDPE sheet shall be 400 microns thick laid flat.

21. **BLANK**

21.2 **BLANK**

21.3 **SETTING OF FORMS**

Setting of forms shall comply with the specifications given in clause No. 20.B.7.6.3 of SSR Part-I.

21.4 **BLANK**

PARTICULAR SPECIFICATIONS

21.5 PLACING AND COMPACTION OF CONCRETE

Placing and compaction shall be carried out as specified in Clause No. 20.B.7.8 to 20.B.8.2 of MES Schedule Part – I as mentioned in para 19.2.20 here-in-before . The placing of concrete in front of PQC shall be preferably from side placer to avoid damage to DLC by concrete tipping trucks. Refer Para 602.9.4.1 and 602.9.4.2 of MORTH book for additional reference.

21.6 WEATHER AND SEASONAL LIMITATIONS

Concreting should be avoided during rainy season. Sufficient precautions shall be taken as per guidelines given in para 602.7.1 of MORT&H book. Working limitation and precautions in hot weather or cold weather shall be as per MORT&H para 602.7.2. THE TREATMENT OF RIGID PAVEMENT ON CULVERTS MORTH clause 602.9.10 may be referred for treatment to rigid pavement on culverts.

21.7 BLANK

21.8 CHEMICAL ADMIXTURES

As per MORTH book para 602.2.3 or as recommended in design mix, Admixtures to be used in PQC shall be retarder to improve workability and setting time to facilitate work in temp above 35 degree and shall be no- chloride based.

21.9 BLANK

22. PAINTING ON ROADS/PAVEMENTS

22.1 Painting shall be all as specified in Schedule ‘A’ and of first quality water based retro reflective marking paint shall be as per makes given at Appendix ‘C’ to Particular Specifications.

22.2 The road / pavement marking paint shall be applied strictly as per manufacturer’s instructions. The contractor shall submit samples of the paints proposed for the project along with results of tests conducted in approved laboratory, as directed by the Engineer-in-Charge, for approval. The manufacturer’s recommendations shall also be submitted for the consideration and approval of the AGE(I) well in advance.

22.3The paint shall be brought to the site of work by the contractor in original sealed containers. The material shall be brought in one lot in adequate quantity to suffice for the entire work. The material shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empties shall not be removed from the site of work, till the work has been completed and permission obtained from the AGE(I). The paint for pavement marking paint shall be single component air drying water based acrylic paint confirming to IS:164.

PARTICULAR SPECIFICATIONS

PAINTING ON ROADS/PAVEMENTS (Contd….)

22.4 **TECHNICAL DATA OF PAINT & EPOXY PRIMER IS GIVEN BELOW:-**

22.4.1 **APCOTRAK IS**

Technical Data related to the ''APCOTRAK IS'' water based road marking paint are given here-in- below:-

(a)	Colour	White and Golden yellow
(b)	Gloss	Matt
(c)	Volume Solids	Approx 35%
(d)	Recommended DFT/Coat	50 microns
(e)	Theoretical covering capacity	7.00 sq.mtr/lt @ 50 microns DFT
(f)	Drying time at 30^0C	Surface dry – 20 minutes Hard dry – 4 hours
(g)	Over-coating interval at 30^0C	Min : 45 minutes Max: unlimited, provided surface is dry and clean from all contamination
(h)	Shelf life (cool 7 dry place)	At least 12 month

22.4.2 **CHOKSEY PRIMER RDL 942 :-**

Technical data related to the "Choksey Primer RDL 942" is given here-in-below :-

(a)	Nature	Single component, moisture sensitive liquid
(b)	Colour	Pale yellow to light brown
(c)	Specific gravity at 30°C	1.00 +- 0.05
(d)	Viscosity on ford cup B4	12-18 Sec
(e)	Inter coat interval	15-20 min
(f)	Sealant application time	30 minutes after application of Primer
(g)	Number of coats required	Two

22.4.3 **STP LIMITED (SHALI PATCH EC 20)**

Technical data related to the "STP Limited (Shali Patch EC 20)" is given here-in-below :-

Characteristic- Physical		
(a)	Colour	Black/ Grey
(b)	Drying Time, Touch, minutes	60
(c)	Pot Life @ 30°C, minutes	10+-1
(d)	Solid % by volume	100
(e)	Open to traffic time, hrs, minimum	2
(f)	Mixing ratio, by wt. A:B:C	3.6 : 0.9 :5.5
(g)	Mixed density	1.75+-0.55
(h)	Application temperature °C	5 to 45
(j)	Chemical Resistance	Excellent
(k)	Curing Time Over Coat hrs Full cure, days	 2 3

Characteristic- Technical			
(a)	Elongation after 7 days %, min	ASTM D 412	30+-2
(b)	Compression, Mps 4 hrs 1 day	ASTM D 695	 3 5
(c)	Stress @ 5% deflection, 4 hrs, Mpa	ASTM D 695	2
(d)	Tensile strength, 7 days, Mpa	ASTM D 412	1.3+-0.07
(e)	Hardness, Shore D	ASTM D 2240	47+-3
(f)	Impact -15 °C, 1lb, 10 ft	ASTM D 3029	No cracking

PARTICULAR SPECIFICATIONS

PAINTING ON ROADS/PAVEMENTS (Contd….)

22.5 **STORAGE & PACKING**

STORAGE :- Store in a cool, dry place. Store in accordance with local regulations
PACKING :-20liters

22.6 **WORKMANSHIP**

(a) **PREPARATION OFSURFACE** The surface shall be thoroughly cleaned and dusted. All dirt, scales, oil and grease shall be thoroughly removed before painting is started. Wire brushing and water washing shall be carried out for thorough removal of dust from the road surface. The surface shall be allowed to dry thoroughly before painting. The prepared surface shall be inspected and approved by the AGE(I) before painting is commenced. The weather shall not be foggy/ rainy, dusty or windy. Surface temperature must be at least 300C above dew point but not above 500C. The suitability of the weather will be determined by the Engineer-in-Charge.

22.7 **APPLICATION**

Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its original container. The paint shall be continuously stirred in the smaller container while applying to runway surface so that its consistency is kept uniform. A time interval as recommended by the manufacturer or as directed by the Engineer-in- Charge shall elapse, between laying and finishing of the bituminous and cement concrete surfaces and the time of marking the pavement.

22.8 **MIXING**

If settling is observed in the drum, loosen the settled material with the help of hand stirrer followed by power driven stirrer for quick homogenous mixing.

(a) **By Brush**

Recommended thinner	:	Municipal/Potable water
Volume of thinner	:	5-15%

(b) **By Air Spray**

Recommended thinner	:	Municipal/Potable water
Volume of thinner	:	20-40%
Nozzle Orifice	:	1.5-3.00mm

(c) The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in opposite direction, two or three times and then finally brushing lightly in a direction at right angle to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat. Final coat of painting may be provided with road marking paint machine at the discretion of the contractor without any extra cost to the department. Each coat shall be allowed to dry out thoroughly before the next coat is applied**.** Earlier applied coat shall be cleaned off dust before the next coat is applied**.** No left over paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed **.**No hair marks from the brush or clogging of paint puddles shall be left on work. The surface shall ordinarily not be painted until it has dried up completely. Trial patches of paint shall be laid at intervals to check if drying is satisfactory. The runway marking shall be done as instructed by the AGE(I)**.**

PARTICULAR SPECIFICATIONS

PAINTING ON ROADS/PAVEMENTS (Contd….)

22.9 **SAFETY INFORMATION**

As a general safety measure, inhalation of paint mist and contract of liquid paint with skin & eyes, should be avoided. Forced ventilation shall be provided when applying paint in confined spaces or stagnant air. Even when ventilation is provided, respiratory, skin and eye protection are always recommended when spraying paint

22.10 **BRUSHES AND CONTAINERS**

After work, the brushes shall be completely cleaned of paint by rinsing with turpentine. A brush in which paint has dried up is spoiled and shall on no account, be reused for painting work. On no account kerosene oil shall be used for washing the brushes. When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth so that they clean, and be used again.

22.11 **ROAD MARKINGS**

The work of Road marking shall be all as per Sch 'A' item and applied mechanically with all specification as per MORTH Para 803.1 to 803.6.9.

23. **OIL BOUND DISTEMPER/ACRYLIC EMULSION PAINT/PLASTIC EMULSION PAINT, POLYURETHANE PAINT ON PLASTER/ CONCRETE/ BRICK OR STONE SURFACES**

The surface shall be cleaned, prepared and alkali resistance primary coat shall be applied all as per IS: 109 of 1968. Depression/Cracks and unclean surface shall be prepared with putty made of clay and paint and rubbed smooth. After the surface is dry, primer shall be applied with brush followed by two consecutive finishing coats of paint/distemper. Oil bound distemper/plastic emulsion /acrylic emulsion and polyurethane paint shall be standard make and shall be got approved from GE, before ordering for bulk supply.

24. **TESTING**

Following testing shall be carried out for the material (as applicable in this work).

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Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
1.	**CEMENT**			
(a)	Physical tests	Once for each consignment	100%	5%
	(i) Setting time (initial & final)			
	(ii) Soundness			
	(iii) Compressive strength			
	(iv) Fineness			
(b)	Chemical tests (Chemical composition)	Once for each	100% site lab/CTL	9%
2.	**COARSE AGGREGATE**			
(a)	Specific gravity	One for each source for sample approval and once more for confirmation in the first lot.	100% site lab/CTL	5%
(b)	Water absorption	One for each source for sample approval and once more for confirmation in the first lot.	100% site lab/CTL	5%
(c)	Soundness	One for each source for sample approval and once more for confirmation in the first lot. After that once in every month.	100% site lab/CTL	5%
(d)	Organic impurities	One for each source for sample approval and once more for confirmation in the first lot.	100% site lab/CTL	5%
(e)	Crushing value	One test per each size for every 100cum	100%	5%

PARTICULAR SPECIFICATIONS

TESTING(CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
(f)	Impact value	One test per each size for every 100 cum	100%	5%
(g)	Los Angeles test Abrasion	One test per each size for every 100 cum	100%	5%
(h)	Deleterious materials	One test per each size for every 100 cum	100%	5%
(j)	Sieve analysis	One test per each size for every 50cum	100%	5%
(k)	Flakiness & elongation index	One test per each size for every 100 cum or part thereof	100%	5%
(l)	Moisture content	Regularly at every one hour interval during batch mixing	100%	-
(k)	Stripping value of aggregates	Initially for aggregate from each quarry and subsequently whenever change in quality of aggregate/quarry noticed.	100%	5%(Min once for each quarry)

PARTICULAR SPECIFICATIONS

TESTING(CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
3.	**FINE AGGREGATE**			
(a)	Specific gravity	One for each source for sample approval and once more for confirmation in the first lot.	100% site lab/CTL	5%
(b)	Organic impurities	One for each source for sample approval and once more for confirmation in the first lot.	100% site lab/CTL	5%
(c)	Sieve analysis	One test per each size for every 15cum	100%	5%
(d)	Moisture content	Regularly at every one hour interval during batch mixing	100%	-
(e)	Clay and silt impurities	One test per each size for every 15cum	100%	5%
4.	**PAVING BITUMEN VG-10/VG-20/VG-30**			
(a)	Absolute & kinetic viscosity	One sample from each container recd on a day or minimum three randomly selected containers in case numbers of containers recd more than three and upto50.	100%	5%
(b)	Flash point	One sample from each container recd on a day or minimum three randomly selected containers in case numbers of containers recd more than three and upto50.	100%	5%

PARTICULAR SPECIFICATIONS

TESTING(CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
(c)	Penetration	One sample from each container recd on a day or minimum three randomly selected containers in case numbers of containers recd more than three and upto 50.	100%	5%
(d)	Softening point	One sample from each container recd on a day or minimum three randomly selected containers in case numbers of containers recd more than three and upto 50.	100%	5%
(e)	Viscosity & ductility on residue from thin film oven tests	One sample from each container recd on a day or minimum three randomly selected containers in case numbers of containers recd more than three and upto 50.	100%	5%
5.	**POLYMER MODIFIED BITUMEN (PMB-40)**			
(a)	Absolute & kinetic viscosity	Sample from each container recd	100%	5%
(b)	Flash point	Sample from each container recd	100%	5%
(c)	Penetration	Sample from each container recd	100%	5%
(d)	Softening point	Sample from each container recd	100%	5%
(e)	Ductility and Elastic recovery	Sample from each container recd	100%	5%
(f)	Viscosity & ductility on residue from thin film oven tests	Sample from each container recd	100%	5%
(g)	FRAAS breaking	Initially on submission	-	100%

PARTICULAR SPECIFICATIONS

TESTING(CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
6.	**TEST ON EARTHWORK FOR SUB-GRADE (SOIL STABILIZED)**			
(a)	Cement content for stabilized formation	Every 500 cum of work	100%	2%
(b)	Field Density	One on every 500 sqm	100%	-
(c)	CBR (IS:2720 Part-XVII) on soaked/unsoaked samples	One test per 3000 cum. Mean of 3 samples shall constitute one test result.	100%	2%
(d)	Moisture content prior to compaction (IS : 2720Part-II)	One test per 250 sqm	100%	-
(e)	Plate load test to determine K value	On every 10,000sqm formation or minimum one test in isolated feature	100%	-
7.	**TESTS ON PQC PAVEMENT**			
(a)	Flexural strength of beam samples	2 samples (each of 3 specimen) for every 150 cum of concrete one at 7 days & other at 28 days	100%	2%
(b)	Cube strength	28 days strength of 2 samples (each of 3 specimen) per day of concreting at randomly chosen time.	100%	2%
(c)	Core strength	As and when strength of beam samples fail to meet the acceptance criterion and as and when AGE(I) decides for the purpose of quality assurance to visiting authorities	100%	2%
	Note:-For trial Bays Nos/Frequency of test will be as required as per section 400-600 in “MORTH Specifications of Roads and Bridge Works (Fifth Edition) and references thereof.			

PARTICULAR SPECIFICATIONS

TESTING(CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
8.	**TESTSONBITUMINOUS PAVEMENT**			
(a)	Marshal stability and flow	For every 100 ton of mix	100%	2%
(b)	Bitumen content	For every 100 ton of mix	100%	2%
(c)	Percentage air voids	For every 100 ton of mix	100%	2%
(d)	Field density	One sample (3 specimens) for every 1000sqm area	100%	2%
9.	**TESTS ON GLASS GRID**			
(a)	Tensile strength	Once during sample approval and subsequently for every lot of supply	-	100%
(b)	Elongation at break	Once during sample approval and subsequently for every lot of supply	-	100%
(c)	Melting point	Once during sample approval and subsequently for every lot of supply	-	100%

PARTICULAR SPECIFICATIONS

TESTING (CONTD.....)

Sl No	Name of Test	Frequency	No of test in site lab	No of tests in IITs/SEMT
9.	**WATER**	Initially then quarterly	-	-
10.	**ADMIXTURE**	Min one test per lot	-	-
11.	**CURING COMPOUND**	Min one test per lot	-	-
12.	**FILLER BOARD**	Min one test per lot	-	-
13.	**POLYURETHANE SEALANT**	Min one test per lot	-	-
14.	**PRIMER JOINT**	Min one test per lot	-	-
15.	**DBM CORE TEST EACH LAYER**	-	100%	5%
16.	**DAC CORE TEST EACH LAYER**	-	100%	5%
17.	**POLYTHENE SHEET**	Only independent test one test per lot		
18.	**TEST ON EARTHWORK FOR SHOULDERS/EMBANKMENT**			
	Sieve Analysis (Gradation)	1 test per 250 cum of good earth.	100%	2%
	Sand Content	2 tests per 3000 cum of good earth.	100%	2%
	Plasticity Test	2 tests per 3000 cum of good earth.	100%	2%
	Density Test	2 tests per 3000 cum of good earth (Each soil type).	100%	2%
	Deleterious Content Test	As and when required by Engineer-in-Charge.	100%	2%
	Moisture Content	1 test for every 250 cum of good earth.	100%	-

PARTICULAR SPECIFICATIONS

25. TESTING OF PERFORMANCE OF CONCRETE BATCH MIXING PLANT

The performance of batch mixing plant shall be tested in accordance with IS:4634 :1991 before accepting the same for utilization in the work. The percentage variation in the contents of cement, fine aggregate and coarse aggregate shall not be more than 8%,6% and 8% respectively. This test shall be repeated once a month and immediately after a meter breakdown.

26. LIST OF LABORATORY EQUIPMENT AT SITE LAB SHALL BE AS UNDER

The list of laboratory equipment at site lab shall be as under. Any additional lab equipment required as per Para 24 here-in-before to be made available by contractor in the site lab. No extra payment shall be admissible to the contractor for additional lab equipment.

Srl No.	Description	Qty	Remarks
1	2	3	4
(a)	Sieve sets	02	
(b)	Organic impurities testing set	01	
(c)	Cube moulds 15X15x15 cm	09	
(d)	Beam moulds 15x15x70(cm)	09	
(e)	Vibration machine for cube moulds	02	
(f)	Water testing kit	02	
(g)	Measuring cylinder 25 ml, 100ml	05	
(h)	Electric oven	02	
(j)	Compression testing machine	01	
(k)	Digital weight machine (i) 250 gm (ii) 10 Kg	 02 02	
(l)	Thermometer	03	
(m)	Slump test apparatus	02	
(n)	Concrete testing hammers	02	
(o)	Stop Watch	02	
(p)	(i)Thickness gauge for flakiness (ii) Length gauge for elongation	01 01	

PARTICULAR SPECIFICATIONS

LIST OF LABORATORY EQUIPMENT AT SITE LAB SHALL BE AS UNDER (Contd…)

Srl No.	Description	Qty	Remarks
1	2	3	4
(q)	Water tank for curing	01	
(r)	Enamelled trays 12”x15”x12”	06	
(s)	Aluminium trays	06	
(t)	Tape measuring (i) 15 m (ii) 5 m	 02 02	
(u)	MS Round 20 mm dia and 6 m long	02	
(v)	Steel Scales	06	
(w)	Set of wire brushes	04	
(x)	Digital vernier brushes	02	
(y)	Adjustable spanners & set of spanners	02	
(z)	Density Basket for Sp gravity test	01	
(za)	Sieve shaker capable of testing 200 mm and 300 mm dia Sieves electrically operated with the switch assemble	02	

Note :-

(a) If any instruments as required for tests are not covered in above list and is required at site; then it will be provided on site as directed by the AGE(I). The same would be made available without any extra cost to the deptt.

(b) Aggregate impact value test, aggregate crushing value test, aggregate abrasion value test and flexural strength of PQC shall be got done by contractor from Command Test Lab (CTL), Lucknow. If the test is not available at CTL (NAC mandatory from OIC, CTL) then the tests can be carried out from the following options only:-

(ii) National Test House (NTH).
(iii) Any Indian Institute of Technology (IIT).
(iv) Any National Institute of Technology (NIT).

(c) The cost of the test will be borne by the contractor and nothing extra shall be paid for the same by the deptt.

PARTICULAR SPECIFICATIONS

27. **MINIMUM T & P TO BE DEPLOYED ATSITE**

Minimum T & P to be deployed at site should be as below:-

S. No.	T&P Items	Min Qty	Vintage (in year)
(a)	Fixed form paver	01 No	03
(b)	Dual mode tandem vibratory roller(08 to 10 Ton cap)	01 No	05
(c)	Fully Automatic Computerized ready mix concrete plant of min 15 Cum/hr output with printing facility	01 No	05
(d)	Hand held heavy duty needle vibrators (electrically operated/diesel driven) for PQC	04 No	03
(e)	Machine for joint filling	01 No	05
(f)	Diamond Cutters for joints(Diesel/Electric driven)(Two full depth concrete cutting machine)	02 No	05
(g)	Vibratory type sand screeners	01 No	05
(h)	Mechanized runway markings and painting equipment	01 No	05
(j)	Air compressor 350 Cfm	01 No	05
(k)	Profilometer / Roughometer	01 No	05
(l)	Core cutting Machine (150 mm diameter and 500mm height bit)	01 No	05
(m)	Lab testing equipment for site lab	01 No	03
(n)	Total Station Survey equipment	01 No	05
(o)	Loader/Excavator	02 Nos.	05
(p)	Hand held Fuel based / Electric Rammer for compaction in tight spaces	02 Nos.	05
(q)	Reversible Vibrating Plate compactor	02Nos.	05
(r)	Mechanical Sensor paver for laying DLC	01 No.	03
(s)	Concrete transport mixer	02 Nos.	05
(t)	Water Bowser	02 Nos.	05
(u)	Auto Level	01 Nos.	05
(v)	Mechanical Dozer for mixing synthetic fiber in RMC plant	01 Nos.	05

PARTICULAR SPECIFICATIONS

27. **MINIMUM T & P TO BE DEPLOYED AT SITE(CONTD…)**

NOTE:

(i) Any additional equipment required and as directed by AGE(I) for execution of work shall be arranged by the contractor and nothing extra amount shall be admissible to the contractor on this account.

(ii) Plant and equipment shall be duly calibrated and calibration certificate shall be obtained from authorized service centre/OEM as per recommended periodicity and submitted by the contractor to the AGE(I).

(iii) After completion of relevant activity, connected T & P may be removed from the site after due written permission from AGE(I).

(iv) Documentary proof shall be submitted by the contractor to Engr-in-charge showing availability of T & P at site like copy of RC book as well as temporary pass issued by the station authority/ details of entry in register at technical area gate in token of entry of T & P to technical area.

(v) A register shall be maintained by the contractor showing availability of T & P on daily basis with serviceability status duly signed by contractor & Engr-in-charge and countersigned by AGE(I) on weekly basis. This will form part of RAR/final bill.

(vi) MOU with service provider for maintenance of T &P to be submitted to AGE(I). The original manufacturer's AMC is current and valid. No extension of time will be entertained on account of any breakdown / non-availability of any T&P. The contractor will ensure fitness of every plant/equipment to ensure completion of work in given time period.

(vii) Fitness certificates shall be submitted from the authorized service centre of original manufacturer/OEM.

(viii) The operator of plant is certified by OEM

28. **ROAD WORK**

28.1 **FORMATION FOR ROAD WORK**

Preparation and compaction of formation surfaces shall be done with 8 to 12 tonne power roller all as per clause 20-A, 22 of MES schedule Part I.

28.2 **SOLING**

Soling shall consist of one layer of 150 mm thick spread thickness with approved quality locally available broken boulders/quarried stone and shall be laid & levelled in one layer watered & rolled to required surface camber all as specified in clause 20.A.20 and 20.A 20.1 of MES Schedule Part I 2009.

28.3 **MATERIAL FOR ROAD WORK**

(a) All materials required for road work shall be stacked for measurements before incorporation in the work.

(b) The quantities collected shall be sufficient for works required and in addition (at no extra cost to the Govt) also adequate for repairing to fill hollows appearing during the execution of works.

(c) Measurements of stacks shall be jointly taken by the Engineer-in-Charge and the contractor's representative and shall be recorded in the measurement book as a check of the quantities brought for the work. The measurement of stacks recorded in measurement book shall be signed by the contractor and the Engineer-in-Charge.

PARTICULAR SPECIFICATIONS

28.4 PREPARATION OF SURFACE

Preparation of road surface shall be carried out as specified in clause No.20.A.23.3, 20.A.24.2, 20.B.4.1 of MES SSR Part-I.

28.5 POT HOLES

6.8.1 Pot holes shall be drained of with water etc and cut to regular shape with vertical sides to depth as directed; all loose and disintegrated material shall be removed to a distance as directed by Engineer-in-Charge.

6.8.2 Pot holes shall be 100% checked by Engineer-in-Charge.

6.8.3 The stone aggregate and chipping for filling pot holes shall be all same material as in the existing surface or as directed by Engineer-in-Charge.

28.6 AGGREGATE FOR ROAD WORK

28.7 COARSE AGGREGATE

Coarse Aggregates shall consist of crushed rock, crushed gravel or other hard materials. They shall be clean, hard, and durable, of cubical shape, free from dust and soft or friable matter, organic or other deleterious matter. The specifications for binder and granular course shall be as per MORTH specifications, Forth Revision (reprinted Apr 2005) or as per subsequent revisions from time to time.

Note:-

(a) Before sample of material for aggregates is approved, these shall be tested for stripping. Where aggregates have poor affinity for bitumen, these shall be treated with approved anti-stripping agents.

(b) Where crushed gravel is proposed for use as aggregate, not less than 90% by weight of the crushed material retained on 4.75 mm sieve shall have at least two fractured faces.

(c) The aggregates shall satisfy the physical requirements & grading requirements as indicated hereinafter & shall be procured in bulk only after obtaining sample approval from the GE.

(d) The aggregates shall be hydrophobia & of low porosity. Sources of supply of aggregates once approved by AGE shall not be changed.

PARTICULAR SPECIFICATIONS

28.8 **PHYSICAL REQUIREMENTS**

(a) The coarse aggregate shall satisfy the following physical requirements:-

TEST	PERCENTAGE MAX				
	WATER BOUND MACADAM	BITUMINOUS MACADAM	DENSE GRADED BITUMINOUS MACADAM	SEMI DENSE ASPHALTIC CONCRETE	DENSE ASPHALTIC CONCRETE
Flakiness Index	15 (Combined Flakiness & Elongation Index)	15	15	15	10
Impact Value	30	30	27	27	30
Los Angeles Abrasion Value	35	40	35	35	40
Stripping test	-	25	25	25	25
Water Absorption Test	-	1%	1%	1%	1%
Soundness Test Sodium Sulphate Magnesium Sulphate	- - -	- 12% 18%	- 12% 18%	- 12% 18%	- 12% 18%

(b) Aggregate impact value may be up to 35% if bituminous macadam is used as base course.

28.9 **FINE AGGREGATE**

The fine aggregate shall consist of crushed or naturally occurring material and be fraction passing 2.36 mm sieve and retained on 75-micron sieve consisting of crushed screening, natural sand or mixture of both. It shall be clean, hard, durable uncoated and dry, free from injurious, soft or flaky pieces and organic or deleterious substance.

S. NO	TEST	TEST METHOD	REQUIREMENT
(a)	Grain size analysis	IS 2386 Part 1	Max 5% passing 0.075 mm sieve
(b)	Los Angeles Abrasion value*	IS :2386(Part -4)	35 Percent Maximum
(c)	Aggregate impact value*	IS :2386(Part -4)	30 Percent Maximum
(d)	Flakiness and Elongation** Indices	IS :2386(Part -1)	30 Percent Maximum
(e)	Coating and stripping of bitumen aggregate Mixtures	IS :6241	Min retained coating 95%
(f)	Soundness	IS :2386(Part -5)	
	(i) Loss with sodium sulphate	5 cycle	12 Percent Maximum
	(ii) Loss with magnesium sulphate	5 cycle	18 Percent Maximum
(g)	Water absorption	IS :2386(Part -3)	2 Percent Maximum

PARTICULAR SPECIFICATIONS

30. **SAND**

(a) The sand shall be conforming to the sample kept in AGE office and will be free from deleterious materials and pebbles.

(b) Sand to be used for brick work/concrete shall be locally available and shall be as given in MES schedule Part-I.

31. **BRICK WORK** Fly ash brick shall be of size 230 mm x 115 mm x 75 mm best quality locally available and as approved by GE/AGE (I) with crushing strength not less than 75 Kg/Sqcm. The fly ash bricks shall confirm to IS-12894-2002 (pulverized fuel ash time bricks.

32. **WATER** Water to be used in this work shall be all specified in IS : 456 of 2000 and in clause 4.9 of SSR Part I (specification). When the water is not issued by the department, the water shall be got tested in Govt. approved laboratory and test certificate shall be submitted to GE. The water shall be used in the work only after receipt of satisfactory test results as per IS.

33. **FILLER** Refer Para 20.B.2.5 of SSR Part I. The filler materials shall be cement as specified in ` SSR and recommended in design mix.

34. **SCARIFYING AND RENEWING WATER BOUND MACADAM** Will conform to 20.A.34.1 of SSR Part I.

35. **PATCHING OF POT HOLES** The repairs to the pot holes will be carried out as per SSR Part I para 20.A.34.2

36. **PREPARATION OF EXISTING BLACK TOP SURFACES AND WBM SURFACES**

36.1 The surfaces shall be prepared and cleaned as specified in Schedule 'A' and as specified in SSR Part I. Any depression or pot holes shall be properly made up and thoroughly compacted. The surface shall be scraped clean and free from dust and foreign material before applying tack coat.

37. **APPLICATION OF TACK COAT**

37.1 Paving bitumen VG-10 grade shall be used as binder for tack coat. Content of tack coat shall be as indicated in Sch 'A' Refer Clause 20.A.24 for other requirements. The application of the coating will be with paving bituminous primer VG-10 penetration applied by mechanical sprayer @ 10kgs/10sqm of surface area. For other grades, it will be as specified in Schedule and as directed by the Engineer-in-Charge.

37.2 The preparation and methods of application shall be as per MES SSR Part-I.

37.3 Following tests shall be carried out:-

(a) **TACK COAT**

(i) Binder temperature for application - At regular class intervals.

(ii) Rate of spread of binder - Two per day.

38. **WATER BOUND MACADAM (BASE COURSE)**

38.1 Course aggregate shall be crushed or broken stone of grading II as laid down in clause 20.A.3.1 of MES Schedule Part I and shall be laid and rolled all as mentioned in Schedule 'A'(BOQ).

PARTICULAR SPECIFICATIONS

38. **WATER BOUND MACADAM (BASE COURSE)(Contd..)**

38.2 Screening shall be of hard stone of grading 'A' as laid down in clause 20-A.3.2 of MES Schedule Part I. It shall be sprinkled to fill intersects & rolled.

38.3 Binding material mentioned in MES Schedule shall be Moorum best quality locally available as approved the GE. WBM surface shall be kept open to traffic for a period of at least two months. Certificate to this affect shall be kept on record duly signed by GE.

38.4 The consolidation of WBM shall be done with 8 to 12 tonne power roller. Sufficient water shall be sprinkled and rolling shall continue till thick mud slurry is formed and rolls with the wheel of the roller.

39. **PAVING BITUMEN**

(a) Bitumen to be used in the work shall be paving bitumen VG-30 grade and for priming/tack coat will be VG-10 and as specified & directed but must be conforming to IS 73-2006.

(b) The Bitumen to be procured from the any of the following main producer:-

(i) M/s Indian Oil Corporation
(ii) M/s Bharat Petroleum Ltd
(iii) M/s Hindustan Petroleum Corporation Ltd
(iv) M/s STP Limited
(v) M/s MK Petro product Faizabad
(vi) Bengal Bitumen, Sarita Vihar, New Delhi.

(c) The contractor shall submit **original purchase vouchers** along with **manufacturers test certificate** for the total quantity of bitumen supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the Asst Garrison Engineer along with the relevant document. The original purchase vouchers and the test certificate shall be verified for subject contract and defaced by the Engineer-in-Charge and kept on record in the office of the Asst Garrison Engineer duly authenticated and with cross reference to the consignment. The Accepting Officer may order a board of officers for random check of bitumen and verification of connected documents during the currency of contract. If the Asst Garrison Engineer desires separate test of bitumen, the test shall be got done through a recognized and approved laboratory/institution as approved by CWE at no extra cost to Government.

(d) The bitumen brought at site shall be recorded in Measurement Book "Not to be abstracted" and shall be signed by both the contractor and Engineer-in-Charge.

40. **ROAD METAL CHIPPING**

(a) Road metal for water bound macadam and chipping for premixed carpet shall be obtained from Jhansi and Delhi respectively and shall conform to provision given in para 20A.3 and 20.A.5 of MES schedule part-I.

(b) The coarse aggregate shall be broken stone and grading of coarse aggregate shall be No.2. Screening to fill voids in coarse aggregate shall be of the same materials. Contractor may use screening of any type class 'A' or 'B' as specified in Para 20.A.3.2 of MES schedule part-I. Binding materials shall comply with the requirements of Para 20.A.3.3 of MES schedule part-I.

(c) Aggregate for bituminous carpet shall comply with requirement of Para 20.A.5 of MES schedule part-I uncrushed and round grading shingle shall not be used.

PARTICULAR SPECIFICATIONS

41. MIX DESIGN CRITERIA FOR BITUMINOUS MACADAM/ASPHALTIC CONCRETE/SEMI DENSE ASPHALTIC CONCRETE

The design requirement shall be as under:-

SER. NO.	PROPERTIES	BITUMINOUS MACADAM	DENSE BITUMINOUS MACADAM/ SEMI DENSE ASPHALTIC CONCRETE	ASPHALTIC CONCRETE	METHOD OF TEST
(a)	Marshall stability (75 blows) at 60°C minimum	545	1050	1200	ASTMD: 1559-1979
(b)	Marshall flow at 60°C, mm	2.0-4.0	2.0-4.0	2.5-4.0	-do-
(c)	Marshall flow at 60°C, mm		250-500	250-500	Stability + Flow
(d)	Voids in compacted Mix, %	10-15	3.0-5.0	3.0-5.0	
(e)	Requirement of retained stability after 24 hours in water at 6°C % minimum	-	90	90	ASTMD: 1075-1979
(f)	Coating with aggregate % (minimum)	-	-	95	AASHTD 182
(g)	Type of binder	VG-30	VG-30	VG-30	
(h)	Filler	-	Cement (43 Grade)	Cement OPC(43 Grade)	
(j)	Binder content percent by weight of total mix	3.5 to 4.5	4.5 to 5.5	5 to 6.5	

42. BITUMINOUS MACADAM

42.1 Bituminous macadam shall consist of crushed aggregates, premixed with a bituminous binder, in hot mix plant. The binder shall be heated to a specified temperature. The aggregate shall be suitably warmed or heated before loading into hot mix plant. The correct qty of each size of aggregate shall be fed into mixer with specified quantity of binder. Each batch shall be mixed to ensure thorough coating.

PARTICULAR SPECIFICATIONS

42.2 AGGREGATE GRADING AND BINDER CONTENT FOR BITUMINOUS MACADAM

The combined grading of the coarse aggregates and fine aggregates, when tested in accordance with IS:2386 (Part 1), wet sieving method, shall conform to limits given below :-

MIX DESIGNATION	GRADING 1	GRADING 2
Nominal aggregate size*	**40 mm**	**19 mm**
Layer thickness	**80 – 100 mm**	**50-75 mm**
IS sieve (mm)	**Cumulative % by weight of total aggregate passing**	
45	100	-
37.5	90 - 100	-
26.5	75 - 100	100
19	-	90 - 100
13.2	35 - 61	56 - 88
4.75	13 - 22	16 - 36
2.36	4 - 19	4 - 19
0.3	2 - 10	2 - 10
0.075	0 - 8	0 - 8
Binder content** %age by weight of total mix	3.3**	3.4**

Note:-

(*) Nominal maximum aggregate size is the largest specified sieve size upon which any of the aggregate material is retained

(**) Corresponds to specific gravity of the aggregate being 2.7. In case aggregates have specific gravity more than 2.7, bitumen content can be reduced proportionately. Further, for regions where highest daily mean temperature is 30^{o} C or lower and lowest daily mean air temperature is -10^{o} C or lower, the bitumen content may be increased by 0.5 percent.

42.3 PROPORTIONING OF MATERIAL

The combined aggregate grading shall not vary from the lower limit on one sieve to the higher limit on the adjacent sieve to avoid gap grading. The aggregates may be proportioned and blended to produce a uniform mix complying with the requirement given at table19.2 above. The binder content shall be within a tolerance of $\pm$ 0.3% by weight of total mix when individual specimens are taken for quality control tests.

42.4 JOB MIX FORMULA

The tenderer shall submit their Job-mix formula to the Asst Garrison Engineer within 30 days of the acceptance of contract from the Command Test Lab (CTL). If Testing not available at CTL (non-availability certificate mandatory from CTL); then only; the tenderer will get Job-mix formula approved from CRRI New Delhi/ IIT/NIT/Govt Engg College. The design mix (job mix formulae) **shall be approved from the Accepting Officer before commencement of Bituminous Macadam work**. For any change in source of supply of aggregate, fresh mix design shall be got done and testing charges shall be borne by the contractor.

PARTICULAR SPECIFICATIONS

42.5 The design mix requirement shall be as under for bituminous macadam:-

SER NO	PROPERTIES	SPECIFIED VALUE OF BITUMINOUS MACADAM
(a)	Number of compaction blow each and of Marshall specimen	75
(b)	Marshall stability (75 blows) at 60^0C minimum in Kg	545 (min)
(c)	Marshall flow at 60^0C MM	2-4
(d)	% void in completed Mix	10-15
(e)	Type of binder	60/70/VG-30
(f)	Binder content % by weight of total mix	3.5-4.5

Note:- The item for bituminous macadam of Schedule "A" is based on 4.0% binder content of total mix by weight. In case the mix design is with more kilogram of binder then nothing extra is paid however if bitumen required as per job mix is less than 4.0% then variation shall be required with minus price adjustment @ Rs 50 per Kg of bitumen.

42.6 Bituminous macadam shall be prepared, spread and compacted as specified in clause 20.B.3 to 20.B.3.10 of SSR-2009 Part-I.

42.7 **BITUMEN CONTENT**

The binder content shall be optimized to achieve the requirements of the mixture set out in the table above.

43. **DENSE ASPHALTIC CONCRETE (DAC)**

43.1 DAC shall consist of coarse aggregate, fine aggregate and filler (if required as per job mix formula) in suitable proportions and mixed with a bituminous binder, in hot mix plant. The binder shall be heated to a specified temperature. The aggregate shall be suitably warmed or heated before loading into hot mix plant. The correct qty of each size of aggregate shall be fed into mixer with specified qty of binder. Each batch shall be mixed to ensure thorough coating.

43.2 **QUALITY CONTROLS**

Instrument required for testing and measurement shall be kept by contractor at his own arrangement at site during execution. All test as specified in Para 20.B.4.9 of MES Sch Part-I for quality control shall be carried out by the contractor shall be kept on record duly signed by contractor and Engineer-in-charge.

PARTICULAR SPECIFICATIONS

43.3 **AGGREGATE GRADING AND BINDER CONTENT**

The combined grading of the coarse aggregates and fine aggregates, when tested in accordance with IS: 2386 (Part 1), wet sieving method, shall conform to limits given below.

TABLE 500-17: COMPOSITION OF BITUMINOUS CONCRETE PAVEMENT LAYERS

Mix Designation	Grading 1	Grading 2
Nominal aggregate size*	**19 mm**	**13.2mm**
Layer thickness	**50 mm**	**30-40mm**
IS sieve (mm)	**Cumulative % by weight of total aggregate passing**	-
45	-	-
37.5	-	-
26.50	100	-
19	90-100	100
13.2	59-79	90-100
9.5	52-72	70-88
4.75	35-55	53-71
2.36	28-44	42-58
1.18	20-34	34-48
0.6	15-27	26-38
0.3	10-20	18-28
0.15	5-13	12-20
0.075	2- 8	4 - 10
Binder content %age by weight of total mix	5 to 6	As per design Mix

Note :-

(a) Nominal maximum aggregate size is the largest specified sieve size upon which any of the aggregate material is retained.

(b) Corresponds to specific gravity of the aggregate being 2.7. In case aggregates have specific gravity more than 2.7, bitumen content can be reduced proportionately. Further, for regions where highest daily mean temperature is 30^{o} C or lower and lowest daily mean air temperature is -10^{o} C or lower, the bitumen content may be increased by 0.5 percent.

43.4 **DESIGN OF MIX**

Besides conforming to the requirement of grading and quality for individual ingredients the mix shall meet the requirement set out in following table.

PARTICULAR SPECIFICATIONS

43.5 MIX DESIGN CRITERIA FOR DENSE ASPHALTIC CONCRETE PAVEMENTS

The design requirement shall be as under:-

Ser. No.	Properties	Bituminous Macadam	Dense Bituminous Macadam/Semi Dense Asphaltic Concrete	Asphaltic Concrete	Method of test
(a)	Marshall stability (75 blows) at 60°C minimum	545	1050	1200	ASTMD: 1559-1979
(b)	Marshall flow at 60°C, mm	2.0-4.0	2.0-4.0	2.5-4.0	-do-
(c)	Marshall quotation Kg per mm		250-500	250-500	Stability + Flow
(d)	Voids in compacted Mix, %	10-15	3.0-5.0	3.0-5.0	
(e)	Requirement of retained stability after 24 hours in water at 6°C % minimum	-	90	90	ASTMD: 1075-1979
(f)	Coating with aggregate % (minimum)	-	-	95	AASHTD 182
(g)	Type of binder	VG-30/As per mix design	As per Mix Design	As per Mix Design	
(h)	Fillet	-	Cement OPC (43 Grade)	Cement OPC (43 Grade)	
(j)	Binder content percent by weight of total mix	3.5 to 4.5	4.5 to 5.5	5 to 6.5	

NOTES :-

(a) Compression test to measure the loss of Marshall Stability due to effect of water on the mix shall be conducted for Dense Asphaltic Concrete. If the Index Retained Stability is less than 75, the mix shall be rejected or the aggregates shall be processed by approved method to increase the index to minimum of 75. The immersion test shall be carried out on Marshall test specimens of design job mix after storing in 1% sodium chloride solution v/v distilled water for 24 hours at 60^0C and then tested for Marshall stability Values. The percentage loss or retention of stability values after immersion is expressed in terms of percentage of the original values.

(b) Filler for DAC/SDAC shall be cement OPC 43 grade.

(c) The item for Dense Asphaltic Concrete of Schedule "A" is based on 6% binder content of total mix by weight. In case the mix design is with more kilogram of binder then nothing extra is paid, however if bitumen required as per job mix is less than **6% then variation shall be required with minus price adjustment @ Rs 50 per Kg of bitumen**.

PARTICULAR SPECIFICATIONS

43.6 JOB MIX FORMULA

The tender shall submit their Job-mix formula to the Asst Garrison Engineer within 30 days of the acceptance of contract from the Command Test Lab (CTL). If Testing not available at CTL (non-availability certificate mandatory from CTL); then only; the tenderer will get Job-mix formula approved from CRRI New Delhi / IIT/NIT/Govt Engg College. Design mix (job mix formulae) **shall be approved from the Accepting Officer before commencement of Dense Asphaltic Concrete Work**. For any change in source of supply of aggregate, fresh mix design shall be got done and testing charges shall be borne by the contractor.

43.7 BITUMEN CONTENT

The binder content shall be optimized to achieve the requirements of the mixture set out in the table above.

43.8 PLANT TRIAL

Plant trial shall be carried out to establish that the plant can produce uniform mix conforming to the Job Mix Formula. The permissible variation of the various ingredients in the actual mix from the Job Mix Formula shall be within the limits as given in following table: -

Description / Aggregate Passing	Permissible Variation
19 mm of larger	± 7%
13.2 mm / 9.5 mm	± 6%
4.75 mm	± 5%
2.36 mm, 1.18 mm, 0.6 mm	± 4%
0.3 mm, 0.15 mm	± 3%
0.075 mm	± 1.5%
Binder Content	± 0.3%
Mixing Temperature	± 10° C

44. CONSTRUCTION OPERATION FOR ROAD WORK (GENERAL)

44.1 WEATHER AND SEASONAL LIMITATION

Laying shall be suspended:-

(a) In presence of standing water on the surface.
(b) When rain is imminent, and during rains, fog or dust storm.
(c) When base binder course is damp.
(d) When the air temperature on the surface on which it is to be laid is less than 10° C for mixes with conventional and is less than 15°C for mixes with modified bitumen.
(e) When the wind speed at any temperature exceeds the 40 Km per hour at 2 m height.

44.2 PREPARATION OF BASE

The surface shall be thoroughly swept clean by mechanical broom and dust removed by compressed air. In locations where a mechanical broom cannot access, other approved methods shall be used as directed by the GE.

PARTICULAR SPECIFICATIONS

44.3 PREPARATION AND TRANSPORTATION OF MIX

(a) The temperature of binder at the time of mixing shall be in the range of 150 degrees Celsius to 165 degrees Celsius and of the aggregates in the range of 150 degrees Celsius to 170 degrees Celsius, provided that at no time, the difference in temperature between the aggregates and binder shall exceed 14 degrees Celsius. The mixing shall be thorough to ensure that a homogeneous mixture is obtained in which all particles of the mineral aggregates are coated uniformly and temperature of mix shall not exceed 165 degrees Celsius.

(b) Hot mix plant shall be used for mixing of aggregate and the binder. The binder shall be heated to the specified temperature. The aggregate shall be suitably warmed or heated before loading into hot mix plant. The correct quantity of each size of aggregate shall be fed into mixer with specified quantity of binder. Each batch shall be mixed to ensure thorough coating.

(c) The mix shall be transported from the mixing plant to the point of use in suitable tipper vehicles. The vehicles employed for transport shall be clean and may be covered using suitable covers in transit to ensure that the temperature of mix does not fall below 125 degrees Celsius at the time of laying.

44.4 SPREADING OF MIX

(a) Except in areas where paver cannot access, bituminous material shall be spread, levelled and tamped by self-propelled hydrostatic paver finisher preferably with sensor. As soon as possible after at arrival site the material shall be supplied continuously to the paver and laid without delay. The rate of delivery of material to the paver shall be regulated to enable the paver to operate continuously. The travel rate of paver and method of operation shall be adjusted to ensure even and uniform flow bituminous material across the screed, free from dragging, tearing and segregation.

(b) Restricted areas (such as confined space, footways, irregular shape and varying thickness, approaches to expansion joints etc.) where paver cannot be used, the material shall be spread, raked and levelled with suitable hand tool by trained staff.

44.5 ROLLING AND COMPACTION

(a) Compaction shall commence as soon as possible after laying and shall be completed before the temperature fall below 90^{o} C. Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this rolling shall commence at the edge and progress towards the centre longitudinally except at sections with unidirectional camber, where it shall progress from lower edge parallel to centre line of the pavement.

(b) All deficiencies in the surface after laying shall be made good by the attendant behind the paver, before initial rolling is commenced. The initial or breakdown rolling shall be done with the 8 to 12 tonnes dead weight or vibratory steel wheel roller. The intermediate rolling shall be done with 8 to 12 tonnes dead weight or vibratory steel wheel roller or with a pneumatic roller of 12 to 15 tonnes, with a tyre pressure of at least 0.56 MPa. The finished rolling shall be done with 6 to 8 tonnes smooth wheel roller. Rolling shall continue till all the roller marks are removed from the surface and the minimum specified field density is achieved.

PARTICULAR SPECIFICATIONS

44.5 **ROLLING AND COMPACTION(Contd..)**

(c) The dense graded bituminous mixes shall be rolled in the longitudinal directions, with the roller as close as possible to the paver. The overlap on successive passes should be at least one third of the width of the rear roll or in the case of pneumatic wheeled rollers, at least the nominal width of 300 mm. The roller should move at a speed of not more than 5 Km/hour. The roller shall not be permitted to stand on pavement, which has not been fully compacted. All precautions shall be taken to prevent dropping of oil, grease, petrol or other foreign material on the pavement. The wheel of the roller shall be keep moist with the water or spray system provided with the machine to prevent the mixture from adhering to the wheels. Minimum moisture to prevent adhesion between wheels and the mixture shall be used and surplus water shall not be allowed to stand on the partially completed pavement.

(d) The density of finished paving layer shall be determined by taking 150 mm diameter cores. The density of finished paving layer shall not be less than 92% of the average (sample size N=2) theoretical maximum specific gravity of the loose mix (Gmm) obtained on that day in accordance with ASTM D 2041.

44.6 **FINISHED SURFACE**

The compacted surfaces shall be uniform and conform to the lines, grades and typical cross sections indicated on the plans and shall present a satisfactory surface. When tested with a template and straight edge, the finished surface shall show no variation greater than 6 mm over 3 metre length in longitudinal and cross profile where surface irregularity falls outside this tolerance, the same shall be rectified by Contractor at his own expense by adding fresh material over a suitable tack coat, if needed and re-compacted to specifications. Where the surface is high full depth of layer shall be removed & replaced with fresh material and compacted to specifications.

44.7 **JOINTS**

Where joints are made, the materials shall be fully compacted and the joint made flush in one of the following ways:-

(a) All joints shall be cut vertical to full thickness of the previously laid mix. All loosened material shall be discarded and the vertical face be coated with any viscosity grade bitumen or cold applied emulsified bitumen. While spreading the material along the joint the material spread shall overlap 25 mm to 50 mm on the previously laid mix beyond the vertical face of the joint. The thickness of the loose overlap material should be approximately a quarter more than the final compacted thickness. The overlapped mix should be dragged back to the hot lane so that the roller can press the small excess into the hot side of the joint to obtain a high density.

(b) By using two or more pavers operating in echelon, where this is practicable, and in sufficient proximity for adjacent widths to be fully compacted by continuous rolling. All joints shall be offset at least 300 mm from parallel joints in the layer beneath or as directed, and in a layout approved by the Asstt Garrison Engineer, joints in the wearing course shall coincide with either the lane edge or the lane marking, whichever is appropriate. Longitudinal joints shall not be situated in the wheel track zones.

PARTICULAR SPECIFICATIONS

45. **AUTOMATIC HOT MIX PLANT** Automatic Hot mix plant of shall be of suitable output and capable of producing a proper and uniform quality mix shall be used for preparation of the mix. The plant will have separate load cells to accurately weigh and feed different type of aggregates and a separate load cell for weighing bitumen. The plant will be of batch type. The plant shall have coordinated set of essential units such as a dryer for heating the aggregates, device for batching, feeding by weight the required control unit for ensuring that the correct quantity of heated binder is fed into the mechanical mixer for thorough mixing of the binder and aggregates. For small quantity continuous drum mixing plant may be used with approval of GE. The plant shall have coordinated set of essential units capable of producing uniform mix as per the Job Mix formula such as:

(a) Cold aggregate feed system for providing blended aggregates in correct proportions at least 4 bin system shall be deployed.

(b) The rotating drum shall be fitted with suitable burners capable of heating the aggregates to the required temperature without any visible un burnt fuel or carbon residue on the aggregate.

(c) The dryer part shall be fitted with thermometric instruments so as to indicate/ Automatically record the temperature of heated aggregates before mixing with the binder.

(d) The three bin aggregates feed system shall have variable speed belt conveyors, (Load cells or other suitable devices) for regulating the accurate proportioning of aggregates into an even flow automatically from a central control cabin.

(e) Bitumen control unit of the system shall be capable of measuring/metering and spraying required quantity of bitumen at specified temperature with synchronization of bitumen and aggregates feed.

(f) Filler system suitable to receive bagged or bulk supply of filler material and its incorporation in the mix in correct quantity, which could be controlled from central control unit.

(g) Dust control unit shall be part of the plant.

(h) Suitable auxiliary bitumen boiler of adequate capacity with self-heating arrangement and temperature control device.

46. **HOT APPLIED THERMOPLASTIC ROAD MARKING**

46.1 **MATERIAL**

(a) The thermoplastic material shall be homogenously composed of aggregate, pigment, resins and glass reflector zing beads.

(b) The pigment, beads and aggregate shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with requirements indicated in Table below.

PARTICULAR SPECIFICATIONS

HOT APPLIED THERMOPLASTIC ROAD MARKING (Contd...)

TABLE
PROPORTIONS OF CONSTITUENTS OF MARKING MATERIAL (Percentage by weight)

S.No	COMPONENT	WHITE	YELLOW
(i)	Binder	18.0 min.	18.0 min.
(ii)	Glass Beads	30-40	30-40
(iii)	Titanium Dioxide	10 mins	-
(iv)	Calcium Carbonate and Inert Fillers	42.0 max	Sec
(v)	Yellow Pigments	-	Note

(c) The properties of thermoplastic material shall be as per ASTM D36/BS-3 262 (Part).

(d) Thermoplastic paint shall be not older than 01 year from the date of manufacturing.

(e) The thermoplastic material shall be sampled and tested in accordance with the appropriate ASTM / BS method.

(f) The contractor shall furnish to the Employer a copy of certified test reports from the manufacturers of the thermoplastic material showing results of all tests specified here in and shall certify that the material meets all requirements of this specification.

(g) Reflectorising glass beads shall be of type I. The glass beads shall meet the gradation requirements as specified in MORTH clause 803.

(h) Properties: The properties of thermoplastic material, when tested in accordance with ASTM D36/BS-3262- (Part I), shall be as below:

(i) **Luminance**
(aa) White: Daylight luminance at 45 degrees-65 per cent min. as per AASHTO M249.
(ab) Yellow: Daylight luminance at 45 degrees-45 per cent mm. as per AASHTO M249.

(ii) **Drying Time** When applied at a temperature specified by the manufacturer and to the required thickness, the material shall set to bear traffic in not more than 15 minutes.

(iii) **Skid Resistance** Not less than 45 as per BS 6044.

(iv) **Cracking Resistance at Low Temperature** The material shall show no cracks on application to concrete blocks.

(v) **Softening Point** 102.5 t 9.5o C as per ASTM D 36.

(vi) **Flow Resistance** Not more than 25 per cent as per AASHTO M 249.

(vii) **Yellowness Index** (for white thermoplastic paint): not more than 0.12 as per AASHTO M 249.

PARTICULAR SPECIFICATIONS

46.2 **WORKMANSHIP**: The thermoplastic compound shall be extruding on to the pavement surface application of glass beads at a specific rate. Upon cooling to ambient pavement temperature, it shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation by traffic. The colour of the compound shall be white or yellow (IS colour No.556) as specified in the drawings or as directed by the Engineer in charge. Where the compound is to be applied to cement concrete pavement, a sealing primer as recommended by the manufacturer, shall be applied to the pavement in advance of placing of the stripes to ensure proper bonding of the compound. On new concrete surface any laitance and / or curing compound shall be removed before the markings are applied. The cost of primer shall be deemed included in the unit rate quoted by the contractor.

46.3 The material shall be melted in accordance with the manufacturer's instructions in a healer filled with a mechanical stirrer to give a smooth consistency to the thermoplastic material to avoid local overheating. The temperature of the mass shall be within the range specified by the manufacturer, and shall on no account be allowed to exceed the maximum temperature stated by the manufacturer. The molten material should be issued as expeditiously as possible and for thermoplastic material which has natural binders or is otherwise sensitive to prolonged heating, the material shall not be maintained in a molten condition for more than 4 hours. After transfer to the laying equipment, the material shall be maintained within the temperature range specified by the manufacture for achieving the desired consistency for laying.

46.4 The stripe shall not be slippery when wet. The marking shall not lift from the pavement in freezing weather. After application and proper drying, the stripe shall show no appreciable deformation or discoloration under traffic and under road temperatures upto 60 C. The marking shall not deteriorate by contact with sodium chloride, calcium chloride or oil drippings from traffic. The stripe or marking shall maintain its original dimensions and position. Cold ductility of the material shall be such as to permit normal movement with the road surface without chopping or cracking. The colour of yellow marking shall conform 10 IS colour No.356 as given in IS : 164.

47. **PAINTING**

(a) **PAINTS**

(i) **PINK PRIMER** It shall conform to IS-3536.
(ii) **RED OXIDE ZINC CHROME PRIMER** It shall conform to IS-2074.
(iii) **SYNTHETIC ENAMEL PAINT** It shall conform to IS-2932 (2003).
(iv) **COAL TAR** It shall conform to IS-212.
(v) **COAL TAR BLACK PAINT** It shall conform to IS-290, type 'A'. Any other paints if required to be used shall conform to the relevant ISs mentioned in Para 17.1 of MES Schedule Part-I.
(vi) **ACRYLIC WEATHER PROOF PAINT** Acrylic weather proof paint after preparation of surfaces all as specified in para 15.21 of MES schedule Part I.

(b) **GENERAL REQUIREMENTS**

(i) Refer para 17.2 and 17.3 of MES Schedule Part-I.
(ii) The contractor shall inform the AGE within two weeks of the date of acceptance of tender the brands/names of paints and order in bulk for purchase of the paints shall be placed by the contractor only after getting the samples of paints approved by the GE. The invoices will be duly defaced and recorded in the MB "NOT TO BE ABSTRACTED".

(iii) **Paints for primer coat, under coat and finishing coat shall be from the same manufacturer.**

(iv) All painting as far as possible shall be carried out in dry weather and neatly cut at all edges. Other surfaces shall be protected and cleaned off as required.

PARTICULAR SPECIFICATIONS

PAINTING (Contd...)

(v) Paints shall be purchased by the contractor direct from the manufacturers or from their authorised dealers/agents/stockists. Receipted bills/purchase vouchers for paints shall be produced by the contractor to the Engineer-in-Charge and these receipted bills/purchase vouchers shall be kept on MES record duly verified and defaced by the Engineer-in-Charge giving reference to contract number and year. The entire quantity of paints and other proprietary branded materials, as and when brought at site of work shall be entered in the measurement book giving reference of the manufacturer, dealer, agents, stockists etc., as applicable with details of the receipted bills/purchase vouchers, for record purpose only under the heading "**NOT TO BE ABSTRACTED**" and shall be signed by the Engineer-in- Charge and contractor.

(vi) All wooden or steel and iron surfaces in contact with concrete/brick work shall be treated with two coats of coal tar or coal tar black paint. Hold fasts shall however be tarred and sanded. The quoted rates for tarring (treating with tar or coal tar black paint) under respective items of Schedule 'A' shall be inclusive of this element.

(vii) The contractor shall when required by the AGE produce certificate from the manufactures or their representatives to establish that the brands of paints produced by the contractor from them satisfy the requirement of the relevant IS or are superior to the quality specified in the relevant IS. Paints for primer coat, under coat and finishing coat shall be from the same manufacturer.

(viii) Surface of wood work and iron/steel work/MS pipe shall be prepared for painting as specified in the MES schedule part-I before painting.

(ix) The contractor shall re-do the painting coat at his own expense if under coat is **applied after more than 6 months of the application of priming coat**.

(x) Bottom surface of door shutter shall be treated with priming coat only.

48. **PRECAST CONCRETE KERBS**

48.1 **MATERIALS**

(a) **Cement** - The cement used shall be Ordinary and low heat Portland Cement conforming to IS: 269-39767. The Contractor will submit the manufacturers invoice and the same will be verified by the GE.

(b) **Aggregates** – The use of aggregates will conform to IS: 383 – 1970. The aggregate crushing aggregate impact value and aggregate abrasion value shall not exceed the corresponding requirements laid down in IS : 383-1970tt for concrete for wearing surfaces. The aggregate impact test shall be done only as an alternative test to aggregate crushing test.

(c) **Concrete** - The concrete shall be of of M 25 grade as specified in the Schedule 'A', with the strength requirements specified in IS : 456-1978*. Air-entrained concrete may also be used for freezing and thawing conditions.

48.2 **LAYING:** The laying of the Kerb Stones will be carried out as per direction given in MES SSR Part – I para 20.A.33.1. The grade of concrete shall not be less than M25. **Kerb Stones shall be tested in Command Test Lab (CTL) for grade of concrete and test certificate shall be produced by the contractor before incorporation in the work. AGE to ensure compliance of the same before work commences**.

PARTICULAR SPECIFICATIONS

49. INTER LOCKING CEMENT CONCRETE PAVER BLOCKS

49.1. Laying, jointing and finishing of tile work shall be carried out as specified in SSR Part-I and as described in particular item of Schedule 'A'.

49.2 The material property shall be as specified in IS.

49.3 The contractor shall submit the original purchase vouchers from the manufacturer for the total quantity of tiles supplied under each consignment to be incorporated in the work along with manufacturer's test certificate in original with test sheet giving the result of each test as applicable. The original vouchers and test certificates produced by the contractor shall be defaced by the engineer in charge and kept on the record. The Engineer in charge / AGE shall also organize independent testing of random samples of interlocking tiles drawn from various lots from a National Test House, Government Research Labs, Zonal labs, IIT Kanpur. The cost of sample and testing charges shall be borne by the contractor.

49.4 The precast concrete blocks shall be M-40 grade and 80 mm thick confirming to IS-15658 : 2006 laid as per schedule 'A' and as directed at site. The shape of the paving block shall be as decided by AGE and quantity of pigment shall be restricted to a maximum of 9% by weight of cement. All paver blocks shall be sound and free of cracks or other visual defects which will interfere with the proper paving of the unit or impair the strength or performance of the pavement constructed with paver blocks.

49.5 The acceptance criteria for the paving blocks shall be as per clause 9.1 of IS 15658-2006 and sampling and testing shall be carried out as per the provisions given in IS. The texture of the paving blocks shall be as finalized by GE. The concrete paver blocks shall be marked with identification of the manufacture, grade of blocks and date of manufacturing.

50. **PVC (SWR) PIPES** Laying, jointing, installation and testing to be carried out as per para 18.67.7A of MES SSR Part-I. The Pipes should conform to ASTM D1785 Standard Specifications. Purchase Invoice duly defaced and recorded in MB "**NOT TO BE ABSTRACTED**".

51. MISCELLANEOUS

50.1 The site will be handed over in parts as decided by the AGE so that there is no hindrance in plying of traffic.

50.2 The Contractor shall undertake all reasonable precautions for the protection from injury or damage and the preservation of any or all existing road site poles, trees, drains, sewers or other sub- surfaces drains, pipes, cables, and kerb etc. However, if any of these objects is damaged by the reasons of Contractor negligence it shall be replaced or restored to the original condition at his expense.

50.3 The contractor shall carry out works on the road in a manner creating least interference to the flow of the traffic. The contractor shall take all necessary measures for the safety of the traffic during construction and provide effect and maintain such barricades, including sign marks, flags, lights and flagmen as may be required by the AGE for the information and protection of traffic approaching and passing through the section of the road under improvement.

50.4 That well in advance, before starting the bituminous work, contractor will have to arrange for 30cm x 30cm x 30cm box for measuring the aggregate of premixed carpet and bituminous macadam. These aggregates will be weighed and a relation between volume and weight of the aggregate will be arrived at within the presence of the representative of the contractor. So that, the percentage of bituminous by weight can be arrived at for bituminous macadam and premixed carpet.

PARTICULAR SPECIFICATIONS (Contd….)

MISCELLANEOUS(Contd...)

50.5 Contractor will also supply at the site bituminous extractor apparatuses for verification of bituminous content at the site. Bituminous, Solvent, Benzene etc will also be provided by the contractor without any extra cost.

51. **All the codes of Practices/IS Codes/BIS Codes/Standards and specifications shall be of latest edition along with up to date correction with correction slip, revision, amendment and errata if any shall be followed**. List of IS codes is given at Appendix 'D'.

52. **SITE CLEARANCE & EARTHWORK**

The work shall be carried out all as specified in Sch 'A'. Specifications and workmanship shall be as mentioned in section 3 of MES SSR Part-I. All the demolished material / excavated soil are required to remove from site without dumping at the place to create hindrance in working condition. All demolished material / excavated soil/ rubbish shall be removed day by day basis without dumping of material at site.

53. **FLIGHT SAFETY MEASURES**

53.1 **POSITIONING OF MACHINERY & EQUIPMENT**

Machinery and equipment shall be positioned at least 500 feet away from the centre line of runway which is in use (away from cleared zones), on either side while the work is in progress on the other runway.

53.2 **ENTRY &EXIT**

The entry and exit to the airfield for the contractor and his labour and machinery and equipment shall be through the pre designated routes only. This route shall be briefed to the contractor by the department before commencement of work.

54. **CROSSING OF RUNWAY**

Crossing of runway and TTs, which is in use by aircraft at any time is "strictly prohibited".

55. **FOD(FOREIGN OBJECT DEBRIS)**

(a) No loose material shall be thrown around the manoeuvring area/TT/runway, which is in use.

(b) The contractor shall remove all loose material / wooden twigs or any other material from the resurfaced portion of the runway after completion of work.

56. **OPENING TO TRAFFIC**

Traffic may be allowed immediately after completion of the final rolling when the mix has cooled down to the ambient temperature.

57. **USE OF HELIPAD / ROAD SITE**

Under any circumstances the site shall not be used for transportation of materials except for movement of tippers, sprayers, pavers etc., which are required in connection with the execution of the work. However during the progress of work on the helipad site, the contractor has to construct suitable temporary screen barricades preferably made of galvanised iron sheets duly painted on both side of intersections of helipad site to avoid any untoward accident.

PARTICULAR SPECIFICATIONS

58. **DISMANTLING/DEMOLITION/TAKING DOWN**

(a) The contractor shall identify the items which are to be dismantled/demolished before commencing the work at site as per the directions of the Engineer-in-Charge and before dismantling prior intimation shall be given to Engineer-in-Charge to enable him to measure jointly to avoid dispute at later date. Contractor shall not commence dismantling/demolition work without the prior permission of Engineer-in-Charge.

(b) The contractor shall take all safety precaution to safe guard his labours, men & materials around the building. Contractor shall also take suitable precaution for not to damage the existing structure while demolishing/dismantling the items. The contractor shall replace and make good the structure if any damaged during execution without any extra cost to department and contract will not have any claim on this account.

(c) Any salvaged materials which are not covered under schedule of credit shall become property of Govt and the same shall be returned to MES store yard without any extra cost.

(d) All demolished and disposal materials which is not in reusable condition, as mentioned in Sch 'A' shall be removed, all as directed by the Engineer-in-Charge. Rubbish shall be cleared away the site from time to time as directed.

59. **COMPLETION**

The contractor on completion of work shall clean the entire site of work by removing the surplus materials, debris or any other rubbish etc., stagnated during the period of contract and ensure that the whole premises is clean and tidy to the entire satisfaction of Engr-in-Charge, before handing over the site to MES.

60. **DEFECT LIABILITY PERIOD**

60.1 The works executed under this contract shall be under defect liability for **03 (Three) years** after completion of entire work. Contractor is fully liable under to replace/rectify all defective work intimated to him during this period. In case contractor fails to rectify/replace the defective work. AGE(I) shall get the replacement /rectification as necessary at the risk and cost of contractor and recover the cost in full from the contractor.

60.2 If the contractor consider that any additional treatment is required over and above that specified here in before, the same shall be carried out by the contractor without any extra cost to the Government. During the period if any portion of helipad/road sinks or damaged due to stagnation of water, the contractor shall rectify or replace defective work/material at his own expenses, when called upon in writing to do so by the GE.

61. **APPENDICES TO PARTICULAR SPECIFICATIONS**

The following Appendices to Particular Specifications shall be referred for the purpose as indicated against each:-

(a) Appendix 'A' : Cement Supply/Acceptance Register.
(b) Appendix 'B' : Source of Materials.
(c) Appendix 'C' : Makes/ Brand of Important Material.
(d) Appendix 'D' : Steel Supply & Acceptance Register.
(e) Appendix 'E' : IS Code/ IRC No of Materials.

62. **LIST OF DRAWINGS**

(a) Site Plan showing proposed helipad site. Sheet 02 Nos.
(b) Drg No CE/ALD/TD-252-ST. Sheet 1/1.
(c) Trg Helipad – Drg No CE/ALD/1098-ST. Sheet 1/1 dt 11 Nov 2021.
(d) Road – Drg No CE/ALD/1099-ST. Sheet 1/1 dt 11 Nov 2021.
(c) Drainage – Drg No CE/ALD/TD/130. Sheet 1/1 dt 04 Aug 2003.

PARTICULAR SPECIFICATIONS

63. **QUALITY CONTROL PLAN**

(To be submitted by contractor within 30 days of commencement of contract)
PART- I

1.	Contract Agreement Reference No					
2.	CPM Network prepared and approved by AGE(I)					
3.	Resource scheduling done base on CPM					
4.	Site Laboratory (with equipments) set up as per Contract Agreement (CA)					
5.	Concrete mix design submitted and approved.					
6.	Preliminary works completed to standard engineering practice					
7.	Arrangements for water made (including testing of water).					
8.	Arrangement for electric supply made					
9.	Materials					
Sl No	Item	Source as per CA	Contractor's plan of Sourcing	Refer to testing clause	Agency for testing	Responsibility for testing
10.	List of all T & P, make and numbers that the contractor would deploy at site of work.					
11.	Name of person nominated by contractor for exercising quality control.					
12.	Qualifications / Experience of person at Serial No. 11 above.					
13.	Names of supervisors with their qualifications /experience employed by contractor.					
14.	Confirmation that contract requirements relating to quality of all materials and quality standards of workmanship and finishes and acceptance criteria are explained and understood by all.					
15.	Confirmation that requirement of tests to be conducted on materials before approval of samples and during execution, tests on workmanship, tests before acceptance including the testing procedure, sampling techniques, frequency and agencies responsible for testing are understood and shall be complied with.					
16.	Method to be adopted for maintaining records of test result.					
17.	Certificate that contractor shall maintain a log of all materials received at site as per the following format :-					
Sl No	Date	Material	Quantity received	Source	Whether as per approved sample or not	Test carried out by supplier	Tests to be carried out before incorporation
18.	General Remarks by contractor of his plan of actions to ensure that quality standards.					

PARTICULAR SPECIFICATIONS

PART-II
(To be completed by AGE(I) before forwarding for approval by CWE)

1.	Verification of Serial No 2 to 8 of Part I.	
2.	Verification of Serial No 9 to 18 of Part I.	
3.	Confirmation that Stage Passing Register laying down the stages and authority responsible for approving the same has been prepared, shown to contractor and kept at site.	
4.	Confirmation that all sites as required by contract had been handed over to contractor on the date fixed in the Work Order No 01.	
5.	Confirmation that arrangements for Govt liability in supply of water electricity have been made and no holdup on this account is expected.	

Signature of Contractor (Signature of AGE(I))

Date:

Approved by CWE

PARTICULAR SPECIFICATIONS
APPENDIX 'A' TO PARTICULAR SPECIFICATIONS
CEMENT SUPPLY & ACCEPTANCE REGISTER

1. CA No & Name of work :

2. Control No* :

3. Name of manufacturer/Brand Name / Gde of cement (a) Manufacture _____ (b) Brand _____ (c) Grade_____

4. Qty of cement & Lt No/week No (in bags) (a) Qty_____ (b) Lot No / week No_____

5. Manufacturer's test certificate No_____

6. Random test details (a) Physical test report from _____ vide letter No _____ (Name of approval lab/Engg college)
   (b) Chemical test report from _____ vide letter No _____ (Name of approval lab/Engg college)

7. Details of physical chemical properties:

	Physical requirement (As per IS 4031)										Chemical requirement (As per IS 4032)							
	Specific surface area (M2/Kg)	Soundness by Le chatellar	Soundness by auto clave	Initial setting time (minutes)	Final time (minutes	Compressive strengths (Mpa) 03 days	07 days	28 days	Temp during testing ^{0}C	Standard consistency (%)	Lime saturation factor (Ratio)	Aclumina iron Ratio (Ratio)	Insoluble Residue (%)	Magnesium (%)	Sulphuric Anhydride (%)	Loss on Ignition (%)	Alkalles (%)	Chlorides (%)
As per relevant IS																		
As per manufacturer test certificate																		
As per Random test certificate																		

Remarks with signature:

Contractor Junior Engineer Engineer-in-Charge Asst Garrison Engineer

Accepted /Rejected

Remarks of BOO/Inspecting Officer /CE / CWE

* To be allotted serially by AGE(I) consignment

APPENDIX 'B'

PARTICULAR SPECIFICATIONS
APPENDIX 'B' TO PARTICULAR SPECIFICATIONS
SOURCE OF MATERIALS

Ser No	Description of Material	Sources of Materials
1	*2*	*3*
(a)	Bricks	Best Material Locally available confirming to IS / BIS.
(b)	Coarse stone aggregate for road work	
(c)	Coarse stone aggregate for road work	
(d)	Crushed Stone aggregate conforming IS 383 for PQC/RCC/PCC/DLC	
(e)	Aggregates conforming to IS 383 for WBM/ Soling	
(f)	Fine aggregate sand for RCC/PCC/PQC/DLC/Brick Work	

SIGNATURE OF CONTRACTOR **FOR ACCEPTING OFFICER**

PARTICULAR SPECIFICATIONS
APPENDIX 'C' TO PARTICULAR SPECIFICATIONS
(LIST OF MAKES/MANUFACTURERS OF IMPORTANT MATERIAL TO BE INCORPORATED IN THE WORK)

S. NO	ITEM	NAME OF MANUFACTURERS / BRAND NAME
1.	Polyurethane Joints Sealant (Double Component and Primer)	(i)M/s Choksey Chemicals Pvt Ltd(ii) M/s Fosroc Chemicals (iii)M/s cipy Polyurethanes Pvt Ltd(iv)M/s STP Ltd (v)M/s Supreme Bituchem India Pvt Ltd(vi)M/s Sika India Pvt Ltd (vii)M/s Maruti Bitumen Pvt Ltd (viii) M/s Bostik India Pvt Ltd.
2.	Backup rod/ de-bonding tape	(i) M/s Supreme Industries(ii)M/s Elcon Products Mumbai
3.	Premoulded Joint filler (as per IS-1838 Pt-III)	(i) M/s Supreme Industries(ii)M/s STP Ltd (iii) Tikitar Industries Ltd (iv) Capital Steel & Chemicals (v) M/s Garlick & Co Pvt Ltd
4.	Polymer modified Bitumen	(i) M/s Ooms Polymer Modified Bitumen (ii)M/s Hincol (Hindustan Colas Limited) (iii) STYRELF IndianOil Total Pvt Ltd. (iv) SHELL CARIPHALTE M/s Tiki Tar and Shell India Pvt Ltd.
5.	Polymer Bitumen Emulsion	(i) EMULCOTE M/s LN Petro Chem Pvt Ltd (ii) M/s Ooms Polymer Modified Bitumen Pvt Ltd (iii) HINMAT PLUS M/s Hindustan Colas Pvt Ltd.
6.	Glass Grid / Fibre glass	(i) M/s Saint Gobain Adfors India – Glass Grid (ii) GTF Glass Geogrid - M/s Giridhar Tech Fab Pvt Ltd (iii) MacGrid AR 10A.7 - M/s Maccaferri Environmental Solutions Pvt Ltd New Delhi
7.	Admixtures & curing compound	(i) M/s STP Limited New Delhi (ii) M/s BASF Ltd (iii) M/s SCICO Technologies (iv)M/s Pidilite Industries Ltd (v) M/s Sika India Pvt Ltd, New Delhi (vi) M/s Thermax Ltd
8.	GI Pipe	(i) Tata (ii) Swastic (iii) Jindal(iv) Prakash(v) Zeneith
9.	Polythene Sheet 400 micron	(i) M/S Mono Industries New Delhi, (ii) M/S Climax Synthetics Pvt. Ltd, Vadodra
10.	Epoxy Mortar	(i) Choksey chemicals (ii) STP, (iii) BASF (iv) CIPY (v) Bostic (vi) M/S Xypex (vii) M/S Sika India Pvt Ltd, New Delhi. (viii) M/s Thermax Ltd
11.	Bitumen	Hindustan Petroleum/Bharat Petroleum/Indian Oil
12.	SyntheticEnamel Paint	Berger (Luxol One coat Enamel , Luxol Enamel, Asian (Apcolite Super, Premium Gloss Enamel,), Asian (Apcolite Super, Premium Gloss Enamel, Akzo, Nobel (Dulux Super Gloss 5 in one, Dulux Gloss)
13.	Construction Chemicals viz., Joint sealant / Waterproofing products/Concrete surface improvements/Epoxy PU flooring	(i) M/s Choksey Chemicals Pvt. Ltd. (ii) M/s Thermax Ltd. (iii) M/s Sika India Pvt Ltd.(iv) M/s Bostik India Pvt Ltd. (v) M/s Fosroc Chemicals. (vi) M/s STP Limited. (vii) M/s Maruti Bitumen Pvt Ltd.(viii) M/s Hindcon Chemicals Ltd
14.	Concrete Surface Improvement	(i) M/s Sika India Pvt Ltd (ii) M/s Fosroc Chemicals (iii) M/s Hindcon Chemicals Ltd
15.	Admixtures	(i) M/s Sika India Pvt Ltd (ii) M/s Fosroc Chemicals (iii) M/s STP limited (iv) M/s Choksey Chemicals Pvt Ltd (v) M.s Maruti Bitumen Pvt Ltd. (vi) M/s Thermax Ltd.

PARTICULAR SPECIFICATIONS
APPENDIX 'C' TO PARTICULAR SPECIFICATIONS
(LIST OF MAKES/MANUFACTURERS OF IMPORTANT MATERIAL TO BE INCORPORATED IN THE WORK)

16.	APP Membrane	(i) M/s Sika India Pvt Ltd (ii) M/s Fosroc Chemicals (iii) M/s STP Ltd (iv) M/s IWL India Ltd (v) M/s Asian Paint Ltd (vi) M/s Torchtar Membranes & Bitumen Product Pvt Ltd (vii) M/s Tiki Tar Danosa (India) Pvt Ltd. (viii) M/s Shivam Tar Products (ix) M/s Bengal Bitumen.
17.	Pothole Repair	(i) M/s Fosroc Chemicals (ii) M/s STP limited (iii) M/s Choksey Chemicals
18.	Thermoplastic Road Marking Paint	(a) ICI Paint (Dulux Gloss) (b) Asian Paint (Apcolite) (c) Shalimar paint (Superlac Hi Gloss) (d) Berger Paint (Luxol Hi gloss) (e) Nerolac Paint (Nerolac Full Gloss) (f) Jenson & Nicolson Paint Ltd (Borolac) (g) Goodlass Nerolac Paints (Nerolac)
19.	Mosaic / PCC Plain / Chequered Tiles / Inter Locking Paver Blocks	(a) NITCO Tiles Hyderabad/ Mumbai (b) Redsun Tiles and Pavers, Panchkula (c) Star Tiles & Industries Rama Devi Kanpur (d) Mayur Tiles & Interlocking Paver Lucknow (e) Bharat Tiles Bangalore (f) Basant Tiles Bangalore (g) Bombay Tiles (h) Mehatab Tiles Indore

NOTE:-

(a) Materials/items for which makes/brands have not been mentioned anywhere in tender document, same shall be as per E-in-C's/HQ CE CC approved list and of ISI Marked and be got approved by AGE(I) before incorporation in the work.

(b) The PS which are not covered in tender documents, shall be as per MES SSR Part-I / IRC.

SIGNATURE OF CONTRACTOR **FOR ACCEPTING OFFICER**
Dated_____

PARTICULAR SPECIFICATIONS

APPENDIX 'D' TO PARTICULAR SPECIFICATIONS
STEEL SUPPLY & ACCEPTANCE REGISTER

1. CA NO & Name of Work

2. Contract No

3. Name of Manufacturer's T.C. No

4. Manufacturer

5. Random Test Details

   (a) Physical test report from _____ vide their letter No _____
   (Name of approved Lab/Engg College)

   (b) Chemical test report from_____ vide their letter No_____
   (Name of approved Lab/Engg College)

6. Types of Steel, Dia & Qty (a) Type: TMT/CRS (b) Dia-____mm

   (c) Actual Wt___MT (d) Conversion Wt ____MT.

	Chemical Test						Mechanical Test						
	Carbon%	Sulphur%	Phosphorous %	Manganese %	Silicon %	Corrosion Resistant Element	Wt per meter	Stress(N/mm^2) 0.2% proof	Tensile Strength (N/mm^2)	Elongation % less than 18%	Bend Test	Rebend Test	Remarks
As per IS-1786													
As per manufacturer's test certificate													
As per independent test													

Remarks with Signature Accepted/Rejected

Contractor Junior Engineer Engineer-in-Charge Asst Garrison Engineer

Remarks of BOO/Inspecting Officer/CWE

APPENDIX 'E'

PARTICULAR SPECIFICATIONS
APPENDIX 'E' TO PARTICULAR SPECIFICATIONS
IS CODE/ IRC No OF MATERIALS

S. No.	IRC No.	Description
1.	IS: 383	Specifications for Course & Fine Aggregates for natural Sources for Concrete.
2.	IS: 432 Part I & Part II	Specifications for MS Medium Tensile Steel Bars and Hard Drawn Steel Wire for Concrete Reinforcement
3.	IS: 455	Portland Slag Cement (Revised)
4.	IS: 456	Code of Practice for Plain and Reinforced Cement.
5.	IS: 460	Test Sieves
6.	IS: 516	Method for Tests for Strength of Concrete Method of Sampling & Analysis of Concrete.
7.	IS:1199	Tests for Concrete
8.	IS: 1834	Hot Applied Sealing Compound for Joints in Concrete
9.	IS: 1838, Part I & Part II	Specification for preformed Filler for Expansion Joints
10.	IS: 2386, Part 1 to Part 8	Method of test for aggregate for concrete.
11.	IS 2430	Method of sampling for Aggregate
12.	IS : 2505	Concrete Vibrators – Immersion type.
13.	IS :2506	Concreter Vibrators – Screed board Type.
14.	IS: 2508	Low density polythene films
15.	IS: 2720, Part 1 to Part 41	Method of Tests for Soil.
16.	IS : 5892	Concrete Transit Mixes and Agitators.
17.	IS : 6509	Concrete Joints in Pavements.
18.	IS : 7245	Specifications for Concrete Pavers.
19.	IS : 7320	Concrete Slump Test
20.	IS: 7861 Part I and II	Concreting in extreme weather conditions.
21.	IS : 8142	Determining the Setting Time.
22.	IS: 8112	Specification for High Strength Ordinary Portland Cement.
23.	IS :9103	Concrete Admixture.
24.	IS : 9284	Abrasion Resistance of Concrete.
25.	IS : 9399	Apparatus for Flexural testing of Concrete.
26.	IS:1791 and IS :12119	Mixers (Bath type & Pen type)
27.	IS 13311_2	Non Destructive Tests for Concrete
28.	IS: 14687	Form work
29.	IS: 12269	Specification for High Strength Ordinary Portland Cement (53 Grade).

APPENDIX 'E'(Contd..)

PARTICULAR SPECIFICATIONS
APPENDIX 'E' TO PARTICULAR SPECIFICATIONS
IS CODE/ IRC No OF MATERIALS

S. No.	IRC No.	Description
30.	IS: 12330	Sulphate Resisting Portland Cement (If soluble salt like Sulphate in soil is more than 0.5%).
31.	IRC : 15 -2011	Standard Specifications and Code of Practice for Construction of Concrete Roads (Fourth Revision).
32.	IRC: 19 - 1977	Standard specifications and code of practice for water bound macadam.
33.	IRC: 29 of 1968	Tentative specification for 4 cms (1 asphaltic concrete Surface course).
34.	IRC : 43-1972	Recommended practice for Tools, Equipment Appliances F for Concreter Pavement Construction.
35.	IRC : 44-208	Guidelines for Cement Concrete Mix Design for Pavements (Second Revision).
36.	IRC : 57-2006	Recommended Practice for Sealing of joints in Concrete Pavements (First revision).
37.	IRC : 58-2002	Guidelines for the Design of Plain Joints Rigid Pavements for Highways (Second Revision).
38.	IRC : 60-1976	Tentative Guidelines for the Use of Lime –Fly Ash Concrete as a Pavement Base or sub- Base.
39.	IRC : 74-1979	Tentative Guidelines for lean – Cement Concrete and lean- Fly Ash Concrete as a Pavement Base or sub-Base.
40.	IRC : 76-1979	Tentative Guidelines for Structural Strength Evaluation of rigid Airfield.
41.	IRC : 84 -1983	Code of Practice for Curing of Cement Concrete Pavement.
42.	IRC : 85 -1983	Recommended Practice for Accelerated Strength Testing & Evaluation of Concrete for Road and Airfield Constructions.
43.	IRC : 91 -1985	Tentative Guidelines for Construction of Cement Concrete Pavements in Cold Weather.

APPENDIX 'E'(Contd..)

PARTICULAR SPECIFICATIONS
APPENDIX 'E' TO PARTICULAR SPECIFICATIONS
IS CODE/ IRC No OF MATERIALS

S. No.	IRC No.	Description
44.	IRC : 101-1988	Guidelines for Design of Continuously Reinforced Concrete Pavement with Elastic Joints.
45.	IRC : SP : 17 -1977	Recommendations about Overlays on Cement Concrete Pavements.
46.	IRC : SP : 46 -1997	Steel Fibre Reinforced Concrete for Pavements.
47.	IRC : SP : 49 -1998	Guidelines for the Use of Dry lean Concrete as Sub-Base for Rigid Pavement.
48.	IRC : SP : 61 -1976	Tentative Guidelines for the Construction of Cement Concrete Pavements in Hot Weather.
49.	IRC : SP : 68 -2005	Guidelines for Construction of Roller Compact Concrete Pavements.
50.	IRC Seminar, 2004	Seminar on " Design Construction and (Proceedings) Maintenance of Concrete Pavement", New Delhi 8-10 October, 2004
51.	IRC : SP : 83 -2008	Guidelines for Maintenance, Repairs & Rehabilitation of Cement Concrete Pavements.
52.	IRC : SP : 89 -2010	Guidelines for soil and Granular Martial Stabilization using Cement Lime & Fly Ash.
53.	MORTH Orange Book	Specification for Road Transport & Highway.
	Indian Standards/Publications	
54.	MORTH	SPECIFICATION FOR ROADS AND BRIDGE (2013 EDITION)
55.	IRC SP 53-2010	GUIDE LINES ON Use of PMB AND CRMB
56.	IRC SP : 79 – 2008	TENTATIVE SPECIFICATIONS FOR STONE MATRIX ASPHALT
57.	IRC: 111-2009	SPECIFICATIONS FOR DENSE GRADED BITUMINOUS MIXES
58.	IS 73-2013	SPECIFICTIONS FOR VISCOSITY GRADE PAVING BITUMINOUS MIXES
59.	IS 15462-2004	SPECIFICATIONS FOR MODIFIED BITUMEN
60.	IRC (37)-2013-	TENTATIVE GUIDELINES FOR THE DESIGN OF FLEXIBLE PAVEMENTS
	AASHTO STANDARDS	
61.	T-166 Bulk specific Gravity of compacted asphalt Mixtures Using saturated surface	Dry Specimens.

APPENDIX 'E'(Contd..)

PARTICULAR SPECIFICATIONS
APPENDIX 'E' TO PARTICULAR SPECIFICATIONS
IS CODE/ IRC No OF MATERIALS

S. No.	IRC No.	Description
62.	T 283	Resistance of compacted Bituminous Mixture to Moisture-Induced Damage.
	ASTM Standards	
63.	C-29	Bulk Density("Unit Weight") and voids in Aggregate.
64.	D 2041	Theoretical Maximum specific Gravity and Density of Bituminous Paving Mixtures
	Asphalt Institute Publications	
65.	MS2,	Mix Design methods for asphalt concrete and other hot- mix types(sixth edition)
	National Asphalt pavement association	
66.	Quality improvement series 122	Designing and constructing SMA Mixtures: sate-of-the-practice by Prithvi S. Kandhal, Mar 2002.
67.	Others	
68.	Kandhal, PS Bituminous Road Construction in India, New Delhi, 2016	
69.	ICA Manuals	
70.	IS: 8112	Ordinary Portland cement 43 Grade.
71.	IS: 12269	Specification for High Strength Ordinary Portland Cement 53 Grade.
72.	IS: 12330	Sulphate Resisting Portland cement. (If soluble salt like sulphate in soil is more than 0.5 per cent)
73.	IS: 1489 Pt-I	Portland Pozzolona Cement (Fly ash content not more than25 per cent by weight of OPC)
74.	Portland Pozzolona cement IS: 1489	(Flyash content not more than 25 percent by weight of PC)

Note: - (a) The items which are not included here in before shall be referred from SSR & website of the BSI.

(b) The IS codes listed above and to be referred from SSR & website of BSI shall be considered with latest amendments/revision up to the date of receipt of tender.

NOTE: - Items listed above shall be ISI marked whether specifically mentioned or not elsewhere.

Signature of Contractor

Dated_____ **For Accepting Officer**

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

1. A tender is invited for the work as mentioned in Appendix 'A' to this **NOTICE INVITING TENDER (NIT).**

2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate, however, is not a guarantee and is merely given as a rough guide and if the work cost more or less, a tenderer / bidder will have no claim on that account. The tender shall be based on as mentioned in aforesaid Appendix 'A'.

3. The work is to be completed within the period as indicated in aforesaid Appendix 'A' in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be on or about two weeks after the date of Acceptance of tender.

4. Normally contractors whose names are on the MES approved list for the area in which the lies, and within whose financial category the estimated amount would fall, may tender / bid but in case of term contracts, contractors of class SS to E may tender / bid. In case, where the tender amount is in excess of the financial limit of the contractor and the Accepting Officer decides to accept the tender / bid, in which event the tenderer / bidder would be required to lodge additional security deposit as notified by the Accepting Officer in term of conditions of contract. Contactors whose names are on the MES approved list of any MES Formation and who have deposited standing security and have executed standing security bond may also tender / bid without depositing Earnest Money along with the tender / bid and if the tender / bide submitted by such a tenderer / bidder is accepted, the contractor will be required to lodge with the Controller of Defence Accounts concerned the amount of ' Individual security deposit' within thirty days of the receipt by him of notification of acceptance of his tender / bid, failing which this sum will be recovered from 1st RAR payment or from the first final bill. In the case of term / running contracts, remaining sum shall be submitted / uploaded by one contractor or one firm of contractors. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender / bid for the same contract as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejections.

5. The **CWE(AF) Agra** will be the Accepting Officer herein after referred to as such for purpose of the contract.

6. The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the tenderer/bidder on or before the date and time mentioned in NIT. A scanned copy of DD with enlistment details / documents shall be uploaded as packet 1 / cover-1 ('T' bid) of the tender / bid on e-tendering portal. DD is refundable in case T bid is not accepted resulting in non-opening of 'Q' bid'. The applicant contractor shall bear the cost of bank charges for procuring and en-cashing the DD and shall not have any claim from Government whatsoever on this account.

7. Tender form and conditions of contract and other necessary documents shall be available on https://www.defproc.gov.in site for download and shall form part of contract agreement in case the tender / bid is accepted.

8. **PERFORMANCE SECURITY**:

(a) The tenderers shall note that the successful bidder shall lodge performance security of an amount equivalent to 5% of contract sum within 28 days from the date of receipt of letter of Acceptance (AOC) in the form of FDR or he may choose to submit BGB or Govt. securities. However the tenderer will be allowed to avail provision of reduced Performance Security of an amount equal to 3% of contract amount by submitting a certificate as below.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

(a) I/We declare that there are no outstanding recoveries against my / our firm.

(b) I/We confirm that I/ We do not intend to abandon the subject work after availing the relief of reduction of performance security from 5% to 3% of the value of contract.

Date : Signature of Contractor
Place :

(b) If the performance security is provided by the successful Contractor in the form of Bank Guarantee. It shall be issued by Nationalized/Scheduled Indian Bank but its confirmation shall be done only from the Head Office of the Bank.

(c) Failure of the successful contractor to comply with the requirements of sub clause8 (a) shall constitute sufficient grounds for cancellation of the award of work and forfeiture of the Earnest Money. In case of MES enlisted contractor, amount equal to the Earnest Money stipulated in the Notice Inviting Tender, shall be notified to the tenderer for depositing the amount through MRO. Issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the Earnest Money is deposited in Government Treasury.

(d) All bidders shall be exempted from submission of EMD in all tenders except those who are ineligible from such exemption vide Para 8(e) below.

(e) All bidders shall be required to sign the **Bid Securing declaration** as below :-

CERTIFICATE

Name of Work :
Tender ID :
Name of Contractor :

I/We hereby understand and accept that if I/We withdraw or modify my/ our bids during the period of validity, or if I/We are awarded the contracts and on being called upon to submit the Performance Security / Security Deposit, fail to submit the Performance Security/ Security Deposit before the deadline defined in the request for bid documents/ Notice Inviting Tender, I/We shall be debarred from exemption of submitting Bid Security/ Earnest Money Deposit for a period of 6 (Six) months, from the date. I/We are declared disqualified from exemption from submission of Earnest Money Deposit/ Security Deposit, for all tenders issued by MES during this period.

Date : Signature of Contractor

(f) In the event of contract being **CANCELLED** under condition 52, 53 & 54 of General Conditions of Contract as per IAFW-2249 the Performance Security**@ 5%** shall be **FORFEITED** in full and shall be credited into Consolidated Fund of India.

9. A contractor who is not enlisted for the area in which the work lies but whose name is in the MES approved list of any MES formation and who has deposited standing security and executed standing security Bond may bid without depositing earnest money along with the tender, but if the Accepting Officer accepts the tender / bid, the contractor will be required to lodge with the Controller of Defence Accounts concerned the amount of 'Individual Security Deposit' within thirty days of the receipt by him of notification of acceptance of his tender / bid, failing which this sum will be recovered from 1st RAR payment or from the final bill. In case of term / running contracts, remaining sum shall be recovered from subsequent bill (s) of the contractor.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

10. A contractor who has executed standing security Bond but not corresponding to the appropriate class as mentioned above, shall lodge with the Accepting Officer, Additional Security Deposit as notified by the Accepting Officer within thirty days of the receipt of his notification of acceptance of his tender / bid, failing which this sum will be recovered from the first RAR payment or from the first final bill. In the case of term / running contracts, remaining sum shall be recovered from subsequent bill(s) of the contractor. However, in case where any payment is made to the contractor within thirty days of the receipt by him of notification of acceptance of tender /bid, the amount of additional security deposit shall be recovered from such payment.

11. The AGE will return the Earnest Money wherever applicable to all unsuccessful tenderers / bidders by endorsing an authority on the deposit-at-call receipt for its refund, on production by the tenderer , bidder a certificate of the Accepting Officer that a bonafide tender / bid was received and all documents were returned.

12. The AGE(I) will either return the Earnest Money to the successful tender / bidder by endorsing an authority on the deposit-at-call Receipt for refund on receipt of an appropriate amount of Security Deposit or will retain the same in part or full on account of security deposit if such a transition is feasible.

13. Copies of the drawings and other document pertaining to the work signed for the purpose of identification by the Accepting Officer or his accredited representatives, sample of materials and stores to be supplied by the contractor will also be available for inspection by the tenderer / bidder at the office of Accepting Officer and concerned AGE(I) Sonegaon during working hours.

14. The tenderers / bidders are advised to visit the site of work by making prior appointment with AGE(I) Sonegaon who is also the Executing Agency of the work (see Appendix ‘A’). The tenderers / bidders are deemed to have full knowledge of all relevant documents, samples, site etc., whether they have inspected them or not.

15. Any tender / bid which proposes any alteration to any of the conditions laid down or which proposes any other condition or prescription whatsoever, is liable to be rejected.

16. The uploading of bid implies that bidder has read this notice and the Conditions of Contract and has made himself aware of the scope and specification of work to be done and of the conditions and rates at which stores, tools and plants etc. will be issued to him and local conditions and other factors having bearing on the execution of the work.

17. Tenderers / bidders must be in possession of a copy of the MES Standard Schedule of Rates (See Appendix ‘A’) including amendments and errata thereto.

18. Invitation for e-tender does not constitute any guarantee for validation of ‘T’ bid and subsequent opening of finance bid of any applicant / bidder, even of enlisted contractors of appropriate class, merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the ‘T’ bid and no open the finance bid of any applicant / bidder. ‘T’ bid validation shall be decided by the Accepting Office based on, inter alia, capability of the firm as per criteria given in Appendix ‘A’ to this NIT. The applicant contractor / bidder will be informed regarding non-validation of his ‘T’ bid assigning reasons thereof through the https://www.defproc.gov.in website. The applicant contractor / bidder if he so desires may appeal to the next higher Engineer authority viz Chief Engineer (AF) Allahabad Zone Allahabad on email id cezafa2-mes@nic.inwith a copy to the Accepting Officer on email before the scheduled date of opening of Financial Bid. The decision of the Next Higher Engineer Authority (NHEA) shall be final and binding. The contractor / bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

19. The Accepting Officer reserves the right to accept a tender submitted by a Public Under taking, giving a price preference over other Tender(s) / bids which may be lower, as are admissible under the Government Policy. No Claim for any compensation or otherwise shall be admissible from such tenderer / bidder whose tender / bid is rejected.

20. Accepting Officer does not bind himself to accept the lowest or any tender / bid or to give any reason for not doing so.

21. This **Notice Inviting Tender (NIT)** including Appendix 'A' shall form part of the contract.

Signature of Contractor **For Accepting Officer**
Dated…….

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)
(For works costing less than Rs 50 crores)

1.	Job No & Name of Work	**44W/AMWP/02/2021-22: PROVN OF TRAINING FACILITY AT NEW LOCATION AT AF STN SONEGAON**
2.	Estimated cost	**Rs 142.29 Lakh** (At Par Market)
3.	Period of completion	270 (Two Hundred Seventy days)
4.	Cost of tender documents	**Rs 1000/- (One Thousand Only)** in the form of DD/Bank cheque from any Schedule/Nationalized bank in favour of **AGE(I) Sonegaon**, payable at **Nagpur** (copy shall be uploaded online and original to be submitted offline before due date of opening of cover No 1)
5.	Website/portal address	https://www.defproc.gov.in & https://www.mes.gov.in
6.	Type of contract	The tender shall be based on IAFW-1779-A (Revised 1955) and GCC (IAFW-2249). Item rate with Schedule 'A' (list of items of work) to be priced by tenderer.
7.	Timeline details:	
	(a) Bid Submission Start Date	Ref Critical Dates published on https://www.defproc.gov.in
	(b) Bid Submission End Date	
	(c) Date of Bid Opening	
8.	Eligibility Criteria	
	(a) For MES enlisted contractors	Contractors shall be enlisted with MES in **Class 'B'** and above and category **a(iii)** or **a(v)** subject to satisfactory remarks w.r.t. performance in respect of works in hand as reflected in Work Load Return (WLR) or any other report circulated by competent engineer authority.
	(b) For contractors not enlisted with MES	(i) Contractors not enlisted with MES should meet the enlistment criteria of **'B' Class & a(iii)** or **a(v)** category contractor with regard to satisfactorily completion of requisite value of works with Central/State Government/ Central/ state PSUs/ AWHO/ AFNHB/ CGEWHO/ DGMAP, Annual turnover, Bank Solvency, working capital and other requirements given in Para 1.4 & 1.5 of section 1 of MES Manual of Contracts 2020. (ii) Not carrying adverse remarks in Work Load Return(WLR) or any other similar report circulated by competent authority, if already working in MES. (iii) Not suspended/debarred/blacklisted (either permanently or temporarily) from participating in any bid or for business dealings by any Central/State Government Department or any Central/ State PSU or any Autonomous Body under Central/ State Government or any Local Body as on the bid submission end date.
9.	Tender issuing and Accepting Officer	SHRI SHYAM NARAIN SHUKLA, IDSE SE, CWE (AF) Agra Phone No. 0562-2971807 Email ID : **dcweafkhej3-mes@gov.in**
10.	Executing agency	AGE(I) Sonegaon
11.	Earnest Money	**Rs 2,17,290.00** in favour of AGE(I) Sonegaon payable at Nagpur in the form of Deposit at call receipt from any Scheduled / Nationalized Bank , **FDR NOT ACCEPTABLE**.
12.	Performance security and Defect Liability period	Within **28 days** of receipt of the letter of Acceptance, the successful contractor shall deliver to the Accepting Officer a **Performance Security** for an amount equivalent to **3%** of contract sum in the form of Bank Guarantee in prescribed form /Government Securities /FDR or any other Government Instrument's as per condition 19 of IAFW-2249. **Defect liability Period** of the work is **Three Years (03 Years)** from the actual date of completion of work in terms of condition 46(b) of IAFW-2249.

NOTICE INVITING TENDER (NIT)
APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)
(For works costing less than Rs 50 crores)

NOTES:

1. After opening of Cover 1, if the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT are less than 7 (Seven). Applications in respect of contractors one class or two classes (in case of remote and difficult areas to be decided as per list circulated by CE command/ADG) below the eligible class shall also be considered subject to fulfilment of other eligibility criteria given in the NIT. Therefore MES contractor's one class below (two classes below in case of remote and difficult areas) may also bid for this tender. However contractors of one/two classes below the eligible class shall not be considered in case their present residual work in hand is more than **FIVE TIMES** of their present tendering limit. Such bidders shall upload in their Cover-1 bid details of works in hand showing names of work, Names of Accepting Officers, Contract amounts, dates of commencement and completion (stipulated) and progress as on bid submission date. These details shall be verified by the Tender Issuing Authority from concerned formations in case bids of such contractors are considered for evaluation.

2. In case after opening of Cover-1, the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT are 7 (Seven) or more, applications of only those one class below the eligible class bidders shall be considered, who have previously completed similar works satisfactorily and are meeting the criteria of upgradation in respect of past experience of completed works (individual work experience and/or average annual turnover as applicable) and financial soundness (solvency/financial soundness and working capital) as per details given in Manual on Contracts. Therefore such contractors shall upload the requisite information / documents in the Cover-1.

3. Unenlisted contractor shall be considered provided he meets the criteria. Foreign firms shall not be eligible for this tender. However Indian Firms having foreign national / Indian nationals staying abroad / Indian national having taken foreign citizenship as director (s) shall be considered subject to security clearance from the concerned authorities.

4. Contractors enlisted with MES will upload following documents in Cover 1 for checking eligibility:-

(a) Application for tender on Firm's letterhead.
(b) Enlistment letter issued by the Registering Authority **duly renewed** for the cycle period in vogue.
(c) Scanned copy of DD/ Bankers Cheque toward cost of tender and EMD instrument in case SSD bond is not signed at the time of registration.
(d) Employees Provident Fund Code Number
(e) GST Registration No.
(f) Bid Securing declaration as mentioned in Para 8(e) of NIT
(g) Scanned copy of undertaking for No Ban or Slow progress in any Govt or other deptt
(h) Any other document required as described in this Appendix.

5. Contractors not enlisted with MES will be required to upload following documents in Cover1 along with documents as referred in Para 1.4 for of manual on contract-2020 checking eligibility.

(a) Application for tender on Firm's letterhead.
(b) Scanned copy of DD / Bankers Cheque toward cost of tender and Earnest Money Deposit (EMD) instrument.
(c) Copy of police verification report/Police Clearance Certificate/ Character Certificate from the Police Authority of the area where the registered office of the firm is located/notarized copy of valid passport of Proprietor/ each Partner/each Director.
(d) All documents required for enlistment in MES for the class mentioned in Para 8(b) of Appendix 'A' to NIT above as per Para 1.5 of Section 1 of MES Manual on Contracts 2020.
(e) Details of works being executed in MES, if any.
(f) Scanned copy of Employees Provident Fund Registration/ Code Number.
(g) Scanned copy of GST Registration.
(h) Scanned copy of undertaking for No Ban or Slow progress in any Govt or other deptt
(j) Bid Securing declaration as mentioned in Para 8(e) of NIT
(k) Any other document required as described in this Appendix.

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)

6. Tenders not accompanied by scanned copies of requisite DD / Bankers Cheque towards cost of tender and earnest money (as applicable) in Cover 1 shall not be considered for validation of 'T' bid and their Financial Bids will not be opened. In case of re-issue of tenders, no additional cost of tender documents is required from the contractor who had quoted in the previous call. Only the new applicants shall pay the cost of tender documents.

7. Contractors should ensure that their original physical DDs and Earnest Money Deposit (EMD) instruments (as applicable) reach the office of Accepting Officer within 05 days of bid submission end date failing which following action shall be taken.

(a) In case of tenders from an enlisted contractor of MES where scanned copies of requisite DD / Bankers Cheque towards cost of tender have been uploaded in cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will be opened. However, non-submission of physical copies of cost of tender shall be considered as wilful negligence of the tenderer with ulterior motives and such tenderer shall be banned from bidding for a period of six months commencing from the date of opening of Financial Bid (Cover 2).

(b) In case of tenders from unenlisted contractor, where scanned copies of requisite DD / Banker Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will not be opened. Name of such contractors along with complete address shall be circulated for not opening of their bids for a period of six months commencing from the date of opening of Financial bid (Cover 2).

(c) In case of tenders from enlisted and unenlisted contractors, where scanned copies of instruments for Earnest Money Deposit (as applicable) have been uploaded in Cover 1 ut the same are not received in physical from within stipulated period, such tenders shall not qualify for opening of financial bid (Cover 2).

8. Contractor will not be allowed to execute the work by subletting or through power of attorney to a third party / another firm on his behalf. However a contractor can execute the work through power of attorney to sons / daughters / spouse of Proprietor / Partner/Director and firm's own employees, director, project manager **provided they are not having a separate enlisted firm in MES in their name as Proprietor / Partner /Director**.

9. After opening of Cover 1 and during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderers as per NIT, a communication in the form of e-mail/SMS/Speed Post etc. shall be sent to the contractor to rectify the deficiency within a period of seven days from date of communication failing which their financial bid (Cover 2) shall not be opened and contractor shall not have any claim on the same.

10. Invitation for e-tender does not constitute any guarantee for validation of Technical bid and subsequent opening of financial bid of any applicant / bidder merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the Technical bid and not to open the financial bid of any applicant / bidder. Technical bid validation shall be decided by the Accepting Officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/ bidder will be informed regarding non–validation of his Technical bid assigning reasons therefore through tender evaluation report which shall be uploaded on the website. Such tenderer, if desire may appeal to the Next Higher Engineer Authority (NHEA) viz HQ CE (AF) Allahabad on email id cezafa2-mes@nic.in with copy to the Accepting Officer on email before the scheduled date of opening of Cover 2. NHEA shall decide the matter within a period of seven working days from the date of receipt of appeal. The decision of the NHEA shall be final and binding. The tenderer / bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

11. In case the BOQ is revised through the corrigendum and the bidder has failed to quote on revised BOQ (i.e. he has quoted on pre revised BOQ), such bid shall be treated as wilful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases the lowest tender shall be determined from amongst the valid/ bonafide bids only. Accepting Officer may decide whether to re-tender or consider the lowest bonafide tender for acceptance.

APPENDIX 'A' TO NOTICE OF INVITING E-TENDER (NIT)

12. In case an un-enlisted contractor is already executing works in MES, he shall not be considered eligible for the subject tender if the total value of such works is more than twice the tendering limit of the MES Class of contractor for which it is eligible. For this purpose, details of the works being executed by such a contractor shall be uploaded in the Cover-1 of the bid and shall be checked / verified by the Accepting Officer.

13. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after opening of Cover 2 shall be considered as a wilful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an un-enlisted tenderer, Earnest Money deposited by him shall be forfeited. In case of MES enlisted tenderer having deposited the Standing Security Bond an amount equal to the earnest money stipulated in the NIT shall be notified to the tenderer for depositing through MRO and consideration of such tenderer in tender evaluation for future works shall remain suspended till the aforementioned amount is deposited in the Government treasury. No other disciplinary / administrative action shall be taken against such tenderers. In such a situation the next lowest offer shall not be considered for acceptance. Instead retendering shall be resorted to in a transparent and fair manner and the defaulting tenderer and his related firm if any shall not be eligible for this tender in second call or subsequent calls.

14. Tender to related firms shall not be issued simultaneously. Firm shall be termed as related if Proprietor / one or more Partners / Directors are common. Decision of Accepting Officer on issue / deny the tender to any one of the related firms shall be final and binding.

15. **JURISDICTION OF COURTS:** Court of the place from where tender has been issued shall alone have jurisdiction to decide any dispute arising out of or in respect of this tender. After acceptance of tender, Condition-72 of IAFW-2249 shall be applicable for this contract.

Signature of Contractor

For Accepting Officer

File No: 80022-05/ /E8

Dated_____

HQ Commander Works Engineer
(Air Force), Agra- 282008

Dated: Jan 2023