

Foreword

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The success of a state is measured by the expansion of social services and well being of the people. To bring it into reality, over the last fifteen years since 2005, Bihar has made massive strides in socioeconomic development using many innovative approaches. This impetus to the socioeconomic growth was made possible by creating a good quality and effective road network in the entire state.

The age old traditional process of construction and maintenance of roads as defined by the Employer failed to yield the desired results of a good and sustainable road all the time. More often during natural calamities like excessive rainfall or floods it was quite difficult to mobilize the resources to maintain the connectivity. Pondering over the problem the State Government in 2013 came up with a new and innovative idea of One Time Project Maintenance Contract, popularly known as Long Term Output & Performance Based Road Assets Maintenance Contract (OPRMC). A broad concept of the Road maintenance contract was designed to increase the efficiency and effectiveness of road asset management and maintenance.

This type of contract significantly expands the role of the private sector, from the simple execution of works to the management and conservation of road assets. It ensured that the physical condition of the roads under contract is adequate for the need of road users, over the entire period of the contract. Moreover, during calamities the system was available all time to face the challenges and provide the connectivity of the state population. The experiment was quite successful at the end of the contract period in 2018. The success led to adoption of Long Term Output & Performance Based Road Assets Maintenance Contract (OPRMC) phase-II in 2019 covering a length of 13064 kms for the period of seven years. Since then the State department has been able to provide the roads with standard service levels to the road users as well as has been able to maintain all the road assets.

Amrit Lal Meena

LONG TERM OUTPUT AND PERFORMANCE BASED ROAD ASSETS MAINTENANCE CONTRACT (OPRMC)

Road Construction Department as a premier works department of Government of Bihar conducts planning, designing, construction, improvement, strengthening and maintenance of roads and bridges, including flyovers, ROBs and elevated corridors. Construction, up-gradation and maintenance of road network system comprising roads categorized under National Highways, State Highways and Major District Roads are undertaken to optimize overall transportation and operational cost by developing high quality road infrastructure using the latest construction techniques to accelerate industrial, commercial, agricultural and other social economics developments like tourism and cultural heritage of the state.

The Fact Sheet: A total road network under Road Construction Department of length 24157.92 km is sprawled across the entire state to provide the least possible journey time to the road users for their destinations. Out this 24157.92 km, 5475.05 km is National Highways, 3713.54 km is State highways and Major District Road is 14969.33 km.

For the timely and proper maintenance and management of Road Assets, Bihar Road Asset Maintenance Policy was adopted w.e.f from 21.02.2013. Old Input based conventional contract system was replaced by long Term Output and Performance Based Road Asset Maintenance Contract System(OPRMC). The system was to be performance based maintenance of roads assets for a period of 5 years. About 9064 kms of the road length with a layout cost of Rs. 2579 crores was successfully maintained between the period of December 2013 to December 2018. After successful completion of the first phase of OPRMC, 2nd phase of OPRMC came into force from 1st March 2019 for next 7 years. This phase of OPRMC covered a road length of 13064 km at the layout cost of Rs. 6655 crores.

The Scope of Work:

- 1) In traditional road construction and maintenance contracts, the Contractor is responsible for the execution of works which are normally defined by the Employer, and the Contractor is paid on the basis of unit prices for different work items, i.e. a contract based on “inputs” to the works. The results of traditional road contracts are in many cases less-than-optimal. The problem is that the Contractor has the wrong incentive, which is to carry out the maximum amount of works, in order to maximize its turnover and profits. Even if the work is carried out according to plan and much money is spent, the overall service quality for the road user depends on the quality of the design given to the Contractor who is not accountable for it.
- 2) Long Term Output and Performance based contract for roads assets is designed to increase the efficiency and effectiveness of road assets management and maintenance. It ensures that the physical condition of the roads under contract is adequate for the need of road users, over the entire period of the contract. This type of contract significantly expands the role of the private sector, from the simple execution of works to the management and conservation of road assets.

- 3) The OPRMC addresses the issue of inadequate incentives. During the bidding process, contractors compete among each other by essentially proposing fixed lump-sum prices for bringing the road to a certain service level and then maintaining it at that level for a relatively long period. It is important to understand that contractors are not paid directly for “inputs” or physical works (which they will undoubtedly have to carry out), but for achieving specified Service Levels, i.e., the Initial Rectification and Periodic Maintenance of the road to predefined standards (if so required by the bidding documents), the Ordinary maintenance service of ensuring certain Service Levels on the roads under contract, and specific improvements (if so required by the bidding documents), all representing outputs or outcomes. A monthly lumpsum remuneration paid to the Contractor will cover all physical and non-physical maintenance services provided by the Contractor, except for unforeseen emergency works which are remunerated separately. The Periodic Maintenance Works which have been explicitly specified by the Employer in the contract are quoted on the basis of measurable output quantities and paid as performed. In order to be entitled to the monthly payment for Ordinary maintenance services, the Contractor must ensure that the roads under contract comply with the Service Levels which have been specified in the bidding document. It is possible that during some months he will have to carry out a rather large amount of physical works in order to comply with the required Service Levels and very little work during other months. However, his monthly payment remains the same as long as the required Service Levels are complied with. The Initial Rectification works are also paid on the basis of measurable output quantities and paid as performed. The Minor Improvements are paid on BOQ basis. Whenever ***Emergency/Contingency works are*** executed through specific work orders, the same are paid based on measured inputs.
- 4) A fundamental feature of the OPRMC is that the “Contractor” must not necessarily and in all cases be a traditional works contractor, but can (if allowed in the Bidding Documents) be any type of firm or business venture having the necessary technical, managerial and financial capacity to fulfil the contract. In any case, the contractor is responsible for designing and carrying out the works, services and actions he believes are necessary in order to achieve and maintain the Service Levels stated in the contract. The Service Levels are defined from a road user’s perspective and may include factors such as average travel speeds, riding comfort, safety features, etc. If the Service Level is not achieved in any given ***response time, the payment for that month shall be reduced in multiple of failed response time.***
- 5) Under the OPRMC, the Contractor has a strong financial incentive to be both efficient and effective whenever he undertakes work. In order to maximize profits, he must reduce his activities to the smallest possible volume of intelligently designed interventions, which nevertheless ensure that pre-defined indicators of Service Level are achieved and maintained over time. This type of contract makes it necessary for the Contractor to have a good management capacity. Here, “management” means the capability to define, optimize and carry out on a timely basis the physical interventions which are needed in the short, medium and long term, in order to guarantee that the roads remain above the agreed Service Levels. In other words, within the contract limitations and those required to comply with local legislation, technical and performance specifications and environmental regulations, the Contractor is entitled to independently define: (i) what to do, (ii) where to do it, (iii) how to do it, and (iv) when to do it. The role of the Road

Administration and of the Employer is to enforce the contract by verifying compliance with the agreed Service Levels and with all applicable legislation and regulations.

- 6) Maintaining a road network includes both **ordinary and periodic (maintenance)** tasks. Ordinary maintenance consists of many different tasks frequently necessary to maintain the function of the road (such as pothole repairs, cleaning of drainage, sealing of cracks, cutting of vegetation, etc.). Periodic maintenance consists of predictable and more costly measures of a less frequent nature designed to avoid road degradation (such as resurfacing, bituminous concrete overlays, etc.). Intelligent management, the timeliness of interventions and the adequacy of technical solutions are critical. It is expected that the use of private specialized firms under output- and performance-based contracts will unleash significant efficiency gains, and stimulate innovation in comparison with traditional road administration practices.
- 7) Minimum road conditions and Service Levels are defined through output and performance measures, and these are used under the OPRMC to define and measure the desired performance of the Contractor. In the OPRMC the defined performance measures are thus the accepted minimum intervention levels for the quality levels of the roads for which the Contractor is responsible.
- 8) The performance criteria should ideally cover all aspects of the contract and take account of the fact that different sub-areas within the contract area might require different Service Levels. Criteria can be defined at three levels (although simpler contracts will not use all of the criteria identified below):

(a) **Road User Service and Comfort** measures are expressed in terms of:

- Rutting
- Depressions
- Skid resistance
- Visibility of road signs and markings
- Response times to rectify defects that compromise the safety of road users
- Attendance at road accidents
- Drainage off the pavement (standing water is dangerous for road users)
- Vegetation control
- Slope Stabilisation
- The extent of repairs permissible before a more extensive periodic maintenance treatment is required
- Degree of sedimentation in drainage facilities

(b) **Road Usability** measures, are expressed in terms of:

- Travel delays
- Availability of each lane-km for use by traffic
- Road Roughness

(c) **Management Performance Measures**, which define the information the Employer requires both to govern the asset during the term of the contract, and to facilitate the next tender round. Requirements should include:

- Delivery of regular progress reports to the Road Controlling Authority

- Inventory updates and other data sharing requirements
 - Maintenance history (so subsequent tenderers can price the work).
 - Environmental and Requirements to avoid ambiguity, all performance measures are clearly defined and objectively measurable.
- 9) Together the performance measures define the minimum acceptable Service Level for the particular road. In setting the measures various criteria (both technical and practical) were carefully considered, such as (i) traffic volume and composition, (ii) urban vs. rural roads (iii) sub-grade quality and type, (iv) quality of available construction materials, (v) capacity of available contractors, **However, probably the most important criterion is the question of what Service Level can be afforded and economically justified for the road in question.**
 - 10) Under the terms of the contract, the Contractor is also be responsible for the continuous monitoring and control of road conditions and Service Levels for all roads or road sections included in the contract. This is not only be necessary to fulfill the contract requirements, but it is an activity which provides him with the information needed to be able (i) to know the degree of his own compliance with Service Level requirements, and (ii) to define and plan, in a timely fashion, all physical interventions required to ensure that service quality indicators never fall below the indicated thresholds. Under the OPRMC modality, the Contractor does not receive instructions from the Employer concerning the type and volume of road maintenance works to be carried out. Instead, all initiative rests with the Contractor who must do whatever is necessary and efficient to achieve the quality levels required. This concept is expected to lead not only to significant efficiency gains, as mentioned earlier, but also to technological innovation.
 - 11) It is expected that in order to comply with the contract, the Contractor is most likely have to carry out different types of works, including some Initial Rectification activities and Periodic Maintenance works. The definition of the exact nature of the works, their timing, their costing and their implementation is left to the judgment of the Contractor. Note that a milestone exists to get the road to the desired standard. This means that his capacity must be above the usual capacity of a traditional civil works contractor. In fact, an essential attribute is the capacity to the manage road Network.
 - 12) Some emergency works should always be foreseen. Those are meant to remedy unexpected damage which occurs as a result of extraordinary natural phenomena, due to the reasons beyond control of contractor in maintenance of roads and which affect the normal use of the road network, or the safety and security of the users. For meeting the ***Emergency / Contingency works*** a provisional sum is included in the contract. For emergency/ *Contingency* works, the contract limits the responsibility of the Contractor. ***Emergency works and Contingency works*** are remunerated by the Engineer in charge from the provisional sum for each work order established on the basis of executed quantities at the unit prices covered under work schedule.
 - 13) Bidders presents their financial offer for:
 - The **Ordinary Maintenance Services** in the form of the amount of the monthly lumpsum payment demanded by the bidder according to the conditions of contract (this is the monthly amount applicable throughout the duration of the contract);
 - The **Initial Rectification Works**, in the form of a lump-sum amount, while indicating the quantities of measurable outputs to be executed in order that the road achieves the

performance standards specified in the bidding documents. Payments is being made in accordance with the progress in the execution of those measured outputs;

- The **Periodic Maintenance Works**, in the form of a lump-sum amount, while indicating the quantities of measurable outputs to be executed in order that the road achieves the performance standards specified in the bidding documents. Payments is be made in accordance with the progress in the execution of those measured outputs;

- The **Minor Improvement Works**, in the form of unit prices for outputs of each type of improvement works; payment for Minor Improvements made in accordance with quoted unit prices for those outputs. A price adjustment clause applicable to all prices and activities in order to compensate for increases or decreases in cost indices are included.

14) The agreed monthly payment for Ordinary Maintenance works and services are to be made to the Contractor if he has complied, during the month for which the payment is to be made, with the agreed Service Levels on the road network under contract. Together with his monthly invoice, the Contractor reports the result of his own evaluation of compliance with the required Service Levels, based on his own monitoring system which is mandatory. His statement is then be verified by the Employer or his representative through inspections. If the Service Levels are not met, payments are reduced, based on a schedule given in the contract. Payments may even be suspended, and the contract cancelled, if the contractor fails *to achieve the desired Service Levels*. The contract describes the formulas used to calculate payment reduction and potential contract *cancellation*.

1. General

The Contractor implements an appropriate maintenance strategy, incorporating regular inspections, programming and work activities to:

- i) Maintain public safety
- ii) Maintain the roadway assets to the required performance Criteria
- iii) Keep the road open to traffic

2. Scope of Services

2.1. Scope of Services to be provided

The services to be provided by the Contractor include all activities, physical or others, which the Contractor needs to carry out, in order to comply with the Service Levels and other output and performance criteria indicated under the contract, or with any other requirements of the contract. In particular, they include management tasks and physical works associated with the following road-related assets and items:

- Pavements (paved roads)
- Roadside longitudinal drainage systems
- Road shoulders
- Signage and road safety furniture
- Slopes (cuts and embankments)
- Structures and major culverts
- Traffic management
- Data Collection

The Limits of the Contractor's maintenance work zone for each road within the Contract encompass the road reserve from property boundary to property boundary, including footways, parking and rest areas. It also includes the first 10m length of side road junctions, both directions of one way systems separated carriage ways and both intermediate and terminal roundabouts (if any), up to either the end of the splitter island or 50m from the circle centre for each contract road up to either the end of the splitter island or 50m from the circle centre. The Contractor agency has to take up the following Components for the project for the periods specified.

1. Ordinary Maintenance - 84 Months
2. Initial Rectification - 6 Months
3. Periodic Maintenance - 78 Months
4. Minor Improvements - 12 Months
5. Emergency/ Contingency Works - 84 Months

Note : Initial rectification, Periodic maintenance and Minor improvement have a specific programme of work within which specified services shall have to be executed.

3. Self-Control Unit of Contractor: The Contractor is obliged to establish, within his own organizational structure, a specific Unit staffed with qualified personnel, whose task is to verify continuously the degree of compliance by the Contractor with the required Service Levels. The Self-Control Unit is also responsible for undertaking the quality control testing required for Initial Rectification Works, Periodic Maintenance Works, Minor Improvement Works and Emergency Works. The Unit is responsible for the generation and presentation of the information needed by the Contractor for the documentation required for the Monthly Statement. In general terms, the Unit will be responsible to maintain at all times a detailed and complete knowledge of the condition of the roads or road sections included in the contract and to provide to the management of the Contractor all the information needed in order to efficiently manage and maintain the roads included in the contract. The Self-Control Unit is also obliged to carry out, in close collaboration with the Engineer in charge, the formal and scheduled inspections of Service Levels which will take place regularly. The compliance (non-compliance) of the Contractor with service level requirements is reported by the Self-Control Unit to the Employer in the form of tables.

4. Methods of Inspection of Service Levels

4.1. Formal Inspections of Service Levels

The Employer informs the Contractor of his intention to carry out a formal inspection at least 48 hours in advance, indicating the exact date, hour and location where the formal inspection is to begin. The Contractor is obliged to be present at the date, hour and location specified by the Employer, providing the physical means needed for the inspection as indicated further below. The following minimum formal inspections are undertaken by the Contractor in the presence of the Engineer in charge of all of the roads covered by the Contract as part of his responsibility to public safety and to enable him to schedule a monthly works Program.

Code Inspection Type Minimum Frequency

R -Routine , Monthly

H- Hazard , Weekly

B- *Bridge Culverts 6 monthly and immediately after flood event*

N -*Night , 3 monthly*

E - **Emergency:** Immediately on receiving information on notification.

4.1.1. Routine Inspection

The main purpose of the Routine Inspection is a Conformance Inspection to enable the Employer to verify the information presented in the Contractor's monthly statement and to issue the interim payment certificate. Routine Inspections is normally, but not necessarily, is scheduled to begin within less than five (5) days after the presentation by the Contractor of the Monthly Statement to the Employer and they should normally be completed within a maximum of three (3) days. The Routine Inspections allow the comparison of the information on compliance provided by the Contractor in the standard tables which are part of his Monthly Statement, with actual measurements taken in locations to be determined by the Employer. During the formal inspections, the Employer communicates electronically/ through any other means/ verbally or non-verbally, any non-compliance which may have been detected. Based on the above information, the contractor has to immediately rectify the non-compliances within response time and ensure the compliance subsequently. Based on the outcome of the formal inspection of Employer & their representatives, the Employer immediately corrects any possible errors or misrepresentations in the Contractor's Monthly Statement, countersign it and present it for payment, and to the Contractor for information. Formal inspections are also be scheduled for the follow-up site visits, whose purpose is to verify if the Contractor has remedied the causes of earlier non-compliance, within the time frame granted by the Employer and specified in the Memorandum. In case Contractor fails to submit monthly statement, within stipulated period as specified in the PC, the Employer shall be free to prepare monthly statement on behalf of Contractor and accordingly interim payment shall be certified and shall be binding upon the contractor.

4.1.2. Hazard Inspection

The main reason for the Safety Inspection is to ensure that the pavement carriageway remains safe at all times and between Conformance Inspections and does not present a hazard to the travelling public. ***This inspection is done by Road Manager and Employer or its representative jointly or independently weekly by driving through the road and particularly cover hazard chainage/ items on foot, with all defects that are visible:***

- ***Hazards that may impose a danger or safety to the road user and others; and***
- ***Defects that are of an offensive nature.***

When determining if a defect is or likely to become a hazard the Contractor must consider, as a minimum:

- severity and nature of the defect;
- extent of the defect;
- general road condition and prevailing or expected weather conditions;
- location of the defect;
- effect on the road user; and
- volume of traffic

4.1.3. Minor Bridge and Culvert Inspections

The reason for ***minor bridge*** and culvert inspections is to ensure that the Contractors are undertaking the required care of bridges and culverts, other than those easily seen during the monthly Conformance Inspection. Generally detailed bridge inspections are not considered necessary as part of the Conformance Inspection as they are slow and time consuming but should be undertaken at least six monthly ***and specially after flood***. Items requiring inspection are all defect that may affect the structural integrity of the structure including joints, superficial damage, batter protection and stream scour.

Minor Bridge and Culvert Inspection (B) Inspection Requirements - Bridge and Culvert Inspections are to be carried out by Road Manager and Employer or its representative jointly or independently initially within 3 months of Start Date and then on a regular 6-monthly basis and immediately after flooding. To include detailed visual inspections of all minor bridges and culvert structures for all structural defects, superficial damage, batter defects and stream scour.

4.1.4. Night Inspection

The reason for Night Inspections is to ensure that while driving at night the road is safe and signs easily visible. It will also provide the Contractor and the Employer with a different view of the road under night time driving conditions that may highlight deficiencies that are not clearly visible during daylight hours. Conducted 3 monthly, then Night Inspection to identify defective/non reflective or missing, signs, delineators, guideposts, hazard markers, pavement markings and any potential hazards to the travelling public at night. The speed is kept to a level that allows the condition of the listed assets to be observed clearly and serviceability easily assessed and recorded.

4.2. Informal Inspections of Service Levels

The Employer or their representatives carry out informal inspections of Service Levels as part of his duty. He does so on his own initiative, at anytime and anywhere on the roads included in the contract. If they detect any road sections where the Service Level criteria are not met within response time, a deduction will be made from contractor's bill as per IPC. Contractor may collect the information regarding deduction from the office.

5. Milestone Reporting Requirements

5.1. Initial Road Condition Report

Within 30 days of signing the Contract, the Contractor's Road Manager submits the 'Initial Road Condition Report' to the Engineer in charge. The Report consists of the following components:

- Initial Condition Survey
- a Video graphic Survey
- Roughness Results
- Environmental & Safety survey

The Initial Condition Survey is to establish a **visual baseline** of road condition at the time of commencement of the works. The purpose of this Initial Condition Survey is to confirm and record:

(a) Those asset features that require Ordinary Maintenance (OM) activities to return the asset to below Intervention Criteria. The Contractor is deemed to have made full allowance for this work in his Lump Sum tender and no additional payment is to be made to bring such works back to intervention standard.

(b) Those sections of road where the defect is of a considerable size, inappropriate for an Ordinary Maintenance repair, and that require the more intensive treatments that are to be programmed in Initial Rectification, Periodic Maintenance in addition to the identified Minor Improvement Sections.

(c) Those sections of road that are currently programmed for reconstruction by others. Work on these sections of road does not require action on Intervention Criteria. The Contractor is to keep the pavement surface safe and hazard-free under the provisions of the Lump Sum.

5.2. Updating of Road Administration Databases

The Employer requires data about the assets being maintained under this contract for future reference. The Contractor supplies all information necessary and maintain this data in a condition of accuracy, currency and completeness appropriate for future use which the data is intended. The following data is to be collected and updated:

- Road and bridge inventory and treatment history
- Road condition and section rating
- Road roughness
- Traffic and classification details
- Schedule of unit rate analysis for standard maintenance works

6. Contractor's Quality Assurance Plan

The purpose of the Contractor's Quality Assurance Plan is to integrate the requirements of the contract and the Contractor's quality assurance systems to deliver the Services. The Contractor's Quality Assurance Plan describes the methods and procedures which the Contractor applies for the execution of the Contract, including how the contractor:

- (a) identify the quality requirements specific to the contract
- (b) plan and execute the work to satisfy those requirements
- (c) inspect and/or test the work to ensure compliance with the quality requirements
- (d) ensure strict document control and structured filing of contract administration documents
- (e) record and monitor the results as evidence of compliance
- (f) monitor the material supply and delivery processes;
- (g) ensure the ability to trace materials incorporated in the works;
- (h) undertake testing and measurement requirements;
- (i) provide evidence of testing apparatus being recently calibrated;
- (j) undertake internal audits;
- (k) provide staff training;
- (l) demonstrate manufacturer's specification confirming compliance of materials;
- (m) record of required testing, measurement and design sheets;
- (n) document all non-conformances; , and
- (o) ensure that prompt action is taken to correct non-compliance.

The Contractor's Quality Assurance Pla clearly describes the systems, procedures and methods that will be used to deliver and monitor compliance of the Services.

7. Health and Safety Management Plans

If required in the Particular Conditions of Contract (PC) the Program of Performance shall include a Health and Safety Management Plan. The purpose of the Health and Safety Management Plan is to foster a responsible attitude towards occupational health and safety and to comply with the provisions of the relevant act/regulations detailed in Section V part H. Because of the nature of the Services, the Contractor may occasionally be exposed to hazardous situations which could involve risk of various degrees of harm, to the contracting staff and/or the public. Situations will arise when it is not practical to eliminate or isolate significant hazards. In these situations the hazards must be minimized by ensuring planned protection systems (e.g. equipment, clothing) are actually used. The Health and Safety Management Plan is to be complied with by the Contractor's personnel and all subcontractors at all times. The Health and Safety Management Plan, when implemented in accordance with the plan requirements:

- (a) Ensure the systematic identification of existing and new hazards on the work site(s)
- (b) Ensure the minimization of significant hazards, where elimination and isolation are both impractical
- (c) Ensure the provision and use of appropriate protective measures
- (d) Include emergency procedures for dealing with accidental spillage, pollution or imminent danger.

(e) Ensure regular review and assessment of each hazard identified and monitor employees exposure to these hazards.

(f) Ensure reporting and recording of work site safety incidents so health and safety problems can be addressed quickly and regularly. It is a requirement of this Contract that any such incident be advised promptly to the Employer.

(g) The Delivery Time for the initial Health and Safety Program shall be not later than **21 days** after the Start Date.

8. Emergency Procedures and Contingency Plan

The Program of Performance includes an Emergency Procedures and Contingency Plan which establishes the roles, practices and procedures during specific types of emergency events identified in the plans and contingency plans associated with the closure of roads. The Emergency Procedures and Contingency Plan is to be developed by the Contractor and agreed with the Employer and any other stakeholders the Employer may identify. The purpose of the Emergency Procedures and Contingency Plan is to ensure the safety of the contractor's personnel and road users in the case of emergency and/or road closure. It should include:

- an effective communication and event recording system
- the name, contact number and specific duties of the contractor's personnel nominated to respond to an emergency event
- the contact number of other parties who need to be notified in cases of emergency events, e.g. police
- detailed response procedures for all emergency events
- possible detour routes in the event of road closure

9. Traffic Management Plan

The Program of Performance includes a Traffic Management Plan. The Traffic Management Plan establishes the practices for traffic management at work sites. The Traffic Management Plan is to be developed by the Contractor and agreed with the Employer. The Contractor shall effectively implement all traffic management requirements in accordance with MoRTH Clause 112 and Clause B7 of the Technical Specifications in respect of all works under the Contract. The objectives of the Traffic Management Plan are to:

- (a) clearly define and document the responsibilities and chain of command for the development, implementation and management of traffic control measures and systems
- (b) establish the minimum requirements for temporary traffic control
- (c) establish the minimum geometric, cross section and surfacing standards for temporary works
- (d) provide appropriate transitions and enable safe and efficient traffic flow into, through and out of work sites
- (e) protect the Contractor's personnel at all times
- (f) protect the Assets and the Contractor's resources at all times.
- (g) meet the operational requirements for the road

The Traffic Management Plan must include at least the following:

- A documented process for preparation, review and approval of the Traffic Management Plan
- A document tracking and control system to ensure that only the latest operative copy of the Traffic Management Plan is in circulation.
- Contact details for Contractor, Principal, emergency services and other stakeholders

- Layout diagrams, method statements etc for implementation of traffic control while undertaking each aspect of the Services (including site specific layout diagrams and method statements if the Services require traffic control measures not covered by standard codes of practice)

10. Environmental Management Plan

The Program of Performance includes an Environmental Management Plan. The plan is to address but not be limited to the Environmental issues defined in “Environmental and Social Requirements”.

Implementation Mechanism:

- (1) **Patrol Maintenance Unit (Road Ambulance):** it is a uniquely designed vehicle equipped with Pugmill, Emulsion, Pump with heating facilities , Grass cutter etc. The vehicle is fitted with GPS tracking system & ZPT-IP camera and is in ready mode 24x7 in Disaster Response Unit. Minor defects are attended in a shorter span of time and thus the roads are maintained at a marked service level.
- (2) **Road Safety ambulance:** The Medical ambulance (Type-B) is available to provide the facility to carry the accident victims.
- (3) **Online Vehicle Tracking System:** The movement of the Patrol maintenance unit is monitored at RCD HQ level through online mode. This enables the tracking of daily movement of the vehicles so that the road maintenance activities are properly monitored.
- (4) **Online Monitoring System:** Though the contractors are given broad responsibilities of roads maintenance through performance based mechanism, the departmental engineers have checks on the activities through regular inspections and site visit. Any defect reflected during the site visit is reported online to the RCD, HQ. base on the online reports the field engineers and the contractors are directed to intervene and rectify the defects.

11. Public Grievance Redressal System: At HQ level there are various mechanisms to involve the road users in the road maintenance system. It is well established fact that the real feedback of a facility is through its users.

- (a) Call centre with Audio Recording system
- (b) Toll free No- 18003456233
- (c) WhatsApp No. 9470001346
- (d) Email: complainroadmaintenance@gmail.com
- (e) URL-WWW.rcdbihar.in
- (f) Bihar Path Sandharan- Mobile App.