

Volume-III F
Operation & Maintenance Requirements

A. MAINTAINANCE FOR ROAD-WORKS**3000 MAINTENANCE OF ROAD**

Please refer to Clause 3005, Maintenance of Cement Concrete Road in "Specifications for road and bridge works", (Fifth Revision) Ministry of Road Transport and Highways, Published by Indian Road Congress, New Delhi 2013.

3001. GENERAL

The Specifications shall apply to all items of road maintenance works as required to be carried out under the Contract or as directed by the engineer. The works shall be carried out in conformity with the relevant Specification to the required level; grade and lines using approved materials. The works shall be carried out using light duty machinery or manual means provided the quality of the end product does not suffer. In execution of maintenance works, a reference is made to the IRC publications: "Manual for Maintenance of Roads" and "Code of Practice for Maintenance for Bituminous Surfaces of Highways, IRC 821982" for guidance and compliance wherever applicable. Wherever the Specification is not clear, good engineering practice shall be adopted in the construction to the satisfaction of the Engineer.

3002. RESTORATION OF RAIN CUTS**3002.1. Scope**

The work shall consist of earthwork for restoration of rain cuts in the embankment and shoulders, using suitable material, and compacting the same.

3002.2. Materials

The material used for restoration of rain cuts shall consist of soil conforming to Clause 305.2.

3002.3. Construction Operation

The area affected by rain cuts shall be cleared of all loose soil and benched. The width of the benches shall be at least 300 mm and they shall extend continuously for a sufficient length. The height of the benches shall be in the range of 150-300 mm.

Fresh material shall be deposited in layers not exceeding 250 mm loose thickness and compacted so as to match with the benching at moisture content close to the optimum. Compaction shall be carried out using suitable equipment such as plate compactors and rammers or by suitable implements handled manually. The finished work shall conform to alignment, levels and slopes as indicated in the drawing.

3003. MAINTENANCE OF EARTHEN SHOULDER**3003.1. Scope**

The work of maintenance of earthen shoulder shall include making up the irregularities/loss of material on shoulder to the design level by adding fresh approved soil and compacting it with appropriate equipments or to strip excess soil from the shoulder surface as per the requirement of this Specification.

3003.2. Material

The material to be added to the shoulder, if required, shall be a select soil conforming to Clause 305.

3003.3. Construction Procedure

This work shall involve:

- a) Making up of the earthen shoulder by adding extra soil and compacting the same; and/or
- b) Stripping a layer of soil to achieve the required grade and level.

Wherever extra earth is required to be added, the earthen shoulder shall be stripped and loosened to receive fresh soil. The deficiency of thickness shall be made up in layers of loose thickness not exceeding 250 mm. Water shall be added, if required, to attain the optimum amount and the layer compacted by 80 to 100 kN smooth wheel roller, vibratory roller, hand roller, plate vibrator or hand rammer to obtain at least 94 per cent of the maximum dry density in accordance with IS: 2720 (Part 8). The finished surface shall have the specified cross slope and line in accordance with the drawing. The side slopes shall be trimmed to the required slope with the help of grader or manual methods using hand tools.

Wherever the earth is required to be excavated from the shoulder, this shall be done either using equipment like grader or by manual means using hand tools. The resulting surface shall be uniform and have a field density of at least 94 per cent of maximum density obtained in accordance with IS: 2720 (Part 8). If the surface is not uniformly compacted, it shall be excavated to a depth of 150 mm and the soil mixed with water if required and compacted at a moisture content close to the optimum to achieve 94 per cent of maximum density as stated above.

3004. BITUMINOUS WORK IN CONNECTION WITH MAINTENANCE AND REPAIRS**3004.1. General**

The scope and type of maintenance work to be carried out shall be in accordance with the provisions of the Contract or as instructed by the Engineer.

In all instances it will have been necessary to identify the causes of defects in order to permit effective repair. Where investigation work into the causes of defects is included in the

Contract it shall be carried out in accordance with the appropriate provisions of this Specification.

Maintenance treatments required under the Contract or instructed by the Engineer may include pothole and patch repair, crack sealing, fog spray, dusting, slurry sealing, surface dressing, overlays and specialist repairs.

When the pavement to be maintained is intended to carry volumes of traffic in excess of 1.5 million e.s.a. the constructed materials (particularly patching and overlay materials) used in maintenance operations shall be of a standard not less than those specified for the original construction.

Traffic control during maintenance operations shall conform to the requirements of the Contract documents.

3004.2. Filling Potholes and Patch Repairs

3004.2.1. Scope : This work shall include repair of potholes and patching of all types of bituminous pavement.

The work shall include the removal of all failed material, in the pavement courses and, if necessary, below the pavement, until the root cause of the failure is removed; the trimming of the completed excavation to provide firm vertical faces; the replacement of material of at least as high a standard as that which was, originally specified for the pavement layer; the painting of tack coat on to the sides and bases of excavations prior to placing of any bituminous materials and the compaction, trimming and finishing of the surfaces of all patches to form a smooth continuous surface, level with the surrounding road.

3004.2.2. Materials : All materials used for the pothole and patch repair of bituminous surface and underlying layers shall be in accordance with this Specification and shall be of the same type as specified for the original construction. A mix superior to the one on the existing surface may also be used for repair work. An emulsified bitumen/modified bitumen mix compatible with the existing layer shall also be considered appropriate.

The bituminous mixture used for such patch repairs shall be in accordance with the appropriate Clause of these Specifications. Materials to be used for patching shall always be of the same type and standard of construction as, or better than, the material being patched at the same level of construction. Materials used for patching shall never be of lesser bearing capacity nor of a greater porosity than the adjacent previous construction. Non-bituminous material must not be used for patching bituminous materials. Where modified binder is to be used, Clause 521 of these Specifications shall apply.

The grading of aggregates and bitumen content of the mix used for such patch repair shall be in accordance with Clause 501.

3004.2.3. Preparation of the area for pothole and patch repair : Each pothole and patch repair area shall be inspected and all loose material removed. The area shall be cut/trimmed either with jack hammers or with hand tools suitable for the purpose, such that the defective material responsible for the failure is all removed and such that the excavation is of a regular shape.

The edges of the excavation shall be cut vertically. The area shall be thoroughly cleaned with compressed air or any appropriate method approved by the Engineer to remove all dust and loose particles. Layers below the level of the bituminous construction shall be replaced using material of the equivalent specification to the original construction, which shall particularly include the specified standards of compaction. The area for bituminous construction shall be tacked or primed with cutback or emulsion depending upon whether the lower area is bituminous or granular in nature. The sides, however, are to be painted with hot tack coat material. The prime coat and tack coat shall conform to Clauses 502 and 503 of these Specifications, respectively.

3004.2.4. Backfilling operation : The mixture to be used in bituminous patching shall be either a hot mix or a cold mix in accordance with the appropriate Clauses of these Specifications. Mixing shall be done in a plant of suitable capacity. The bituminous mixture shall be placed in layers of thickness not more than 100 mm (loose) and shall be compacted in layers with roller/plate compactor/hand roller/rammer to the compaction standards defined in the appropriate Clauses of these Specification & While placing the final layer, the mix shall be spread slightly proud of the surface so that after rolling, the surface shall be flush with the adjoining surface. If the area is large, the spreading and levelling shall be done using band shovels and wooden straight edges. During the process of compaction, the surface levels shall be checked using a 3m straight edge.

3004.3. Crack Sealing

3004.3.1. Scope: Crack sealing shall consist of one or more of the following operations as instructed under the Contract:

- i) fog seal
- ii) filling cracks with a binder, or a combination of crusher dust and a binder
- iii) by treating the crack sealing as a patch repair.

3004.3.2. Fog seal

3004.3.2.1. Scope : Fog seal for use in maintenance work shall conform to the requirements of Clause 518 of these Specifications, and shall, consist of an application of emulsified bitumen, without any aggregate cover for sealing fine hair cracks or for rejuvenating oxidised bituminous surfaces. Areas having cracks with less than 3mm width shall be considered for this treatment, unless otherwise instructed by the Engineer.

3004.3.2.2. Material: Bituminous emulsion for Fog Seal shall be of a slow setting type. Where modified binder is to be used, Clause 521 of these Specifications shall apply.

3004.3.2.4. Measurement for payment: The fog seal work shall be measured in sq. metres, calculated from the dimensions of work instructed in the Contract or by the Engineer.

3004.3.3. Crack filling

3004.3.3.1. Scope: Crack filling shall be carried out using a binder of a suitable viscosity, normally a slow-curing bitumen emulsion, as instructed by the Engineer. For wider cracks, in excess of an average of 3 mm in width the application of emulsion may be preceded by an application of crusher dust, or other fine material acceptable to the Engineer.

3004.3.3.2. Materials: Bitumen for use in crack sealing shall be of a slow curing type as instructed by the Engineer. Dust for crack sealing, when used, shall be crusher dust or some

other suitable fine material approved by the Engineer, passing the 4.75 mm sieve but with a maximum of 10 per cent passing the 0.075 mm sieve.

3004.3.3.3. Construction: If dust is to be used it shall be placed in the cracks before the application of binder and the cracks filled to a level approximately 5 mm below road surface level. The surface of the road shall be swept clear of dust prior to the application of binder. Binder shall be poured into the cracks, taking care to minimise spillage. If spillage onto the road surface does occur, dust shall be applied to the excess bitumen until it is blotted up.

3004.3.4. Crack prevention courses: Clause 522 specifies crack prevention courses. These may be included in substantial maintenance treatments.

3004. 4. Dusting

3004.4.1. Scope: Dusting shall consist of the application of crusher dust or other fine graded material approved by the Engineer to areas of road where bleeding of excess bitumen is occurring.

3004.4.2. Material: Dust shall consist of crusher dust or other graded fine material acceptable to the Engineer, and shall generally be finer than 3.0 mm with not more than 10 per cent passing the 0.075 mm sieve.

3004.5. Slurry Seal

Slurry seal for use in maintenance work shall conform to the requirements of Clause 516. Manual methods of spreading and levelling may be used, subject to the prior agreement of the Engineer.

3004.6. Surface Dressing for Maintenance Work

Surface dressing for maintenance applications shall be carried out in conformity with the requirements of Clause 5 10, except that the use of small and portable equipment shall be permitted provided that it can be demonstrated, to the satisfaction of the Engineer, that it can produce work consistently in accordance with the requirements of these Specifications.

3004.7. Specialist Repairs

3004.7.1. Specialist repairs include repairs of localized areas of damage to materials for which repairs using normal hotmix or coldmix patching materials are inappropriate. Such specialist repairs will include repairs to mastic asphalt and stone mastic asphalt.

3004.7.2. In such cases, pothole and patch repairs shall be carried out in accordance with the provisions of Clause 3004.2 above, except that the construction to the mastic asphalt, stone mastic asphalt or other specialist material layer shall, subject to the instructions of the Engineer, be carried out in accordance with the provisions of the appropriate Clause of these Specifications.

3005. MAINTENANCE OF CEMENT CONCRETE ROAD

3005.1. Repair of Joint Grooves with Epoxy Mortar or Epoxy Concrete

3005.1.1 Scope : The work shall consist of repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in a concrete pavement using epoxy mortar or epoxy concrete.

3005.1.2. Materials : The type /grade of epoxy compatible with the coefficient of thermal expansion of concrete shall be used with either processed fine aggregate or fine stone chips to produce a dry mix for repairing spalled or damaged edges.

3005.1.3. Repairing Procedure: Spalled or broken edges shall be shaped neatly with a vertical cut with chisels into the shape of rectangle. Small pneumatic chisels also may be used, provided the cutting depth can be controlled. The depth of the cut shall be the minimum to effect repair. After shaping the spalled area, it shall be cleaned and primed. The epoxy mortar/concrete is then applied using hand tools like trowels, straight edges, brushes etc. The repaired edge shall be in line with the joint groove and shall be flush with the concrete slabs. During the repair work, any damage noticed to the joint sealant shall be made good by raking out the affected portion and resealing.

3005.1.4. Traffic: Although the epoxy mixes set in 23 hours time, it is desirable to divert the traffic for 12 hours or as per the recommendation of the manufacturers.

3005.1.5. Measurements for payment: Repair of joint grooves shall be measured in linear metres.

3005.2. Repair Involving Removal of Old Joint Sealant and Sealing with Fresh Sealant in Cement Concrete Pavements

3005.2.1. Scope: The repair of sealant of contraction, longitudinal or expansion joints shall include removal of the existing sealant and resealing the joint with fresh sealant material.

3005.2.2. Material: Sealant material to be replaced shall be either hot poured rubberized bitumen or polysulphide type of sealant as per Clause 602.2.8. As per the recommendation of the manufacturer, appropriate type of primer also shall be applied.

3005.2.3. Repairing procedure: The existing sealant shall be raked out with the help of a metal raker such that most of the sealant is removed. Subsequently, the sealant stuck to the sides of the grooves shall be removed thoroughly either by using saw cutting machine so that grooves may be widened by one mm or by sand blasting. In no base the old sealant shall be present during resealing operation. If joint grooves are found inadequate in depth, they shall be deepened as directed by the Engineer.

Before commencing the sealing operation, compressed air shall be used to clean the joint grooves to clean the joint groove. A heat resistant, paper backed compressible debonding strip or tape should be inserted in accordance with the requirement of Clause 602.112. Sealant may be poured either using hand held pourer or using mechanised sealing machines. Sealants should not be heated directly but in double-jacketed machine. All precautions and arrangements shall be taken not to spill the sealant on the concrete pavement. The sealant may be poured to a depth of 5 ± 2 mm from the pavement surface.

3005.2.4. Measurements for payment: Repair of joint sealant shall be measured in linear metres.

Paver Blocks

Providing and fixing pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M-30 compressed by mechanically pressed and as per approved design including 50 mm Sand layer for levelling and filling the joint with sand in proper line and level etc complete.

Scope work:

The scope of work includes supplying and lying of precast paver blocks at site, as mentioned in the Item. All relevant provisions of IS 15658:2006 shall apply. Laying of paver blocks at site as per requirement in technical specification, within shortest possible time. The site is public place hence care should be taken to ensure that the routine activities shall not be disturbed. The job of laying may required to be carried out during night also. The work shall be executed in perfect line and level as per instructions of Engineer in charge. Colored concrete paver blocks shall be manufactured as per specifications using approved color pigment. The color shade shall be as selected by employer before commencement of the work. The contractor shall guarantee that all material and components designed, fabricated, supplied and laid by him shall be free from any type of defect due to faulty material and/Workmanship/erection For a period of One year from the date of completion of work.

**B. MAINTAINANCE FOR STORM WATER DRAINS & RAIN WATER
HARVESTING SYSTEM**

1. The proper maintenance of storm water drainage systems is essential in order to ensure that the systems are functioning to their designed capacity. This will include routine inspection of the systems, and carrying out necessary cleansing, repair and de-silting works. Contractors should devise maintenance procedures including the frequency of inspection, schedule for cleaning, de-silting and necessary repair works, and documentation for maintenance records. Routine inspection and periodic maintenance are the best ways to prevent blockages and deterioration of storm water drainage systems, and hence minimize the risk of flooding.
2. De-silting operations of Storm Water Drains should be done by the contractors. The de-silting of Storm Water Drain should be done in a cyclic manner and must be carried out at least twice in a year. This activity is being carried out in a weekly programmed manner throughout the year. The removed silt is cleared immediately and transported to the designated place as specified by engineer in-charge.
3. Some of the Storm Water Drains passing through the densely populated areas, commercial areas and areas devoid of sewers always carry sewage. De-silting of such kind of drains is very difficult. To overcome this kind of problems advance machineries can be used for de-silting and cleaning of the storm water drain carrying sewer.
4. During flooding emergencies, contractor is responsible for carrying out immediate desilting or repair of blocked or damaged any section to overcome the situation.
5. RWH systems shall be cleaned periodically to avoid clogging of filter media & thus water logging.
6. Filter media shall be replaced as and when required or at least once in 2 years.

C. OPERATIONS & MAINTAINANCE FOR 24X7 WATER SUPPLY SYSTEM**1. CONDITIONS OF CONTRACT FOR OPERATION AND MAINTENANCE OF 24X7 WATER SUPPLY****1.1 ADMINISTRATIVE PROVISIONS**

The following additional clauses shall apply only during the Operation and Maintenance period.

1. DEFINITIONS AND INTERPRETATION**1.1. Definitions**

In these Conditions of Contract ("Conditions") the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires.

1. "Applicable Law" means all national (or State) legislation, statutes, ordinances and other Laws and regulations and by laws of any legally constituted public authority.

2. "Contract" means the contract agreement, these conditions, the employer's requirements, the Tender and the further documents (if any) which are listed in the contract agreement.

3. "Contractor's Equipment" shall mean all equipment, instruments, tools, machinery and other appliances and things of the Contractor at the Site required for the fulfilment of the obligations of the Contractor under these Conditions.

4. "Contractor's Personnel" means the contractor's representative and all personal whom the contractor utilizes on site, who may include the staff, labour, & other employees of the contractor and of each sub-contractor & any other personnel assisting the contractor in the execution of the work.

5. "Dispute" shall have the meaning given to it in Clause 15 of these Conditions.

6. "Employer's Risk" shall include the risks mentioned as employers risks in the General Conditions and shall include any negligence or misconduct on the part of the Employer and also any event of Force Majeure as provided in Clause 12 of these Conditions.

7. "Employer's Personnel" means the Employer's Representative, the assistants and all other staff, labour and other employees of the employer and of the Employer's representative, and any other personnel notified to the contractor, by the employer or the employer's representative, as employer's personnel.

8. "Employer's Requirements" means the document entitled employer's requirements, as included in the contract, and any additions and modifications to such document in accordance with the contract. Such document specifies the purpose, scope, and / or design and / or other technical criteria, for the works.

9. "Facility" shall mean the entire system to be designed and constructed including the equipments, buildings, structures, ramps, pits, pipes, fencing, lighting, testing and analysis equipment, tools, computers, software programs, safety equipment, plant machinery, supplies, instruments and inventory incorporated therein, as well as all open areas within the Site, and including any additions, modifications, alterations, replacement and repairs as may be made thereto from time to time.

10. "Force Majeure" shall mean those events mentioned in Clause 12 of these Conditions.

11. "General Conditions" shall mean the conditions of tender issued by RSCL for O&M works of projects.

12. "Good Operating Practices" means the standards, practices, methods and procedures as practiced internationally and in India conforming to all Applicable Law and that degree of skill, diligence, prudence and foresight which would reasonably be expected from a skilled and experienced contractor engaged in India in the same type of undertaking under the same or similar circumstances as the Contractor pursuant to these Conditions.

13. "O & M Contract" shall mean the contract or part of any other contract having scope of Operation and Maintenance of facilities, entered in between the Employer and the Contractor pursuant to these Conditions.

14. "O & M Completion Certificate" shall mean the certificate to be issued by the Employer on the completion of all the obligations of the Contractor under these Conditions.

15. "O & M Services" shall mean those services specified in Schedule [1] which the Contractor is obligated to perform under these Conditions.

16. "O & M Standard" shall mean the standards:

- a) As set forth in the O & M Manual as accepted by the Employer, b) As required pursuant to Applicable Law;
- c) Set out in the Performance Guarantee; and
- d) For the functioning of the Facility as required in accordance with the Contract including such requirements as may be mentioned in the Employer's Requirements.
- e) For the functioning of the Facilities set forth in these Conditions.

17. "O & M Manual" shall have the meaning for manual of Operation and Maintenance.

18. "O & M Period" shall have the meaning set out in Clause.

19. "O & M Price" shall mean the amount stated in Price Schedule.
20. "Party" shall mean each of the Contractor and the Employer and Parties shall mean both of them together.
21. "Performance Guarantees shall mean the guarantee that the Facility shall be operated continually satisfying the minimum performance parameters set out in Schedule.
22. "Successor Contractor" shall have the meaning given to it in Clause.
23. "Site" shall means that specific area specified in the bid documents & shall include any other places as may be specifically designed by the employer from the time to time as forming part of the site.
24. "Taking Over Date" shall means the date of issue of the taking over certificate at the end of the Operation and Maintenance period.
25. "Taking Over Certificate" means the certificate to be issued by RSCL to the contractor at the successful completion of the Operation and Maintenance period.
26. "Termination" shall have the meaning given to it in Clause [13] of these Conditions.

1.2. Interpretation

- a) In these Conditions , except where the context requires otherwise. a) words indicating one gender include all genders,
- b) words indicating the singular also include the plural and words indicating the plural also include the singular,
- c) Provisions including the word 'agree', 'agreed' or 'agreement' require the agreement to be recorded in writing;
- d) 'written' or 'in writing' means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
- e) The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions;
- f) The words 'include,' 'includes' and 'including' are not limiting;
- g) As used in these Conditions, all defined terms include the plural as well as the singular;
- h) Any agreement, document or drawing defined or referred to in these Conditions shall include amendment, modification and supplement thereto and waiver thereof as may become effective from time to time, except where otherwise indicated;
- i) Any reference to any Clause or Sub-Clause shall unless specified otherwise

mean a Clause or Sub- Clause of these Conditions; and

j) Any rights of the Employer to make any inspections or to review any document shall not create any obligation on the Employer to conduct such inspections or reviews to detect any errors, inaccuracies, ambiguities or other potential problems. No inspection or approval by or on behalf of the Employer shall operate as a waiver of any provision of these Conditions, any obligation of Contractor under these Conditions, or any of the rights of the Employer hereunder, except as expressly agreed in writing by the Employer.

1.3. Commencement and Duration of O & M part of contract

1.3.1. "The O & M Period" shall commence from the date of issue of Certificate of successful commissioning of the facilities and shall continue for a period of 5 years there from. The Employer may propose an extension to the O & M Period by giving 90 days prior notice to the Contractor.

1.3.2. The O & M period may then be extended subject to mutual consent and on terms and conditions agreed to by both the Parties.

1.4. Applicable Law

1.4.1. The Contractor shall comply with all Applicable Law relevant to the Contractor's Personnel, including Applicable Law relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

1.4.2. The Contractor shall require his employees to obey all Applicable Laws, including those concerning safety at work.

1.4.3. In the event Employer becomes liable to any Employers Personnel, any Governmental authority (including but not limited to any fines or penalties levied by or payable to such authority) or to any other third party under the provisions of any Applicable Law resulting from Contractor's failure to comply with such Applicable Law, Contractor shall reimburse Employer for all payments required to be made by Employer to such Employers Personnel, governmental authority or any other third party, plus the actual expenses that Employer may incur in investigating, settling or defending any litigation or threatened litigation..

1.5. Assignment

The Contractor will not be entitled to sub-contract any part of his obligation under these Conditions to any third party without prior approval of the Employer. Neither party may assign their rights and obligations under these Conditions without the consent of the other Party. However the Employer may assign any rights under these Conditions to any financial institution from whom any financial assistance/credit facilities have been availed by the Employer.

1.6. Safety

1.6.1. Emergencies

In the event of an emergency endangering any life or property, the Contractor shall immediately take such action as may be necessary to prevent, avoid or mitigate injury, damage or loss and shall, as soon as possible, report any such incidents, including his response thereto to the Employer.

1.6.2. Contractor Action

The Contractor shall utilize his personnel to take such action as may be necessary in accordance with Good Operating Practices in the event of an emergency. Notwithstanding anything to the contrary herein, the Contractor may incur any expenditure or take any other operating actions as the Contractor deems to be necessary (in accordance with Good operating practices) in the case of emergencies affecting the Facilities or the operation of the

Facilities to counteract the effects where the Contractor considers immediate action is required to safeguard lives or property. In case such emergency was caused due to an Employer's Risk then the Employer shall reimburse such reasonable expenses that might have been incurred by the Contractor in relation thereto acting in accordance with Good Industry Practices.

1.7. Notification

1.7.1. In the event of an emergency the Contractor shall forthwith notify the Employer of the emergency, the expenditures made and the operating actions taken.

1.7.2. If the Employer considers that an emergency has arisen in relation to the Facilities, the Employer may give written notice to the Contractor specifying the nature of the emergency which it has identified and the manner in which it requests such emergency to be rectified. The Contractor shall rectify such defect with all due diligence. If such emergency is on account of an Employer's Risk then the Contractor shall be reimbursed all costs and expenses reasonably incurred by the Contractor for any actions taken by it pursuant to such direction or notice. If the Contractor fails to comply with such direction or notice promptly, the Employer shall be entitled to procure that it or any third party takes such actions as may be necessary to remedy such breach by the Contractor. Any costs that may be incurred by the Employer in this regard shall be reimbursed to him in full by the Contractor and shall be a debt due to him from the Contractor.

1.8. Inspections

Notwithstanding any provisions of these Conditions and without prejudice to any of the other rights vested by the Contractor under these Conditions, The Employer shall have the right at all times to inspect the Facilities and the Contractor shall co-operate in every manner with the representatives of the Employer inspecting the Facilities and allow them access to every part of the Facilities and produce any records requested.

2. OPERATION OF THE FACILITIES

2.1. Operation of the Facilities

2.1.1. On Employer appointing the Contractor to perform and undertake the O & M Services and all other obligations set out and in accordance with these Conditions during the O&M Period. The Contractor shall accept the appointment and acknowledges a duty to perform such obligations.

2.1.2. The Contractor shall be in complete charge of and have custody and control over and responsibility for the Facilities, and the Contractor shall perform or cause to be performed on behalf of the Employer all O & M Services for the Facilities and shall supply or cause to be supplied all materials required there for in accordance with the O & M Standard.

2.1.3. The Contractor shall also acknowledge that the Employer and the Employer's Personnel and other contractors may be carrying out work at the Facilities and shall endeavour to fully co- operate and work in a manner so as not to cause any obstruction or hindrance to them.

2.1.4. The Contractor shall remain an independent Contractor and not an agent, employee and nothing in these Conditions or the O & M part of contract shall be deemed to create a Joint Venture between the Employer and the Contractor.

2.2. Responsibility of the Contractor

The Contractor shall be solely and exclusively responsible for:

2.2.1. Obtaining all necessary permits and consents required by Applicable Law or any Governmental authority for the Contractor to carry out the O & M Services;

2.2.2. The procurement of all goods and services necessary to ensure compliance with his obligations under these Conditions,

2.2.3. Making available suitably qualified and trained personnel to perform the O & M Services;

2.2.4. Perform the O & M Services in accordance with the O & M Manuals prepared by the contractor and as approved by Raipur Smart City Limited., and maintain the Facilities in good repair and condition and ensure that the Facilities are well and suitably maintained at all times in accordance with Good Operating Practices and in accordance with these Conditions;

2.2.5. Procuring and administering all chemicals and other consumables, tools, equipment, spare parts and other materials (which shall be of good quality and unused) necessary for the operation and maintenance of the Facilities;

2.2.6. Maintaining a system of records to identify all inventories related to the Facilities and preparing and providing to the Employer a complete accounting of such inventory for every fiscal quarter;

2.2.7. Arranging for the testing and recalibration of all scales, meters, gauges and other

measuring devices at the Facilities on an annual basis and maintain the Calibration certificates as records unless otherwise stated in the O & M part of contract; and

2.2.8. for providing any and all relevant information required by the Employer.

3. DUTY OF CARE BY THE OPERATOR AND PERFORMANCE STANDARDS

3.1. Duty of Care

3.1.1. The Contractor shall manage, operate and maintain the Facilities in accordance with Good Operating Practices and in accordance with the O & M Standard so that the Facilities are capable of meeting the outputs and specifications set out in the Contract.

3.1.2. The Contractor shall take full responsibility for the care of the Facility from the date of start of O&M period, till the end of the O & M Period.

3.1.3. If any loss or damage happens to the Facility, during the O & M Period due to any breach by the Contractor of any of his obligations under these Conditions including any wilful misconduct, negligence and non-conformity with Good Operating Practices then the Contractor shall, at his own cost, rectify such loss or damage so that the Facility conforms in every respect with the provisions of these Conditions.

3.1.4. The Employer shall be liable only in case of any damage caused due to any Employer's Risk.

4. OBLIGATIONS AND RESPONSIBILITIES OF THE EMPLOYER

The Employer shall employ the Contractor to provide the O & M Services and shall:

4.1. following the issue of Certificate of Successful commissioning, hand- over the custody of the Facilities to the Contractor for its intended use during the O & M Period; and

4.2. Pay the Contractor all sums required to be paid in accordance with the terms of these Conditions. Notwithstanding anything else herein contained the Employer may set off any sums owed by the Contractor under the Contract for money owed to the Contractor by the Employer under these Conditions or as a debt due from the Contractor.

5. REPRESENTATIONS AND WARRANTIES OF THE CONTRACTOR

The Contractor hereby represents for the benefit of the Employer as follows:

5.1. Performance of O & M Services

5.1.1. that the Contractor has the required skills and capability to perform, and shall diligently perform, the O & M Services in a high- quality, timely and professional manner utilizing sound engineering principles and project management procedures in accordance with Good

Industry Practices;

5.1.2. that the Contractor shall perform his obligations hereunder in accordance with the requirements of these Conditions and shall meet the Performance Guarantee; and

5.1.3. that it shall not use any spare parts or material that are not new and which shall be of a quality that is in accordance with Good Industry Practices.

5.2. Knowledge of Adverse Information

5.2.1. As of the Commencement Date, Contractor is not aware of any facts, conditions or events which would affect the ability of Contractor to provide the O & M Services in accordance with these Conditions.

5.2.2. Contractor has familiarized himself with the nature and extent of the O & M Services required to be provided under these Conditions and with all other requirements under Applicable Law

5.3. Organization, Standing and Qualification

Contractor is validly existing and in good standing under Applicable Law and has all necessary power and authority to carry on its business as presently conducted and to perform its obligations under these Conditions. Contractor is, or will be prior to the date on which the O & M Services are to be commenced duly qualified or licensed to provide these services.

5.4. Due Authorization

5.4.1. Each of the execution, delivery and performance by the Contractor of all contracts entered into pursuant to these Conditions shall be duly authorized by all necessary action on the part of Contractor.

5.4.2. Neither the execution and delivery by Contractor of the O&M Contract, nor the consummation by Contractor of any of the transactions contemplated hereby, requires the consent or approval of, the giving of notice to, the registration with, the recording or filing of any document with, or the taking of any other action in respect of, any Governmental authority or agency, except:

a) Such as have been duly obtained, given, registered, recorded, filed or taken and are in full force and effect or are not yet required; and

b) Filings and recordings expressly required pursuant to the O & M part of contract.

Contractor holds, or will obtain, any and all licenses, permits and approvals on a timely basis. Contractor has no reason to believe that any of those not yet required will not be readily obtainable or done in the ordinary course of business upon due application there for

5.5. Litigation

In the aggregate, there are no pending or, to the knowledge of Contractor, threatened actions, investigations or proceedings before any court, Governmental authority or arbitrator, which would have material adverse effect on the ability of Contractor to perform its obligations under these Conditions.

6. INSURANCE

6.1.1. Without limiting the Contractor's obligations, responsibilities and liabilities under these Conditions, the Contractor shall be required to provide and maintain in full force and effect, at his expense the insurance coverage's specified in Schedule [5] throughout for the O&M Period. Any deductibles on the insurance shall be to the account of the Contractor.

6.1.2. Maintenance of insurance shall not relieve the obligation of the Contractor to remedy or repair any damage to the Facility in case such damage is caused due to the fraud, negligence, wilful misconduct or breach of any obligations of the Contractor under these Conditions (including failure to perform the O & M Services in accordance with Good Operating Practices) at the Contractors cost promptly and regardless of the extent of settlement of claims by the underwriters or the time taken for settlement of claims. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor to the extent any such liability or damage is caused due any breach of any obligations of these Conditions (including failure of the Contractor to perform the O & M Services in accordance with the Good Operating Practices) by the Contractor or any wilful misconduct, negligence on the part of the Contractor.

6.1.3. The terms of the Insurance shall be approved by the Employer.

6.1.4. The Contractor within the 14 days from work order shall submit to the Employer evidence that the insurances required under Schedule [5] of these Conditions has been obtained as approved by the Employer.

6.1.5. The Contractor shall not make any alteration to the terms of any insurance without the prior approval of the Employer. If the Contractor fails to effect and keep in force any of the insurance it is required to effect and maintain under these Conditions, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub- Clause,

the Employer may effect insurance for the relevant coverage and pay the premiums due and may claim the same from the Contractor.

The insurances shall:

a) shall be in the name of the Employer and the Employer shall be the sole loss payee,

b) shall be extended to cover liability for all loss and damage to the Employer's property arising out of the Contractor's performance of his obligations or failure to do so under these Conditions and any fraud, gross negligence or wilful misconduct on his part, and

6.1.6. If the Contractor fails to effect and keep in force insurance which is required to be maintained under these Conditions, and the Employer neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which would have been recoverable pursuant to such insurance shall be paid by the Contractor.

6.1.7. The insurance shall cover all the electrical items, mechanical items, Instrumentation & automation items, all civil works, Storage structures etc. The insurance for the work of transmission main is optional. Since the responsibility of safety of all work lies with contractor, contractor may prefer to take the insurance of optional item also if deemed fit.

1. INDEMNIFICATION

7.1. Loss or Damage to Facilities

The Contractor shall at its own expense make good any physical loss or damage to the Facilities occasioned by it in the course of the performance of its obligations under these Conditions if and to the extent such loss or damage is caused by the negligence, wilful default or breach of statutory duty or failure to follow Good Industry Practices by the Contractor

7.2. Other Loss or Damage

7.2.1. Except as otherwise stated in this Clause 7.2 or covered by Clause 7.3, the Contractor shall indemnify, defend and hold harmless the Employer against any and all liabilities, losses, damages and claims of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties or any employee of the Employer or the in respect of loss of or damage to any third party property or property belonging to employee of the Employer by:

- i) any breach by the Contractor of its obligations hereunder and
- ii) any negligence, wilful default or breach of statutory duty on the part of Contractor

7.2.2. Except as otherwise stated in this Clause 7.2 or covered by Clause 7.3, the Employer shall indemnify, defend and hold harmless the Contractor for all claims and losses of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties or of any person employed by the Contractor in respect of loss of or damage to any third party property or property belonging to any person employed by the Contractor to the extent that the same arises out of any Employer's Risk

7.3. Accidents or Injury to Workmen

7.3.1. The Contractor shall indemnify, defend and hold harmless the Employer or any Employer's Personnel against any and all claims for loss, damage and expense of whatever kind and nature (including all related costs and expenses) in respect of the death of or injury to any

person employed by the Contractor in connection with the performance of the O&M Services and obligations hereunder except to the extent that such death or injury is caused by an Employer's Risk.

7.3.2. Neither Party shall be liable to the other Party for loss of use of the Facilities, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than under Sub- Clause [13] and this Clause [7].

7.3.3. The total liability of the Contractor to the Employer, under or in connection with these Conditions other than as provided in Clause 7.3.2 & 14 shall not exceed the sum of the O & M Price and the Delay Damages payable under the these Conditions.

7.3.4. This Sub- Clause shall not limit liability of the Contractor in case of fraud wilful default, gross negligence and liabilities arising due to breach of Applicable Law and the liability under any other Clause of these Conditions that might impose a greater liability on the Contractor.

8. INSPECTION

8.1. General Provisions

8.1.1. The Employer may check the operation of the Facilities or designate an organization of his choice to carry out inspections regularly. The Employer or the organization appointed by him shall check that the Contractor is performing the tasks for which he is responsible with due diligence. The Contractor shall at his cost provide all the assistance the Employer requires to complete these inspections

8.1.2. Before any inspection, the Employer shall give prior notice to the Contractor, indicating the name(s) of the person(s) empowered to carry out such inspection in the name of the Employer

8.2. Measurement and Analysis

8.2.1. The Employer has the right to perform any analysis or inspection he deems necessary. Before any inspection, the Employer shall give a prior written notice to the Contractor.

8.2.2. The water quantity, for any such test, analysis or inspection shall be measured by flow- meters

installed at the Facility, which are acceptable to the Employer, provided they are maintained and calibrated as per requirements of this contract.

8.2.3. Other parameters like Pressure temperature and speed shall be measured by certified calibrated meters provided by the contractor and, which are acceptable to the Employer

8.2.4. The flow meters shall be inspected and certified upon their availability by the Employer and the Contractor. Thereafter, the said meters shall be tested and their accuracy verified once in every six (6) months by the Contractor. After each inspection, the flow- meters shall both be sealed in

the presence of representatives of the Employer and the Contractor in a manner that is adequate to prevent the tampering of said meters by any person.

8.2.5. The Contractor shall be responsible for the security and protection of flow-meters at the designated point. If there is any malfunctioning of the meters, it should be repaired at the Contractor's cost, as per manufacturer's technical recommendations.

8.3. Plant Complex Visits

8.3.1. At the end of each month, or at the initiative of the Employer, a visit shall be organized so that both Parties can check the condition of the installations at the Facilities.

8.3.2. A report shall be drawn up to record the opinions of both Parties. The Employer reserves the right to call in equipment manufacturers or specialized technicians for these visits.

8.3.3. These visits shall provide an opportunity for examining maintenance programs and operating procedures and improvements requiring additional investments.

8.3.4. Any test, visit, analysis or inspection and any approval thereof shall not in any way alter/modify or dilute the responsibility of the Contractor to fulfil his obligations under these Conditions.

9. RECORDS AND REPORTS

9.1. Operating Records and Data

The Contractor shall:

9.1.1. Prepare and maintain, on a current basis and in accordance with generally accepted Indian accounting principles, proper, accurate and complete books and records and accounts of all transactions related to the Facilities including a log book at the site which shall contain inter alia the following details

a) Reading from the different meters, indicators and recorders (including but not limited to consumption of energy, volume of water conveyed, operating times of the different items of equipment etc which may be updated on a daily basis); and

b) Report of visits by persons other than those of the Employer and the Contractor to

the Facility.

9.1.2. Establish and maintain a weekly and monthly reporting system to provide storage and ready retrieval of operating data relating to the Facilities, including such information necessary to verify calculations made pursuant to these Conditions or the O & M part of contract and provide the same to the Employer on a monthly basis

9.1.3. Provide to the Employer or such persons notified by it access to the Facilities and to data in relation to the Facilities, at all times.

9.1.4. At the Employer's request, at the end of every month, make a copy of the system performance data for that month as recorded by the instrument and control system on CDs / DVDs and printed document there from and deliver the same to the Employer with one week.

9.1.5. Provide support to the Employer to meet the data requirements of all competent authorities and under Applicable Law

9.2. Reports

9.2.1. The Contractor shall submit the reports mentioned in Schedule [4] at times indicated in the said Schedule.

9.2.2. The Contractor shall also provide the Employer with such reports as are required by the Employer and shall comply with all reporting requirements prescribed under these Conditions and the O & M part of contract. In addition the Contractor shall submit the following information to the Employer.

9.2.3. Upon obtaining knowledge thereof, shall submit prompt written notice of:

- i) Any litigation or material claims, disputes or actions, threatened or filed, concerning the Facilities or the services to be performed hereunder;
- ii) Any refusal or threatened refusal to grant, renew or extend or any action pending or threatened that might affect the granting, renewal or extension of any clearance, permit or license;
- iii) Notwithstanding the aforementioned materiality, all penalties or notices of violation issued by any authority under Applicable Law;

9.3. The Contractor shall promptly submit to the Employer any material information concerning new or significant aspects of the operations of the Facilities, any material complaint about the Facilities from any person or entity with a bonafide complaint who complains directly to the Contractor and, upon Employer's request, shall promptly submit any other information concerning the Facilities or the services performed by the Contractor.

9.3.1. The Employer may from time to time specify any changes to be made to any of the

format of any report or plan required hereunder.

9.3.2. If the Contractor is required by any Applicable Law to produce any projection, report or any other document relating to the provision of the O & M Services of the Facilities or the Employer requests a report regarding other information relating to the Facilities, the Contractor shall prepare a draft of such document at the request of the Employer, as soon as practicable and in any event within any time limit prescribed by Applicable Law.

9.3.3. If the Contractor is required by any Applicable Law to produce any projection, report or any other document, it shall prepare such report diligently and submit the same to the Employer as soon as possible thereafter. Wherever practicable, such reports shall be submitted to the Employer for review seven days before the same is issued. The Contractor shall take into account any comments or revisions proposed by the Employer thereon.

9.4. Procurement

9.4.1. The Contractor is responsible for the procurement of all goods and services necessary to ensure compliance with its obligations under these Conditions.

9.4.2. The Contractor shall procure and keep in readiness spare parts required for urgent repairs, materials, supplies and other consumable items, and maintains an adequate inventory thereof Facilities.

9.4.3. The Contractor shall submit a report for every fiscal quarter to the Employer reflecting the status of the inventory for spare parts, materials and other consumable items.

10. PAYMENT

10.1. The Contractor's request(s) for payment shall be made in writing, accompanied by invoice(s) along with presence sheet of personnel of particular month duly certified by our Engineer on site, claims etc. as appreciate.

10.2. Payment shall be made by **Raipur Smart City Limited** as per prevailing procedure subsequent to the submission of such invoice(s) / claim(s) by the Contractor.

10.3. **Raipur Smart City Limited** will deduct from the amount payable to the Contractor, any amount paid by Raipur Smart City Limited on behalf of the Contractor (e.g. telephone bills, C S P D C L penalty for Power factor or any other dues and liquidated damages as per clause and, as per tender terms and condition.)

10.4. The contractor will get O & M work payment only for the deployed staff and insurances
During the period of defect liability of works. The base for payment will be approved estimated rate

11. LIQUIDATED DAMAGES

11.1. Leakages in pipeline.

The contractor shall ensure that leakages from Distribution Network, faulty air release valves, scour valves, joints, damage to pipeline are urgently attended.

11.2. For delay in Restoration

The Restoration Period shall be subject to the following liquidated damages & penalties for its failure to carry out.

Sr. No.	Type of work Restoration	Period
1	Replacement of sluice valve/Sluice Gate	1 Day
2	Minor Breakdown /Repairing	12 Hrs
3	Replacement of PE-AL-PE/ DI pipe of all diameter	2 Days
4	Replacement of Valves / Specials	1 Days
5	Pressure Gauge / Water meter for all dia and all types of meter	1 Days

In case of non compliance to the restoration period as above, the recovery / deduction at the rate of Rs. 250/- per Hour shall be made from the payment due for first two hours delayed and their after Rs.5000/- per hours shall be made from the payment due

11.3. For the non-compliance of employment of key personnel

If the successful bidder does not recruit/depute the key personnel identified as per schedule, then liquidated damages will be deducted at double the rate of applicable scale of RSCL or the rate quoted, whichever is higher.

12. FORCE MAJEURE

In this Clause, 'Force Majeure' shall mean an event or circumstance, which materially and adversely affects the ability of the affected Party to perform its obligations.

- i) which is beyond a Party's control,
- ii) which such Party could not reasonably have provided against before entering into the O & M part of contract;
- iii) which, having arisen, such Party could not reasonably have avoided or overcome, and
- iv) which is not attributable to the other Party Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:
- v) war, hostilities (whether war be declared or not), invasion, act of foreign enemies)
- vi) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,

vii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel and other employees of the Contractor;

viii) As result of war, explosive materials, harmful radiation or contamination by radio- activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio- activity, and

ix) Natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.
Heavy rainfall, cyclone, strike and lockout.

12.1. Notice of Force Majeure

12.1.1. If a Party is or will be prevented from performing any of its obligations under these Conditions by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 7 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

12.1.2. The Party shall, having given notice, be excused performance of such obligations for so long as such Force Majeure prevents it from performing them.

12.1.3. Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

12.2. Duty to Minimize Delay

12.2.1. Each Party shall at all times use all reasonable endeavours to minimize any delay in the performance of the Contract as a result of Force Majeure.

12.2.2. A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

12.2.3. Notwithstanding anything else herein contained the Employer may terminate the O & M part of contract if the Force Majeure event continues for more than a period of 90 days.

13. TERMINATION

Termination shall mean the termination of the O&M part of Contract by the Employer or the Contractor in accordance with Clause 13.1 or 13.2 respectively.

13.1. Termination by Employer

The Employer may terminate the O & M part of Contract by notice on:

- i) the dissolution or insolvency of the Contractor, pursuant to an order of a court or the bankruptcy of the Contractor; or;
- ii) if 45 days having passed since the Contractor is in material breach of his obligations under these Conditions, or
- iii) if the Contractor ceases to carry on its business; or iv) abandonment;
- v) the subsisting Force Majeure event as provided in Clause 12.2.3 above.

13.2. Payments upon Termination

13.2.1. Upon termination or as soon as practicable thereafter an account shall be taken of the net amount owing from the Employer to the Contractor or from the Contractor to the Employer (as the case may be). The Employer shall forthwith pay to the Contractor (if the balance is due to the Contractor) all moneys due to the Contractor. If the account shows a balance due to the Employer from the Contractor, the Contractor shall forthwith pay any such balance to the Employer;

13.2.2. As part of the calculation made pursuant to clause 13.1 of the amounts due to the Contractor on Termination, the following amount shall be taken into account.

13.2.2.1. the portion of the O & M Price outstanding and payable by the Employer for the period prior to the Termination;

13.2.2.2. any Delay Damages or indemnities for which the Contractor would be liable under these Conditions upto the date of Termination;

13.2.2.3. any other amounts due to the Employer under these Conditions by the Employer including return of any amount of the O & M Price paid in advance by the Employer to the Contractor under Clause [10].

13.3. In case of a Termination by the Employer in accordance with Clause 13.1 the Employer may recover other than the amounts due to him under Clause 13.2.2.2, any costs incurred by him in finding any replacement contractor

13.4. Successor to the Contractor Upon Termination:

13.4.1. The Contractor shall use all endeavours to facilitate the appointment and commencement of duties of any person to be appointed by the Employer to operate and maintain the facilities (the "Successor Contractor") so as not to disrupt the normal Operation & Maintenance of the Facilities and shall provide full access to the Facilities and to all relevant information, data and records relating thereto by the Successor Contractor and its representatives and accede to all reasonable requests made by such persons in connection with preparing for taking over the Operation & Maintenance of the Facilities;

13.4.2. Promptly after Termination, the Contractor, shall deliver to (and shall, with effect from Termination, hold on trust for and to the order of) the Employer or (if so required

by the Employer by written notice) to the Successor Contractor all property in its possession or under its control owned by the Employer or leased or licensed to the Employer;

13.4.3. The Contractor shall transfer to the Successor Contractor, as from the date of Termination, its rights as the Contractor under all contracts entered into by it in the performance of its obligations under these Conditions or relating to the Operation & Maintenance of its obligations under these Conditions or relating to the Operation & Maintenance of the Facilities. Pending such transfer, the Contractor shall hold its rights and interests there under for the account and to the order of the Successor Contractor.

13.4.4. The Employer shall be reimbursed any cost and expenses incurred by the Employer due to default of the Contractor in discharging its obligations under this Clause [13].

13.4.5. The Contractor shall, upon Termination of the O & M part of Contract, co- operate with the Employer and the Successor Contractor and comply with all reasonable requests thereof, including the execution of documents etc.

13.4.6. Upon Termination of the O & M part of Contract on expiry of the terms of the O & M part of Contract, the Parties agree that:-

13.4.7. The Contractor will use reasonable efforts to ensure a transition to the next Contractor that will avoid operating difficulties for the Facilities.

13.4.8. For a six (6) month period after Termination or six (6) months prior to the expiration of the O & M part of Contract, the Contractor shall, at his expense, provide sufficient assistance to the Employer in the hiring and training of replacement personnel for those Facilities.

13.5. Notwithstanding anything else herein contained the Employer shall be entitled to terminate the O & M part of Contract, at any time at the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after issuance of the notice of termination.

13.5.1. On the expiry of the O & M part of Contract or Termination of the O & M part of Contract, all the installations, works and equipment placed under the Contractor's responsibility shall be handed over to the Employer, at no cost, in good working order, except for normal wear and tear. The Employer may perform any inspections, tests or expert appraisals he shall consider necessary with a view to checking that the property is in good working order. The Contractor shall also hand over any unutilized spares, consumables etc. purchased for the Facilities.

13.5.2. At the end of O & M Period, the Contractor shall be entitled to receive an O & M Completion Certificate within thirty (30) days

13.5.3. The delivery of such O & M Completion Certificate will relieve the Contractor from his responsibility as regard to the operation & maintenance of the Facilities and confirm that the Contractor has fulfilled all of his obligations under these Conditions.

14. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS**14.1. Confidential Information**

Subject to Clause [14.2], the Contractor shall at all times during the O & M Period and for a period of five years after that:

14.1.1. use all efforts to keep all information regarding the terms and conditions and any data or information acquired under or pursuant to these Conditions confidential and accordingly shall not disclose the same to any other person; and

14.1.2. not use any document or other information (whether technical or commercial) obtained by them it by virtue of these Conditions or the Contract concerning the Employer's undertaking for any purpose other than performance of the its obligations under these Conditions;

Provided that the provisions of this Clause 14.1 shall not apply to information, which at the time of disclosure was in the public domain other than by breach at the foregoing obligations of confidentiality.

14.2. Disclosure of Confidential Information

The Contractor shall not be entitled to disclose the terms and conditions of these Conditions and any data or information acquired by it under or pursuant to these Conditions without the prior written consent of the Employer unless such disclosure is made in good faith:

14.2.1. to any outside consultants engaged by or on behalf of the Contractor and acting in that capacity, having made them aware of the requirements of this Clause [14].

14.2.2. to the lenders, any security trustee, any bank or other financial institution and its advisers from which the Contractor is seeking or obtaining finance, having made them aware of the requirements of this Clause [14].

14.2.3. to the extent required by Applicable Law;

14.2.4. to any insurer under a policy of insurance; or

14.2.5. to the Contractor's Personnel having made them aware of the requirements of this Clause [14];

14.3. Information

The Contractor shall:

14.3.1. make available to the Employer without charge such materials, documents and

data of any nature (except any materials documents and data protected by legal privilege or which is subject to any duty of confidentiality to any third party) acquired or brought into existence in any manner whatsoever by it as the Employer may request for the purposes of exercising its rights or carrying out its duties in respect of the Facilities or exercising its rights under or performing its obligations under these Conditions.

14.3.2. make available to the Employer other such materials and documents and data acquired or brought into existence by third parties as the Employer may request for the purposes referred to in sub- paragraph (i) above

14.4. Third Party Intellectual Property

The Contractor shall:

14.4.1. procure that any intellectual property owned or developed by third parties and utilized by the Contractor in connection with the performance of its obligations under these Conditions is licensed to the Contractor for the purposes of the Operation & Maintenance or repair of the Facilities and otherwise for the purposes of the Facility; and
14.4.2. ensure that the Contractor shall have the right to sub- license that intellectual property

to the Employer and any Successor Contractor for use in connection with the operation, maintenance and repair of the Facilities. These licenses should survive termination under these Conditions. The Contractor shall grant all such sub- licenses. If any fee is payable to the licensor in consideration of any such sub- license, the Contractor shall pay such amount during the O & M Period and each such license shall be irrevocable.

14.4.3. Indemnify and hold harmless the Employer against any action, claims, damages, losses caused to the Employer by the owner of the Intellectual Property due to the allegedly unauthorized or improper use of this intellectual property by the Contractor for the fulfilment of his obligations under these Conditions.

14.5. Successor Contractor

If the licenses and sub- licenses of intellectual property granted under this Clause respectively

shall survive termination of the O & M part of contract in accordance with the terms of this

Clause, the Employer shall be permitted to grant sub- licenses of intellectual property licensed

to it there under to any Successor Contractor of the Facilities for use only in connection with the

operation, maintenance and repair of the Facilities provided that such Successor Contractor concludes an agreement with the Contractor or, as the case may be, the licensor of any such intellectual property on terms which it may reasonably require any payment in connection with

those sub- licenses. Where intellectual property has been sub- licensed to the Employer

under this Clause and such sub- license is not subject to revocation by the Contractor there
under, the Contractor shall take such actions as the Employer may request in connection with
the grant of licenses to any Successor Contractor for the purposes set out above.

15. ARBITRATION AND DISPUTE RESOLUTION A) SETTLEMENTS OF DISPUTES:

i. If any dispute of any kind whatsoever may arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing any question regarding its existence validity or termination, or the execution of the works whether during the progress of the work or before or after the termination, abandonment or breach of the contract, the either parties shall have to raise/ refer their disputes/ differences / claims in writing to the other party, within a period of 30 days on occurrence of such events, to resolve any such dispute or difference.

ii. The contractor shall have to refer their disputes to the concerned Superintending Engineer. After receipt of the dispute from the contractor under this clause, the Superintending Engineer In-charge of works shall have to submit their report to the Chief Engineer within a period of 90 (Ninety) days. The Chief Engineer shall offer an opportunity to the contractor to be heard and to furnish evidence in support of their disputes within 30 (Thirty) days after the receipt of the disputes duly compiled by Superintending Engineer. After hearing the contractor regarding their disputes along with their documentary support and the concern Superintending Engineer & Executive Engineer in charge of the work, the Chief Engineer shall give decision within a period of 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision within 120 (One Hundred Twenty) days after the contractor has been heard. If The Chief Engineer does not give decision within 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision of the Chief Engineer, the contractor shall within 30 (thirty) days after receiving the instruction or decision, appeal to the Managing Director Raipur Smart City Limited . After hearing both the parties the Managing Director Raipur Smart City Limited will give reasonable decision within 180 (One Hundred Eighty) days from the date of receipt of appeal by the contractor. The decision of Managing Director Raipur Smart City Limited shall be final and binding on both the parties. If the Managing Director Raipur Smart City Limited does not give decision within 180 (One Hundred Eighty) days after the date of appeal by the contractor, the contractor will have right to refer the dispute to arbitration tribunal as per provision of clause "Arbitration".

B) ARBITRATION: Provision of ARBRITATION should be considered deleted wherever written in the whole tender.

16. GOVERNING LAW AND JURISDICTION

These Conditions and the O & M Part of Contract shall be governed in accordance with Indian Law.

The Contractor agrees that any legal action or proceedings arising out of these Conditions may be brought in the courts or tribunals at Raipur in India and irrevocably submits themselves to the jurisdiction of such courts or tribunals. The Employer may, however, in its absolute discretion commence any legal action or proceedings arising out of these Conditions

in any other court, tribunal or other appropriate forum, and the Contractor hereby consents to such jurisdiction.

17. MATERIAL, TOOLS AND TEST EQUIPMENTS:

All materials required for the O&M of the project shall be new and of best quality and suitable for the purpose intended. These shall be got approved from the Engineer in charge before use.

17.1. Electricity Supply:

Contractor shall keep good liaison with concerned Electric Authority for power supply in case of electric power failure (break down/shut down) it shall be the responsibility of the agency to inform all the concerns as well as to contact concern authorities to restore the power supply. The contractor shall keep good liaison with concern substation for Voltage Up & Down and restore the power. The vehicle kept at site by the contractor shall be provided for this purpose along with operation and maintenance staff in case of requirement as per direction of Engineer in charge or his representative without any extra claims.

17.2. Work Order Book

A bound half sheet size work order book shall be provided by the contractor and handed over to the owner for maintaining at the work site. This shall be a permanent record. The contractor or his Resident engineer shall sign against instructions & orders recorded by the Engineer in charge or his representative for the maintenance work. He may take out a copy thereof if necessary. He shall take prompt action as per the instruction/orders of the owner and necessary compliance shall be recorded against each instruction/order

17.3. Electrical Installations

All electrical work shall be carried out as per the provisions of Indian Electricity Act, Indian Electricity Rules, Instructions and requirement of authority/authorities i.e. Electrical Inspector and Chhattisgarh State Power Distribution Company Limited or as mentioned in the Volume of General Condition for contract.

17.4. Accident on the works

The contractor shall be fully responsible for any accident that may occur to the labour on his work on duty and report the same to the Engineer in charge and concerned Govt. labour department authority and shall pay all necessary compensation as per rules. Contractor shall also be fully responsible for any loss to any individual or public property occurred due to him or his workers negligence under the scope of this contract.

17.5. Use of site

The contractor shall not unreasonably encroach the site with materials and equipment. The contractor shall not use land for any private purpose.

17.6. Compliance

The contractor shall be bound by all ordinance acts, codes, rules, regulations and orders of which in any way affects conduct of works, or workmen engaged for the work. The contractor shall be responsible for any violation of any govt. rules & regulations. It shall be the responsibility of the contractor against any claim or liability arising from violation of above.

17.7. Accommodation for Staff

Contractor shall provide necessary accommodation to their labours & engineers at his own cost. However, owner shall give vacant staff quarters available at each head works, sub head works or available in the jurisdiction at the rate prescribed by the owner.

17.8. Transportation

Contractor shall have to make his own arrangements for conveyance of his staff at his cost. No facility will be provided by the owner.

17.9. Medical

Contractor shall provide medical facility to his staff at his cost.

18. CONTRACTOR'S STAFF & THEIR CONDUCT ETC.:**18.1. Nationality & Address**

All employees shall be Indian Nationality and it shall be contractor's responsibility to give

temporary and permanent address: Convicted or penalized person shall not be employed.

18.2. Salary to Employees

Contractor shall strictly follow labour laws and shall also ensure regular monthly salary payment to his staff. The owner will not take any liability of any of his employees appointed for operation and maintenance under this contract. Contractor shall submit monthly certificate for full payment to his staff on or before 10th of every month. Owner reserves the right to conform the contents of the certificate from contractor's employee for their last pay. The owner will not be responsible for any delayed payment/ compensation/ overtime or any other claims by employees of contractor during the tender period and even after the tender period.

18.3. Identification Dress Code with Badge/ Identity Card

Contractor shall have to provide special dress code with identification badge with name plate strip to be displayed on front pocket to each staff as approved by Engineer in charge along with Identity Card etc.

18.4. Holidays and Leave

Holidays and leaves shall be given to staff as per relevant labour rules. During holidays/ causal leave/earned leaves etc. and contractor shall arrange for the substitute. The owner shall not make any separate payment of overtime for these substitutes provided by the contractor during above periods.

18.5. Conduct

All employees of the contractor shall follow the instruction of Engineer in charge. If any employee misbehaves with Engineer in charge he/she shall be immediately removed from duty and substitute for that shall be employed by the contractor. If contractor fails to do so, non-refundable penalty of Rs.200/- (Rupees Two hundred only) per day per such case will be levied, this amount shall be recovered from the bill or any due amount of agency.

18.6. Visitors

It is expected that all staff and Engineers be present and follow the directives of Engineer in charge.

19. PERFORMANCE TARGETS DURING O & M PERIOD:

Definitions

- i. Water Loss: Scope in Water Supply shall include, the operation, maintenance and repairs of all existing and new assets created for the water supply under this project and to be kept in operation to deliver but also to keep water losses in established DMA's within contractual limits. Bulk water supply by employer shall be measured at Inlet supply point of Elevated Service Reservoir (ESR) as System Input Volume (SI) or Bulk water Export/ Import point measured as Certified Export Meter. Water supply quantum shall be measured as all consumption at consumer end and export point or at the end of transfer point as applicable. The water loss is defined as difference between System Input volume & Certified Export point. However the bulk water import or export (if any) shall be adjusted through respective flow meters.
- ii. Continuous (24 x 7) Pressurized Water Supply means achieving and maintaining a continuous supply of water in respective DMA based on quantity of availability of bulk water at 7 m water column at consumer end, monitoring flow and pressure data including logging & data transfer with SCADA.
- iii. Measurement Points means the points on the project components at which the flow and or pressure measuring devices to measure and record one or multiple parameters

with data logger would be installed which shall be mutually agreed by the Employer and the Contractor during the Design Construction period but should include all major and sub components and inlet and outlet points. The logger shall transfer the data to both Employers & Operators location through wireless communication without any human interface on 24/7 basis.

- iv. Potable Water Quality Operators obligations is limited to maintain the residual chlorine of 0.2 ppm at consumer end provided that RSCL/RMC shall supply Bulk Water at ESR outlet with minimum 0.5 ppm chlorine.

B. Performance Targets

The Operator must meet following Performance Targets on monthly basis:

- i.) Water Loss / NRW Level
- ii.) Continuous Pressured 24x7 Water Supply must be provided to the ESR's or Transfer Points
- iii.) Consumer Complaints

C. Methodology for Measurement of Performance:

The Contractor shall develop a robust methodology and framework for measurement and monitoring of Performance Standards stipulated under this clause and proposed as part of the Service Improvement Plan (SIP). The Employer shall review the same and upon agreement between the Parties, the agreed methodology shall form the basis for monitoring the performance of the Contractor and apply the Performance

Payment.

D. Performance Measurement Protocol (NRW)

During performance measurement period it is not possible to measure to have simultaneous measurement within a DMA or multiple DMA. Therefore, for normalizing the readings, following, protocols will be followed;

Performance measurement will always be taken 12 noon to 12 noon of start date to 12 Noon of end Date on a particular day of a month as decided by Engineer for a period under consideration.

Measurement time gap for consumption or supply flow meter with DMA performance period, if any, in terms of days/ hrs or any other period under consideration shall normalize as per following corrections;

- a. Performance measurement period (Tp) : is the duration in days / hrs. for which Contractor performance is assessed for performance measurement (Te-Ts)
- b. Initial Reading (R1): is the reading taken during start of time for performance period (Ts)
- c. Final reading (R2): is the reading taken during end of performance period (Te)

- d. Actual Performance period (Ta): is the duration / time of actual reading from Initial reading (R1)
- e. Normalizing Reading: is the correction of actual reading with respect to time gap if any, during performance period.
- f. Normalizing Formula : $= (R2-R1) \times (Tp/Ta)$
- $$= (R2-R1) \times [(Te-Ts)/ Tm-Ts]$$

Where,

“Start time (Ts)” is the time of Initial Reading for Performance Measurement period (Tp) of DMA

“End Time (Te)” is the time of Final Reading at the end of Performance Measurement period of DMA

“Actual Measurement Time (Tm)” is the time of actual measurement for respective consumption meter / or supply meter

“Actual Performance period (Ta)” means Tm-Ts in hrs./ day

Minimum Service Level Bench Mark.

Sr. No.	Indicator	Bench Mark Level
1	Continuity of supply	24 hours
2	Coverage	100%
3	Quality	Potable drinking water as per CPHEEO Manual
4	Minimum residual pressure at consumer end	7 m
5	Metering	100%
6	NRW	Upto 15%
7	Efficiency in redressal of customer complaint	95%

The technical services of O and M shall be paid in equal monthly installments for O and M period with penalties as detailed below.

PENALTIES:

Penalty for water losses for zero year of O&M

- (a) The water losses up-to 40% will be allowed without any penalty or bonus.
- (b) For the losses in water quantity more than 40% but up to 42%, one and half times penalty of production cost
- Losses more than 42% to 44% - two times of production cost
 - Losses more than 44% to 50% - three times of production cost,
 - Losses above 50% - five times of production cost will be levied by Raipur Municipal Corporation.
 - Production cost will be considered @ INR 3/- per 1000 liter.

Penalty for water losses for first year of O&M

- (b) The water losses upto 35% will be allowed without any penalty or bonus.
- (b) For the losses in water quantity more than 35% but up to 37%, one and half times penalty of production cost
- Losses more than 37% to 39% - two times of production cost
 - Losses more than 39% to 45% - three times of production cost,
 - Losses above 45% - five times of production cost will be levied by Raipur Municipal Corporation.
 - Production cost will be considered @ INR 3/- per 1000 liter.

Penalty for water losses from third year to fifth year of O&M

- (a) The water losses upto 20% will be allowed without any penalty or bonus.
- (b) For the losses in water quantity more than 20% but up to 22%, one and half times penalty of production cost
- Losses more than 22% to 25% - two times of production cost
 - Losses more than 25% to 30% - three times of production cost,
 - Losses above 30% - five times of production cost will be levied by Raipur Municipal Corporation.
 - Production cost will be considered @ INR 3/- per 1000 liter.

PRESSURE:

7m head at consumer end will be allowed without any penalty or bonus.
For Head less than 7 m a penalty of INR 5000/- per incident shall be levied.

Delay in provision of water connection.

Water connection should be completed in all respect within 7 (seven) days after approval given from RSCL/RMC. failing which penalty will be charged as below.

- (i) After 7 (seven) days, INR 1,000/- per day.
- (ii) If connection is not as per specification of the tender, penalty of INR 5,000/- for each connection.

Delay in replace/repairs of faulty meter.

- (i) All the faulty meters shall be repaired within 48 hours from the time of intimation. On failing to attend the complaint within 48 hours penalty of INR 250/- per day shall be levied from the Running Account Bill.
- (ii) The faulty meter shall be repaired in such a manner that there will be no complain of the same at least for 3 (three) months. If within three month the same meter will become faulty the same shall be repaired at free of cost by the contractor.

Delay of non-issue of bi-monthly bill to consumer.

At every even number of month, within the first week of the months contractor has to complete measurement reading, printing, sanction from approved authority, keeping all the bills ready to deliver to the consumer. In the second week of said month contractor should complete the delivery of all bills of water meter to the consumer. The proof of

dispatch of bill / receipt note shall be submitted within third week of the same month to the Engineer- in-Charge.

If contractor fails to complete any activities mention above he will penalized INR 100/- per non-billing of each meter, for not issuing a bill bi-monthly.

Penalty for Not Submitting Demand / Recovery Statement / faulty meter detail / Temper Meter Detail, etc. within 10 days from the date of bill issue of billing cycle. Contractor will penalized INR 500 for each report.

Reading, billing complaint must be solved within 72 hrs from the receipt of complaint otherwise contractor will penalized INR 250 per complaint.

CUSTOMER CARE:

Customer complaints will be properly recorded at Operator office. Penalty will be calculated as: Complaint not solved within 2 workings days in all the area during the current month

Less than 10 complaints Unsolved	10 to 30 complaints unsolved	30 to 50 complaints unsolved	>50 complaints unsolved
0%	-2%	-5%	-10%

All penalties are calculated on the monthly execution bills presented by the Bidder/operator before any contractual or taxes retention. Penalty shall be calculated as per the formula (a). The O and M bills shall be paid to the operator only on production of Monthly O and M report as detailed in Scope of work section.

Non attendance leakage in network.

If there is any type of leakage which is informed by RSCL/RMC staff to authorized person of contractor, it shall be repaired within 24 hours failing which, penalty will be charged as below.

- 24 to 48 hours INR 2,000/-
- 48 to 72 hours INR 3,000/-
- More than 72 hours INR 5,000/- for each day.

Note:- The Parameters given above should be measured/quantified by Third party agency in every three (3) months as part of the performance audit. The performance based payment will be linked to the outcome of the audit. Based on the audit result penalties will be calculated as per calculations enclosed in RFP.

SCHEDULE 1**Operation and Maintenance Services**

The Contractor shall be required to perform the following services under these Conditions:

The Contractor shall be responsible for corrective and preventive maintenance of civil, hydraulic, mechanical, electrical and computing equipment as well as miscellaneous equipment.

The Contractor shall be responsible for carrying out regular servicing and lubrication of rotary machines, complying with maintenance instructions as defined in the Operation and Maintenance Manual and ensuring that electromechanical equipment and motors operate correctly at all times.

The Contractor shall ensure that all measurement systems are calibrated, within the valid period of certification and operate correctly at all times.

The Contractor shall be responsible for maintenance of civil structures, workshops, garages, etc.

The Contractor will operate and maintain in a state of continuous operational readiness all plant and systems to meet the flow requirements.

It shall remain the Contractor's responsibility to ensure that plant systems are at all times able to operate to the maximum capacity of the installed duty plant.

Provided here are certain standard services that Raipur Smart City Limited could require. However Raipur Smart City Limited may wish to review this and make changes depending on the exact nature of services they require from the Contractor.

The Contractor shall be entitled to appoint a representative who shall together with Employer's Representative on the last day of each month or if such day is not a working day on the following day, jointly carry out a reading of water meters and jointly certify the record of such readings.

For the duration of the O & M period, the Contractor will be responsible for the supply and control of lubricants, spare parts and consumable materials only excluding Electrical Power, necessary for the continuous operation of the works.

The Contractor will manage the consumables and utilities services to ensure their most economic consumption and to minimize wastage.

The quantities of all the unutilized spare parts and consumable materials will be fully handed- over to the Employer at the end of the O&M period.

The stores inventory, the issuing and recording of spare parts will be the responsibility of

the Contractor.

The Contractor is also responsible for providing spare parts and material required for the operation and maintenance during the operation period, and shall bear the cost for the same, including the cost of storing and safeguarding.

The Contractor will make all necessary arrangements to ensure the continuous supply of spare parts and material for the works; and the rate of advance supply of these materials shall be in such quantities and amounts as would ensure uninterrupted operation.

All the furniture and administrative office equipment etc. required shall be furnished by the Contractor. Costs of operating administrative office and supplies shall be borne by the Contractor.

The Contractor shall take out subscriptions for standard telephone lines/ wireless sets. Running cost for the telephone / wireless sets will be borne by the Contractor.

Cost of operation and maintenance and housekeeping of housing complexes including domestic water supply and drainage, roads, gardens, electrical installations, etc. will be borne by the contractor.

The Contractor will provide staff personnel for the full term of O & M as per schedule of establishment given in Annexure- I.

Contractor has to do painting to Every Civil Structures, Valves, pipeline etc. with the same quality of paint used while construction of the structures or as directed by Executive at an regular interval of every two and half years.

SCHEDULE - 2

Performance Guarantees

DELETED

SCHEDULE- 3**O & M Price**

The Contractor shall be paid at the quoted rates per month. The amount withheld against the O & M from the bill of the main contract shall be released by end of each year.

SCHEDULE- 4**REPORTS****MONTHLY REPORT**

The monthly report shall include but not be limited to:

Volume of water conveyed, to each consumers off- take point end.

All the problem areas in the facility,

O & M works carried out during the month. Electricity consumed totally.

Monthly materials consumption statement

SEMI- ANNUAL REPORT

A semi- annual report shall include the measurement of noise level at the site boundary at plant, to be the indicated by the Employer.

ANNUAL REPORT

The Contractor shall provide the Employer by March 31 of the current year (n) with an annual report for the preceding year (n- 1). This report shall include:

*All technical statistics related to plant operation as supplied by the operation;

*A statement of works carried out during the preceding year n- 1 in connection with the contractor's obligations under these conditions.

NOTE: The Employer may consider if it requires these reports or requires reports and provide for the same. This will need to be looked at in the light of reporting requirements in these Conditions. The Employer will also need to determine what information is required in these reports

SCHEDULE- 5**Insurances**

Insurance against Injury to Persons and Damage to Property :

The Contractor shall insure against each liability for any loss, damage, death or bodily injury which may occur to any physical property (mechanical, electrical, automation work, all civil works, Storage etc. excluding pipe line) or to any person which may arise out of the Contractor's performance of his obligations under these Conditions during the O & M Period.

This insurance shall be for a limit of per occurrence of not less than the amount of Rs. 5 lakh, with no limit on the number of occurrences.

Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The Employer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

Contractor shall have to take insurance for Electrical, Mechanical and instrumentation equipment under this packages. This General Insurance for the work will be in the name of Raipur Smart City Limited. The depreciated value is to be considered for the purpose of insurance for respective year. The insurance for skilled, semi- skilled and unskilled labour is compulsory. The same should be taken by agency as per labour act laws in force.

**SECTION B: SPECIAL CONDITIONS OF CONTRACT FOR OPERATION &
MAINTENANCE
PART- 1: Technical Conditions**

The Contractor shall have the following obligations:

- a) Prepare & implement operating and maintenance manuals, spare parts lists, recommended spares, warranty period from equipment suppliers and connected matters;
- b) Identifying and procuring workshop equipment and capital spares for repairs as may be required, at his cost.
- c) Select suitably qualified Suppliers of Spares, Consumables, and the external Contractors required during Operations.
- d) Set up a fully functional office with computers, personnel, equipment, furniture and communications and at locations / space provided or suggested by RMC/ engineer. Customer service front office shall be managed by RMC, while support staff for resolving the complaints or repairs shall be provided by Contractor. The Customer Service Center shall function between 8am to 8pm during all working days and between 8am to 1pm during public holidays including Sundays.
- e) The Contractor shall assist the RMC in evaluating and verifying the reasonableness of the Operations and Maintenance Plan and answer all queries, explain the assumptions, projections, calculations etc. and shall make available all the concerned staff who had prepared the respective plans.

1 Notwithstanding the above obligations the Contractor shall have the following obligations during Operation & Maintenance

- (a) Provide prudent management, operation and maintenance services as per the prescribed-standards of performance for existing as well as new assets created under this contract;
- (b) Undertake efficient demand management and meet the entire demand for water as required during the time of operation;
- (c) Co-ordinate with RMC for ensured Bulk Supply volume at WDS inlet
- (d) Contract management;
- (e) Connections, reporting defaulters, reconnecting as per the general conditions

of contract.

(f) Manage and maintain the Integrated Management Information System (IMIS) to ensure efficient and transparent information, record keeping, and decision making. Under IMIS, set up a robust integrated information system comprising of the following areas:

(i) technical services such as service levels of NRW, water quality, consumption, pressure, losses, monthly real time water balance, SCADA etc.;

(ii) business services comprising, procurement, inventory management and human resource management;

(iii) Hydraulic network Modeling:- A hydraulic network model representing the water supply system for selected area of RMC shall be developed using suitable software such as Water GEMS. The model shall be calibrated, reconciled and established and fully functional for continuous updating for management of the system;

(iv) Asset Management Program including covering each type and category of asset, its servicing schedule, replacement frequency, etc. for all assets in water system including but not limited to:-

(A) Valve inspections

(B) Tank inspections

(C) Pipeline inspections

(D) Leak detection process.

(E) Leak repairs

(F) SCADA & Preventive maintenance of all existing and new mechanical, electrical and instrumentation equipment

(v) Set up operating and maintenance procedures for each of the unit operation including Standard Operating Procedures, Standard Maintenance Procedures, Emergency Procedures, Health and Safety Procedures etc incorporating Original Construction Contractor's Operating and Maintenance Manuals;

(g) Maintain effective and efficient customer complaints redressal system, the prescribed performance standards including awareness program, campaigns, trainings etc.;

(h) Undertake timely and cost effective asset management program;

(i) Maintain the automated water quality surveillance system;

(j) Operate and maintain all mechanical, electrical, instrumentation, SCADA Server & Monitoring and information technology installations, equipment, machinery etc as per the respective standard operating and maintenance procedures;

(k) Undertake preventive and breakdown maintenance for all pipelines, valves, appurtenances, mechanical, electrical and instrumentation equipment in relation to the above referred Facilities, along with appropriate documentation to facilitate warranty and insurance claims, if required;

- (l) Ensure effective and efficient planning, procurement and inventory management for all spares, equipments, consumables, instrumentations and PLC/SCADA system etc;
- (m) Provide robust security arrangements for all the facilities within the scope of this project, including restriction of entry of unauthorised persons;
- (n) Manage and maintain the water distribution management system (WDMS) for the water supply in the project area, including all, water storage facilities, flow measurement, pressure measurement and quality surveillance systems etc. complete;
- (o) Comply with all relevant local laws including environmental, industrial and labour laws;
- (p) Maintain healthy working relations with all stakeholders including the Water resources department, RMC, NHAI, PWD, State Pollution Control Board, and power utilities; etc.
- (q) Maintain detailed documentation and prepare periodical reports including monthly, quarterly and yearly reports for submission to RMC including data on water balance, leakage levels, flow and pressure of water at designated check points, Import / Export point flow details, water loss / NRW level, service level, etc. complete as set out in.
- (r) Training of the operating personnel from RMC or any other designated authority for taking over the system at the end of Contract Term;
- (s) To undertake emergency chlorination measures at times of outbreak of epidemics and any such emergency situations on behalf of RMC;
- (t) Rectify all defects attributable to the Contractor and notify the RMC of defects, developed within defect liability period of the commissioned components or equipments of Water supply system;
- (u) Follow all reporting requirements as specified by Engineer;
- (v) Maintain the Performance Indicators, Quality Assurance, Standard & Safe Operation Procedures (SOPS);
- (w) To summarize, the services provided by the Contractor shall include the following:
 - ☐ Operation of Facilities from inlet of service reservoir upto consumer end;
 - ☐ Provision for 24 hours a day operation and emergency cover;
 - ☐ Ground and buildings maintenance;
 - ☐ Unscheduled and emergency maintenance;
 - ☐ New service connection surveys and estimates as per instructions of RMC;
 - ☐ Making new service connections as per instructions of RMC;
 - ☐ Investigation of illegal connections, install meter & measure and necessary reporting

as per instructions of RMC;

- ☐ Quality surveillance programme;
- ☐ Data collection and reporting;
- ☐ Holding emergency exercises;
- ☐ Incident management;
- ☐ Safety inspections;
- ☐ Supervision of subcontractors ,enforcement of specifications;
- ☐ Operational liaison;
- ☐ Updating of the IMIS/ Computerized water management software system;
- ☐ SCADA system operations / cloud facility
- ☐ Preparation of all plans, procedures and budgets relating to operational matters, as required within the Contract.
- ☐ Consumer awareness program, campaign, training, meetings, media interaction etc.
- ☐ Any other work necessary to ensure the continued operation and availability of the system.

(x) All instruments shall be maintained, checked, calibrated and serviced periodically and will always be kept in operating condition. The calibration shall be checked whenever necessary and corrected. Calibration data shall be submitted to the RMC for approval. As a minimum, all instruments shall be calibrated once per year.

(y) For the purpose of complying with the requirements of this contract, the Contractor will need to provide.:

- i) An adequate and skilled workforce, supervisors, managers and technical support staff;
- ii) Administrative and financial support staff and computer and business support systems;
- iii) All necessary mobile plant and equipment, vehicles and incidental equipment;
- iv) Health and Safety equipment and staff protective clothing as well as traffic and footpath barriers and signs;
- v) Necessary chemicals and fuel;
- vi) Stores suitably stocked with adequate spare parts and replenished within a store policy that recognizes frequency of use and delivery periods;
- vii) Suitable depot and office premises.

(z) The Contractor shall carry out the complete cleaning & disinfection of service reservoirs, master balancing reservoirs etc. once in a year.

(aa) All SCADA and monitoring data shall be maintained and available on internet through application software.

2.

Standard Operating Procedures (SOP)

2.1 Operating Instructions and Standard & Safe Operating Procedures (SOP) shall be formulated for each Site comprising of process equipment schedules, operation & maintenance data, sampling and analysis with frequencies etc. The operating parameters

shall be optimised based on the data collected on commissioning of the facilities. All the activities in the preventive maintenance schedule shall be followed without any lapse. Indicative functions that are expected to be performed at each site are given below:

Water Supply Network

- (a) Take all relevant meter, flow and pressure readings
- (b) Check operation of all equipment
- (c) Periodically check water meters and cross check readings
- (d) Check for Chlorine residual, flow and pressure at the Critical Measurement Points (CMPs)
- (e) Checking SCADA operations & monitoring

Water pumping stations/ and transmission main

- (a) Check operation of all pumps
- (b) Take all relevant meter readings
- (c) To ensure compliance with agreed withdrawals and to bring to notice of the DMA any excess or short withdrawal
- (d) Check operation of all valves along the transmission main
- (e) Flow and pressure measurement
- (f) Checking operations of electrical & mechanical equipment
- (g) Check the power factor and power consumption

Elevated Service Reservoir (ESR)

- (a) Check operation of valves
- (b) Checking SCADA operations & monitoring

2.2

Maintenance and Repairs (Mechanical, Electrical and Instrumentation) A] Management and Maintenance Plan

2.3 A properly designed water system shall be capable of delivering desired output at all times. Considering that every mechanical system shall have to be given a downtime for maintenance purposes, the Contractor shall schedule a downtime of one hundred twenty hours, on a cumulative basis in a year for the water components or project facilities in consultation with the RMC so as to minimise disruption in services.

- (A) Routine inspection and maintenance of all equipment;
- (B) Planned and scheduled maintenance (preventive);
- (C) Unscheduled maintenance (breakdown);

B]Routine Inspection and Maintenance of Equipment

The Contractor shall carry out routine monitoring of the equipment and ensure that the equipment is properly maintained to meet the desired output. Typical tasks that shall be undertaken are:

- (A) Mechanical
- (a) Checking the lubrication and necessary follow-up

- (b) Replacing of glands that are leaking
- (c) Servicing as per supplier's instructions
- (d) Checking for unusual vibrations and noise

(B) Electrical

- (a) Checking electrical contacts and wiring
- (b) Assessing efficiency of electrical equipment

(C) Instrumentation

- (a) Cleaning and calibration of probe / sensors
- (b) Fault diagnosis
- (c) SCADA, PLC, RTU, Cables, Display Unit etc.

These maintenance tasks shall be issued on a weekly basis through computer aided management system and the Contractor shall incorporate it in operating work schedule. All observations shall be recorded in the properly designed record system and would be analysed for initiating corrective actions, if any.

D] Planned and Scheduled Maintenance (Preventive)

A work schedule chart listing identification of critical equipment, work assignment, timing shall be prepared. Critical equipment is defined as those items where failure would adversely affect the quality and quantity of output or those that risk the safety of employees or customers. The schedule shall identify the responsible person / agency who shall be intended to complete the task e.g. in - house technician or specialist contractor etc.

The overall yearly plan schedule shall be issued to all parties to enable forward planning of anticipated manpower requirement and equipment down time. The indicative maintenance schedule is provided further in the following table. This shall be finalised during the preparation of the Operation and Maintenance Plan.

D]

Break

down Maintenance

The aim of routine and preventive maintenance is to keep breakdown to minimum for items of critical equipment which shall directly affect the performance of treatment processes. However certain breakdown may occur in spite of proper maintenance. The Contractor shall take the breakdown maintenance on top priority to keep disruption to the systems at a minimum level.

The Contractor shall have an option to call other available staff and also the services of the local skilled contractors should the breakdown occur.

E] Spare Parts

The Contractor shall store spares of all the critical equipment on respective sites and the inventory shall be assessed according to anticipated usage and in conformity with Annual Operating and Maintenance Plan.

The Contractor shall obtain consumable items required for maintenance e.g. grease, gaskets etc. from local suppliers, as and when required.

F] Maintenance Report

As part smart management of the maintenance activities, a Computer Aided Maintenance Management (Camm) shall be implemented by the Contractor which shall be integrated with the IMIS system i.e. WDMS with the help of GIS. Appropriate proprietary Camm packages shall be utilised by the Contractor for maintenance purposes. This package shall incorporate features such as Facility details, maintenance history records, and scheduling of maintenance activities and updated regularly in GIS database. The use of such package shall allow the Contractor to predict when the maintenance activities need to be carried out.

Record of maintenance jobs carried out shall be reported in the record system, which shall provide the RMC the past history, time and cost involved for each category.

SECTION C

TECHNICAL SPECIFICATION AND SCOPE OF SERVICES

SECTION C: TECHNICAL SPECIFICATIONS & SCOPE OF SERVICES O & M Work**SCOPE OF SERVICES**

The Scope of work / service to be done / provided by the contractor under this bid will be as under :

Operation and maintenance Scope :

- 1) The scope of work further includes an Operation and Maintenance period of five years for ABD area of Mor Raipur City Center Area only in which the Contractor is required to carry out the following activities as provided in brief.
 - Day to Day Operation & Maintenance of the system including Valve operations, leak repairs, assistance to customer complaints.
 - Intensive maintenance training to minimum two of purchaser's personnel shall be given at bidder's facility for a period of 2months. Operation and maintenance training at site shall also be given.
 - Contractor shall arrange minimum 2 training programs per year to benefit its employee and the RSCL staff on good engineering practices and development in water supply and O&M.
 - Operation shall include training to RSCL nominated Staff in.
 - a) Installation of metering equipments
 - b) Programming of meters and data loggers
 - c) Meter reading practices
 - d) Download of data from data loggers
 - e) Operation & Maintenance of portable download devices
 - f) Analysis of the data
 - g) Operation & Maintenance of the online calibration validation equipment
 - h) Planned Preventive Maintenance of meters and other accessories
 - i) Remote monitoring setup by GSM/GPRS technology.
 - j) Public awareness by presentations, meetings, etc.
- 2) Contractor shall arrange minimum one public program every six months on WATER CONSERVATION AND AWARENESS either by arranging exhibitions or school competitions, publications of news articles, brochures, and holdings.
- 3) Customer billing shall be done on monthly basis and the soft copies of all the bills shall be submitted to the RSCL.
- 4) Contractor shall establish customer care centre within the zone. The customer care centre shall prominently display information to the customer. The contact details shall be printed on the bill.
- 5) The water audit is also under the scope of bidder only in order to predict the real losses of water. The bidder shall prepare the Water balance and submit the same with monthly reports of O&M.
- 6) The operator shall arrange a minimum of seven meetings with stake holders (Citizens and representatives) on behalf of RSCL during the project and minimum two meetings during first year of the execution of project
- 7) Laboratory Testing facilities for All water Meters and repairs facilities:
 - Operator shall provide and maintain a complete of laboratory for testing of All water meters which are found to be out of order and then repairing the same.
 - If found impossible to repair, the water meter shall be replaced by the operator on his own cost.
- 8) Monitoring and maintaining the system using necessary inventory with proper storage and required staff :

- The operator shall monitor the system using necessary number and required diameter of clamp on flow meters as well as other inventory and transportation facility to check the problematic areas or for general maintenance.
 - This inventory shall be in the custody of operator/bidder and stored properly. The operator shall provide his staff and the inventory as and when required or proposed by the RSCL.
- 9) The Contractor will also be responsible for the replacement of any theft/stolen of Bulk Flow Meters.

A. WATER AUDIT:

Water, audit shall be done for a thorough accounting of all water into and out of a utility as well as an in-depth record and field examination of the distribution system that carries the water, with the intent to determine the operational efficiency of the system and identify sources of water loss and revenue loss.

For conducting water audit, System maps shall be prepared based on the design of network finalised.

For it, the water distribution pipe network is divided into a number of sectors (Zones)

Process to Conduct a Water Audit:

Water audit can be done using appropriate licensed software or Liemberger's free software WBEasyCalc (www.liemberger.cc) can be used to compute NRW of the zones.

Task-1: Measure the supply: The bulk flow meters are installed at the entry points of all Zones and at the outlet of ESR-GSR. Daily readings of such meters are taken. Annual system input volume shall be shown in Table format as given below.

System input volume.

ESR-GSR (m3) Error Margin

DMA (m3) Error Margin

Task-2: Measure authorized metered use: i.e. billed metered consumption

Billed Metered Consumption: Manual billing operations shall be used to generate bills. Bills are raised monthly. Volume of water that is billed is worked out from the billing data and shall be shown in Table format as given below.

Billed meter consumption:

Zone	Volume (m3)
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Task-3: Measure Water Losses: Water losses comprise of two parts: First is the apparent losses and second is the real losses.

(i) **Apparent Losses:** It consists of two parts- Unauthorized connections and customer metering inaccuracies.

a) **Unauthorized connections:** Unauthorized connections are domestic and other than domestic connections. In addition to this, losses are due to meter tampering and the meter bypassing etc. Losses due to all unenthused consumption shall be shown in Table format as given below. Unauthorized Consumption (m3)

Description Estimate	Number	Error Margin (+/-%)	Consumption (liters/person/days)	Total (m3)

- b) Customer Metering Inaccuracies:** Losses due to customer metering inaccuracies shall be shown in Table format as given below. Customer Meter inaccuracies and Data Handling Errors

Description	Total (m3)	Meter under registration	Total (m3)	Error Margin (+/-%)

- (ii) Real Losses:** Real losses are- leakage on distribution network, leakage and overflows at storage tanks and leakage on service connections up to point of customer meter which shall be computed using difference in reading of Bulk flow meter and domestic water meters of the concerned Zones and through experience using portable flow meters. i.e. The bulk meters shall be installed at source i.e. near outlet of ESR-GSR, at the entry point of each operational zone and at the entry point of each Zones. The readings of these bulk flow meters shall be cross checked with the total of the Domestic meter readings (taken manually). Portable flow meters shall be placed at concerned nodes to check whether the design flow and pressure is obtained. The readings shall not match on pipe with leakages or thefts.

The operator shall produce the NRW obtained as reports in the format of table below:
 NRW of operational zones and Zones

Operation Zone	Zones	Present population	Total Consumer Connections	Bulk meters installed	Water input in Zone in mld.	Water Supply in lpcd	Billed Water in mld.	Total NRW in %

After conducting water audit, clear picture of the behavior of the distribution system is known. The operator shall prepare WATER BALANCE and submit the same with monthly reports of O and M. All efforts are focused in that Zone to curb NRW. Reducing Physical Losses, i. e. losses in distribution network pipeline and house service connection pipelines shall save lot of losses If the bidder is planning to use some other methodology for Water audit, water balance and leak detection program, the bidder shall give complete methodology for carrying out periodic water audit, water balance and leak detection program to RSCL along with the DRAFT

PROPOSAL FOR EXECUTION.

Contractor shall install a meter complete with House Service Connection as per the instruction of Engineer in charge for all the existing connection provided by RSCL and shall produce the bill and submit it to RSCL water works dept.

If installed water meter is damaged or altered by the customer, the operator shall

inform RSCL for punitive action against the customer.

In case of metering connection is not allowed by customer, appropriate help/security shall be provided by RSCL for effective installation of water meters. Developing and agreeing a Planned Preventive Maintenance (PPM) program for all the bulk meters and other accessories supplied & installed as part of this contract. Supply of labour, materials, tools & equipment to carry out the agreed PPM, including supply of all consumables & spare parts. The Contractor shall attend for an emergency breakdown immediately (within 48 hrs). On receipt of the orders from RSCL regarding replacing of any domestic meter, the representative of the Contractor should go to the site of work with all spares, tested meter (provided by RSCL) and remove the Defective meter and replace the same with tested working meter.

On receipt of the complaint regarding bulk flow meters, the representative of the firms should go to the site of work with all spares, tested meter and remove the Defective meter and replace the same with tested working meter.

On the inspection of the bulk flow meter, if the impeller is not damaged and only the totalizer is found damaged or strainer is missing then the firm shall inform the RSCL to replace only the totalizer or strainer at site and furnish the initial reading of the new totalizer to customer and RSCL.

The defective domestic meter should be reported to RSCL by the Contractor immediately and working meter (provided by RSCL) should be installed immediately within 3 days after intimation by CCC representative or RSCL. However, the upper limit should not be more than seven days. The contractor may take defective meters to RSCL to rectify the defects by the supplier and calibrated for subsequent use.

The defective bulk flow meter should be replaced with working meter immediately within 3 days after intimation by CCC representative or RSCL. However, the upper limit should not be more than seven days. The operator may take defective meters to his laboratory to rectify the defects and calibrated for subsequent use.

Complaints regarding normal / subnormal reading will also be treated as defective meters. The contractor has to inform RSCL to arrange for repair the same in case of domestic water meter and replace the meter in case of bulk flow meters.

Theft of meter shall be instructed through FIR to the nearest police station, intimation to RSCL for its timely replacement and payment. The cost of recovery for such stolen individual domestic water meter shall be done from the customer.

If the factory seal of the company is tampered then the signature of the departmental personal and the customer should be obtained on the complaint sheet and cost of such repairs will be charged to the customer. Any tampering in the customer meter shall be immediately reported to RSCL and water supply shall be disconnected after informing to ward office. The digital photograph shall be kept in record.

All safety precaution with lighting protection shall be provided to all the flow meters.

All maintenance charges should be all inclusive and shall be mentioned in the price bid year wise (in the column of O and M). The electric power consumed during O and M period shall be paid by the RSCL. Contractor shall deposit a copy of the bills generated for all the customer within 24 hours in the RSCL office and shall collect the counter receipt of the same from RSCL. The tariff details and serial number issued to the customer shall be given by RSCL. The bills generation record as per serial number shall be submitted to RSCL every day. The failure of submission of bills generated to customers will be liable for penalty of 1 % of O and M cost.

Logging of customer complaint receipts shall be kept at central location with one soft

copy to ward office of RSCL by email. Weekly report of complaint receipt and attended shall be given to the ward office and monthly report shall be submitted to the RMC office. No bill of the operator shall be paid without submission of customer complaint status report. The digital photograph of each customer complaint and its solution shall be submitted before and after solution provided to the customer on behalf of operator (in case of works reqd.)

Water meters and House Service connections in the Price bid are considered only for the present population. Contractor shall provide the new connections within 72 hours after receipt of approval letter from RSCL. Rates for fixing of requested additional domestic water meter and supply and fixing of house service connection (during O and M period) with all the accessories as per relevant item of Price bid shall be paid from RSCL funds:

- As per rate quoted in the tender till 2 years of O and M
- With 5 % escalation/year over the quoted rates for next 3 years of O and M period.

The responsibility of reporting of non measurement of water consumption due to non working of customer meter shall be with operator. The operator is expected to procure extra water meters as and when required from the RSCL.

The scope of works of operation and maintenance also includes;

- 1) The works shall include Operation & Maintenance of, Pumping machinery & other ancillary works etc for five years.

Scope of work includes operation, maintenance, repairing & replacement of spare parts of following Mechanical Electrical, Instrumentation & Civil equipment.

- 2) Operation and maintenance of following structure for the period of 60 months from the start of O&M period.

All civil structures like staff quarters, Command Control Building, compound wall etc of the works should be maintained for their excellent serviceability and shall be painted once in every Two and half years, during contract period with the same type of paint originally applied at the time of construction of the structure. All the flooring and finishing of all the building shall be maintained and replacement of the same shall be done by of the flooring of same type, specification and colour. The repairs shall be carried out in such a manner that it should fully merge with the original flooring without any noticeable variation at the repaired locations.

All the plumbing fixtures like taps, cocks, valves, hoses, showers, faucets, pipes shall be maintained in good working condition and replacements, if any, shall be made with the same type and style so that the repairs are not noticeable.

- 3) DELETED

- 4) DELETED

- 5) Maintenance of Electrical and electrical equipments at head/ Sub head works including emergency brake down works with cost thereof.

- 6) Supply of all type of consumables material excluding material to be supplied by Raipur Smart City Limited as mentioned in Schedule – A of this Tender and also re-carting the un-serviceable or serviceable material to the departmental store.

- 7) All type of spare parts for Electrical / Mechanical equipment. All electrical/mechanical works including repairs shall be done under supervision of mechanical wing of Raipur Smart City Limited and a certificate shall be produced at the end of each month regarding satisfactory maintenance of electrical/mechanical equipments carried out during that month.
- 8) Submission of daily / weekly / monthly report to Raipur Smart City Limited.
- 9) Submission of running bills along with all required evidence and documents.
- 10) Two coats of oil paints / cement paint of approved make to all metallic and wooden structures including over exposed piping arrangement are under scope of agency. The scope covers painting of all building's exterior with Cement paint and inside with lime/distemper point in first six months of taking over of O&M.
- 11) Deleted.
- 12) All necessary safety provision for the security and safety of labours, Public properties etc. as per prevailing rules and regulations shall be followed during maintenance period.
- 13) Maintenance of Garden/ Trees / Plantation within the premises of work site.
- 14) Deleted
- 15) In short, this tender includes cost of all civil, mechanical & electrical works including cost of consumables excluding electricity & irrigation charges but including routine & emergency brake down works with cost of material, labour etc.
- 16) Contractor has to depute one responsible person with mobile telephone facility at concerned all the working days for attending the complain regarding prompt repairing and leakages and quantity of water receiving at all the faced works which are under scope of the works.
- 17) DELETED
- 18) Regional Water Supply Scheme(RWSS) as described in the specification are proposed to be supplied with water. The agency has to quote rates for demand of RWSS only. Due to addition/ subtraction of villages, increase/decrease in quantum of water supply may happen. Any increase/decrease in excess of 10% shall be paid/ deducted @ rates quoted by the agency on actual supply at tail end on pro-rata basis. No payment/deduction shall be made till 10% deviations.
- 19) The details of current establishment enclosed are of indicative nature only. The agency is at liberty to provide less/more staff for smooth O&M of the scheme. The primary objective of Raipur Smart City Limited is to provide safe and reliable network for drinking water to villages and no compromise on this shall be made.
- 20) Scope of work of Raipur Smart City Limited. :
 - a) Supervision of entire Maintenance of the work and scrutinizing / running account bills submitted by the agency and payment of passed bill as per the availability of funds.

- b) Payment of Electric consumption bill to Electric Utility Company shall be made by Raipur Smart City Limited. However, as bills are received at site, contractor shall have to make arrangements for its submission to Raipur Smart City Limited within 4 days of its receipt to enable office to make payment in time. In case of delay in Submission of Bill, Penalty as imposed by CSPDCL will have to be borne by the contractor.
- c) Payment to irrigation authority for usage of raw-water shall be made by Raipur Smart City Limited. Penalty, if any, imposed by Irrigation dept for non working of water meter shall be borne by Contractor.
- d) Supply of DI / M.S. pipe free of cost in case of major break down in DI / MS pipeline. However necessary bend, tee, tapes etc. shall be prepared on site with this pipe and pipe shall be carted by contractor at this cost and for the remaining materials and condition will be as per Schedule A.

Scope of work includes operation, maintenance, repairing & replacement of spare parts of following Mechanical Electrical, Instrumentation & Civil equipment.

- 21) The contractor would be responsible for smooth, efficient & satisfactory operation & maintenance and repairing, replacement of spares, any works related to pipelines and Meters Installed on the round clock basis for the period of 60 calendar months from the date of contract of plant shortly described as above.
- 22) The scope of work of contractor includes operation, maintenance and repair of each & every structures, all pipeline, Electro- mechanical and instrumentation and control systems constructed / installed under the said project.
- 23) Each & Every structure as mentioned above like, Air valve C.C. pillar, Air valve, Sluice valve, riser pipe air valve, Zero velocity valve, Butter fly valve, bypass arrangement, for different type of valve chamber, store, godowns, CCC Building should be coloured by Oil Paint / Acrylic emulsion paint / black japan as per the instruction of Engineer-in-charge (Once in three year period) at his own cost as under :
 - a. Exterior paint shall be Acrylic Emulsion Paint colour (like APEX) : Air valve C.C. pillar, chamber for different type of valve etc.
 - b. Oil Paint colour : All type of Doors, Windows, Ventilation, Shutter, Pump, Motor, All valves & equipment in side pump house, Transformer yard, D.P. structure, Transformer etc.
 - c. Black Japan Colour : Air valve, Sluice valve, Riser pipe of air valve, Zero velocity valve, Butter fly valve (outdoor), bypass arrangement etc.
- 24) Water sump & suction structure shall be cleaned every three months or earliest if required. The floating debris of articles if any shall also be required regularly to be removed from the sump for cleaning purpose.
- 25) The scope of the contractor includes operation, maintenance & replacement of spares.

- 26) The scope of work also includes providing necessary tools and tackles for day-to-day O&M routine maintenance, preventive maintenance and breaking down maintenance.
- 27) Also minor and major repairs to the equipment involved in the plant have to be carried out by the contractors during O&M period.
- 28) The scope also includes cleaning of sump, removing of foreign materials like debris, sand, fish, frogs or any other dead or live animals and also cleaning of strainers of each pump quarterly so that 24 hrs. required quantity of water is made available from the sump.
- 29) The disposal of the foreign particles like sand, dead or alive animals etc. from sump to suitable place as shown by Raipur Smart City Limited will be in the scope of contractor.
- 30) Repairing & replacement of damage strainer of each pump set, repairing of dewatering pump motor sets, chain pulley block etc. as well as any items to be procured for replacement will be in the scope of contractor.
- 31) The scope of works also includes the calibration of all meters e.g. pressure gauge, Ammeter, voltmeter, relay, trivector meter, Energy meters, temp scanners, flow meters etc. for measurement of accurate readings once in a year or as and when required.
- 32) All these capacitor panel must be kept in working condition to keep CSPDCL power factor more than 0.95 by the contractor. If any additional capacitors irrespective of rating required to maintain the power factor for rebate shall be procured and fitted in HT or LT panels at his own cost. No spares for capacitor panel & LT capacitor panel in any circumstances will be provided by Raipur Smart City Limited. Any penalty levied by concern CSPDCL on account of poor power factor (i.e. less than 0.9) will be recovered from the contractor from his monthly O&M bill.
- 33) Daily record about the incoming flow & outgoing flow at each & every sump of all head work site should be maintained by the Contractor as per the Performa is to be supplied by the Raipur Smart City Limited and will be send day to day directly to EIC.
- 34) Hourly record of raw water analysis and treated water analysis at all Treatment Plants should be maintained by the Contractor as per the Performa is to be supplied by the Department and will be send day to day directly to EIC.
- 35) Contractor shall have to carry out Relay testing, Scheme testing & primary injection tests once in three years maintenance period at his own cost by specialised personnel in power system protection to ensure system operational stability & reliability for pumping station. For specialised testing of this job, contractor shall have to take the approval from Raipur Smart City Limited for carrying out job by specialised personnel.
- 36) The scope of work also includes attending of all types of cable faults for pump motor set, street light etc.

- 37) Drawal of raw water from Sump, transfer of raw water to WTP and pumping and transfer of Treated water by means of system, control and operation of plant.
- 38) Routine maintenance of all buildings, transmission main, installation and equipment and area lighting, gardening.
- 39) Management of the plant in administrative and financial operations connected to the plant management.
- 40) All sluice valve/B.F. Valves/Air Valves/Zero velocity valves/Air cushion valve to be kept under working condition.
- 41) Area lighting – The premises of various works are provided with mercury/sodium vapor lamps, fluorescent tubes and also ceiling fans/exhaust fans inside the various structures. Daily on/ off operation and routine cleaning of all type of electric fixtures. Replacement of lamps/ Tubes/ Fans in case of failure at contractors cost.
- 42) Maintenance of garden – Normally watering the trees once a day or more if required. Grass cutting, removal of shrubs, weeds, around tree to be done as directed. Remarking the ponds around the tree after loosening with soil with supply of additional earth if required. Cutting of branches if required, for straight growth of tree/plant and development of garden
- 43) Roads to be kept neat and clean.
- 44) All buildings, bathroom, toilet to be kept swepted, cleaned washed daily. Consumable requirement for cleaning such as acid, harpic, phenyl, air freshner, washing powder, brooms, wire brushes, duster, bamboos, toilet shop, lotion waste, kharata shall be provided and used as required. All ventilators, windows/ doors to be clean and good condition.
- 45) To keep watch on overflowing of sump. If such overflow take place the agency shall have to bear the damages caused to surrounding properties.
- 46) Maintaining rising and gravity transmission main. If any leakage breaking of pipe found, same shall have to be rectified within 12 hrs. All materials equipments and labour shall have to be employed by the agency to attend such repairs.
- 47) All air valves shall be repainted every year and numbered with radium paint.

DOCUMENTS RECORDS / LOG BOOK

- ☐ The contractor will be responsible for keeping up to date records of documents including History Card for equipment and maintaining every day log book relating to various analysis performed and to prepare and submit a daily report of Pumping Station performance. The contractor shall maintain an updated log book and details of operational parameters like pumping hours, Amperes, Flow meter reading, H.T. Voltage, Power Factor, energy meter reading, pressure and other reading

required are recorded in every shift at regular interval e.g. hourly or as agreed mutually (by Raipur Smart City Limited).

- ☐ Printing of log sheets, registers and all necessary stationery required for maintaining records of operations and maintenance has to be arranged by the Contractor at his cost. Format of log sheets, registers will be made available to the successful tenderer by Raipur Smart City Limited.

ADDITIONAL SCOPE OF WORK

- ☐ For additional work, if any, which is not included in the scope at present shall be executed by the contractor on authorization in writing from Raipur Smart City Limited..
- ☐ The rate of such additional work will be worked out by the Contractor based on the cost of materials and labour and shall be furnished to Raipur Smart City Limited.. The contractor shall be entitled for full cost of materials, direct labour and cost of operation of equipment/machinery etc. required to execute the work.
- ☐ For such additional work, the contractor shall maintain time sheets of personnel engaged and equipment/machinery used for the execution of work. Only such labour and other costs based on the above records shall be applicable to the rates payable for above additional work.

NOTICE BOARD / DISPLAY BOARD

The contractor shall provide a Notice Board/Display Board at appropriate locations detailing precautions to be taken by operation and maintenance personnel in work conformity with Industries and Labour Regulations and Department of Explosives.

GENERAL ROUTINE MAINTENANCE

General routine preventive maintenance schedule for various equipment shall be adopted from O&M Manual. However the general routine maintenance to be carried out by the Contractor's personnel will include but not limited to the following:

- a) Replacement of gland packing for the sluice valves etc. whenever required.
- b) Greasing of bearing and lubricating all moving parts as per the schedule.
- j) Tightening of all loose nut- bolts and other fasteners.
- l) Lubricating and test operation of the valves.
- m) General cleaning of all equipments and building.
- n) Checking and replacement of bulbs, tubes, chokes, starters, switches, control etc. thorough out SCADA center and including street and head lights.
- o) Watering of plants and tree.

PREVENTIVE MAINTENANCE CHECKS:

The contractor shall adopt a preventive maintenance check's schedule as per original equipment manufacturer O & M schedule under intimation to the Employer. The preventive maintenance checks and their tasks frequencies will not be limited to the following:

Checks to be performed daily

- a) Vibration in the pump sets, moving assemblies etc.
- b) Tightness
- c) Check condition of oil & grease & replace if necessary
- d) Rise in temperature of bearings in motor, in moving parts and other units etc.
- e) Working of gauges and other measuring devices.
- f) Observations on water quality.

Checks to be performed weekly

- i. Pipeline leakages
- ii Tightness of all electrical connections
- iii. Tightness of all cable connections
- iv. Temperature rise due t loose connections
- v. Watering of earthing pits
- vi. Operation of all sluice and butterfly valves, scour and pressure relief valves, gates and air valves.
- vii. Contractor shall be equipped with dewatering pump of capacity of pumping water equal to 5 kilometer length of pipe line in 24hours , the unit shall also consist of power generating set. One such set is required every 25 kilometer of pipe line section.
- viii. All parts of the machinery and electrical equipments liable to wear and tear shall be replaced by the contractor every 6 months
- ix. Current and voltages in all electrical equipments.

Checks to be performed monthly

- a) Gland packing
- b) Wear and tear of moving parts.
- c) Adoption of electrical energy conservation consumption methods.
- d) Electrical contacts
- e) Motors
- f) Metering of electrical equipment

Checks to be Performed Quarterly

- a) Relay testing and calibration if possible of meters, gauges, instruments, flow meters, flow indicator units, Level gauges and flow meters signals.

b) Speed of motors

Checks to be performed bi- annually

- a) Cleaning, checking/tightening of HT and LT circuit/panel b) Tightening of PMCC
- c) Auxiliary DB, Capacitor bank d) Battery and Battery charger

Checks to be performed annually

- a) Overhauling requirement of all equipment
- b) Improvement required if any in operation of plant c) Testing and calibration of all instruments
- d) 11 KV VCB cleaning, testing.
- e) Transformer cleaning, checking silica gel, oil checking filtering/ replacing.

MINOR REPAIR GENERALLY ENCOUNTERED IN THE PLANT

Electrical works

a) For H.T. Installations

i. Replacement of jumpers

ii. Replacement of insulator (Porcelain)

iii. Replacement of Air- Break Switch

b) For Both H.T. & L.T. Installations

i. Replacement of no- volt coil for VCB

ii. Replacement of Cable lugs including terminations

iii. Replacement of burnt out HRC fuses

iv. Replacement of moving and fixed contacts or contractors

v. Repairs to isolators and switch fuse units and replacement of it and fuse base units.

c) Pump sets

i. Replacement of coupling bolt and nuts including rubber bushes

ii. Replacement of worn out impeller nut

iii. Replacement of spindle nut in the sluice valve.

iv. Replacement of terminal plate in the motor

v. Replacement of faulty/dead spares in the battery charger and battery control panel.

vi. Replacement of gland packing, graphite packing from the pump sets.

COMPUTER MONTHLY REPORT

The contractor has to provide at site one computer with printer to keep all the records, data maintenance schedules, spares available for the plant. Monthly statements for electricity consumed, total hours of pump operation, total qty. of pumping in MLD, average power factor, monthly consumable and repair maintenance during the month shall be furnished by the contractor.

ANNEXURE -I

The contractor shall employ the minimum staff for each package as under with qualification and experience stated below, Contractor may employ additional staff over and above minimum prescribed as per his requirement in order to run the system efficiently. The staff mention below its obligatory.

SR No	DESIGNATION	QUALIFICATION	EXPERIENCE	NUMBERS
1.	NRW Expert	BE Civil	15 Years	1No
2	Maintenance Engineer – M&E	BE or Diploma Mechanical & Electrical	3 years operation & maintenance exp. of all electro-mechanical equipment of water supply projects.	1 No
3	Maintenance Engineer – Civil	BE or Diploma/ Civil	3 years of relevant experience	1 No
4	Electrician	PWD supervisory certificate pass & having license of Govt. of Chhattisgarh for HT Installations or ITI (Electrician) with NCTVT Certificate	5 years of operating Electrical Equipment.	1 No
5	Operators	ITI – Electrical Certificate Holder	5 years of operating Electrical Equipment.	1 No
6	Mechanics / Fitter/ Welder	ITI (Fitter Trade)	5 years exp.	1 No
7	Accounts / Store clerk / Computer Operator	B Com preferably DCA Accounts	2 years Exp. in Store activity & computer operation	1 No
8	Helper	Stout Body Physique (unskilled)	Experience in pumping stations is preferable	1 No
9	Sweeper / Mali / Chokidar	Stout Body Physique (unskilled)	Experience of Gardening & House Keeping	1 No
10	Lineman	Stout Body Physique (unskilled)	Experience for patrolling of pipeline works	10 Nos

SR No	DESIGNATION	QUALIFICATION	EXPERIENCE	NUMBERS
11	Service Operator			2 Nos
12	Computer Operator			2 Nos
13	Supervisor			1 Nos
			Total no of staff	22

Note:

The above staff shall be required minimum as per mutual agreement between contractor & Raipur Smart City Limited.. The arrangement of reliever for weekly off/all holidays etc. shall be made by the contractor separately.

The above mentioned requirement is indicative. However adequate staff are required for normal operation & maintenance. The contractor has to call respective engineer for rectification of fault at any time of the day, during contract period. The contractor shall have to provide additional manpower for maintenance and repair on as and when require basis. No extra payment shall be made for hiring services of additional manpower.

However Senior Manager may give relaxation in qualification and experience for suitable cases and necessary recovery if any, will be made accordingly.

ANNEXURE- II**SCHEDULE OF ROUTINE CHECKING OF PUMPS AND VALVES****A) Daily in each shift:**

- 1) Leakages through gland packing and tightening, loosening to ensure that extent of leakages is in drip form.
- 2) Bearing temperature If highly check up cause and take remedial action.
- 3) Noise & Vibration :If undue check up cause and take remedial action.
- 4) Pressure : If high or low, check up cause.
- 5) Check oil level for bearing lubricant and topping up if necessary.
- 6) Clean and remove dust from pumps, piping and valves etc.

B) Weekly:

- 1) Greasing to the stuffing boxes. Greasing to valve actuator gear

C) Monthly:

- 1) Check tightness of all nut bolts. Check coupling bushes for wear.
- 2) Checking and replacing gland packing if necessary (Pump & valve)
- 3) Check oil in air compressor. Check valve actuator bushes.

D) Quarterly:

- 1) Inspection of gland packing and replacing if necessary. Cleaning and oiling of gland bolts.
- 2) Checking and lubrication of all bearings.

E) Half Yearly:

- 1) Removing plant packing and checking wear on line shaft at gland portion.
- 2) Replacing gland packing.
- 3) Cleaning and examination of all bearings for flaws and checking and play. Replace oil/grease of bearing.
- 4) Replacing gland packing of sluice valves.

ANNEXURE- III**LIST OF THE TOOLS AND TACKLES TO BE PROVIDED AT EACH PUMPING STATION, TREATMENT PLANT & PUMPING STATION FOR OPERATION AND MAINTENANCE.**

Sr. No.	Item	Quantity
1.	For spanner set size 6 mm to 22 mm	1 set.
2.	Fix Spanner set size 6 mm to 52 mm	1 set
3.	Ring spanner set size 6 mm to 22 mm	1 set
4.	Ring Spanner set size 7 mm to 52 mm	1 set
5.	Box spanner set size 6 mm to 38 mm	1 set
6.	Pipe wrench size 36"	1 No.
7.	Pipe wrench size 24"	2 Nos.
8.	Screw driver size 6", 9"and 12" (2 Nos. of each size)	6 Nos.
9.	Insulated pliers size 12"	6 Nos.
10.	Long Nose Pliers 8"	3 Nos.
11.	Adjustable screw spanner size 12"	3 Nos.
12.	Hammer 1 Lb x 2 Lb	2 Nos.
13.	Testers	6 Nos.
14.	Chisels 12" x 6" (2 Nos. of each size)	4 Nos.
15.	Hack Saw Frame	6 Nos.
16.	Hack saw Blade	6 packets.
17.	Hand gloves suitable for 33 KV	2 Pairs.
18.	Phawada	2 Nos.
19.	Ghamela	4 Nos.
20.	Tikam	2 Nos.
21.	Kaichin (For Gardening)	2 Nos.
22.	Vile (For Gardening)	3 Nos.
23.	Plastic Bucket 10 Litres	2 Nos.
24.	Rope 1/2'	30 meter
25.	Torch/Battery	2 Nos.

SECTION – D Periodical Statements

The contractor shall have to submit the periodical statements

(1 to 11) as per annexure attached here with.

STATEMENT 1	Weekly report of attendance of Raw & Treated Water mains for O & M work
STATEMENT 2	Monthly report of material consumed for O & M.
STATEMENT 3	Quarterly Report of inventory of materials for O & M work.
STATEMENT 4	Quarterly Report for calibration of instruments installed in equipment
STATEMENT 5	Monthly report for vehicles deployed in O & M work
STATEMENT 6	Monthly report for staff deployed in O & M work.
STATEMENT 7	Monthly report for maintenance.
STATEMENT 8	Monthly report for pumping.
STATEMENT 9	Monthly water supply report

Statement- 1**Name of Project:****Period:** Week**Weekly report of attendance of Raw & Treated Water mains for O & M work**

Sr. No.	Date of Visit	Air Valve no.	Status of air valve	Action taken for repairing	Vehicle used with No.	Remarks
1	2	3	4	5	6	7
1						
2						
3						
4						
5						
6						
7						

Signature of Contractor

Statement- 2**Name of Project:****Period:** Month**Monthly report of material consumed for O & M**

Sr. No.	Materials Used	Qty.	Average Cost	Issued/ Purchase by	Remarks
1	2	3	4	5	7
1					
2					
3					
4					
5					
6					
7					

Signature of Contractor

Statement- 3**Name of Project:****Period:** Quarterly**Quarterly report of material consumed for O & M**

Sr. No.	Material	Part No (if any)	Qty.	Average Cost	Remarks
1	2	3	4	5	6
1					
2					
3					
4					
5					
6					
7					

Signature of Contractor

Statement- 4**Name of Project:****Period:** Quarterly**Quarterly report of material for calibration of Instruments installed**

Sr. No.	Name of Instrument (Pressure Gauge, Flow meter, Relay, Voltmeter,	Instrument No. (if any)	Qty.	Date of calibration	Remarks
1	2	3	4	5	6
1					
2					
3					
4					
5					
6					
7					

Signature of Contractor

Note: Calibration report shall be submitted along with calibration report.

Statement- 5**Name of Project:****Period:** Month**Monthly report of Vehicles deployed for O & M work**

Sr. No.	Type of Vehicle	Model & Year of manufacture.	Registration no.	Working condition	Remarks
1	2	3	4	5	7
1					
2					
3					
4					
5					
6					
7					

Signature of Contractor

Statement- 6**Name of Project:****Period:** Month**Monthly report of Staff deployed for O & M work**

Sr. No.	Name of Person	Designation	Age	Qualification	Experience.	Remarks
1	2	3	4	5	6	7
1						
2						
3						
4						
5						
6						
7						

Signature of Contractor

Statement- 7**Name of Project:****Period:** Month**Monthly report of maintenance work**

Sr. No.	Date	Nature of work attended	Remarks
1	2	3	4
1			
2			
3			
4			
5			
6			
7			

Signature of Contractor

Statement- 8**Name of Project:****Period:** Month**Monthly report for Pumping**

Sr. No.	Date	Pumping Set				Total in Hrs.	Incoming Flow MLD.	Outgoing Flow MLD.	Remarks
1	2	3				4	5	6	7
		P- 1 Hrs.	P- 2 Hrs.	P- 3 Hrs.	P- 4 Hrs.				
1									
2									
3									
4									
5									
6									
7									

Signature of Contractor

Statement- 9**Name of Project:****Month:****Monthly Water supply Report**

Date	Sign	Date	Sign
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	
		31	
TOTAL No's of Days Water supply			

Signature of Contractor**Signature of Work Charge****Signature of Assistant Engineer****Signature Of DEE**

D. MAINTAINANCE FOR ELECTRICAL WORKS

1. Joint Annual maintenance contract (AMC) shall be initiated after completion of installation & commissioning of underground cable, CSS & RMU, DT box, service feeder pillar for five year.
2. O&M shall be initiated after completion of installation and commissioning of street lighting system on all the specified roads and issue of completion certificate by RSCL after due inspection and testing.
3. The contractor shall install a Help Desk minimum 30 days in advance before the initiation of the O&M period.
4. The contractor shall responsible for maintaining / repair / replacement / comprehensively of all the cable failure, cable joint failure, compact substation equipment failure, failure of electrical items such as ACB, MCCB, MCB & LED indicators and busbar in feeder pillar (DT box, service feeder pillar).
5. The contractor shall be responsible for failure of RFID route marker.
6. The contractor shall be responsible for shortage of any items required for repairing or replacement failed items. Hence, contractor shall have availability of min. 15-20% spares of all critical equipment in contractor store at Raipur.
7. Contractor shall provide list of critical items to CSPDCL / RSCL after commissioning period before start of AMC.
8. Contractor shall maintained team of one supervisor, one skill and two unskilled working staff per shift at Raipur smart city project site.
9. Contractor shall provide vehicle for movement of staff with spare parts to cater any consequence and quick response to maintenance team.
10. Contractor shall provide latest cable fault finding equipment to its maintenance team and tools
11. Contractor shall provide training for O&M of fault finding in cable, CSS & RMU etc.
12. The contractor shall be responsible for maintaining/ repair/ replacement, comprehensively, of all the Luminaires, Switching point controller panels, cable and earthing systems along with the Cloud or In-house Server installed by it in the allocated area during the tenure of the contract.
13. The contractor may maintain a service team/s with vehicle/ s to address the complaints/ accidents on SOS basis and take action immediately.
14. The payment for the O&M shall be per agreed in the Contract for the entire tenure.
15. The Manpower and accessories required for O&M shall be provided by contractor during relevant contract period. Minimum One 8 years experienced electrical technician and one assistant shall be provided for every 1000 luminaires right at the beginning of the

- contract and shall be augmented if found insufficient during the course of the contract. Replacement for the teams shall be well planned during the scheduled offs and leaves.
16. RSCL shall ensure availability of power. Electricity charges and Connectivity charges shall be paid by RSCL / RMC to the CSPDCL.
 17. Availability of communication network through the selected mode shall be ensured by the contractor for data and SMSs. The contractor shall bear the cost of connectivity of all such network charges and pay monthly/ annually as the case may be to the telecom service provider.
 18. The Non -availability of incoming power supply from CSPDCL shall be intimated by contractor within 24 hours. The contractor shall coordinate with CSPDCL on behalf of RSCL and RSCL shall facilitate as and when required to expedite the response.
 19. Any complaint for failure of luminaire due to lack of earthing, SPD, connector and loose connections shall be to contractor's Account.
 20. The contractor shall upgrade the software application from time to time during the contract period in terms of features, performance & security of the system.
 21. The contractor shall take adequate insurance to cover themselves for the cost of O&M during the tenure of the contract including the ones due to theft.
 22. The contractor shall make provision for adequate number of Ladder mounted vehicles self sufficient with all the required tools and instruments, duly calibrated, to meet the maintenance requirements as per service benchmark.
 23. All the electrical parameters and illuminance level of all the roads shall be monitored with calibrated Power Analyzer and Lux meter and documented for records and analysis at regular interval as specified.
 24. All the necessary modifications that are required to be carried out for the efficient working of the system including network and Luminaires and minimise the breakdowns and issues shall be carried out by contractor from time to time at its own cost.
 25. The contractor shall develop training material for the RSCL technicians; impart them training from time to time as may be decided by the RSCL.
 26. All the responsibilities related to replacement of LED lamps / cables / other accessories shall be borne by contractor in respect of cost, managing the technical barrier and other related aspect during the tenure of the project.
 27. The maintenance work will be carried out without disturbing the street traffic and with proper work permit.
 28. Helpdesk Setup
 29. The contractor shall set up a centralized helpdesk to address the O&M for the project for entire Contract period with the following;

30. A web based Complaint Management System shall be installed which should enable users to log complains and monitor its status & closure. The CMS shall be updated regularly with new updates/ patches to improve the performance during the contract period.
31. A Toll Free Number exclusively for the Street lighting for Spine Roads shall be finalized in consultation with the RSCL. Language Capabilities : Assamese, Hindi and English;
32. The help desk shall operate 24X7 to assist and guide the users.
33. The help desk will handle user queries and issues relating to implemented solution
34. The helpdesk shall ensure that users can log calls and complaints for any technical issues they face while accessing the system.
35. The helpdesk shall have Interactive Voice Response (IVR) system for first level of call segregation;
36. A Standard Operating Procedures (SOP) for O&M process shall be created by the contractor from logging of request to closure of the request. The SOP shall address call prioritization guidelines, problem security codes and escalation procedures etc. in consultation with RSCL ;
37. It shall be also possible to log requests by user through other channels like email and web interface;
38. All the complaints and work carried out by the contractor shall be logged in the system with a unique service request.
39. The application shall be accessible to all users including general public through the RSCL portal for logging issues;
40. Contractor shall allocate Serial No to the Pole- Lamp combination and maintain records of each one of them during the Contract period.
41. A Report containing the operational Status of each light pole, complaints received and resolved; Preventive maintenance schedule and status, Stock of spares, man power update, etc shall be submitted to the RSCL on a weekly basis.
42. The call statistics will be analyzed every quarter after Go-Live and the number of Customer Care Executives may be ramped up or down accordingly on a week's notice;
43. Service Level Benchmark
44. A service Level Benchmark for evaluating the performance of the contractor shall consist of the following;
45. Resources - contractor shall maintain O&M team, tools and calibrated measuring and verification instruments as specified above from the day one of the contract. In case the required resources are not deployed on time, a penalty of Rs.5000 per day shall be imposed for the first week and the same shall be doubled in the subsequent weeks till adequate resources are deployed.

46. System Uptime - contractor shall maintain sufficient resources and achieve minimum uptime of 95% on yearly basis (year period to be decided by RSCL for the entire system, excluding the period of non-availability of power supply).
47. Energy Consumption – The energy consumed by the lamp shall not exceed more than as committed in the design report. The contractor shall guarantee the total energy consumption of the system for each road with respect to its design offered in the DPR. The same shall be monitored on daily basis and reported to the RSCL. Any excess energy more than the guaranteed consumption shall be recovered from the contractor. Any action required for mitigating the excess energy consumption may be immediately taken up by the contractor with the information to the RSCL.
48. Lux Level – Contractor shall guarantee the Lux level based on Design output and offered Luminaire for each road. There shall not be any reduction of the Lux level during the entire tenure of the contract period. Illuminance of each road shall be checked every fortnightly and reported to RSCL. Any reduction in the lux level shall be immediately investigated and corrective action shall be taken with information to RSCL.
49. In case a reduction in the lux levels are found due to reduction in the output/ performance of the Luminaires, all the Luminaires of the same wattage and same batch offered in the project shall be investigated and rectified/ replaced if found faulty by the Contractor at its own cost within a period of time as may be agreed by RSCL.
50. Complaints Resolution - All the complaints shall be redressed within 24 working hrs. In case the service provider fails to comply with the same a penalty of Rs. 100/- per day per complaint shall be imposed for a period of 7 days after which the amount will be doubled for the next subsequent weeks till the complaint is resolved to the satisfaction of the owner.
51. At any given time the contractor shall maintain spares equivalent to minimum 1% of the total number of lights installed. Failing to maintain spares and causing delay in resolution of the complaint shall be penalized as indicated above.
52. Cleaning of the luminaire cover shall be taken up once in half year and record shall be maintained and reported to RSCL.

E. MAINTAINANCE FOR VISUAL IMPROVEMENT WORKS

1) Tactile for footpath:

Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm having water absorption less than 0.5% and conforming to IS: 15622, of approved make in all colors and shades in outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.

- *Maintenance:*

Cleaning should be done at regular intervals. Broken and missing tiles should be replaced as and when required.

2) Median Planters;

Plantation of flowering plants and shrubs in central verge i/c digging Trenches, filling earth & farm manure shall be at various roads. The list of the shrubs could be referred from landscape section of this document.

- *Maintenance:*

Daily watering should be avoided. Fertilizer should be given to shrub for better growth. Pruning should be done prior to monsoon. Weed control should be done. Missing shrubs should be planted again within 15 days from the observation recorded.

3) Median Painting:

Painting exterior surface (two or more coats) with good quality paint as per manufacturer's specifications and directions as selected by in charge engineer and as approved. Protective and good finish surface including cleaning washing of surface etc. shall be done. The paint should be of various colors including patterns of arts. Surfaces shall be Smooth Base Preparation. Fine Cement Plaster on Brickwork, & Smooth Casting finish on RCC; Honey-Comb to be filled using grouting for smooth surface finish

- *Maintenance:*

Once in a year painting at medians plastered finish surface shall be done.

4) Tree plantation:

Digging hole of size 0.60 m dia and 0.60 m deep imported with earth mixed with cow dung manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% :1 part of stacked. Volume of manure after reduction by 8% is including cost of plant, flooding with water, dressing including removal of rubbish and surplus earth, if any with all leads and lifts i/c cost of manure, sludge or extra good earth if needed. Well established, healthy, free from disease, 150-180 cm height in earthen pot of size/poly bag of 25 cm. The list of the plants could be referred from landscape section of this document.

- *Maintenance:*

Daily watering should be avoided. Fertilizer should be given to tree for better growth. Pruning should be done before monsoon. Identification of disease and due care should be taken in respect of all trees. Generally, no more than 25% of the crown should be removed at once, and less for mature trees. No branch should be removed without a reason. It is applicable for existing and newly planted trees. Bracing should be removed after the first growing season to reduce the possibility of plant damage, and to improve the appearance of the planting. Applying mulch at planting, and maintaining it for several

years, helps hold moisture in the soil, suppresses weed germination, and keeps trimmers and mowers away from plants. Weed control should be done for grown trees. Missing trees should be planted again within 15 days from the observation recorded. Ensure the fallen tree or broken branches are removed within 24 hours of receiving a report.

5) Theme paved circle around statue:

Providing 100 mm thick PCC M-15 Baseband fixing plain cement concrete fiber reinforced heavy duty designer glazed floor tiles or as approved by client with uniform color (for colored tiles) and texture conforming to IS: 1237 (for abrasion wear) and IS: 516 (for compressive strength) of approved make, colors, shades and size on cement Mortar bed and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with matching pigment complete. On floor, steps and risers over 20mm thick bed of cement Mortar 1:4 (1 cement: 4 coarse sand)

- *Maintenance:*

Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Quarterly, Fixing of damaged part and replacement if necessary.

6) Statue base:

Fixing 25 to 40 mm thick **Shahabad Stone** slabs with pointing and finishing joints neatly in CM 1:3 proportion for canal / field channel lining including cost of all materials, labour, cutting slabs to required size, mixing mortar, packing and finishing joints, curing etc., complete with lead up to 50 m and all lifts.

- *Maintenance:*

Quarterly, Rinse the top with warm water to remove surface dirt and wipe dry with a clean, soft cloth for routine maintenance. Wash with a soft cloth and a mixture of a mild detergent and warm water. Rinse with warm water, and wipe dry with a clean, soft cloth. Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Fixing of damaged part and replacement shall be done, if necessary.

7) Statue base:

Fixing 25 to 40 mm thick Shot blasted **sadar ali grey granite** stone slabs with pointing and finishing joints neatly in CM 1:3 proportion for canal / field channel lining including cost of all materials, labour, cutting slabs to required size, mixing mortar, packing and finishing joints, curing etc., complete with lead up to 50 m and all lifts.

- *Maintenance:*

Quarterly, Rinse the top with warm water to remove surface dirt and wipe dry with a clean, soft cloth for routine maintenance. Wash with a soft cloth and a mixture of a mild detergent and warm water. Rinse with warm water, and wipe dry with a clean, soft cloth. Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Fixing of damaged part and replacement shall be done, if necessary.

8) Railing around statue

Tubular Steel Railing on Medium Weight steel channel (ISMC series) 50mm: Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 50 mm support, 0.45 meters high above ground, 2 m center to center, complete as per approved drawings. Fixing of Railings anchorage 75mm Deep BGL using Cement Concrete. First Paint surface with Red oxide.

- *Maintenance:*

Checking of railing supports and welding of broken parts as and when required, with quarterly checking should be done. Any stickers, advertising board apart from theme graphics should be removed immediately. To prevent rusting, application of anti-rusting coat on railing should be done prior to every monsoon.

9) Green Island around statue:

Installation of Grass of common name Dwarf Bermuda having medium texture and suitable for open sunny situation installation on soil at all area around statue as per details and drawings and as per direction of Engineer-in-Charge should be done.

- *Maintenance:*

Ensure that grass cutting is conducted every 15 day. Plant Nutrition, Mowing Periodically wherever required, Topdressing should be done at every month, Daily Irrigation Should be avoided, over seeding should not be done, Pest Control should be done as per professional way and suitable to lawn species.

10) Cleaning and of statue:

For Statue, sculpture of Metals or other material - Sculptures, especially metal ones, can benefit from using protective coatings. Regular application and renewal of protective coatings can be cost-effective means of prolonging the life of the sculpture, since they are much less intrusive and less expensive to replace or adjust than are the artist's original surfaces.

For Statue, sculpture of stone- It should be given periodic overall cleaning as necessary to remove accumulated pollutants. Easily accessible stone surfaces are to be cleaned often like pedestal, lower base etc. It should be kept free of debris and soiling by periodically sweeping and washing with water. Normal maintenance should include periodic inspection of stone surfaces for structural defects, movement, deterioration, or staining.

It is needed to conduct a visual identification of the stone. It is advisable to maintain careful records about the type, name, and origin of the stone. If such records do not exist, it should explore the following options before determining a cleaning and maintenance program. It should be done by professional. It is necessary to identify whether the stone is siliceous or calcareous by simple acid sensitivity test by expert.

- *Maintenance:*

Cleaning should be done once in a year by professional method as per respective make and material of statue. Cleaning should be done around the statue as well. Maintain protective coatings for outdoor sculpture. Maintenance should include regular washing with light hose pressure, using a dilute solution of mild detergent in water followed by water rinse. Use soft, nylon bristle brushes or sponges to apply the detergent. Changes in surface patina, pitting/streaking or other evidence of corrosion, blanching, structural problems or damage should be documented. Care is to be taken of entire central monument with all part as with statue, artwork, landscape and provided technical beatification services.

11) Tree grate:

Supply & fixing of Concrete Tree grate (1000x1000x 60) mm is overall dimension made of 4 nos. of panels each unit having dim of (500x500) mm & 40/75 mm thickness as per

approved design. It should be suitably reinforced for long use and to prevent damage during transportation & handling. It should be Manufactured with M-30 grade of concrete using vibro-compaction process using joint less FRP moulds so as to achieve shuttering finish on five faces and Gurmala finish on the top surface. A choice of standard colors and unlimited custom colors will match any natural stone finish or interlock pavers in the surrounding Parameters & as per the direction of Engineer in charge, complete incl. all consumables, T&P and Labours required for the job.

- **Maintenance:**

Quarterly, Washing should be done at regular intervals and replacing broken part should be done immediately, if any

12) Seating Bench:

Sitting platform of bench made of Grey Colour Granite stone without back support having dimension of 400MM in width, 1500 MM in length and 400MM in height i.e. (1500x400x400) MM & 100 MM in thickness; Leg size - 400mm Height X 400mm Width X 100mm thickness; shall be placed on footpath in a way that the pedestrians pass-by without disturbing the user. Water logging places shall avoid for placing the benches.

- **Maintenance:**

Twice in a year, Rinse the top with warm water to remove surface dirt and wipe dry with a clean, soft cloth for routine maintenance. Wash with a soft cloth and a mixture of a mild detergent and warm water. Rinse with warm water, and wipe dry with a clean, soft cloth. Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Fixing of damaged part and replacement if necessary.

1 M high M.S railing, painted as approved by the site engineer. It should be firmly grouted to ground with bolt or anchored using Cement concrete. Modular design attached to each other with a vertical post as per drawing should be taken. Gauge of the material is as per approved drawing details. Fixing of Railings anchorage 100 mm Deep BGL using Cement Concrete. First Paint surface with Red oxide. Design as per drawing and gauge as mentioned in the drawing.

- **Maintenance:**

Dust, mud and other papers, flex or advertisement boards other than designed theme graphics attached or pasted without permission should be removed immediately. Anti-rusting treatment should be given wherever required once in a year.

13) Median Railing:

600M high M.S. Painted as approved by the site engineer. Firmly grouted to ground with bolt or anchored using Cement concrete. It should be Continuous along the median as per drawing details. Fixing of Railings anchorage 75 mm Deep BGL using Cement Concrete. First Paint surface with Red oxide.

- **Maintenance:**

Coloring and replacing of broken, missing parts should be done immediately as and when required. Anti-rusting treatment should be given wherever required once in a year. Any stickers, advertising board apart from theme graphics should be removed immediately.

14) Dual system Litter Bins;

Provision shall be at approximate 75M intervals along the roads at railing side. It shall be

fixed to railing in such a way that, bins shall be accessible from road side and from pedestrian way side. Material shall be FRP of capacity from 60-80 lit or any other approved quality material by client. The litterbins should be fixed in a way that, bins shall be assembled in such a way that, those could be detached. Each bin is made of two bins for segregation of waste. Dual system litterbins model color as approved by the site engineer and site in charge with Installation and fixing at site.

- *Maintenance*

Quarterly checking and Cleaning should be done at regular intervals. Broken and missing bins should be replaced as and when required.

15) Flags:

Procurement and installation of good quality double side printed on fabric used in a good-quality umbrella canopy, a nylon taffeta rated at 190T (190 threads per inch) or material as approved by the client, with coating and good finish of size 300x600mm printed graphics as per the street theme.

- *Maintenance:*

Quarterly checking and it should be replaced tear and missing flags should be replaced again within 15 days from the observation recorded.

16) Thematic art display at mast:

Procurement and installation of art work on each post as per the theme. The material used and printed graphics should withstand weather, temperature of outdoor. The panel material shall be ACP or PVC or as approved by the client. It should withstand the weather. The thickness of the panel shall be min 3MM to 12 MM max. Themes shall be followed for the graphics design.

- *Maintenance:*

Quarterly checking and it should be replaced tear, broken and missing flags or graphics within 15 days from the observation recorded.

17) Central Thematic Panel:

Procurement and installation of art work on each post as per the theme. The material used and printed graphics should withstand weather, temperature of outdoor. The panel material shall be ACP or PVC or as approved by the client. It should withstand the weather. The thickness of the panel shall be min 3MM to 12 MM max.

- *Maintenance:*

Quarterly checking and it should be replaced tear, broken and missing panels or graphics within 15 days from the observation recorded.

18) Pot and Planter:

Procurement and installation of factory made FRC pot or any other material as approved by the client and planting small plants in the same as per necessary methods and in coordination with the site engineer.

- *Maintenance:*

Quarterly checking and it should be replaced broken and missing pots replaced within 15 days from the observation recorded.

19) Spike / Spot light:

Providing Graphite grey powder coated integral aluminum housing. Die-cast aluminum housing comprises Warm White (WW) COB LED and reflector 9W. COB LED color temperature: 3000°K \pm 250°K, COB LED housing covered with die-cast aluminum ring with weatherproof gasket and toughened glass. Adjustable mounting bracket with spike is provided for easy to focus the object. 2 nos., Ø8mm holes also provided on adjustable mounting bracket for surface mounting. Constant current LED driver. □ Degree of protection: IP65xing 9W to 100 W (5000 to 10000 Lumen) mounted LED bracket spotlight focusing to the statue to enhance its presence. Spot light should be fixed and placed around statue. It should withstand for seasons without affecting the temperature max & Min. Of city in co-ordination of the site Engineer.

- *Maintenance:*

Quarterly, Check for lighting and working of bulbs and fixture should be done.

20) Flood light:

Die-cast aluminum housing designed to act as heat sink for efficient dissipation of heat & 30W. Electrochemically brightened and anodized aluminum reflector. Heat resistant toughened glass is provided with die-cast aluminum frame. (IK 08) Luminaires provided with a mounting bracket for aiming adjustment. Driver is provided with open and short circuit protection. Finish: Powder coated. Degree of protection - IP65 providing and fixing light focusing the statue to enhance its presence, in co-ordination of the site Engineer.

- *Maintenance:*

Quarterly, Checking should be done for lighting and working of bulbs and fixture.

21) Chowk name:

Name of chowks at suitable eye level & locations painted or mounted or embossed as per design and as selected by in charge engineer and as approved. Fixing of Vertical posts anchorage 100 mm Deep BGL using Cement Concrete. First Paint surface with Red oxide if using MS. As per selection of text height material suitable illumination shall be provided for night time. The text shall be visible from minimum 30 m distance to naked eyes. Material used for junction name shall be weather proof and waterproof. Design of the junction name, boards shall be placed at site after design finalization by the client.

- *Maintenance:*

Quarterly, Checking should be done for lighting and working of bulbs and fixture. Coloring or replacing of broken part should be done immediately as and when required.

22) Bollards:

Providing and fixing RCC precast bollards of size 125mm dia of length 650mm casted in CC 1:1.5:3 with 20mm down size aggregates using 10mm dia vertical 4 TMT Steel Rods and 8mm dia Stirrups at 20 cm c/c fixed 300mm above ground level, curing, transportation to work spot including excavation in hard soil in size 250 x 250 x 450mm deep with plain cement concrete 1:2:4 using 20mm down size aggregates including aligning to plumb and line providing enamel painting to exposed faces in alternate black & white strips and painting with reflective paint on top of bollards with a width of 10 cm including cost of all materials, labour, hire charge of machineries complete (As per drawing) Pedestrian crossing and as directed by Engineer-In-Charge of the work etc., complete.

- **Maintenance:**
Quarterly, Checking should be done for bollards. Coloring or replacing of broken bollard should be done immediately as and when required.

- **Maintenance For visual Improvement Elements:**
 - 1) **Tactile for footpath:**
Cleaning should be done at regular intervals. Broken and missing tiles should be replaced as and when required.
 - 2) **Median Planters;**
Daily watering should be avoided. Fertilizer should be given to shrub for better growth. Pruning should be done prior to monsoon. Weed control should be done. Missing shrubs should be planted again within 15 days from the observation recorded.
 - 3) **Median Painting:**
Once in a year painting at medians plastered finish surface shall be done.
 - 4) **Tree plantation:**
Daily watering should be avoided. Fertilizer should be given to tree for better growth. Pruning should be done before monsoon. Identification of disease and due care should be taken in respect of all trees. Generally, no more than 25% of the crown should be removed at once, and less for mature trees. No branch should be removed without a reason. It is applicable for existing and newly planted trees. Bracing should be removed after the first growing season to reduce the possibility of plant damage, and to improve the appearance of the planting. Applying mulch at planting, and maintaining it for several years, helps hold moisture in the soil, suppresses weed germination, and keeps trimmers and mowers away from plants. Weed control should be done for grown trees. Missing trees should be planted again within 15 days from the observation recorded. Ensure the fallen tree or broken branches are removed within 24 hours of receiving a report.
 - 5) **Theme paved circle around statue:**
Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Quarterly, Fixing of damaged part and replacement if necessary.
 - 6) **Statue base:**
Quarterly, Rinse the top with warm water to remove surface dirt and wipe dry with a clean, soft cloth for routine maintenance. Wash with a soft cloth and a mixture of a mild detergent and warm water. Rinse with warm water, and wipe dry with a clean, soft cloth. Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Fixing of damaged part and replacement shall be done, if necessary.
 - 7) **Cleaning and of statue:**
Cleaning should be done once in a year by professional method as per respective make and material of statue. Cleaning should be done around the statue as well. Maintain protective coatings for outdoor sculpture. Maintenance should include regular washing with light hose pressure, using a dilute solution of mild detergent in water followed by water rinse. Use soft, nylon bristle brushes or sponges to apply the detergent. Changes in surface patina, pitting/streaking or other evidence of corrosion, blanching, structural problems or damage should

be documented. Care is to be taken of entire central monument with all part as with statue, artwork, landscape and provided technical beautification services.

8) Tree grate:

Quarterly, Washing should be done at regular intervals and replacing broken part should be done immediately, if any

9) Seating Bench:

Twice in a year, Rinse the top with warm water to remove surface dirt and wipe dry with a clean, soft cloth for routine maintenance. Wash with a soft cloth and a mixture of a mild detergent and warm water. Rinse with warm water, and wipe dry with a clean, soft cloth. Do not use abrasive, acid, alcohol-based, or solvent-based cleaners; they will damage the surface. Fixing o damaged part and replacement if necessary.

10) Pedestrian Railing:

Dust, mud and other papers, flex or advertisement boards other than designed theme graphics attached or pasted without permission should be removed immediately. Anti-rusting treatment should be given wherever required once in a year.

11) Median Railing:

Coloring and replacing of broken, missing parts should be done immediately as and when required. Anti-rusting treatment should be given wherever required once in a year. Any stickers, advertising board apart from theme graphics should be removed immediately.

12) Dual system Litter Bins;

Quarterly checking and Cleaning should be done at regular intervals. Broken and missing bins should be replaced as and when required.

13) Flags, Thematic art display at mast, Central Thematic Panel, Pots & Planters :

Quarterly checking and It should be replaced tear, broken, missing flags, panels, art display & pots. Those should be replaced again within 15 days from the observation recorded.

14) Flood light:

Quarterly, Checking should be done for lighting and working of bulbs and fixture.

15) Chowk name:

Quarterly, Checking should be done for lighting and working of bulbs and fixture. Coloring or replacing of broken part should be done immediately as and when required.

16) Bollards:

Quarterly, Checking should be done for bollards. Coloring or replacing of broken bollard should be done immediately as and when required.