

**STANDARD OPERATING PROCEDURES (SOPs) FOR IMPLEMENTATION OF SMART CITY  
PROJECTS UNDER NASHIK MUNICIPAL SMART CITY DEVELOPMENT CORPORATION LTD.  
(NMSCDCL), NASHIK.**

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**SOP NO. 1 : Coordination at Construction Stage/Execution of works/projects.**

1. The PMs/DGMs/GMs/CUP (PM- Project Manager, DGM – Deputy General Manager, GM – General Manager, CUP- Chief Urban Planner) of the project (as the case may be) hold regular co-ordination meetings with other concerned officers of respective disciplines of NMC/ Smart City (including PMC and Vendor) to review the progress and to sort out any hindrances or bottlenecks in the work/projects. (PMC- Project Management Consultant)
2. The respective representative of PMC/Vendor may also be invited to participate in the co-ordination meetings for regular appraisal of progress of work, appreciation of needs and desire, and to sort issues, if any.
3. Regular minutes of such meetings shall be issued to all concerned.
4. Activities that conflict or cause avoidable damage to the work already done are avoided by proper planning.
5. Any change in the architectural/structural drawings and designs found necessary during the execution of work due to any practical difficulty etc., is immediately brought to the notice by contractor/PMC to the concerned Architect Unit/Consultant/Expert of PMC and Authority for approval/review.

**SOP No. 2 : Periodic inspection of works**

1. The various levels of field staff (PMs) executing the work as well as DGMs concerned with the work, mandatorily inspect the works frequently to ensure that the works are in general being executed according to the design, drawings and specifications laid down in the contract. In this regards the guidelines are issued as per respective Annexures – Which are to be followed by field staff of contractor and PMC.
2. The DGMs draw a weekly programme of inspection in respect of various works under his Jurisdiction. He should intimate his inspection programme to PMC/Contractor well in advance. The minimum number of inspections for each work are 2 for every bill for the works under his jurisdiction and subject to minimum one inspection per week for the works. A copy of this programme is to be sent to his next higher authority and Inspection-Report is to be issued regularly and submit to his next higher authority with a copy given to PMC and Vender/contractor for compliance.
3. Similarly, the GMs/CUP draw a programme of inspection during a month in respect of various works in particular, for contracts/projects related to him and for other important works. The programme for inspection shall be so drawn that the GM/CUP inspects at least once in a month or of each bill of the stages during the execution of each work. GM/CUP shall try to resolve the technical issue related to project/work (if any) during his visit.

### **SOP NO. No. 3 : Maintenance of Site Documents**

#### **I. Site Order book**

1. The form of the site order book is to be maintained at each site of work (preferably in contractor site office) as per Annexure-I in printed format.
2. Senior personnel of the rank of GMs/CUP communicate their observations by way of inspection notes/reports.
3. Verbal orders of Senior personnel is confirmed by the PMs/PMC in writing in all cases, however, implementation of these verbal orders is not delayed for want of confirmation.
4. CUP during their field inspections, point out architectural/Planning points through separate inspection notes, the field staff of PMC/NMSCDCL acts on their observations after proper examination from technical, contractual and financial angles.
5. DGMs and PMs concerned, sign the Site Order Book in token of having read all the instructions issued by senior personnel and replies made thereto.
6. In case the DGMs or PMs want to give any instructions, he records them in the Site Order Book. Even site Instruction shall be given instantly at site of work in form of Annexure-II by PMC/PM/DGM.
7. From contractor /Vender side request for Inspection/Approval (RFI) shall be submitted to PMC at every stage of work activity of Project in form of Annexure-III same shall be made available to DGM/PM for verification/review from time to time during their inspection/visit to site of work.
8. The PM records his observations in the Site Order Book, if he finds any defective work going on, or if the PMC/contractor is not complying with any of the terms of the contract, or on the slow progress of work, if any.
9. The Site Order Book is maintained at the site of the work, and is never removed from there under any circumstance.
10. The PMC or his authorized representative is also at liberty to note his observations etc. in this Book.
11. The compliance of orders/instructions given by the PMC and the date(s) of its(their) compliance from the contractor is recorded side by side in the Site Order Book by PMC and reviewed by the PM with dated initials.
12. The DGMs periodically reviews the Site Order Book to ensure that it is being properly maintained and used. The Site Order Book is consulted at the time of making payments of each bill to the contractor.
13. PMC/PM ensures from Site Order Book whether the defects pointed out during construction have been rectified or not, and also proposes part rates, if necessary, for the items of work for which defects were pointed out but have not been rectified. Also DGM should review such observations weekly and during his visit to work before submission of the bill by the PMC.

#### **II. Inspection Registers**

1. A docketed Inspection Register issued by the Authority/PMC is maintained at every site of work for recording of inspection by the PMC/GMs/CUP and above level.
2. The proforma for the various Inspection Registers are to be maintained for each work/project as per Annexure-V (Drawing issue form) Annexure-VI (Inspection request form), Annexure – VII (Daily report form), Annexure-VIII (Mechanical Plant/Machinery Inspection Report)

3. GMs/CUP on his site visits records the date and time of his visit, items inspected and his observations.
4. The DGM ensures that the observations of the inspecting officers for each and every visit are available in the Inspection Register.
5. The DGM/PM carries over such observation and defects on which action is to be taken by PMC through contractor to the Site Order Book with appropriate cross references in the Inspection Register.
6. Observations recorded in the Inspection Register by the GMs/CUP are reviewed during their subsequent inspections to ensure their compliance.
7. Quality Assurance Inspection team also reviews these registers.

### **III. Cement Registers**

1. The PMC/PM/DGM checks the registers maintained for accounting of cement procured by contractor at different work sites.
2. They inspect the registers and stores during their respective visits and inspection of the works.
3. Register of ready mixed concrete (RMC) to be maintained mentioning the location of concreting work where it is being used. In case of works where Ready Mixed Concrete (RMC) is stipulated to be used from an approved source/manufacturer and if such registers are not be maintained. however, the computerized dispatch slips that are sent with each dispatch of RMC are kept on record.

### **IV. Dismantled materials arising out of dismantlement through works**

1. The serviceable materials obtained from dismantlement of a building or structure wherever not sold by tender or auction, is recorded without value in the Measurement Book for record purpose.
2. On the basis of the measurements, before dismantling any structure the serviceable materials are taken in the Register of Dismantled Materials. It's photographs should be taken and kept for purpose of record Measurements should be recorded in register and review by DGM/PM.
3. The PMC/PM after duly attesting the entries made in the Measurement Book makes a suitable note that these materials have been entered in the Register.
4. A separate folio or set of folios is kept apart for keeping the accounts of dismantled materials pertaining to each work.
5. The serviceable materials obtained from dismantlement is used in the works as far as possible and is shown as issued to works accordingly in the Register.
6. This register (even for "Nil" transactions) is submitted by the PMC/PM regularly to DGM.
7. In no case dismantled materials is collected on the road berms adjoining to work area. If for any reason, it is not found possible to comply with these instructions in any particular case, then written approval of the and local authority, if any, is obtained.
8. Post dismantled photographs should also be taken for records.

### **SOP No.4 : Guidelines for Non-Conforming works :**

#### **1. General**

In broad terms, for the Quality Assurance of the finished work it is necessary for the materials and workmanship to conform with the Contract requirements. Ideally. Non-conforming work shall be rejected.

The statement above is true in general terms, but special difficulties arise in the case of concrete, where the non-conformance may only be known after 28 days cube results become available, in which period work has progressed further. In some of the situations, acceptance after repair/review for adequacy is feasible. Therefore, separate procedures are laid out for some of the non-conforming situations. In case the feasible items do not meet the requirements after such repair/review, the non-conforming item should be rejected.

## **2. Concrete/Asphalt Work for Road work/water supply work/sewerage work/Civil construction work/Building work etc.**

The primary means by which Quality Assurance shall be achieved is by the procedures described in relevant material qualification and workmanship method statement. The non-conforming items shall be further reviewed, as given below:

### **2.1 Non-Conformance other than Strength or Finish**

In the event that any requirement other than strength and standard of finish is not met, then NCR (Non-conformance report )may be issued as per Annexure-IV and the following procedure shall be followed

- i. The contractor shall be notified without delay verbally, and in writing by the following means:
  - (a) Return of the Request for Inspection (RFI) Form signed “not approved” with the reason for rejection stated.
  - (b) Issue of a Site Instruction or Site Works Order or letter stating the facts and confirming that the works are not approved.
- ii. Approval to carry out further work of a similar nature and subsequent work shall be withheld.
- iii. The Contractor shall be asked for his proposals to rectify the non-compliance, which may involve re-submission of materials, new trial mixes, revised method statement etc.
- iv. The acceptance or rejection of any unapproved Civil/Structural work shall be referred to the Engineer-In-Charge
- v. When satisfied with the measures taken to ensure future compliance, the Engineer shall confirm approval to continue Civil/Structural for permanent works.

### **2.2 Non-Conformance with Strength Requirements**

- i. The specification, strength/density for concrete/asphalt recognises the statistical Probability/possibility of cube failures and thus limits of means, standard deviation, minimum values of strength are specified. The rejection criteria is as set out in the agreement.
- ii. In the event of cube/density failures outside the provision of the contract then the non-compliance procedures described in the specification shall be followed:
  - (a) Approval of Civil/Structural of similar works shall be withheld.
  - (b) All aspects of Civil/structural work shall be reviewed.
  - (c) The clause of failure shall be identified and measures taken to remedy the problem.
- iii. Various repair/rectification procedures for commonly arising/non-conformance are as specified in contract and the contractor shall furnish his exact

proposals/methodology for rectification under consideration as per Good Industry Practice.

- iv. The fact of non-conformance and the proposed rectification procedure is conveyed to the engineer/design organization of PMC/SPV (or design consultant) for review and opinion about.
  - (a) Acceptability of measure proposed by the Contractor, if any.
  - (b) Further non-destructive testing, if any
  - (c) Acceptability in case strength is achieved at a later age (e.g.90 days)
  - (d) Acceptability at the level of strength achieved for the stress levels in concerned members.
  - (e) Acceptance of repair/rectification/strengthening measures with modifications, if required or rejection.
- v. Rejection in case the item does not pass modified acceptance limits after repairs.

### **2.3 Non-Conformance with Finish Requirements.**

- i. Where the required finish is non-attained then the non-conformance procedure for repair/rectification as described in the Specification shall be followed.
- ii. In addition, the following procedures shall be followed.
  - (a) Approval of similar work shall be withheld.
  - (b) All aspects of work shall be reviewed.
  - (c) The cause of poor finish shall be identified.
- iii. Revised specifications/instructions to avoid further recurrence of non-conformance shall be issued.
- iv. Non-conformance in case of any components of road works such as earthworks, base and other pavement coarse etc and also items related to civil construction work/water supply work/sewerage work/building work etc can be treated as per guidelines under above sections applicable in relevance with the specifications, IRC/Is codes and Good Industry Practice.

### **3. Records**

- i. It is mandatory that all instances of work outside the specification are recorded in writing and conveyed to the contractor. This ensures that:
  - (a) The contractor is irrefutably informed.
  - (b) A record of non-compliance is built up to give a general guide to the contractor's performance.
- ii. The records of repair/rectification, retesting, inspection and acceptance shall be kept as part of 'as-built' documentation.
- iii. Record of all references to designers for concessions/rectification and approval given by them shall be kept.
- iv. Record of compliance to the modifications in procedures, testing, etc, if any shall be kept.

## **SOP No. 5 : Special Conditions For Steel Reinforcement Bars**

- (1) (a) The contractor shall procure IS marked TMT bars of various grades from Integrated Unit of the steel manufacturers or their authorized dealers (as per following selection criteria) having valid BIS license as per provisions of IS: 1786-2008. (with relevant latest Amendments)

The procured steel should have following qualities:-

- i. Excellent ductility, bend ability and elongation of finished product due to possible refining technology.
- ii . Consumption of steel should be accurate as per design.
- iii . Steel should have no brittleness problem in finished product.
- iv . Steel should carry the quality of corrosion and earthquake resistance.
- v. Quality steel with achievement of proper level of sulphur and phosphorus as per IS: 1786-2008.

- (b) Selection Criteria of steel manufacturers

The supply of reinforcement steel for all works should have following selection criteria of steel manufacturers:-

Steel producers of any capacity using iron ore/ processed iron ore as basic raw material adopting advanced refining technologies as given hereunder,

- (i) DRI-EAF = Direct Reduced iron – Electric Arc Furnace.

Or

- (ii) BF- BOF = Blast Furnace – Basic Oxygen Furnace.

Or

- (iii) COREX- BOF = COREX – Basic Oxygen Furnace.

For production of liquid steel to finish product at single/multiple locations with NABL or any other similarly placed accrediting Government body which operates in accordance with ISO/IEC17011 and accredits labs as per ISO/IEC 17025 conforming to IS : 1786-2008 (with relevant latest Amendments)

- (2) The contractor shall have to obtain and furnish test certificates to the PMC/Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.
- (3) Samples shall also be taken and got tested by the PMC in presence of representative of Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para (1)(a) & (1)(b) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the PMC/representative of Engineer-in-Charge to do so.
- (4) The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more, or as decided by the PMC or representative of Engineer-in-charge.

- (5) The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- (6) For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

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

- (7) The contractor shall supply free of charge the steel required for testing including its transportation to the third-party NABL approved/accredited testing laboratories testing shall be conducted in presence of representative of PMC and Engineer-In-charge. The cost of tests shall be borne by the contractor.
- (8) The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the PMC/representative of Engineer-in-charge.

**SOP No. 6 : Advance payment**

**I. For The Work Done And Measured**

1. Advance payments to contractors against on account bills received in the NMSCDCL Office may be made by the CEO (Chief Executive Officer of NMSCDCL), on receipt of proposal from PMC on request application from the contractor for financial aid in the shape of part payment, shall make a lump-sum advance payment to the extent of maximum limit mentioned below subject to the following conditions:
  - a. The bill in respect of which the advance is proposed to be made should actually be under check in the PMC/NMSCDCL Office.
  - b. The amount of advance should not exceed 50% of the net amount of the bill under check, but no advance payment will be admissible in cases where the amount of advance payable works out to less than Rs. 25,00,000/- (Rs. Twenty Five Lakhs only).
  - c. The payment should be suitably endorsed both on the running bill against which the advance payment is made and the connected abstract of measurements in the Measurement Book. The voucher on which payment is made should bear reference to the number, date and amount of the bill against which the payment is made, and also to the page number of Measurement Book and the number, date and amount of the voucher, if any, on which the previous on account payment was made. The payment should be treated in the accounts as an advance.
  - d. Before making payment, an undertaking should be obtained from the contractor to the extent that, should the amount of advance paid to him is subsequently found to be more than the amount of the running account bill in respect of which the



advance was paid, he will refund to NMSCDCL forthwith the amount overpaid. The CEO shall ensure that the advance is adjusted when payment is made on the running account bill in respect of which it was made, and for any overpayment which may occur.

2. Grant of a second advance before the first one has been recovered through subsequent regular Running Bill shall not be permitted.
3. Statutory taxes like Income tax GST, Royalty etc. shall be deducted from the secured advance payment.

## **SOP No 7 : Test checking of Measurements**

### **I. Test check by the Project Manager of NMSCDCL**

1. The **Project Manager of NMSCDCL** is to personally inspect all the works of any magnitude along with PMC /Contractor and submit the same to NMSCDCL office before payment.
2. He is required to check & measure the works in his charge as below (subject to 100 % verified measured and recorded in authentic Measurement Books by the authorised representative of equivalent level of the PMC and cross checked by the project Director or equivalent level representative of the PMC)
3. PMC may decide internally the procedure of 100% verification and cross checking of measurements by authorized representative of equivalent level of PMC (may intimate their junior and senior level personnel and duties their of).

### **II. Important items for Measurements**

Important works, within meaning of the above, include items which owing to the situation cannot be subsequently checked or which have very high unit rates. For guidance, these items are classified generally as below :-

#### **(a) Items of work which owing to their situation cannot subsequently be checked.**

- (i) All work below ground level such as Concrete, Masonry, Steel work etc. in foundation; and
- (ii) Fabricated Steel work in columns, beams, etc. which are encased either in masonry or concrete, reinforcement in RCC work/Building/Road/Civil structures.
- (iii) Wood work, Iron work etc. hidden by ceilings, wall panelling or floor boarding.
- (iv) Water proofing compounds used in gauging cement.
- (v) Lines of pipes buried in floor or masonry in internal sanitary, water supply or drainage installations, River front area development, water resources/conservation work etc.
- (vi) Earthing installation, cable laying etc.
- (vii) Utilities of types and any other civil/structure works.

#### **(b) Items of works which are considered to have very high unit rates:-**

- (i) RCC Work.
- (ii) Items in sunk ashlar stone or marble work, plain sunk or moulded in walls, columns, arches or domes.
- (iii) Stone or marble work in wall lining. All steel cladding, structural glazing etc.

- (iv) All major equipment's for AC, lifts, Generator sets, Sub-station equipment, fireworks, any other items desired by Engineer-in-charge.
- (3) In case of major/minor works PM should check/measure not less than 50% of the value of the measurements recorded by PMC before any running/final bill is paid.  
**(Note:** For the purpose of test check, "measurements" means the "corresponding monetary value of measurements of work done." This, however, does not apply to "Levels", in which case the test check has to be based on the number of levels recorded.)
- (4) While test checking the works of repetitive type, the Project Manage (Elect) should check 100% of all items of at least one unit, taken at random, besides test checking isolated and individual items in other units to bring the total extent of check measurement to the desired limit of 50% of value of work done.
- (5) Besides the mandatory test check of RCC and hidden items of work, the test check of measurements by PM shall also include not less than 50% of the plumbing work for sanitary and water supply road works civil/structures works etc. wherever applicable.
- (6) Preferably measurements are to be taken, recorded and checked jointly so that to avoid delay in processing check measurements and hence to expedite the work progress.

### **III. Test check by the DGM.**

- (1) The DGM should test check 10% of the measurements recorded by PMC and 50% test check is exercised by his subordinates (i.e.PM) at least every bill for works. Measurements selected by him should be independent of measurements test checked by PM. However this will not apply to items, the measurement of which are a checked 100% by PM.
- (2) **Test check of RCC Civil/Structure, water supply and plumbing works**
  - (i) Test check of the DGM shall also include at least 10% test check of the measurements of RCC items so as to ensure structural safety of work/project.
  - (ii) Besides the mandatory test check of RCC and hidden items of work, the test check of measurements by the DGM shall also include not less than 10% of the civil/Structure plumbing work for sewerage and water supply projects.
- (3) **Test check of Steel**
  - (i) In the case of Reinforcement measurement of steel, the DGM shall test check 10% of the reinforcement steel for all major works to ascertain the steel is placed as per approved R.C.C. Design requirements. Also, test check to be exercised by DGM for steel consignment for major structures
- (4) **Test check in Road Works and other civil/Structure works**

In case of road work involving supplying and laying of sub-base and base course material:

  - (i) The stacks shall be uniformly distributed along the road. The collection of stone metal material product shall be completed for the entire work, or for complete length of minimum 500 meters of each road, or as directed by the Engineer-in-Charge, and measured before the work of laying and consolidation is taken up in hand.
  - (ii) The PM shall test check not less than 50%, and the DGM, not less than 10% of the materials procured in each road of length of 500 before the work of laying is started.

(iii) Same methodology is applicable for other works such as Civil/Structures, water supply and sewerage, water resources/Conservation works etc.

**(5) Test checks to be attested**

The individual items checked should be clearly shown in the Measurement Book, and the result recorded by the personnel concerned of PMC. The items thus checked should be attested by the dated initials of the checking Officer (i.e. by PM and DGM)

**(6) Consolidated record of checks/test checks**

(i) A collective record of all the check carried out from time to time will be prepared in each Measurement Book.

(ii) The result will be indicated by the word "Satisfactory" or "Unsatisfactory" as judged at the time on merits of each case. Unsatisfactory result will be communicated to PMC and contractor as the case may be.

**SOP No. 8 : SOP For Measurement Books**

(1) The payments to contractors and others for the work done or other services rendered are made on the basis of measurements recorded in the Measurement Book. (Issued by the Authority to the project Director of PMC)

(2) The measurement book is the basis of all accounts of quantities whether of works done by Contractors. It should be so written that the transactions are readily traceable with PMC.

(3) These books are considered as very important accounts records and maintained very carefully and accurately as these may have to be produced as evidence in a court of law, if and when required.

(4) All the Measurement Books belonging to NMSCDCL, are numbered serially. A register is maintained showing the serial number of each book.

(5) A similar register is maintained in the PMC Office showing the names of persons, to whom the Measurement Books are issued at their levels.

**(6) Recording of measurements**

**(A) Entries at commencement of measurements**

**Each set of measurements to be recorded should commence with entries stating:**

(i) In the case of bills for works done:

- (a) Full name of work as given in the agreement/estimate.
- (b) Location of work.
- (c) Name of contractor.
- (d) Number and date of agreement.
- (e) Date of written order to commence work.
- (f) Date of actual completion of work.
- (g) Date of recording measurements.
- (h) Reference to previous measurements.

(ii) In the case of bills for supply of materials by the Vendor /Supplier:

- (a) Name of supplier.
- (b) Number and date of supply order/agreement.
- (c) Purpose of supply

(d) Date of written order to commence the supply.

(e) Date of actual supply.

(f) Date of recording measurements.

**(B) Writing of abstract**

(i) A suitable abstract should then be prepared which should collect in the case of measurements for works done.

**(C) Nomenclature of item**

(i) In case of extra/substituted item of work that is not covered in the agreement, the full nomenclature shall be reproduced in the Measurement Book and the bill form.

(ii) The full nomenclature of the items shall be adopted in preparing abstract of final bill in the Measurement Book and also in the bill form for final bills.

**(D) Cross reference in case of running account bill If the measurements are taken in connection with a running contract, a reference to the last set of measurements, if any, should be given.**

**(E) Recording of date of completion**

(i) If the entire job or contract has been completed, the date of completion should be duly recorded.

(ii) If the measurements taken are the first set of measurements on a running account, or the first and final measurements, this fact should be suitably noted against the entries in the Measurement Book, and in the latter case, the actual date of completion should be recorded.

**(F) Neat recording of measurements**

All measurements should be recorded neatly in the Measurement Book.

**(G) Signature of the contractor.**

The signature of the contractor or his authorized representative and PMC or his authorised representative should be obtained in the Measurement Book for each set of measurements.

**(H) Measurements in ink**

The measurements shall be recorded preferably in blue ink.

**(I) Making corrections in measurements**

(i) No entry shall be erased or overwritten. If a mistake is made, it should be corrected by crossing out the incorrect words or figures and inserting the correction. The correction thus made shall be initialled and dated by the officer recording/checking measurements.

(ii) When any measurements are cancelled or disallowed these must be endorsed by the dated initials of the Officer ordering the cancellation or by a reference to his orders, initialled by the Officer who made the measurements, the reasons for cancellation being also recorded.

**(J) Page numbering**

(i) The pages of the Measurement Books should be machine numbered.

(ii) Entries should be recorded continuously and no blank page left or torn out. Any pages or space if left out blank inadvertently should be cancelled by diagonal lines, the cancellation being attested and dated.

**(K) Recording of measurements only by authorized persons**

All items of work in a project irrespective of their cost shall be measured and recorded by the authorised representative/engineer of PMC of the work. It is, however, open to the PM to check and or the DGM to record measurements for any particular item of work himself.

**(L) Certification of measurements**

The person recording the measurements should record a dated certificate "Measured and recorded by me" over his full signature (with designation, name of contractor PMC etc.) in the Measurement Book.

**(7) Review of Measurement Books**

(A) The Measurement Books are required to be reviewed periodically by CFO (Chief Finance Officer of NMSCDCL).

(B) The review by the CFO shall be in the following respects:-

(i) To compare the books in use of the Register of Measurement Books maintained in, and to note necessary corrections in the Register.

(ii) To see that no original sheet is torn out of a Measurement Book, nor any entry erased or disfigured, and that the corrections made therein are initialed.

(iii) To see that pencil entries are not inked over.

(iv) To test check the accuracy of calculations.

(C) On receipt of the Measurement Books in the NMSCDCL, the DGM should indicate the "Review Notes" in each Measurement Book as to which of the calculations are to be test checked by the CFO. The extent of this check will be determined by the DGM having regard to the result of the last review, and should cover complete set of measurements.

(D) Payments based on the entries reviewed should be traced into various accounts and verified. Similarly, supplies or issue of materials should be traced into the various accounts, contractor's ledger, etc. and verified.

**(8) Loss of Measurement Books**

(i) When a Measurement Book is lost, an FIR should be lodged with the police by PM/DGM as per report received from PMC.

(ii) An immediate report of the facts of the case together with an explanation of all parties concerned responsible for the loss should also be made promptly to the CEO, NMSCDCL, who is empowered to sanction the write off of the lost Measurement Books. In case of theft or loss of a blank Measurement Book, the CEO shall be the competent authority to write off the loss.

(iii) It is also necessary that the measurements in the lost Measurement Book should be re-constructed at the earliest.

**(9) Notice to the contractor before recording measurements - action to be taken if he fails to respond**

- (i) Before taking any measurement of any work, the PMC or authorised representative deputed by them shall give 3 days' notice to the contractor. If the contractor fails to attend at the measurements, after such notice or fails to countersign or to record objection within a week from the date of measurement, then the measurements recorded in his absence by the PMC or authorised representative deputed by them as the case may be shall be deemed to have been accepted by the contractor. However, for such action intimation should also be given to PMC/DGM, so that they will attend for witnessing the measurements which are to be taken in absence of the contractor.
- (ii) These instructions will not apply in cases where the contractor is to submit computerized measurements to the NMSCDCL and ultimately sent to PMC for verification and comments.

**(10) Preparation of bill**

- (i) On completion of the abstract, the Measurement Book should be submitted to the PMC, personnel, who after carrying out his test check should enter the word "Check and bill" with his dated initials. The concerned representative of PMC should then check the calculation of quantities in the abstract, and the bill in case of work carried out by contract, and should then place the Measurement Book and the bill before the PMC who, after comparing the two, should sign the bill and the Measurement Book at the end of the abstract.
- (ii) All corrections made by the account/audit staff should be in red ink.
- (iii) As regards certification for quality of works, an interim payment certificate must be enclosed along with R.A. bill with dated signature of project Director of PMC. The format of such certificate is as per Annexure-X.
- (iv) The bill checked by PMC, be submitted in the office of NMSCDCL where thorough checking will also be exercised by PM/DGM and CEO, PMC (as reviewed by EIC)

**(11) Recording measurements of laying of steel**

- (i) Wherever the structural drawings that are approved by the PMC/NMSCDCL for a work contain the bar bending schedule, the measurements of reinforcement bars laid shall be recorded on the basis of this schedule after due verification that they have been laid in conformity to the structural drawings. The bar bending schedule shall show the extra percentages that shall be allowed for laps and wastages. Detailed measurements of each and every bar shall be dispensed with in such cases.
- (ii) In other cases, the bar bending schedule shall be prepared by the contractor, and checked and signed by the PMC before the bending of bars is taken up at site.

**(12) Recording measurements for levelling work of various items related to works.**

**(12.1) Level Books**

In case of levelling operations for earthwork and various items related to works, measurements are required to be recorded in Level Books in addition to Measurement Books. The Level Books should be numbered, accounted for and handled like Measurement Books.

**(12.2) Preparatory works**

Before starting the any work, the following steps should be taken:

- (i) Original ground levels should be recorded by PMC in the Level Book in the presence of the contractor or his authorized representative, and should be signed by him and cross checked by PMC who records the levels. All the local mounds and depressions should be indicated clearly in the drawing and the field Level Book, and should be checked by test the PM/DGM before the levelling work is started.
- (ii) A suitable baseline should be fixed with permanent RCC/masonry pillars at distances not exceeding 150 meters to provide a permanent reference line for facilitating check work. The base line(s) should be entered in the Level Book with co-ordinates. These baselines should be maintained till the final payment for the work has been made. All levels shall be taken as per Total Station Method (TSM) or any other advanced method of levelling.
- (iii) While recording the levels, it should be ensured that the circuit is closed by taking final levels of the starting point or any other point, the R.L. of which was previously determined.
- (iv) Plans showing initial levels, location of bench marks and reduced levels, should be prepared and signed by both the parties and attached to the agreement before commencement of the work.

### **(12.3) Test check of the levels**

- (i) The PM should exercise test check at least to the extent of 50%, and the DGM at least to the extent of 10%.
- (ii) The test check of the levels should be carried out independently, and the readings should be recorded in the prescribed Level Book against the old levels which should be neatly scored out wherever necessary. If the test check carried out reveals serious mistakes in the original levels, these should be taken or re-taken and re-checked.
- (iii) The test check carried out by PM/DGM should be as representative as possible for the entire work done.
- (iv) On completion of work, the levels should again be recorded in the Level Book by the PMC and contractor's signatures obtained. These levels should also be test checked by the PM/DGM to the same extent as indicated in (i) within one week of the date of completion of the earlier work, and according to the procedure as laid down in the case of initial levels as indicated above.
- (v) The formation levels as per final execution of the work should be compared with the proposed formation levels as per approved design and drawing as Good For Construction (GFC) and the work got rectified within permissible tolerance.

### **(12.4) Payment for levelling work**

- (i) Every Second running bill (Such as 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup> etc..) and the final bill should be paid on the basis of levels.
- (ii) Intermediate payments can, however, be made on the basis of borrow pit/tape measurements. The PMC/PM/DGM should take care that the quantities thus assessed are not in any case more than the actual work done.

### **(12.5) Large scale levelling work**

- (i) In case of large-scale levelling work involving both cutting and filling in road works or any other major civil structures projects an accurate site plan should be prepared before the

work is commenced. The portions requiring cutting and filling shall then be divided into squares and corresponding squares into filling, which are complementary to the squares in cutting given the same number.

- (ii) A table may be written upon the plan showing leads involved between the various complementary squares. This would form a lead chart for the work to be done.
- (iii) Before the work of levelling is commenced, the lead chart shall be checked by the PM in the presence of PMC and the contractor or his authorized representative, and his signatures shall be obtained on the same. This should form an integral part of the contract and should be duly signed by both the integral parties (i.e. contractor and PMC) before commencement of the work.
- (iv) The quantity payable for earthwork shall be lower of the quantity derived from cutting or filling. The payment for lead shall be based on lead chart prepared in the aforesaid manner.

**(13) Payment of bill**

(i) Part rates

Full rates, as per agreement order should be allowed only if the work or supply has been accepted as of required quality and specification.

(ii) If the contract is determined, or an on-account payment is to be made when the contract is to run, a part rate as considered reasonable approved by the bill passing authority shall be allowed with due regard to the work remaining to be done and general terms of the agreement.

(iii) In case of supplies, the payment is not permissible until the materials have been received to actual site of work, examined and accepted.

(iv) In case payment has been permitted on production of dispatch documents etc. the payment should be treated as advance against the final settlement on receipt, examination and acceptance of the materials.

(v) If at all payment is to be made to the material actually procured at site of work, but not utilised against respective item of work, then the advance up to 75% of actual cost of material and shall be adjusted during subsequent R.A. bill towards completion of corresponding item of work.

**SOP No. 9 : Recording of Hindrances**

1. Whenever any hindrance whether on part of department as covered under clause or events including those beyond the control of contractor causing delay in the work comes to the notice of the PMC and PM, he immediately makes a note of such hindrance in the register, electronic or kept at site and reports it to the DGM within a week by official mail.
2. The DGM reviews the Hindrance Register at least twice in a month or during his inspection
3. The proforma for the Hindrance Register is as per Annexure IX.
4. The following points are kept in mind while entering the hindrances in the Hindrance Register:
  - (i) The entry of date of start of hindrance and date of removal of hindrance are made within 48 hours of the hindrance takes place or the cause of the hindrance is removed, respectively.



**(Note :** The DGM is to work out the rescheduling the milestone/s and extension of time considering the events recorded in the hindrance register and the impact of relevant events on the planned programme of the contractor and forward the same to the GM/Authority for revision of milestones or extension of time within one week of receipt of the same from the PMC/Contractor)

**SOP NO. 10 : EOT & Rescheduling Of Mile Stone**

1. The contractor may apply to the authority within stipulated period (as per provision of contract Agreement) in writing for extension of time stating the grounds that hindered the execution of work. The PMC should recommend with justification regarding the same. PM is to verify all the facts mentioned by PMC.
2. The Authority is to see the grounds shown for the extension of time are reasonable as per recommendation of DGM/GM.
3. Based on hindrance register the Authority may also grant EOT as per justification of PMC and recommendation of GM.
4. Extension of time is to be granted and milestones rescheduled by the Competent Authority strictly as per the terms of the Contract Agreement.
5. The justified extended time shall be promptly and firmly decided throughout the work and actual progress monitored with reference to the same. If the extension entitled for extra work cannot be fully and properly assessed before completion of the work, this should be assessed on the work nearing completion. Such extra time, if any, is to be added to the extension of time granted earlier and notified by Authority before final action.
6. All extensions of time shall be with a firm date as per due assessment on record while giving such extension and in no case there shall be any provisional extension of time.
7. In case there is any prevention by the NMSCDCL, such authority should invariably and promptly grant extension of time under the relevant provision in the clause, even if the contractor fails to apply, however making the point of non-application by contractor clear in the letter of extension of time. This should be based on recommendation by the PMC and ascertained by DGM/GM on the basis of relevant event recorded. It shall be the duty of DGM/GM to bring such fact of prevention to the knowledge of the Authority immediately and initiate immediate remedial measures to avoid delay in work on such account.
8. In case the contractor does not give any such programme and the contract has not been determined for non-completion of work in the justified extended time, the GM/Engineer-in-charge shall fix a reasonable time as per proposed from PMC/DGM duly assessed on record in writing for the balance work and shall issue similar notice intimating the failure on the part of the contractor to give any programme to complete the work and making such time as essence of the contract for performance by the contractor with liability under relevant clause.
9. The powers and procedure for grant of justified extension of time shall be as provided in the contract. Time need to be extended based on due evaluation of causes listed in the contract. Hence first there has to be determination of whether such causes are relevant; causes entitling the contractor to extension. If the causes are not relevant (i.e. do not fall under any of the category listed in clause) there can be no justified extension of time for such causes. In case the causes or the events causing delay in work are relevant causes or events then there has to be an objectives assessment of the impact of such causes on the final or sectional completion date.
10. Certain relevant causes or events may disrupt the work and even entitle the contractor to rescheduling of milestones, but not entitle him to extension of time or entitle him to

extension of time or entitle him to extension of time only partially. However, any relevant event affecting any critical activity shall invariably entitle the contractor to extension of time or entitle him to extension of time only partially. However, any relevant event affecting any critical activity shall invariably entitle the contractor to extension of time for its full impact even if other non critical activities are in progress during such time. Hence the determination of justified extension of time shall be purely based on how relevant events impact the critical activities. Such an evaluation should be made considering the impact of the relevant event on the planned and approved programme of the contractor.

## **SOP No. 11 : Documentations Of Accounts**

### **(1) Bills Register**

- (i) A consolidated record of all the bills received from the PMC in respect of works/supplies is maintained as the Register of Bills in the office of NMSCDCL.

### **(2) Contractor's Ledger**

- (i) The accounts relating to contracts/ supplies should be kept in a bound book known as the "Contractors Ledger" in the Account Branch under control of CFO (Chief Finance Officer).
- (ii) A separate folio or set of folios should be reserved for all the transactions with each contractor/supplier, for whom a personal account should be maintained. The register should be properly indexed.
- (iii) A personal account should be opened in the ledger for every contractor.
- (iv) The Contractors' Ledger should be written up and maintained up-to-date.
- (v) The Ledger accounts should be closed and balanced monthly the amount outstanding is shown, if any, under each of the three suspense accounts i.e. (i) Advance payments (ii) Secured Advances and (iii) Other transactions.
- (vi) The CFO on behalf of CEO, NMSCDCL is responsible for correctness of entries in the Contractors' Ledger and balances at the closing of the month. All the personal accounts in the Ledger should be examined to see that:
  - a. The balances do not remain outstanding for a long time without justification, and
  - b. The bills are prepared at reasonable intervals in the case of running accounts.

### **(3) Register of Works**

- (i) The permanent and collective record of the expenditure incurred in the NMSCDCL during a year on each work is the "Register of Works". This record is maintained in the NMSCDCL Office under control of CFO.
- (iii) Generally, in cases of Major Works, the account of expenditure incurred is maintained in detailed Form of the Register of Works.
- (iv) The Registers of Works are posted monthly from Works Abstracts. Separate folio or set of folios in Register should be assigned to each Work estimate.

## **SOP No. 12 : Avoidance of Sub Standard work**

### **I. Avoidance of sub-standard work**

1. The contractors are required to execute all works according to the specifications laid down, and in a proper workman like manner. The motto of the PMC/NMSCDCL shall remain quality, speed and economy in cost in the execution of any work. There shall be no compromise on the quality of work.
2. The field staff, namely, the PMC/PMs/DGMs, shall remain vigilant to see that the contractor does not execute any defective/poor quality work. If, despite their vigilance and issue of directions, certain items of work are done below specifications, and/or if they have not been done in a proper workman like manner, the contractor should be immediately asked to rectify by issuing NCRs (in format as per Annexure- IV) and re-do them according to the specifications, and according to sound engineering practice. In this regard, the contractor shall submit compliance of NCR within stipulated period to PMC for verification and to be reviewed by PM/DGM.
3. All such defects/deficiencies in the items of works are to be noted in time and recorded in the Site Order Book. It will be the duty of the PMC and field staff of NMSCDCL to point out such defects in the work in time during the progress of the work.
4. These defects should also be brought to the notice of the DGMs/GM immediately on their occurrence by the PMC/PMs of NMSCDCL, so that he may take timely action to issue notices to the contractor by issuing NCR by PMC either to rectify the defects or even to get the work dismantled and re-done if necessary as per clauses relevant of the contract agreement. The DGMs shall also on his own inspect the work as frequently as possible and take timely action to issue such notices to the PMC and contractor with intimation to GM.
5. Every attempt should be made to issue such notices regarding the defective/deficient items immediately on their occurrence during the progress of the work. Timely action alone can prevent occurrence of defects/deficiencies that will be difficult or impossible to rectify later on. Also NCRs issued from time to time must be complied in all respects along with rectification.
6. Where such defects/deficiencies crop up during the Defect liability period, notices for re-doing/rectifying the same should be issued within the prescribed defect Liability period.
7. If the contractor does not rectify the defect or make good the deficiency, the work should be got re- done or rectified through another agency, at the contractor's risk and cost in terms of the relevant and similar conditions mentioned in Contract Agreement.

### **Operation of Contract Clauses**

#### **1) Extension of time due to variations in items executed**

As regards the extra time for completion of the work due to deviations in agreement items and altered, additional or substituted items, the PMC and Engineer-in-charge should determine the proportion that the algebraic sum of deviated, altered, additional or substituted work bears to the original contract work and certify for such portion. For substituted items, the additional cost of modified component only is to be taken. The time limit may be extended for the completion of the work according to such proportion plus 25% thereof. The proportion so determined and recommended by the Engineer-In charge

is to be by competent- Authority and the contractor cannot raise a dispute as to such proportion and demand any claim for that.

## **2) Procedure for sanction of items**

- (i) On receipt of the items duly supported by analysis of rate from the contractor as intimated by him to PMC, the Engineer-In-charge should consider whether the rates demanded therein are reasonable. If he is of the opinion that they are reasonable, he may agree to the rates after consulting the Competent Authority. If on the other hand he is of the opinion that the rates demanded are not reasonable and he does not agree to them, but agrees to the admissibility of these items, he should determine the rates on the basis of the respective schedule of rates/market rates within prescribed time limit. As far as possible, the market rate analysis should be based on competitive statement of competitive quotations (minimum three) as recommended by PMC.
- (ii) The contractor on no account shall suspend the work on the plea of non-settlement of rates of items.
- (iii) For operation of this clause, the following points may be necessary:
  - (a) There should be written order for deviation and recommendations from PMC to NMSCDCL.
  - (b) The rates for deviated items are to be based on respective departments schedule of rates or if no such rates available in schedule of rates the market rates will prevent. The work shall not be suspended on the plea of non-settlement of rates.

### **SOP No. 13 : Quality Assurance And Technical Audit**

**The various steps regarding Quality Assurance and Technical audit are to be followed as below:-**

#### **1.0 Minimum Quality Assurance Plan**

- (i) Minimum Q.A. Plan for all major projects shall have to be part of tendered document for all the works and to be submitted by the contractor and verified by PMC for review of NMSCDCL.
- (ii) Lot size, number of required tests and frequency of testing needs to be clearly indicated in QA Plan. Volume of work, Practical Difficulties and Site Conditions etc. may also be kept in view and lot size, number of tests and frequencies of testing may be mentioned suitably.
- (iii) It should clearly indicate the Machinery and other Tool & Plants required to be deployed at site by the contractor.
- (iv) Requirement to set up field laboratory should be defined. All the testing equipment to be arranged by the contractor should be clearly mentioned. A list of field equipment for typical field laboratory shall also be mentioned.
- (v) All the relevant and applicable codes, specifications and standards, as well as the acceptance criteria for various items of work, workmanship, materials and process employed needs to be mentioned work methodology/procedure and work schedule/plan to be mentioned.
- (vi) A proper/detail schedule showing quantity of materials to be brought at site either in one lot or at different stages of work should form part of QA Plan.
- (vii) Maintenance of Register of Tests –
  - (a) All the registers of tests carried out at Construction Site or in verified outside laboratories shall be maintained by the contractor which shall be by PMC and reviewed by Engineer-In-Charge.
  - (b) All Samples of materials including Cement Concrete Cubes may be taken jointly with Contractor by PMC and out of this at least 50% in presence of PMs & 10% by DGMS.

All the necessary assistance shall be provided by the contractor. Cost of sample materials is to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site.

- (c) All the test in field lab setup at Construction Site shall be carried out by the Engineering Staff deployed by the contractor, 100% witnessed by PMC and 50% by PMs and 10% by DGMs.
- (d) All the entries in the registers will be made by the designated Engineering Staff of the contractor and same may be regularly reviewed by PMC/PMs/DGMs.
- (e) Contractor shall be responsible for safe custody of all the test registers.
- (viii) Submission of copy of all test registers, Material at Site Register and Hindrance Register along with each Running Account Bill and Final Bill shall be mandatory. These registers should be duly checked by PMs and receipts of registers should also be acknowledged by Accounts Officer by signing the copies and register to confirm receipt in NMSCDCL office. If all the test registers and Hindrance Register is not submitted along with each R.A.Bill & Final Bill, no payment is released to the contractor.
- (ix) Minimum QA plan may vary work to work basis depending upon nature and volume of work (i.e. for road work, civil/structure work, water supply work, sewerage work, water retaining/conservation/resources structures Building work etc.)
- (x) The GM shall also have to check and sign compliance of the Quality Assurance Plan for the work costing above Rs.2 crore. The GM shall ensure that the Quality Assurance Plan is complied for every such work, It will be his responsibility to locate the lapses or deficiency and take suitable action if the quality assurance plan is not implemented in spirit by contractor and action is not taken by the PMC/PMs/DGMs.

## **2.0 Organizational set-up of Quality Assurance Unit**

The implementation of Quality Assurance in the field will require close co-operation among the agencies, namely (a) field engineer of PMC (b) the construction agency, and (c) the field and Quality Assurance team at NMSCDCL level for strict compliance of Quality Assurance Procedure.

## **3.0 Checklist**

- (a) As and when any important item is taken up for execution, the PMC/PMs should go through the specifications and invariably make a checklist of those items.
- (b) This checklist may be got approved from the DGMs, and should be shown to the inspecting officers/GM/CUP/EIC during his visit.
- (c) The important items inter-alia include foundation work, including reinforcement and shuttering, cast-in-situ including road works, RCC works, Building works, Civil/Structure works, water supply, sewerage pipe lines, earth filling etc. which are a few illustrative items for check- list purpose.
- (d) Sample checklists for items of above works and concrete for raft, columns/beams/slabs, water supply lines etc. to be prepared by PMC before start of work and got reviewed by DGM/GM for implementation during execution of work.
- (xiii) To avoid dampness and leakage, the DGMs shall ensure that necessary tests are carried out for proper slopes in road works, drainage arrangements, water tightness of expansion joints, joints in the water supply, drainage and sewerage works before these are covered/ concealed, and also ensure rectification of defects noticed.

- (xv) The DGMs ensure availability of the required test equipment for field tests, as well as an updated copy of specifications, copies of agreement at sites of works.
- (xvi) During periodical visits, efforts of the PM (QA) should be directed at:
  - (a) To check the quality of materials accepted by the field units for use in the work and to see whether the laid down system of 'Quality Assurance Plan' has been followed.
  - (b) To check the overall quality of the finished items. Random checks shall be applied by the PM (QA) with the help of handy instruments like impact hammer for determining the strength of concrete, electronic moisture meter for testing moisture content etc.
  - (c) To randomly check the field tests carried out by the field staff during the progress of the work.
  - (d) To provide guidance to the field staff in case of any problem relating to routine field tests.
  - (e) Finally, on the basis of these observations with regard to the quality of works, general adherence to the quality assurance procedures and the standard of progress, he shall submit an overall assessment report to the GM/EIC. The GM/EIC will then send the report to the DGM/ PMC for necessary compliance by the contractor regarding the same.
  - (f) It should be ensured by the PMC/DGM that compliance of such report/observations are done by the contractor before submission of next R.A. Bill for payment.

#### **4.0 Additional SOP for quality Control/Assurance in construction of Roads.**

- (i) The construction of quality roads are not only essential for efficient utilization of national resources and capital cost but also to provide safe and comfortable journey to the road users with minimum operating cost.
- (ii) Though the contractor is primarily responsible for construction of quality road yet the role of other stakeholders (Such as SPV, PMC, QC etc.) are also equally important to ensure quality control/assurance.
- (iii) The construction of Roads is carried out as per the standards and specifications laid down in various IRC standards and MoRTH Specification and guidelines from UD dept. regarding Urban Roads and Bridge works. To ensure quality, field laboratory is to be established and manned by qualified engineers /technician. The quality of natural materials, factory manufactured materials, specialized items, mix items are important for construction of quality roads. The various quality control tests on various ingredients and mixes and their frequencies are stipulated in MoRTH specifications for road and bridge works. As such it is important for all the stakeholders to ensure that all the quality test at the specified frequencies are conducted.
- (iv) In case quality control/assurance is not ensured as per codal provision of MoRTH/IRC various deficiencies to the finished product may occur. Some of these deficiencies and areas of concern where attention of all the stakeholders is required may be as under:-
  - a) Inadequacy in thickness of granular/bituminous/concrete layers.
  - b) Quantity of bitumen as per design mix.
  - c) Not using specified grade of bitumen.
  - d) Depression/cracks in concrete slabs.
  - e) Bituminous mix not conforming to acceptance criteria.

- f) All the tests specified in the IRC code/ MoRTH specification for the materials i.e. bitumen, cement, steel, aggregates etc and propriety items i.e. expansion joints, bearings etc must be carried out at site laboratory or by third party which are most often left out
- g) All the tests required for Soil and aggregates.
- h) Test on various ingredients and mixes at the specified frequency. Bitumen is to be purchased from oil refineries rather than private agencies.
- i) Providing proper slope and compaction of earthen shoulder and embankments.
- k) Shifting of utilities are to be done as far as possible at the extreme boundary of ROW.
- l) Deployment of adequate personnel by the contractor and Engineer to ensure quality control /assurance.
- m) The quality checks and tests, as specified in contract agreement, are to be witnessed by the PMC/NMSCDCL.
- (v) The various aspects of quality control/assurance have been specified in IRC: SP: 112-2017 “Manual for Quality Control in Road and Bridge works” which has to be referred in conjunction with MoRTH specification for road and bridge works. Some of the important requirements for implementation of quality assurance system efficiently and role/responsibility of various stakeholders shall be as highlighted below:

**A) Contractor**

- a) The field laboratory shall be setup with adequate equipment and facilities not limited to the provisions as stipulated in clause 120 of MoRTH specification for Road and Bridge works.
- b) The field laboratory shall be adequately lit, ventilated, with proper water supply and sanitary arrangements. Separate room shall be arranged for test that uses inflammable substances. The quality control engineer shall regularly ensure about the proper maintenance and upkeep of field laboratory.
- c) The personnel responsible for the quality control i.e. Material Engineer, Quality Control Engineer, Lab Technician etc. shall be of proper qualification, experience and expertise. The contractor shall engage adequate number of these personnel for quality control/assurance.
- d) The quality assurance plan incorporating organizational duties, responsibility, procedure, inspection, tests frequencies, acceptance criteria, internal audit etc. shall be submitted by the Contractor for the approval of PMC and for review of NMSCDCL.
- e) Normally most of the tests on factory manufactured materials such as Steel, Bitumen, Cement, Geo-synthetic etc. and specialized items such as crash barriers etc. are conducted in the manufacturer’s laboratory or specialized laboratory. However, certain tests are also to be conducted by the contractor on such materials in the field laboratory as indicated in IRC: SP: 112-2017 to ascertain the quality.
- f) Most of the equipment used in the field laboratory involves measuring devices such as proving rings, dial gauges, load cell, temperature gauges, weighing pads etc. whose accuracy degrade with the passage of time, due to their wear and tear. As such calibration of these devices should be carried out as specified in the IRC:SP:112-2017 to ensure reliability of the material/mix.

- g) All the inspection, measuring and testing equipment shall be calibrated with the help of NABL accredited laboratory and verified prior to their use and also at specific interval as specified by the equipment manufacturer and/or other standards available in this regard including IRC:SP:112-2017.
- h) All the Plant, Equipment and Machinery deployed in the project are to be regularly calibrated and maintained for their intended use by the contractor. Some of the calibrations can be done at site by an external agency which is qualified and accredited to perform a specific calibration. For details including frequency of calibration IRC: SP: 112-2017 may be referred.
- i) The performance of the paver and grader etc. in producing the desired workmanship and finished properties shall be verified in the field and suitable corrections shall be made to the equipment/processes. The plant or equipment, which is unable to produce the desirable quality at site shall be removed and replaced with the approved equipment as per contract.
- j) All the ingredients of GSB, WMM, Bitumen layer, concrete etc. shall be tested on day to day basis at various stages including in stock piles, bins, dry mix, final mix loaded in the truck and at field as applicable and relevant.
- k) Samples shall be collected from the pavement layers prior to compaction and after compaction to verify the properties of mix including its density etc.
- l) Process parameters viz. moisture, temperature, line and level shall be checked prior to compacting the layers so that the end product fulfills the requirements of the specifications.
- m) Some of the tests may have to be conducted in the third party laboratories in case of special tests and also if the contractor does not have the test equipment and expertise to carry out the tests which include special tests on cement, bitumen, aggregate, Geo-synthetic, Reinforced Earth fill, stone polishing value of aggregate etc.
- n) The Contractor shall maintain all the records/documents for quality control/assurance and handover a copy of it to the Authority's/independent Engineer before the completion certificate is issued.

**B) Project Management Consultant (PMC)**

- a) The PMC shall approve the field laboratory of the contractor and ensure its proper maintenance/upkeep.
- b) The personnel responsible for the quality control i.e. Material Engineer, Quality Control Engineer, Lab Technician etc. shall be of required knowledge, experience and expertise. The PMC shall engage adequate number of these personnel for quality control/assurance.
- c) The quality assurance plan submitted by the contractor shall be approved by the PMC and be submitted to NMSCDCL for review
- d) The PMC shall witness certain percentage of in-house tests conducted by the manufacturer/supplier and check the test reports for all the factory manufactured materials such as Steel, Bitumen, Cement, Geo-synthetic etc. and specialized items such as crash barriers etc.
- e) The PMC based on quality assurance plan and certain test report/test conducted on the factory manufactured items shall approve the source of supply for such factory-made items. The manufactured material shall be tested at field laboratory and in the accredited laboratory as relevant, as determined by the PMC and submitted to NMSCDCL for review.



- f) The PMC shall ensure and certify about the calibration of measuring devices such as proving rings, dial gauges, load cell, temperature gauges, weighing pads etc. used in the field laboratory.
- g) The PMC shall regularly ensure that the contractor carry out the calibration of all the Plants, Equipment and Machinery deployed in the projects on regular basis for their intended use.
- h) The PMC shall verify and check the performance of the paver and grader etc. in producing the desired workmanship and finished properties. If required, suitable corrections shall be got made to the equipment/processes or equipment replaced so that desired quality is achieved at site.
- i) The PMC shall ensure that all the ingredients of GSB, WMM, Bitumen layer, concrete etc. are tested on day to day basis at various stages including in stock piles, bins, dry mix, final mix loaded in the truck and at field as applicable and relevant and also witness requisite test and issue his acceptance before laying next layer.
- j) The PMC shall ensure collection of samples from the pavement layers prior to compaction and after compaction to verify the properties of the mix including its density etc.
- k) Process parameters viz. moisture, temperature, line and level shall be checked by the PMC prior to compacting the layers so that the end product fulfills the requirements of the specifications.
- l) In-process inspection and final inspection against a standard checklist given in MoRTH specification should be ensured by the PMC for proper quality of work as per specifications and standards.
- m) The PMC shall also witness certain percentage of quality tests as specified in the Contract Agreement. The PMC should exercise 100% of the quantity or number of tests described for each category or types of test for quality control.
- n) The PMC shall submit a monthly inspection report to the NMSCDCL and copy to the Contractor bringing out the result of inspection. Wherever a material/work does not pass acceptance criteria as per MoRTH specifications for road and bridge work and additional quality characteristic for factory manufactured and specialized items, the PMC has to decide following option in accordance with the condition of contract/specification
- i) The work to be re-carried out to meet acceptance criteria.
  - ii) The work to be accepted with reduce pay factor.
  - iii) The material may be re-graded for alternate use.
  - iv) The work may be rejected and replaced.
- o) Some of the tests may have to be conducted in the third party laboratories in case of special tests and also if the contractor does not have the test equipment and expertise to carry out the tests which include special tests on cement, bitumen, aggregate, Geo-synthetic, RE fill, stone polishing value of aggregate etc. The PMC can also order confirmatory tests in external laboratory, even though the contractor has the test facility at site laboratory.
- p) The PMC shall ensure that the Contractor submits all the records/documents for quality control/assurance and handover a copy of it to the NMSCDCL before the completion certificate is issued.

q) The completion certificate is to be issued by the PMC with the prior approval of NMSCDCL, as per provision of the Contract Agreement. The PMC should ensure that a video of completed work on the date of completion should invariably be prepared and furnished as an authentic documentary evidence of completion of works within 15 days of completion without which completion certificate should not be issued. PMC apart from furnishing certificate of completion and all tests as per specifications in accordance with contract, would also certify that all NCRs issued during the contract have been closed after successful rectification of defects within the completion date.

**C) NMSCDCL (SPV)**

a) At least one person from NMSCDCL of minimum Project Manager level to be designated for the purpose of quality control/assurance. The designated person shall ensure that all the Contractors /Engineers have fulfilled their obligations/role, as stipulated above, towards the achievement of quality control/assurance.

b) The NMSCDCL officials (PMs/ DGMs) shall devote more time for inspection of the work and shall also ensure that certain quality tests during execution of the work and also on completion of the work are performed in their presence.

c) The NMSCDCL officials (PMs/DGMs) have to ensure that all works are being executed strictly in accordance with the requirement of the MoRTH specifications. He shall ensure that the contractor has setup a field laboratory with adequate equipment and personnel in order to carry out quality control test for works as per specifications of MoRTH. A certificate in this regard shall be issued by the DGMs while countersigning the very first bill of the contractor.

d) The NMSCDCL officials (PMs/DGMs) shall visit frequently during the construction period of the projects, preferably during the stage when bituminous work/concrete work is being carried out by the contractor. During the visit, some tests shall also be performed during their presence.

e) The details of such tests performed by the PMs as mentioned in above shall be indicated in the bills to be countersigned by the DGMs before releasing the bill.

f) The PMs/DGMs shall not delay in releasing/counter signing the bill of the contractor. The time limit prescribed in the contract agreement for making the payment to the contractors is to be adhered by the NMSCDCL.

g) The completion certificate is to be issued by the PMC to NMSCDCL for review Authority with the prior approval of NMSCDCL as per provision of the Contract Agreement. Therefore, NMSCDCL should ensure that the completion certificate is approved after verifying/ confirming that all works/ items including ancillary items forming part of the project are completed in all respect conforming to the Standards & Specifications. A video of completed work on the date of completion should invariably be prepared and submitted as an authentic documentary evidence of completion of work.

h) The NMSCDCL should also verify/ confirm that the work has been completed in all respects, before considering the payment of final bill.

**D) Quality Control Set up.**

a) Formulation of policy guidelines, dissemination of information on practices and suggesting measures/issuing direction for system improvement on Quality Assurance & Quality Control for road works among NMSCDCL.

b) Quality Control setup in the NMSCDCL may request PMC/PMs/DGMs to submit the documents related to the quality control/assurance and their inspection report of any project under their jurisdiction. Based on such documents received in the Quality Control setup and their inspection report, further instructions may be issued for necessary compliance including non-acceptance of some of the works completed without following the due procedure as stipulated in the quality assurance plan or not meeting the quality standards as stipulated in the IRC Codes/MoRTH specifications.

c) An Officer of Quality Control Setup or a team may select any of the sites, on random basis and may inspect the records/documents related to quality control/assurance. The Officer of Quality Control set up or a team may also carry out certain tests in their presence to check the quality of the ingredients & mix and acceptance properties of finished work etc. Based on such inspection of quality control setup, instructions with the approval of GM/CEO may be issued to the PMC/Contractor for necessary compliance.

(vi) An indicative checklist consisting the roles and responsibilities of various stakeholders for quality control/ assurance is also attached at Annexure - XI

**SOP No. 14 Responsibilities of the construction staff/Sr. Staff, of PMC, PMs, DGMs and overall control of GM/CUP/EIC.**

(i) To ensure that materials duly approved by the competent authority are used in the work, samples of various materials in repetitive type, important/ big works is approved by DGM concerned and for comparative small works the samples of various materials is approved by the PMs.

(ii) Wherever necessary the PMC/DGM approves the sources for respective materials.

(iii) Samples of materials is approved by the PMC/DGM and signed by him and the contractor and preserved till the end of the project.

(iv) Samples of various materials, fittings are approved well in advance and displayed at sites of works with make and name of the manufacturer/supplier.

(v) The material non confirming to specifications are promptly rejected and removed from site.

(vi) It is incumbent upon the PMC/DGM to keep a watch over regular testing of materials before making payment at the stage of each running bill.

(vii) Samples for tests are taken mostly by the PMC and some (about 50%) by the PMs. Samples for 10% of mandatory tests should be collected by the DGMs. 10% of the field tests are got done by the DGMs in their presence.

(viii) A file is maintained at all work sites, with copies of all inspection reports to-date.

(ix) Inspection Register, Site Order book, Record of tests, Hindrance Register, etc. are put up for entries and review to every inspecting officer.

(x) The inspecting officers of the rank of GM/CUP/EIC and above not only confine themselves to review of progress, co-ordination and general matters, but also inspect the work from quality Assurance aspects.

(xi) The GM/CUP/EIC visits each major site of work, preferably for every fortnight, but minimum once in a month. He issues Visit Note/Inspection Report regarding observations during his visit mentioning Technical Observations/lacuna's and remedial measures their of to PMC and the contractor. In this regard normally he will issue visit note/Inspection Report in the form of Annexure-XI.

(xii) The GM/CUP/EIC invariably reviews and signs the file of earlier inspections, Inspection Register, Site Order Book, Register of tests carried out, Hindrance Register, etc. during his visit to work project.

#### **SOP No. 15 : Estimates For Addition And Alteration**

1. Additions and alteration are carried out after preparations of detailed working drawings by the PMC and concurrence of the is to be obtained.
2. No work of addition/alteration involving structural changes in any work which alters the aesthetics of the structure, is carried out except with the approval of competent authority.
3. The estimates for additions and alterations to various projects include the capital cost thereof.
4. Whether the proposal has the approval of the competent Authority.
5. Information regarding availability of funds to finance the proposal and approval of competent Authority.

#### **SOP No. 16 : Upkeeping of Records of documents, drawing, photographs and video's related to work project during execution and after completion.**

1. All records of documents, drawing are to be maintained by the contractor verified by PMC and reviewed by DGM during execution and after completion of work project.
2. The designs and drawings in form of good for construction (GFC) are to be maintained by the contractor as approved by PMC and reviewed by NMSCDCL during execution of work project. Also, 'As Built' drawings and designed to be prepared as approved by PMC and reviewed by NMSCDCL after final completion of work project.
3. All records of geotagged photographs/Albums to be maintained by the contractor at his own cost as verified by the PMC and reviewed by NMSCDCL during execution and after completion of work project. Register is to be maintained by the contractor/PMC in form of Annexure-XII for photographs and in form of Annexure-XIII for videos. All such documents /registers to be submitted by the PMC in every month to NMSCDCL for review.
4. A Monthly Progress Report (MPR), Quarterly Progress Report (QPR) and Annual Progress Report (APR) to be submitted by PMC including all activities of each project, along-with all details and photographs/videos to be submitted by PMC to NMSCDCL for review and record. Within 10 days after the due date of schedule of above progress reports.
5. A Completion Certificate is to be submitted by the PMC to NMSCDCL for review and record after successful completion of work project along with actual date of completion and relevant documents, As Built drawings, specific issues regarding the work project. Also handing over note/proposed to be submitted along-with completion certificate, so that to hand over such project to NMC/concern authority.

**Annexure-I**

**Name of Project :-**

**SITE ORDER BOOK (In Triplicate)**

To : \_\_\_\_\_ Position : \_\_\_\_\_

From : \_\_\_\_\_ Position : \_\_\_\_\_

Reference : \_\_\_\_\_

Subject : \_\_\_\_\_

Memo/Message/Order :

\_\_\_\_\_

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Signed Author : \_\_\_\_\_

Received by : Name : \_\_\_\_\_

Signature : \_\_\_\_\_

Time : \_\_\_\_\_ a.m./p.m.

Date : \_\_\_\_/\_\_\_\_/\_\_\_\_

Distribution :

- Original – Recipient .
- 1 Copy – Project file.
- 1 Copy – Author’s site memo file.

**Annexure-II**

**Name of Project: -**

**SITE INSTRUCTION NO.** \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

CONTRACT NO. \_\_\_\_\_

To:

\_\_\_\_\_  
Contractor's Field Rep.

Date: - \_\_\_\_\_

Site Instruction:

\_\_\_\_\_  
For PMC Engineer                      Date

Received & Noted By

C.C.: PM/PD, PROJECT MANAGEMENT, CONSULTANT

\_\_\_\_\_  
Contractor's Representative

**Annexure-III**

<b>REQUEST FOR INSPECTION/APPROVAL</b>					
<b>Name of Project: -</b>					
Client		: NMSCDCL, Nashik			
Consultant		: KPMG/Wadia			
Contractor					
Sub-Contractor		:			
Section/Location		:			
RFI No.....		Date:			
Request for Inspection on – Road works/Water supply works/Sewerage works/Civil works/ Building works					
Items	Items	Items	Items		
<b>Work Particulars:</b>					
Chainage					
BOQ Item No.					
Works Description					
Tests					
Layer/Grade/Stage					
Particulars of Test					
Previous Layer/Stage					
Date & Time					
Commencement of Work					
<b>Requested by:</b>		<b>Received by:</b>			
Name		Name			
Signature		Signature			
Date		Date			
Time		Time			
Comments..... ..... ..... .....					
<b>For Sub Contractor</b>		<b>For Construction Contractor</b>		<b>For Project Manager /Consultant</b>	
Signature		Signature		Signature	
Name		Name		Name	
Date		Date		Date	

### Annexure-IV

**Name of Project :** \_\_\_\_\_

#### Non-Conformance Report (NCR)

<b>Client</b>	<b>: Nashik Municipal Smart City Development Ltd., Nashik</b>
<b>P.M.C.</b>	<b>: KPMG, Advisory Services Ltd., Nashik.</b>
<b>Contractor</b>	<b>:</b>

<b>Contractor's Department: -</b> QC/Structures/Highways/Buildings/Water Supply/Sanitation	<b>Audit Report/RFI Ref. No: -</b>
---	------------------------------------

**PMC's Auditor(s) :-** QME/Bridge/Structural/Building/Highway/W.S./sewerage Engineer Etc. NCR No. :-

**Audited Procedure: -** \_\_\_\_\_

**Non-Conformance Statement: -**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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**Objective Evidence: -**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

<b>PMC Department Rep. (Sign)</b>	<b>NCR category (Tick One)</b>						<b>EN ISO:9001 Reference:</b>
	1	2	3	4	5	6	

**Proposed remedial Action: -**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Proposer :.....** **Completion Target Date :.....**

**Corrective/Preventive action: (Necessary Y/N) (With Comments)**

**PMC Dept. Rep. (Sign.) :** \_\_\_\_\_ **Completed Date :-**

	<b>Category</b>
1. Procedure followed but not documented	- Minor
2. Procedure changed but not amended in records	- Minor
3. Documentation not up to date	- Minor
4. Check lists and records not authenticated	- Minor
5. Procedures not followed, remedial may restore quality	- Minor
6. Procedures and documentation inadequate, product not to acceptable standards and hence requires rejection.	- Minor



**Annexure – V**

**DRAWING ISSUE FORM**

Sheet No.            of

		DATE OF ISSUE											
		Day											
		Month											
		Year											
DRAWING TITLE	DRAWING NO.	DRAWING REVISION NO.											
NO. OF DRAWINGS ISSUED TO :		Client											
Legend		Contractor											
		Site Office											
		Other											
		Information											
		Approval											
PURPOSE OF ISSUE		Comment											
		Construction											
		Other											

\_\_\_\_\_

Attached drawings have been checked and agree with above list

Issued by : \_\_\_\_\_                      Receipt Acknowledged : \_\_\_\_\_

**Annexure- VI**

**INSPECTION REQUEST FORM (INITIAL/RESUBMITTAL)**

Package \_\_\_\_\_ Section \_\_\_\_\_ Contractor \_\_\_\_\_

Activity Location	Chainage	BOQ Item	Activity Description	Schedule		Inspection Result/Remarks
				Date	Time	

Requested by : \_\_\_\_\_ Requested by : \_\_\_\_\_ Requested by : \_\_\_\_\_  
 Contractor Date/Time Contractor Date/Time Contractor Date/Time

Comments :

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Notes :

1. Contractor to submit Request minimum of 48 hours in advance of work requirements.
2. Consultants to return approved or disapproved original and one copy to the contractor before work proceeds.

Request to begin activity is:  
 APPROVED/DISAPPROVED

Request turned

\_\_\_\_\_  
 Resident Engineer  
 Date/Time :

\_\_\_\_\_  
 Contractor  
 Date/Time :

**Annexure – VII**  
**DAILY REPORT FORM.**

Date : \_\_\_\_\_

Weather A.M. \_\_\_\_\_

Page : \_\_\_\_\_

P.M. \_\_\_\_\_

Bill No. \_\_\_\_\_

<b>ACTIVITIES</b> (Item No. description, locations, quantity or work, etc.)
<b>MANPOWER</b> (Engineers, Foremen, skilled laborers, operators, others)
<b>EQUIPMENT</b> (Type, No. working/idle)
<b>PROBLEMS/ISSUES ENCOUNTERED</b> (Disturbances, accidents, etc.)
<b>REMARKS</b> (Inspecting officers, site instructions, emergency work orders, etc.)

**Prepared by:**  
**Designation:**  
**Engineer:**

**Noted:**  
**Resident**

(Contractor's Representative)

**Annexure- VIII**

**MECHANICAL PLANT/MACHINERY INSPECTION REPORT**

**Name of Project :-**

Contractor \_\_\_\_\_

Inspection Date \_\_\_\_\_ Time \_\_\_\_\_

Plant Machine Type \_\_\_\_\_ Model No. \_\_\_\_\_

Manufacturer \_\_\_\_\_ Manufacturer date \_\_\_\_\_

**General Conditions**

Description	Condition O.K./Poor/Not O.K.	Remarks/Defects
Overall Appearance		
Tyres/Drums/Tracks		
Steering		
Brakes		
Operator /Understanding /Training		
Environmental Condition		

**Specification Requirements**

Spec. Clause No.	Description Specification Requirement	Rating O.K./Poor/Not O.K.	Remarks/Defects

Final recommendations :

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Noted by :

Recommended by:

Approved by:

Signatures : \_\_\_\_\_

Designation : Contractor's Rep.

Date \_\_\_\_\_

Signatures : \_\_\_\_\_

Designation : Consultant's Rep.

Date \_\_\_\_\_

Signatures : \_\_\_\_\_

Designation : Project Manager/Director

Date \_\_\_\_\_

Copy to :

1. NMSCDCL
2. PMC
3. Contractor

**ANNEXURE - IX**

**Proforma For Hindrance Register**

Sl. no.	Nature of hindrance	Items of work that could not be executed due to this hindrance	Date of start of hindrance	Date of removal of hindrance	Overlapping period, if any	Net hindrance in days	Sign. of PM	Weightage of this hindrance	Net effective days of hindrance	Sign. of DGM	Remarks of Reviewing Officer
1	2	3	4	5	6	7	8	9	10	11	12

**Annexure - X**

**Name of Project :-**

Period : Ending Month          2019

**Interim Payment Certificate No. ....(For R. A. Bill No.....)**

**CERTIFICATION FOR QUALITY OF WORKS**

1. I certify that the above certificate is correct and just and that the payment therefore has not been received and that, with respect to any items above covering payments for materials, said materials are on hand and are properly stored and protected at near the site of the work, have been inspected and approved, are not in excess of the estimated quantities required, and are to be incorporated into the project.
2. I certify that I have checked the quantities covered in this certificate; that the work was actually performed; that the quantities, including materials furnished but not incorporated in the work, are correct and consistent with all previous computations as actually checked; and that the work, quantities and amounts are wholly consistent with requirements of contract or other instrument involved.
3. I certify that all royalties have been paid on all materials used in the works or the materials stored at the works. The original receipts/challans are also paid by the contractor to concerned Govt. Authorities.

Signature :

Signature :

Name  
Contractor's Representative  
Date :

Name  
Representative  
Date :

**ANNEXURE – XI**

**CHECK LIST FOR QUALITY CONTROL/ASSURANCE**

<b>Sr. No.</b>	<b>Activity</b>	<b>Roles/ Responsibilities of Contractor</b>	<b>Roles/ Responsibilities of PMC</b>	<b>Roles/Responsibilities of PMs/ DGMs of NMSCDCL</b>
1	Field Laboratory with adequate equipment	To setup	To approve	To ensure
2	Upkeep and maintenance of laboratory	Responsible for upkeep & maintenance	To ensure	To ensure
3	Quality Control Personnel	Material Engineer, QC Engineer, Lab Technician etc.	Ensure the deployment of Contractor's personnel and to deploy team of Material Engineer, QC Engineer, Lab Technician etc.	Approve the personnel of PMC and designate at least one officer for Quality Control
4	Quality Assurance Plan	To be submitted	Review and Approval	To ensure
5	Source of man-made materials	To indicate	To approve	To ensure
6	Calibration of measuring devices such as proving rings, dial gauges, load cell, temperature gauges, weighing pads etc.	Responsible	Ensure and certify	To ensure

7	Calibration of plant, Equipment and Machinery such as batching plant, hot mix plant etc. on regular basis	Responsible	To ensure	To ensure
8	Tests on factory made materials such as cement, steel, bitumen, geo-synthetics etc.	Most of the tests to be conducted in manufacturer's lab, some tests in field lab and/or in third party laboratory.	Witness and ensure tests	To ensure
9	Testing of Ingredients of GSB, WMM, concrete etc.	Responsible	To ensure	To ensure
10	Third party laboratory	Responsible for third party lab testing in absence of adequate expertise and/or equipment	Ensure testing by contractor and can also order confirmatory test even in presence of test facility at site	To ensure
11	Performance of Paver and grader	To ensure	To check and verify	To ensure



12	Collection of samples from pavement layers for verification	Responsible	To ensure	To ensure
13	All tests for raw material, finished layers as per MoRT&H specifications	Responsible for performing tests with frequency as per MoRTH specifications	To ensure	To ensure
14	Percentage of Tests	Conduct 100% tests	Witness tests as per the contract agreement 100 % of the tests as per recent.	Visit frequently once during the construction period and some tests shall also be performed during his presence
15	Monthly Inspection Report	To comply	To submit	To ensure
16	Acceptance/Rectification	To comply	Based on test results, decision to be made for acceptance /rectification	To ensure
17	Documentation	Maintain all records and provide a copy to AE/IE	To ensure	To ensure
18	Completion Certificate	Request	Issue	Approve

**Annexure – XII**

**Visit Note / Inspection Report of GM/CUP/EIC**

1)	Name of Project	:	
2)	General Scope of work	:	
3)	Chainage /Location of work	:	
4)	Agreement No. & date	:	
5)	Name of Contractor	:	
6)	Name of PMC	:	
7)	Date of work order (With ref.)	:	
8)	Period of Completion (Time limit extension if any)	:	
9)	Actual date of completion	:	
10)	Date of Inspection /Visit	:	
	k) Present Status of work	:	
11)	Key personnel present during Inspection /Visit	:	
	I) From NMSCDCL	:	i)
			ii)
			iii)
	II) From PMC	:	i)
			ii)
			iii)
	III) From Contractor	:	i)
			ii)
			iii)
12)	Points of Observations during inspection/ Visit	:	

Sr. No.	Observation	To be complied by contractor/PMC/ NMSCDCL	Target date of submission of compliance	Remarks
13)	Any other specific points (for which more attention to be given )			
	i)			
	ii)			
	iii)			

14)	General Remarks/Suggestions/orders about quality/progress/management/supervision /manpower/machinery/etc.
	i) ii) iii)

Signature of GM/CUP/EIC  
( \_\_\_\_\_ )  
Name

**Copy to:-**

- i) CEO, NMSCDCL, Nashik.
- ii) DGM/PM, NMSCDCL, Nashik
- iii) PMC
- iv) Contractor

**Annexure-XIII**

**Name of Project :-**

PHOTOGRAPHIC / (GEO TAGGED)REGISTER

Sr. No.	Geotag Ref. No.	Title of Photo Description	Date(s) Taken	Location	Remarks

Photographs taken by \_\_\_\_\_  
(Representative of contractor)

Photographs verified by \_\_\_\_\_  
(Representative of PMC)

Photographs Reviewed by \_\_\_\_\_  
(Representative of NMSCDCL)

### Annexure-XIV

Name of Project :-

VIDEO REGISTER

Sr. No.	Subject (s)/Description of Video	Date(s) Taken	Location	Remarks

Photographs taken by \_\_\_\_\_  
(Representative of Contractor)

Photographs verified by \_\_\_\_\_  
(Representative of PMC)

Videos Reviewed by \_\_\_\_\_  
(Representative of NMSCDCL)



# **Nashik Municipal Smart City Development Corporation Ltd.**

**STANDARD OPERATING PROCEDURES (SOPs) FOR  
IMPLEMENTATION OF SMART CITY PROJECTS UNDER  
NASHIK MUNICIPAL SMART CITY DEVELOPMENT  
CORPORATION LTD. (NMSCDCL), NASHIK.**