



सत्यमेव जयते

MINISTRY OF RURAL DEVELOPMENT

# RURAL ROAD MAINTENANCE TRAINING MODULES FOR CONTRACTORS

## Module-9 COSTING AND TENDERING







Ministry of Rural Development

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## Module-9 Costing and Tendering



This training module is produced through a collaborative effort between the International Labour Organization and the National Rural Road Development Agency under the technical assistance component of the World Bank supported Rural Roads Project-II of Pradhan Mantri Gram Sadak Yojana Project (PMGSY).

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### **Contents:**

- Type of contracts
- Unit rates
- Cost Estimation
- Tendering process

### **Learning Objective:**

At the end of this Module you are expected:

- To understand tendering process
- To know the sections included in a bidding document
- To be able to calculate unit rates
- To be able to make a realistic bid

### **Acknowledgement**

The following publications were also used as reference materials:

- Managing Maintenance of Rural Roads in India, ILO/NRRDA, January 2015

## Foreword

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Pradhan Mantri Gram Sadak Yojana (PMGSY), was launched in December, 2000 as a special intervention of the Government of India with the broad objective of ensuring sustainable poverty reduction. The scheme aims to provide good quality all-weather single connectivity to every eligible habitation. Rural roads are a state subject under the Constitution and as such are the basic responsibility of the states. However under the PMGSY, the construction of good quality and well-engineered roads are fully funded by the central government. Maintenance of these roads is the responsibility of the states. The year 2013 saw the launch of PMGSY-II with the objectives of consolidating the existing rural road network and upgrading existing rural roads that provide connectivity to rural growth centres. PMGSY-II envisages sharing of construction costs between the Centre and the states with maintenance costs continuing to be funded fully by the states.

Over the last 14 years, the PMGSY has carved out a place for itself as a programme characterised by creation of good quality assets, effective management and technical proficiency by the National Rural Road Development Agency (NRRDA), along with capable state road agencies. For implementation and operations, the involved agencies have been supported with detailed documentation in the form of programme guidelines, an operations manual, standard bidding documents, specifications, a standard data book, a procurement and contracts management manual and the Quality Assurance Hand Book with support from the Indian Roads Congress. These documents have also contributed significantly towards effective implementation of PMGSY and even for mainstreaming good practices in other rural roads programmes being executed by the states from their own resources.

An area of concern has been lack of regular maintenance as per the “Programme Guidelines”. However, in recent years, there has been increased awareness and commitment to maintenance by the states. The tempo needs to be sustained and further accelerated.

Under the technical assistance component of the World Bank supported Rural Roads Project-II, the International Labour Organization (ILO), in collaboration with NRRDA has prepared a manual “Managing Maintenance of Rural Roads in India”. This initiated the execution of maintenance works and the development of these training modules for engineers and contractors associated with rural road maintenance works. To strengthen such activities in the participating states of RRP-II, a series of training of trainers workshops were arranged at national and state level based on the course material developed.

The training modules broadly cover the principles for maintenance management of rural roads, planning and execution of common maintenance interventions to ensure reliable transport services and safety to users and the local communities served by the rural roads, and arrangements for monitoring the performance of contractors engaged for the task.

I would like to acknowledge the support of all those associated with the development of these training modules, especially the ILO and its technical assistance team, Mr. Htun Hlaing, Mr. Bjorn Johannessen and the project's Rural Roads Maintenance Engineers. I would also place on record the valuable suggestions of my colleagues Ms. Manju Rajpal, IAS, (ex Director – RC), Mr. R. Basavaraja, Director NRRDA, Mr. S. S. Bhatia, Deputy Director, NRRDA, Mr. A. K. Sharma, Consultant World Bank and senior engineers as well as secretaries from State Governments in bringing the document to its present shape.

I sincerely believe, the training modules would be found useful for the states in their efforts to secure adequate maintenance of all rural roads, not merely the PMGSY roads and improve maintenance practices so that benefits of access continue to remain available for our rural people on a sustainable basis.

(Rajesh Bhushan, IAS)  
JS (RC) & DG, NRRDA  
Ministry of Rural Development  
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# Introduction to Training Modules

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The purpose of this training manual is to provide technical management staff and contractors with appropriate guidelines for the effective management of road maintenance works. The training modules are based on the manual “Managing Maintenance of Rural Roads in India”. These modules broadly cover the principles for maintenance management of rural roads, planning and execution of common maintenance interventions to ensure reliable transport services and safety to users and the local communities served by the rural roads. The arrangements for monitoring the performance of contractors engaged for the task are also covered in these modules.

This manual is broken down into the following categories composed of different modules:

Module 1: INTRODUCTION

Module 2: TECHNICAL CONSIDERATIONS AND IMPLEMENTATION ARRANGEMENTS

Module 3: CONSTRUCTION MEASUREMENT AND BASIC CALCULATIONS

Module 4: PLANNING AND WORK ORGANISATION

Module 5: APPROPRIATE SETTING OUT TECHNIQUES

Module 6: HAND TOOLS, EQUIPMENT & CONSTRUCTION MATERIALS

Module 7: ROUTINE MAINTENANCE WORK METHODS

Module 8: OCCUPATIONAL HEALTH & SAFETY, ENVIRONMENTAL ISSUES AND DECENT WORK

Module 9: COSTING AND TENDERING

The trainer may decide to conduct a full course consisting of all the nine modules or may selectively conduct specific modules depending on the needs of the target group.

As a general advice the trainer should:

- **Encourage active participation**

There is sometimes a tendency of the trainer to act like a teacher in school and to read or lecture directly from the course material. This behaviour should be avoided. Trainees remember information better if they participate actively in discussions and if there is a free exchange of views and of questions between everyone participating in the course.

- **Guiding the discussion**

There are times during a discussion when everyone wants to speak at the same time. When such situations arise, the trainer should insist that the group listen to one person at the time. If one speaker hijacks the floor too long, the trainer needs to interrupt, pointing out that other participants may also want to speak.

- **Listen attentively**

Equal attention should be paid to each speaker. Listen attentively and let the speaker understand that ideas and opinions expressed are both interesting and relevant. It is sometimes useful to take a brief note of participants' suggestions while they are speaking, noting them down on a flipchart or blackboard. A summary of these notes may prove useful for later discussions.

- **Emphasise important points**

Each time the participants make an important point or expresses an interesting opinion, the trainer should draw the group's attention to it by repeating the idea in simple terms which are understood by the majority of the trainees.

- **Preparing the sessions**

When trainees only listen to a description of how a particular job should be done, they are likely to forget what they heard. If however, they actually carry out the task concerned, they will remember how to do it. For this reason, every effort should be made to include as many practical exercises and demonstrations as possible, be they carried out on the worksite or in the training room. Practical sessions should always be carefully planned in advance.

- **Recapping**

A discussion is more than just a conversation. A subject is discussed with an aim in mind. It may occasionally be worthwhile recapping the topic considered and recalling the aim of the discussion by intervening from time to time to give a brief summary of the main points dealt with so far.

- **Questioning**

An important role of the trainer is to ensure that the atmosphere during training is sufficiently relaxed to allow participants to feel at ease to speak freely. Questions set by the trainer should not be regarded by the trainees as tests. Often there is no strict "right or wrong" answer to a question, except for mathematics. Questions should simply give your trainees the opportunity to put forward their individual points of view.



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# Costing and Tendering

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## 9.1 INTRODUCTION

The entire road network in the country falls under the ownership of the government which may either be the Government of India as in the case of National Highways or the State Governments in the case of State Highways, Major District Roads and Rural Roads. The construction and maintenance of these roads is carried out by the respective governments either after selection of contractors through Notices Inviting Bids or through Force Account (Departmental labour). All construction and maintenance activities on all categories of roads to be carried out through contractors are undertaken after entering into a contract with them.

## 9.2 CONTRACT

### *What is a contract?*

- I. When two or more persons have a common intention communicated to each other to create some obligation between them, there is said to be an agreement. An Agreement which is enforceable by law is a "Contract".
- II. According to Section 10 of the Indian Contract Act, 1872, only those agreements are enforceable by law which are made by the free consent of parties competent to contract, for a lawful consideration and with a lawful object, and are not expressly declared to be void. This is subject to any special law according to which a contract should be in writing and attested by witness.
- III. The following are the essential ingredients of a contract:-
  - a. Offer made by one person called the "Promisor"
  - b. Acceptance of an offer made by the other person called the "Promisee"
  - c. Doing of an act, or abstinence from doing a particular act by promisor to promise, that is called a consideration.
  - d. The offer and acceptance should related to something which is not prohibited by law.
  - e. Offer and acceptance constitute an agreement, which when enforceable by law, becomes a contract.
  - f. In order to make a valid and binding agreement, the party entering into such an agreement should be competent to make such agreement.

- IV. For the purpose of an agreement, there must be a communication of intention between the parties thereto. Hence in forms of a contract there is:
  - a. A proposal
  - b. Communication of the proposal
  - c. Communication of acceptance of the proposal
- V. The communication of acceptance of the proposal completes the agreement. An offer may lapse for want of acceptance or be revoked before acceptance. Acceptance produces something that cannot be recalled or undone. A contract springs up as soon as the offer is accepted and imposes an obligation upon the person making the offer. It has been opined by the Ministry of Law that before communication of acceptance of an offer, the tenderer would be within his right to withdraw, alter and /or modify his tender before the acceptance, unless there is a specific promise to keep the offer open for a specific period, backed by a valid consideration.

*Source: CPWD Works Manual*

### **Definitions**

- I. Agreement—Every promise and every set of promises, forming the consideration for each other, is an agreement. [Section 2(e)]  
When one person conveys to another his proposal, and that other person assents thereto, the proposal is said to be accepted. A proposal when accepted becomes a promise.
- II. Contract—An agreement enforceable by law is a contract. In other words, a contract is an agreement made with an intention to create a legal obligation, i.e., a duty enforceable by law. [Section 2 (h)]
- III. Offer or Proposal—When one person signifies to another his willingness to do or to abstain from doing anything, with a view to obtaining the assent of that other to such act or abstinence, he is said to make a proposal. [Section 2(a)]
- IV. Acceptance—When the person to whom the proposal is made signifies his assent thereto, the proposal is said to be accepted. In other words, acceptance is the manifestation by the offeree of his assent to the terms of the offer. [Section 2(b)]
- V. Consideration—When at the desire of the promisor, the promisee or any other person has done or abstained from doing, or does or abstains from doing, or promises to do or abstain from doing, something, such act or abstinence or promise is called a consideration for the promise. [Section 2(d)]
- VI. Consent—Two or more persons are said to consent when they agree upon the same thing in the same sense. [Section 13]

*Source: Indian Contract Act, 1872*



## 9.3 BIDDING DOCUMENT

Any bidding document would normally comprise the following sections:

Section 1: Invitation for Bids

Section 2: Instructions to Bidders

Section 3: Bidding Data

Section 4: General Conditions of Contract (GCC)

Section 5: Specifications

Section 6: Bidding Forms

Section 7: Bill of Quantities (BOQ)

Section 8: Form of Agreement

### ***Section 1: Invitation for Bids***

This advertisement inviting bids provides a brief description of the works to be procured/carried out, contract conditions, financing of the project, eligibility requirements, time and place where bidding documents can be obtained and bids submitted. This is published in national newspapers having wide publicity.

### ***Section 2: Instructions to Bidders***

This section outlines the scope of the bid, source of funds, eligible bidders' requirements, clarification of bidding document, site visit, pre-bid meeting, language of bid, documents comprising the bid, currency of bid, documents establishing qualification of bidders, period of validity of bids, bid security, format and signing of bids, deadlines for submission of bids, bid opening, evaluation of bids, notification of award, signing of contract and performance security.

### ***Section 3: Bidding Data***

The bidding data or the bid data sheet gives the details with respect to various items listed above.

### ***Section 4: General Conditions of Contract (GCC)***

Any contract has standard conditions which are reproduced under this section. These conditions remain constant under the standard bidding document and no changes are made. Whatever changes are required to be made to these conditions are specified under Additional Conditions or Conditions of Particular Application (COPA).

## Section 5: Specifications

From the contractor's point of view, this is a very important section and must be read by the bidders. This section includes the scope of work, specifications to be adopted, expected quality control, mode of measurements and payments, conformance monitoring, deductions in payment due to non-conformance, reporting procedures inspections, special instructions and execution of emergency works. In this section, the specifications to be followed/adopted for each and every item of work are specified. Normally, for PMGSY works, these are as per the specifications for rural roads issued by the Ministry of Rural Development, Govt. of India. In case the specifications are not available for any item, the specifications to be adopted are specified which could be the specifications being followed in state works for rural roads and in the absence of that the specifications are specified to be adopted as decided by the engineer.

**In the case of PBMC Bidding Document, this section is extremely important for the contractors as they must have complete knowledge of the scope of the work which would normally be defined as under: output expected of them vis-à-vis the contract. There are a number of annexes forming part of this section which need to be understood. They are reproduced and discussed as under:**

1. **Ordinary Repairs:** Each road in the network shall be maintained by carrying out Routine maintenance (Ordinary Repairs) operations which will generally include activities as given under:
  - a. Routine Maintenance and up-keep of road components such as road formation, retaining walls, breast walls, culverts, bridges, causeways, pavement and other appurtenances.
  - b. Clearance of landslides / slips caused by rains or other natural causes in hilly terrain, below the threshold limits proposed for Emergency Works.
2. **Initial Rectification:** In the initial part of the Contract, the Contractor shall carry out minor rehabilitation works to bring the condition of the road components to a defined level and thereafter maintain that condition of the road for entire duration of the Contract. This initial period is specified period in the Contract Data.
3. **Emergency Repairs:** The Contractor may be required to undertake some emergent works to repair or control damage to the road caused by unforeseen natural phenomenon such as heavy flooding, severe landslides, slope failures etc.

### ***Initial Rectification Works***

- a. In the initial period of the Contract, the Contractor shall repair any existing damages to the road and associated structures, so that the following conditions are met with by the end of this period:
  - i. There are no potholes in the carriageway
  - ii. There are no surface patches in the carriageway
  - iii. There are no depressions, ruttings or any corrugated surface in the carriageway
  - iv. The surface bleeding of bituminous course, if any, has been treated
  - v. There is no edge break
  - vi. The shoulders / berms are properly built-up and maintained in entire length of road
  - vii. The existing side drains are clear of silt, debris, garbage etc., and water flows through these without any obstruction
  - viii. The passage and inlets/outlets of existing Cross-Drainage structures are clear of silt, debris, garbage etc., and water flows through these without any obstruction
  - ix. There is no growth of grass on carriageway
  - x. The vegetation along the road does not obstruct the vision of driver (Passenger car)
  - xi. All existing Road Signage and Road marking (as per the layout and inventory detail given at time of bidding) is in good condition and visible to the road user
  - xii. All existing parapets are in proper shape
  - xiii. All Kilometre stones are in place
- b. This initial period of Contract is defined as Period-I. Duration of Period-I is specified in the Contract Data.
- c. During Period-I, the Contractor may also be required to construct and/or repair some additional works so as to attain the condition of the road as specified above.

### ***Routine Maintenance Works***

- a. In the subsequent period of the Contract i.e. the remaining period of the Contract, the Contractor shall regularly maintain the road and associated structures and ensure that the conditions met with after the completion of the Period-I are pro-actively preserved and any further damage to the road is prevented.
- b. This subsequent period of Contract is defined as Period-II. Duration of Period-II is specified in the Contract Data.



## Emergency Works

During the execution of the Contract, there may arise a situation which warrants undertaking some emergent works to repair or control damage to the road caused by unforeseen natural phenomenon such as heavy flooding, severe landslides, slope failures etc. If directed so by the Engineer or Employer, the Contractor may be required to carry out some Emergency works to maintain the condition of the road. Further details regarding Emergency works are provided in this section.

### Annexure III

#### Relevant Specifications for the repair of the defects

No.	Defect	Relevant Specifications*
<b>1</b>	<b>Carriageway (Pavement)</b>	
	(i) Surface patches (Due to stripping, ravelling, delamination etc.)	1904
	(ii) Potholes	
	(iii) Surface deformations (all depressed, rutted or corrugated surfaces)	1905
	(iv) Surface Bleeding	1907
<b>2</b>	<b>Edges &amp; Shoulders</b>	
	(i) Edge Break	-
	(ii) Deformation / Scouring of Shoulders (Berms)	1902, 1903
<b>3</b>	<b>Drainage</b>	
	(i) Surface runoff	-
	(ii) Side drains	1908
	(iii) Cross-Drains (Culverts) and Causeways	1909, 1910
<b>4</b>	<b>Vegetation Control</b>	
	(i) Shrubs, Bushes, Grass	1915
	(ii) Tree branches	
<b>5</b>	<b>Road Safety</b>	
	(i) Blockage on carriageway	-
	(ii) Road Signage & Road Marking	1911
	(iii) Railings of Bridges & Parapets of Culverts	1912, 1916
	(iv) Maintenance of 200m, Km and guard stones	1913
<b>6</b>	<b>Side slopes (in case of hilly areas)</b>	
	(i) Landslides / Slips (Hill Side) [Less than 5 cum in each instance]	
	(ii) Erosion of Slopes (Valley Side) [If damages more than half width of the shoulder]	

\*Specifications for Rural Roads, published by Ministry of Rural Development Year 2014



This annexure refers to the specifications which are to be adopted. In case of PMGSY works the 'Specifications for Rural Roads' published by the Ministry of Rural Development are to be followed. In fact, a number of states are adopting these specifications for non-PMGSY roads also.

## Annexure IV

### Weightage assigned to Defects for releasing payments in Period – II For Hilly Areas (Normal Season)

	Defect	Weightage
<b>1</b>	<b>Pavement</b>	<b>38</b>
	(i) Surface patches* (Due to stripping, raveling, delamination)	20
	(ii) Potholes	10
	(iii) Surface deformations (all depressed, rutted or corrugated surfaces)	8
	(iv) Surface Bleeding	0
<b>2</b>	<b>Edges &amp; Shoulders</b>	<b>25</b>
	(i) Edge Break	10
	(ii) Deformation / Scouring of Shoulders (Berms)	15
<b>3</b>	<b>Drainage</b>	<b>18</b>
	(i) Surface runoff	0
	(ii) Side drains	8
	(iii) Cross-Drains (Culverts)	10
<b>4</b>	<b>Vegetation Control</b>	<b>4</b>
	(i) Shrubs, Bushes, Grass	3
	(ii) Tree branches	1
<b>5</b>	<b>Road Safety</b>	<b>10</b>
	(i) Blockage on carriageway	1
	(ii) Road Signage & Road Marking	3
	(iii) Railings of Bridges & Parapets of Culverts	4
	(iv) Maintenance of 200m, Km and guard stones	2
<b>6</b>	<b>Side slopes</b>	<b>5</b>
	(i) Landslides / Slips (Hill Side) [Less than 3 cum in each instance]	3
	(ii) Erosion of Slopes (Valley Side) [If damages more than half width of the shoulder]	2

\*Cracked surface, having cracks of width more than 5mm, shall be considered as area eligible for surface patching [A single isolated crack will be assessed as having equivalent surface area of 0.5 sqm per metre length]

## Weightage assigned to Defects for releasing payments in Period – II For Hilly Areas (Rainy Season)

	Defect	Weightage
<b>1</b>	<b>Pavement</b>	<b>38</b>
	(i) Surface patches* (Due to stripping, ravelling, delamination)	20
	(ii) Potholes	10
	(iii) Surface deformations (all depressed, rutted or corrugated surfaces)	8
	(iv) Surface Bleeding	0
<b>2</b>	<b>Edges &amp; Shoulders</b>	<b>25</b>
	(i) Edge Break	10
	(ii) Deformation/Scouring of Shoulders (Berms)	15
<b>3</b>	<b>Drainage</b>	<b>18</b>
	(i) Surface runoff	0
	(ii) Side drains	8
	(iii) Cross-Drains (Culverts)	10
<b>4</b>	<b>Vegetation Control</b>	<b>2</b>
	(i) Shrubs, Bushes, Grass	1
	(ii) Tree branches	1
<b>5</b>	<b>Road Safety</b>	<b>8</b>
	(i) Blockage on carriageway	1
	(ii) Road Signage & Road Marking	2
	(iii) Railings of Bridges & Parapets of Culverts	4
	(iv) Maintenance of 200m, Km and guard stones	1
<b>6</b>	<b>Side slopes</b>	<b>9</b>
	(i) Landslides / Slips (Hill Side) [Less than 3 cum in each instance]	6
	(ii) Erosion of Slopes (Valley Side) [If damages more than half width of the shoulder]	3

\* Cracked surface, having cracks of width more than 5mm, shall be considered as area eligible for surface patching [A single isolated crack will be assessed as having equivalent surface area of 0.5 sqm per metre length]

This annex defines the weightages to be given to various items pertaining to maintenance of the carriageway as well as off carriageway. The payment is regulated according to these weightages. In other words, in case any maintenance activity which is not carried out within the specified period or as per the desired level of service, the payment for that item is withheld as per this defined weightage. As can be seen from the above two tables, different weightages have been assigned for normal and rainy season since certain

activities get reduced during rainy season and some activities require greater attention during this period.

## Annexure V

### Intervention Period to undertake maintenance measures to control Defects

	Defect	Maintenance measure	Intervention Period (Minimum Frequency of undertaking maintenance measures to control defect)
<b>1</b>	<b>Carriageway (Pavement)</b>		
	(i) Surface patches* (Due to stripping, ravelling, delamination, etc.)	Surface Patching	i. Once every two months. ii. One month before the onset of the monsoon period
	(ii) Potholes	Pothole repair	Once every month
	(iii) Surface deformations (all depressed, rutted or corrugated surfaces)	Repair surface deformations	Once every month
	(iv) Surface Bleeding	Treat Bleeding	Once every month
<b>2</b>	<b>Edges &amp; Shoulders</b>		
	(i) Edge Break	Repair road edge, including adjacent shoulder	Once every month
	(ii) Deformation/Scouring of Shoulders (Berms)	Fill / Scrap and compact the Shoulder to maintain its profile	Once every month
<b>3</b>	<b>Drainage</b>		
	(i) Surface runoff	Drain out the water from Carriageway and shoulders	Within One day of stoppage of rain
	(ii) Side drains	Clean the side drains of any Silt, debris or any obstruction	i. Once every month ii. One month before the onset of the monsoon period
	(iii) Cross-Drains (Culverts)	Clean the culvert passage/ pipe, inlet and outlet of any Silt, debris or any obstruction	i. Once every two months ii. One month before the onset of the monsoon period
<b>4</b>	<b>Vegetation Control</b>		
	(i) Shrubs, Bushes, Grass	Cut the grass. Clear the bushes / shrubs	Once every month
	(ii) Tree branches	Prune the branches (after the clearance of the forest department, if required)	Once every month

5 Road Safety		
(i) Blockage on carriageway	Remove Blockage (to a safe distance from shoulders)	Within 4 hours of observation by Contractor or notification to Contractor by the Engineer/ any public representative / police
(ii) Road Signage & Road Marking	Keep clean all the road signage	i. Once every month. ii. Once every fortnight during monsoon period
	Repair road signs	i. At the earliest after damage coming to the notice of Contractor. ii. Within two weeks of Employer notifying the Contractor
	Report the missing road signs to Employer	In the monthly report to Employer
	Repaint road markings	Repaint once every six months
(iii) Railings of Bridges & Parapets of Culverts	Replace / Repair bridge railings. Construct / Repair parapet of the culverts	Within two weeks of observation by Contractor or notification to Contractor by the Engineer/ any public representative / police
(iv) Maintenance of 200m, Km and guard stones	Replace any missing 200m, km and guard stones.	Once every month
	Repair and repaint 200m, km and guard stones	Once in a year
6 Side slopes (in case of hilly areas)		
(i) Landslides / Slips (Hill Side) [Less than 3 cum in each instance]	Clear the debris from carriageway	i. At the earliest after slide/ slip coming to the notice of Contractor or notification to Contractor by the Engineer/any public representative/police ii. Within 24 hours of occurrence
	Clear the debris from Shoulders	Within 48 Hours of occurrence
(ii) Erosion of Slopes (Valley Side) [If damages more than half width of the shoulder]	Secure the Shoulder / Carriageway with Road Safety measures	At the earliest after erosion coming to the notice of Contractor or notification to Contractor by the Engineer/ any public representative / police
	Rebuild / Stabilise the Slopes	Within one fortnight

\*Cracked surface, having cracks of width more than 5mm, shall be considered as area eligible for surface patching [A single isolated crack will be assessed as having equivalent surface area of 0.5 sqm per metre length]

This table defines the periods when intervention is expected from the contractor for various activities so as to maintain the desired level of service as obtained on completion of Period I.

## Annexure VI Performance Criteria for Defects

	Defect	Performance Criteria (Permissible allowance) [Within One km of road section]	Notice Period
<b>1</b>	<b>Pavement</b>		
	(i) Surface patches* (Due to stripping, ravelling, delamination)	Pavement surface damaged due to cracks (> 5mm), stripping, ravelling, delamination should be less than 1% of the total surface area of carriageway	One month
	(ii) Potholes	1. Not more than 4 potholes in one km stretch with diameter more than 300mm.	Two weeks
		2. Not more than 1 (one) sqm of area of potholes	
		3. No pothole more than (depth of the wearing course + 50mm)	
	(iii) Surface deformations (all depressed, rutted or corrugated surfaces)	1. No depression, rutting or corrugated surface is more than 50mm deep (measured with 3.0 m straight edge)	Two weeks
		2. No depression, rutting or corrugated surface is more than 1.5m long	
	(iv) Surface Bleeding	No isolated bleeding surface should be more than 5 sqm	Two weeks
<b>2</b>	<b>Edges &amp; Shoulders</b>		
	(i) Edge Break	1. No edge break should be more than 150mm wide (also refer Cl. 29.2 of Section 5)	Four weeks
		2. On either side, the cumulative length of the edge break should be less than 20m	
		3. No isolated continuous edge break more than 5m	
	(ii) Deformation/Scouring of Shoulders (Berms)	1. No scour/pothole in shoulder more than 50mm deep	One month
		2. Drop off of shoulder from carriageway edge top is not more than 50mm deep, for 5m isolated stretch or 20m cumulative length on either side of road	
		3. No portion of the shoulder is above the edge of the carriageway (also refer Cl. 29.3 of Section 5)	
		4. The slope of the shoulder should be between 3.0% - 5.0%	

3 Drainage		
(i) Surface runoff	Water should not pond on road after rainfall (Maximum 10 instances. Each ponding instance not more than one sqm ponding area and 20mm ponding depth)	4 hours
(ii) Side drains	The path of the drain should be clear, and water should flow in drain without any obstruction	Two weeks
(iii) Cross-Drains (Culverts)	Culvert passage or pipe should allow free flow of water	Two weeks
4 Vegetation Control		
(i) Shrubs, Bushes, Grass	The Carriageway and the shoulders should be clear of any growth of grass and bushes/shrubs. Maximum grass height should be 100mm	Two weeks
(ii) Tree branches	The Vision of a bus/truck driver should not be obstructed from hanging/obstructing branches of trees with a vertical clearance of 5.00m all along the formation width	Two weeks
5 Road Safety		
(i) Blockage on carriageway	No obstructions on carriageway such as broken branches, dead animals etc.	Within 24 hours
(ii) Road Signage & Road Marking	(i) Road signage should be visible to the road user (also refer Cl. 37.4 of Section 5)	Within one week
	(ii) Damaged road signage should be repaired	Within two weeks
	(iii) Missing Road sign should be reported (to Engineer)	Within one week
	(iv) Road marking should be visible to the motorists (also refer Cl. 37.4 of Section 5)	Within one month
(iii) Railings of Bridges & Parapets of Culverts	Existing Bridge railings should be in place. No existing parapet should be missing/damaged.	Within two weeks
(iv) Maintenance of 200m, Km and guard stones	All, Km and guard stones should be in place	Within one month
	All 200m, Km and guard stones should be repaired and repainted (also refer Cl. 37.4 of Section 5)	Within one month
6 Side slopes (in case of hilly areas)		
(i) Landslides / Slips (Hill Side)	(i) Remove the debris from carriageway	Within one day
	(ii) Remove the debris from shoulders	Within two days
(ii) Erosion of Slopes (Valley Side)	(i) Protect the carriageway and provide road safety measures	Within one day
	(ii) Reconstruct the slopes	Within two weeks

\*Cracked surface, having cracks of width more than 5mm, shall be considered as area eligible for surface patching [A single isolated crack will be assessed as having equivalent surface area of 0.5 sqm per metre length]



The expected level of service is brought out in this table indicating the stages at which intervention is required for bringing the road to the desired service level.

### ***Section 6: Bidding Forms***

These forms prescribe the format in which the bids are to be submitted and letter of bid, list of personnel with experience and qualification, equipment to be deployed, pending litigations, annual turnover, similar work experience and bid security form in the form of bank guarantee.

### ***Section 7: Bill of Quantities (BOQ)***

In this section, the individual items to be executed are specified indicating the specification clause to be followed, the unit rate of the item and the estimated quantity. The bidder is expected to fill in the rate of each and every item, both in words and figures, and the total amount for each item. In case the rate of any item is not specified it specified, it is presumed that the rate of this item is covered in the other items and nothing shall be payable for execution of this item.

In case of Performance Based Maintenance Contracts, the individual items of the BOQ are specified for works to be carried out under Period I for Initial Rehabilitation and the rates for each item is required to be filled in. However, for Routine Maintenance of the entire stretch/stretches of road, the contractor is to give a single rate for the entire network and for the entire duration of the contract.

### ***Section 8: Form of Agreement***

This section contains the standard form of agreement and lists out the documents that shall form part of the agreement and also lists the priority of these documents. This section specifies the format of letter of acceptance, the format in which the performance bank guarantee is to be submitted and the format of bank guarantee for advance payment in case the same is payable as per the terms of the contract. The section also contains the format for submission of bank guarantee in lieu of retention money.

## **9.4 ANALYSIS OF RATES**

The execution of any work, whether it is construction or maintenance, requires a reasonable assessment of the likely cost involved in various activities to be performed during the course of the contract. For working out the unit rate of each item of the BOQ for contracts other than PBMC and for each item likely to be carried out in PBMC contract, it is imperative that the bidder has a thorough understanding of the requirements of men, material and machinery of each item to be executed. From his experience, he should

be able to assess the requirement of skilled and unskilled labour per work day for the item, the quantity of materials required taking into consideration the wastages expected and the hourly requirement of different machinery as the case may be. He should also be aware of the statutory law of the land pertaining to engagement of labour, requirements of minimum wages and other related issues.

It is imperative to assess the rates of various items involved in performance of the contract on the present day market rates. This exercise would help the bidder in proposing a fair, reasonable and competitive rate. The analysis of rates of items likely to be taken up as part of the routine maintenance are worked out as under:

### **Labour Rates**

Sr. No.	Description	Unit	Labour Rate (Rs.)
1.	Beldar	per day	250
2.	Mason (1 <sup>st</sup> Class)	per day	500
3.	Mason (2 <sup>nd</sup> Class)	per day	450
4.	Mate	per day	250
5.	Mazdoor (Unskilled)	per day	250
6.	Painter (1 <sup>st</sup> Class)	per day	450
7.	Painter (2 <sup>nd</sup> Class)	per day	400
8.	Whitewasher	per day	275

### **Machinery Rates**

Sr. No.	Description of		Output of Machine		Usage Rates (Rs.)	
	Machine	Activity	Unit	Output	Unit	Rate
1.	Air compressor 210cfm	Supplying compressed air	Cfm	210	per hour	357.50
2.	Bitumen Boiler oil fired 200 litre	Heating of bitumen	litre/h	400	per hour	312
3.	Bitumen emulsion pressure distributor	Applying bitumen tack coat	sqm/h	1750	per hour	1235
4.	Front end loader one cum bucket capacity @ 45 cum/h	Loading aggregate/soil	cum/h	45/100	per hour	1023
5.	Mixall 6-10 t capacity	Mixing of bituminous material	t/h	8.00	per hour	1885
6.	Plate Compactor	Compaction	cum/h		per hour	71.5
7.	80-100 kN Static Roller	Compaction/Rolling				

		Earth- Embankment or Sub-grade	cum/h	80/70	per hour	546
		Base G-II/G-III	cum/h	8.00		546
		BUSG	cum/h	10.00		546
		BM 50/75mm	cum/h	12.00		546
		Premix 20mm	sqm/h	250.00		546
		Seal Coat	sqm/h	500		546
8.	Tipper 5.5cum/10t	Carriage	cum/trip	5.50	per hour	357.50
9.	Tractor with trolley	Transportation of material	t/trip	3 to 5	per hour	448.50
10.	Truck 10 t capacity	Carriage	cum/trip	5.50	per hour	357.50

Source: Himachal Pradesh Public Works Department

### Rates of Materials

Sr. No	Description	Basic Rate of Material at Quarry/Dealer's Depot (Rs.)	Carriage to Site of Work (Mechanical/ Manual) (Rs.)	Unit (MT/cum)	Unloading at Site of Work (Rs.)	Unit Cost of Material at Site of Work (Rs.) (3+4+6)
1	2	3	4	5	6	7
1.	Cement	7000	200	Tonne	100	7300
2.	Sand (Coarse)	900	215	cum	23.78	1138.78
3.	Aggregate (10mm size)	980	625.15	cum	39.07	1644.22
4.	Aggregate (20mm size)	980	625.15	cum	39.07	1644.22
5.	Aggregate (40mm size)	800	49.03	cum	39.07	888.10
6.	Sand (Fine)	950	587.33	cum	23.78	1561.11
7.	Stone Chips (13.2 - 5.6 mm)	1000	625.15	cum	39.07	1664.22
8.	Bitumen VG-10	60360	137.66	tonne	169.68	60667.34
9.	Bitumen Emulsion RS-1 (TC)	57449	137.66	tonne	169.68	57756.34
10.	Bitumen Emulsion SS-1 (PC)	57449	137.66	tonne	169.68	57756.34
11.	Stone Aggregate for Gr-II (63-45mm)	600	49.03	cum	66.64	715.67
12.	Stone Aggregate for Gr-III (53-22.5mm)	690	49.03	cum	66.64	805.67
13.	Binding material for road	400	49.03	cum	39.07	488.10
14.	Earth	0	0	cum	23.78	23.78
15.	Granular Material	400	54.54	cum	39.07	493.61

Source: Himachal Pradesh Public Works Department

## Analysis of Rates

Sr. No.	Ref.to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
1	1900	15.3	Repair to pot holes and removal of loose material, trimming of sides, cleaning of surface, providing tack coat, 20mm thick premix carpet and seal coat type B as per drawing and technical specifications Clauses 1904.2, 503 and 508.1 including carriage of materials through all modes of transportation including all incidental charges in all leads and lifts as per direction of Engineer-in-charge				
			Unit = sqm				
			Taking output = 200sqm				
		a)	Labour				
			Mate	day	0.80	250.00	200.00
			Mazdoor (Unskilled)	day	20.00	250.00	5,000.00
		b)	Machinery				
			Air Compressor 210 cfm with tractor	hour	2.00	357.50	715.00
			Bitumen pressure distributor	hour	2.00	1235.00	2,470.00
			Mixall 6/10t capacity	hour	2.00	1885.00	3,770.00
			Three wheeled 80-100kN Static Roller	hour	4.00	546.00	2,184.00
		c)	Material				
			Bitumen for tack coat @3kg per 10sqm 200 x 3/10 = 60kg	tonne	0.064	60,667.33	3,882.71
			Bitumen for premix carpet @ 14.60kg per 10sqm= 200 x 14.6/10 = 292kg	tonne	0.292	60,667.33	17,714.86
			Bitumen for seal coat @ 6.8kg per 10sqm = 200 x 6.8/10 = 136kg	tonne	0.136	60,667.33	8,250.76
			Crushed stone aggregate @ 0.27 cum per 10sqm = 200 x 0.27 / 10 = 5.4 cum	cum	5.400	1664.22	8,986.79
			Crushed sand passing 2.36mm sieve and retained on 180 micron sieve @ 0.06 cum per 10sqm 200 x 0.06/10 = 1.20 cum	cum	1.200	1561.11	1,873.33
							55,047.45
		d)	Overhead charges @ 10% on (a+b+c) except bitumen			25199.12	2,519.91

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
		e)	Contractor profit @ 10% on (a+b+c+d) except bitumen			27719.03	2,771.90
			Cost for 200sqm = (a+b+c+d+e)				60,339.26
			Rate per sqm = (a+b+c+d+e)/200				301.70
			Say Rs.				302
2			Repair to ravelling and removal of loose material, trimming of sides, cleaning of surface by providing tack coat with bitumen emulsion, 20mm thick pre-mix carpet using bitumen VG-10 and seal coat type B				
			Unit = sqm				
			Taking output = 200sqm				
		a)	Labour				
			Mate	day	0.640	250.00	160.00
			Mazdoor (Unskilled)	day	16.000	250.00	4,000.00
		b)	Machinery				
			Air compressor 210 CFM with tractor	hour	2.000	357.50	715.00
			Emulsion pressure distributor	hour	2.000	1235.00	2,470.00
			Three wheeled 80-100 km static roller	hour	4.000	546.00	2,184.00
		c)	Material				
			Emulsion for tack coat @ 3kg per 10sqm 200 x 3/10 = 60kg	tonne	0.060	57756.33	3,465.38
			Bitumen VG-10 for premix carpet @ 14.60kg per 10sqm = 14.6 x 200/10 = 292kg/2	tonne	0.146	60667.33	8,857.43
			Bitumen VG-10 for seal coat @ 6.80kg per 10sqm = 200 x 6.8/10 = 136kg	tonne	0.136	60667.33	8,250.76
			Crushed stone aggregate @ 0.27 cum per 10sqm = 200 x 0.27/10 = 5.4 cum/2	cum	2.700	1664.22	4,493.39
			Crushed sand passing 2.36mm sieve and retained on 180 micron sieve @ 0.06 cum per 10sqm 200 x 0.06/10 = 1.20 cum	cum	1.200	1561.11	1,873.33
							36,469.34
			Overhead charges @ 10% on (a+b+c) except bitumen			15895.79	1,589.58

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Contractor profit @ 10% on (a+b+c+d) except bitumen			17485.37	1,748.54
			Cost for 200sqm = (a+b+c+d+e)				39,807.46
			Rate per sqm = (a+b+c+d+e)/200				199.04
			Say Rs.				199
3	501.3	15.18	Rutting depression and corrugation repair				
			Rutting depression and corrugation repair by clearing and removal of loose material providing lack coat with bitumen emulsion and filling with graded premix using cationic emulsion (Special technical specification 132.3.3) in layer not exceeding 50mm to average depth of 50mm as per MORD technical specification 501.3				
			Unit= sqm				
			Taking output = 200sqm				
		a)	Labour				
			Mate	day	0.640	250.00	160.00
			Mazdoor (Unskilled)	day	16.000	250.00	4,000.00
		b)	Machinery				
			Mixall 6/10 Tonne	hour	2.000	1885.00	3,770.00
			Bitumen pressure distributor	hour	2.000	1235.00	2,470.00
			Three wheeled 80-100 km static roller	hour	4.000	546.00	2,184.00
		c)	Material				
			Bitumen for premix carpet @ 14.60kg/10sqm = 200 x 14.6/10 x 2 = 584kg	t	0.584	60,667.33	18,554.20
			Bitument for track coat @ 2kg/10sqm = 200x2/10 = 40kg	t	0.040	57,756.33	2,310.25
			Bitumen for seal coat @ 6.8kg per 10sqm = 200 x 6.8/10 = 136kg	t	0.136	60,667.33	4,478.60
			Crushed stone aggregated @ 0.27 cum per 10sqm 200x0.27/10x2 = 10.8 cum	cum	10.800	1664.22	17,973.58

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Crushed sand passing 2.36mm sieve and retained on 180 micron sieve @ 0.06cum per 10sqm				
			200x0.6/10 x 2= 2.40cum	cum	2.400	1561.11	3,746.66
							59,647.34
		d)	Overhead charges @ 10% (a+b+c) except bitumen			34304.29	3,430.43
		e)	Contractor's profit @ 10% on a+b+c+d excluding bitumen			37734.72	3,773.47
			Cost for 200sqm = a+b+c+d+e				66,851.24
			Rate per sqm = (a+b+c+d+e)/200				334.26
			Say Rs.				334
4			Repair to Edge Break				
			Repair to Edge break and removal of loose material, trimming of sides, cleaning of surface by providing tack coat with bitumen emulsion, 20mm thick pre-mix carpet using bitumen VG-10 and seal coat type B with bitumen as per technical specifications				
			Unit = sqm				
			Taking output = 200sqm				
		a)	Labour				
			Mate	day	0.640	250.00	160.00
			Mazdoor (Unskilled)	day	16.000	250.00	4,000.00
		b)	Machinery				
			Concrete mixer 0.4/0.28 cum capacity	hour	2.500	260.00	650.00
			Air compressor 210 CFM with tractor	hour	2.000	357.50	715.00
			Emulsion pressure distributor	hour	2.000	1235.00	2,470.00
			Three wheeled 80-100 km static roller	hour	4.000	546.00	2,184.00
		c)	Material				
			Stone aggregate for Gr. II	cum	22.000	715.67	15,744.74
			Emulsion for tack coat @ 3kg per 10sqm 200 x 3/10 = 60kg	tonne	0.060	57,756.33	3,465.38
			Bitumen VG-10 for premix carpet @ 14.60kg per 10sqm = 14.6 x 200/10 = 292kg	tonne	0.292	60,667.33	17,714.86

Sr. No.	Ref.to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Bitumen VG-10 for seal coat @ 6.80kg per 10sqm = $200 \times 6.8/10 = 136\text{kg}$	tonne	0.136	60,667.33	8,250.76
			Crushed stone aggregate @ 0.27 cum per 10sqm = $200 \times 0.27 / 10 = 5.4\text{ cum}$	cum	5.400	1664.22	8,986.79
			Crushed sand passing 2.36mm sieve and retained on 180 micron sieve @ 0.06 cum per 10sqm $200 \times 0.06 / 10 = 1.20\text{ cum}$	cum	1.200	1561.11	1,873.33
							66,214.86
			Overhead charges @ 10% on (a+b+c) except bitumen			36783.89	3,678.39
			Contractor profit @ 10% on (a+b+c+d) except bitumen			40462.28	4,046.23
			Cost for 200sqm = (a+b+c+d+e)				73,939.48
			Rate per sqm = (a+b+c+d+e)/200				369.70
			Say Rs.				370
5.1	1900	15.2	Maintenance of Earthen shoulder (filling with fresh selected soil)				
			Making up loss of material/irregularities on shoulders to the design level by adding fresh approved selected soil and compacting it with appropriate equipment at OMC up to a lead of 1000m as per technical specification Clause 1903				
			Unit = sqm				
			Taking output = 100 sqm				
			Assuming average thickness of filling to be 150mm				
			Quality of fresh material = 15 cum				
		a)	Labour				
			Mate	day	0.20	250.00	50.00
			Mazdoor (Unskilled)	day	5.00	250.00	1,250.00
		b)	Machinery				
			Hydraulic Excavator 0.9 cum bucket capacity @ 60 cum per hour	hour	0.25	1430	357.50
			Tipper 5.5cum	hour	0.68	357.50	243.10
			Add 10% cost of carriage towards loading and unloading charges				24.31



Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Plate compactor @ 25 sqm per hour	hour	4.00	71.50	286.00
		c)	Material				
			Compensation for earth	cum	15.00	40.00	600.00
		d)	Overhead charges @ 10% on (a+b+c)			2,810.91	281.09
		e)	Contractor's profit @ 10% on (a+b+c+d)			3,092.00	309.20
			Cost for 100 sqm = a+b+c+d+e				3,401.20
			Rate per sqm = (a+b+c+d+e)/100				34.01
			Say Rs.				34
5.2		15.2	Maintenance of Earthen shoulder (stripping of excess soil)				
			Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor at OMC as per drawing and technical specification Clause 1903				
			Unit = sqm				
			Taking output = 100 sqm				
			Assuming height of stripping as 75mm				
			Quality of earth cutting = 7.5 cum				
		a)	Labour				
			Mate	day	0.10	250.00	25.00
			Mazdoor (Unskilled)	day	2.50	250.00	625.00
		b)	Machinery				
			Plate compactor	hour	4.00	71.50	286.00
		c)	Overhead charges @ 10% on (a+b)			936.00	93.60
		d)	Contractor's profit @ 10% on (a+b+c)			1,029.60	102.96
			Cost for 100sqm = a+b+c+d				1,132.56
			Rate per sqm = (a+b+c+d)/100				11.30
			Note: Earth stripped from earthen shoulders to be used for making shoulders to balance cut and fill and any excess earth to be disposed as directed				
6.1	1900	15.6	Maintenance of Drains	Silted 100%			

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			The maintenance of drains include erosion, repair, clearing, cleaning, reshaping, regrading, deepening of side drains as well as catch water drains as per technical specification Clause 1907				
			Unit = per metre				
			Taking output one km = 1000metre				
		a)	Labour				
			Mate	day	0.320	250.00	80.00
			Mazdoor (Unskilled)	day	8.000	250.00	2,000.00
		b)	Overhead charge @10% on a			2,080.00	208.00
		c)	Contractor's profit @10% on a + b				220.80
			Cost for 1000 metre = a+b+c				2,428.80
			Rate per metre = a+b+c/1000				2.43
			Say Rs.				2.50
6.2	1900	15.6	Maintenance of Drains	Silted 50%			
			The maintenance of drains include erosion, repair, clearing, cleaning, reshaping, regrading, deepening of side drains as well as catch water drains as per technical specification Clause 1907				
			Unit = per metre				
			Taking output one km = 2000metre				
		a)	Labour				
			Mate	day	0.320	250.00	80.00
			Mazdoor (Unskilled)	day	8.000	250.00	2,000.00
		b)	Overhead charge @10% on a				208.00
		c)	Contractor's profit @10% on a + b				220.80
			Cost for 1000 metre = a+b+c				2428.80
			Rate per metre = a+b+c/2000				1.225
			Say Rs.				1.25
7	1900	15.7	Maintenance of Culverts				

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Maintenance of Hume pipe Culvert by way of clearing, cleaning, erosion repair, repairs to cracks, parapet wall and protection work as per drawing and technical specification Clause 1908				
			Unit = One Hume pipe (1000mm dia)				
			Taking output = One H.P. Culvert				
		a)	Labour				
			Mate	day	0.10	250.00	25.00
			Mazdoor (Unskilled)	day	1.00	250.00	250.00
			Mason (2 <sup>nd</sup> Class)	day	1.40	450.00	630.00
		b)	Material				
			Cement, Sand, Brick, Boulders, etc	LS			470.00
							1,375.00
		c)	Overhead charges @10% on (a+b)			905.00	90.50
		d)	Contractor's profit @ 10% on (a+b+c)			995.50	100.00
			Cost for one No. Hume pipe culvert = a+b+c+d				1,565.50
			Rate per Hume pipe Culvert = a+b+c+d				1,565.50
			Say Rs.				1,565
8	1900	15.12	Cutting of Branches of Trees and Shrubs and Trimming of Grass and Weeds				
8.1			Cutting of shrubs from the roadway or within R.O.W. and disposal of shrubs to suitable locations as per technical specification Clause 1914				
			Unit = Each				
			Taking output = 100 shrubs				
		a)	Labour				
			Mate	day	0.08	250.00	20.00
			Mazdoor (Unskilled)	day	2.00	250.00	500.00
		b)	Overhead charges @10% on a			520.00	52.00
		c)	Contractor's profit @10% on (a+b)			572.00	57.20
			Cost for 100 shrubs = a+b+c				629.20
			Rate per shrub = (a+b+c)/100				6.29

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Say Rs.				6.00
8.2			Trimming of grass and weeds from the shoulders/berms and disposing off the same to suitable locations as per technical specification Clause 1914				
			Unit = sqm				
			Taking output = 1500sqm				
		a)	Labour				
			Mate	day	0.40	250.00	100.00
			Mazdoor (Unskilled)	day	10.00	250.00	2,500.00
		b)	Overhead charges @10% on a			2,600.00	260.00
		c)	Contractor's profit @10% on (a+b)			2,860.00	286.00
			Cost for 1500sqm = a+b+c				3,146.00
			Rate per sqm = (a+b+c)/1500				2.09
			Say Rs.				2.1
9	1900	15.9	Maintenance of Road Signs				
			Maintenance of road signs by way of cleaning and repainting of mandatory/regulatory/cautionary/informatory and place identifications sign board as per drawings and technical specification Clause 1910				
			Unit = 1km				
			Taking output = one km				
			All types of signs in one km				
		a)	Labour				
			Mate	day	0.090	250.00	22.50
			Mazdoor (Unskilled)	day	2.000	250.00	500.00
			Painter 1 <sup>st</sup> Class	day	0.125	450.00	56.25
		b)	Material				
			Synthetic Enamel Paint, Engineering grade tape, welding machine etc. (LS)	LS			675.00
							1,253.75
		c)	Overhead charges @10% on a+b			578.75	57.88
		d)	Contractor's profit @10% on a+b+c			636.625	63.66
			Cost for one km = a+b+c+d				1,375.29
			Rate per km = a+b+c+d				1,375.29

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Say Rs.				1,375
10	1900	15.11	Maintenance of 200 metre and km stones				
			Maintenance of 200 metre km stone by way of refitting of tiled stones repairing with cement mortar, cleaning, repairing and lettering on 200 metre km stone and 5 <sup>th</sup> km stone as per drawing and technical specification Clause 1912				
			Unit = 1 km (4 Nos.)				
			Assuming 1km stone, 4nos. 200 metre stone and 1/5 <sup>th</sup> 5km stone				
		(i)	Painting two coats with synthetic enamel paint				
			200 m stone 4 nos = 0.760sqm				
			One km stone = 0.815sqm				
			5 <sup>th</sup> km stone 1 x 1/5 = 0.320sqm				
			Total = 1.895sqm				
			As per item No. 10.5 of chapter 10	sqm	1.895	130.05	246.45
		(ii)	Printing letters and figures of any shade with synthetic enamel paint of any approved colour to give an even shade				
			200m stone 4 Nos. = 40 per cm height per letter				
			One no. Km stone = 120 per cm height per letter				
			5 <sup>th</sup> km stones 1/5 <sup>th</sup> = 60 per cm height per letter				
			Total = 220 per cm height per letter				
			Rate as per item no. 10.1 of chapter 10	Per cm height per letter	220.000	1.05	231.00
		a)	Labour				
			Mate	day	0.024	250.00	6.00
			Mazdoor (Unskilled)	day	0.500	250.00	125.00
			Mason 1 <sup>st</sup> Class	day	0.100	500.00	50.00
		b)	Materials				
			Cement, sand, aggregates etc (LS =325)	LS			325.00

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
							983.45
		c)	Overhead charges @10% on (a+b)			658.45	65.84
		d)	Contractor's profit @10% on a+b+c			724.29	72.43
			Cost for one km = i+ii+a+b+c+d				1,121.72
			Rate per km. = (i+ii+a+b+c+d)				1,121.72
			Say Rs.				1,122
11	1900	15.13	White Washing of Parapet Walls of CD Work and Tree Trunks				
			White washing two coats on parapet walls and tree trunks including preparation of surface by cleaning scraping etc. As per technical specification Clause 1915				
			Unit = sqm				
			Taking output = 9sqm				
		a)	Labour				
			Mate	day	0.01	250.00	2.50
			Mazdoor (Unskilled)	day	0.143	250.00	35.75
			White washer	day	0.143	275.00	39.325
		b)	Materials				
			Lime	quintal	0.045	600.00	27.00
			Fevicol adhesive	kg	0.10	200.00	20.00
			Indigo	kg	0.013	175.00	2.275
		c)	Overhead charges @ 10% on a+b			49.275	4.93
		d)	Contractor's profit @ 10% on (a+b+c)			54.20	5.42
			Cost for 9sqm = a+b+c+d				59.62
			Rate per sqm = (a+b+c+d)/9				6.62
			Say Rs.				6.50
12	1900	15.1	Restoration of Rain Cuts				
			Restoration of rain cuts, moorum gravel or a mixture of these, clearing the loose soil, benching for 300mm width laying fresh material in layers not exceeding 250mm and compaction with plate compactor or power rammer to restore the original alignment, level and slopes as per drawings and technical specification Clause 1902				

Sr. No.	Ref. to MORD Spec.	Ch. No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
			Unit = cum or sqm				
			Taking output = 10 cum or 40sqm. Assuming 25cm depth for restoration				
		a)	Labour				
			Mate	day	0.24	250.00	60.00
			Mazdoor (Unskilled)	day	6.00	250.00	1,500.00
		b)	Machinery				
			Plater compactor	hour	3.00	71.50	214.50
		c)	Materials				
			Compensation for earth taken from private land	cum	7.50	40.00	300.00
		d)	Overhead charges @ 10% on a+b+c			2,074.50	207.45
		e)	Contractor's profit @ 10% on (a+b+c+d)			2,281.95	228.20
			Cost for 40sqm				2,510.145
			Rate per sqm				62.75
			Say Rs.				63.00

Source: Himachal Pradesh Public Works Department and Standard Data Book of Ministry of Rural Development

## 9.5 COST ESTIMATION

In the performance of the PBMC contract, no quantities are specified for carrying out the routine maintenance activities except for the items which are to be carried out for initial rehabilitation so as to achieve the desired level of service of the road. Therefore, it is for a bidder to make a reasonable assessment of the inputs of various activities required for ensuring the desired level of service throughout the entire period of the contract. The bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting the bids as to the nature of the ground, terrain, the road alignment, drainage characteristics and condition and nature of subsoil. The bidder is expected to obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bids. A bidder is deemed to have full knowledge of the site whether he inspects it or not and no extra charges or payments consequent or any misunderstanding or otherwise is allowed.

A typical sample of the assessment of requirements of various routine maintenance items likely to be executed in 1km length during the contract period is shown in a road condition survey in the table below. It would be worthwhile for a contractor to have such type of exercise carried out for assessing the likely cost for maintenance of the road.

Road Condition Inventory										Road Name:		Length: 1.00 km																										
District:										Road Category:		Page: of																										
Division:										Project:		Chainage																										
Sub-division:										+000 1		2		3		4		5		6		7		8		9		1+000										
Proposed Maintenance Activities										Unit	Q-ty																											
Bush clearing (width)										m2	450																											
Clear side drains (silted up to 50%)										m	200	100x1	100x1	50x1																			75x1	50x1				
Clear side drains (silted up to 100%)										m	500	30	70	80																			100	30				
Excavate cross drains(depth<30cm)										m	20	20	100	100																			50	100				
Lower berm										m2	22.5	-	25x0.9	-																			-	-				
Shoulder repair (-50mm)										m2	31.5	-	-	15x0.9	20x0.9																			-	-			
Side slope cutting repair										m2	12	12	-	-																			-	-				
Pothole repair (area)										m2	12	-	-	-																			-	-				
Crack sealing (crack > 5mm)										m																												
Crocodile crack (area)										m2																												
Edge break (width)										m2																												
Relevelling (area)										m2	10	-	10 x1	-																			-	-				
Depression (area)										m2	55	-	5 x 3	8 x 5																			-	-				
Bush clearing (width)										m2	250	-	75x1	50x1																			25x1	-				
Clear side drains (silted up to 50%)										m																												
Clear side drains (silted up to 100%)										m																												
Excavate cross drains(depth<30cm)										m																												
Lower berm										m2																												
Shoulder repair (-50mm)										m2	9	-	-	10 x 0.9																			-	-				
Side slope cutting repair										m2	10	-	4 x 2.5	-																			-	-				
Clear culvert HP/small bridge including inlets and outlets										no.	4	-	1	-	1																			1	-			
Repair culvert/small bridge										no.																												
Maintenance of road signs										no.	7	1	-	2	-	2																			-	2		
200m & Kilometre stone maintenance										no.	5	-	1	-	1																			-	1			
Parapets										no.																												
Guard stones										no.																												

Date:

Surveyed by:

Date:

Checked by:

Date:

Counter-signed by:





## Cost Estimate for Routine Maintenance of 1km of Rural Road

District:				Division:			
Sub-Division:				Road Category:			
Road Name:						Length:	1.000 km
Sr. no.	Activities	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Time/Year	Total amount (Rs.)
1	Pothole repair	sqm	12	302	3624	One and a half	5,436
2	Crack sealing	m				One and a half	
3	Crocodile crack	sqm				One and a half	
4	Edge break	sqm	8.5	370	3145	One and a half	4,717.5
5	Revelling	sqm	10	199	1990	One and a half	2985
6	Depression	sqm	55	334	18370	One and a half	27,555
7	Bush clearing	sqm	700	6.30	4410	Twice	8,820
8	Clear side drains (silted 50%)	m	200	1.25	250	Twice	500
9	Clear side drains (silted 100%)	m	500	2.50	1250	Twice	2,500
10	Lower berm	sqm	22.5	11.30	254.25	Twice	508.5
11	Excavate cross drains (depth, 30cm)	m				Twice	
12	Shoulder repair (-50mm)	sqm	40.5	34	1377	Twice	2,754
13	Side slope cutting repair	sqm	10	63	630	Twice	1,260
14	Clear HP culvert/small bridge including inlet and outlet	cum	4	1565	6260	Twice	12,520
15	Maintenance of Road Signs	no.	7	137.5	962.5	Once	962.5
16	200m and Kilometre stones maintenance	km	1	1122		Once	1122
17	Parapets	no.				Once	
18	Guard stones	no.				Once	
<b>Grand Total:</b>							<b>71,640.5</b>

### 9.6 TENDERING PROCESS

A press notice, inviting tender, would appear in a leading newspaper as well as in a local newspaper. Normally, a time period of 30 days is allowed between the date of the invitation to bid appearing in the newspapers or the

date of availability of bidding documents whichever is later and the date of submission of the bids. A pre-bid meeting, if decided, is normally fixed 10-12 days from the date of publication of the notice/ sale of the bid documents.

A bidder is advised to visit the office issuing the bid document and examine the bidding document before purchasing the same. This would help him to note the minimum qualification criteria mentioned in the Instruction to Bidders (ITB) to qualify for the award of work.

The bidder is encouraged to visit and examine the site of works and the surroundings so as to gather all the relevant information that may be required for the preparation of the bid by him. The cost of site visit is to be borne by the bidder.

The bidder is responsible for arranging and maintaining at his own cost all material, tools and plants, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract document. Submission of a bid by a bidder implies that he has read the notice pertaining to invitation for bids and all other contract documents and has made himself aware of the scope and the specifications of the work to be performed and other factors having a bearing on the execution of the work. Therefore, keeping in view the above aspects, it is extremely important for any bidder to have a detailed site visit for ascertaining issues pertaining to the site of work and thereafter submit his bid.

In case the Invitation for Bids (IFB) specifies pre-bid meeting, the bidder is encouraged to attend the same on the specified date, time and location so that his doubts are clarified. He should list out his doubts on which he would like to seek clarification and raise them during the pre-bid meeting. This will help him in submitting his bid more realistically and reduce the elements of risk to the minimum possible. He is advised to visit the proposed site of work prior to attending the pre-bid meeting.

While submitting the bid, the bidder must ensure that the following documents are attached:

- a. The Bid (in the specified format)
- b. Bid Security
- c. Priced Bill of Quantities
- d. Qualification Information Form and Documents
- e. And any other material required to be completed and submitted.

The bidder should fill in the rates and prices and line item total both in figures and words. It may be noted that the item for which no rate or price is entered by the bidder will not be paid for when executed and shall be deemed covered by other rates and prices.

The bidder must ensure that the validity of both his bid and bid security are in consonance with the period specified in the bid document. The time period for bid validity is normally 90 days after the deadline date for bid submission and the bid security, if in the form of a bank guarantee, would normally be valid for 45 days beyond the validity of the bid.

The bidder should prepare one original and one copy of the documents comprising the bid and clearly mark “original” and “copy” as appropriate. The bid should be in sealed cover and submitted within the deadline specified for the submission of the bids. The bidder or his authorized representative may attend the bid opening if he so desires.

The bidder whose bid is accepted is notified of the award accordingly. He has to submit the requisite Performance Security within 21 days of receipt of letter of acceptance. The notification of award will constitute the formation of the contract subject only to the furnishing of the requisite Performance Security.

The following documents shall be deemed to form and be read and construed as part of this Agreement:

- 1) Agreement
- 2) Letter of Acceptance
- 3) Notice to Proceed with the Work
- 4) Contractor’s Bid
- 5) Contract Data
- 6) General Conditions of Contract
- 7) Specifications
- 8) Drawings
- 9) Bill of Quantities, and
- 10) Any other document listed in the Contract Data.







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