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ROYAL AUDIT AUTHORITY



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ཞབས་ཏོག་ལྷན་ཁག།



**Performance Audit Report on
Road Maintenance Works
Department of Roads**

Ministry of Works and Human Settlement

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OCTOBER 2019

*Reporting on Economy, Efficiency & Effectiveness in the use of
Public Resources*

DISCLAIMER NOTE

The audit was conducted in accordance with the International Standards of Supreme Audit Institutions (ISSAIs). The review is confined to road maintenance works in national highways and gewog centre roads in the country. The audit was carried out as per the objectives and criteria determined in the audit plan and program prepared by the Royal Audit Authority (RAA). The findings are based on the information and documents made available by the audited agencies.

This is also to certify that the auditors during the audit had neither yielded to pressure, nor dispensed any favour or resorted to any unethical means that would be considered as violation of the RAA's Oath of Good Conduct, Ethics and Secrecy.



རྒྱལ་གཞུང་ཕྱི་སྒྲིག་འཛུགས་འཛིན།
ROYAL AUDIT AUTHORITY
Bhutan Integrity House

Reporting on Economy, Efficiency & Effectiveness in the use of Public Resources



RAA/TAD (PA-MoWHS)/2019-2020/2575

Date: 25 October 2019

Hon'ble Secretary
Ministry of Works and Human Settlement
Thimphu

Subject: Performance Audit Report on Road Maintenance Works

Dear Dasho,

Enclosed herewith please find the Performance Audit Report on Road Maintenance Works covering the period 2013-14 to 2017-18. The Royal Audit Authority (RAA) conducted the audit under the mandate bestowed by the Constitution of Kingdom of Bhutan and the Audit Act of Bhutan 2018. The audit was conducted as per the International Standards of Supreme Audit Institutions on performance auditing (ISSAI 3000). The overall objective of the audit was to ascertain the economy, efficiency and effectiveness of Department of Roads (DoR) in the operation and management of road maintenance works. Specifically, the audit aimed:

1. To ascertain the existence and/or adequacy of institutional framework including planning mechanism in road maintenance; and
2. To review the efficiency and effectiveness of existing system/procedures/practices in implementation of road maintenance works.

The report has been prepared based on our reviews of the available documents, analysis of data, and discussion with relevant officials of the Ministry of Works and Human Settlement (MoWHS). The report contains positive initiatives, shortcomings and deficiencies as well as recommendations.

The draft report was issued on 9 September 2019 to the Ministry for factual confirmation, comments and feedback. Responses received have been incorporated as well as appended in the report as Annexure. The report also contains a set of recommendations, which are intended to address the shortcomings and deficiencies thereby enhancing efficiency and effectiveness of the road maintenance works.

In line with Section 55(16) of the Audit Act of Bhutan 2018, the RAA would like to request the MoWHS to provide duly completed and **signed Accountability Statement** (attached) for implementation of each recommendation. In the event of non-submission of the Accountability Statement, the RAA shall fix the responsibility for implementation of the recommendations on the Head of the Agency as per Section 55(17) of the Audit Act of Bhutan 2018. The RAA will follow up on implementation of the recommendations based on the Accountability Statement and failure to comply will result in taking appropriate actions, which may include suspending audit clearances to the accountable official(s).

The RAA would therefore appreciate receiving a Management Action Plan Report for implementation of audit recommendations with definite timeframe on or before 24 January 2020 along with the signed Accountability Statement.

We take this opportunity to acknowledge the officials of MoWHS for rendering necessary co-operation and support extended during the audit.

Yours sincerely,



(Tshering Kezang)

Auditor General of Bhutan

Copy to:

1. Hon'ble Lyonchhen, Royal Government of Bhutan, Thimphu;
2. Hon'ble Gyalpoi Zimpon, Office of Gyalpoi Zimpon, Thimphu;
3. Hon'ble Speaker, National Assembly of Bhutan, Thimphu;
4. Hon'ble Chairperson, National Council of Bhutan, Thimphu;
5. Hon'ble Opposition Leader, National Assembly of Bhutan, Thimphu;
6. Hon'ble Chairperson, Public Accounts Committee, National Assembly of Bhutan, Thimphu (enclosed five copies);
7. Director General, Department of Roads, MoWHS, Thimphu;
8. Chief Engineer, Maintenance Division, Department of Roads, MoWHS, Thimphu
9. Chief Engineer, Regional Office (Lingmethang, Lobeyisa, Phuentsholing, Samdrupjongkhar, Sarpang, Thimphu, Tingtibi, Trashigang, and Trongsa);
10. Policy Planning and Annual Audit Report Division, RAA, Thimphu;
11. Follow-up and Clearance Division, RAA, Thimphu;
12. Office copy; and
13. Guard file.

MANAGEMENT ACTION PLAN REPORT

Recon No.	Audit Recommendation in brief	Action Taken or To be Taken	Estimated Implementation Date	Estimated Completion Date	Responsibility Entrusted to:	
					Name & Designation	EID no.
4.1	The DoR should develop a periodic maintenance plan that can aid in effective road management					
4.2	The DoR should strategize to improve efficiency in restoration of monsoon damages					
4.3	The DoR should maintain and analyse records of possible price escalation due to non-restoration of damaged structure on time					
4.4	The DoR should develop a comprehensive Information Management System					
4.5	The DoR should develop a guideline/SOP for proper and effective coordination during emergencies					
4.6	The DoR should strengthen the internal control for hiring of machineries /equipment					
4.7	The DoR and ROs must ensure compliance to the prescribe standards for maintenance of roads					
4.8	The DoR should standardize and strengthen its monitoring and supervision roles of routine maintenance works					

ACCOUNTABILITY STATEMENT

PERFORMANCE AUDIT ON ROAD MAINTENANCE WORKS

Recon No.	Audit Recommendation in brief	Personal Accountability			Supervisory Accountability		
		Name & Designation	EID no.	Sign	Name & Designation	EID no.	Sign
4.1	The DoR should develop a periodic maintenance plan that can aid in effective road management						
4.2	The DoR should strategize to improve efficiency in restoration of monsoon damages						
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4.8	The DoR should standardize and strengthen its monitoring and supervision roles of routine maintenance works						

(s/d)

Secretary

TITLE SHEET

1. Title of the Report	:	Performance audit report on Road Maintenance Works
2. AIN	:	16163
3. Audited Entity	:	Department of Roads, Ministry of Works and Human Settlement
4. Audit Period	:	2013-14 to 2017-18
5. Audit Schedule	:	March 2019 to May 2019
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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AIN	Audit Identification Number
APA	Annual Performance Agreement
BCSR	Bhutan Civil Service Rules and Regulations
BSR	Bhutan Standard Rates
DCC	Departmental Coordination Committee
DDM	Department of Disaster Management
DoR	Department of Roads
FY	Financial Year
FYP	Five Year Plan
GC	Gewog Center
GSB	Granular Sub Base
IMS	Information Management System
ISSAI	International Standards for Supreme Audit Institution
JICA	Japan International Cooperation Agency
KKTY	Kothakpa-Khar-Tsebar-Yurung
MB	Measurement Book
MoF	Ministry of Finance
MoWHS	Ministry of Works and Human Settlement
NIT	Notice Inviting Tender
NWF	National Work Force
PAG	Performance Audit Guidelines
PBMS	Performance Based Management System
PNH	Primary National Highway
PPD	Policy and Planning Division
PRR	Procurement Rules and Regulations
RAA	Royal Audit Authority
RAMS	Road Asset Management System
RBP	Royal Bhutan Police
RGoB	Royal Government of Bhutan
RMC	Road Maintenance Center
RO	Regional Office
RSMP	Road Sector Master Plan
RSTA	Road Safety Transport Authority
SNH	Secondary National Highway
WMM	Wet Mix Mecadam

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EXECUTIVE SUMMARY

In Bhutan, roads form the main mode of transport that link districts and rural communities to areas of socio-economic importance. The Department of Roads (DoR), under the Ministry of Works and Human Settlement (MoWHS) is the national authority for all roads in the country. DoR is mandated to ensure that the road network in the country is safe, efficient and reliable for national security and socio-economic development.

Investment in road sector had been and is the top most development priority evident from the budget allocated for construction and maintenance of roads. During the period 2013-14 to 2017-18, out of the Ministry's total approved budget of Nu. 35,213.17 million, the DoR including the nine Regional Offices (RO) were approved Nu. 29,323.77 million constituting 83.28% of the overall approved budget. The expenditure incurred on road maintenance works amounted to Nu. 2,666.54 million constituting 9% of DoR's budget.

The Royal Audit Authority (RAA) conducted the Performance Audit on Road Maintenance Works as mandated by the Constitution of the Kingdom of Bhutan and Audit Act of Bhutan 2018. The audit was conducted following Performance Audit Guidelines (PAG), which is in line with the International Standards of Supreme Audit Institutions (ISSAIs).

The overall audit objective was to ascertain the economy, efficiency and effectiveness of DoR in the operation and management of road maintenance works. Specifically, the audit aimed:

1. To ascertain the existence and/or adequacy of institutional framework including planning mechanism in road maintenance; and
2. To review the efficiency and effectiveness of existing system/procedures/practices in implementation of road maintenance works.

The performance audit was conducted in the DoR, and its five ROs covering the period 2013-14 to 2017-18. The audit covered the operations of Maintenance Division and ROs under DoR, and other relevant departments under the MoWHS involved in road maintenance works.

The RAA observed both positive developments and inadequacies. Some of the notable initiatives and positive developments include:

- i. The enactment of the Road Act of Bhutan, 2013 that provides set standards for road construction, and establishes clear delineation of roles and responsibilities of governmental bodies at various levels & road users to manage and administer efficient road network system;
- ii. Development and implementation of the Road Rules & Regulations 2016 facilitating road construction and maintenance with proper technical specifications and standards to bring uniformity in the country;
- iii. Development of '*The Road Classification System in Bhutan*' to delineate ownership and roles of relevant agencies in planning, budgeting, implementation and maintenance of road network in the country;

- iv. Revision of the Road Sector Master Plan (2007-2027) through assessment of achievements during 2007-17 and to plan and develop action plans for next 10 years; and
- v. Bioengineering as a part of climate resilience work was carried out adopting new techniques such as bamboo crib wall with brush layer, palisade, and bag check dam, mud bund for rain water diversion, plastic sheeting, live stake and plantation.

Notwithstanding the positive accomplishments, the RAA also observed deficiencies and shortcomings of which, significant findings are briefly highlighted below.

- i. A periodic maintenance plan including a strategy statement and list of desired results was found lacking. Annual Performance Agreement (APA) lacks definite/realistic targets in terms of maintenance works;
- ii. There is no formalized planning and prioritisation system instituted for selecting roads for periodic maintenance. The prioritisation and selection of roads for periodic maintenance is carried out in absence of proper records and data on construction and maintenance of roads;
- iii. During the implementation of monsoon restoration works, there were changes in priority leading to huge number of ad-hoc activities resulting in underachievement of planned activities;
- iv. Low priority was accorded in terms of budget allocation for periodic maintenance resulting in untimely maintenance. The annual coverage for periodic maintenance works was low with 25.26% and 27.31% for Primary National Highway (PNH) and Secondary National Highway (SNH) respectively;
- v. Institutional arrangement and linkages amongst relevant stakeholders for a coordinated and integrated approach during emergency situations was found lacking;
- vi. There is lack of updated and complete information on road maintenance works, which is key to decision makers for successive reviews, developing plans and maintenance strategies;
- vii. There is an inadequate internal control mechanism during hiring of machineries/equipment which if continued may have cost implication to the government;
- viii. Non-compliance to prescribed standards pertaining to road pavements, carriage width, formation width, road cross fall/cambers, drains, etc.;
- ix. With recurring and increasing monsoon damages, and lack of geotechnical studies on slope stabilization, monsoon restoration works remains a challenge;
- x. Routine maintenance works to keep the roads aesthetically pleasing and safe for traveling motorists by mowing roadsides and removing right-of-way debris through regular and effective routine maintenance was inadequate.

Based on the audit findings, the RAA has provided eight recommendations aimed at enhancing efficiency and effectiveness in road maintenance works. The audit recommendations are:

- i. Develop a periodic maintenance plan that can aid in effective road management;
- ii. Strategize to improve efficiency in restoration of monsoon damages;

- iii. Maintain and analyse records of possible price escalation due to non-restoration of damaged structures on time;
- iv. Develop a comprehensive Information Management System;
- v. Develop a guideline/SOP for proper and effective coordination during emergencies;
- vi. Strengthen the internal control for hiring of machineries/equipment;
- vii. Ensure compliance to prescribed standards for maintenance of roads; and
- viii. Standardize and strengthen its monitoring and supervision roles of routine maintenance works.

Despite having adequate legislative tools, policies, and DoR's concerted efforts, the department is faced with numerous challenges and barriers in road maintenance works. RAA's review of road maintenance and management identified several deficiencies that inhibited the DoR's effectiveness in delivery of its services. The department's road maintenance practices are not preventive but reactive and rely intensely on more costly corrective maintenance. The DoR and ROs suffers from administrative shortcomings in its road maintenance planning and record keeping. There is an absence of institutional set up for coordination and collaboration amongst relevant agencies during emergency situations for road maintenance.

The DoR had not been effective in avoiding roads dilapidation and deterioration principally due to budgetary constraints and shortages of labourers that had forced available resources to be over stretched resulting in backlogs. Maintenance of roads was not given importance as required. RAA acknowledges that the financial resources are beyond the DoR and ROs control as they depend entirely on MoF. Thus, the RAA is of the view that in order to use the available funds judiciously, the DoR and ROs must have proper maintenance plan and comprehensive information management system that can be used for planning and prioritisation of roads maintenance works.

CHAPTER 1: ABOUT THE AUDIT

1.1 Mandate

The Royal Audit Authority conducted the “Performance audit on Road Maintenance Works” as mandated by the Constitution of the Kingdom of Bhutan and Audit Act of Bhutan 2018 as follows:

- a) Article 25 (1) of the Constitution of the Kingdom of Bhutan provide that “There shall be a Royal Audit Authority to audit and report on the economy, efficiency, and effectiveness in the use of public resources”; and
- b) Section 68 of the Audit Act of Bhutan 2018, under the ‘Functions and Jurisdiction of the Authority’ states, “The Authority shall audit and report on the economy, efficiency and effectiveness in the use of public resources”.

1.2 Audit Standards

The RAA conducted the audit in accordance with the RAA’s Performance Audit Guidelines, which is consistent with the International Standards of Supreme Audit Institutions on Performance Auditing (ISSAI 3000).

1.3 Audit Objectives

The overall audit objective was to ascertain the economy, efficiency and effectiveness of DoR in the operation and management of road maintenance works. Specifically, the audit aimed:

- To ascertain the existence and/or adequacy of proper planning mechanism and institutional framework in road maintenance; and
- To review the efficiency and effectiveness of existing system/procedures/practices in implementation of road maintenance works.

1.4 Audit Approach Applied

The RAA used system-oriented and problem based audit approaches. Using these approaches, the audit focused mainly on the systems and matters related to road maintenance works by DoR in the country. These approaches were applied considering the issues and challenges in road maintenance works through review of various documents and discussion with officials from the Ministry.

1.5 Audit Scope

The performance audit on road maintenance works covered the operations of Maintenance Division and ROs under DoR, and other relevant departments under the MoWHS involved in road maintenance works covering the period from 2013-14 to 2017-18.

The audit covered PNH, SNH and Gewog Centre (GC) roads in five ROs namely Lobeysa, Lingmethang, Samdrupjongkhar, Sarpang and Thimphu.

1.6 Audit Methodology

The RAA applied the following methodologies to gather information, analyse data and derive conclusions.

- i. Reviewed legislation, rules and regulations, government policies, business and operational objectives, publication and reports, various files on road operations to understand the processes and procedures regarding road maintenance;
- ii. Reviewed Road Sector Master Plan (RSMP), MoWHS's staffing, conference resolutions, RO's minutes of meetings among others to understand Ministry's vision, strategies, action plans, and challenges in road maintenance works;
- iii. Interviewed key personnel involved in road maintenance in Ministry and ROs to enhance our understanding of the processes involved in road maintenance works and seek their opinions for the way forward on issues governing road maintenance works;
- iv. On sampled basis, visited ROs to review the road maintenance plan/programs for PNH, SNH and GC road and to assess whether DoR have appropriate maintenance management systems in place;
- v. Reviewed ROs system/practices/processes for road maintenance works;
- vi. Identified systemic infrastructure planning and implementation issues that impede maintenance works, and priority areas that require government's attention through adequate investment.
- vii. On sampled basis, visited PNH, SNH, GC roads accompanied by engineers from various ROs to assess the conditions of roads and where there are recurrent monsoon damages;
- viii. Visited ROs to obtain and confirm expenditure for road maintenance works for FY 2013-14 to 2017-18;
- ix. Assessed DoR's information management system;
- x. Visited MoWHS and ROs to collect information on budget proposal, approval and release to understand the budgeting processes;
- xi. Visited MoWHS and ROs to collect information on planning and prioritisation of road maintenance works to understand the planning and prioritisation process;
- xii. Conducted walkthroughs, interviews, and document reviews;
- xiii. Physically verified expenditures on road maintenance for financial year 2017-18;
- xiv. Gathered pictorial evidences; and
- xv. Reviewed past audit reports.

CHAPTER 2: INTRODUCTION

2.1 Background on Road Maintenance

In Bhutan, roads form the main mode of transport, besides air transport. Accordingly, the Royal Government of Bhutan (RGoB) has been consistently prioritizing road and highway construction ever since it began its development process in 1961. Road development had been and is the topmost development activity by the past and present governments. Over the plan periods, major portion of the country's budget outlay is allocated to road sector showing the importance of having a safe, efficient and reliable road network for national security and socio-economic development.

Being a land-locked and mountainous nation, Bhutan is prone to all kinds of natural hazards. Owing to the difficult topography and resource constraints, roads were built following land contours with few bridges. Hence, the roads in general, are narrow with sharp curves and steep gradients. Thus, road building and maintenance is very challenging.

At present there are 4,783.46 km of motorable roads comprising of PNH, SNH, dzongkhag road, GC road and approach road constructed and maintained by the DoR. Maintenance of roads to a satisfactory standard requires substantial expenditure, often a very significant portion of the government's annual expenditure.

During the financial year (FY) 2013-14 to 2017-18, out of the MoWHS's total approved budget of Nu. 35,213.17 million, DoR was approved Nu. 29,323.77 million constituting 83.28% of the overall approved budget. The expenditure incurred on road maintenance works amounted to Nu. 2,666.54 million constituting 9% of DoR's budget. During the FY 2017-18, road maintenance amounted to Nu. 650.55 million out of the Ministry's total budget release of Nu. 7,894.47 million equivalent to 8.24%. In spite of the investments, there have been inadequacies governing the safety and reliability of roads networks in the country. Media and road users in countless occasions have expressed their displeasure on the state of national highways, especially during monsoon season.

Often, lack of right maintenance interventions at the right time results in higher expenditure than the cost of the maintenance itself. Despite the DoR coming up with measures such as adoption of climate resilient technologies and bioengineering works, the department is still faced with recurrent challenges on monsoon restoration worksthat needs to be addressed for a safe, efficient and reliable road network in the country. Despite the importance and expenditure highlighted above, there are not many studies conducted on the issues, challenges and barriers on road maintenance works in the country.

The recurrent nature of road maintenance works remains a key structural weakness in the road sector. Majority of the Bhutanese population still live in rural areas, engaged in agricultural activities and these rural areas are not adequately served by efficient and reliable transportation system.

2.2 Policy and Institutional Framework

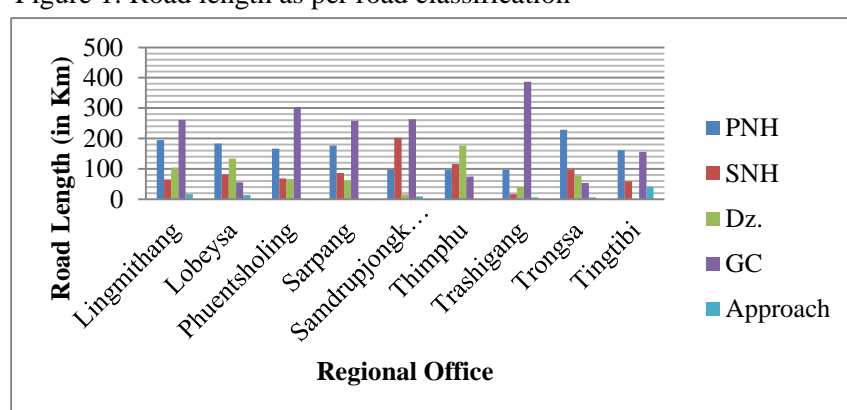
The Road Act of Bhutan 2013 governs all roads and roads related issues in the country. The strategic framework for construction, expansion and maintenance of road infrastructure up to the year 2027 is guided by the RSMP. The legislation and regulations in relation to road maintenance works is provided in Appendix I.

The DoR under the MoWHS is the national authority for all roads in the country.

2.3 Road network and responsibilities

The road types with length in kilometre (km) for each RO under the DoR are presented in the Figure 1 and detailed in Appendix II:

Figure 1: Road length as per road classification



There are 4,783.46 km of roads under the DoR including 1,403.08 km of PNH, 794.49 km of SNH, 676.27 km of dzongkhag road, 1,814.77 km of GC road and 94.84 km of approach road. The DoR is solely responsible for planning and implementation of PNH and SNH. The department has the authority for development of the national road network and to set technical standards for all classes of roads and bridges, including re-classification of roads, as and when it is necessary to match the socio-economic development of the country.

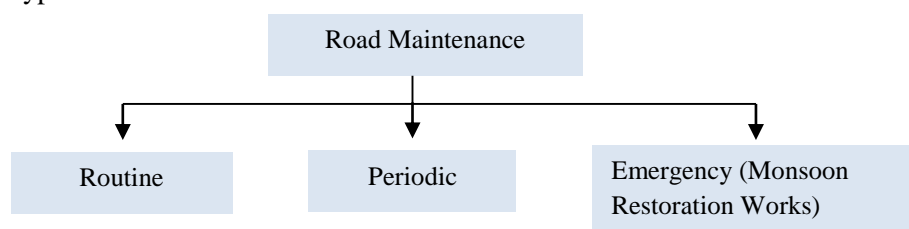
The planning, prioritisation and budgeting of dzongkhag roads is done by respective Dzongkhag Tshogdu. In view of the limited in-house capacity of the dzongkhags, pre-investment studies, survey, design, procurement, construction and maintenance of dzongkhag roads are carried out by DoR.

The 'Road Classification System in Bhutan' provides roles of various stakeholders in planning, budgeting, implementation and maintenance of road network in the country including in-depth look at the road network of the country.

2.4 Types of road maintenance

Maintenance of roads is broadly divided into three types as presented in Figure 2 and described below.

Figure 2: Types of Road Maintenance



i. Routine Maintenance

Routine maintenance is a group of recurrent activities which are related to the repair of faults and attention to the road structure and facilities to ensure the preservation of asset and convenience and safety of traffic. Typical activities include repairing of potholes, surface patching, drain cleaning, grass and scrub cutting, maintenance of road structures, maintenance of road signs and apparel, and grading road surface and shoulder.

ii. Periodic Maintenance

Periodic maintenance is that group of activities which can normally be predicted and planned for by nature, location and extent and are carried out periodically. Typical activities are resurfacing works (BT surface dressing), surface dressing (single surface dressing, double surface dressing) and overlaying (asphalt concrete).

Every stretch of road with 25mm thickness, resurfacing is normally due for the next resurfacing in 4 to 5 years and lesser in extreme climate areas.

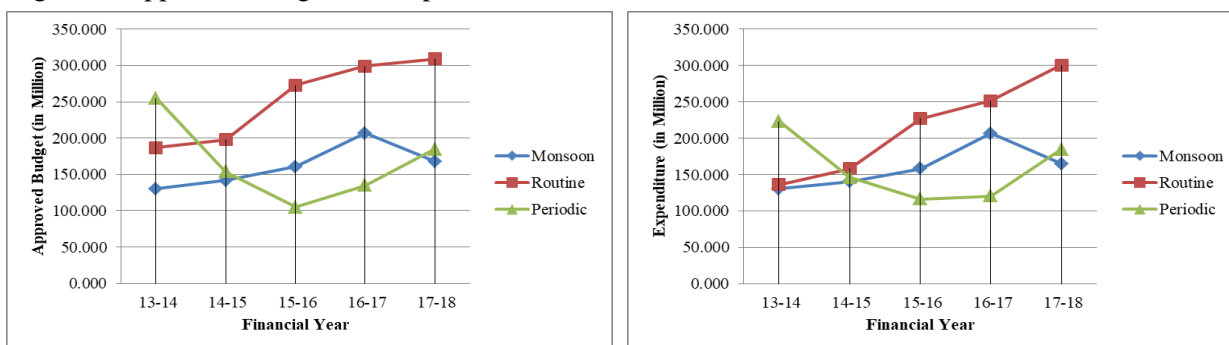
iii. Restoration Works/Emergency Maintenance

Restoration works/Emergency maintenance is the group of activities performed to restore the roadway following damage by events such as monsoon rains resulting in floods or landslides which would be unpredictable. Typical activities are clearing of landslides, culvert and bridge repairs, retaining wall reconstruction, construction of diversions, floodway repairs, and restoration of road formation width.

2.5 Budget outlay for Road Maintenance Works

The total budget approved and expenditure incurred on road maintenance works during the FY 2013-14 to 2017-18 is presented in Figure 3 and detailed in Appendix III:

Figure 3: Approved Budget and Expenditure for Road Maintenance Work for the FY 2013-18



During the FY 2013-14 to 2017-18, the approved budget and expenditure incurred for monsoon restoration work shows an increasing trend till FY 2016-17 and decrease in FY

2017-18. The approved budget and expenditure incurred for routine maintenance work has also increased every year while periodic maintenance approved budget and expenditure has decreased over the years but increased in FY 2017-18. The total approved budget for the FY 2013-14 to 2017-18 was Nu. 2,906.61 million and the expenditure incurred was Nu. 2,666.541 million. The average annual expenditure incurred for the road maintenance work amounts to Nu. 533.308 million.

a) Routine

The budget for routine maintenance works is fixed according to the road type as presented in Table 1. The last revision on budget allocation for different maintenance works was done in the year 2017 to adjust reflecting price increases.

Table 1: Budget allocation for Maintenance works		
Road Type	Budget FY 2012-13 onwards	Budget FY 2017-18 onwards
Primary National Highway	86.000 Nu/km/year	115,000 Nu./km/year & 170,000 Nu./km/year for hybrid
Secondary National Highway	80.000 Nu/km/Year	109,000 Nu./km/year
Dzongkhag Roads	44.000 Nu/km/year	44,000 Nu./km/year
Urban Roads	89.000 Nu/km/year	Thromde roads
Bridge Maintenance	26.000 Nu/bridge/year	26,000 Nu./ bridge/year

b) Periodic

The RO's send the budget proposals for periodic maintenance to the Administration and Finance Division (AFD), MoWHS. Before submitting to AFD, the DoR verifies the proposals considering the criticality of requirement of road maintenance and the budget availability.

c) Monsoon

The ROs are approved with certain amount (currently Nu. 3.00 million for each RO) for the restoration of damages caused by monsoon and certain amount is approved under the DoR for the same activity for later distribution to ROs depending on the extent of damages.

CHAPTER 3: AUDIT FINDINGS

This chapter is divided into two parts: Part 1 highlights the positive initiatives and Part 2 discusses the shortcomings and deficiencies.

Part 1: Initiatives and Positive Developments

The DoR has made positive changes contributing in addressing road related issues and challenges through various initiatives and programmes. Some of the positive initiatives and developments in road maintenance works are discussed below:

- i. The enactment of the Road Act of Bhutan 2013 was a key reform in the road sector. Enacted by the Parliament on 1 March 2013, the Act provides set standards for road construction, and establishes clear delineation of roles and responsibilities of governmental bodies at various levels and road users to manage and administer efficient road network system. The Act provides for a coordinated management system that promotes safe and efficient road networks in the country;
- ii. Development and implementation of the Road Rules and Regulations 2016 was one important developments brought in by MoWHS. The Road Rules and Regulations came into force on 21 May, 2016. The regulation was necessary as there were various agencies involved in the construction, maintenance and management of different categories of roads in the country. The Road Rules and Regulations 2016 facilitate road construction and maintenance with proper technical specifications and standards to bring uniformity in the country;
- iii. The DoR, MoWHS has developed ‘The Road Classification System in Bhutan’ to delineate ownership and roles of relevant agencies in planning, budgeting, implementation and maintenance of road network in the country. The system helps to have a proper understanding of various road categories, roles of various stakeholders involved, and enhance decision making. The document also gives an in-depth look at the road network of the country with figurative notation of road lengths;
- iv. The DoR, MoWHS had revised the Road Sector Master Plan (2007-2027). The revision was carried out in 2017 to assess the achievements during 2007-17 and to plan and develop action plans for next 10 years;
- v. The DoR has initiated a system wherein all the maintenance requirements are annually planned in detail within the available budget. The annual plan provides indicative quantity of different maintenance activities to be implemented within the FY. The plan, besides serving as the basis for measurement of annual achievement at the end of the year, allows the monitoring team to objectively monitor the conduct of maintenance activities in different seasons; and
- vi. Bioengineering, as a part of climate resilience work was carried out at Katley II slide at 24 km on Gelephu-Trongsang PNH under Sarpang RO when there was no fund for the construction of retaining wall. New techniques adopted elsewhere in India had

been followed such as bamboo crib wall with brush layer, palisade, sand bag check dam, mud bund for rain water diversion, plastic sheeting, live stake & plantation.

Part 2: Shortcomings and deficiencies

While recognising the positive contributions made in road maintenance works, the RAA's review also revealed areas that require further improvements. The findings were made based on review and analysis of the available documents and information as discussed below.

3.1 Planning and prioritisation of road maintenance works

Planning is an important function of management. A proper planning process not only ensures effective decisions making through allocation of resources that enables the organization to meet its intended goals and objectives but also aids in minimizing the risks of future uncertainties. The RAA's analysis on the planning and prioritisation of road maintenance works during FY 2013-14 to 2017-18 revealed absence of a periodic maintenance plan, plan prioritisation shortcomings, planned activities not executed, and unplanned activities carried out as discussed below.

3.1.1 Absence of plan on periodic road maintenance

Plan is a management tool used for guiding an organization for better delivery of its mandates by making the most of its resources and ensuring everyone working towards common goals and objectives. The DoR's strategic framework for construction, expansion and maintenance of road infrastructure up to the year 2027 is guided by the RSMP 2007-2027. The RSMP include road network expansion, road realignment, tunnelling, roads for inter-dzongkhag connectivity and the second east-west highway. The department in 2016 took stock of the RSMP in order to set targets for the next five years (2017-2022) of the master plan horizon along with action plans. The review report on RSMP included road maintenance action plans to develop Road Asset Management System (RAMS).

However, the revised RSMP is focused only on construction of dzongkhag roads based on cost per household (cphh). The document does not take into consideration maintenance plans and targets including maintenance issues and limitations. Besides, the DoR does not have a plan for periodic maintenance works including a strategy statement and list of desired results. While the department has some internal protocol, these procedures are not documented and dated, and do not provide indication of reporting of incidences and management approval. According to DoR's management, the reason for not having a master plan was that DoR and ROs prepare and implement APA.

While master plan can be understood as an organizational long term vision, APA provides responsibilities and targets to meet the goals and objectives of the master plan. Absence of road maintenance plan had resulted in various shortcomings as explained under *Para 3.1.3, 3.2.1, and 3.2.6*. Besides, it indicates that maintenance activities have not been given importance by the management.

The Asian Development Bank's (ADB) country diagnostic study in 2012 also reported on a need of having an institutional framework for strategic planning, coordination and monitoring

through expansion of RSMP including operation and maintenance issues. As per the report, Bhutan is ranked the highest among selected Asian economies in 2007 in budget for maintenance and rehabilitation of roads with approximately 38% of Gross National Product (GNP)¹.

A comprehensive plan is felt necessary to guide and forecast when different types of roads would require maintenance rather than relying on the ROs proposal without proper data. Further, in absence of such plan, there was no benchmark for measuring the department's performance with regard to goals and objectives stated for maintenance.

The DoR responded that planning for maintenance requires enormous data and detailed studies of all the slopes throughout the country which is challenging given limitations in technical expertise and the financial resources. The planning for routine and periodic maintenance can be done once the Road Asset Management System is fully established and institutionalized.

The RAA reiterates that there is a need for the DoR to have a comprehensive plan to guide periodic maintenance of different types of roads.

3.1.2 Annual Performance Agreement lacks definite/realistic maintenance targets

APA is drawn between the Director, DoR and ROs to establish clarity and consensus on annual priorities for the department consistent with the Five Year Plan (FYP) document. The APA's objective is to inculcate a performance-based culture with accountability mechanism at all levels of government. The APA acts as a standard for performance and promotes accountability and efficient utilization of resources. These plans also provide management with feedback and assist them to make informed decisions.

The review revealed that the APA, which can be understood as ROs annual operational plans, has indicated the works standards and period for the work of DoR and ROs. However, the plans lack definite/realistic targets in terms of maintenance works. With regard to plans drawn, activities were reflected in the plans but targets on maintenance activities were not set realistically.

For instance, success indicators for routine maintenance and monsoon restoration works were set to be the total length of roads under each ROs jurisdiction. The plan had not indicated different activities and components under each type of works. Further, the annual coverage of roads was not set realistically. ROs stated that complete activities under routine maintenance was prepared by ROs depending on the season such as vegetation clearing, sweeping of roads, pothole patching, etc. The only realistic activity they can plan was road resurfacing but the target was set very low due to lack of budget.

Planning of maintenance activities should have been based on activity, coverage and periods that indicated activities to be completed and to ensure that assignments and responsibilities relating to maintenance had been successfully carried out. Due to lack of properly stipulated

¹ Donnges, Edmonds, and Johannessen 2007

and outlined plans, it was not possible for RAA to assess the DoR's performance pertaining to maintenance works.

The DoR, in its response, stated that the reason why APA targets are kept broad is because of the recurrent nature of the maintenance activities and lack of systematic monitoring. Realizing these shortcomings, the DoR has initiated a system wherein all the ROs are required to annually plan in detail the maintenance activities to be performed. The annual plan indicates the quantity of different maintenance activities against which the achievements can be monitored and evaluated.

The RAA acknowledges the initiative undertaken by the DoR to prepare annual plan for maintenance works. However, the DoR should ensure that the APA targets prepared by the ROs are realistic and measurable.

3.1.3 Inadequate prioritisation of periodic maintenance works

The proposal and selection of road maintenance works within the Regional Office (RO) takes place at sub-divisional level considering qualitative criteria such as severity and urgency of works. The proposal is then submitted to the RO, which is decided by Regional Level Committee for further submission to the DoR for review and approval.

Periodic maintenance works involve resurfacing works (BT surface dressing), surface dressing (single surface dressing, double surface dressing) and overlaying (asphalt concrete). In depth planning and prioritisation of works are crucial for periodic maintenance to ensure that most critical and urgent roads are identified for resurfacing within the allocated resources. Further, planning and prioritisation of resurfacing works require comprehensive and updated information especially the year of construction, road length and date of last maintenance.

The detail of roads resurfaced during the period 2013-14 to 2017-18 are presented in Table 2 and detailed in Appendix IV.

FY	Roads Constructed (km)	Roads Resurfaced (km)	Expenditure (Nu. in million)
2013-2014	1,693.37	69.79	192.210
2014-2015		123.11	123.499
2015-2016		75.64	100.905
2016-2017		67.19	74.374
2017-2018		108.30	193.335
Total	1693.37	444.03	684.324

Note: PNH excluding 504.2 Km of North East West Highway (NEWH)

As shown in Table 2, a total of 444.03 km of PNH and SNH were resurfaced during the FY 2013-14 to 2017-18 incurring a total expenditure of Nu. 684.32 million.

The RAA noted that there is no formalized prioritisation system instituted in the department for selecting roads for periodic maintenance. Currently, there is no practice reporting and recording the surface condition of asphalt pavement. The prioritisation and selection of roads for periodic maintenance was carried out in absence of proper records and data on construction and maintenance of roads. Moreover, there was no consultation with relevant

stakeholders for prioritizing and selecting roads for periodic maintenance. Involvement of relevant stakeholders is important to understand the condition of roads and to consider the economic (productivity and access to markets) and social benefits (access to health centers and schools).

Without proper records and data, the management will not have adequate information to decide which roads need to be selected for resurfacing. In absence of formalized prioritisation system, the decision taken by the management may not be appropriate for periodic maintenance impeding effective service delivery. Therefore, proper prioritisation and selection of roads for resurfacing must be ensured with proper data and records for effective, and balanced economic and social development.

While accepting the audit finding, the DoR explained that the department is consistently working on developing a Road Asset Management System through the financial support of the World Bank to objectively prioritize periodic maintenance in the country. The asset management tool is developed in an excel database containing data on road roughness, potholes, undulations, vulnerability of roads to natural disasters, condition of road furniture and other related information.

Further, the DoR stated that the way forward to implement the system is to procure a server to host the database, providing training to all the field engineers, updating of the data base at regular intervals and making investment plans. Accordingly, budget was proposed for institutionalization of the system in FY 2019-2020 but unfortunately the budget did not come through.

The RAA stresses the importance of prioritisation of roads for periodic maintenance in order to avoid delays in maintaining roads that are in bad conditions thereby reducing cost implication to the government.

3.1.4 Non-implementation of planned activities

Every year, the DoR through its nine ROs carries out various monsoon restoration works which require immediate action. As per standard practice, the DoR releases Nu. 3.00 million at the beginning of every FY. The overall monsoon restoration budget is kept with DoR, which is distributed among ROs after verification by monsoon assessment teams and approved by Departmental Coordination Committee (DCC) depending on the extent of damages.

During the FY 2017-18 as per the DCC verification report of monsoon damages, a total of Nu. 87.24 million was approved and distributed to the ROs for restoration of permanent structures. The budget distribution is as shown in the Table 3 below:

Sl. No.	RO	Approved Budget (Nu. in million)
1	Lobeysa	23.575
2	Phuentsholing	7.200
3	Thimphu	4.830
4	Tingtibi	12.888
5	Sarpang	13.191
6	Trongsa	3.749

7	Lingmethang	7.059
8	Trashigang	5.730
9	Samdrupjongkhar	9.025
Total		87.247

As seen in Table 3, RO Lobeysa received the highest budget for monsoon restoration works amounting to Nu. 23.57 million while RO Trongsa had received the lowest amounting to Nu. 3.749 million.

The RAA's analysis on the planned activities against the executed ones based on approved structure lists from monsoon verification report and structure constructed lists provided by ROs showed that during FY 2017-18, there were unplanned activities carried out resulting in deviation from planned activities as presented in Table 4 and detailed in Appendix V.

Sl.No.	RO	Structure Approved (A)	Structure Constructed (B)	Structure Not Constructed (C)	Percentage of Structure Constructed (B/A)
1	Lobeysa	25	25	0	100.00%
2	Sarpang	40	38	2	95.00%
3	Thimphu	6	3	3	50.00%
4	Phuentsholing	16	3	13	18.75%
5	Tingtibi	18	15	3	83.33%
6	Trongsa	6	0	6	0.00%
7	Lingmethang	10	2	8	20.00%
8	Trashigang	12	8	4	66.67%
9	Samdrupjongkhar	22	10	12	45.45%
Total		155	104	51	67.10%

As transpired from Table 4, the DoR had planned 155 monsoon restoration structures during 2017-18, out of which 104 structures were constructed constituting 67.10% of planned activities, thereby 51 structures remained unexecuted resulting in under achievement of planned targets by 32.90%. RO Lobeysa shows 100% achievement in terms of construction of approved structures followed by RO Sarpang with 95% and RO Tingtibi with 83.33%. RO Trongsa could not construct all six approved structures.

On further verification, it was observed that several unplanned activities were carried out from the approved budget as shown in Table 5 and detailed in Appendix VI:

Sl.No.	RO	No. of Structure	Amount (Nu. in million)
1	Sarpang	4	1.382
2	Thimphu	1	0.201
4	Phuentsholing	18	5.217
5	Tingtibi	4	1.650
6	Trongsa	36	6.934
7	Lingmethang	1	1.947
8	Trashigang	3	0.995
9	Samdrupjongkhar	4	0.901
Total		71.00	19.227

As shown in Table 5, 71 structures were constructed without approved budget constituting 45.81% of the approved structures. RO Trongsa had carried out the highest number of unplanned activities with 36 structures not having approved budget. The actual expenditure

incurred by RO Trongsa for such adhoc monsoon restoration structures was Nu. 6.934 million, which was 84.96% more than the approved budget. RAA noted that change in the priority of the activities during the time of implementation led to huge numbers of ad-hoc schemes. The RAA attributes ad-hoc activities as one of the main reasons for non-implementation of approved structures indicating that proper planning and prioritisation of monsoon restoration works have not been carried out. Such practice could lead to higher cost of maintenance in the future.

The DoR responded that sometime monsoon season gets prolonged beyond normal expected time and damages to the roads continue even after assessments. This has resulted in change in priority and reallocation of the fund which leads to not only the change in location but also the budget amount as different locations call for different remedial measures with varying estimates.

While the RAA notes the uncertainties involved in road maintenance works, the DoR should ensure that all restoration activities prioritized and approved must be implemented as per plan. However, in case of unplanned activities or change in priority, the DoR should institute a system wherein prior approval must be obtained from the DoR before executing the activities by the ROs.

3.2 Management of road maintenance works

3.2.1 Timely periodic maintenance of roads not carried out

As per the Road Maintenance Manual 2005, every stretch of road with 25mm thick, resurfacing is normally due for the next resurfacing in 4 to 5 years or may be lesser in extreme climate areas. The DoR through its ROs strives to extend roads life through maintenance and pavement preservation techniques.

The RAA noted that the practice of periodic maintenance is untimely and has led to further deterioration of unattended roads. In absence of comprehensive records on periodic maintenance, such as year of construction and records on maintenance with the department, the RAA estimated backlogs in roads resurfacing with estimated fund required based on available information. The RAA worked out roads due for resurfacing considering that resurfacing is normally done every 4-5 years and on the assumption that no new construction took place during 2013-14 to 2017-18 as presented in Table 6 and Appendix VII.

Table 6: PNH and SNH roads due for resurfacing					
Road Type	Length (in km)	Resurfaced during 2013-18 (km)	Due for Resurfacing (km) (A)	Resurfacing Cost per km (Nu. in million) (B)	Amount required for resurfacing (Nu. in million) (AxB)
PNH	898.88	227.08	671.8	10.01	6,724.72
SNH	794.49	216.94	577.55	7.41	4,279.65
				Total	11,004.36

Note: PNH excluding 504.2 km of North East West Highway (NEWH)

As shown in Table 6, 671.80 km (74.74%) of PNH and 577.55 km (72.69%) of SNH are due for resurfacing that would require an estimated budget of Nu.11,004.36 million for entire length of PNH and SNH to be resurfaced in the country. The RAA also noted that the annual

coverage for periodic maintenance works was low with 25.26% and 27.31% for PNH and SNH respectively.

Despite road maintenance works being recognized by the DoR as an important aspect of maximizing the value of capital funds invested in the road network, maintenance is often challenged and neglected due to huge maintenance cost. The existing trend of periodic maintenance especially for SNHs had resulted in further deterioration of roads quality to the extent that the roads need to be reconstructed as observed during the RAA's field visits.

The RAA is of the opinion that government gives low priority in terms of budget allocation for periodic maintenance. Additionally, the ROs did not have proper records on periodic maintenance such as year of road constructed and records of resurfacing works over the period and more so, information maintained were either incomplete or inadequate. The RAA observed that improper handing taking between the outgoing and incoming officials as the main reason for non-maintenance of information indicating negligence on the part of the official in-charge. Nevertheless, Pemagatshel sub-divisional office under RO Samdrupjongkhar had maintained satisfactory records on periodic maintenance. The resurfacing record included the year of initial construction and resurfacing details years wise along with chainage as provided in Table 7.

To highlight a case for periodic maintenance work, Tshelingkhor Khothakpa SNH (36 km) was constructed in 1979 and the DoR had not carried out resurfacing works for the entire stretch of the roads even after a lapse of 4 decades. The details of resurfacing works done on the road are presented in the Table 7.

Table 7: Summary of resurfacing works on Tshelingkhor Khothakpa SNH									
Year	Chainage/Location in km								
	1-7	5-6	7-11	11-16	12-13	16-22	22-28	28-34	34-36
1998									
2000									
2003									
2004									
2011-12									
2014-15									
2015-16	1-6 Km								
2017-18									

As seen from Table 7 and as per records made available, periodic maintenance on the above road was first carried out for 7 km (Chainage 1-7 km) of the total length of 36 km in 1998 after a lapse of 19 years from its construction. A total road length of 8 km on chainage 22-28 km and 34-36 km was never resurfaced during the last 40 years. Thus, it is evident that since inception of road, resurfacing works for the entire stretch of the roads was not properly planned and carried out. The RAA observed the road was in a poor condition wherein reconstruction is required. The cost for reconstruction of roads is estimated at Nu. 12.19 million/km of road including base course, black topping and drainage.

Similarly, there could be other roads in the country that are in dire need of resurfacing/reconstruction. In absence of proper records, the RAA could not carry out detailed analysis of all roads as planned.

Generally, proposal for periodic maintenance of roads is based on institutional memory and resurfacing of the roads largely depends on available budget. The unattended roads will increase the length of national highways that are in poor condition. This situation if not checked could entail more resources to undertake periodic maintenance works. Thus, with current funding levels, the roads in the country will continue to deteriorate, which will result in increased cost of restoration. In other words, the worse the condition of the road, the more costly it is to restore to the optimal condition.

The DoR agreed with the finding and reiterated that the backlog of road resurfacing is increasing every year without consistent and professional maintenance. Without timely maintenance, roads will continue to deteriorate, requiring significant repairs or even replacement after certain period which would be too expensive and taxing on the Government exchequer.

The DoR also expressed lack of budget to be one of the main reasons for not being able to carry out timely periodic maintenance.

While the RAA notes the response provided by the DoR, considering the increasing length of unattended roads in the country, there is a need to ensure compliance to requirements and prioritisation of periodic maintenance based on comprehensive data.

3.2.2 Undue delay in the restoration of monsoon damaged structures

Presently, the DoR does not have a written protocol on reporting of incidences on monsoon damaged road structures and approval from the management. However, as per standard practice, in case of emergency situations, the first contact point is the sub-divisions and section offices. Any damage/blockage and issues related to the roads are immediately informed to the sub-division/section office who then intimates the incident to the RO and subsequently to the DoR for necessary accord and release of budget. The response to such restoration/rectification by all stakeholders should be efficient in order to reduce the extent of damage to the sites which otherwise would have huge cost implication if not restored on time.

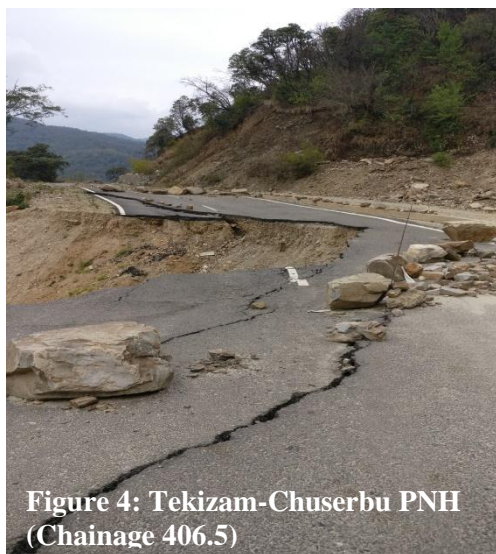


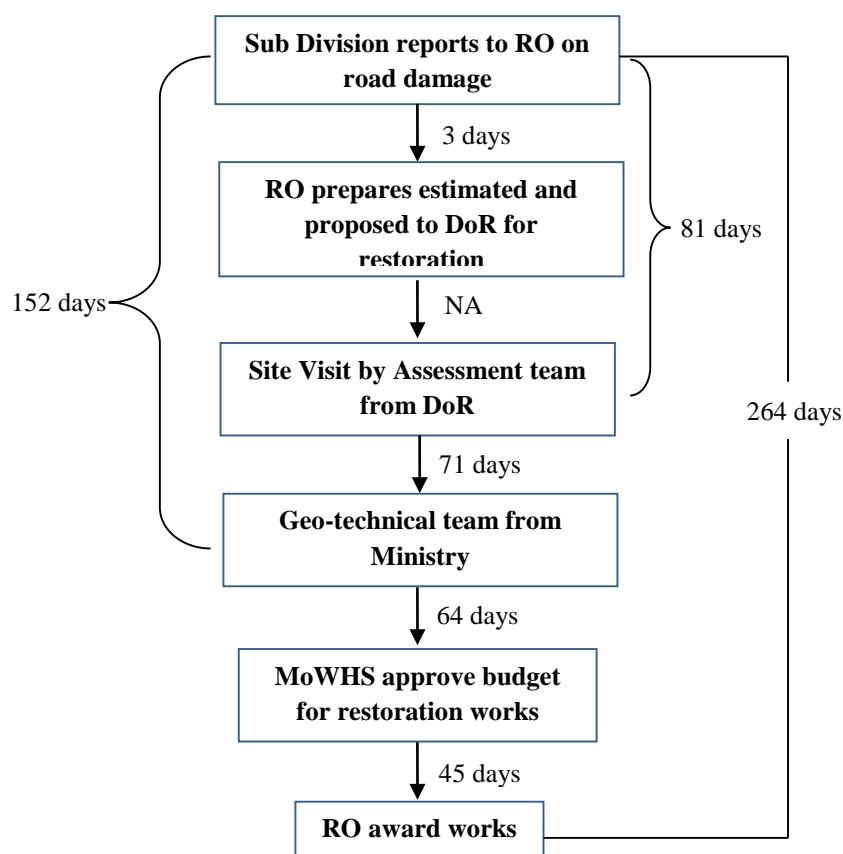
Figure 4: Tekizam-Chuserbu PNH (Chainage 406.5)

During the field visits to various roads, the RAA observed that some structures along the PNH and SNH were damaged and some were in critical conditions. In absence of proper records on monsoon emergencies maintained by the ROs, the RAA only took a case to study the efficiency in restoring monsoon damages in RO Lobeysa.

To explain the case, during RAA's field visit under RO Lobeysa, along the Tekizam-Chuserbu PNH under Nobding sub-division at chainage 406.5 km, the carriage width of 7.5m of the road measuring approximately 8m length of road was washed away during monsoon. The RAA examined the time taken to restore the site considering it being a PNH connecting

central and eastern dzongkhags. As per information furnished to the RAA, the following series of events took place and the total number of days taken to commence the restoration works following due process as shown in Figure 5.

Figure 5: Flow chart showing time taken in awarding monsoon restoration work for Tekizam-Chuserbu PNH at chainage 406.5km under RO Lobeysa



As shown in Figure 5, the sub-division through the site engineer had reported the damage to the RO on 2 August 2018, within three working days of the damage. Accordingly, the RO proposed to the DoR for restoration along with detailed estimate of structure amounting to Nu. 5.70 million. The date of proposal sent by the RO to the DoR was not made available to the RAA.

The assessment team from the DoR visited the site on 22 October 2018, after 81 days of the damage reported. However, the assessment team could not finalize the structure as there was a need for a geotechnical assessment. On 1 January 2019, a geotechnical engineer visited the sites after 152 days. Based on the geotechnical assessment report, it was finalized to construct a gabion wall of varying length ranging from 5m to 30 m and height from 1m to 8m with the revised estimated amount of Nu. 3.65 million. Subsequently, the budget for the same was approved and released to RO Lobeysa on 6 March 2019 after 64 days of Geotechnical engineer's visit to the site. Soon after the budget was received, the RO tendered the work abiding the existing revised Procurement Rules and Regulations (PRR) 2015 and awarded the work to M/s Khamsum Wangyel Construction, Wangduephodrang on 20 April 2019.

A total of 264 days was taken to complete the due formalities from the date of damage till the date of award of work translating to about 9 months. As apparent from flowchart, the

majority of delay was taken for assessment and geo-tech's visit to the site and finalizing the structure, followed by release of budget from the Ministry of Finance (MoF).

Considering the damage occurred in a PNH, which is the main connectivity between the regions, the RAA opines that the time taken for restoration works was unreasonable. Such delays in the long run will have huge impact on the cost of restoration due to further deterioration of the structure with the passage of time.

The DoR responded that generally, the ROs get about five to six months for implementation of monsoon restoration works which is usually a comfortable time given the amount of budget and the complexity of the works. However, the situation for FY 2018-19 was different as the Government released the budget in two parts. The release of second part of the budget was received only towards mid-February, despite assessment completed by the end of October, delaying the implementation.

Since majority of delays happened during field assessment by the DoR followed by release of budget from the MoF, there is a need for the DoR to study the current practice for further enhancement of efficiency and effectiveness in monsoon restoration works.

3.2.3 Price escalation foreseen due to non-restoration of road structures on time

The DoR has adopted monsoon restoration works prioritisation methodology based on certain criteria to select roads for rehabilitation and restoration works damaged by monsoon and other natural calamities. The ROs conducts inspection on the condition of the roads and prepare cost estimates for restoration and maintenance works. Based on the proposal by the ROs, assessment teams from the DoR are formed and deputed to evaluate the conditions of the monsoon damages and to see which roads are critical and in urgent need of repair. The assessment team comprises of engineers, accounts personnel, officials from the Policy and Planning Division (PPD), and representatives from the ROs. The assessment team classifies roads into three categories considering the criticality of the damages caused to the road, **P1: Traffic cannot ply, P2: Traffic ply with caution and P3: No traffic disturbance** but need to prevent further damages. Priority for restoration of monsoon damages is accorded to P1.

However, not all proposed structures for restoration are approved by the Departmental Coordination Committee (DCC) mainly due to lack of fund. The RO wise budget proposed and approved for restoration of structures due to monsoon damages during 2017-18 are presented in Table 8 and detailed in Appendix VIII:

ROs	Proposed (Nu. in million)	Approved (Nu. in million)	Difference (Nu. in million)
Lingmethang	8.738	7.059	1.679
Lobeysa	26.245	23.575	2.671
Phuentsholing	21.573	7.200	14.373
Thimphu	6.383	4.830	1.553
Trashigang	22.190	5.730	16.460
Trongsa	8.968	3.749	5.219
Samdrupjongkhar	23.120	9.025	14.095

Sarpang	24.770	13.191	11.579
Tingtibi	29.329	12.888	16.441
Total	171.316	87.247	84.070

The review revealed that during the FY 2017-18, only 50.93% of the proposed budget was approved for restoration of damaged structures. The highest budget for monsoon restoration was approved for RO Lobeysa followed by Sarpang and Tingtibi. The lowest budget was approved for RO Trongsa.

The RAA learned that the DCC is the highest authority in prioritisation and approval of budget for monsoon restoration works. Prior to 2017, the practice of allocation of fund to the ROs was based on percentage in order to ensure that all ROs receive certain share from the available resources. Thus, the authority to select structures for restoration remained with respective ROs as per the severity of the damaged structures and availability of fund. Nonetheless, from FY 2017-2018 onwards, the DoR, recognising the need to bring more clarity and fairness in budgeting process, started allotting budget for specific activity (against name of the structures, chainage and road) to curtail misuse and promote value for money.

On verification of assessment reports on monsoon damages for the FY 2017-2018, it was noted that out of nine ROs, structures categorization (P1, P2 & P3) was carried out for six ROs for the purpose of budget approval. Although monsoon structures categorization were not carried out for ROs Lobeysa, Phuentsholing and Thimphu, budget were allocated for restoration works. As per the assessment report, ROs Lobeysa, Phuentsholing, and Thimphu received Nu. 23.57 million, Nu. 7.20 million and Nu. 4.83 million respectively.

Accordingly, the RAA worked out the proposed and approved structures with categorization for monsoon restoration works for the six ROs. The percentage of approved and rejected structures for monsoon restoration works in FY 2017-18 as per category is presented in Table 9 and detailed in Appendix IX.

Category	Proposed	Approved	Rejected	% Approved
P1	137	102	35	74.45%
P2	70	2	68	2.86%
P3	55		55	0.00%
Total	262	104	158	39.69%

As shown in Table 9, the assessment team categorized 137 structures as P1, 70 structures as P2, and 55 structures as P3. A total of 262 structures were submitted for prioritisation and approval by the DCC. In total, 39.69% of damaged structures were approved for reconstruction. From the analysis of monsoon restoration works, the RAA noted that the DCC approved 74.45% of P1 structures and 2.86% of P2 structures. The P3 category was not approved due to lack of fund.

The RAA opines that non-restoration of assessed structures under P1 and P2 category on time may have higher cost implication to the government. The RAA, in anticipation of price escalation of restoring the backlog of damaged structures, requested the ROs to provide details on the damaged structures that are further deteriorated over the years due to lack of fund. However, neither the ROs nor the Maintenance Division, DoR had maintained such records.

In absence of such records, the DoR cannot authenticate the degree of structures deteriorated and price escalated over the time. Subsequently, the decision makers and budget approving bodies are not informed on such issues impeding effective maintenance works and will result in huge cost implication to the government in the long run.

As such, it is important for the DoR to conduct analysis on cost escalation/implication to the government by maintaining proper records of prioritized structures that could not be restored and such matters can be taken up with the MoF for appropriate action and informed decision making.

The DoR agreed with the finding and explained that the RAA's recommendation requiring the DoR to maintain the rate of deterioration of the unattended structures is forward looking and it will help DoR to justify more objectively to the MoF for allotting more funds. The DoR will work on trial basis monitor the unattended structures in terms of extent of further damages and accordingly the increase in cost.

As agreed, the DoR should maintain proper records on damaged structures and should work out the anticipated cost escalation if these structures are not restored on time.

3.2.4 Lack of standard protocol for relevant agencies in carrying out emergency works

During monsoon season, uncertain tropical cyclone with heavy downpour brings massive destruction to the roads and roadsides infrastructures. In restoring monsoon damages, every year the government invest substantial amount in the construction of road side permanent structures, clearing of slip/blocks/blasting and pavement of roads. The total cost incurred during the 11th FYP on monsoon restoration works was Nu. 905.52 million.

Despite the requirement under Section 6 of the Road Act of Bhutan 2013, the RAA noted that there is lack of formal institutional arrangement for a coordination and collaboration amongst relevant agencies such as Royal Bhutan Police (RBP), Road Safety and Transport Authority (RSTA), local authorities and Department of Disaster Management (DDM) for effective delivery of services. Absence of such system invites public criticism on the service delivery including risks of accidents from falling boulders and landslides.

At present, coordination among agencies is based on personal relationships. Nevertheless, information on roads blocks is now made available on social media, mostly on Facebook. Most of the times information is received from commuters/travelers on road blocks. During monsoon and emergency situations, the DoR verbally request RBP to control the traffic. Despite the nature of works that requires coordination and collaboration among relevant agencies, the management did not provide satisfactory evidence that the issues or challenges were discussed in appropriate forum.

The RAA held discussion with regional chief engineers and relevant officials on the need of having guidelines for such situations. The RAA was provided with positive feedback by the regional chief engineers on having a guideline for a coordinated approach for emergency situations because it will not only delineate clear roles and responsibilities of all stakeholders but inculcate a performance-based culture with accountability mechanism at all levels.

Existence of a guideline/SoP for a coordination and collaborated approach among relevant agencies will ensure that their activities are communicated appropriately especially during emergency situations.

While agreeing with the finding, the DoR informed that the having a guideline/SOP, delineating clear roles and responsibilities of the stakeholders, will help better coordinate, especially during emergency, and deliver better services to the public.

The DoR should develop a guideline/SoP for effective coordination and communication among relevant stakeholder during emergencies.

3.2.5 Road resurfacing works without components for construction of drain

A proper drainage system is important in the construction of all types of roads. Proper drainage system along the road aids in channelizing uninterrupted flow of water and reduce damages to road and infrastructures. Section 4.1 of the Road Maintenance Manual 2005, clearly states the importance and objectives drainage system along the roads as:

- ✓ intercept and remove water on and under the road way;
- ✓ prevent inconvenience to traffic; and
- ✓ ensure that the road pavement and its structures are not unduly weakened or damaged.

During the FY 2013-18, DoR incurred Nu. 684.32 million on resurfacing works. The field visits revealed that most of the blacktopped roads did not have proper drainage either in concrete or earthen drain especially in SNH and GC roads as evident from Figure 6.

Figure 6: No proper drainage along the roads



The RAA, during its field visits, observed that roads without proper drains are deteriorating faster as opposed to roads with good drainage facilities. Due to poor drainage conditions at site, the RAA noted that flow of water has caused the damages such as scouring of WMM/shoulders/drains, loss of pavement/surface materials, softening of sub grade/soil formation resulting failure of pavement and causing landslides on both cuttings and embankments.

Considering the damages caused in the absence of drains, the RAA emphasized on verifying the budget proposal submitted by the ROs and noted that there is neither a separate budget proposed nor included in the details of periodic maintenance works for the construction of drains. The RAA learned that resurfacing budget does not include component for drains. For budgeting purpose, construction and maintenance of drains are booked under improvement of roads which is a different activity but under same object code (OBC).

Although a few instances were noted on proposal of improvement of roads, such proposal does not solely include the construction of drain but includes other road side permanent structures like breast wall, retaining wall, gabion wall, boulder barrier, and log barrier. The RAA noted that all ROs have similar understanding and practice in proposing the budget without budget component for construction/maintenance of drains.

Drainage is the most important aspect in road construction and maintenance. Proper construction and maintenance of drainage helps prolonged performance of the road pavements. Thus, absence of cost component for drains in maintenance budget may result in reducing the economic life of the road including forming potholes and deterioration of road quality.

The DoR in its response stated that MoF considers drain construction, culvert extension, french drain construction as improvement of road and such activities should only be proposed under the head of road improvement. Nonetheless, the DoR will continue to propose budget and justify the importance of having drains.

The RAA emphasises the importance of having proper drainage facilities in reducing further deterioration of roads and extending the economic life of roads. Thus, the DoR should ensure to include component of construction of drains in maintenance budget.

3.2.6 Lack of comprehensive road maintenance database

The road database is a prerequisite that forms the very basis for all successive reviews and plans. The Maintenance Division, DoR is responsible to collect road condition data, update road-resurfacing data and compile traffic data. With time and changing demand, it proves crucial to have complete and instant access to information on road such as conditions, prevailing nature, maintenance works undertaken with specific locations.

The RAA observed that the DoR had not developed a comprehensive information management system to enable efficient highway operation and maintenance. The inadequacies observed pertaining to road maintenance database are discussed below:

- i. Despite the requirement as per Section 178 of the Road Act of Bhutan 2013, DoR lacks critical information on road including date of construction, information on life span, conditions of roads, and schedules for maintenance. The road database made available contained only information on the name of the road, location, and length of road but missed out critical information such as year of construction, surface types and measurements, critical areas prone to landslides, types of maintenance carried out and due year for periodic maintenance. Moreover, there was no date on which the list was prepared.
- ii. Additionally, there is no practice of updating inventory on a regular basis on the maintenance activities carried out as per road chainage in the Information Management System. It was also noted that record formats used by the ROs were not uniform and lacks completeness of information.
- iii. Records on weekly maintenance activities, monthly reports, quarterly and annual records were not maintained as required. ROs documents and files are generally

limited to information for last 2-3 years. The ROs record retention schedule is outdated contributing to ROs poor record keeping practices and hampering ROs planning and evaluation efforts. The RAA noted that RO's officials in general have a practice of maintaining records from the time they took charge of the office indicating lack of proper handing taking process of officials during transfers.

- iv. In absence of complete information, the RAA could not perform the analysis on historical data to determine what routine or preventive maintenance should have been performed since the road's inception, and what actual treatments have been applied. More so, due to lack of comprehensive database, the ROs themselves could not identify when a road was resurfaced last, when it was first constructed, how many times it was resurfaced, or a comprehensive history of all work done on a particular stretch of road. The RAA is of the view that there is value in maintaining historical data so that analysis can be performed (trend analysis) and forecast maintenance models for national highways, based on actual experience.
- v. Further, the RAMS does not have information that was aimed by the system in its initiation such as valuation of roads and bridges, economic lives of the roads and bridges, replacement or rebuilding cycles of roads and bridges, traffic details and structure specifications. Further, the system is not able to track recurring activities on monsoon restoration and provides little or no guidance on the particular needs of the road networks and its users.
- vi. It is imperative that the DoR prepares and maintains updated road database describing important features of all types of roads in order to have accurate and complete information on road structures to support decision. Absence of critical and comprehensive information on roads could inhibit management's decisions concerning planning and budgeting for road maintenance activities.

The DoR responded that they are in process of developing a comprehensive road asset management system through the assistance of the World Bank. The system will capture all the information about a road including its condition and existence of different road component which will be regularly updated. The system will help provide information on the condition of different road asset helping engineers plan, review, propose and carryout timely interventions.

While noting the initiative to develop road asset management system, the DoR should further ensure that this system captures all necessary data on roads for making informed decisions related to road maintenance works and the system is fully implemented in the field.

3.2.7 Lack of complain management system on roads conditions

The ROs and the DoR do not have a system for receiving complaints against conditions of roads such as potholes, defective drains, damaged pavements, corrugated road, etc. from various sources like integrated call centre hotline, media, passengers, and other government departments. As a result, there is no database maintained to analyze the complaints by nature and compile statistics on a regular basis for review and necessary actions.

In RAA's view, complaints on road maintenance serve as an important source of public feedback on the effectiveness of the DoR's services. As a performance indicator to be reported in the operation of maintenance works, the existence of a complaint statistics that is complete and reflect all aspects of the DoR's maintenance work is vital. Therefore, the DoR needs to review its way of reporting complaint statistics to road users, government and other stakeholders.

Such practice would ensure an efficient and smooth process of inspection and registration of public complaints, preparation of maintenance estimates and consequent implementation of maintenance plans of roads, in order to prolong their usefulness and lifespan.

DoR agreed on not having an established system of receiving complaints on condition of roads from road users and general public. However, the DoR expressed that the Department does not feel the need to institute a formal complaint system as they have been receiving complaints through mainstream media and social media on the different cases related to roads.

3.2.8 Irregularities noted in hiring of machineries/equipment

Beginning of every new FY, the ROs hire machineries/equipment through formal invitation of Notice Inviting Tender (NIT) to implement road maintenance works for both planned and ad-hoc activities. This is in line with the provision of revised PRR 2015 to ensure transparency, uniformity, fair and equal access to all hiring agencies and achieve economy and efficiency in the procurement of goods, works and services.

The review of hiring of machineries and equipment for monsoon restoration works revealed some inadequacies and lapses as discussed below:

- i. Examination of evaluation reports of hiring of machineries/equipment for the FY 2017-18 disclosed varying practices in hiring of machineries/equipment amongst the ROs. While some ROs have practice of inviting bids at the same rates for all dzongkhags under the ROs jurisdictions, some ROs invite bids with separate rates depending on the location of the sub division and section offices. For example, ROs Lobeyasa, Sarpang, Samdrupjongkhar and Tingtibi invite bids for machinery hiring irrespective of locations of sub-division and section office. Whereas ROs Lingmethang and Thimphu invite different bids for sub-division and section office.
- ii. The review revealed that the practice of hiring machineries at same rates for all sub divisions and section offices resulted in untimely and non-deployment of machineries during emergencies. The RAA noted instances where machineries could not be deployed by bid winning hiring agency. For example, during FY 2017-18, RO Sarpang spent a total of Nu. 80.46 million on hiring machineries and upon review, it was noted that Nu. 40.27 million which was spent on machineries hiring was not supported with deployment orders indicating direct award of works. RO Sarpang could not provide evidences establishing that works were executed by bid winning hiring agencies.
- iii. ROs invite bids for hiring of machineries/equipment in compliance to the revised PRR 2015. However, on examination of comparative statements, deployment order, vehicle

maintenance register, and payment bills, it was noted that ROs Lobeysa, Lingmethang and Thimphu had hired machineries/equipment directly from firms who had not participated in the bid. The machineries/equipment hired directly is detailed in Appendix X.

- iv. Further, instances were noted where RO Lobeysa awarded works to hiring firm despite not being the lowest bidder as per the comparative statement, the details of which are provided in Appendix XI. Such practice defeats the objective of ensuring transparency in government procurement system which might result in unfair award of contracts.
- v. Vehicle/machinery log sheet records were also maintained in different formats. Formats requiring signature of operator, supervisor and site In-charge for the purpose of making payments were found incomplete. Such varying practices indicate weak internal control system and lack of due diligence in verifying the documents by the site engineer, account personnel and drawing and disbursing officer for bill payments. For example, in RO Sarpang, a sum of Nu. 38.90 million was found to be released on the account of hiring of machineries/equipment without the signature of operator in the log sheet as detailed in Appendix XII.
- vi. While being a part to the tender committee, it is a pre-requisite for all members to declare their conflict of interest prior to their participation in the bidding process. This is to ensure that there is no biasness, favoritism, nepotism or any other kind of discrimination to any of the participating bidders. This requirement is clearly stated under Clause 3.1.1.1 and 3.1.2.1 Chapter 3 of the revised PRR 2015, and Clause 3.3.25, Chapter 3 of Civil Service Values and Conduct of Bhutan Civil Service Rules and Regulations (BCSR) 2018.
- vii. However, on selective verification of the evaluation report of hire of machineries/equipment of ROs Sarpang, Samdrupjongkhar, Lingmethang, Lobeysa, Tingtibi and Thimphu for the last two FYs 2016-17 and 2017-18, it was noted that there were varying practices of declaration of conflict of interest among the ROs. In some ROs, only the member of opening committee declare conflict of interest whereas in some other ROs only the member of evaluation committee declares the conflict of interest as detailed in Appendix XIII. Generally, no member of the awarding committee of ROs had declared the conflict of interest. With the exception to RO Lobeysa, during the FY 2017-18, all members of the committee in other ROs had either declared the conflict of interest in opening or evaluation of bids during the FY 2016-17 & 2017-18, which is in contradiction to the requirement of separate member in all the committee for the purpose stated thereon.
- viii. These inadequacies indicate ineffective internal control in the hiring of machineries/equipment for monsoon restoration works. Absence of proper internal control may result in ineffective delivery of services and non-achievement of value for money. Bringing in uniformity in practices across all ROs would help in achieving the economy and effectiveness in the hiring of machineries/equipment as a whole.

The DoR in its response explained that having the rates at RO level and at sub-divisional level have its own advantages and disadvantages. However, the Department agreed the importance to have uniform system within ROs and therefore, they will seek the view of the ROs and make it uniform depending on the feedback from ROs.

Further, the DoR agreed to send out an order requiring all machinery logbooks to be properly authenticated by the site in-charge and the operator at least.

Regarding the declaration of conflict of interests of different committees in machinery hiring procurement, the norms as stipulated in the PRR 2019 will be strictly followed.

As agreed, the DoR should bring in uniformity in practices and should also strengthen internal control of hiring machineries/equipment across ROs.

3.3 Implementation of road maintenance activities

3.3.1 Road Pavement does not meet the prescribed standard

The DoR has the responsibility to design the road standards and ensure compliance to the prescribe standards while construction and maintenance of roads. As per Section 219 of the Road Act of Bhutan 2013, *'The standards for all types of roads shall be developed by the Department and from time to time, it shall be required to conduct studies to improve the design standards keeping in view of new technologies and methods to enhance safety, streamline construction and improve capacity by providing positive separation at all times between traffic, equipment, and workers on road construction projects'*.

During the field visits, the RAA observed that DoR and ROs did not comply with prescribed standards pertaining to road pavements, carriage width, formation width, road cross fall/cambers, and drains.

The minimum standard of pavement requirements for PNH, SNH and GC roads are AC 40mm, and AC 30-40mm as presented in the Table 10. Based on the field visits, the details of road pavements in various roads not meeting the prescribed standards are presented in Table 10.

SN	Name of the road	Length of the road (km)	Regional Office	Pavement Requirement (mm)	Site condition
1	Choekorling GC Road	24 km	Nganglam Sub-Division, Samdrupjongkhar	AC 30-40 mm	8 kms Premix Carpeting 25 mm
2	Dewathang-Samdrupchoeling SNH	50 km	Dewathang Sub-Division, Samdrupjongkhar	AC 40 mm	6.5 km of AC 40
3	Martshala GC road	13 km	Dewathang Sub-Division, Samdrupjongkhar	AC 30-40 mm	AC 25 mm
4	Tshelingkhor-Kothakpa SNH	36 km	Pemagatshel Sub-Division, Samdrupjongkhar	AC 40 mm	5.3 km of AC 40 mm constructed during FY 2014-15 on 27-34 km chainage. Remaining road was found premix 25 mm.

5	KKTY SNH	37.01 km	Pemagatshel Sub-Division, Samdrupjongkhar	AC 40 mm	Base course constructed in 2007-08
6	Khengkhar GC Road	25 km	Lingmethang Sub-Division, Lingmethang	AC 30-40 mm	Premix Carpeting 25 mm
7	Gangola-Lhuntse SNH	65 km	Autsho Sub-Division, Lingmethang	AC 40 mm	20 mm Premix Carpeting
8	Gelephu-Sunkosh PNH	107.05 km	Sarpang and Tsirang Sub-Division, Sarpang	AC 40 mm	87.05 km of 25mm AC, 2.8 km of 25mm AC and 25mm premix carpeting, 14.2 km of 25mm premix carpeting, and 3 km of 30mm AC and 25mm premix carpeting
9	Gelephu-Trongsa PNH	48 km	Batasey Sub-Division, Sarpang	AC 40 mm	10 km of 25mm AC and 38 km of 25mm premix carpeting
10	Wakleytar Bridge - Chanchey (Tri-junction) PNH	20 km	Tsirang Sub-Division, Sarpang	AC 40 mm	25mm AC
11	Sunkosh - Dagana SNH	86 km	Tshendagang Sub-Division, Sarpang	AC 40 mm	25mm Premix carpeting
12	Reserboo - Mendrelgang DR	11 km	Tsirang Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting
13	Damphu-Lobisotey DR	13 km	Tsirang Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting
14	Tshachu Road DR	1.8 km	Batasey Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting
15	Drujegang Road DR	9 km	Tshendagang Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting
16	Drujegang-Balung Road DR	26.1 km	Tshendagang Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting
17	Dagapela Old Dungkhag Road DR	0.8 km	Tshendagang Sub-Division, Sarpang	AC 30-40 mm	25mm Premix carpeting

As transpired from Table 10, almost all roads visited by RAA did not meet the prescribed standards on road pavement for SNH and GC roads. Most of the roads pavements were of 25 mm premix carpeting against the requirement of AC 30-40mm for SNH and GC roads. The current road pavements especially SNH are not suitable for existing traffic loads and pavements made not as per standards result in untimely deterioration of roads.

As a case in point, mining sector has a huge impact on the road infrastructure under RO Samdrupjongkhar with significant volumes of goods being transported on daily basis using the roads. Besides local commuters, school bus, passenger transport buses, military vehicles, the main user of the Dewathang-Samdrupchoeling SNH are heavy-duty trucks transporting coal and gypsum. The road pavement design for this road is found to be not suitable for the present traffic where state mining and public limited mining companies carry in excess of the standard road carriage weight of 18 MT. Further, there are three bailey bridges on the road with carrying capacity of 18 MT each, which are frequently used by the heavy transport vehicles.

Similar is the road situation in Tshelingkor-Khothakpa SNH and Khothakpa-Khar-Tsebar-Yurung (KKTY) SNH under Pemagatshel Sub Division office, RO Samdrupjongkhar.

Likewise, the minimum requirement of the carriageway for PNH and SNH are 7.50m and 5.50m respectively. During the field visit, the road width in some stretches in SNH was found to be between 3.0m to 4.0m which is in deviation from the standard and the carriage widths are also maintained throughout the road as per standards.

Maintaining proper road shoulders acts as debris collection and prevent from direct falling of muck to the pavement and causing damage to the road. As per the prescribed standard, SNH should have road shoulder of 1m. In contrary, it was observed that road shoulders were not properly maintained as per standard and as a result the road formation width of 8.50 m for SNH was not maintained.

In addition, road cross fall/camber was also not properly maintained in the road visited by the RAA. As per the required standard, 2-4% of cross fall must be maintained to avoid water formation and remaining immobile on the road. Yet, instances were noted where roads were submerged under water especially during monsoon.

Roads conditions not meeting the prescribed standards require immediate attention to protect the structural integrity of the road. The RAA was informed that the reason was that most roads were constructed prior to the introduction of roads classification and standards.

Despite having prescribed standards for road designs, construction and maintenance, the DoR still continues to maintain and improve road infrastructures including resurfacing, and drain works on the existing roads without complying with the standards. Non-compliance to prescribed standards will accelerate the depreciation process of the roads leading to wearing and tearing of road pavement and ultimately costing the government exchequer on account of periodic maintenance.

The DoR explained that the discrepancies between the standard and the actual conditions at site are because of the fact that standardization happened very recently whereas construction of the most of the roads were completed long time back. The DoR's idea of standardizing different categories of roads is to serve more as a yard stick for future guidance so that they achieve the standards gradually rather than to fulfill the standards right away. While the DoR aspires to upgrade the existing roads in terms of width, pavement thickness, drainage requirement to the set standards, their efforts are often impeded by the budgetary constraints.

The RAA notes the response provided by the DoR. Nonetheless, the DoR and ROs should ensure effective implementation of road works as per prescribed standards so as to have quality roads ensuing less maintenance cost.

3.3.2 Deterioration of Wet Mix Macadam due to non-pavement of roads on time

The construction of Tsebar-Mikuri-Durungri SNH under Pemagatshel Sub-Division Office, RO Samdrupjongkhar measuring 35 km (Ch.20+600 ~ 55+600) was undertaken by Road Network Project-II (RNP-II) with financial support from Asian Development Bank (ADB)

and Royal Government of Bhutan (RGoB). The work was awarded and executed by M/s Marushin Shitaka Construction Company Inc. Japan for a contract amount of Nu. 388.73 million. The project was commenced on 15 February 2012 and completed on 15 August 2015.

During the physical verification on 13 April 2019, it was observed that throughout the Tsebar-Mikuri-Durungri SNH, there were disintegration (wear and tear) of compacted Wet Mix Macadam (WMM) due to plying of heavy vehicles and stagnation of water on the road during monsoon season as illustrated in Figure 7.

Figure 7: Disintegration of WMM on Tsebar-Mikuri-Durungri SNH



The RAA observed that the maintenance for Tsebar-Mikuri-Durungri SNH may entail more resources due to decline in the condition of the road as depicted in Figure 7. As of date of audit, the road was lying without the execution of pavement works for almost four years. Upon assessment of expenditure, it was noted that a sum of Nu. 41.48 million was paid on account of base course works (i.e., for GSB and WMM). Out of which, Nu. 24.29 million was paid for WMM indicating waste of resources. Since the WMM had worn out throughout the road, the RAA, together with RO Samdrupjongkhar, has worked out the cost estimate for re-laying of WMM based on Bhutan Standard Rates (BSR) 2017 (with inclusion of cost index) and estimate based on analyzed rate of FY 2018-19 as provided in Table 11:

Table 11: Detail estimate for laying WMM										
Departmental Estimate based on Consultant's Analyzed Rate (2010-11)					Cost Estimate based on BSR 2017			Cost Estimate based on Analyzed Rate (2018-19)		
Description	Unit	Total Qty.	Rate (Nu.)	Amount (Nu. in Million)	Rate (Nu.)	Amount (Nu. in million)	% Rise	Rate (Nu.)	Amount (Nu. in million)	% Rise
Supply & placing wearing WMM (125mm thick)	Cum	20,025.00	640	12.816	1,853.99	37.126	190	2,207.25	44.20	244.88
Sub-Total			12.816			37.126			44.20	
Add: Cost Index (23.44%)						8.702				
Grand Total			12.816		45.828		258	44.200		244.88

As shown in Table 11, the estimate for re-doing of WMM based on BSR 2017 and analyzed rate of FY 2018-19 would cost Nu. 45.828 million and Nu. 44.200 million representing 258% and 244.88 % of cost increased from initial analyzed rate of 2010-11. Thus, re-laying of WMM would be additional burden to the government exchequer that would exponentially increase the overall cost for the construction of the road.

Therefore, it warrants immediate rectification of WMM to prevent further deterioration of the WMM and accordingly carry out pavement work to minimize maintenance cost.

The DoR responded that they proposed budget to the MoF for blacktopping of the highway and the DoR had received only some amount every year with which blacktopping works are carried out. In current financial year, Samdrupjongkhar is approved with Nu. 10.00 million, with which about 3 km or so can be blacktopped.

Although the RAA recognizes the difficulties in acquiring budget from the MoF, there is a need for the DoR to assess the condition of the roads especially in stretches where WMM had worn out to avoid further damages and accordingly worked out the cost estimate for re-laying of WMM if pavement works on the existing road is not possible.

3.3.3 Inadequacies in geotechnical studies on monsoon restoration works

The process of understanding and working with soil and rock, underground water, site and structural conditions in relation to a construction project is known as geotechnical engineering. Geological investigations play important role in the design, stability and economical construction and maintenance of the roads. Such investigations are aimed at providing full details regarding topography of the area for selection alignment of a road construction, lithological characters of the rocks or soil and the groundwater conditions. Considering the recurrent nature of road maintenance in the country, having geotechnical expertise becomes more important.

Every year during the monsoon season, multiple roads are blocked due to slope failure. The Kuensel issue on 16 July 2019 reported various road blocks due to landslides, falling boulders and flash floods following incessant rain at different locations along 23 PNH since 6 July 2019. The monsoon damages show an increasing trend over the years indicating a need for strategies and measures to minimize the damages. As per RBP's Statistical year book 2018, there were 30 casualties due to poor road conditions such as potholes, sinking roads, landslides and falling boulders.

The RAA noted that the DoR's practice in restoration of monsoon damages is reactive and not preventive. Every monsoon landslide occur damaging road infrastructures which are rehabilitated and restored after monsoon season. Besides minimal bioengineering works, the engineers are limited to using the conventional method like construction of breast wall, toe wall and retaining wall without application of new applicable techniques.

Monsoon restoration works have become recurring in nature without a permanent solution. The details of expenditures incurred in restoration works for monsoon damages in addition to road maintenance budget during 2013-14 to 2017-18 are presented in Table 12.

Table 12: Summary of expenditure on mitigations works during 2013-18

SN	Particular	Nu. in million					
		FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	Total
1	Mitigation Work on Tintalley slide area, Sarpang	0.96	0.24	0.45		0.97	2.62
2	Mitigation Work and slip Clearance Work at Khagochin sinking area, Sarpang	2.49	0.99	5.99	6.49	1.97	17.93
3	Mitigation Work of Chengala slide area on Sunkosh-Daga Road, Sarpang	1.49	0.49	1.49	1.98	1.00	6.45
4	Mitigation Work and slip Clearance Work at Boxcut on	4.95	2.99	5.43	6.49	1.88	21.74

	Gelephu-Trongsa Highway (PNH), Sarpang						
5	Clearance of Land slide area at Ossey on Gelephu-Trongsa Highway (PNH), Sarpang	1.68				3.73	5.41
6	Mitigation Work on Dungjuri & Yudiri (Tgang-Phongmey Road), Trashigang		1.00	0.46		0.99	2.45
7	Hire charges of machineries stationed Rotpashong, Lingmethang	2.84	2.51	2.61	1.99	2.00	11.95
8	Hire charges of machineries stationed at Gathana, Lobeysa	2.92		2.62	2.62	0.01	8.17
9	Mitigation Work at 0-point on Dewathang-Phuntshothang, Samdrupjongkhar			1.49	1.00	1.00	3.49
10	Mitigation Work and hire charges of machineries stationed at Reotala, Trongsa	2.49	2.78	3.00	10.00	5.99	24.26
	Total (in million)	19.82	11.00	23.54	30.57	19.54	104.47
11	Monsoon Restoration Works	130.39	140.60	158.15	206.53	165.12	800.81
	Total (in million)	150.21	151.60	181.69	237.10	184.66	905.28

On an average, an expenditure of Nu. 20.94 million has incurred every year for mitigation and slip clearance works on these critical sites. During the FY 2013-14 to 2017-18, the highest expenditure incurred was for mitigation work and hire charges of machineries stationed at Reotala under the RO Trongsa amounting to Nu. 24.26 million.

The RAA noted that the DoR does not have geotechnical engineers and presently, geological investigation and assessment for road construction and maintenance are carried out by the civil engineers. The DoR engineers have had difficulty evaluating the risk of slope disaster and determining the countermeasures due to lack of experience of slope disaster investigation. Japan International Cooperation Agency (JICA) Report 2016, titled “*The project for master plan study on road and slope management in Bhutan*” also reported lack of geologists/geotechnical engineers to evaluate slope disaster risk. At the same time, the report highlighted that inspection and preventative maintenance for preventing slope failure has not been conducted by the DoR. Upon the recommendation from the JICA, the DoR has started to maintain a disaster history sheet that contains information on road slope failures for some critical sites to come up with appropriate counter measures.

Presently, the department and ROs relies on the experience of field supervisors/engineers to make judgment. The RAA observed that the ROs rely on visual inspection to determine work needs. Field supervisors inspect road conditions and recommend the appropriate treatment based on their experiences and knowledge of monsoon damage restoration. While field supervisors are likely to be knowledgeable about road repair techniques, the lack of proper studies in areas with recurrent damages may result in treatment and expenditures that are inappropriate and does not ensure value for money.

The DoR responded that the geotechnical section under Design Division in HQ is staffed with only two geotechnical engineers and they are not able to attend to slope instability problem across the country. However, not all the slope failures require the input of a geotechnical engineer. Some slope failures problems are very straight forward where assessments and countermeasures proposals can be done by civil engineers. The services

of the geotechnical engineers are focused more on areas with more complexities and require detailed geotechnical studies.

While acknowledging inadequate number of geotechnical engineers, it is imperative for the DoR to conduct studies on slope instability in order to develop appropriate counter measures to minimize slope failure disaster risks.

3.3.4 Improper quantification of monsoon slip clearance work

During the monsoon season, soil slips and debris flow are caused due to rainfall resulting in minor to major damages such as blocking the roadside drains and roads or complete road width getting washed away. In the event of roads blocks, The ROs concerned are required to take immediate action to clear the slips and make the road pliable.

The payment for machineries deployed for clearing the slips is done in hourly basis as per the quoted hire charges rates while value of work done is calculated by quantifying the soil excavated in cubic meter at the rate provided in the revised BSR 2018. The practice is found to be same across all ROs. The ROs work out the input and output differences in the Measurement Book (MB) to show the work done. An example on quantification of Slip Cleared at Punakha-Tshodelmo SNH is shown in the Table 13 for understanding.

Table 13: Quantification of slip cleared at Punakha-Tshodelmo SNH, RO Lobeysa						
Code	Description of item	No	L	B	H	Quantity (in m3)
EW0046	Earth work in excavation over areas by Dozer including leveling and dressing - All kinds of soils	1	12.5	1.2	2.6	39.00
		1	10	1.1	2.5	27.50
		1	15.7	1.4	2.6	57.15
		1	13.3	1	2.3	30.59
		1	14.8	1.45	2.5	53.65
Total Work Done (m3)						207.89
Total Work Done Amount (@Nu.80.01/m3)						16,633.12
Recoveries						
Payment made for hire charges = Nu.16,464						
Difference = Nu.16633.12-16464 =169.12						
Deviation Statement: There is a profit of Nu.269.28						

The review revealed following inadequacies in quantification of slip clearance works where improvements are desirable.

- i. There is no information maintained with the ROs against which an external agency could assess whether slip clearance works were carried out or not. For example, the RAA, on sample basis, visited few slip cleared areas and found that measuring the quantity of slips, which were already cleared, is not feasible. Figure 8 is an example of a road cleared in Dovan GC road where it is not possible to quantify the slip cleared.



Figure 8: Slip cleared at Dovan GC

- ii. In ROs Samdrupjongkhar and Lingmethang, instances were noted where number of

The DoR agreed with the finding and stated that the Department has developed a monthly reporting wherein approximate quantity of the slips should be recorded and reported as soon as the slips have occurred. To make the reporting more real-time, the DoR is also working on using Kobo toolbox, an App to record and report the details of the landslide including size, approximate quantity, input resources required and used etc. Such monitoring and reporting system is expected to overcome some of the ambiguities observed in the current system.

As agreed, the DoR should institute monitoring system in quantifying slip clearance works.

3.3.5 Lack of road testing in pavement works

Every component of road pavement structures in construction/maintenance of roads must be tested before and after it is laid to ensure quality of works including compliance to prescribed standards. It is important to conduct the test as it confirms the correct/incorrect mixture of bitumen, compaction, thickness, and required size of aggregates that contribute to durability and quality of the roads and vice-versa. Some of the basic tests that should be conducted in the execution of road pavement structures are presented in Table 15:

Table 15: Minimum test requirements in execution of pavement works				
Granular Sub-Base (GSB) and Wet Mix Macadam (WMM)		Dense Bituminous Macadam (DBM) and Asphalt Concrete (AC)		
For Selection of Aggregates:	After Laying:	For Selection of Aggregates:	Before laying:	After Laying:
<ul style="list-style-type: none"> Gradation test Flakiness and Elongation test Liquid limit and plasticity index Abrasion test Impact test Moisture content 	Compaction test to check the California Bearing Ratio (CBR) is achieve or not.	<ul style="list-style-type: none"> Gradation test 	<ul style="list-style-type: none"> Job Mix formula (JMF) stating the required gradation, bitumen content and bulk density Conduct plant trials and laying trials to ensure whether JMF can be achieved or not. 	Core test to validate thickness, Bitumen content and bulk density
<ul style="list-style-type: none"> Flakiness and Elongation test 		<ul style="list-style-type: none"> Flakiness and Elongation test 		
<ul style="list-style-type: none"> Liquid limit and plasticity index 		<ul style="list-style-type: none"> Liquid limit and plasticity index 		
<ul style="list-style-type: none"> Abrasion test 		<ul style="list-style-type: none"> Abrasion test 		
<ul style="list-style-type: none"> Impact test 		<ul style="list-style-type: none"> Impact test 		
<ul style="list-style-type: none"> Moisture content 		<ul style="list-style-type: none"> Moisture content 		

Source: Specification for building and road works, MoWHS

However, on verification of documents relating to road pavement structures carried out during FY 2015-16 to 2017-18, the RAA noted that some pavement/blacktopped works were executed without conducting any of the above necessary tests. The road pavement works carried out without the conduct of tests in various ROs is summarized in Table 16 and detailed in Appendix XIV.

Table 16: Summary of road tests not conducted under various ROs during FY 2015-18				
Name of Regional Office	Financial Year			Total
	2015-16 (No. of pavement works)	2016-17 (No. of pavement works)	2017-18 (No. of pavement works)	
Thimphu	6	0	2	8
Sarpang	3	0	2	5
Samdrupjongkhar	7	3	3	13
Lingmethang	2	2	0	4
Tingtibi	0	3	0	3
Grand Total	18	8	7	33

As shown in Table 16, during the FY 2015-16 to 2017-18, there were 33 cases of road testing not conducted by ROs. Nevertheless, the ROs have shown progressive decreasing trend in terms of tests not conducted during the period of review from 18 in FY 2015-16 to 7 roads in FY 2017-18.

Absence of road testing is also attributed by lack of laboratory and unserviceable equipment. For example, RO Samdrupjongkhar didn't have a lab when the ROs were allotted Nu. 311.270 million during FY 2013-14 to 2017-18 for road maintenance activities. ROs Lingmethang, Sarpang, Thimphu and Tingtibi have established labs. However, required tests could not be conducted due to non-availability of required equipment. Further, the labs are not headed by designated engineers and it is operated by technicians.

In absence of proper lab, complete set of equipment, and dedicated engineer, tests relating to pavement works may not be able to ensure achievement of desired quality in road pavement works. Therefore, there is a need to ensure all necessary tests are conducted for better quality of road and to avoid unforeseen contingencies.

The DoR responded that the laboratory in ROs will be strengthened in terms of laboratory space, equipment and manpower. The laboratories at Lingmethang, Lobeysa and Sarpang ROs shall function as the regional laboratory wherein major laboratory equipment such as compressive testing machine, marshall stability apparatus, core drilling machine (pavement), Los Angeles abrasion testing machine, dynamic cone penetration equipment, etc. shall be housed. The laboratories at other six ROs will house minimum equipment necessary for road works tests.

Further, a separate and dedicated material/laboratory engineer will be appointed in consultation with the Royal Civil Service Commission during the upcoming OD exercise.

As assured, the DoR should strengthen laboratories in ROs and carry out necessary road testing to achieve desired quality roads.

3.3.6 Inadequacies in Routine maintenance works

3.3.6.1 Ineffective routine maintenance works

One of the main mandates of the DoR is to keep the roads aesthetically pleasing and safe for traveling motorists by mowing roadsides and removing right-of-way debris through regular and effective routine maintenance. As per the Road Maintenance Manual 2005, '*Routine maintenance is a group of recurrent activities which are related to the repair of faults and attention to the road structure and facilities to ensure the preservation of the asset and the convenience and safety of traffic. Some of the distinctive routine activities are repairing of potholes, surface patching, drain cleaning, grass and scrub cutting, maintenance of road structures, maintenance of road signs and apparel and grading road surface and shoulder*'.

Routine maintenance is carried out by ROs based on a prepared maintenance calendar. The routine maintenance calendar requires set of activities that are to be carried out in different months of the year. The routine maintenance works under DoR is carried out through labor contract where labors are recruited to carry out routine works. The set of activities under

routine maintenance is detailed in Appendix VII. As per the calendar, during the month of March, April and May, the activities of routine maintenance include *vegetation clearing, brooming of road surface, clearing of side drains, minor slip clearance up to 1.5 cu.m, clearing of cross drainage, patches/potholes repairing, nursery maintenance and bio-engineering maintenance.*

On sample basis, the RAA visited some roads in the country to assess the compliance and effectiveness of the planned activities under routine maintenance during the month of March to May 2019. The visit to roads revealed ineffective routine maintenance works such as brooming of road surface, side drain clearing, vegetation clearing, and minor slip clearance as presented in the Figure 9.

Figure 9: Improper routine maintenance works carried out



As can be seen from Figure 9, routine maintenance works were not carried out effectively including poor vegetation clearing, unattended drains, visible potholes and uncleared slip on the roads. The ROs stated that as per the standard, one labour is deputed for every 1.5 kms of road. However, in actual practice, laborers are deployed in groups at various locations, which were confirmed by the RAA during field visits. It was noted that the ROs encouraged such practice for work efficiency and easy supervision. In addition, the RAA was informed that with the existing daily wage rates for workers the profession have become unattractive and retaining workers is a constant challenge.

The RAA, during the field visits also observed ineffectiveness in the present arrangements as the area once cleared are neglected for couple of weeks, as the group have to move to cover other areas. Further, the supervising officials for quantifying the routine maintenance works have not maintained any standard inspection documents.

The DoR in its response stated that the Department has initiated a system wherein all the ROs are required to annually plan in detail the maintenance activities to be performed for that year within the confines of the available budget. The annual plan indicates the quantity of different maintenance activities against which the achievements can be measured. Further, the plan will also guide the engagement of maintenance labour and deployment of resources bringing in improvement of the system.

While noting the initiative taken by the DoR to have annual plan by ROs, the RAA would like to stress that the DoR should ensure effective implementation of the plan.

3.3.6.2 Ineffective practice in measuring and monitoring labourers' performance

The DoR have instituted a Performance Based Management System (PBMS) to enhance the efficiency and effectiveness of routine maintenance works. The performance of the maintenance groups is measured as per the requirement laid down in the agreement between the ROs and group leader of the labour maintenance group.

During the field visit, a number of cases of asphalt failures were seen on the road network. The reasons for such situations are complex, some relating system while others related to skill deficiencies in the construction industry reflecting issues in labour contract management by the DoR.

Further, the RAA noted that ROs had not maintained adequate records on the inspection carried out by the site engineers. As required, during the inspection, the inspecting engineer must fill up the road inspection sheet and countersign by the routine maintenance group leader. Nevertheless, the RAA's review revealed that none of the site engineers in the five ROs, which the team had visited, used the road inspection sheet while supervising their routine maintenance works. The reason the site engineers cited during the interviews was complexity of the inspection sheets. On the other hand, the RAA, upon the review of the inspection sheet, found the sheet was easy to read and understand. Thus, the RAA is of the opinion that the site engineers are not enforcing the use of the routine maintenance inspection sheets in the fields.

As per the contract agreement, the inspection frequency should at least be once a week for junior engineers, once every two weeks for assistant engineers, and once every month for executive engineers. Although the RAA acknowledges the impossibility of presence of site engineers for each stage of construction and restoration, there should be a proper process that ensures that labourers/contractors comply with the standards.

Considering the inadequacy in the present practice, the RAA feels that there is merit in the DoR undertaking a comprehensive evaluation of the strategic approach to its contract management of labours in order to avoid similar shortcomings in the future and for further improvements.

The DoR responded that they are currently piloting performance based maintenance wherein a group of labourers is given a stretch of road based on the labour norm. The performance of the labour gang is monitored based on the output of the work gauged against monthly work plan unlike number of man-days in the past. The system, besides improving the productivity, is expected to reduce monitoring time of site engineers which could be used more productively for other important works.

Further, the DoR has also initiated labour contract where a group of labour is made to contribute labour component with materials and equipment provided by the department for executing a work. The systems has already helped the department in improving the quality of the work and reduced the supervision and monitoring time of site engineers.

While acknowledging the initiatives taken by the DoR in improving the efficiency of measuring labours' performance, the RAA reiterates carrying out periodic monitoring of labours' performance by site engineers.

3.3.6.3 No standard procedure for inspection/monitoring and supervision of road maintenance activities

Inspection of roads forms the major basis for road maintenance activities. As a prerequisite prior to coming up with a plan and budget, a survey has to be carried out for all existing roads to enable management to come up with a schedule and priorities regarding maintenance operations. Moreover, inspections have to be conducted on on-going maintenance activities to identify abnormalities if any and come up with corrective measures.

However, RAA observed that there were no standard procedure for recording inspections for in-house maintenance. For instance, it surfaced from the interviews that inspections were done twice a week, but there is no practice or requirement to document or report those inspections. The absence of a standard procedure for inspections may lead to lack of uniformity and inconsistency in carrying out the maintenance works efficiently thereby disabling management to make informed decisions.

DoR responded that they have instituted a system to plan the maintenance works at the beginning of the Financial Year which is then broken down into monthly plans in which the quantities of all the activities along with the budget will be assessed and worked out. With the planning system put in place, monitoring should become systematic and objective as the progress can be gauged against the annual and monthly plans.

The DoR should further ensure proper maintenance of inspections documents by ROs as well as adequate supervision of routine maintenance works.

3.3.6.4 Unsatisfactory road marking works

Maintenance of proper road markings provides useful directions and warnings to road users. As per Section 19(18) under the Powers and Functions of the DoR of the Road Act of Bhutan 2013, the DoR shall install and maintain informatory signs along the road to provide motorists and pedestrians necessary information. In practice, such maintenance works have been entrusted to the labourers and/or contractors under PBMS as part of routine maintenance works. According to the terms of performance standard for PBMS, the group shall carry out both repairing works and white washing/painting works.

During the field visits, the RAA observed unsatisfactory roadside informatory signs across PNH and SNH in the country. An example from Gelephu-Trongsa PNH is presented in Figure 10.

Figure 10: Unsatisfactory road marking works on Gelephu-Trongsa PNH



As can be seen in Figure 10, the milestones on the 27 km long road are not legible. Further, review of expenditure statements revealed no records on expenses incurred on road marking activities.

Kilometer marking is an important feature in national highways to assist motorists in providing information on their location, and provide a means to identify the location of incidents and emergencies when there are a few reference points along the highway.

The DoR agreed with the audit finding and explained that with Bhutan Standards on road safety signs and symbols (BTS 33:2017) published, the DoR will work on having standard road signs. Further, the DoR will instruct all ROs to update and maintain the road signs as per the standard.

As agreed, the DoR should make sure that all road signs are updated and maintained as per the standard.

3.3.6.5 Remedial measures not executed after construction of Approach road

As per the standard practice in construction of approach roads, the DoR provides technical backstopping such as provision of design standards and specifications in consultation with the concerned agencies/individuals. Accordingly, access/approach roads are then constructed to a minimum of Farm Road standard.



However, during field visit, the RAA observed that after completion of approach roads, remedial measures are not put in place causing inconveniences to commuters and the DoR in carrying out maintenance works as depicted in Figure 11. As a particular case, in 2017, an approach road was constructed after having availed clearance from the RO Samdrupjongkhar. Although the terms and condition while issuing the clearance clearly stated the owner of the approach road to construct a 7m cross drain as a remedial measures including consideration of construction precautions such as construction methods, disposal of excavated earth, slope cutting, and traffic management it was observed that construction requirements were not fulfilled at the time of audit in March 2019 and the road surface runoff have resulted in road pavement deterioration ultimately contributing to cost escalation of maintenance works.

The DoR agreed with the finding and explained that the Department has been facing challenges in implementing the provisions of the agreement mainly because of lukewarm response and cooperation from the beneficiaries. The DoR also stated that all ROs will be instructed to physically verify the compliance and take actions as per the agreement.

As agreed, the DoR should enforce strict compliance to the agreement by the beneficiaries.

3.3.6.6 Lack of mechanized equipment for routine maintenance works

Activities carried out under routine maintenance works include drain cleaning, culvert cleaning, scrub cutting/jungle clearance, potholes repair, berm/shoulder reshaping, parapet repair & other structure, white washing & painting, sweeping, minor slip clearance and road marking. For routine maintenance activities, an appropriate mix of labor and equipment is required to provide works of adequate quality in a time and cost-effective manner. However, the ROs do not have adequate mechanized equipment for routine maintenance works like brush cutter, hand guide roller, chain saw, mechanical road broom, and road marker machine. The labors working on the roads are mostly seen using conventional hand tools like sickle and hard brooms. Even for the minor repair of potholes and cutting down of fallen trees, the ROs have to hire machineries from contractors.

The DoR have also proposed the establishment for Road Maintenance Center (RMC) to professionalize the road maintenance works by the way of mechanization besides bringing the National Work Force (NWF) stationed at isolated locations nearer and accessible to basic amenities to improve working condition and enhance productivity in the process. Nonetheless, the proposal was dropped due to the budget constraint.

In absence of the basic mechanized equipment for routine maintenance work, the work completion duration will be prolonged and the work quality will also get compromised. Furthermore, the ROs have to repeatedly hire machineries from the contractors whenever required which, in the long run, the cumulative hire charges paid will be more than the initial purchase of equipment.

The DoR stated that the Department meets its machineries requirement by hiring from Construction Development Corporation Limited (CDCL) and private sector, including the machines required for maintenance works.

The DoR recognising the need to own its own machineries such as excavator, pay loader, and mini-roller, requested the Government for financial support. However, the request was not approved. The DoR purchased one mini-roller for each RO but due to lack of repair and spare parts services, almost all the mini-rollers have become unserviceable. The DoR explained that owning equipment would entail creating a mechanical wing in the DoR to provide repair and maintenance services of these equipment.

CHAPTER 4: RECOMMENDATIONS

Based on the issues pointed out under Part 2 in chapter 3, the RAA has provided recommendations aimed at enhancing efficiency and effectiveness in road maintenance works. The recommendations are discussed below:

4.1 The DoR should develop a periodic maintenance plan that can aid in effective road management

The current RSMP does not provide sufficient strategies to effectively manage periodic maintenance works in the country. Presently, about 74.74% and 72.69% of backlogs for PNH and SNH respectively in terms of periodic maintenance were identified during the review. Additionally, with current funding levels, the roads in the country particularly SNHs will continue to deteriorate, which will result in higher costs of maintenance in the future.

Having a periodic maintenance plan will aid the DoR in defining goals and objectives along with performance levels required for maintenance as well as time frames within which such targets are to be met. Therefore, the RAA recommends the DoR to develop a periodic maintenance plan that will serve as a benchmark to assess the department's strength, weaknesses, opportunities and threats. Moreover, the exercise in preparation of maintenance plan may help the department in estimating cost and coming up with long term plans to address issues of backlogs in periodic maintenance of roads. Further, the RAA recommends the DoR to draw realistic operational plan stipulating maintenance schedules for routine and periodic maintenances. The plan will allow management to measure whether the activities therein are achieved. It will further assist management to develop accurate forecasts of maintenance and budget for it.

4.2 The DoR should strategize to improve efficiency in restoration of monsoon damages.

Instances were noted, where the DoR and ROs took 264 days from the date of damage till the date of award of work pertaining to monsoon restoration work due to lengthy bureaucratic process. The majority of delay was taken during field assessment by the DoR followed by release of budget from MoF.

As such, the DoR needs to review the current practice for further enhancing the efficiency and effectiveness in monsoon restoration works. The DoR should develop/prescribe detailed responsibility and time frame to ensure that highway maintenance activities are timely and effective. In addition, the department should establish SoP to respond appropriately and consistently to requests from the ROs in order to improve efficiency in road maintenance.

4.3 The DoR should maintain and analyse records of possible price escalation due to non-restoration of damaged structure on time

The RAA noted untimely restoration of priority structures under P1 and P2 category that may have higher cost implication to the government. In absence of records on damaged structures that are further deteriorated over time, the decisions taken may not be appropriate. Moreover,

the DoR cannot authenticate the degree of structures deteriorated and price escalated over time.

Therefore, the RAA recommends the DoR to maintain the rate of deterioration of the unattended structures and analyse cost escalation over time. It is vital for the Department to report to MoF on the cost escalation due to non-funding of priority monsoon damaged structures. The RAA also recommends updating the road inventory as a prerequisite to carry out such analysis.

4.4 The DoR should develop a comprehensive Information Management System

Strategic asset planning and prioritisation can occur if there is access to reliable, accurate and complete data. Lack of data impedes capturing and analyzing data to model scenarios for strategic planning and decision making. Road assets are crucial components that must be assessed on a timely manner to have better governance and realization of its values over the period.

The DoR have experienced preventive road maintenance and prioritisation challenges during several budget cycles. Nonetheless, the department is yet to develop data or performance analysis to address them. In absence of a comprehensive information management system, the department lacks proper maintenance planning, prioritisation of roads for maintenance, assessment of their achievements and challenges impeding prompt decisions and improvements in performing their maintenance operations.

Thus, the RAA recommends the DoR to develop and maintain a comprehensive road asset management system that accurately records the quantum and conditions of their road asset, maintenance effort and cost. This will provide the essential data to the management to make informed decisions including planning and proper distribution of the budget. The database should contain information on roads for ease of reference of maintenance works such as road category, date of construction, surface type (bitumen, gravel), gradient (flat, hilly), average width, traffic flow, date of last maintained, number of culverts lined, date inventory last updated, among others.

4.5 The DoR should develop a guideline/SOP for proper and effective coordination during emergencies

Absence of an overall framework/guideline/SoP for coordination and collaboration amongst stakeholders during emergencies poses a serious risk to the management as it will lead to lack of proper guidance, procedures and coordination of maintenance activities. It will also result in unstandardized way of carrying out maintenance at the various ROs of the DoR.

Therefore, there is a need for the DoR to develop a guideline/SOP for relevant stakeholders to effectively and efficiently carry out their maintenance activities during emergency situations in order to delineate clear roles and responsibilities of all stakeholders and to institute accountability mechanism.

4.6 The DoR should strengthen the internal control for hiring of machineries /equipment

The review revealed inadequacies in hiring of machineries/equipment indicating ineffective internal control in the process. Therefore, the DoR should bring in uniformity in practices across all ROs that would help in achieving economy and effectiveness in the hiring of machineries/equipment as a whole and also strengthen internal control in the process of hiring.

Further, inadequacies were noted in quantifying the slips leading to probable adjustment of quantity based on input resources as provided in *Para 3.3.4*. Thus, the DoR should explore and study the possibility of coming up with a scientific method to capture the exact quantity of slips cleared.

4.7 The DoR and ROs must ensure compliance to the prescribed standards for maintenance of roads

Although the Road Rules and Regulations 2016 facilitate road construction and maintenance with proper technical specifications and standards to bring uniformity in the country, the DoR did not comply with prescribed standards pertaining to road pavements, carriage width, formation width, road cross fall/cambers, and drains.

The current roads pavements particularly SNH are not suitable for existing traffic loads that has resulted in untimely deterioration of roads. This accelerates the depreciation process of the roads leading to wearing and tearing of road pavement ultimately causing a huge cost implication to the government exchequer on account of periodic maintenance.

Thus, the DoR should ensure compliance to road pavement standards and other requirements on PNHs and SNHs including regular and timely conduct of mandatory road component testing to protect the structural integrity of the road.

4.8 The DoR should standardize and strengthen its monitoring and supervision roles of routine maintenance works

Presently, there is a lack of adequate inspection/monitoring and supervision on the routine maintenance works. Moreover, the supervising officials for quantifying the routine maintenance works have not maintained any standard inspection documents. Inadequate monitoring and supervision of the labourers/contract groups are attributing to ineffective routine maintenance works.

The absence of a standard format for inspections may lead to lack of uniformity and inconsistency in carrying out the maintenance works efficiently thereby inhibiting management to make informed decisions. Therefore, to ensure efficacy of the PBMS initiated by the DoR as well as to ensure compliances to the contract agreement, there should be an adequate inspection/monitoring with proper documentation of inspection carried out by site engineers since monitoring and supervision ensure that resources spent provide value for money.

CHAPTER 5: CONCLUSION

Roads are important for a country's economic prosperity and for upliftment of livelihood of its people through alleviation of poverty. As road sector is of vital importance for a nation's growth providing access to employment, social, health and education services, it is important to provide proper maintenance to road infrastructure so that roads are usable and in good conditions. The levels of maintenance interventions adopted by the DoR include routine, periodic and monsoon restoration works. These maintenance interventions have positively impacted on the conditions of the roads over the years. The transportation landscape has undergone rapid transformation with the government giving a massive push to infrastructure growth and development through adoption of climate resilient technologies and bioengineering works.

Despite having adequate legislative tools, policies, and the DoR's concerted efforts, the department is faced with numerous challenges and barriers in road maintenance works, which needs to be addressed. The RAA's review of road maintenance and management identified several deficiencies that inhibited the DoR's effectiveness in the delivery of its services. The department's practices in road maintenances are not preventive but mostly reactive relying ies intensely on costly corrective maintenance. The DoR and ROs suffer from administrative shortcomings in its road maintenance planning and record keeping.

The DoR lacks periodic road maintenance plan, which resulted in absence of proactive mechanisms for undertaking periodic maintenance works. There is a lack of comprehensive database on road assets that would have assisted in developing proper maintenance plan. Furthermore, there is absence of an institutional set up for coordination and collaboration amongst relevant agencies during emergency situations for road maintenance.

The RAA found that road maintenance works are not always done effectively, and the department and ROs failed to maintain accurate and adequate records of national highway pavement conditions. The DoR had not been effective in maintaining good road conditions principally due to budgetary constraints and shortages of labourers that had forced available resources to be over stretched thereby resulting in backlogs.

Therefore, the RAA concludes that maintenance of roads was not given importance as required. Nonetheless, despite the deficiencies stated in the report, RAA acknowledges that the financial resources are beyond the DoR and ROs control as they depend entirely on MoF. Thus, the RAA is of the view that the DoR and ROs must use the available funds judiciously for maintenance works.

The Road sector can enhance its maintenance management through an effective and appropriate institutional intervention. Development of plan for road maintenance with a comprehensive information management system and its full implementation are expected to bring in transformation of road sector towards building a safe, efficient and reliable road network for national security and socio-economic development. Further, intervention and appropriate solutions are desirable on challenges and barriers mentioned above.

Based on the inadequacies observed, the RAA has made eight recommendations intended to further enhance the efficiency and effectiveness of the department in delivery of its mandate.

APPENDICES

Appendix-I

Legislation, Regulations and related documents on road maintenance Works

1	The Road Act of Bhutan 2013
2	Road Rules and Regulations 2016
3	Road Maintenance Manual 2005
4	Specification for Building and Road Works 2009, 2015, 2017
5	Guidelines on Road Classification System and Delineation of Construction & Maintenance Responsibilities 2009
6	Road Classification System in Bhutan 2017
7	Procurement Rules and Regulations 2009
8	Financial Rules and Regulations 2001 and 2016
9	Guidelines on use of Standard Work Items for Common Road Works 2010
10	Norms and Standards for Human Resource planning – Annexure 9b(2)
11	Road Sector Master Plan 2007-27
12	10 year HR master plan
13	Service Delivery Standards, 2009
14	Design and Construction of Stone Masonry Retaining Walls – A Quick Guide
15	Department of Roads TAT and SOP – Annexure II(c)
16	Eleventh Five Year Plan Document
17	Annual Information Bulletin
18	Assessment report of monsoon damaged sites during 2013-18
19	MoWHS's Conference Resolutions
20	Contract Agreement of the Monsoon Restoration Works

Appendix-II
Details of Road length as per road type

Sl. No.	RO	PNH (in km)	SNH (in km)	Dz. road (in km)	GC road (in km)	Approach road (in km)	Total
1	Lingmethang	194.62	65	103.95	261.83	16.76	642.16
2	Lobeysa	183	82.13	134.18	55.89	13.73	468.93
3	Phuentsholing	166.4	69	66	303.67		605.07
4	Sarpang	177.25	86	61.7	258.07	0.43	583.45
5	Samdrupjongkhar	97.75	202.01	15.43	263.63	9.43	588.25
6	Thimphu	96.9	116.35	176.77	75		465.02
7	Trashigang	97	17	40.06	386.92	6.32	547.3
8	Trongsa	229.16	98	78.18	54.08	6.9	466.32
9	Tingtibi	161	59		155.68	41.27	416.95
	Total	1,403.08	794.49	676.27	1,814.77	94.84	4,783.46

Appendix-III

Details of Approved budget for routine maintenance works for the FY 2013-18

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
Samdrupjongkhar	MAINTENANCE WORKS ON SECONDARY NATIONAL HIGHWAY (86 KM @ NU 80,000/KM)	6.880		14-15
Samdrupjongkhar	MAINTENANCE OF DZONGKHAG ROADS (60 KM @ NU 44,000/KM)	2.640	9.520	14-15
Samdrupjongkhar	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (65 KM@NU86,000/KM)	3.440		15-16
Samdrupjongkhar	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (86KM@NU.80,000/KM)	6.966		15-16
Samdrupjongkhar	MAINTENANCE OF DZONGKHAG ROADS (146.5 KM@44000)	6.468		15-16
Samdrupjongkhar	MAINTENANCE OF GC ROADS (262 KM@44000)	11.528		15-16
Samdrupjongkhar	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (65 KM@NU86,000/KM)	3.440	31.842	15-16
Samdrupjongkhar	MAINTENANCE OF PRIMAY NATIONAL HIGHWAYS	5.255		16-17
Samdrupjongkhar	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (166KM@NU.81,000/KM)	14.608		16-17
Samdrupjongkhar	MAINTENANCE OF DZONGKHAG AND GC ROADS (326 KM@44000)	11.660	31.523	16-17
Samdrupjongkhar	MAINTENANCE OF PRIMRY NATIONAL HIGHWAYS (79KM @ NU. 115000)	5.470		17-18
Samdrupjongkhar	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (166KM@NU.109,000/KM)	15.000		17-18
Samdrupjongkhar	MAINTENANCE OF DZONGKHAG & GC ROADS (320 KM@44000)	14.000		17-18
Samdrupjongkhar	MAINTENANCE OF PRIMRY NATIONAL HIGHWAYS (79KM @ NU. 115000)	5.470	39.940	17-18
Lingmethang	MAINTENANCE WORKS ON PRIMARY NATIONAL HIGHWAYS (196 KM@NU86,000/KM)	15.156		13-14
Lingmethang	MAINTENANCE OF GYALPOSHING-NGANGLAM ROADS. (75 KMS@NU.86,000/KM)	6.450		13-14
Lingmethang	MAINTENANCE OF DZONGKHAG ROADS(107KM@NU44,000/KM)	4.708		13-14
Lingmethang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS [68KM@NU80,000/KM]	5.440	31.754	13-14
Lingmethang	SNOW CLEARANCE ON PRIMARY NATIONAL HIGHWAY	2.500		14-15
Lingmethang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (68KM@80,000/KM)	5.280		14-15
Lingmethang	MAINTENANCE OF DZONGKHAG ROADS(107KM@NU44,000/KM)	4.629		14-15
Lingmethang	MAINTENANCE WORKS ON PRIMARY NATIONAL HIGHWAYS (196 KM@NU88,000/KM)	13.846		14-15
Lingmethang	MAINTENANCE OF GYALPOSHING-NGANGLAM ROADS. (77 KMS@NU.88,000/KM)	6.776	33.031	14-15
Lingmethang	MAINTENANCE WORKS ON PRIMARY NATIONAL HIGHWAYS (162 KM@NU. 86,000/KM)	10.267		15-16
Lingmethang	MAINTENANCE OF GYALPOSHING-NGANGLAM ROADS. (77 KMS@NU.86,000/KM)	6.791		15-16
Lingmethang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (68KM@80,000/KM)	5.576		15-16

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
Lingmethang	MAINTENANCE WORKS OF GEWOG CENTRE ROADS (262 KM @ NU. 44,000)	11.816		15-16
Lingmethang	MAINTENANCE OF DZONGKHAG ROADS (107 KM@NU44,000/KM)	4.826	39.276	15-16
Lingmethang	MAINTENANCE WORKS ON PRIMARY NATIONAL HIGHWAYS (162 KM@NU. 115,000/KM)	22.124		16-17
Lingmethang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (68KM@109,000/KM)	7.312		16-17
Lingmethang	MAINTENANCE OF DZONGKHAG AND GEWOG CENTRE ROADS (369 KM @ NU. 44,000)	15.936	45.372	16-17
Lingmethang	MAINTENANCE WORKS ON PRIMARY NATIONAL HIGHWAYS FROM YADI-SERPANG & GYELPOSHING - NGANGLAM (224-64=160 KM@NU. 115,000/KM)	18.300		17-18
Lingmethang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (68KM@109,000/KM)	7.412		17-18
Lingmethang	MAINTENANCE OF DZONGKHAG ROADS & GEWOG CENTRE ROADS (366 KM@NU. 44,000/KM)	16.004	41.716	17-18
Lobeysa	SNOW CLEARANCE WORKS	0.450		13-14
Lobeysa	MAINTENANCE OF HIGHWAYS(209 KM@NU.86,000/KM)	12.986		13-14
Lobeysa	MAINTENANCE OF SECONDARY NARTIONAL HIGHWAY ROADS(84KM@NU.80,000/KM)	6.720		13-14
Lobeysa	MAINTENANCE OF DZONGKHAG ROADS(163KM@NU.44,000/KM)	7.172	27.328	13-14
Lobeysa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (191 KM @ NU.86,000/KM)	15.224		14-15
Lobeysa	MAINTENANCE OF SECONDARY NARTIONAL HIGHWAY ROADS(84KM@NU.80,000/KM)	6.683		14-15
Lobeysa	MAINTENANCE OF DZONGKHAG ROADS(158KM@NU.44,000/KM)	5.738	27.645	14-15
Lobeysa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (184 KM @ NU.86,000/KM)	15.824		15-16
Lobeysa	MAINTENANCE OF SECONDARY NARTIONAL HIGHWAY (84KM@NU.80,000/KM)	6.720		15-16
Lobeysa	MAINTENANCE OF GC ROADS- 68 KM @NU.44000/KM	2.992		15-16
Lobeysa	MAINTENANCE OF DZONGKHAG ROADS (158 KM@NU.44,000/KM)	6.952	32.488	15-16
Lobeysa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (184 KM @ NU.86,000/KM)	13.780		16-17
Lobeysa	Adjustment of Previous Year's Advances	0.530		16-17
Lobeysa	MAINTENANCE OF SECONDARY NARTIONAL HIGHWAY (84KM@NU.80,000/KM)	6.720		16-17
Lobeysa	MAINTENANCE OF DZONGKHAG AND GC ROADS- 226 KM @NU.44000/KM	9.944	30.974	16-17
Lobeysa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (184 KM @ NU.115,000/KM)	12.000		17-18
Lobeysa	MAINTENANCE OF SECONDARY NARTIONAL HIGHWAY (84KM@NU.109,000/KM)	7.000		17-18
Lobeysa	MAINTENANCE OF DZONGKHAG AND GC ROADS- 226 KM @NU.44000/KM	9.944	28.944	17-18
Phuentsholing	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (111KM@NU.86000/KM)	9.546		13-14
Phuentsholing	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS(49	3.920		13-14

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
	KM@NU.80,000/KM)			
Phuentsholing	MAINTENANCE OF DZONGKHAG ROADS(100KM@NU.44,000/KM)	4.400	17.866	13-14
Phuentsholing	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (111KM@NU.86000/KM)	9.546		14-15
Phuentsholing	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS(49 KM@NU.80,000/KM)	3.920		14-15
Phuentsholing	MAINTENANCE OF DZONGKHAG ROADS(105KM@NU.44,000/KM)	5.125	18.591	14-15
Phuentsholing	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (146KM@NU.86000/KM)	12.556		15-16
Phuentsholing	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (49 KM@NU.80,000/KM)	3.600		15-16
Phuentsholing	MAINTENANCE OF DZONGKHAG ROADS (DZ.-115.57 KM, GC- 180.42 KM) 307 KM@NU.44,000/KM	13.923	30.079	15-16
Phuentsholing	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (146 KM@NU.115000/KM)	19.188		16-17
Phuentsholing	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (49 KM@NU.109,000/KM)	5.341		16-17
Phuentsholing	MAINTENANCE OF DZONGKHAG AND GC ROADS (DZ.-115.57 KM, GC-180.42 KM) 296 KM@NU.44,000/KM	13.024	37.553	16-17
Phuentsholing	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (164 KM@NU.115000/KM)	18.74		17-18
Phuentsholing	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (49 KM@NU.109,000/KM)	5.261		17-18
Phuentsholing	MAINTENANCE OF DZONGKHAG AND GC ROADS (DZ.-32 KM, GC-352.92 KM) 385 KM@NU.44,000/KM	14	38.001	17-18
Thimphu	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (90KM@NU.86000/KM)	6.136		13-14
Thimphu	MAINTENANCE OF ALL SECONDARY NATIONAL HIGHWAY(45.53KM@NU80,000/KM)	3.435		13-14
Thimphu	MTC OF DZONGKHAG ROADS IN HA, PARO & THIMPHU(99.84KM@NU44,000/KM)	4.296	13.867	13-14
Thimphu	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (64KM@NU.86000/KM)	8.102		14-15
Thimphu	MAINTENANCE OF ALL SECONDARY NATIONAL HIGHWAY(9.250KM@NU80,000/KM)	3.642		14-15
Thimphu	MAINTENANCE OF DZONGKHAG ROADS IN HA, PARO & THIMPHU(21.5KM@NU44,000/KM)	4.393	16.137	14-15
Thimphu	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (94.71KM@NU.86000/KM)	8.084		15-16
Thimphu	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (113 KM@NU80,000/KM)	8.620		15-16
Thimphu	MAINTENANCE OF THIMPHU THROMDE ROADS (2KM@89000)	0.178		15-16
Thimphu	MAINTENANCE OF DZONGKHAG ROADS IN HAA, PARO & THIMPHU (100 KM@NU44,000/KM)	4.840		15-16

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
Thimphu	MAINTENANCE OF GC ROADS (39.63 KM@NU44,000/KM)	1.760	23.482	15-16
Thimphu	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (101KM@NU.115000/KM)	11.944		16-17
Thimphu	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (116 KM@NU.109,000/KM)	12.569		16-17
Thimphu	MAINTENANCE OF THIMPHU THROMDE ROADS (2KM@115000)	0.230		16-17
Thimphu	MAINTENANCE OF DZONGKHAG AND GC ROADS (187 KM@NU 44,000/KM)	8.168	32.911	16-17
Thimphu	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (101KM@NU.115000/KM)	11.540		17-18
Thimphu	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (116 KM@NU.109,000/KM)	12.319		17-18
Thimphu	MAINTENANCE OF DZONGKHAG AND GC ROADS (211 KM@NU 44,000/KM)	9.154	33.013	17-18
Trongsa	MAINTENANCE OF PNH(231.5KM @NU.88,000/KM)	17.868		13-14
Trongsa	MAINTENANCE OF KHOSELA-REFEE BYPASS ROAD (2.321KM@NU.86,000/KM)	0.172		13-14
Trongsa	MAINTENANCE WORKS ON SECONDARY NATIONAL HIGHWAYS(44KM@NU.80,000/KM)	3.520		13-14
Trongsa	MAINTENANCE WORKS ON DZONGKHAG ROADS(101KM@NU.44,000/KM)	4.444	26.004	13-14
Trongsa	MAINTENANCE OF PNH(231.5KM @NU.88,000/KM)	28.227		14-15
Trongsa	MAINTENANCE WORKS ON DZONGKHAG ROADS(101KM@NU.44,000/KM)	4.099	32.326	14-15
Trongsa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (320.57 KM @NU.86,000/KM)	21.140		15-16
Trongsa	MAINTENANCE OF NANGAR-URA PNH ON HYBRID CONTRACT (25 KM @NU. 0.17M/KM)	4.450		15-16
Trongsa	MAINTENANCE WORKS ON DZONGKHAG ROADS (124.35 KM@NU.44,000/KM)	5.771	31.361	15-16
Trongsa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (365KM @NU.88,000/KM)	19.581		16-17
Trongsa	MAINTENANCE OF NANGAR-URA PNH ON HYBRID CONTRACT (25 KM @NU. 0.115M/KM)SPILL OVER	2.875		16-17
Trongsa	MAINTENANCE WORKS ON DZONGKHAG ROADS (125KM@NU.44,000/KM)	5.544	28.000	16-17
Trongsa	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY PNH (TOTAL 362KM PROPOSED 263KM @NU.115,000/KM)	21.000		17-18
Trongsa	MAINTENANCE OF NANGAR-URA PNH ON HYBRID CONTRACT (13 KM @NU. 0.170,000/KM)SPILL OVER	2.210		17-18
Trongsa	MAINTENANCE WORKS ON DZONGKHAG & GC ROADS (125KM@NU.44,000/KM)	5.500	28.710	17-18
Tingtibi	MAINTAINENCE OF PANBANG-GALABI (3KM) ROAD	0.150		13-14
Tingtibi	AINTAINENCE OF MATHANGURI-PANBANG (13.3KM) ROAD	0.700		13-14
Tingtibi	MAINTENANCE OF KHOSELA-REFEE BYPASS ROAD (2.321KM@NU.86,000/KM)	0.000		13-14
Tingtibi	MAINTENANCE OF TONGTHOPHEY TO CHAPLAYCHU ON GELEPHU-TRONGSA HIGHWAY(152KM)	11.830		13-14
Tingtibi	MAINTENANCE OF SECONDARY NATIONAL	3.120		13-14

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
	HIGHWAYS (39.2KM@NU.80,000/KM)			
Tingtibi	MAINTENENCE OF DZONGKHAG ROADS(47.12KM@NU.40,000/KM)	1.880	17.680	13-14
Tingtibi	MAINTENANCE OF MATHANGURI-PANBANG ROAD(13.8KM)	1.260		14-15
Tingtibi	MAINTENANCE OF WANGDIGANG TO CHAPLAYCHU ON GELEPHU-TRONGSA HIGHWAY(120KM)	9.976		14-15
Tingtibi	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS (37.385KM@NU.82,000/KM)	4.176		14-15
Tingtibi	MAINTENENCE OF DZONGKHAG ROADS(45.32KM@NU.40,000/KM)	1.424	16.836	14-15
Tingtibi	MAINTENANCE OF MATHANGURI-PANBANG-GALABI ROAD (17KM)	0.850		15-16
Tingtibi	MAINTENANCE OF GOSHING GC ROADS - 11 KM	0.484		15-16
Tingtibi	MAINTENANCE OF WANGDIGANG-ZHEMGANG-TINGTIBI TO CHAPLAYCHHU ON GELEPHU-TRONGSA HIGHWAY (120 KM @ 86,000/KM))	10.320		15-16
Tingtibi	MAINTENANCE OF TINGTIBI-PRALING PRIMARY NATIONAL HIGHWAY (36.181KM @ 86,000/KM)	3.096		15-16
Tingtibi	MAINTENANCE OF DZONGKHAG ROADS: DAKPAI-BULI & GOMPHU FEEDER ROAD (62.82 KM@NU.44,000/KM)	2.772		15-16
Tingtibi	MAINTENANCE OF GEWOG CENTRE ROADS (72.96 KM@44,000.00/KM)	5.192	22.714	15-16
Tingtibi	MAINTENANCE OF MATHANGURI-PANBANG-GALABI ROAD (17KM)	0.853		16-17
Tingtibi	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (214 KM)	21.400		16-17
Tingtibi	MAINTENANCE OF DZONGKHAG AND GC ROADS (117.54 KM @ NU.44,000.00/KM)	5.192	27.445	16-17
Tingtibi	MAINTENANCE OF MATHANGURI-PANBANG-GALABI ROAD (17KM)	1.900		17-18
Tingtibi	MAINTENANCE OF PRIMARY NATIONAL HIGHWAY (214KM @ 115000/KM)	24.610		17-18
Tingtibi	MAINTENANCE OF DZONGKHAG AND GC ROADS (172 KM @ NU.44000/KM)	7.568	34.078	17-18
Sarpang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (168KM@NU. 86000/KM)	15.308		13-14
Sarpang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAY ROAD (87KM@NU.80,000/KM)	6.960		13-14
Sarpang	MAINTENANCE OF DAMPHU URBAN ROAD (1.5KM) @ 89000/KM	0.178		13-14
Sarpang	MAINTENANCE OF DZONGKHAG ROADS (65KM)	2.860	25.306	13-14
Sarpang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (177KM@NU.86000/KM)	15.222		14-15
Sarpang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAY ROAD (87KM@NU.80,000/KM)	6.960		14-15
Sarpang	MAINTENANCE OF DAMPHU URBAN ROAD (1.5KM) @ 89000/KM	0.135		14-15
Sarpang	MAINTENANCE OF DZONGKHAG ROADS (KM)	3.604	25.921	14-15
Sarpang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (177KM@NU.86000/KM)	15.222		15-16
Sarpang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAY (87KM@NU.80,000/KM)	6.960		15-16

RO	Name of Activities	Amount (Nu.)	Financial Year wise (Nu.)	Financial Year
Sarpang	MAINTENANCE OF DZONGKHAG ROADS (82 KM @ 44000)	3.608		15-16
Sarpang	MAINTENANCE OF GC ROAD (249 KM @ 44000)	10.956	36.746	15-16
Sarpang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (177KM@NU.86000/KM)	19.888		16-17
Sarpang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAY (87+1.5 URBAN ROAD AT DAMPHU) KM@NU.80,000/KM)	6.960		16-17
Sarpang	MAINTENANCE OF DZONGKHAG AND GC ROADS (290.57 KM @ 44000)	12.760	39.608	16-17
Sarpang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS (177KM@NU.115000/KM)	20.355		17-18
Sarpang	Adjustment of Previous Year's Advances	0.014		17-18
Sarpang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAY (87 KM@NU.109,000/KM)	7.000		17-18
Sarpang	MAINTENANCE OF DZONGKHAG ROAD (65K @ 44000)	2.860		17-18
Sarpang	MAINTENANCE OF GC ROAD	10.000	40.229	17-18
Trashigang	MAINTENANCE OF HIGHWAYS ON HYBRID CONTRACT (49KM@NU.86000/KM)	4.214		13-14
Trashigang	MAINTENANCE WORKS ON SECONDARY NATIONAL HIGHWAYS ROADS (131KM@NU.80,000/KM)	10.480		13-14
Trashigang	MAINTENANCE OF DZONGKHAG ROADS(281.1KM@NU.44,000/KM)	12.364	27.058	13-14
Trashigang	MAINTENANCE OF HIGHWAYS ON HYBRID CONTRACT (49KM@NU.90000/KM)	4.214		14-15
Trashigang	MAINTENANCE WORKS ON SECONDARY NATIONAL HIGHWAYS ROADS (131KM@NU.81,000/KM)	3.622		14-15
Trashigang	MAINTENANCE OF DZONGKHAG ROADS(286KM@NU.45,000/KM)	9.944	17.780	14-15
Trashigang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS(49 KM @NU.90000/KM)	1.714		15-16
Trashigang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS(45 KM @NU.80000/KM)	3.600		15-16
Trashigang	MAINTENANCE OF DZONGKHAG AND GC ROAD (436KM@NU.44,000/KM)	19.684	24.998	15-16
Trashigang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS(15 KM @NU.115000/KM)	3.555		16-17
Trashigang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS(30 KM @NU.109000/KM)	3.600		16-17
Trashigang	MAINTENANCE OF DZONGKHAG AND GC ROAD (449KM@NU.44,000/KM)	18.800	25.955	16-17
Trashigang	MAINTENANCE OF PRIMARY NATIONAL HIGHWAYS(15 KM @NU.115000/KM)	1.725		17-18
Trashigang	MAINTENANCE OF SECONDARY NATIONAL HIGHWAYS(30 KM @NU.109000/KM)	3.270		17-18
Trashigang	MAINTENANCE OF DZONGKHAG AND GC ROAD (449KM@NU.44,000/KM)	19.800	24.795	17-18
		1,266.403	1,266.403	

Appendix-III

Details of Approved budget for periodic maintenance for the FY 2013-18

RO	Name of road	Revised	Financial Year wise (Nu.)	Financial Year
Lingmethang	RESURFACING WORKS ON YADI-URA ROAD	20.000		13-14
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	6.000	26.000	13-14
Lingmethang	RESURFACING WORKS ON YADI-SERPANG PRIMARY NATIONAL HIGHWAY	20.000		14-15
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	5.000	25.000	14-15
Lingmethang	RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (4KM)	9.288		15-16
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (8.20KM)	7.000	16.288	15-16
Lingmethang	RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (6 KM) (ONGOING)	28.000		16-17
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (12KM) (ONGOING)	5.000	33.000	16-17
		100.288	100.288	
Lobeysa	RESURFACING WORKS ON VARIOUS DZONGKHAG ROADS, (TALO-NOBGANG- (2.88KM), SONAGASA PALACE - (3KM), WOLAKHA-TALO- (3.50KM), BAJO-SHENGANA- (6-11.8KM) & LAWALA-GANGTEY PHOJIKHA ROADS- 3KM) (18.18KM)	16.212		13-14
Lobeysa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORKS ON LAMPERI-WANGDUE PRIMARY NATIONAL HIGHWAYS (28KM)	50.000		13-14
Lobeysa	RESURFACING WORKS ON TEKIZAMPA-CHUSERBU PRIMARY NATIONAL HIGHWAYS (7 KM)	31.296		13-14
Lobeysa	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON PUNAKHA-TSHODELMO HIGHWAY (CHAINAGE: 14.60KM TO 19.60KM) (5KM)	10.601	108.109	13-14
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY CH. 0.00KM TO 12.00KM = 12KM	10.000	10.000	14-15
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY [RESURFACING WITH 40MM THICK AC CH:0.00-8.645 KM]	4.340		16-17
Lobeysa	RESURFACING & IMPROVEMENT WORKS OF SONAGASA PALACE ROADS [BT/LD CH: 0-3.07KM]	7.000		16-17
Lobeysa	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS BASE COURSE & BITUMEN SEALING WITH 40MM AC ON PUNAKHA-GASA SNH [CH: 30.40-50.40KM=20KM]	10.000	21.340	16-17
Lobeysa	IMPROVEMENT, BC & BT WORKS ALONG METSINA-PUNAKHA PNH [WIDENING WITH RETAINING STRUCTURES 1KM, 1KMBC, 8KMBT]	19.500		17-18
Lobeysa	RESURFACING WORKS ON PUNAKHA-GASA SNH (CH 0.00-10.00KM=10KM)	20.000		17-18
Lobeysa	BLACK TOPPING OF VVIP ROAD AT SIRIGANG, PUNAKHA [2.50KM]	6.229		17-18
Lobeysa	IMPROVEMENT OF PUNAKHA-GASA SNH (POTHOLE REPAIRS)	5.000	50.729	17-18

RO	Name of road	Revised	Financial Year wise (Nu.)	Financial Year
		190.178	190.178	
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY (2 KM)	10.000		13-14
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	7.500		13-14
Phuentsholing	RESURFACING OF SIPSU - TENDU ROAD (5 KM)	6.200	23.700	13-14
Phuentsholing	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAY(19KM)	5.000		14-15
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	10.000		14-15
Phuentsholing	RESURFACING OF SIPSU-TENDU ROAD (5KM)	5.000	20.000	14-15
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHAHIGHWAY	5.000		15-16
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10 KM)	5.000		15-16
Phuentsholing	RESURFACING OF SIPSU-TENDU ROAD	3.000	13.000	15-16
		56.700	56.700	
Thimphu	RESURFACING WORKS ON SEMTOKHA-DOCHULA ROADS (9.1KM), DRUK WANGYAL CHORTEN(0.30KM),NGAMAPHU(0-3KM),DEBSI(0-1.5KM),UPPER BABESA(0-3KM),UPPER MOTITHANG(0-5KM),DECHENPHUG MONASTERY(0-2KM),ROYAL G.MOTHER MOTITHANG(0-1.5KM) AND DECHENCHOLING PGODRANG(0-1.5KM)	50.000		13-14
Thimphu	RESURFACING WORKS ON CHANGTAGANG TO BEGANA ROAD(5KM)-BALANCE WORK	5.000		13-14
Thimphu	RESURFACING WORKS ON NAMSELING PALACE(0.40KM)	0.500		13-14
Thimphu	RESURFACING OF OLATHANG HOTEL ROADS(2.2KM) AND SIMTOKHA-CHAMGANG ROAD(3KM),	5.000	60.500	13-14
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO NGAMAPHU (3KM)	2.500		14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO UPPER BABISA(3KM)	5.000		14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO UPPER MOTITHANG(5KM)	5.000		14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO DECHENPHUG MANASTRY (2KM)	2.500		14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO ROYAL GRAND MOTHER MOTITHANG(1.5KM)	2.500		14-15
Thimphu	RESURFACING WORKS ON KHASADRAPCHU TO GIDAKOM(3KM)	5.000		14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO DECHENCHOLING PALACE (1.5KM)	2.500		14-15
Thimphu	RESURFACING OF PRIMARY NATIONAL HIGHWAYS UNDER THIMPHU FIELD DIVISION Adjustment of Previous Year's Advances	0.005	25.005	14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO NGABIPHU (3KM)	6.000		15-16
Thimphu	BEGANA-TANGO CHERI SNH 3 KM	5.000	11.000	15-16
Thimphu	RESURFACING WORKS ON UPPER BABESA (2KM)	5.000		16-17
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (2.50 KM)	4.000		16-17
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3 KM)	6.000		16-17
Thimphu	BLACK TOPPING OF GENEKHA GEWOG GC ROAD	10.150		16-17

RO	Name of road	Revised	Financial Year wise (Nu.)	Financial Year
	(WANGBEMA - GENEKHA 5KM) GOI SDP Batch III			
Thimphu	RESURFACING OF DOCHULA PHN (5.6KM)	17.100	42.250	16-17
Thimphu	RESURFACING WORKS ON UPPER BABESA (4KM)	3.000		17-18
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (3.00 KM)	5.000		17-18
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3.50 KM)	5.000		17-18
Thimphu	RESURFACING OF ROAD TO DECHENCHOLINGGOENPA	5.000		17-18
Thimphu	RESURFACING WORKS FROM JANGSA TO TAA DZONG AND RINPONG DZONG(6.3 KM)	5.000		17-18
Thimphu	BLACK TOPPING OF GENEKHA GEWOG GC ROAD (WANGBEMA - GENEKHA 5KM)	3.092	26.092	17-18
		164.847	164.847	
Trongsa	RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	15.000		13-14
Trongsa	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 160KM-170KM (10KM)	10.000	25.000	13-14
Trongsa	RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	10.000	10.000	14-15
Trongsa	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KATIGANG-KHOSHILA VIEW POINT(166-177KM)(11KM)	12.000		16-17
Trongsa	RESURFACING WORKS ON DOMKHAR PALACE ROADS(BLACK TOPPING & L-DRAIN CONSTRUCTION) AS A VVIP PROJECT	2.000		16-17
Trongsa	RESURFACING OF INTERNAL ROADS 5KM(DZONG,HOSPITAL, SCHOOLS & DOR AREAS)	1.000	15.000	16-17
Trongsa	RESURFACING WORKS ON JAKAR-URA PNH(274-279KM)	5.000		17-18
Trongsa	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KHOSHILA-LANGTHEL 10KM	10.000		17-18
Trongsa	RESURFACING OF DZONGKHAG ROADS (THARPALING 3KM)	5.800		17-18
Trongsa	RESURFACING OF DZONGKHAG ROADS(CHAMKHAR-KURJEE 2KM)	3.100	23.900	17-18
		73.900	73.900	
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUNTSHOTANG ROAD	5.000		14-15
Samdrupjongkhar	RESURFACING WORKS ON TSHELINGOR-PEMA GATSHEL ROAD	3.000		14-15
Samdrupjongkhar	RESURFACING OF DZONGKHAG ROAD AND APPROACH ROAD TO NANGKOR HSS	2.000		14-15
Samdrupjongkhar	DZONGKHAG ROAD RESURFACING SERVICES, BLACK TOPPING OF DECHELING GC ROAD	3.872	13.872	14-15
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUENTSHOTANG SNH (12.3 KM)	8.000	8.000	15-16
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUENTSHOTANG, MAJOR POTHOLE REPAIRS(10 KM) FROM 50KM-40KM.(ONGOING)	3.000	3.000	16-17
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG - PHUNTSHOTANG SNH (10KM).	15.000	15.000	17-18
		39.872	39.872	
Sarpang	RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	11.850	11.850	13-14
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL	16.500		14-15

RO	Name of road	Revised	Financial Year wise (Nu.)	Financial Year
	HIGHWAYS PAVEMENT STRENGTHENING WORKS ON GELEPHU-SANKOSH HIGHWAY			
Sarpang	RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	16.500		14-15
Sarpang	RESURFACING WORK ON DAMPHU LOBSEBOTAY ROADS	2.000		14-15
Sarpang	RESURFACING WORK ON RESERBU MENDRELGANG ROADS	3.000	38.000	14-15
Sarpang	PAVEMENT STRENGTHENING WORKS ON GELEPHU-SANKOSH(DARACHU) HIGHWAY	17.190		15-16
Sarpang	PAVEMENT STRENGTHENING WORK ON DARACHU SUNKOSH (PNH)	18.000		15-16
Sarpang	RESURFACING WORK ON GELEPHU-TRONGSA (CHAPLAYKHOLA) HIGHWAY(PNH)	15.000		15-16
Sarpang	RESURFACING OF RESERBOO MENDRELGANG ROAD 3KM	2.790	52.980	15-16
Sarpang	PAVEMENT STRENGTHENING WORK ON DARACHU-SUNKOSH PNH	2.600		16-17
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS (25KM)	10.600	13.200	16-17
Sarpang	PAVEMENT STRENGTHENING WORKS ON SARPANG-TSIRANG PNH (5KM)	25.000		17-18
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS	10.000		17-18
Sarpang	RESURFACING WORK ON TSHACHU DZONGKHAG ROAD	2.160	37.160	17-18
		153.190	153.190	
Tingtibi	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 107KM-126KM (10KM)	10.000	10.000	14-15
Tingtibi	RESURFACING WORKS ON TINGTIBI-WANGDIDGANG BYPASS ROAD (15KM)	24.400	24.400	17-18
		34.400	34.400	
Trashigang	Resurfacing of Shali - Tshenkarla Road (Pothole 5KM)	2.000	2.000	14-15
Trashigang	Resurfacing of Trashigang - Rangjung Road (4KM)	3.600	3.600	15-16
Trashigang	Resurfacing of Trashigang - Rangjung (4Km)	7.000	7.000	16-17
Trashigang	Resurfacing of Shali - Tshenkarla Road (Ch. 2.7KM)	7.345	7.345	17-18
		19.945	19.945	
		833.320	833.320	

Appendix-III
Details of expenditure incurred for routine maintenance works for the FY 2013-18

FY	RO	Lingmethang	Lobeysa	Phuentsholing	Samdrupjongkhar	Sarpang	Trashigang	Trongsa	Tingtibi	Thimphu
		Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)	Amount (Nu.)
13-14	PNH		12,985,702.59	9,545,959.95		14,845,951.90	3,998,560.72	18,040,000.00		6,136,000.00
	SNH		6,719,999.20	3,891,563.87		6,959,999.20	10,474,776.41	3,520,000.00		3,434,945.33
	Dz. & GC Roads		7,171,807.15	4,399,611.00		2,965,881.00	12,364,000.00	4,444,000.00		4,295,999.30
		-	26,877,508.94	17,837,134.82	-	24,771,832.10	26,837,337.13	26,004,000.00	-	13,866,944.63
14-15	PNH		15,196,427.71	9,545,999.94		15,168,731.79	4,213,999.53	28,226,999.09	9,975,981.01	8,101,999.20
	SNH		6,681,327.66	3,920,000.00	6,879,999.25	6,959,999.58	3,621,999.91		4,175,477.40	3,637,912.55
	Dz. & GC Roads		5,735,991.34	4,970,144.98	2,633,528.57	3,258,385.43	9,943,999.43	4,098,999.93	1,423,475.25	4,393,000.00
		-	27,613,746.71	18,436,144.92	9,513,527.82	25,387,116.80	17,779,998.87	32,325,999.02	15,574,933.66	16,132,911.75
15-16	PNH		15,215,144.01	12,535,943.22	3,440,000.00	15,221,558.60	1,713,629.34	25,589,999.65	13,415,878.76	8,261,999.83
	SNH		6,719,999.73	3,599,999.75	6,965,999.88	6,959,000.00	3,515,893.60			8,619,999.57
	Dz. & GC Roads		9,944,000.00	13,862,521.18	17,926,352.62	14,541,171.15	19,329,978.81	5,771,000.00	7,219,795.75	6,599,999.35
		-	31,879,143.74	29,998,464.15	28,332,352.50	36,721,729.75	24,559,501.75	31,360,999.65	20,635,674.51	23,481,998.75
16-17	PNH		13,780,000.00	19,157,794.68	5,254,999.79	19,818,463.88	3,554,902.28	21,155,999.78	21,069,056.42	11,944,000.00
	SNH		6,720,000.00	5,293,858.40	14,608,000.00	6,943,917.38	3,599,912.74			12,799,000.00
	Dz. & GC Roads		9,944,000.00	13,008,673.00	11,659,999.78	12,759,999.67	19,728,408.09	5,543,999.10	5,188,139.37	8,168,000.00
		-	30,444,000.00	37,460,326.08	31,522,999.57	39,522,380.93	26,883,223.11	26,699,998.88	26,257,195.79	32,911,000.00
17-18	PNH	8,286,832.29	12,000,000.00	18,739,978.07	5,470,000.00	20,354,370.45	1,724,987.45	23,130,056.57	23,939,158.81	11,540,000.00
	SNH	7,412,000.00	7,000,000.00	5,260,999.49	15,000,000.00	6,999,999.26	3,269,993.69			11,829,170.00
	Dz. & GC Roads	16,004,000.00	9,944,000.00	13,999,999.32	13,999,550.59	12,859,998.43	19,797,855.58	5,500,000.00	7,206,150.65	9,154,000.00
		41,702,832.29	28,944,000.00	38,000,976.88	34,469,550.59	40,214,368.14	24,792,836.72	28,630,056.57	31,145,309.46	32,523,170.00
		41,702,832.29	145,758,399.39	141,733,046.85	103,838,430.48	166,617,427.72	120,852,897.58	145,021,054.12	93,613,113.42	118,916,025.13

Appendix-III

Details of expenditure incurred for periodic maintenance works for the FY 2013-18

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS ON YADI-URA ROAD	20,000,000.00		13-14
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	6,000,000.00	26,000,000.00	13-14
Lingmethang	RESURFACING WORKS ON YADI-SERPANG PRIMARY NATIONAL HIGHWAY	19,920,565.01		14-15
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	5,000,000.00	24,920,565.01	14-15
Lingmethang	PAVEMENT STRENGTHENING OF ROADS AT THRUMSHINGLA AREA	2,080,202.00		15-16
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (4 KM)	9,134,922.16		15-16
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (8.20KM)	7,000,000.00	18,215,124.16	15-16
Lingmethang	PAVEMENT STRENGTHENING OF ROADS AT THRUMSHINGLA AREA (ONGOING)	3,000,000.00		16-17
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (6 KM) (ONGOING)	25,848,229.18		16-17
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (12KM) (ONGOING)	4,901,636.00	33,749,865.18	16-17
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS 01 RESURFACING WORKS ON LINGMETHANG-SERPANG PRIMARY NATIONAL HIGHWAY (10 KM) Adjustment of Previous Year's Advances	2,152,000.00		17-18
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS 01 RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (12KM) (ONGOING) 0003 Adjustment of Previous Year's Advances	98,000.00	2,250,000.00	17-18
Lobeysa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS 02 RESURFACING WORKS ON	31,295,944.92		13-14

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
	TEKIZAMPA-CHUSERBU PRIMARY NATIONAL HIGHWAYS (7 KM)			
Lobeysa	RESURFACING WORKS ON PUNAKHA-TSHODELMO HIGHWAY (CHAINAGE: 14.60KM TO 19.60KM) (5KM)	10,382,439.31		13-14
Lobeysa	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING WORKS ON VARIOUS DZONGKHAG ROADS, (TALO-NOBGANG- (2.88KM), SONAGASA PALACE - (3KM), WOLAKHA-TALO- (3.50KM), BAJO-SHENGANA- (6-11.8KM) & LAWALA-GANGTEY PHOJIKHA ROADS- 3KM) (18.18KM)	16,211,999.54	57,890,383.77	13-14
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY CH. 0.00KM TO 12.00KM = 12KM	9,999,786.00	9,999,786.00	14-15
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY [RESURFACING WITH 40MM THICK AC CH:0.00-8.645 KM]	4,340,000.00		16-17
Lobeysa	RESURFACING & IMPROVEMENT WORKS OF SONAGASA PALACE ROADS [BT/LD CH: 0-3.07KM]	7,000,000.00	11,340,000.00	16-17
Lobeysa	RESURFACING WORKS ON PUNAKHA-GASA SNH (CH 0.00- 10.00KM=10KM)	19,309,957.22	19,309,957.22	17-18
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY (2KM)	9,999,999.27		13-14
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	7,499,104.26		13-14
Phuentsholing	RESURFACING OF SIPSU - TENDU ROAD (5 KM)	6,199,330.44	23,698,433.97	13-14
Phuentsholing	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAY(19KM)	4,999,994.30		14-15
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	9,999,999.34		14-15
Phuentsholing	RESURFACING OF SIPSU-TENDU ROAD(5KM)	5,000,000.00	19,999,993.64	14-15
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY	5,000,000.00		15-16
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY	4,958,484.00		15-16
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10 KM)	5,000,000.00		15-16
Phuentsholing	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING OF SIPSU-TENDU ROAD	3,000,000.00	17,958,484.00	15-16
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUNTSHOTHANG ROAD	4,910,801.93		14-15
Samdrupjongkhar	RESURFACING WORKS ON TSHELINGOR-PEMA GATSHEL ROAD	2,637,339.12		14-15
Samdrupjongkhar	RESURFACING OF DZONGKHAG ROAD AND APPROACH ROAD TO NANGKOR HSS	2,000,000.00	9,548,141.05	14-15

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUEENTSHOTHANG SNH (12.3 KM)	8,000,000.00		15-16
Samdrupjongkhar	RE-SURFACING WORKS ON TSHERLINGORE, PEMA GATSHEL & KHOTHAKPA SNH ROADS (2 KM).	2,999,999.40		15-16
Samdrupjongkhar	RE-SURFACING WORKS ON APPROACH ROAD TO YONGLA GOENPA ROAD (2.75 KM).	7,999,999.05	18,999,998.45	15-16
Samdrupjongkhar	PAVEMENT STRENGTHENING OF ROAD FROM LINZIN TO TSENKHARI, NGLAM	1,196,687.07		16-17
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUEENTSHOTHANG, MAJOR POTHOLE REPAIRS(10 KM) FROM 50KM-40KM.(ONGOING)	3,000,000.00		16-17
Samdrupjongkhar	RE-SURFACING WORKS (10KM) UNDER DEWATHANG-PHUEENTSHOTHANG ROADS	12,733,485.07	16,930,172.14	16-17
Samdrupjongkhar	PAVEMENT STRENGTHENING ,LINGZIN ,TSENKARI (9.5KM).	36,000,000.00		17-18
Samdrupjongkhar	PAVEMENT STRENGTHENING WORKS ON TSHERINGORE-PEMA GATSHEL-KHOTHAK PA (6KM).	12,000,000.00		17-18
Samdrupjongkhar	RE-SURFACING WORKS (10KM) UNDER DEWATHANG-PHUEENTSHOTHANG ROADS Adjustment of Previous Year's Advances	2,267,000.00		17-18
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG- PHUNTSOTHANG SNH (10KM).	14,999,999.70	65,266,999.70	17-18
Sarpang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	11,850,000.00	11,850,000.00	13-14
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORKS ON GELEPHU-SANKOSH HIGHWAY	16,500,000.00		14-15
Sarpang	RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	14,830,132.59		14-15
Sarpang	RESURFACING WORK ON DAMPHU LOBSEBOTAY ROADS	1,561,316.00		14-15
Sarpang	RESURFACING WORK ON RESERBU MENDRELGANG ROADS	2,600,560.20	35,492,008.79	14-15
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORKS ON GELEPHU-DARACHHU PNH	17,190,000.00		15-16
Sarpang	PAVEMENT STRENGTHENING WORK ON DARACHU-SUNKOSH PNH	14,496,469.58		15-16
Sarpang	RESURFACING WORKS ON GELEPHU-CHAPLAYKHOLA PNH	14,700,787.15		15-16
Sarpang	RESURFACING OF RESERBOO MENDRELGANG ROAD (3 KM)	1,200,094.35	47,587,351.08	15-16

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORK ON DARACHU-SUNKOSH PNH	2,554,806.57		16-17
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS (25KM)	7,389,613.30	9,944,419.87	16-17
Sarpang	PAVEMENT STRENGTHENING WORKS ON SARPANG-TSIRANG PNH (5KM)	9,539,616.03		17-18
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS (8KM)	9,999,999.68		17-18
Sarpang	RESURFACING WORK ON TSHACHU DZONGKHAG ROAD	2,159,999.63	21,699,615.34	17-18
Thimphu	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING OF PRIMARY NATIONAL HIGHWAYS UNDER THIMPHU FIELD DIVISION	49,970,874.50		13-14
Thimphu	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON CHANGTAGANG TO BEGANA ROAD(5KM) - BALANCE WORK	5,000,000.00		13-14
Thimphu	RESURFACING WORKS ON NAMSELING PALACE(0.40KM)	500,000.00		13-14
Thimphu	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING OF OLATHANG HOTEL ROADS(2.2KM) AND SIMTOKHA-CHAMGANG ROAD(3KM),	5,000,000.00	60,470,874.50	13-14
Thimphu	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING OF PRIMARY NATIONAL HIGHWAYS UNDER THIMPHU FIELD DIVISION Adjustment of Previous Year's Advances	4,474.42		14-15
Thimphu	RESURFACING OF APPROACH ROAD TO NGAMAPHU (3KM)	2,500,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER BABISA(3KM)	5,000,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER MOTITHANG(5KM)	5,000,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD TO DECHENPHUG LHAKHANG (2KM)	2,500,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER MOTITHANG (1.5KM)	2,500,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT DECHENCHOLING (1.5KM)	2,500,000.00		14-15
Thimphu	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON KHASADRAPCHU TO GIDAKOM(3KM)	4,683,000.00	24,687,474.42	14-15
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO NGABIPHU (3 KM)	5,999,659.50		15-16
Thimphu	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS IMPROVEMENT OF BEGANA-TANGO CHERI ROAD (3 KM)	4,344,951.15	10,344,610.65	15-16
Thimphu	RESURFACING WORKS ON UPPER BABESA (2KM)	4,769,002.02		16-17

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (2.50 KM)	4,000,000.00		16-17
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3 KM)	6,000,000.00		16-17
Thimphu	RESURFACING OF DOCHULA PNH (5.6KM)	17,099,999.12	31,869,001.14	16-17
Thimphu	RESURFACING WORKS ON UPPER BABESA (4KM)	2,606,456.50		17-18
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (3.00 KM)	4,634,000.00		17-18
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3.50 KM)	4,606,456.50		17-18
Thimphu	RESURFACING OF ROAD TO DECHENCHOLINGGOENPA	4,843,406.00		17-18
Thimphu	RESURFACING WORKS FROM JANGSA TO TAA DZONG AND RINPONG DZONG(6.3 KM)	5,000,000.00	21,690,319.00	17-18
Trashigang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RE-SURFACING WORKS ON KHERI-YADI (10KM) HYBRID CONTRACT.	10,000,000.00		13-14
Trashigang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS MAJOR POTHOLE REPAIR ON TSHELINGORE-KHOTHAKPA WITHIN (36KM) ROA	4,729,546.87	14,729,546.87	13-14
Trashigang	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING WORKS ON SHALI-TSENGKHARLA ROAD (POTHOLE)- 5KM	1,999,600.40	1,999,600.40	14-15
Trashigang	RESURFACING WORKS ON DZONGKHAG ROADS RE-SURFACING WORKS ON TRAHIGANG-RANGJUNG (4KM).	3,402,931.16	3,402,931.16	15-16
Trashigang	RESURFACING WORKS ON DZONGKHAG ROADS RE-SURFACING WORKS ON TRAHIGANG-RANGJUNG (4KM). RGOB Financing	6,472,620.64	6,472,620.64	16-17
Trashigang	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING OF SHALI - TSHENKHARLA ROAD (CH. 2-7 KM)	7,644,964.92	7,644,964.92	17-18
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 160KM-170KM (10KM)	10,000,000.00		13-14
Trongsa	RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	14,982,328.00		13-14
Trongsa	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING WORKS ON TAMSHING ,LAMEY GOENPA, KARCHU DRATSHANG ,LAMEY GOENPA, KARCHU DRATSHANG ROADS (5KM)	3,864,000.00	28,846,328.00	13-14
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	9,695,955.62	9,695,955.62	14-15

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	Financial Year
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KATIGANG-KHOSHILA VIEW POINT(166-177KM)(11KM)	9,409,660.36		16-17
Trongsa	RESURFACING OF INTERNAL ROADS 1KM(DZONG,HOSPITAL, SCHOOLS & DOR AREAS)	1,000,000.00	10,409,660.36	16-17
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS (15KM) RESURFACING WORKS ON JAKAR-URA PNH (274-279KM)	5,000,000.00		17-18
Trongsa	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KHOSHILA-LANGTHEL 10KM	9,661,885.50		17-18
Trongsa	RESURFACING WORKS ON DZONGKHAG ROADS RESURFACING OF DZONGKHAG ROADS (THARPALING 3KM)	5,799,999.70		17-18
Trongsa	RESURFACING OF DZONGKHAG ROADS (CHAMKHAR-KURJEE 2KM)	3,100,000.00	23,561,885.20	17-18
Tingtibi	RESURFACING ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 107KM-126KM (10KM)	10,000,000.00	10,000,000.00	14-15
Tingtibi	RESURFACING ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON TINGTIBI-WANGDIDGANG BYPASS ROAD (15KM)	23,590,340.00	23,590,340.00	17-18

Appendix-IV
Total length of PNH and SNH constructed

Sl. No.	RO	PNH (in Km) (A)	NEWH (in Km) (B)	NET PNH (in Km) A-B	SNH (in Km)
1	Lingmethang	194.62	153.00	41.62	65.00
2	Lobeysa	183.00	118.00	65.00	82.13
3	Phuentsholing	166.40		166.40	69.00
4	Sarpang	177.25		177.25	86.00
5	Samdrupjongkhar	97.75		97.75	202.01
6	Thimphu	96.90	20.00	76.90	116.35
7	Trashigang	97.00	52.00	45.00	17.00
8	Trongsa	229.16	161.20	67.96	98.00
9	Tingtibi	161.00		161.00	59.00
	Total	1,403.08	504.20	898.88	794.49
TOTAL PNH & SNH CONSTRUCTED					1,693.37

Total length of PNH and SNH resurfaced

Sl. No.	RO (in Km)	PNH (in Km)	SNH (in Km)
1	Lingmethang	38.14	14.62
2	Lobeysa	12.00	51.07
3	Phuentsholing	8.90	26.30
4	Sarpang	59.14	30.00
5	Samdrupjongkhar		65.83
6	Thimphu	48.50	16.80
7	Trashigang	5.00	12.33
8	Trongsa	31.40	
9	Tingtibi	24.00	
		227.08	216.95
TOTAL PNH & SNH RESURFACED			444.03

Appendix-IV

Details of expenditure incurred on periodic maintenance for the FY 2013-18

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	FY
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON YADI-URA ROAD	20,000,000.00		13-14
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	6,000,000.00		13-14
Lobeysa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS 02 RESURFACING WORKS ON TEKIZAMPA-CHUSERBU PRIMARY NATIONAL HIGHWAYS (7 KM)	31,295,944.92		13-14
Lobeysa	RESURFACING WORKS ON PUNAKHA-TSHODELMO HIGHWAY (CHAINAGE: 14.60KM TO 19.60KM) (5KM)	10,382,439.31		13-14
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY (2KM)	9,999,999.27		13-14
Sarpang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	11,850,000.00		13-14
Trashigang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RE-SURFACING WORKS ON KHERI-YADI (10KM) HYBRID CONTRACT.	10,000,000.00		13-14
Trashigang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS MAJOR POTHOLE REPAIR ON TSHELINGORE-KHOTHAKPA WITHIN (36KM) ROA	4,729,546.87		13-14
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 160KM-170KM (10KM)	10,000,000.00		13-14
Trongsa	RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	14,982,328.00		13-14
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	7,499,104.26		13-14
Thimphu	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING OF PRIMARY NATIONAL HIGHWAYS UNDER THIMPHU FIELD DIVISION	49,970,874.50		13-14
Thimphu	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON CHANGTAGANG TO BEGANA ROAD(5KM) -BALANCE WORK	5,000,000.00		13-14
Thimphu	RESURFACING WORKS ON NAMSELING PALACE(0.40KM)	500,000.00	192,210,237.13	13-14
Lingmethang	RESURFACING WORKS ON YADI-SERPANG PRIMARY NATIONAL HIGHWAY	19,920,565.01		14-15

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	FY
Lingmethang	RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY	5,000,000.00		14-15
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY CH. 0.00KM TO 12.00KM = 12KM	9,999,786.00		14-15
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10KM)	9,999,999.34		14-15
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORKS ON GELEPHU-SANKOSH HIGHWAY	16,500,000.00		14-15
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON TRONGSA-YOTONGLA AND JAKAR HIGHWAYS	9,695,955.62		14-15
Tingtibi	RESURFACING ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY, CHAINAGE 107KM-126KM (10KM)	10,000,000.00		14-15
Phuentsholing	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAY(19KM)	4,999,994.30		14-15
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUNTSHOTANG ROAD	4,910,801.93		14-15
Samdrupjongkhar	RESURFACING WORKS ON TSHELINGOR-PEMA GATSHEL ROAD	2,637,339.12		14-15
Sarpang	RESURFACING OF SUNKOSH-DAGA ROAD (14KM)	14,830,132.59		14-15
Thimphu	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING OF PRIMARY NATIONAL HIGHWAYS UNDER THIMPHU FIELD DIVISION Adjustment of Previous Year's Advances	4,474.42		14-15
Thimphu	RESURFACING OF APPROACH ROAD TO NGAMAPHU (3KM)	2,500,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER BABISA(3KM)	5,000,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER MOTITHANG(5KM)	5,000,000.00		14-15
Thimphu	RESURFACING OF APPROACH ROAD AT UPPER MOTITHANG (1.5KM)	2,500,000.00	123,499,048.33	14-15
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (4 KM)	9,134,922.16		15-16
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (8.20KM)	7,000,000.00		15-16
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY	5,000,000.00		15-16

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	FY
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUENTSHOTHANG SNH (12.3 KM)	8,000,000.00		15-16
Samdrupjongkhar	RE-SURFACING WORKS ON TSHERLINGORE, PEMA GATSHEL & KHOTHAKPA SNH ROADS (2 KM).	2,999,999.40		15-16
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORKS ON GELEPHU-DARACHHU PNH	17,190,000.00		15-16
Sarpang	PAVEMENT STRENGTHENING WORK ON DARACHU-SUNKOSH PNH	14,496,469.58		15-16
Sarpang	RESURFACING WORKS ON GELEPHU-CHAPLAYKHOLA PNH	14,700,787.15		15-16
Lingmethang	PAVEMENT STRENGTHENING OF ROADS AT THRUMSHINGLA AREA	2,080,202.00		15-16
Phuentsholing	RESURFACING WORK ON RINCHENDING-PASAKHA HIGHWAY	4,958,484.00		15-16
Phuentsholing	RESURFACING WORKS ON SAMTSE-SIPSU ROAD (10 KM)	5,000,000.00		15-16
Thimphu	RESURFACING WORKS ON APPROACH ROAD TO NGABIPHU (3 KM)	5,999,659.50		15-16
Thimphu	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS IMPROVEMENT OF BEGANA-TANGO CHERI ROAD (3 KM)	4,344,951.15	100,905,474.94	15-16
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON YONGKOLA-SERPANG PRIMARY NATIONAL HIGHWAY (6 KM) (ONGOING)	25,848,229.18		16-17
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS RESURFACING WORKS ON GANGOLA-LHUENTSE SECONDARY NATIONAL HIGHWAY (12KM) (ONGOING)	4,901,636.00		16-17
Lobeysa	RESURFACING WORKS ON METSINA-PUNAKHA PRIMARY NATIONAL HIGHWAY [RESURFACING WITH 40MM THICK AC CH:0.00-8.645 KM]	4,340,000.00		16-17
Sarpang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS PAVEMENT STRENGTHENING WORK ON DARACHU-SUNKOSH PNH	2,554,806.57		16-17
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KATIGANG-KHOSHILA VIEW POINT(166-177KM)(11KM)	9,409,660.36		16-17
Lingmethang	PAVEMENT STRENGTHENING OF ROADS AT THRUMSHINGLA AREA (ONGOING)	3,000,000.00		16-17
Samdrupjongkhar	PAVEMENT STRENGTHENING OF ROAD FROM LINZIN TO TSENKHARI, NGANGLAM	1,196,687.07		16-17

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	FY
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG-PHUEENTHOTHANG, MAJOR POTHOLE REPAIRS(10 KM) FROM 50KM-40KM.(ONGOING)	3,000,000.00		16-17
Samdrupjongkhar	RE-SURFACING WORKS (10KM) UNDER DEWATHANG-PHUEENTHOTHANG ROADS	12,733,485.07		16-17
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS (25KM)	7,389,613.30	74,374,117.55	16-17
Thimphu	RESURFACING WORKS ON UPPER BABESA (2KM)	4,769,002.02		16-17
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (2.50 KM)	4,000,000.00		16-17
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3 KM)	6,000,000.00		16-17
Thimphu	RESURFACING OF DOCHULA PHN (5.6KM)	17,099,999.12		16-17
Lingmethang	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS 01 RESURFACING WORKS ON LINGMETHANG-SERPANG PRIMARY NATIONAL HIGHWAY (10 KM) Adjustment of Previous Year's Advances	2,152,000.00		17-18
Lingmethang	RESURFACING WORKS ON SECONDARY NATIONAL HIGHWAYS 01 RESURFACING WORKS ON GANGOLA-LHUEENTSE SECONDARY NATIONAL HIGHWAY (12KM) (ONGOING) 0003 Adjustment of Previous Year's Advances	98,000.00		17-18
Lobeysa	RESURFACING WORKS ON PUNAKHA-GASA SNH (CH 0.00- 10.00KM=10KM)	19,309,957.22		17-18
Samdrupjongkhar	PAVEMENT STRENGTHENING WORKS ON TSHERINGORE-PEMA GATSHEL-KHOTHAK PA (6KM).	12,000,000.00		17-18
Samdrupjongkhar	RESURFACING WORKS ON DEWATHANG- PHUNTSHOTANG SNH (10KM).	14,999,999.70		17-18
Sarpang	PAVEMENT STRENGTHENING WORKS ON SARPANG-TSIRANG PNH (5KM)	9,539,616.03		17-18
Trongsa	RESURFACING WORKS ON PRIMARY NATIONAL HIGHWAYS (15KM) RESURFACING WORKS ON JAKAR-URA PNH (274-279KM)	5,000,000.00		17-18
Trongsa	RESURFACING WORKS ON GELEPHU-TRONGSA HIGHWAY (KHOSHILA-LANGTHEL 10KM)	9,661,885.50		17-18
Tingtibi	RESURFACING ON PRIMARY NATIONAL HIGHWAYS RESURFACING WORKS ON TINGTIBI-WANGDIDGANG BYPASS ROAD (15KM)	23,590,340.00		17-18
Samdrupjongkhar	PAVEMENT STRENGTHENING ,LINGZIN ,TSENKARI (9.5KM).	36,000,000.00		17-18

RO	Particular	Amount (Nu.)	Financial Year wise Amount (Nu.)	FY
Samdrupjongkhar	RE-SURFACING WORKS (10KM) UNDER DEWATHANG-PHUENTSHOTHANG ROADS Adjustment of Previous Year's Advances	2,267,000.00		17-18
Sarpang	RESURFACING WORKS ON SUNKOSH DAGA ROADS (8KM)	9,999,999.68		17-18
Thimphu	RESURFACING WORKS ON UPPER BABESA (4KM)	2,606,456.50		17-18
Thimphu	RESURFACING WORKS ON NGABIPHU PNH (3.00 KM)	4,634,000.00		17-18
Thimphu	RESURFACING WORKS ON UPPER MOTITHANG (3.50 KM)	4,606,456.50		17-18
Thimphu	RESURFACING WORKS FROM JANGSA TO TAA DZONG AND RINPONG DZONG (6.3 KM)	5,000,000.00	193,334,712.27	17-18
TOTAL EXPENDITURE			684,323,590.22	

Appendix-V

Details of approved permanent structures for monsoon restoration works for the FY 2017-18

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
	Phuentsholing							
1	Samtse-P/ling PNH	13.75	Retaining Wall	8x5	162,906.28			Not Executed
2		4.50	Gabion Toe Wall	20x2	156,759.71			Not Executed
3	Jumja-Manitar-Raidak-Lhamozhingkha PNH	53.50	RCC Slab Culvert	L=20m with 5 rows of 1200mm M/pipe -Cause way	1,355,633.90			Not Executed
4		53.80	Gabion B/Wall	17x2, 14x2, 35x3	727,677.74			Not Executed
5		53.90	Gabion toe Wall and R/Wall	5x2-3nos., 10x4	333,689.69			Not Executed
6		54.50	Gabion R/Wall	20x7	1,139,186.96			Not Executed
7		61.00	R/Wall	8x8	739,552.52	8x8	7,39,552.52	
8		64.00	Gabion R/Wall	6x4	129,671.94			Not Executed
9		Badina-Phusa GC Road	1.70	RCC enchored Wall	9x2.5	177,628.99		
10	10.40		RCC enchore RRM Wall	7x2.5	145,638.78			Not Executed
11	Gedu-Junglay Dz. Road	22.50	R/Wall with cause way	11x3	202,510.58	9.3x3.05	248,026.56	
12		28.05	R/Wall with cause way	10x5 & 1.5 toe Wall	497,946.16	13.0x4.5	754,212.82	
13	Gangla-Dungna GC Road	3.80	RCC R/Wall	10x1	495,977.50			Not Executed
14	Rinchending Manitar PNH	4.80	Gabion Toe Wall	15.5x2	121,488.85			Not Executed

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
15		4.80	Gabion R/Wall	12x5	361,140.96			Not Executed
16		6.20	RRM R/Wall	13x4	452,785.35			Not Executed
			Total	16	7,200,195.91	3	1,002,239.38	
	Thimphu							
17	Bjakamja-Yuetsa GC Road	2.00	Toe Protection Wall (2 steps & RRM Wall	8x9	726,669.05			Not Executed
18		5.00	Gabion R/Wall	19.5x9	1,281,002.09			
19		5.00	RRM Wall	15x3				
20	Begana-Tango Cheri	8.00	Gabion Wall	7x8 & 17x3	694,210.34	23.8x7	390,735.00	
21		Bridge Point	Gabion Wall	20x5	726,924.00	16.5x4	129,814.00	
22	Semtokha-Chamgang Dz.Road	4.80	R/Wall + Catch Pit	20x8 + Catch Pit	1,401,112.56	Various size	1,496,555.50	
			Total	6	4,829,918.04	3	2,017,104.50	
	Lobeysa							
23	Tekizam-Chuserbu PNH(under Nobding Section)	391.20	Gabion R/Wall	26x9	2,548,111.02	23x9	1,667,500.00	
24		392.50	Gabion Toe Wall	22x3	355,076.86	21.5x3	279,500.00	
25		396.50	Gabion Toe Wall	36x3	581,036.08	31.5x3	409,500.00	
26		397.00	Gabion B/Wall	25x3	382,801.25	29.5x3	383,500.00	
27		399.00	Gabion B/Wall	40x3	612,482.00	40x3	520,000.00	
28	Tekizam-Chuserbu PNH(under Garzikha Section)	411.30	Gabion B/Wall	50x3	765,602.50	111x3	1,221,000	
29		413.50	Gabion B/Wall	40x3	612,482.00			
30		413.60	Gabion B/Wall	20x3	306,241.00			
31		413.70	Gabion B/Wall	50x3	765,602.50	11x.8, 14.3x4.5, 7x2, 11x3, 1x5.5, 3x6.5	796,881.92	
32		417.30	Plump Concrete Wall	30x5	873,168.55			
33		417.75	Gabion B/Wall	45x3	675,057.60			
34		417.60	Gabion B/Wall	30x5	550,993.52			18x5
35	Dochula Wangdizam	449.30	RRM R/Wall	15x7	687,571.65	22.83x10.85,	9,965,286.57	

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks		
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)			
36	PNH	449.35	RRM R/Wall	16x7	734,941.15	48x.5, 3x.5, 11.13x6.78, 9.63x5.91, 10.85x5.91, 8.45x8.23, 21.21x8.2, 28x6.86, 25.18x7.18				
37		449.40	RRM R/Wall	31x7	1,423,046.04					
38		449.46	RRM R/Wall	22x9	1,477,707.98					
39		449.60	RRM R/Wall	33x7	1,507,999.30					
40		449.70	RRM R/Wall	25x7	1,145,952.75					
41		467 & 474-475	Formation Cutting	350x8	4,752,000.00					3,584,975.00
42		454.00	Gabion Toe Wall	20x3	350,000.00				70x2	770,000.00
43	Wangdizam-Tekizampa PNH	432.60	RRM R/Wall	18x8	1,124,916.76		1,124,916.76			
44	Rakayzam-Nisho GC Road	1.60	RRM R/Wall	5.5x8	205,239.23	9.55x5.4, 8.7x1.5	143,086.00			
45	Punakha-Tshodelmo SNH	10.30	Gabion R/Wall	16x6	870,293.98	13x6	916,202.18			
46		10.90	Gabion Toe Wall	8x3	139,679.57	10x5				
47		11.40	RRM R/Wall	5x4	126,838.00	4.85x4.1				
			Total	25	23,574,841.29	25	22,255,740.51			
	Tingtibi									
48	Tingtibi-Z/gang-W/gang PNH	54.00	Retaining wall	3mx3m	39,091.39	3x3	39,091.00			
49			Toe wall	6mx2m	27,415.30			Not Executed		
50	Gomphu-Panbang PNH	1.20/ 36.40	R/wall	16.00m x 5.90m 13.00m x 2.00m	845,699.22	17.0mx3.15m, 15.0mx2.85m, 4.15mx1.95m	1,320,988.20			
51		2.90/ 37.9	R/wall	25.60 x 3.80 m	538,899.22	9.0mx3.5m, 14.85mx3.85m, 3.24mx2.3m				
52		20.20/ 55.5	R/wall	11.75m x 3.80m 11.75m x 2.00m 11.75m x 1.20m 11.75m x 1.00m	533,532.35	12.15mx3.28m, 12.0mx1.95m, 0.5mx3.63m, 3.78mx0.67m				
53		33.70/ 64.7	R/wall	17.8m x 3.00m	263,953.88	14.3mx2.85m				

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
54		17.30/ 53.3	R/wall	8.60m x 5.00m 8.60m x 1.0m 8.0 x 2.0m gabion	533,492.76	10.40mx5.15m	1,742,235.55	
55		17.50/ 53.5	R/wall	8.60 m x 6.00m 10.00m x 2.00m	501,718.27	10.30mx7.70m		
56		38.10/ 67.9	R/wall	13.70 x 6.0m	590,852.82	9.4mx2.6m, 9.6mx2.9m		
57		3.00/ 38	Formation Cutting	35x8.5m	124,786.49	45.0m x 5.6m	66,596.50	
58	Panbang-Nganglam PNH	8.02	RRM R/wall RRM toe wall Gabion t/wall U shape drain	21x4m 21x2m 15x4m 2 nos. 235m	1,441,481.40	Gabion R/wall, Gabion B/wall, Box Drain 21.0mx16.0m, 15.0mx3.0m, 246.0mx0.45m	1,834,000.00	
59		8.80	RRM R/wall RRM T/wall	17.8x4m 17.8x2m 2 Nos.	689,710.80			Not Executed
60	Buli-Nimshong GC Road 0-30.2km	9.50	G- Wall	(20x9)m	1,807,517.20	15x9 m	1,228,369.68	
61		20.00	R/wall	(12x8.19)m	1,864,839.88	14.85x2.61	767,280.00	
62	Nimshong-Therang GC road(18.4km)	0.45	R/wall	(9.6x4)m	584,434.51			Not Executed
63	Dakpel-Buli GC Road(36.6km)	27.80	G- Wall	(23x9)m	1,351,156.37	3nosx23.5mx3m	931,000.00	
64	Goshing GC Road	1.70	R/wall	18m x 5.8 m 7 m x 1.5 m 7.5 m x 1.5 m	845,352.31		1,810,000.00	
65		5.80	R/wall	12.00 m x 4.30 m	304,379.99			
			Total	18	12,888,314.16	15	7,929,560.93	
	Sarpang							
66	Sunkosh Dagana SNH (km 0-87)	14.40	Timber Crib Wall	35x4	153,263.60	1x25x2	178,530.00	
67			Gabion Toe Wall			2x15x1		

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
68		49.00	RCC and R/wall	23x5	742,261.05	6.50x1.50, 9.50x2.77, 9.90x0.75, 9.90x2.77	336,485.38	
69		49.00	Base Course works			1x110x4.5		
70		58.50	RRM R/wall	25x4.75	617,735.48	8.90x3.25, 8.70x2.90	241,542.31	
71			RCC Toe wall			1x16x1.18		
72		47.10	BC works	110x4.50	465,816.78	1x100x3.5	232,908.39	
73		72.60	BC works	110x4.50		1x110x4.5		
74		76.20	Gabion R/Wall	10x1	36,213.60	1x5.20x1, 1x4.90x1, 1x5.30x1, 1x6.15x1, 1x6.9x1	254,513.20	
75			Gabion B/Wall	20x2		1x5.4x1, 1x5.8x1		
76			Widening	20x3.5x10		105,812.00		
77		Dorona GC Road	8.60	Gabion R/Wall	23x3	371,380.81	1x23x3	345640
78	Gabion B/Wall			25x3	403,655.58	1x23x3	321560.00	
79	9.20		Gabion B/Wall	33x5	891,130.83	6x7x1	226918.67	
80	9.30		Gabion R/Wall	7x6	226,918.67	5x33x1	678123.00	
81	9.40		Gabion R/Wall	16x4	328,811.00	4x16x1	328811.00	
82	9.50		Gabion R/Wall	15x2	108,640.80	2x15x1	108640.80	
83	12.50		Gabion R/Wall	15x4	323,315.00	4x15x1	323315.00	
84	Khebesa GC Road	8.00	Widening	20x3.5x7	316,652.70	20x3.5x7	100,026.83	
85	Sergithang GC Road	10.30	Gabion R/Wall	14x3	791,544.24	14.5x3	364,659.00	
86				15x5		15x5		
87	Sunkosh-Darachu PNH	105.40	Masonary B/Wall	15x2	127,682.01	15.75x0.93x2	261,550.60	
88		79.60	Masonary R/Wall	9.6x3.5	163,120.01	9.8x1.23x3.27	154,659.80	
89	Shershong GC Road	4.40	R/Wall and RCC H/pipe	8x6	471,632.58		816,704.50	

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
90		5.30	R/Wall and Chute Drain	10x6.5	661,221.00			
91		7.50	R/Wall and Chute Drain	4x2	44,752.60			
92	Gelephu-Trongsa PNH	9.36	Masonry B/Wall	26x1	2,823,711.00	1x12x3.5, 1x4x3, 1x10.2x3.7	2,666,900.80	
93			Causeway	40x7.5		1x54x7.5		
94			Masonry R/Wall	24x2		1x12x5.4, 1x10.55x5.8, 1x15x5.8		
95		Causeway	8x7.5	75,991.00	1x9.5x4.3			
96		Gabion R/Wall	23x4	500,162.60	1x17.3x3			
97		Gabion R/Wall	13x4	282,700.60	1x15x4			
98		Box Drain	150m	336,629.24				
99		Gabion R/Wall	20x2	183,222.15	1x170.5x0.50	249,918.00		
100	Karmaling GC Road	1.18	Gabion R/Wall	13x3	181,415.78			Not Executed
101		1.55	Gabion R/Wall	7x3	97,685.42			Not Executed
102		3.20	RCC Submisible Causeway	15x4	341,236.07		207,184.90	
103	Nichula GC Road	6.85	RC Slab culvert 6m span	8x4	146,628.24		344,603.11	
104		7.20	RC Slab culvert 6m span	8x4	146,628.24			
105		7.80	Gabion Toe Wall	7x3	460,516.98			
			Total	40	13,191,177.16	38	9,296,343.38	
	Trongsa							
106	Wangdigang-Trongsa PNH	157.70	Masonry R/Wall	8x3.5	236,967.00			Not Executed
107		189.00	Gabion R/Wall	7x3, 10x3, 10x3	376,786.60			Not Executed

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
108	Trongsa-Sherubling Dz Road	0.90	Gabion B/Wall, chute and toe wall	14x5	2,562,505.46			Not Executed
109	Karshong Dz. Road	0.60	Gabion B/Wall	11x2	193,735.58			Not Executed
110	Tang GC Road	15.40	Masonry R/Wall	5x2	46,097.19			Not Executed
111	Tharpaling Road	9.00	Masonry R/Wall	15x3	332,906.84			Not Executed
			Total	6	3,748,998.67	0	0.00	
	Lingmethang							
112	Chompa-Thanangbi Dz. Road	1.50	R/wall	25x6.5	898,979.86			Not Executed
113	Zimzorong-Khenkhar GC Road	15.30	R/wall	10x2.1	139,649.93	RCC Wall, 10mx1.2m RRM Wall, 10mx1.2m	205,853.29	
114	Jurme GC Road	4.80	R/wall	14x4.5	219145.97			Not Executed
115	Silambi GC Road	24.00	Gabion R/Wall	11x4	294,393.93			Not Executed
116		29.80	RRM R/Wall	9.6x5	450,295.00			Not Executed
117		41.50	RRM R/Wall	19.2x5	895,783.64			Not Executed
118	Gangola-Lhuntse SNH	60.80	R/Wall with concrete base	21x7	2,300,000.00		1,778,082.89	
119	Minje GC Road	7.30	R/wall	9x4	226,057.30			Not Executed
120		8.00	Hume pipe with wing wall and step wall	2(8x5)	1,322,867.30			Not Executed
121		3.90	RRM R/Wall	9.6x5	312,000.00			Not Executed
			Total	10	7,059,172.93	2	1,983,936.18	
	Trashigang							

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
122	Chaskhar-Thagrang GC Road	13.85	R/Wall	13x5.50m	418,352.18		361326.8	
123	Khengdongmani-Udzorong GC Road	1.90	Masonry B/Wall	11x3m	223,742.72			Not Executed
124		17.20	Masonry B/Wall	15x3.5m	427,637.00	R/Wall 14.96*3.42	1,084,322.50	
125		29.50	Masonry R/Wall	22x4m	763,386.00	21.50*4.00		
126		29.60	Gabion B/wall	16x3m	325,444.00			Not Executed
127	Samkhar GC Road	3.50	R/Wall and toe wall	11x3m	480,263.29	11.0mx3m	365,512.72	
128	Dogorom-Thrakthrik GC (Sakteb GC Road)	27.40	W/Wall with 1.5m ht. plumb	11x7m	998,483.33	11.0mx7m	401,907.50	
129	Chazam-Duksum PNH	1.95	R/wall	17x4.10m	404,547.51	17.30x4.40	306,864.53	
130	Bumdelling GC Roads	1.10	Abutment	6(x4.5) 2no.	375,617.48			Not Executed
131	Jamkhar GC Road	3.80	R/Wall	12x2.5	250,759.73	12.70 * 4.00	269857.83	
132	Trashigang-Rangung Dz. Road	1.00	R/Wall	6x6m	270,000.00		69,933.77	
133	Tongmi-jangsa GC Road	10.50	RRM R/wall	16x6.5	791,500.12			Not Executed
			Total	12	5,729,733.36	8	2,859,725.65	
	Samdrupjongkhar							
134	Tsebar-Mukuri-Durungri SNH	47.00	R/wall	20x8	1,377,652.66			Not Executed
135			G/T/Wall	20x2	169,247.45			Not Executed
136	Tsebar-Dungmin SNH	1.20	RCC toe wall	9.6x6x3	1,705,617.78			Not Executed
137	Dewathang-Samdrupcholing SNH	48.00	PCC	6.8x2.8x0.5	562,644.97			Not Executed
138			RRM	6x2.2x1.0				Not Executed

Sl.No.	Name of Road	Chainage/ Location(in km)	Type of Structure	Approved by DCC		Executed by ROs		Remarks
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
139			RRM	4.1x1.6x2.2				Not Executed
140			PCC	9.0x1.0x0.5				Not Executed
141			RRM	7.7x.90x1.6				Not Executed
142			36.20	G/Rwall and toe wall		18x5, 10x3	820,926.22	60x3, 40x3
143	Chokorling GC Road (0-24 km)	15.50	R/wall	(2x9.6x2x4) 2 panel	427,822.73	41.00x2.00	414,536.91	
144	Decheling GC road (17.4 km)	7.28	R/Wall	15x5	569,353.55	9.00x2.40	110,129.40	
145		7.30	Widening	120 cum	26,510.40		26,510.40	
146		8.60	Gabion breast wall	15x3	300,555.35			Not Executed
147		10.00	R/Wall & Hume pipe	10x5	284,009.13	9.60x4.00	210,828.20	
148	Chimung GC Road	15.60	R/Wall	15x4	485,097.68	12.6x4, 10.4x4	448,155.91	
149	Khar GC Road	4.00	RRM R/Wall	10x4	321,121.39	20x4	389,700.80	
150	Jomotshangkha-Lauri GC Road	7.85	R/wall	15x9	1,191,328.96	10.3x5.24, 10x2.11, 7.8x2.92	1,319,459.18	
151		9.45	R/wall	12.5x3	345,135.62	12.7x1.66	86,360.00	
152	Martshala GC Road	1.04	G/Wall	7.5x9	275,016.94	22x3	275,594.48	
153	Khothagpa-Khar-Tesbar-Yurung Dz	26.60	Gabion R/Wall(1st step	5x2	162,466.25			Not Executed
154			2nd step	8x2				Not Executed
155			3rd step	10x2				Not Executed
			Total	22	9,024,507.08	10	4,533,977.44	
			Grand Total	155	87,246,858.60	104	51,878,627.97	

Appendix-VI

Details of permanent structures constructed without approved budget under monsoon restoration works for the FY 17-18

Sl.No.	RO	Name of Road	Chainage/ Location (km)	Type of Structure	Executed	
					Size of structure	Amount (Nu.)
1	Sarpang	Sunkosh Dagana SNH (km 0-87)	22.30	Boulder Wall	1x30x3	36,389.50
			49.00	RCC Toe Wall	3x1.5	274,229.51
			22.50	Gabion B/Wall	2x36x1	278,560.00
		Gelephu-Trongsa PNH	37.00	Masonry R/Wall and toe wall	1x16.6x1.13x3, 1x18.6x1.13x3.00, 2x9.3x1.31x3.9	792,790.96
Total			4		1,381,969.97	
2	Thimphu	Jangsa-Taa Dzong Road		B/wall	11x5, 8.9x5.5	201,123.00
Total			1		201,123.00	
		Ganglakha - Dungna GC Road	3.80	RCC R/Wall		
			10.30	Gabion Wall	10 x7	180,000
			16.20	RRM Wall	6.6 x3.5 & 7.25 x4.5	236,255.1
			17.80	Gabion B/Wall	130 x 3	1,404,000
			19.50	Gabion B/Wall	54.5 x 2	327,000
			19.90	Gabion B/Wall	18.67 x 3	201,636
			21.00	Gabion B/Wall	44 x 3	475,200
		Gedu-Junglay Dz. Road	23.90	B/wall	24.4x2.0	307,031.64
3	Phuentsholing	Ganglakha - Dungna GC Road	3.00	Cause way	10.76 x 9.8	470,200.94
				Cause way wall 1st	5.2 x 2.7	
				Cause way wall 2nd	6.8 x 2.6	
				Cause way wall 3th	10.45 x 1.6	
				Supporting wall	11.3 x 0.9	
		26.50	RRM wall	10.2 x2, 10.3 x 2, 10 x 2	289,625.20	
		16.00	Gabion wall	10.5 x 2	63,000.00	
		26.90	Gabion wall	72 x 3	777,600.00	
		12.40	Gabion wall	10 x 4	180,000.00	
27.00	RRM wall	7.8 x 3.4, 7.8 x 3.45	305,197.12			

Sl.No.	RO	Name of Road	Chainage/ Location (km)	Type of Structure	Executed	
					Size of structure	Amount (Nu.)
			Total	18		5,216,746.00
4	Tingtibi	Gomphu-Panbang PNH	36.40	RRM R/wall	12x3.5	1,650,000.00
			37.90	RRM R/wall	17x3.8	
			55.50	RRM R/wall	6x3.5	
			64.70	RRM R/wall	10.6x2.0	
			Total	4		1,650,000.00
5	Trongsa	Karshong Road	0.30	L drain	15 x 0.3 x 0.3	188,496.29
			0.30	Chute	19.5 x 0.40 x 0.6	
			0 to 4	Earthern Drain	4000 x 1 x 1	460,280.00
			0.30	Earthern Drain	3000 x 1 x 1	345,210.00
			0.30	Earthern Drain	1500 x 1 x 1	172,605.00
			0.30	Earthern Drain	1500 x 1 x 1	172,605.00
				Earthern Drain	5000 x 1 x 1	747,955.00
			0.30	Gabion Toe Wall	4 x 2	113,004.64
			0.30	Gabion Toe Wall	3 x 1	
			0.30	Gabion Toe Wall	4 x 1	
			0.30	Gabion Toe Wall	4.5 x 1	
			0.30	Gabion Wall	15 x 1	832,007.80
			0.30	Gabion Wall	21.3 x 1	
			0.30	Gabion Wall	23.9 x 1	
			0.30	Gabion Wall	25.55 x 1	1,512,448.86
			0.30	Gabion Wall	33 x 2	141,861.76
			0.30	Gabion Wall	5.5 x 1x 1	
			0.30	Gabion Wall	4.5 x 1x 1	
			0.30	Gabion Wall	5 x 1 x 1	
			0.30	Gabion Wall	4.5 x 1 x1	169,970.71
	Gabion Wall	13 x 5				
0.30	RRM Wall	9 x 2				
0.30	RRM Wall	20 x 0.6				
0.30	RRM Wall	4 x 0.6	231,468.91			
0.30	RRM Wall	11 x 0.6				

Sl.No.	RO	Name of Road	Chainage/ Location (km)	Type of Structure	Executed	
					Size of structure	Amount (Nu.)
			0.30	RRM Wall	15 x 4.79	969,589.13
			0.30	RRM Wall	18.2 x 1.03	
			0.30	RRM Wall	11 x 3	250,654.62
			0.30	RRM Wall	10.2 x 2.75	
			0.30	RRM Wall	7 x 2.3	
			0.30	RRM Wall	8.9 x 1.8	
			0.30	RRM Wall	9.3 x 1.6	
			5.10	RRM Wall	8.65 x 3.9	
		G-T PNH	159.60	Retaining Wall	18.5x5.2	346,023.00
			161.65	Retaining Wall	12x1.6	218,775.00
			168.20	Retaining Wall	10x4.40	
			Total	36		6,934,025.44
6	Lingmethang	Lhunetse-Dungkar	6.50	R/wall		1,946,690.55
7	Trashigang	Duksum-Ramjar GC Roads	3.60	R/Wall	5.725x4.10	194,487.32
		Chazam-Duksum PNH	6.90	R/wall	9.50x3.70	297,925.22
		Phuyang -Tragom GC Road	1.10	R/wall	8.95x5.00	502,344.75
8	Samdrupjongkhar	Decheling GC road	3.10	R/Wall	11.00x3.50	190,748.90
			7.10	DRM wall	4.00x0.75m	21,879.82
			9.50	R/Wall	15.90x3.36	590,350.70
		Martshala GC Road	1.05	G/Wall	5x4	97,629.80
			Total	8		3,842,057.06
				71		19,225,921.47

Appendix-VII
Details of National Highways due for resurfacing

SN	RO	PNH (A)	NEWH (B)	NET PNH	Resurfaced (PNH)	PNH due for Resurfacing	SNH	Resurfaced (SNH)	SNH due for Resurfacing
1	Lingmethang	194.62	153.00	41.62	38.14	3.48	65.00	14.62	50.38
2	Lobeysa	183.00	118.00	65.00	12.00	53.00	82.13	51.07	31.06
3	Phuentsholing	166.40		166.40	8.90	157.50	69.00	26.30	42.70
4	Sarpang	177.25		177.25	59.14	118.11	86.00	30.00	56.00
5	Samdrupjongkhar	97.75		97.75		97.75	202.01	65.83	136.18
6	Thimphu	96.90	20.00	76.90	48.50	28.40	116.35	16.80	99.55
7	Trashigang	97.00	52.00	45.00	5.00	40.00	17.00	12.33	4.67
8	Trongsa	229.16	161.20	67.96	31.40	36.56	98.00		98.00
9	Tingtibi	161.00		161.00	24.00	137.00	59.00		59.00
	Total	1,403.08	504.20	898.88	227.08	671.80	794.49	216.95	577.54

Appendix-VIII

Details of budget proposed and approved for monsoon restoration works for the FY 2017-18

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC		
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
	Phuentsholing							
1	Samtse-P/ling PNH	9.60	Retaining Wall	28x13	1,003,137.17			
2		13.75	Retaining Wall	8x5	162,906.28	8x5	162,906.28	
3	Halhalay-Dorokha GC Road	12.30	Retaining Wall	16.8x5	287,595.25			
4	Jumja-Manitar-Raidak-Lhamozhingka PNH	4.50	Gabion Toe Wall	20x2	156,759.71	20x2	156,759.71	
5		36.15	Widening	50x8	210,728.00			
6		53.50	RCC Slab Culvert	6x8	2,410,085.69	L=20m with 5 rows of 1200mm M/pipe -Cause way	1,355,633.90	
7		53.80	Gabion B/Wall	17x2, 14x2, 35x3	727,677.74	17x2, 14x2, 35x3	727,677.74	
8		53.90	Gabion toe Wall and R/Wall	5x2-3nos., 10x4	333,689.69	5x2-3nos., 10x4	333,689.69	
9		54.50	Gabion R/Wall	20x7	1,139,186.96	20x7	1,139,186.96	
10		56.50	Gabion R/Wall	10x5	314,927.81			
11		56.60	R/Wall and Toe Wall	7x5 & 5x2	195,031.57			
12		56.70	Gabion B/Wall	50x3	692,428.85			
13		61.00	R/Wall	8x8	739,552.52	8x8	739,552.52	
14		63.10	R/Wall	5x3	94,096.18			
15		64.00	Gabion R/Wall	6x4	129,671.94	6x4	129,671.94	
16		Badina-Phusa GC Road	0.37	R/Wall with toe and cause way	17.5x5	943,619.11		
17			1.50	RRM R/Wall	7x3.5	150,475.12		
18	1.70		RCC enched Wall	9x2.5	177,628.99	9x2.5	177,628.99	
19	2.25		RRM R/Wall with toe wall	15x4	892,798.54			
20	7.50		Gabion R/Wall	31x3	486,871.33			
21	8.70		RRM R/Wall	8x3.5	208,410.65			

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
22	Gedu-Junglay Dz. Road	9.50	Gabion R/wall	16x6	844,061.12		
23		10.40	RCC enchoe RRM Wall	7x2.5	145,638.78	7x2.5	145,638.78
24		21.80	Gabion R/wall	18x9	1,667,962.81		
25		22.50	R/Wall with cause way	11x3	202,510.58	11x3	202,510.58
26		23.90	B/wall	90x2	819,384.21		
27		23.90	Gabion R/Wall	9x8	669,763.21		
28		28.05	R/Wall with cause way	10x5 & 1.5 toe Wall	497,946.16	10x5 & 1.5 toe Wall	497,946.16
29	Geling GC Road	0.045	B/wall	25x6	1,072,988.54		
30		0.15	B/wall	30x4	693,521.08		
31		0.15	R/Wall	15x7	888,954.10		
32	Gangla-Dungna GC Road	3.80	RCC R/Wall	10x1	495,977.50	10x1	495,977.50
33		10.30	Gabion Wall	14x5	408,292.48		
34		16.20	RRM Wall	9.6x5	155,000.00		
35		17.80	Gabion B/Wall	50x3	518,266.00		
36		19.50	Gabion B/Wall	80x3	829,225.60		
37		19.90	Gabion B/Wall	21x3	217,671.72		
38		21.00	Gabion B/Wall	95x3	984,705.40		
39		25.00	Gabion B/Wall	40x2	185,000.00		
40		25.40	Gabion Wall	52x3	538,996.64		
41		Rinchending Manitar PNH	4.80	Gabion Toe Wall	15.5x2	121,488.85	15.5x2
42	4.80		Gabion R/Wall	12x5	361,140.96	12x5	361,140.96
43	6.20		RRM R/Wall	13x4	452,785.35	13x4	452,785.35
			Total	43	24,228,560.19	16	7,200,195.91
	Thimphu						
44	Bjakamja-Yuetsa GC Road	2.00	Toe Protection Wall (2 steps & RRM Wall	8x9	726,669.05	8x9	726,669.05
45		5.00	Gabion R/Wall	19.5x9	1,281,002.09	19.5x9	1,281,002.09
46		5.00	RRM Wall	15x3		15x3	

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
47	Begana-Tango Cheri	8.00	Gabion Wall	7x8	534,042.04	7x8 & 17x3	694,210.34
48	Ramtokto Road	Bridge Point	Gabion Wall	16x3	234,762.08		
49		Bridge Point	Gabion Wall	20x5	726,924.00	20x5	726,924.00
50	Simtokha Dochula PNH	19.00	Gabion R/Wall	15x3	250,000.00		
51	Khasadrapchu Bjemina SNH	1.70	B/wall	28x3	505,536.34		
52	Semtokha-Chamgang Dz.Road	4.80	R/Wall + Catch Pit	20x8 + Catch Pit	2,123,949.25	20x8 + Catch Pit	1,401,112.56
			Total	9	6,382,884.85	6	4,829,918.04
	Lobeysa						
53	Tekizam-Bjena Dzongkhag Road	0.30	Gabion R/Wall	16x4	400,722.56		
54	Tekizam-Chuserbu PNH(under Nobding Section)	391.20	Gabion R/Wall	26x9	2,548,111.02	26x9	2,548,111.02
55		392.50	Gabion Toe Wall	22x3	355,076.86	22x3	355,076.86
56		396.50	Gabion Toe Wall	36x3	581,036.08	36x3	581,036.08
57		397.00	Gabion B/Wall	25x3	382,801.25	25x3	382,801.25
58		399.00	Gabion B/Wall	40x3	612,482.00	40x3	612,482.00
59	Tekizam-Chuserbu PNH(under Garzikha Section)	411.30	Gabion B/Wall	50x3	765,602.50	50x3	765,602.50
60		413.50	Gabion B/Wall	40x3	612,482.00	40x3	612,482.00
61		413.60	Gabion B/Wall	20x3	306,241.00	20x3	306,241.00
62		413.70	Gabion B/Wall	50x3	765,602.50	50x3	765,602.50
63		417.30	Plump Concrete Wall	30x5	1,400,000.00	30x5	873,168.55
64		417.75	Gabion B/Wall	45x3	675,057.60	45x3	675,057.60
65	417.60	Gabion B/Wall	30x5	550,993.52	30x5	550,993.52	
66	Dochula Wangdizam PNH	449.30	RRM R/Wall	15x7	687,571.65	15x7	687,571.65
67		449.35	RRM R/Wall	16x7	734,941.15	16x7	734,941.15
68		449.40	RRM R/Wall	31x7	1,423,046.04	31x7	1,423,046.04
69		449.46	RRM R/Wall	22x9	1,477,707.98	22x9	1,477,707.98
70		449.60	RRM R/Wall	33x7	1,507,999.30	33x7	1,507,999.30
71		449.70	RRM R/Wall	25x7	1,145,952.75	25x7	1,145,952.75

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
72		467- &474-475	Formation Cutting	350x8	4,752,000.00	350x8	4,752,000.00
73		454.00	Gabion Toe Wall	20x3	350,000.00	20x3	350,000.00
74	Wangdizam-Tekizampa PNH	432.60	RRM R/Wall	18x8	1,124,916.76	18x8	1,124,916.76
75	Rakayzam-Nisho GC Road	1.60	RRM R/Wall	5.5x8	205,239.23	5.5x8	205,239.23
76	Punakha-Tshodelmo SNH	10.30	Gabion R/Wall	16x6	870,293.98	16x6	870,293.98
77		10.90	Gabion Toe Wall	8x3	139,679.57	8x3	139,679.57
78		11.40	RRM R/Wall	5x4	126,838.00	5x4	126,838.00
79		10.90	Gabion R/Wall	16x5	656,096.13		
80		1.45	Catch Pit	1.1x1	36,465.75		
			Total	28	25,194,957.18	25	23,574,841.29
	Tingtibi						
81	Tingtibi-Z/gang-W/gang PNH	54.00km	Retaining wall	3mx3m	39,091.39	3mx3m	39,091.39
82			Retaining wall	9.6mx4m	172,773.74		
83			Toe wall	6mx2m(Privide chute)	27,415.30	6mx2m	27,415.30
84	G/phu-Trongsas PNH	106.300km	Retaining wall	7mx4m	128,110.15		
85		107.900km	Retaining wall	11mx3m	130834.11		
86		109.700km	Retaining wall	10mx3m	286,842.05		
87		112.900km	Retaining wall	5mx2m	37,627.38		
88	Gomphu-Panbang PNH	1.20km/ 36.40Km	R/wall	16.00m x 5.90m 13.00m x 2.00m	845,699.22	16.00m x 5.90m 13.00m x 2.00m	845,699.22
89		2.90km/ 37.9Km	R/wall	25.60 x 3.80 m	538,899.22	25.60 x 3.80 m	538,899.22
90		20.20km/ 55.5Km	R/wall	11.75m x 3.80m 11.75m x 2.00m 11.75m x 1.20m 11.75m x 1.00m	533,532.35	11.75m x 3.80m 11.75m x 2.00m 11.75m x 1.20m 11.75m x 1.00m	533,532.35
91		33.70km/ 64.7km	R/wall	17.8m x 3.00m	263,953.88	17.8m x 3.00m	263,953.88
92		17.30km/ 53.3Km	R/wall	8.60m x 5.00m 8.60m x 1.0 m 8.0 x 2.0 m gabion	533,492.76	8.60m x 5.00m 8.60m x 1.0m 8.0 x 2.0m gabion	533,492.76
93		17.50km/	R/wall	8.60 m x 6.00m	501,718.27	8.60 m x 6.00m	501,718.27

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
		53.5km		10.00m x 2.00m		10.00m x 2.00m	
94		38.10km/ 67.9km	R/wall	13.70 x 6.0m	590,852.82	13.70 x 6.0m	590,852.82
97		3.00km/ 38km	Formation Cutting	50m length	124,786.49	35x8.5m	124,786.49
98		21.80km	B/wall	12.00m x 2.50m	167,665.59		
99		29.20km	R/wall	17.30m x 4.00m	393,803.94		
100		38.20km	RCC Slab Culvert	5.00m span Abutment=7.5mx6.0m	2,395,663.95		
101	Panbang-Nganglam PNH	8.02	RRM R/wall RRM toe wall Gabion t/wall U shape drain	21x4m 21x2m 15x4m 2 nos. 235m	1,441,481.4	21x4m 21x2m 15x4m 2 nos. 235m	1,441,481.40
102		8.8	RRM R/wall RRM T/wall	17.8x4m 17.8x2m 2 Nos.	689,710.8	17.8x4m 17.8x2m 2 Nos.	689,710.80
103	Buli-Nimshong GC Road 0-30.2km	9.5 km	G- Wall	(20x4.5x9)m	1,807,517.20	(20x9)m	1,807,517.20
104		20 km	R/wall	(12x3.6x8.19)m	2,750,000.93	(12x8.19)m	1,864,839.88
105		27km	B/wall	(39x1.5x3)m	1,012,040.61		
106	Nimshong-Therang GC road(18.4km)	0.45 km	R/wall	(9.6x1.9x4)m	584,434.51	(9.6x4)m	584,434.51
107		16.9km	R/wall	(10x1.9x4)m	605,555.55		
108	Therang-Shingkar GC road (11.8km)	7.9km	G- Wall	(25x3)m	348,876.50		
109			Causeway	(8x3.5x0.2)m	61,271.37		
110	Therang-Khomshar GC road (25.6km)	6.87km	R/wall	(9.6x1.9x4)m	584,434.51		
111		17.9km	R/wall	(9.6x1.9x4)m	584,434.51		
112		17.95km	R/wall/toe Wall	(15x1.9x4)m, (30x3)m	906,167.30		
113		20.15km	R/wall	(35x1.9x4)m	2,074,354.88		
114			R/wall	15x1.9x4)m	906,167.30		
115		22.96km	Gabion	(13x5)m	449,040.67		
116	Dakpel-Buli GC Road(36.6km)	5.3	R/wall	(12x3.6x8.19)m	2,782,044.70		
117		18	R/wall	(6.6x4.19x2.2)m	345,467.02		
118		24.8	R/wall	6.6x2.2x4.19)m	455,170.30		
119		27.8	G- Wall	(23x4.5x9)m	2,078,644.78	(23x9)m	1,351,156.37
120	Goshing GC Road	1.70km	R/wall	18m x 5.8 m	845,352.31	18m x 5.8 m	845,352.31

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
				7 m x 1.5 m 7.5 m x 1.5 m		7 m x 1.5 m 7.5 m x 1.5 m	
121		5.80km	R/wall	12.00 m x 4.30 m	304,379.99	12.00 m x 4.30 m	304,379.99
			Total	41	28,179,577.46	18	12,888,314.16
	Sarpang						
122	Sunkosh Dagana SNH (km 0-87)	5.60	Gabion B/Wall	30x3	498,477.58		
123		14.4	Timber Crib Wall	35x4	153,263.60	35x4	153,263.60
124			Gabion Toe Wall				
125		15.80	R/Wall	11x4	216,568.94		
126		22.20	Gabion B/Wall	25x3	420,674.44		
127		22.30	Boulder Wall	35x4	42,905.80		
128		22.50	Gabion B/Wall	25x2	277,267.12		
129		25.98	R/Wall	9x4.5	154,880.51		
130		27.98	Timber Crib Wall	20x4	87,579.00		
131		46.90	Filling Works	25x3x2.5	266,748.75		
132		49.00	RCC and R/wall	23x5	742,261.05	23x5	742,261.05
133		49.00	Base Course works				
134		58.50	RRM R/wall	25x4.75	617,735.48	25x4.75	617,735.48
135			RCC Toe wall				
136		47.10	BC works	110x4.50	465,816.78	110x4.50	465,816.78
137		72.60	BC works	110x4.50		110x4.50	
138		76.20	Gabion R/Wall	10x1	36,213.60	10x1	36,213.60
139	Gabion B/Wall		20x2	263,089.50	20x2	263,089.50	
140	Widening		20x3.5x10	105,812.00	20x3.5x10	105,812.00	
141	Dorona GC Road	8.60	Gabion R/Wall	23x3	371,380.81	23x3	371,380.81
142			Gabion R/Wall	40x3	645,863.42		
143			Gabion B/Wall	25x3	403,655.58	25x3	403,655.58
144		8.80	Gabion B/Wall	15x5	402,656.11		
145		9.20	Gabion B/Wall	33x5	891,130.83	33x5	891,130.83
146		9.30	Gabion R/Wall	7x6	226,918.67	7x6	226,918.67
147		9.40	Gabion R/Wall	16x4	328,811.00	16x4	328,811.00

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
148		9.50	Gabion R/Wall	15x2	108,640.80	15x2	108,640.80
149		10.50	Gabion B/Wall	10x2	93,152.36		
150		11.90	G.Toe wall	5x2	378,334.47		
151			Gabion R/Wall	12x5			
152		12.50	Gabion R/Wall	15x4	323,315.00	15x4	323,315.00
153		12.60	Gabion B/Wall	25x2	266,381.75		
154		13.30	Gabion R/Wall	10x4	215,544.00		
155		Tseza GC Road	4.50	Masonary R/Wall	10x6.5	483,262.68	
156	Drujegang GC Road	2.70	Gabion B/Wall	16x2	178,530.98		
157	Drujegang-Balung DR	9.87	Gabion B/Wall	36x2	416,390.73		
158		9.97	Gabion B/Wall	14x1	329,865.50		
159		11.85	Gabion B/Wall	25x2	398,235.15		
160	Lhaja GC Road	0.04	Gabion B/Wall	15x4	263,089.50		
161		15.42	Gabion B/Wall	20x2	758,253.50		
162		15.42	Gabion R/Wall	20x5	94,300.00		
163	Khebesa GC Road	8.00	Widening	20x3.5x7	316,652.70	20x3.5x7	316,652.70
164	Sergithang GC Road	10.30	Gabion R/Wall	14x3	791,544.24	14x3	791,544.24
165				15x5		15x5	
166	Dungalagang GC Road	1.00	R/Wall	4.3x3.9	68,028.00		
167		3.00	Gabion B/Wall	17x3	258,940.26		
168	Barshong GC Road	5.90	Gabion R/Wall	11x5	343,099.54		
169	Sunkosh-Darachu PNH	105.40	Masonary B/Wall	15x2	127,682.01	15x2	127,682.01
170		79.60	Masonary R/Wall	9.6x3.5	163,120.01	9.6x3.5	163,120.01
171		70.50	Masonary B/Wall	10x3	134,913.61		
172	Darachu-Sarpang PNH	46.47	Masonary R/Wall	6.6x4	112,595.74		
173		45.90	Masonary R/Wall	16x5	254,533.48		
174		34.00	Masonary R/Wall	14x3	297,305.58		
175			Toe Wall	5x1.5			
176	Shershong GC Road	4.00	Gabion R/Wall	10x4	268,444.49		
177		4.40	R/Wall and RCC H/pipe	8x6	471,632.58	8x6	471,632.58

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
178		5.30	R/Wall and Chute Drain	10x6.5	661,221.00	10x6.5	661,221.00
179		7.50	R/Wall and Chute Drain	4x2	44,752.60	4x2	44,752.60
180	Dovan GC Roads	26.80	Masonry R/Wall	8x3	603,273.67		
181				9x3			
182				11x4			
183				28.00		Gabion R/Wall	17x2
184	Gelephu-Trongsá PNH	9.18	Gabion Wall	3Nos	941,485.00		
185		9.36	Masonry B/Wall	26x1	2,823,711.00	26x1	2,823,711.00
186			Causeway	40x7.5		40x7.5	
187			Masonry R/Wall	24x2		24x2	
188		14.00	Causeway	8x7.5	75,991.00	8x7.5	75,991.00
189		14.00	Gabion Toe Wall	8x3	110,522.76		
190		14.02	Gabion R/Wall	20x3	183,222.15		
191		14.10	Gabion R/Wall	23x4	500,162.60	23x4	500,162.60
192		15.10	Gabion R/Wall	13x4	282,700.60	13x4	282,700.60
193		29.10	L Drain	90m	362,861.63		
194	32.00	Box Drain	150m	336,629.24	150m	336,629.24	
195		Gabion R/Wall	20x2	183,222.15	20x2	183,222.15	
196	37.00	Masonry R/Wall and toe wall	17x5m & 13x3m	482,725.05			
197	Karmaling GC Road	0.09	Gabion R/Wall	Hill side cutting	12,000.00		
198		1.18	Gabion R/Wall	13x3	181,415.78	13x3	181,415.78
199		1.35	Gabion R/Wall	6x3	83,730.36		
200		1.55	Gabion R/Wall	7x3	97,685.42	7x3	97,685.42
201		3.20	RCC Submisible Causeway	15x4	341,236.07	15x4	341,236.07
202	Nichula GC Road	6.85	RC Slab culvert 6m span	8x4	146,628.24	8x4	146,628.24
203		7.20	RC Slab culvert 6m span	8x4	146,628.24	8x4	146,628.24

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
204		7.80	Gabion Toe Wall	7x3	460,516.98	7x3	460,516.98
			Total	83	24,770,322.93	40	13,191,177.16
	Trongsa						
205	Wangdigang-Trongsa PNH	157.70	Masonry R/Wall	8x3.5	236,967.00	8x3.5	236,967.00
206		172.60	Gabion R/Wall	20x3	434,505.15		
207		173.30	Gabion R/Wall	45x2	354,394.35		
208		183.00	Masonry B/Wall	12x2.5	172,178.06		
209		189.00	Gabion R/Wall	7x3, 10x3, 10x3	376,786.60	7x3, 10x3, 10x3	376,786.60
210		241.40	Masonry R/Wall	5x2.5	66,588.17		
211		242.10	Masonry Wall	9x1.5	64,609.95		
212	Refee-Khosala bypass	8.00	Masonry R/Wall	25x2.5	430,411.06		
213		12.70	Gabion R/Wall	20x2	157,508.60		
214	Trongsa-Sherubling Dz Road	0.90	Gabion B/Wall, chute and toe wall	14x5	2,562,505.46	14x5	2,562,505.46
215	Karshong Dz. Road	0.30	Gabion R/Wall	15x5	547,332.29		
216		0.60	Gabion B/Wall	11x2	193,735.58	11x2	193,735.58
217	Tang GC Road	8.00	Gabion R/Wall	4x3	55,820.24		
218		12.30	Masonry R/Wall	8x4.3	188,027.15		
219		15.40	Masonry R/Wall	5x2	46,097.19	5x2	46,097.19
220		22.50	Gabion R/Wall	11.50x2	90,567.45		
221	Tharpaling Road	5.50	Masonry R/Wall	11x4	166,578.83		
222		5.53	Gabion B/Wall	15x2	118,131.45		
223		9.00	Masonry R/Wall	15x3	332,906.84	15x3	332,906.84
224	Nangar-Jakar PNH	278.00	Gabion R/Wall	170x3	2,372,360.20		
			Total	20	8,968,011.62	6	3,748,998.67
	Lingmethang						
225	Chompa-Thanangbi Dz. Road	1.50	R/wall	25x6.5	898,979.86	25x6.5	898,979.86
226		3.00	B/wall	15x2.5	153,337.62		
227	Zimzorong-Khenkhar GC Road	15.30	R/wall	10x2.1	139,649.93	10x2.1	139,649.93
228	Jurme GC Road	4.80	R/wall	14x4.5	219145.97	14x4.5	219145.97

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
229	Silambi GC Road	24.00	Gabion R/Wall	11x4	294,393.93	11x4	294,393.93
230		24.20	Gabion R/Wall	15x4	401,446.27		
231		24.20	Gabion Toe Wall	10x2	102,071.82		
232		29.80	RRM R/Wall	9.6x5	450,295.00	9.6x5	450,295.00
233		41.50	RRM R/Wall	19.2x5	895,783.64	19.2x5	895,783.64
234	Gangola-Lhuntse SNH	6.10	Gabion Wall	15x2	161,803.22		
235	Gangola-Lhuntse SNH	60.80	R/Wall with concrete base	21x7	2,300,000.07	21x7	2,300,000.00
236	Minjey GC Road	7.30	R/wall	9x4	226,057.30	9x4	226,057.30
237		8.00	Hume pipe with wing wall and step wall	900mmdia wall(8x5m, 10x5) 3 steps wall	1,322,867.30	2(8x5)	1,322,867.30
238	Lhunetse-Dungkar	36.00	R/Wall	10.5x5	236,270.02		
239	Khoma GC Road	3.90	RRM R/Wall	9.6x5 2nos.	623,896.00		
240		3.90	RRM R/Wall	9.6x5	312,000.00	9.6x5	312,000.00
			Total	16	8,737,997.95	10	7,059,172.93
	Trashigang						
241	Chaskhar-Thagrang GC Road	13.85	R/Wall	13x5.50m	418,352.18	13x5.50m	418,352.18
242	Yadi Chaskar GC road	4.50	R/Wall	10x4m	293,195.23		
243	Khengdongmani-Udzorong GC Road	1.90	Masonry B/Wall	11x3m	223,742.72	11x3m	223,742.72
244		1.90	Masonry B/Wall	22x3m	359,572.22		
245		4.90	Masonry R/Wall	10x5m	405,626.77		
246		14.45	Masonry R/Wall with toe wall	25x5.8	1,260,491.26		
247		21.90	Masonry R/Wall	6.6x4m	213,058.52		
248	Reserboo-Lumang GC Road	0.76	Masonry R/Wall	8.5x8m	908,723.00		
249		1.10	Masonry R/Wall	16x4m	388,457.00		
250		4.50	Masonry R/Wall	21x3m	500,760.00		
251		5.00	Masonry R/Wall	14x3m	316,318.00		
252		6.05	Masonry R/Wall	10x5m	355,555.00		
253		6.60	Masonry R/Wall,	21x5m	1,268,056.00		

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
			G/Wall with cause way				
254	Kharungla-kanpara GC Road	10.90	Gabion B/wall	35x3m	437,526.00		
255		10.90	gabion R/wall	20x5m	622,488.00		
256		17.20	Masonary B/Wall	15x3.5m	427,637.00	15x3.5m	427,637.00
257		29.50	Masonary R/Wall	22x4m	763,386.00	22x4m	763,386.00
258		29.60	Gabion B/wall	50x5m	1,556,221.00	16x3m	325,444.00
259	Ranjung-Phongmey GC Road	6.10	Gabion Wall	10x5m	310,199.40		
260		6.25	Gabion Wall	10x3m	186,119.63		
261		6.35	Gabion Wall	10x1m	18,611.63		
262	Samkhar GC Road	2.70	R/Wall and toe wall	11x3m	397,226.83		
263		2.80	R/Wall	6x2.5m	116,197.73		
264		3.50	R/Wall and toe wall	11x3m	480,263.29	11x3m	480,263.29
265	Shongphu GC Road	1.00	Gabion B/Wall	15x3.5m	270,948.95		
266		1.30	Gabion R/Wall	15x4m	361,265.27		
267	Dogorom-Thrakthrik GC (Sakteb GC Road)	2.50	Gabion B/Wall	30x3m	548,553.88		
268		27.40	W/Wall with 1.5m ht. plumb	11x7m	998,483.33	11x7m	998,483.33
269	Approach Road to Chador Lhakang	1.70	Gabion R/Wall	10x3m	194,754.21		
270	Bartsham-Bidung GC Road	21.60	R/wall with 3.5m ht toe wall	10.5x5	670,867.25		
271	Ranjung-Bidung GC Road	1.70	gabion R/wall	14x3m	257,355.46		
272		4.00	R/wall	10.5x2.8	182,365.99		
273		7.10	Gabion R/wall	21x3m	395,128.10		
274		11.90	R/Wall (cross drainage) with toes	11.5x3.5	450,035.83		
275		13.60	R/wall	14x3.5	327,915.59		
276	Chazam-Duksum PNH	1.95	R/wall	17x4.10m	404,547.51	17x4.10m	404,547.51
277		6.90	R/wall	13.5x5.5m	463,320.01		
278	Bumdelling GC Roads	0.35	R/wall	6x3m	103,160.40		
279		1.10	Abutment	6x4.5x2m	375,617.48	6(x4.5) 2no.	375,617.48

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
280		1.30	R/Wall	6x3m	103,160.40		
281	Duksum-Ramjar GC Roads	3.58	R/Wall	13.8x7m	1,025,575.64		
282		3.60	R/Wall	9x7m	370,172.52		
283		4.20	R/Wall	14.3x8m	1,221,402.00		
284		15.50	Gabion B/Wall	15x3m	301,553.56		
285		Khamdhang-Toedtsho GC Roads	1.85	B/Wall	27x2.5	223,129.56	
286	Jamkhar GC Road	3.80	R/Wall	12x2.5	250,759.73	12x2.5	250,759.73
287		5.02	R/Wall	7x4.5	192,242.37		
288	Trashigang-Rangung Dz. Road	1.00	R/Wall	6x6m	270,000.00	6x6m	270,000.00
289	Tongmi-jangsa GC Road	10.50	RRM R/wall			16x6.5	791,500.12
			Total	49	22,190,099.45	12	5,729,733.36
	Samdrupjongkhar						
290	Tsebar-Mukuri-Durungri SNH	36.1km	G/Wall	35.00x3.00m	449,300.00		
291		44.5km	R/wall	10.00x6.00	493,611.80		
292		47.00km	R/wall	20.00x8	1,377,652.66	20x8	1,377,652.66
293			G/T/Wall	20.00x2.00m	169,247.45	20x2	169,247.45
294	Tsebar-Dungmin SNH	1.2 km	RCC toe wall	9.6x6x3m	1,705,617.78	9.6x6x3	1,705,617.78
295		1.5 km	RRM R/Wall	10.00x4.00m	351,116.47		
296	Tshelingore-Khothakpa SNH (0.00-22km)	18.9 km	*Gabion wall first step	4.00x2.00	1,121,135.86		
297			*Gabion wall second step	5.00x2.00			
298			*RRM first wall	15.00x4.00			
299			*RRM second wall	15.00x4.00			
300	Dewathang-Samdrupcholing SNH	48.00km	PCC	6.8x2.8x0.5m	562,644.97	6.8x2.8x0.5	562,644.97
301			RRM	6.00x2.2x1.0m		6x2.2x1.0	
302			RRM	4.1x1.6x2.2m		4.1x1.6x2.2	
303			PCC	9.0x1.0x0.5m		9.0x1.0x0.5	
304			RRM	7.7x.90x1.6m		7.7x.90x1.6	

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC		
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)	
305		36.20km	G/Rwall and toe wall	18x5m, 10x3m	820,926.22	18x5, 10x3	820,926.22	
306	Chokorling GC Road (0-24 km)	5 km	Hume pipe Culvert	1x5m	82,902.01			
307		15.5 km	R/wall	(2x9.6x2x4) 2 pannel	427,822.73	(2x9.6x2x4) 2 pannel	427,822.73	
308		18.4km	G/wall-2m ht	1x38m	321,570.16			
309		23.1km	G/wall-5m ht	1x15m	559,305.83			
310		Decheling GC road (17.4 km)	3.1 km	R/Wall	6x4.5m	173,763.89		
311	7.28 km		R/Wall	15x5m	569,353.55	15x5	569,353.55	
312	7.3 km		Widening	120 cum	26,510.40	120 cum	26,510.40	
313	8.6 km		Gabion breast wall	40x3m	898,555.35	15x3	300,555.35	
314	9 km		Gabion breast wall	20x2m	169,247.45			
315	9.5 km		R/Wall	10x6m	493,611.80			
316	10 km		R/Wall & Hume pipe	10x5m	284,009.13	10x5	284,009.13	
317	11.7 km		Gabion retaining wall	10x3m	149,759.22			
318	Nanong GC Road (00-30km)		23.2 km	RRM R/wall	8x5	403,674.08		
319	Yurung GC Road 00-20 km		5.3 km	Gabion Wall	20x3	250,015.40		
320		5.5 km	Gabion Wall	20x3	250,015.40			
321		7.95 km	Hume pipe 900mm dia with R/wall	15x4	529,228.33			
322		8.1 km	Hume pipe 900mm dia with R/wall	15x4	540,196.77			
323		8.5 km	Hume pipe 900mm dia with R/wall	15x4	431,497.03			
324		10.3 km	R/Wall	10x3	202,849.19			
325		Chimung GC Road	4.8 km	Hume pipe 900mm dia with R/wall	9x3	469,999.35		
326	15.3 km		RRM R/Wall	15x4	416,642.08			
327	15.6 km		R/Wall	15x4	485,097.68	15x4	485,097.68	
328	Khar GC Road	4 km	RRM R/Wall	10x4	321,121.39	10x4	321,121.39	

Sl.No.	Name of Road	Chainage/ Location(km)	Type of Structure	Budget required as per the Assessment Team		Budget approved by the DCC	
				Size of structure	Amount (Nu.)	Size of structure	Amount (Nu.)
329	Jomotshangkha-Lauri GC Road	7.85 km	R/wall	15x9	1,191,328.96	15x9	1,191,328.96
330		9.45 km	R/wall	12.5x3	345,135.62	12.5x3	345,135.62
331		9.455 km	R/wall	10x2.5	123,261.58		
332		9.6 km	R/wall	11x3	197,897.81		
333		14.5 km	R/wall	10x5	319,126.89		
334	Martshala GC Road	1.04km	G/Wall	7.5x9	275,016.94	7.5x9	275,016.94
335		1.05km	G/Wall	5x4	97,269.79		
336	Khothagpa-Khar-Tesbar- Yurung Dz	26.6 km	Gabion R/Wall(1st step	5x2	162,466.25	5x2	162,466.25
337			2nd step	8x2		8x2	
338			3rd step	10x2		10x2	
339		26.8km	RCC box Culvert	7x8	4,900,000.00		
			Total	50	23,119,505.27	22	9,024,507.08
			Grand Total	339	171,771,916.90	155.00	87,246,858.60

Appendix-IX

Details of approved and rejected permanent structures for monsoon restoration works for the FY 2017-18

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
List of approved P1 structures RO wise								
	Tingtibi							
1	Tingtibi-Z/gang-W/gang PNH	54.00km	Retaining wall	3mx3m	39,091.39	P1	3mx3m	39,091.39
2	Tingtibi-Z/gang-W/gang PNH	54.00km	Toe wall	6mx2m(Prive chute)	27,415.30	P1	6mx2m	27,415.30
3	Gomphu-Panbang PNH	1.20km	R/wall	16.00m x 5.90m 13.00m x 2.00m	845,699.22	P1	16.00m x 5.90m 13.00m x 2.00m	845,699.22
4	Gomphu-Panbang PNH	2.90km	R/wall	25.60 x 3.80 m	538,899.22	P1	25.60 x 3.80 m	538,899.22
5	Gomphu-Panbang PNH	3.00km	Formation Cutting	50m length	124,786.49	P1	35x8.5m	124,786.49
6	Gomphu-Panbang PNH	17.30km	R/wall	8.60m x 5.00m 8.60m x 1.0 m 8.0 x 2.0 m gabion	533,492.76	P1	8.60m x 5.00m 8.60m x 1.0 m 8.0 x 2.0 m gabion	533,492.76
7	Gomphu-Panbang PNH	17.50km	R/wall	8.60 m x 6.00m 10.00m x 2.00m	501,718.27	P1	8.60 m x 6.00m 10.00m x 2.00m	501,718.27
8	Gomphu-Panbang PNH	20.20km	R/wall	11.75m x 3.80m 11.75m x 2.00m 11.75m x 1.20m 11.75m x 1.00m	533,532.35	P1	11.75m x 3.80m 11.75m x 2.00m 11.75m x 1.20m 11.75m x 1.00m	533,532.35
9	Gomphu-Panbang PNH	33.70km	R/wall	17.8m x 3.00m	263,953.88	P1	17.8m x 3.00m	263,953.88
10	Gomphu-Panbang PNH	38.10km	R/wall	13.70 x 6.0m	590,852.82	P1	13.70 x 6.0m	590,852.82
11	Panbang-Nganglam PNH	8.02	RRM R/wall RRM toe wall Gabion t/wall U shape drain	21x4m 21x2m 15x4m 2 nos. 235m	1441481.4	P1	21x4m 21x2m 15x4m 2 nos. 235m	1441481.4
12	Panbang-Nganglam PNH	8.8	RRM R/wall RRM T/wall	17.8x4m 17.8x2m 2 Nos.	689710.8	P1	17.8x4m 17.8x2m 2 Nos.	689710.8
13	Buli-Nimshong GC Road 0-30.2km	10.10km	G- Wall	(20x4.5x9)m	1,807,517.20	P1	(20x9)m	1,807,517.20
14	Buli-Nimshong GC Road 0-30.2km	20 km	R/wall	(12x3.6x8.19)m	2,750,000.93	P1	(12x8.19)m	1,864,839.88
15	Dakpel-Buli GC Road(36.6km)	27.8	G- Wall	(23x4.5x9)m	2,078,644.78	P1	(23x9)m	1,351,156.37

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
16	Goshing GC Road	1.70km	R/wall	18m x 5.8 m 7 m x 1.5 m 7.5 m x 1.5 m	845,352.31	P1	18m x 5.8 m 7 m x 1.5 m 7.5 m x 1.5 m	845,352.31
					Approved	16		
	Samdrupjongkhar							
17	Dewathang-Samdrupcholing SNH	48.00km	PCC	6.8x2.8x0.5m	562,644.97	P1	6.8x2.8x0.5m	562,644.97
18			RRM	6.00x2.2x1.0m		P1	6.00x2.2x1.0m	
19			RRM	4.1x1.6x2.2m		P1	4.1x1.6x2.2m	
20			PCC	9.0x1.0x0.5m		P1	9.0x1.0x0.5m	
21			RRM	7.7x.90x1.6m		P1	7.7x.90x1.6m	
22		36.20km	G/Rwall and toe wall	18x5m, 10x3m	820,926.22	P1	18x5m, 10x3m	820,926.22
23	Tsebar-Dungmin SNH	1.2 km	RCC toe wall	9.6x6x3m	1,705,617.78	P1	9.6x6x3m	1,705,617.78
24	Tsebar-Mukuri-Durungri SNH	47.00km	R/wall	20.00x8	1,377,652.66	P1	20.00x8	1,377,652.66
25	Tsebar-Mukuri-Durungri SNH		G/T/Wall	20.00x2.00m	169,247.45	P1	20.00x2.00m	169,247.45
26	Chokorling GC Road (0-24 km)	15.5 km	R/wall	(2x9.6x2x4) 2 pannel	427,822.73	P1	(2x9.6x2x4) 2 pannel	427,822.73
27	Decheling GC road (17.4 km)	7.28 km	R/Wall	15x5m	569,353.55	P1	15x5m	569,353.55
28	Decheling GC road (17.4 km)	7.3 km	Widening	120 cum	26,510.40	P1	120 cum	26,510.40
29	Decheling GC road (17.4 km)	8.6 km	Gabion breast wall	40x3m	898,555.35	P1	15x3m	300,555.35
30	Decheling GC road (17.4 km)	10 km	R/Wall & Hume pipe	10x5m	284,009.13	P1	10x5m	284,009.13
31	Chimung GC Road	15.6 km	R/Wall	15.00x4.00m	485,097.68	P1	15.00x4.00m	485,097.68
32	Khar GC Road	4 km	RRM R/Wall	10.00x4.00m	321,121.39	P1	10.00x4.00m	321,121.39
33	Jomotshangkha-Lauri GC Road	7.85 km	R/wall	15x9m	1,191,328.96	P1	15x9m	1,191,328.96
34	Jomotshangkha-Lauri GC Road	9.45 km	R/wall	12.5x3m	345,135.62	P1	12.5x3m	345,135.62
35	Martshala GC Road	1.04km	G/Wall	7.5x9 m	275,016.94	P1	7.5x9 m	275,016.94
36	KKTY	26.6 km	Gabion R/Wall(1st step	5.00x2.00m	162,466.25	P1	5.00x2.00m	162,466.25
37	KKTY		2nd step	8.00x2.00m		P1	8.00x2.00m	
38	KKTY		3rd step	10.00x2.00m		P1	10.00x2.00m	
39					Approved	22		
40	Sarpang							

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
41	Sunkosh Dagana SNH (km 0-87)	14.4	Timber Crib Wall	35x4	153,263.60	P1	35x4	153,263.60
42	Sunkosh Dagana SNH (km 0-87)	49.00	RCC and R/wall	23x5	742,261.05	P1	23x5	742,261.05
43	Sunkosh Dagana SNH (km 0-87)	58.50	RRM R/wall	25x4.75	617,735.48	P1	25x4.75	617,735.48
44	Sunkosh Dagana SNH (km 0-87)	76.20	Gabion R/Wall	10x1	36,213.60	P1	10x1	36,213.60
45	Sunkosh Dagana SNH (km 0-87)	76.20	Gabion B/Wall	20x2	263,089.50	P1	20x2	263,089.50
46	Sunkosh Dagana SNH (km 0-87)	76.20	Widening	20x3.5x10	105,812.00	P1	20x3.5x10	105,812.00
47	Dorona GC Road	8.60	Gabion R/Wall	23x3	371,380.81	P1	23x3	371,380.81
48	Dorona GC Road	8.60	Gabion B/Wall	25x3	403,655.58	P1	25x3	403,655.58
49	Dorona GC Road	9.20	Gabion B/Wall	33x5	891,130.83	P1	33x5	891,130.83
50	Dorona GC Road	9.30	Gabion R/Wall	7x6	226,918.67	P1	7x6	226,918.67
51	Dorona GC Road	9.40	Gabion R/Wall	16x4	328,811.00	P1	16x4	328,811.00
52	Dorona GC Road	9.50	Gabion R/Wall	15x2	108,640.80	P1	15x2	108,640.80
53	Dorona GC Road	12.50	Gabion R/Wall	15x4	323,315.00	P1	15x4	323,315.00
54	Khebesa GC Road	8.00	Widening	20x3.5x7	316,652.70	P1	20x3.5x7	316,652.70
55	Sunkosh-Darachu PNH	105.40	Masonary B/Wall	15x2	127,682.01	P1	15x2	127,682.01
56	Sunkosh-Darachu PNH	79.60	Masonary R/Wall	9.6x3.5	163,120.01	P1	9.6x3.5	163,120.01
57	Shershong GC Road	4.40	R/Wall and RCC H/pipe	8x6	471,632.58	P1	8x6	471,632.58
58	Shershong GC Road	5.30	R/Wall and Chute Drain	10x6.5	661,221.00	P1	10x6.5	661,221.00
59	Shershong GC Road	7.50	R/Wall and Chute Drain	4x2	44,752.60	P1	4x2	44,752.60
60	Gelephu-Trongsa PNH	14.00	Causeway	8x7.5	75,991.00	P1	8x7.5	75,991.00
61	Gelephu-Trongsa PNH	14.10	Gabion R/Wall	23x4	500,162.60	P1	23x4	500,162.60
62	Gelephu-Trongsa PNH	15.10	Gabion R/Wall	13x4	282,700.60	P1	13x4	282,700.60
63	Gelephu-Trongsa PNH	32.00	Box Drain	150m	336629.24	P1	150m	336,629.24
64	Gelephu-Trongsa PNH		Gabion R/Wall	20x2	183222.15	P1	20x2	183,222.15
65	Karmaling GC Road	1.18	Gabion R/Wall	13x3	181,415.78	P1	13x3	181,415.78
66	Karmaling GC Road	1.55	Gabion R/Wall	7x3	97,685.42	P1	7x3	97,685.42
67	Karmaling GC Road	3.20	RCC Submisible Causeway	15x4	341,236.07	P1	15x4	341,236.07

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
68	Karmaling GC Road	6.85	RC Slab culvert 6m span	8x4	146,628.24	P1	8x4	146,628.24
69	Karmaling GC Road	7.20	RC Slab culvert 6m span	8x4	146,628.24	P1	8x4	146,628.24
70	Karmaling GC Road	7.80	Gabion Toe Wall	7x3	460,516.98	P1	7x3	460,516.98
71	Sunkosh Dagana SNH (km 0-87)	47.10	BC works	110x4.50	465,816.78	P1	110x4.50	465,816.78
72	Sunkosh Dagana SNH (km 0-87)	72.60	BC works	110x4.50		P1	110x4.50	
73	Gelephu-Trongsa PNH	9.36	Masonary B/Wall	26x1	2,823,711.00	P1	26x1	2,823,711.00
74	Gelephu-Trongsa PNH	9.36	Causeway	40x7.5		P1	40x7.5	
75	Gelephu-Trongsa PNH	9.36	Masonary R/Wall	24x2		P1	24x2	
76	Sergithang GC Road	10.30	Gabion R/Wall	14x3	791,544.24	P1	14x3	791,544.24
77	Sergithang GC Road	10.30		15x5		P1	15x5	
78					Approved	37		
79	Trongsa							
80	Wangdigang-Trongsa PNH	157.70	Masonary R/Wall	8x3.5	236,967.00	P1	8x3.5	236,967.00
81	Wangdigang-Trongsa PNH	189.00	Gabion R/Wall	7x3, 10x3, 10x3	376,786.60	P1	7x3, 10x3, 10x3	376,786.60
82	Trongsa-Sherubling Dz Road	0.90	Gabion B/Wall, chute and toe wall	14x5	2,562,505.46	P1	14x5	2,562,505.46
83	Karshong Dz. Road	0.60	Gabion B/Wall	11x2	193,735.58	P1	11x2	193,735.58
84	Tang GC Road	15.40	Masonary R/Wall	5x2	46,097.19	P1	5x2	46,097.19
85	Tharpaling Road	9.00	Masonary R/Wall	15x3	332,906.84	P1	15x3	332,906.84
					Approved	6		
	Lingmethang							
86	Chompa-Thangbi Dz. Road	1.50	R/wall	25x6.5	898,979.86	P1	25x6.5	898,979.86
87	Zimzorong-Khenkhar GC Road	15.30	R/wall	10x2.1	139,649.93	P1	10x2.1	139,649.93
88	Jurme GC Road	4.80	R/wall	14x4.5	219,145.97	P1	14x4.5	219,145.97
89	Silambi GC Road	24.00	Gabion R/Wall	11x4	294,393.93	P1	11x4	294,393.93
90	Silambi GC Road	29.80	RRM R/Wall	9.6x5	450,295.00	P1	9.6x5	450,295.00
91	Silambi GC Road	41.50	RRM R/Wall	19.2x5	895,783.64	P1	19.2x5	895,783.64
92	Gangola-Lhuntse SNH	60.80	R/Wall with concrete base	21x7	2,300,000.07	P1	21x7	2,300,000.00

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
93	Minjey GC Road	7.30	R/wall	9x4	226,057.30	P1	9x4	226,057.30
94	Minjey GC Road	8.00	Hume pipe with wing wall and step wall	900mmdia wall(8x5m, 10x5) 3 steps wall	1,322,867.30	P1	2(8x5)	1,322,867.30
95	Khoma GC Road	3.90	RRM R/Wall	9.6x5	312,000.00	P1	9.6x5	312,000.00
					Approved	10		
	Trashigang							
96	Chaskhar-Thagrong GC Road	13.85	R/Wall	13x5.50m	418,352.18	P1	13x5.50m	418,352.18
97	Khengdongmani-Udzorong GC Road	1.90	Masonary B/Wall	11x3m	223,742.72	P1	11x3m	223,742.72
98	Kharungla-kanpara GC Road	17.20	Masonary B/Wall	15x3.5m	427,637.00	P1	15x3.5m	427,637.00
99	Kharungla-kanpara GC Road	29.50	Masonary R/Wall	22x4m	763,386.00	P1	22x4m	763,386.00
100	Kharungla-kanpara GC Road	29.60	Gabion B/wall	50x5m	1,556,221.00	P1	16x3m	325,444.00
101	Samkhar GC Road	3.50	R/Wall and toe wall	11x3m	480,263.29	P1	11x3m	480,263.29
102	Dogorom-Thrakthrik GC (Sakteb GC Road)	27.40	W/Wall with 1.5m ht. plumb	11x7m	998,483.33	P1	11x7m	998,483.33
103	Chazam-Duksum PNH	1.95	R/wall	17x4.10m	404,547.51	P1	17x4.10m	404,547.51
104	Bumdelling GC Roads	1.10	Abutment	6x4.5x2m	375,617.48	P1	6(x4.5) 2no.	375,617.48
105	Jamkhar GC Road	3.80	R/Wall	12x2.5	250,759.73	P1	12x2.5	250,759.73
106	Trashigang-Rangung Dz. Road	1.00	R/Wall	6x6m	270,000.00	P1	6x6m	270,000.00
					Approved	11		4,938,233.24
					Total Approved	102		
List of rejected P1 structures RO wise								
	Tingtibi							
107	Gomphu-Panbang PNH	38.20km	RCC Slab Culvert	5.00m span Abutment=7.5mx6.0m	2,395,663.95	P1		
108	Gomphu-Panbang PNH	29.20km	R/wall	17.30m x 4.00m	393,803.94	P1		
109	Nimshong-Therang GC road(18.4km)	16.9km	R/wall	(10x1.9x4)m	605,555.55	P1		
110	Therang-Khomshar GC road (25.6km)	6.87km	R/wall	(9.6x1.9x4)m	584,434.51	P1		
111	Therang-Khomshar GC road	17.9km	R/wall	(9.6x1.9x4)m	584,434.51	P1		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
	(25.6km)							
112	Dakpel-Buli GC Road(36.6km)	5.3	R/wall	(12x3.6x8.19)m	2,782,044.70	P1		
					Rejected	6		
	Samdrupjongkhar							
113	Tshelingore-Khothakpa SNH (0.00-22km)	18.9 km	*Gabion wall first step	4.00x2.00	1,121,135.86	P1		
114			*Gabion wall second step	5.00x2.00		P1		
115			*RRM first wall	15.00x4.00		P1		
116			*RRM second wall	15.00x4.00		P1		
117	Tsebar-Mukuri-Durungri SNH	36.1km	G/Wall	35.00x3.00m	449,300.00	P1		
118	Tsebar-Mukuri-Durungri SNH	37.4	R wall and toe wall	12x8m 12x2m		P1		
119	Chokorling GC Road (0-24 km)	18.4km	G/wall-2m ht	1x38m	321,570.16	P1		
120	Decheling GC road (17.4 km)	9 km	Gabion breast wall	20x2m	169,247.45	P1		
121	Yurung GC Road 00-20 km	8.1 km	Hume pipe 900mm dia with R/wall	15.00x4.00m	540,196.77	P1		
122	Yurung GC Road 00-20 km	10.3 km	R/Wall	10.00x3.00m	202,849.19	P1		
123	Chimung GC Road	15.3 km	RRM R/Wall	15.00x4.00m	416,642.08	P1		
124	Jomotshangkha-Lauri GC Road	9.455 km	R/wall	10x2.5m	123,261.58	P1		
125	Jomotshangkha-Lauri GC Road	9.6 km	R/wall	11x3m	197,897.81	P1		
126	KKTY	26.8km	RCC box Culvert	7.00x8.00m	4,900,000.00	P1		
					Rejected	14		
	Sarpang							
127	Tseza GC Road	4.50	Masonry R/Wall	10x6.5	483,262.68	P1		
128	Lhaja GC Road	15.42	Gabion R/Wall	20x5	94,300.00	P1		
129	Sunkosh Dagana SNH (km	22.30	Boulder Wall	35x4	42,905.80	P1		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
	0-87)							
130	Sunkosh Dagana SNH (km 0-87)	25.98	R/Wall	9x4.5	154,880.51	P1		
131	Sunkosh Dagana SNH (km 0-87)	27.98	Timber Crib Wall	20x4	87,579.00	P1		
132	Sunkosh Dagana SNH (km 0-87)	46.90	Filling Works	25x3x2.5	266,748.75	P1		
133	Dungalagang GC Road	3.00	Gabion B/Wall	17x3	258,940.26	P1		
134	Dovan GC Roads	28.00	Gabion R/Wall	17x2	172,502.16	P1		
135	Karmaling GC Road	0.09	Gabion R/Wall	Hill side cutting	12,000.00	P1		
136	Darachu-Sarpang PNH	34.00	Masonary R/Wall	14x3	297,305.58	P1		
137	Darachu-Sarpang PNH	34.00	Toe Wall	5x1.5		P1		
					Rejected	11		
	Trongsa							
138	Wangdigang-Trongsa PNH	173.30	Gabion R/Wall	45x2	354,394.35	P1		
139	Refee-Khosala bypass	12.70	Gabion R/Wall	20x2	157,508.60	P1		
140	Tang GC Road	8.00	Gabion R/Wall	4x3	55,820.24	P1		
141	Tharpaling Road	5.50	Masonary R/Wall	11x4	166,578.83	P1		
					Rejected	4		
					Total Rejected	35		
List of approved P2 structures RO wise								
	Tingtibi							
142	Nimshong-Therang GC road(18.4km)	0.45 km	R/wall	(9.6x1.9x4)m	584,434.51	P2	(9.6x4)m	584,434.51
143	Goshing GC Road	5.80km	R/wall	12.00 m x 4.30 m	304,379.99	P2	12.00 m x 4.30 m	304,379.99
					Approved	2		
					Total Approved	2		
List of rejected P2 structures RO wise								
	Tingtibi							
144	Tingtibi-Z/gang-W/gang	54.00km	Retaining wall	9.6mx4m	172,773.74	P2		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
	PNH							
145	G/phu-Trongsa PNH	106.300km	Retaining wall	7mx4m	128,110.15	P2		
146	G/phu-Trongsa PNH	109.700km	Retaining wall	10mx3m	286,842.05	P2		
147	Therang-Shingkar GC road (11.8km)	7.9km	G- Wall	(25x3)m	348,876.50	P2		
148	Therang-Shingkar GC road (11.8km)	7.9km	Causeway	(8x3.5x0.2)m	61,271.37	P2		
149	Therang-Khomshar GC road (25.6km)	17.95km	R/wall/toe Wall	(15x1.9x4)m, (30x3)m	906,167.30	P2		
150	Therang-Khomshar GC road (25.6km)	22.96km	Gabion	(13x5)m	449,040.67	P2		
151	Dakpel-Buli GC Road(36.6km)	24.8	R/wall	6.6x2.2x4.19)m	455,170.30	P2		
					Rejected	8		0.00
	Samdrupjongkhar							
152	Chimung GC Road	4.8 km	Hume pipe 900mm dia with R/wall	9.00x3.00m	469,999.35	P2		
153	Yurung GC Road 00-20 km	7.95 km	Hume pipe 900mm dia with R/wall	15.00x4.00m	529,228.33	P2		
154	Jomotshangkha-Lauri GC Road	14.5 km	R/wall	10x5m	319,126.89	P2		
155	Tsebar-Mukuri-Durungri SNH	38.2km	B/wall	28.00x5.5		P2		
					Rejected	4		0.00
	Sarpang							
156	Dovan GC Roads	26.80	Masonary R/Wall	8x3	603,273.67	P2		
157	Dovan GC Roads	26.80	Masonary R/Wall	9x3		P2		
158	Dovan GC Roads	26.80	Masonary R/Wall	11x4		P2		
159	Sunkosh Dagana SNH (km 0-87)	15.80	R/Wall	11x4	216,568.94	P2		
160	Dorona GC Road	10.50	Gabion B/Wall	10x2	93,152.36	P2		
161	Dorona GC Road	12.60	Gabion B/Wall	25x2	266,381.75	P2		
162	Drujegang GC Road	2.70	Gabion B/Wall	16x2	178,530.98	P2		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
163	Drujegang-Balung DR	9.87	Gabion B/Wall	36x2	416,390.73	P2		
164	Drujegang-Balung DR	11.85	Gabion B/Wall	25x2	398,235.15	P2		
165	Barshong GC Road	5.90	Gabion R/Wall	11x5	343,099.54	P2		
166	Shershong GC Road	4.00	Gabion R/Wall	10x4	268,444.49	P2		
167	Gelephu-Trongsa PNH	14.00	Gabion Toe Wall	8x3	110,522.76	P2		
168	Gelephu-Trongsa PNH	14.02	Gabion R/Wall	20x3	183,222.15	P2		
169	Gelephu-Trongsa PNH	37.00	Masonry R/Wall and toe wall	17x5m & 13x3m	482725.05	P2		
					Rejected	14		0.00
	Trongsa							
170	Wangdigang-Trongsa PNH	172.60	Gabion R/Wall	20x3	434,505.15	P2		
171	Wangdigang-Trongsa PNH	242.10	Masonry Wall	9x1.5	64,609.95	P2		
172	Refee-Khosala bypass	8.00	Masonry R/Wall	25x2.5	430,411.06	P2		
173	Tang GC Road	22.50	Gabion R/Wall	11.50x2	90,567.45	P2		
174	Nangar-Jakar PNH	278.00	Gabion R/Wall	170x3	2,372,360.20	P2		
					Rejected	5		0.00
	Lingmethang							
175	Chompa-Thanangbi Dz. Road	3.00	B/wall	15x2.5	153,337.62	P2		
176	Silambi GC Road	24.20	Gabion R/Wall	15x4	401,446.27	P2		
177	Silambi GC Road	24.20	Gabion Toe Wall	10x2	102,071.82	P2		
178	Gangola-Lhuntutse SNH	6.10	Gabion Wall	15x2	161,803.22	P2		
179	Lhunetse-Dungkar	36.00	R/Wall	10.5x5	236,270.02	P2		
180	Khoma GC Road	3.90	RRM R/Wall	9.6x5 2nos.	623,896.00	P2		
					Rejected	6		0.00
	Trashigang							
181	Yadi Chaskar GC road	4.50	R/Wall	10x4m	293,195.23	P2		
182	Khengdongmani-Udзорong GC Road	4.90	Masonry R/Wall	10x5m	405,626.77	P2		
183	Khengdongmani-Udзорong GC Road	14.45	Masonry R/Wall with toe wall	25x5.8	1,260,491.26	P2		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
184	Khengdongmani-Udzorong GC Road	21.90	Masonary R/Wall	6.6x4m	213,058.52	P2		
185	Reserboo-Lumang GC Road	0.76	Masonary R/Wall	8.5x8m	908,723.00	P2		
186	Reserboo-Lumang GC Road	1.10	Masonary R/Wall	16x4m	388,457.00	P2		
187	Reserboo-Lumang GC Road	5.00	Masonary R/Wall	14x3m	316,318.00	P2		
188	Reserboo-Lumang GC Road	6.05	Masonary R/Wall	10x5m	355,555.00	P2		
189	Kharungla-kanpara GC Road	10.90	Gabion B/wall	35x3m	437,526.00	P2		
190	Kharungla-kanpara GC Road	10.90	gabion R/wall	20x5m	622,488.00	P2		
191	Ranjung-Phongmey GC Road	6.10	Gabion Wall	10x5m	310,199.40	P2		
192	Ranjung-Phongmey GC Road	6.25	Gabion Wall	10x3m	186,119.63	P2		
193	Ranjung-Phongmey GC Road	6.35	Gabion Wall	10x1m	18,611.63	P2		
194	Shongphu GC Road	1.00	Gabion B/Wall	15x3.5m	270,948.95	P2		
195	Shongphu GC Road	1.30	Gabion R/Wall	15x4m	361,265.27	P2		
196	Dogorom-Thrakthrik GC (Sakteb GC Road)	2.50	Gabion B/Wall	30x3m	548,553.88	P2		
197	Approach Road to Chador Lhakhang	1.70	Gabion R/Wall	10x3m	194,754.21	P2		
198	Bartsham-Bidung GC Road	21.60	R/wall with 3.5m ht toe wall	10.5x5	670,867.25	P2		
199	Ranjung-Bidung GC Road	1.70	gabion R/wall	14x3m	257,355.46	P2		
200	Ranjung-Bidung GC Road	4.00	R/wall	10.5x2.8	182,365.99	P2		
201	Ranjung-Bidung GC Road	7.10	Gabion R/wall	21x3m	395,128.10	P2		
202	Ranjung-Bidung GC Road	11.90	R/Wall (cross drainage) with toes	11.5x3.5	450,035.83	P2		
203	Ranjung-Bidung GC Road	13.60	R/wall	14x3.5	327,915.59	P2		
204		6.90	R/wall	13.5x5.5m	463,320.01	P2		
205	Bumdelling GC Roads	0.35	R/wall	6x3m	103,160.40	P2		
206	Bumdelling GC Roads	1.30	R/Wall	6x3m	103,160.40	P2		
207	Duksum-Ramjar GC Roads	3.58	R/Wall	13.8x7m	1,025,575.64	P2		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
208	Duksum-Ramjar GC Roads	3.60	R/Wall	9x7m	370,172.52	P2		
209	Duksum-Ramjar GC Roads	4.20	R/Wall	14.3x8m	1,221,402.00	P2		
210	Duksum-Ramjar GC Roads	15.50	Gabion B/Wall	15x3m	301,553.56	P2		
211	Khamdhang-Toedtsho GC Roads	1.85	B/Wall	27x2.5	223,129.56	P2		
					Rejected	31		
					Total Rejected	68		
List of rejected P3 structures RO Wise								
	Tingtibi							
212	G/phu-Trongsa PNH	107.900km	Retaining wall	11mx3m	130834.11	P3		
213	G/phu-Trongsa PNH	112.900km	Retaining wall	5mx2m	37,627.38	P3		
214	Gomphu-Panbang PNH	21.80km	B/wall	12.00m x 2.50m	167,665.59	P3		
215	Buli-Nimshong GC Road 0-30.2km	27km	B/wall	(39x1.5x3)m	1,012,040.61	P3		
216	Therang-Khomshar GC road (25.6km)	20.15km	R/wall	(35x1.9x4)m	2,074,354.88	P3		
217	Therang-Khomshar GC road (25.6km)	20.15km	R/wall	15x1.9x4)m	906,167.30	P3		
218	Dakpel-Buli GC Road(36.6km)	18	R/wall	(6.6x4.19x2.2)m	345,467.02	P3		
					Rejected	7		0.00
	Samdrupjongkhar							
219	Decheling GC road (17.4 km)	9.5 km	R/Wall	10x6m	493,611.80	P3		
220	Tsebar-Mukuri-Durungri SNH	44.5km	R/wall	10.00x6.00	493,611.80	P3		
221	Tsebar-Mukuri-Durungri SNH	22.2km	Improvement works at Laniri	2250 cu.m		P3		
222	Tsebar-Dungmin SNH	1.5 km	RRM R/Wall	10.00x4.00m	351,116.47	P3		
223	Chokorling GC Road (0-24 km)	5 km	Hume pipe Culvert	1x5m	82,902.01	P3		
224	Chokorling GC Road (0-24 km)	23.1km	G/wall-5m ht	1x15m	559,305.83	P3		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
225	Decheling GC road (17.4 km)	3.1 km	R/Wall	6x4.5m	173,763.89	P3		
226	Decheling GC road (17.4 km)	11.7 km	Gabion retaining wall	10x3m	149,759.22	P3		
227	Nanong GC Road (00-30km)	10.05 km	Gabion R/Wall	20.00x3.00		P3		
228				20.00x3.00		P3		
229		10.9 km	RRM R/wall	10.50x5.00		P3		
230		13.3 km	Gabion B/Wall	75.00x3.00		P3		
231		17.1 km	RRM R/wall	45.00x5.00		P3		
232		23.2 km	RRM R/wall	8.00x5.00	403,674.08	P3		
233	Chongshing GC Road	3.2 km	Gabion Wall	40.00x3.00m		P3		
234	Yurung GC Road 00-20 km	5.3 km	Gabion Wall	20.00x3.00m	250,015.40	P3		
235	Yurung GC Road 00-20 km	5.5 km	Gabion Wall	20.00x3.00m	250,015.40	P3		
236	Yurung GC Road 00-20 km	8.5 km	Hume pipe 900mm dia with R/wall	15.00x4.00m	431,497.03	P3		
237	Martshala GC Road	1.05km	G/Wall	5x4 m	97,269.79	P3		
					Rejected	19		0.00
	Sarpang							
238	Sunkosh Dagana SNH (km 0-87)	5.60	Gabion B/Wall	30x3	498,477.58	P3		
239	Sunkosh Dagana SNH (km 0-87)	22.20	Gabion B/Wall	25x3	420,674.44	P3		
240	Sunkosh Dagana SNH (km 0-87)	22.50	Gabion B/Wall	25x2	277,267.12	P3		
241	Dorona GC Road	8.60	Gabion R/Wall	40x3	645,863.42	P3		
242	Dorona GC Road	8.80	Gabion B/Wall	15x5	402,656.11	P3		
243	Dorona GC Road	13.30	Gabion R/Wall	10x4	215,544.00	P3		
244	Drujegang-Balung DR	9.97	Gabion B/Wall	14x1	329,865.50	P3		
245	Lhaja GC Road	0.04	Gabion B/Wall	15x4	263,089.50	P3		
246	Lhaja GC Road	15.42	Gabion B/Wall	20x2	758,253.50	P3		
247	Dungalagang GC Road	1.00	R/Wall	4.3x3.9	68,028.00	P3		
248	Sunkosh-Darachu PNH	70.50	Masonary B/Wall	10x3	134,913.61	P3		

Sl. No.	Name of Road	Chainage/ Location(km)	Type of Structure	Approved by Assessment Team			Approved by DCC	
				Size of structure	Amount (Nu.)	Priority	Size of structure	Amount (Nu.)
249	Darachu-Sarpang PNH	46.47	Masonry R/Wall	6.6x4	112,595.74	P3		
250	Darachu-Sarpang PNH	45.90	Masonry R/Wall	16x5	254,533.48	P3		
251	Gelephu-Trongsa PNH	9.18	Gabion Wall	3Nos	941,485.00	P3		
252	Gelephu-Trongsa PNH	29.10	L Drain	90m	362,861.63	P3		
253	Karmaling GC Road	1.35	Gabion R/Wall	6x3	83,730.36	P3		
254	Dorona GC Road	11.90	G.Toe wall	5x2	378,334.47	P3		
255	Dorona GC Road	11.90	Gabion R/Wall	12x5		P3		
					Rejected	18		
	Trongsa							
256	Wangdigang-Trongsa PNH	183.00	Masonry B/Wall	12x2.5	172,178.06	P3		
257	Wangdigang-Trongsa PNH	241.40	Masonry R/Wall	5x2.5	66,588.17	P3		
258	Karshong Dz. Road	0.30	Gabion R/Wall	15x5	547,332.29	P3		
259	Tang GC Road	12.30	Masonry R/Wall	8x4.3	188,027.15	P3		
260	Tharpaling Road	5.53	Gabion B/Wall	15x2	118,131.45	P3		
					Rejected	5		
	Trashigang							
261	Khengdongmani-Udzorong GC Road	1.90	Masonry B/Wall	22x3m	359,572.22	P3		
262	Reserboo-Lumang GC Road	4.50	Masonry R/Wall	21x3m	500,760.00	P3		
263	Reserboo-Lumang GC Road	6.60	Masonry R/Wall, G/Wall with cause way	21x5m	1,268,056.00	P3		
264	Samkhar GC Road	2.70	R/Wall and toe wall	11x3m	397,226.83	P3		
265	Samkhar GC Road	2.80	R/Wall	6x2.5m	116,197.73	P3		
266	Jamkhar GC Road	5.02	R/Wall	7x4.5	192,242.37	P3		
					Rejected	6		
					Total Rejected	55		

Appendix-X

Details of machineries/equipment directly hired (direct award) from hiring firms during the FY 2016-18

Financial Year	Name of Hiring Firm	Machine/equipment	Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed For	Sub-Division
2016-17	CDCL	Pay loader	BP-1-0485	24,000.00	2078 dt. 9/8/2016	Mt. of Punakha-Tshodelmo SNH	Damji
		Tripper	BG-1-0460	124,416.00	2067 dt. 5/8/2016	Mt. of Punakha-Tshodelmo SNH	
		Tripper	BG-1-0460	139,968.00	2083 dt. 8/9/2016	Mt. of Punakha-Tshodelmo SNH	
		Crane	BG-2-0254	10,595.00	2100 dt.8/11/2016	Monsoon restoration work on Punakha -Gasa during highland festival	
		Compressor	CPS/325/17	2,800.00			
		Pay loader	BG-1-0488	23,296.00			
		Crane	BG-2-0254	7,335.00	2121 dt.8/12/2016	Mt. of GC road (Kabjisa)	
	CDCL	Water tanker	BG-2-0019	55,100.00	2064 dt. 5/8/2016	Imp. Of Wangdue-Chuserbu PNH	Lobeysa
		Water tanker	BG-2-0019	60,320.00	2080 dt.12/9/2016	Imp. Of Wangdue-Chuserbu PNH	
		Water tanker	BG-2-0019	58,000.00	2093 dt.15/10/2016	Imp. Of Wangdue-Chuserbu PNH	
		Water tanker	BG-2-0019	58,000.00	2102 dt.8/11/2016	Imp. Of Wangdue-Chuserbu PNH	
		Water tanker	BG-2-0019	40,600.00	2118 dt.8/12/2016	Imp. Of Wangdue-Chuserbu PNH	
	CDCL	Compressor	CPS-325/17	134,400.00	2066 dt.5/8/2018	Monsoon restoration work on Punakha-Gasa SNH	Gasa
		Compressor	CPS-325/17	156,800.00	MB 227/P-107	Monsoon restoration works on Punakha-Gasa SNH	
		Crow drill	DC-120/09	374,776.00	MB-227/P-113	Monsoon restoration works on Punakha-Gasa SNH	
		T/Truck	BG-1-0460	103,680.00			
		A/compressor	CPS-325/17	6,300.00	2099 dt. 8/11/2016	Payment of hh/charge at Gathana I & KK	
		Crow drill	DC-120/09	341,568.00			
		Tripper	BG-1-0460	114,048.00			
	A/compressor	CPS-325/17	151,424.00	2127 dt.3/1/2017	Monsoon restoration works on Punakha-Gasa SNH		
CDCCL	Pay loader	BG-1-0484	24,500.00	2062 dt. 5/8/2016	Monsoon restoration works (clearing road block and slip)	Pinsa	
	Pay loader	CAT 928f/13	49,000.00				
	Pay loader	BG-1-0485	39,200.00				
	Pay loader	BG-1-0485	245,000.00	2084 dt. 8/9/2016	Monsoon restoration works on clearance along Wangdue- Waklatar		
	Pay loader	BG-1-0485	136,864.00	2089 dt.15/10/2016	Monsoon restoration works along		

Financial Year	Name of Hiring Firm	Machine/equipment	Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed For	Sub-Division	
						Wangdue- Waklater PNH & Athang GC road		
		Pay loader	CAT928/13	29,640.00	2103 dt. 8/11/2016	Monsoon restoration works along Wangdue-Waklater PNH & Athang GC road		
		Pay loader	BG-1-0488	139,776.00				
		Trailer	BG-1-0469	16,695.00				
		Pay loader	BG-1-0488	279,552.00	2119 dt. 8/12 /2016	Monsoon restoration works - slip clearance along Wangdue-Waklater		
		Pay loader	BG-1-0488	216,944.00	2144 dt. 1/1/2017	Monsoon restoration work along Athang GC road and Wangdue-Waklater		
2016-17	CDCL	Pay loader	BG-1-0488	23,296.00	2158 dt. 14/2/2017	Monsoon restoration work along Wangdue-Waklater	Pinsa	
		Excavator	BG-2-0006	16,600.00	2304 dt 4/5/2017	Mtc. Of Wangdue -Khangpajechu PNH PHPA deposit work		
		Kato Crane	BG-2-0010	17,124.00				
		CDCL	Water tanker	BG-2-0019	16,240.00	2065 dt. 5/8/2016	Up gradation of Dochula Wangduezampa PNH	Lobeysa
	Excavator		SK-200-6E/13	87,800.00	2114 dt. 8/11/2016	Mtc. of Dochula-Wangdue formation cutting of Rubesa GC		
	Excavator		SK-200-6E/13	365,248.00	2128 dt. 3/1/2017	Rubesa GC road formation cutting		
	Excavator		SK-200-6E/13	321,348.00	2153 dt. 10/2/2017	Rubesa GC road formation cutting		
	Excavator		SK-200-6E/13	121,164.00	2167 dt.7/2/2017	Mtc. Of Dochula Wangduezam PNH		
	Pay loader		BG-01-0488	93,184.00	2178 dt. 11/4/2017	Up gradation of Dochula Wangduezampa PNH		
	Pay loader		BG-01-0485	27,664.00				
	Trailer		BG-1-0469	51,940.00				
	Pay loader		BG-1-0488	81,648.00	2301 dt. 4/5/2017	Up gradation of Dochula PNH		
	Crane		BG-2-0010	14,270.00	2314 dt. 8/5/2017	up gradation of Dochula-Wangdue PNH		
	Air Compressor		CPS-325/17	39,312.00	2167 dt. 7/2/2017	Rubessa Formation Cutting & Mtc. Of Dochula-Wangdue PNH		
	Jack Hammer		Not given	3,078.00				
	Crane		BG-2-0254	3,832.00	2328 dt. 6/6/2017	Up gradation of Dochula Wangduezampa PNH		
	Crane		BG-1-0464	4,288.00				
	Tripper		BG-2-0558	18,310.00	2336 dt.27/6/2017	Up gradation of Dochula Wangduezampa PNH		
Pay loader	BG-1-0488	68,040.00						

Financial Year	Name of Hiring Firm	Machine/equipment	Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed For	Sub-Division
		Grader	BG-3301/01	13,896.00	2346 dt. 5/7/2017	Up gradation of Dochula Wangduezampa PNH	
		Tripper	BG-1-0400	51,840.00	2189 dt. 11/4/2017	Bajo-khuru SNH	
		Tripper	BG-1-0405	5,184.00			
		Pay loader	BG-10488	163,296.00	2302 dt.4/5/2017	Toewang GC road	
		Tripper	BG-2-0558	65,618.00		Toewang GC road	
		Air Compressor	CPS-325/17	4,842.00		Bajo-khuru SNH	
		Jack Hammer	Not given	576.00			
		Crane	BG-1-0464	6,432.00			
		Pay loader	BG-1-0488	20,412.00	2327 dt. 6/6/2017	BT work on Chubu GC road	
		Tripper	BG-2-0537	9,156.00			
		Tripper	BG-2-0558	22,127.00	2335 dt. 5/7/2017	BT work on Gumkarmo	
		Tripper	BG-2-0558	12,208.00			
		17-18	Raldey Construction	Excavator	BP-1A-0186	94,680.00	
Tipper	BP-2A-6421			23,744.00			
Sons Builder	Excavator		BP-1A-0076	272,057.00	Not available	Monsoon restoration work on Punakha-Gasa	
CDCL, Eastern Operation, Lingmethang	Craw drill				DoR/ROL/Mtc-14/2017-2018/1624 dated 8.6.2018		Gyelposhing-Nganglam
CDCL, Eastern Operation, Lingmethang	Craw drill				DoR/ROL/Mtc-14/2017-2018/1586 dated 30.5.2018		GNRP
CDCL, Eastern Operation, Lingmethang	Crane				DoR/ROL/Mtc-14/2017-2018/1529 dated 22.5.2018		Silimbi GC Road
CDCL, Eastern Operation, Lingmethang	Trailer				DoR/ROL/Mtc-14/2017-2018/1073 dated 06.02.2018		Autsho
CDCL, Eastern Operation, Lingmethang	Excavator				DoR/ROL/Mtc-14/2017-2018/468 dated 02.10.2018		Gyelposhing-Nganglam
CDCL, Eastern Operation, Lingmethang	Excavator				Ref:GNRP/PIU (N)/06/2017-18/56 dated 31.08.2017		Gyelposhing-Nganglam

Financial Year	Name of Hiring Firm	Machine/equipment	Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed For	Sub-Division
	CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1901 dated 07.05.2018		IV
	CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1899 dated 07.05.2018		I
	CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/2062 dated 05.06.2018		I
	CDCL, Hesothangkha, Wangdue	Road Roller			RO-T/DoR/2017-2018/W-6/2101 dated 25.06.2018		I
	M/s. CDCL, Hesothangkha, Wangdue	Road Roller			RO-T/DoR/2017-2018/W-6/1893 dated 07.05.2018		I
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/2043 dated 05.06.2018		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1615 dated 30.03.2018		I
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1649 dated 06.04.2018		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1478 dated 06.03.2018		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1348 dated 09.02.2018		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1467 dated 05.03.2018		I
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1334 dated 06.02.2018		I
	M/s. CDCL,	Core driller			RO-T/DoR/2017-		IV

Financial Year	Name of Hiring Firm	Machine/equipment	Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed For	Sub-Division
	Hesothangkha, Wangdue				2018/W-6/1073 dated 08.01.2018		
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1942 dated 13.12.2017		IV
	M/s. CDCL, Hesothangkha, Wangdue	Road Roller			RO-T/DoR/2017-2018/W-6/873 dated 23.11.2017		II
	M/s. CDCL, Hesothangkha, Wangdue	Roller			RO-T/DoR/2017-2018/W-6/738 dated 8.11.2017		I
	M/s. CDCL, Hesothangkha, Wangdue	Pay Loader			RO-T/DoR/2017-2018/W-6/327 dated 01.09.2017		II
	M/s. CDCL, Hesothangkha, Wangdue	Pay Loader & Road Roller			RO-T/DoR/2017-2018/W-6/339 dated 01.09.2017		I
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/1073 dated 08.01.2018		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/777 dated 13.11.2017		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/572 dated 11.10.2017		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/410 dated 11.09.2017		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/196 dated 08.08.2017		IV
	M/s. CDCL, Hesothangkha, Wangdue	Core driller			RO-T/DoR/2017-2018/W-6/27 dated 06.07.2017		IV

Appendix-XI

Details of machinery/equipment hired (direct award) from hiring firms other than the lowest bidder

Financial Year	Name of Hiring Firm	Machines/equipment	Veh. Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed	Sub-Division
2017-2018	CDCL	Nissan Tipper	BG-1-0558	48,832.00	2371 dt. 3/9/2017	Monsoon restoration works-slip clearance along PNH, Baylangdra, Kazhi GC roads.	Lobeysa
		Tsuzu Tipper	BG-1-0459	37,536.00			
	CDCL	Tipper Truck	BG-2-0558	6,104.00	2390 dt.5/10/2017	Monsoon restoration works on Wangdue-Tekizampa PNH,	Lobeysa
		Tipper Truck	BG-1-0459	18,768.00		Monsoon restoration along PNH, Baylangdra & Kazhi GC road	
	CDCL	Isuzu Tipper	BG-1-0459	56,304.00	1426 dt. 5/12/2017	Monsoon restoration on Wangdue langkina PNH (slip clearance)	Lobeysa
		Nissan Tipper	BG-2-0558	85,456.00			
		Isuzu Tipper	BG-1-0456	6,256.00			
		Isuzu Tipper	BG-1-0462	31,280.00			
	CDCL	Nissan Tipper	BG-1A-0558	48,832.00	1448 dt. 5/1/2018	Monsoon restoration along Wangdue langkina slip clearance)	Lobeysa
	CDCL	Isuzu Tipper	BG-1-0459	12,512.00	1373 dt. 6/6/2018	Monsoon restoration along Wangdue langkina PNH	Lobeysa
	CDCL	Crane	BG-1-0464	17,152.00	2376 dt. 4/9/2017	Monsoon restoration works on Punakha-Gasa SNH	Damji
	Yadak	JCB	BP-1A-3601	109,760.00	441 dt.1/10/2017	Monsoon restoration works on Punakha Gasa SNH	Gasa
	Yadak	JCB	BP-1A-3601	137,200.00	447 dt.1/11/2017	Monsoon restoration works on Punakha-Gasa SNH	Gasa
	Yadak	JCB	BP-1A-3601	21,952.00	2016-17/SE/01	Monsoon restoration works on Punakha-Gasa SNH	Gasa
Yadak	JCB	BP-1A-3601	142,688.00	2016-17/SE/06	Monsoon restoration works on Punakha-Gasa SNH	Gasa	
Yadak	JCB	BP-1A-3601	27,440.00	Not available	Monsoon restoration works on Punakha-Gasa SNH (Slip clearance)	Gasa	
CDCL	Crane	BG-1-0464	13,908.00	Not available	Mtc. of Punakha-Gasa SNH	Damji	

Financial Year	Name of Hiring Firm	Machines/ equipment	Veh. Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed	Sub-Division
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3601	16,464.00	441 dt. 1/10/2017	Monsoon restoration work along Punakha-Tshodelmo SNH	Tshodelmo
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3601	82,320.00	YH/2016-17/SE/01 dt. 1/12/17	Monsoon restoration work along Punakha-Tshodelmo SNH	Tshodelmo
	CDCL	Tripper	BG-1-0456	38,318.00	1427 dt 5/12/2017	Base course rectification works at Tongtsana VVIP road	Tshodelmo
	CDCL	Tripper	BG-1-0459	44,574.00	1427 dt. 5/12/2017	Base course rectification works at Tongtsana VVIP road	Tshodelmo
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3812	126,224.00	YH/2016-17/SE/07/dt.21/12/2017	Bitumen sealing on Punakha-Gasa SNH	Tshodelmo
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3601	71,344.00	YH/PV/2017-18/SE/21 dt. 1/5/2018	Mtc.of Punakha-Tshodelmo SNH	Tshodelmo
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3661	32,928.00	YH/PV/2017-18/SE-25 dt.1/6/2018	Mtc.of Punakha-Tshodelmo SNH	Gasa
	Yadak Hiring Agent, Thimphu	JCB	BP-1A-3361	21,952.00	YH/PV/2017-18/SE-26	Mtc.of Punakha-Tshodelmo SNH	Tshodelmo
	CDCL	Crane	BG-2-0254	38,320.00	235 dt. 5/8/2017	Monsoon restoration work on Punakha-Gasa SNH	Gasa
	CDCL	Crow drill	DC-120/09	280,784.00			
	CDCL	Crow drill	DC-120/09	260,728.00	2369 dt. 3/9/2017	Monsoon restoration on Punakha-Gasa SNH	Gasa
	Yadak Hiring, Thimphu	JCB	BP-1A-3661	65,856.00	SE-25 dt. 1/6/2018	Mtc. Of Tshodelmo-Damji SNH	Gasa
	Yadak Hiring, Thimphu	JCB	BP-1A-3661	107,016.00	Not available	Mtc. Of Tshodelmo-Damji SNH	Gasa
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	3,430.00	442 dt. 1/10/2017	Monsoon restoration works	Lobeysa
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	71,344.00	446 dt. 1/11/2017	Thinleygang Lhaxhang road	Lobeysa

Financial Year	Name of Hiring Firm	Machines/ equipment	Veh. Registration No.	Amount (Nu.)	Bill No. & Date	Machine Deployed	Sub-Division
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	104,272.00	YH/2016-17/SE/02/dt.1/12/2017	Thinleygang site	Lobeysa
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	5,488.00	YH/2016-17/SE/05 dt. 1/1/2018	Approach road to Thinleygang Lhaxhang	Lobeysa
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	65,856.00	12 dt. 1/3/2018	Blacktopping of Thinleygang road	Lobeysa
	Yadak Hiring, Thimphu	JCB	BP-1-A3661	43,904.00	YH/2017-18/SE/13 dt. 1/04/2018	Blacktopping of Menchuna Lhaxhang road	Lobeysa
Total				2,303,102.00			

Appendix-XII

Vehicle/Machinery log sheet records maintained without signature of Machine Operators

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
1	8.33 dated 17/8/2017	479,952.00	Hire charge	026 dt. 7/8/2017	BP-1A-3753	No	No	Yes	Batasey Sub-Division
2	8.34 dated 18/8/2017	252,736.00	Hire charge	841 dt 5/8/2017	BP-2A-3070	No	No	Yes	Sarpang Sub-Division
				842 dt 5/8/2017	BP-1A-7114	No	No	Yes	Sarpang Sub-Division
				843 dt 9/8/2017	BP-1A-2626	No	No	Yes	Batasey Sub-Division
				844 dt 9/8/2017	BP-3A-0008	No	No	Yes	Sarpang Sub-Division
3	8.38 dt 18/8/2017	416,325.00	Hire charge	479 dt 7/8/2017	BP-1A-2086	No	no	Yes	Sarpang Sub-Division
					BP-1A-3040	No	No	Yes	Sarpang Sub-Division
					Bp-3A-0349	No	No	Yes	Batasey Sub-Division
4	8.71 dt 25/8/2017	135,190.00	Hire charge	1280 dt 7/8/2017	CPS325/18	No	No	Yes	Tshendengang Sub-Division
					J/Hammer	No	No	Yes	Tshendengang Sub-Division
					CP8325/18	No	No	Yes	Dovan
					J/Hammer	No	No	Yes	Dovan
5	8.74 dt 25/8/2017	509,350.00	Hire charge	477 dt 7/8/2017	BP-1A-3322	No	No	Yes	Dovan
					BP-1A-3040	No	No	Yes	Dovan
6	8.78 dt 30/8/2017	67,868.00	Hire Charge	1373 dt 10/8/2017	BP-1A-3436	No	No	Yes	Batasey Sub-Division
7	8.81 dt 30/8/2017	231,040.00	Hire charge	1372 dt 8/8/2017	BP-2A-7013	No	No	Yes	Batasey Sub-Division
					BP-2A-4883	No	No	Yes	Batasey Sub-Division
					BP-2A-0333	No	No	Yes	Batasey Sub-Division
8	8.89 dt 31/8/2017	396,048.00	Hire charge	153 dt 11/8/2017	BP-2A-2227	No	No	Yes	Lhamoizingkha section
				158 dt 11/2/2017	BP-2-A6974	No	No	Yes	Batasey Sub-Division
9	8.91 dated 31/8/2019	131,150.00	Hire Charge	Nil dated 29/8/2019	BP-1A-3331	No	No	Yes	Batasey Sub-Division
10	9.86 dt 29/9/2017	486,633.00	Hire Charge	1345 dt 7/9/2017	BP-2A-6159	No	Yes	Yes	Tshendengang Sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
				1346 dt 7/9/2017	BP-3A-0435	No	Yes	Yes	Tshendengang Sub-Division
					BP-3A-0365	No	Yes	Yes	Tshendengang Sub-Division
				1347 dt 7/9/2017	BP-3A-0365	No	Yes	Yes	Tshendengang Sub-Division
				1375 dt 31/8/2017	BP-3A-0333	No	No	Yes	Batasey Sub-Division
					BP-2A-7013	No	No	Yes	Batasey Sub-Division
					BP-2A-4883	No	No	Yes	Batasey Sub-Division
				1379 dt 2/9/2017	BP-3A-3436	No	No	Yes	Dovan Section
					BP-3A-0707	No	No	Yes	Dovan Section
				1381 dt 2/9/2017	BP-3A-0333	No	No	Yes	Batasey Sub-Division
					BP-3A-0283	No	No	Yes	Batasey Sub-Division
					BP-2A-7738	No	No	Yes	Batasey Sub-Division
				1378 dt 2/9/2017	BP-3A-0695	No	No	Yes	Sarpang sub-Division
					BP-1A-2636	No	No	Yes	Sarpang sub-Division
					BP-3A-0435	No	No	Yes	Sarpang sub-Division
BP-2A-4883	No	No	Yes		Sarpang sub-Division				
11	9.87 dt 29/9/2017	300,381.00	Hire Charge	062 dtd 31/8/2017	BP-1A-0017	No	No	Yes	Damphu Sub-Division
				063 dt 4/9/2017	BP-1A-0017	No	No	Yes	Damphu Sub-Division
				163 dt 6/9/2017	BP-3A-0043	No	No	Yes	Dovan Section
12	9.88 dt 29/9/2017	80,416.00	Hire Charge	847 dt 3/9/2017	BP-1A-2626	No	No	Yes	Batasey Sub-Division
13	9.89 dtd 29/9/2017	157,064.00	Hire Charge	Nil dated 18/8/2017	BP-3A-006	No	No	Yes	Damphu Sub-Division
14	10.46 dt 18/10/2017	573,300.00	Hire Charge	001 dt 8/10/2017	BP-1A-0094	No	No	Yes	Tshendengang Sub-Division
				004 dt 8/10/2017	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
				008 dt 8/10/2017	BP-1A-382	No	No	Yes	Tshendengang Sub-Division
					BP-1A-5139	No	No	Yes	Tshendengang Sub-

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
									Division
					BP-1A-0180	No	No	Yes	Tshendengang Sub-Division
				006 dt 8/10/2017	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
15	10.27 dt 17/10/2017	611,520.00	Hire Charge	058 dt 7/10/2017	BP-2A-0021	No	No	Yes	Damphu Sub-Division
				056 dt 6/10/2017	BP-3A-0019	No	No	Yes	Damphu Sub-Division
					BP-3A-0025	No	No	Yes	Sarpang sub-Division
				055 dt 6/10/2017	BP-3A-0433	No	No	Yes	Sarpang sub-Division
					BP-2A-7269	No	No	Yes	Sarpang sub-Division
16	10.31 dt 17/10/2017	1,383,893.00	Hire charge	058 dt 1/10/2017	BP-1A-1543	No	No	Yes	Sarpang sub-Division
				045 dt 5/9/2017	BP-1A-3803	No	No	Yes	Sarpang sub-Division
				027 dt 4/9/2017	BP-1A-3753	No	No	Yes	Batasey Sub-Division
17	10.29 dt 17/10/2017	391,699.00	Hire charge	164 dt 11/9/2017	BP-1A-0180	No	No	Yes	Tshendengang Sub-Division
					BP-3A-061	No	No	Yes	Tshendengang Sub-Division
					BP-3A-0042	No	No	Yes	Tshendengang Sub-Division
					BP-1A-3682	No	No	Yes	Tshendengang Sub-Division
					BP-2A-2826	No	No	Yes	Tshendengang Sub-Division
18	10.32 dt 17/10/2017	2,639,512.00	Hire charge	555 dtd 14/9/2017	BP-1A-3322	No	No	Yes	Dovan Section
					BP-1A-3803	No	No	Yes	Dovan Section
				552 dt 5/9/2017	BP-3A-0349	No	No	Yes	Batasey Sub-Division
					BP-3A-0012	No	No	Yes	Batasey Sub-Division
					BP-1A-3803	No	No	Yes	Batasey Sub-Division
					BP-1A-3036	No	No	Yes	Batasey Sub-Division
					BP-1A-3124	No	No	Yes	Batasey Sub-Division
				553 dt 8/9/2017	BP-1A-3040	No	No	Yes	Sarpang sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
				476 dt 1/8/2017	BP-1A-2602	No	No	Yes	Sarpang sub-Division
					BP-1A-2686	No	No	Yes	Sarpang sub-Division
					BP-1A-2737	No	No	Yes	Sarpang sub-Division
					BP-1A-2410	No	No	Yes	Sarpang sub-Division
19	10.14 dt 10/10/2017	852,576.00	Hire charge	1387 dt 1/10/2017	BP-3A-0434	No	No	Yes	Sarpang sub-Division
					BP-3A-0368	No	No	Yes	Sarpang sub-Division
					BP-3A-0696	No	No	Yes	Sarpang sub-Division
					BP-3A-0273	No	No	Yes	Sarpang sub-Division
					BP-3A-7013	No	No	Yes	Sarpang sub-Division
					BP-1A-4883	No	No	Yes	Sarpang sub-Division
				1389 dt 2/10/2017	BP-3A-0695	No	No	Yes	Sarpang sub-Division
					BP-2A-8221	No	No	Yes	Sarpang sub-Division
				1348 dt 9/10/2017	BP-3A-0365	No	Yes	Yes	Tshendengang Sub-Division
				1349 dt 9/10/2017	BP-3A-0345	No	No	Yes	Tshendengang Sub-Division
1350 dt 9/10/2017	BP-2A-6159	No	No	Yes	Tshendengang Sub-Division				
20	10.42 dt 18/10/2017	149,344.00	Hire Charge	752 dt 2/10/2017	BP-3A-0269	No	No	Yes	Damphu Sub-Division
				849 dt 3/9/2017	BP-1A-3302	No	No	Yes	Damphu Sub-Division
21	11.22 dt 7/11/2017	27,000.00	Hire charge	33 dt 19/8/2017		No	No		Batasey Sub-Division
22	11.24 dt 8/11/2017	59,064.00	Hire charge	1391 dt 2/10/2017	BP-3A-0192	No	No	Yes	Dovan Section
23	11.28 dt 8/11/2017	246,225.00	Hire charge	064 dt 27/10/2017	BP-1A-3322	No	No	Yes	Dovan Section
24	11.33 dt 9/11/2017	35,531.00	Hire charge	1064 dt 6/10/2017	CPS/325/18	No	No	Yes	Tshendengang Sub-Division
					J/hammer	No	No	Yes	Tshendengang Sub-Division
25	11.38 dt 9/11/2017	822,832.00	Hire charge	067 dt 2/11/2017	BP-2A-0021	No	No	Yes	Damphu Sub-Division
				064 dt 2/11/2017	BP-3A-0433	No	No	Yes	Sarpang sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
					BP-3A-0025	No	No	Yes	Sarpang sub-Division
					BP-2A-6974	No	No	Yes	Sarpang sub-Division
					BP-3A-0433	No	No	Yes	Sarpang sub-Division
				065 dt 2/11/2017	BP-3A-0025	No	No	Yes	Sarpang sub-Division
					BP-2A-7269	No	No	Yes	Sarpang sub-Division
					BP-3A-0042	No	No	Yes	Sarpang sub-Division
26	11.54 dt 20/11/2017	463,050.00	Hire charge	076 dt 16/11/2017	BP-1A-3951	No	No	Yes	Tshendengang Sub-Division
					BP-1A-3682	No	No	Yes	Tshendengang Sub-Division
				078 dt 16/11/2017	BP-1A-0094	No	No	Yes	Tshendengang Sub-Division
					BP-2A-0658	No	No	Yes	Tshendengang Sub-Division
27	11.56 dt 21.11/32017	644,494.00	Hire Charge	284 dt 18/10/2017	BP-1A-2010	No	No	Yes	Tshendengang Sub-Division
				285 dt 18/10/2017	BP-1A-3755	No	No	Yes	Tshendengang Sub-Division
28	11.62 dt 21/11/2017	270,480.00	Hire Charge	057 dt 6/10/2017	BP-3A-0043	No	No	Yes	Dovan Section
				079 dt 16/11/2017	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
29	11.63 dtd21/11/2017	144,624.00	Hire Charge	2202 dt 20/11/2017	BP-3A-0365	No	No	Yes	Tshendengang Sub-Division
				2203 dt 20/11/2017	BP-2A-6159	No	No	Yes	Tshendengang Sub-Division
30	11.76 dt 22/11/2017	448,128.00	Hire Charge	1390 dt 3/10/2017	BP-3A-0333	No	No	Yes	Batasey Sub-Division
					BP-3A-0283	No	No	Yes	Batasey Sub-Division
					BP-2A-6043	No	No	Yes	Batasey Sub-Division
				2261 dt 3/11/2017	BP-3A-0283	No	No	Yes	Batasey Sub-Division
					BP-3A-0333	No	No	Yes	Batasey Sub-Division
					BP-2A-6043	No	No	Yes	Batasey Sub-Division
				BP-1A-2284	No	No	Yes	Batasey Sub-Division	

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
					BP-1A-2945	No	No	Yes	Batasey Sub-Division
31	11.96 dt 24/11/2017	140,719.00	Hire charge	1054 dt 4/10/2017	BG-1-0483	No	No	Yes	Sarpang sub-Division
				1283 dt 5/9/2017	CPS/325/18	No	No	Yes	Tshendengang Sub-Division
					J/hammer	No	No	Yes	Tshendengang Sub-Division
				1052 dt 4/10/2017	BG-1-0483	No	No	Yes	Sarpang sub-Division
32	11.104 dt 27/11/2017	834,630.00	Hire Charge	1266 dt 7/8/2017	D5M/05	No	No	Yes	Batasey Sub-Division
					MG130/06	No	No	Yes	Batasey Sub-Division
				1289 dt 5/9/2017	MG130/06	No	No	Yes	Batasey Sub-Division
					D5M/05	No	No	Yes	Batasey Sub-Division
33	11.105 dt 27/11/2017	231,800.00	Hire charge	556 dt 16/9/2017	BP-3A-0012	No	No	Yes	Batasey Sub-Division
					BP-3A-0349	No	No	Yes	Batasey Sub-Division
34	11.109 dt 28/11/2017	37,464.00	Hire charge	165 dt 8/9/2017	BP-3A-0042	No	No	Yes	Tshendengang Sub-Division
35	11.110 dt 28/11/2017	93,968.00	Hire Charge	070 dt 22/11/2017	BP-1A-3755	No	No	Yes	Tshendengang Sub-Division
36	11.111 dt 28/11/2017	92,610.00	Hire Charge	066 dt 2/11/2017	BP-4A-0544	No	No	Yes	Dovan Section
					BP-3A-0433	No	No	Yes	Dovan Section
37	11.112 dt 28/11/2017	268,674.00	Hire Charge	2262 dt 2/11/2017	BP-3A-0265	No	No	Yes	Damphu Sub-Division
					2257 dt 2/11/2017	BP-3A-0696	No	No	Yes
				BP-3A-0695		No	No	Yes	Dovan Section
				BP-3A-0435		No	No	Yes	Dovan Section
				BP-3A-4883		No	No	Yes	Dovan Section
2258 dt 2/11/2017	BP-3A-0192	No	No	Yes	Dovan Section				
38	12.25 dt 7/12/2017	288,240.00	Hire Charge	073 dt 10/11/2017	BP-1A-0180	No	No	Yes	Batasey Sub-Division
				062 dt 9/10/2017	BP-1A-0180	No	No	Yes	Batasey Sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
					BP-2A-6974	No	No	Yes	Batasey Sub-Division
39	12.26 dt 7/12/2017	2,473,578.00	Hire charge	061 dt 3/11/2017	BP-1A-2556	No	No	Yes	Batasey Sub-Division
					BP-3A-0349	No	No	Yes	Batasey Sub-Division
					BP-2A-3993	No	No	Yes	Batasey Sub-Division
				057 dt 1/10/2017	BP-3A-0349	No	No	Yes	Batasey Sub-Division
					BP-1A-1343	No	No	Yes	Batasey Sub-Division
					BP-3A-0012	No	No	Yes	Batasey Sub-Division
				044 dt 8/9/2017	BP-1A-3753	No	No	Yes	Batasey Sub-Division
40	12.29 dt 7/12/2017	47,175.00	Hire Charge	452 dt 10/11/2017	BP-1-0229	No	No	Yes	Batasey Sub-Division
41	12.59 dt 18/12/2017	1,123,464.00	Hire charge	273 dt 4/12/2017	BP-1A-2945	No	No	Yes	Lhamoizingkha Section
				272 dt 4/12/017	BP-3A-0008	No	No	Yes	Sarpang sub-Division
					BP-1A-2626	No	No	Yes	Sarpang sub-Division
					BP-2A-3070	No	No	Yes	Sarpang sub-Division
				2269 dt 4/12/2017	BP-3A-0695	No	No	Yes	Sarpang sub-Division
				2281 dt 8/12/2017	BP-2A-4106	No	No	Yes	Sarpang sub-Division
				2271 dt 4/12/2017	BP-3A-008	No	No	Yes	Sarpang sub-Division
					BP-2A-7114	No	No	Yes	Sarpang sub-Division
				2275 dt 4/12/2017	BP-3A-0368	No	No	Yes	Sarpang sub-Division
					BP-2A-7013	No	No	Yes	Sarpang sub-Division
					BP-3A-0434	No	No	Yes	Sarpang sub-Division
					BP-2A-4883	No	No	Yes	Sarpang sub-Division
					BP-3A-0435	No	No	Yes	Sarpang sub-Division
BP-3A-0695	No	No	Yes		Sarpang sub-Division				
2278 dt 8/12/2017	BP-3A-0696	No	No	Yes	Sarpang sub-Division				
	BP-3A-0707	No	No	Yes	Sarpang sub-Division				
				2278 dt 8/12/2017	BP-2A-7388	No	No	Yes	Sarpang sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
				2270 dt 4/12/2017	BP-3A-0435	No	No	Yes	Dovan Section
					BP-3A-0695	No	No	Yes	Dovan Section
					BP-3A-0696	No	No	Yes	Dovan Section
					BP-1A-3436	No	No	Yes	Dovan Section
42	12.60 dt 18/12/2017	468,930.00	Hire charge	101 dt 6/12/2017	BP-3A-0025	No	No	Yes	Sarpang sub-Division
					BP-1A-0023	No	No	Yes	Sarpang sub-Division
				102 dt 6/12/2017	BP-3A-0433	No	No	Yes	Sarpang sub-Division
				103 dt 6/12/2017	BP-4A-0544	No	No	Yes	Dovan Section
43	1.3 dt 1/1/2018	324,135.00	Hire Charge	085 dt 14/1/2018	BP-2A-0631	No	No	Yes	Tshendengang Sub-Division
				086 dt 14/12/2017	BP-1A-3682	No	No	Yes	Tshendengang Sub-Division
44	1.19 dt 6/1/2018	2,057,069.00	Hire Charge	157 dt 18/12/2017	BP-1A-3322	No	No	Yes	Dovan Section
				065 dt 18/12/2018	BP-3A-0299	No	No	Yes	Dovan Section
				159 dt 20/11/2017	BP-2A-3755	No	No	Yes	Tshendengang Sub-Division
				154 dt 12/12/2017	BP-1A-3756	No	No	Yes	Sarpang sub-Division
					BP-1A-2730	No	No	Yes	Sarpang sub-Division
					BP-3A-0391	No	No	Yes	Sarpang sub-Division
BP-2A-0014	No	No	Yes	Sarpang sub-Division					
45	1.29 dt 8/1/2018	231,084.00	Hire Charge	2279 dt 8/12/2017	BP-2A-6043	No	No	Yes	Batasey Sub-Division
				2277 dt 6/12/2017	BP-1A-3162	No	No	Yes	Batasey Sub-Division
				2280 dt 8/12/2017	BP-1A-2284	No	No	Yes	Batasey Sub-Division
					BP-3A-0283	No	No	Yes	Batasey Sub-Division
46	1.30 dt 8/1/2018	490,245.00	Hire Charge	087 dt 14/12/2017	BP-1A-0061	No	No	Yes	Damphu Sub-Division
				084 dt 7/12/2017	BP-1A-0180	No	No	Yes	Batasey Sub-Division
				104 dt 8/12/2017	BP-3A-0301	No	No	Yes	Sarpang sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
					BP-3A-0018	No	No	Yes	Sarpang sub-Division
47	1.65 dt 17/1/2018	60,897.00	Hire Charge	1098 dt 7/12/2017	CPS/325/18	No	No	Yes	Tshendengang Sub-Division
					J/hammer	No	No	Yes	Tshendengang Sub-Division
				1115 dt 0/12/2017	CPS/325/18	No	No	Yes	Tshendengang Sub-Division
					J/hammer	No	No	Yes	Tshendengang Sub-Division
48	1.84 dt 19/1/2018	125,850.00	Hire Charge	152 dt 20/11/2017	BP-1A-3745	No	No	Yes	Tshendengang Sub-Division
				153 dt 4/12/2017	BP-1A-3745	No	No	Yes	Tshendengang Sub-Division
49	1.87 dt 22/1/2018	97,755.00	Hire charge	100 dt 9/1/2018	BP-2-A3456	No	No	Yes	Sarpang sub-Division
50	1.119 dt 26/1/2018	355,005.00	Hire Charge	075 dt 6/1/2018	BP-2-A7609	No	No	Yes	Tshendengang Sub-Division
				089 dt 6/1/2018	BP-1-A5139	No	No	Yes	Tshendengang Sub-Division
				090 dt 6/1/2018	BP-1-A3682	No	No	Yes	Tshendengang Sub-Division
51	1.134 dt 29/1/2018	895,356.00	Hire Charge	062 dt 7/12/2017	BP-1-A3753	No	No	Yes	Batasey Sub-Division
					BP-1-A2556	No	No	Yes	Batasey Sub-Division
					BP-3-A0349	No	No	Yes	Batasey Sub-Division
					BP-2-A3993	No	No	Yes	Batasey Sub-Division
52	2.22 dtd 12/2/2018	279,300.00	Hire charge	01 date Nil	BP1-A2664	No	No	Yes	Lhamoizingkha Section
				02 dt 10/2/2018	BP1-A2664	No	No	Yes	Lhamoizingkha Section
53	2.72 dt 20/2/2018	142,833.00	Hire Charge	2284 dt 3/1/2018	BP-2-A4883	No	No	Yes	Batasey Sub-Division
					BP-1-A2884	No	No	Yes	Batasey Sub-Division
				2285 dt 3/1/2018	BP-2-A6043	No	No	Yes	Batasey Sub-Division
					BP-3-A0435	No	No	Yes	Batasey Sub-Division
54	3.2 dt 2/3/2018	377,550.00	Hire	087 dt	BP-1-A3755	No	No	Yes	Tshendengang Sub-

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
			Charge	12/02/2018					Division
				162 dt 22/1/2018	BP-1-A3755	No	No	Yes	Tshendengang Sub-Division
55	3.3 dt 2/3/2018	88,767.00	Hire Charge	2205 dt 7/2/2018	BP-2-A6159	No	No	Yes	Tshendengang Sub-Division
56	3.22 dt 6/3/2018	1,451,484.00	Hire charge	088 dt 2/3/2018	BP-1_A3755	No	Yes	Yes	Tshendengang Sub-Division
				534 dt 23/02/2018	BP-3-A0349	No	No	Yes	Batasey Sub-Division
					BP-2-A3998	No	No	Yes	Batasey Sub-Division
					BP-1-A38=753	No	No	Yes	Batasey Sub-Division
				112 dt 21/2/2018	BP-1-A3322	No	No	Yes	Dovan Section
BP-3-A0299	No	No	Yes		Dovan Section				
57	3.23 dt 6/3/2018	346,920.00	Hire charge	096 dt 19/2/2018	BP-1-A3682	No	No	Yes	Tshendengang Sub-Division
				093 dt 5/01/2018	BP-1-A0023	No	No	Yes	Dovan Section
				095 dt 19/2/2018	BP-1-A0180	No	No	Yes	Batasey Sub-Division
58	3.28 dt 7/3/2018	436,678.00	Hire charge	1126 dt 1/1/2018	CPS/325/26	No	No	Yes	Batasey Sub-Division
					J/hammer	No	No	Yes	Batasey Sub-Division
					BG-100421	No	No	Yes	Batasey Sub-Division
59	3.118 dt 21/3/2018	465,241.00	Hire charge	106 dt 3/3/2018	BP-2-A3993	No	No	Yes	Batasey Sub-Division
					BP-1-A3758	No	No	Yes	Batasey Sub-Division
60	3.60 dt 12/3/2018	125,034.00	Hire Charge	2371 dt 1/3/2018	BP-3-A008	No	No	Yes	Batasey Sub-Division
				2372 dt 1/3/2018	BP-3-A0273	No	No	Yes	Batasey Sub-Division
					BP-3-A0435	No	No	Yes	Batasey Sub-Division
				822 dtd19/3/2018	DC120/23	No	No	Yes	Dovan Section
61	4.50 dt 19/4/2018	599,760.00	Hire Charge	203 dt 1/4/2018	BP-1-A0180	No	No	Yes	Damphu Sub-Division
				009 dt 5/4/2018	BP-1-A3682	No	No	Yes	Tshendengang Sub-Division
				118 dt 3/4/2018	BP-3-A0055	No	No	Yes	Lhamoizingkha Section
BP-1-A0275	No	No	Yes		Lhamoizingkha Section				

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
62	4.82 dt 24/4/2018	1,839,627.00	Hire charge	091 dt 1/4/2018	BP-1-A3322	No	No	Yes	Lhamoizingkha Section
					BP-3-A0299	No	No	Yes	Lhamoizingkha Section
				119 dt 1/4/2018	BP-1A-3756	No	No	Yes	Sarpang sub-Division
					BP-3A-0391	No	No	Yes	Sarpang sub-Division
1059 dt 6/4/2018	BP-1A-3755	No	No	Yes	Tshendengang Sub-Division				
63	5.32 dt 10/5/2018	15,750.00	Hire Charge	1318 dt 3/5/2018	Water tank	No	No	Yes	Sarpang sub-Division
64	5.34 dt 8/5/2018	172,527.00	Hire Charge	2378 dt 2/4/2018	BP-3-A0273	No	No	Yes	Batasey Sub-Division
					BP-3-A0435	No	No	Yes	Batasey Sub-Division
65	5.51 dt 3/5/2018	649,701.00	Hire charge	2403 dt 3/5/2018	BP-3-A0368	No	No	Yes	Damphu Sub-Division
				404 dt 3/5/2018	BP-3-A0265	No	No	Yes	Damphu Sub-Division
66	5.53 dt 15/5/2018	394,695.00	Hire Charge	204 dt 3/5/2018	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
				010 dt 8/5/2018	BP-1-A3682	No	No	Yes	Tshendengang Sub-Division
				128 dt 2/5/2018	BP-3-A0055	No	No	Yes	Lhamoizingkha Section
					BP-1-A0275	No	No	Yes	Lhamoizingkha Section
120 dt 4/4/2018	BP-4-A0015	No	No	Yes	Batasey Sub-Division				
67	5.118 dt 29/5/2018	147,000.00	Hire Charge	124 dt 3/5/2018	BP-1-A0023	No	No	Yes	Dovan Section
68	6.88 dt 13/6/2018	479,270.00	Hire charge	178 dt 16/5/2018	BP-1A-3753	No	No	Yes	Batasey Sub-Division
					BP-1A-3756	No	No	Yes	Batasey Sub-Division
					BP-2A-3998	No	No	Yes	Batasey Sub-Division
					BP-1A-3756	No	No	Yes	Batasey Sub-Division
				174 dt 4/6/2018	BP-1-A3755	No	No	Yes	Tshendengang Sub-Division
69	6.89 dt 14/6/2018	259,600.00	Hire charge	214 dt 5/6/2018	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
					BP-2A-7609	No	No	Yes	Tshendengang Sub-Division
				25 dt 2/6/2018	BP-1A-0707	No	No	Yes	Damphu Sub-Division

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
70	6.91 dt 14/6/2018	423,654.00	Hire charge	2416 dt 2/6/2018	BP-3-A0696	No	No	Yes	Lhamoizingkha Section
					BP-3-A0695	No	No	Yes	Lhamoizingkha Section
					BP-1-A2284	No	No	Yes	Lhamoizingkha Section
				2415 dt 2/6/2018	BP-2-A7013	No	No	Yes	Sarpang sub-Division
					BP-3-A0434	No	No	Yes	Sarpang sub-Division
					BP-3-A0365	No	No	Yes	Sarpang sub-Division
					BP-3-A0365	No	No	Yes	Sarpang sub-Division
					BP-3-A0776	No	No	Yes	Sarpang sub-Division
BP-2-A7013	No	No	Yes	Sarpang sub-Division					
71	6.101 dt 15/6/2018	5,000.00	Hire charge	214 dt 5/6/2018	BP-3A-0631	No	No	Yes	Tshendengang Sub-Division
					BP-2A-7609	No	No	Yes	Tshendengang Sub-Division
72	6.113 dt 16/6/2018	114,660.00	Hire Charge	127 dt 2/6/2018	BP-1A-0275	No	No	Yes	Lhamoizingkha Section
73	6.122 dt 18/6/2018	1,448,232.50	Hire Charge	177 dt 16/5/2018	BP-1A-0014	No	No	Yes	Lhamoizingkha Section
					BP-1-A3824	No	No	Yes	Lhamoizingkha Section
					BP-1-A3216	No	No	Yes	Lhamoizingkha Section
					BP-1-A2010	No	No	Yes	Lhamoizingkha Section
				185 dt 5/6/2018	BP-1-A3756	No	No	Yes	Sarpang sub-Division
					BP-3-A0391	No	No	Yes	Sarpang sub-Division
74	6.158 dt 23/6/2018	145,803.00	Hire charge	2223 dtd6/6/2018	BP-3-A0368	No	No	Yes	Tshendengang Sub-Division
				2224 dt 6/6/2018	BP-2A-6159	No	No	Yes	Tshendengang Sub-Division
75	6.177 dt 25/6/2018	244,020.00	Hire Charge	213 dt 5/6/2018	BP-1A-3682	No	No	Yes	Tshendengang Sub-Division
					BP-3A-0361	No	No	Yes	Tshendengang Sub-Division
					BP-2A-7609	No	No	Yes	Tshendengang Sub-Division
76	6.206 dt 27/6/2018	70,560.00	Hire	132 dt 25/6/2018	BP-1-A2664	No	No	Yes	Lhamoizingkha Section

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
			Charge						
77	6.2017 dt 27/6/2018	27,590.00	Hire Charge	223 dt 25/5/2018	BP-3-A0042	No	No	Yes	Sarpang Sub-Division
78	6.253 dt 28/6/2018	277,191.00	Hire Charge	2402 dt 3/5/2018	BP-3-A0192	No	No	Yes	Dovan Section
				2418 dt 2/6/2018	BP-3-A0192	No	No	Yes	Dovan Section
				2225 dt 26/6/2018	BP-3-A0368	No	No	Yes	Tshendengang Sub-Division
					BP-3A-0368	No	No	Yes	Tshendengang Sub-Division
				2226 dt 26/6/2018	BP-2A-6159	No	No	Yes	Tshendengang Sub-Division
79	6.255 dt 28/6/2018	254,310.00	Hire Charge	206 dt 25/6/2018	BP-1-A3682	No	No	Yes	Tshendengang Sub-Division
					BP-3-A0631	No	No	Yes	Tshendengang Sub-Division
80	6.256 dt 28/6/2018	93,968.00	Hire charge	163 dt 27/6/2018	BP-1-A3755	No	No	Yes	Tshendengang Sub-Division
81	6.285 dt 29/6/2018	991,526.00	Hire Charge	2439 dt nil	BP-3-A0776	No	No	Yes	Sarpang Sub-Division
					BP-2-A7013	No	No	Yes	Sarpang Sub-Division
					BP-3-A0365	No	No	Yes	Sarpang Sub-Division
					BP-2-A6160	No	No	Yes	Sarpang Sub-Division
					BP-2-A2674	No	No	Yes	Sarpang Sub-Division
				2435 dt nil	BP-3-A0365	No	No	Yes	Sarpang Sub-Division
				2428 dt nil	BP-1-A2626	No	No	Yes	Sarpang Sub-Division
				2429 dt nil	BP-3-A0008	No	No	Yes	Sarpang Sub-Division
					BP-2-A7114	No	No	Yes	Sarpang Sub-Division
				2436 dt nil	BP-3-A0695	No	No	Yes	Sarpang Sub-Division
					BP-3-A0696	No	No	Yes	Sarpang Sub-Division
				2431 dt 27/6/2018	BP-3-A0273	No	No	Yes	Batasey Sub-Division
					BP-2-A4883	No	No	Yes	Batasey Sub-Division
2432 dt	BP-3-A0435	No	No	Yes	Batasey Sub-Division				

Sl. No.	DV. # & Date	Amount (Nu.)	Purpose	Bill No. & Date	Veh. Log Book	Signature			Sub-Division
					Veh. No.	Operator	Site Supervisor	Site In charge	
				27/6/2018	BP-3-A0776	No	No	Yes	Batasey Sub-Division
				2433 dt nil	BP-3-A0695	No	No	Yes	Lhamoizingkha Section
					BP-3-A0696	No	No	Yes	Lhamoizingkha Section
				2434 dt nil	BP-2-3804	No	No	Yes	Lhamoizingkha Section
82	6.286 dt 29/6/2018	565,660.00	Hire Charge	129 dt nil	BP-3-A0433	No	No	Yes	Sarpang Sub-Division
				221 dt 25/6/2018	BP-1-A0180	No	No	Yes	Batasey Sub-Division
				217 dt nil	BP-1-A0023	No	No	Yes	Sarpang Sub-Division
				100 dt nil	Bp-3-A0055	No	No	Yes	Lhamoizingkha Section
83	6.289 dt 29/6/2018	1,828,312.00	Hire charge	196 dt 27/6/2018	BP-1A-0391	No	No	Yes	Sarpang Sub-Division
					BP-1A-3756	No	No	Yes	Sarpang Sub-Division
					BP-1A-3753	No	No	Yes	Sarpang Sub-Division
				198 dt 26/6/2018	BP-1A-0014	No	No	Yes	Batasey Sub-Division
					BP-1A-3753	No	No	Yes	Batasey Sub-Division
					BP-2A-3993	No	No	Yes	Batasey Sub-Division
					BP-1A-3216	No	No	Yes	Batasey Sub-Division
					BP-1A-2737	No	No	Yes	Batasey Sub-Division
Total		38,908,296.50							

Appendix-XIII**Non-declaration of conflict of interest by Tender Committee under various ROs**

Sl. No.	Financial Year	RO	Declaration of Conflict of Interest (Yes/No)			Remarks
			Opening Committee	Evaluation Committee	Awarding Committee	
1	2016-17	Sarpang	Yes	No	No	
	2017-18		Yes	No	No	
2	2016-17	Lingmethang	Yes	No	No	
	2017-18		No	Yes	No	
3	2016-17	Lobeysa	No	Yes	No	
	2017-18		Yes	Yes	No	Opening & awarding members were same
4	2016-17	Samdrupjongkhar	No	No	No	
	2017-18		No	No	No	
5	2016-17	Tingtibi	Yes	No	No	
	2017-18		Yes	No	No	
6	2016-17	Thimphu	No	Yes	No	
	2017-18		No	Yes	No	

Appendix-XIV

Details of pavement/blacktopping works carried out without road testing during the FY 2015-16 to 2017-18

Financial Year	RO	Name of work/Project Name	Length (in Km)	Approved Budget (in Mill)	Contract awarded to	Contractor's Amount (in Mill)	Remarks
2015-16	Lingmethang	Resurfacing work on Yadi-Sarpang PNH	4	9.288	M/s Chengala Construction, Mongar	9.857	
		Resurfacing work on Gangola-Lhentse SNH	5.7	7	M/s Chengala Construction, Mongar	6.849	
	Sarpang	Base Course and Permanent works on Dovan Gewog Centre Road	3.5	48	M/s Yangki Construction	11.372	
					M/s. Alfa Beta Construction	12.026	
					M/s. Gautam Construction	8.966	
	Thimphu	Blacktopping of Sangbay Amma GC road from Khamina-Sangbay Amma (Package-V)	14	12.8	M/s Lhendup Norbu Construction, Thimphu	31.765	
		Blacktopping works of Khamina-Gakidling and GC road Gakidling-Rangtsee under Haa Dzongkhag (Package VI)		11.31	M/s Raven Builder Co. Pvt Ltd, Saprang	43.265	Ongoing
		Up gradation of Jenkana to Khamina road (Package I)		74	M/s. Joenshing Construction, Thimphu	45.342	Ongoing
		Up gradation of Jenkana to Khamina road (Package II)			M/s Lotey Construction	63.927	
		Up gradation of Jenkana to Khamina road (Package III)			M/s Tacho Construction Pvt. Ltd, Paro	74.510	
		Up gradation of Jenkana to Khamina road (Package IV)			M/s. Tacho Construction Pvt. Ltd, Paro	58.204	
	Samdrup Jongkhar	Resurfacing Work on Denchi Yurungzam	3.2	6	M/s Sernyel Zeykhel Construction, Pemagatshel	4.927	
		Resurfacing and Improvement work on approach road to Yongla Gonpa	2.76	8	M/s N. Yarphel Construction, Pemagatshel	5.905	
		Blacktopping work on Khothakpa Khar Tsebar Yurung DR (KPTY)	15	25	M/s Kharsa Construction Pvt. Ltd. Trashiyangtse	26.034	
		BT work on Khairigonpa- Yelchen (Nanong) GC Road(0-10km Package I)	10	21.289	M/s Indanella Construction Pvt. Ltd. Pemagatshel	26.094	
		BT work on Khairigonpa- Yelchen (Nanong) GC Road(10-20km Package II)	10	29.173	M/s Indanella Construction Pvt. Ltd. Pemagatshel	30.655	
BT work on Khairigonpa- Yelchen (Nanong) GC		10	28.441	M/s Indanella Construction Pvt. Ltd.	31.733		

Financial Year	RO	Name of work/Project Name	Length (in Km)	Approved Budget (in Mill)	Contract awarded to	Contractor's Amount (in Mill)	Remarks
		Road(20-30km Package III)			Pemagatshel		
		Resurfacing work on Dewathang-Samdrupcholing SNH	5	7.51	M/s Chhogdhen Construction, Tashiyangtse	7.910	
2016-17	Lingmethang	Resurfacing work on Yadi-Serpang PNH	2.7	30	M/s Desing Nidup Construction	12.787	
			6			10.678	
		Resurfacing work on Gangola-Lhentse SNH	0.5	5	M/s Tsasum Yangphel Construction	4.712	
	Tingtibi	BT works on Phumethang Lhakhang road	3.5	11.7	M/s. Sonam Rinzin Const. Tingtibi	9.860	
		BT work & permanent work on Goshing GC road	8	31.317	M/s SL Construction, Pvt. Ltd.	28.399	
		Pavement & permanent work on Gomphu Panbang	8.3	63.191	M/s KD Builders Pvt. Ltd	65.445	
	Samdrup Jongkhar	Black Topping work on Khar-Tsebar DR	6.3	15	M/s Lhawang Yugyel Construction, Samdrupjongkhar	2.876	
		BT work on Denchi-Mandi (Chongshing) GC Road	11.5	Not given	M/s Indanella Construction Pvt. Ltd. Pemagatshel	30.054	
		Resurfacing work on Dewathang-Samdrupcholing SNH	8.92	6.85	M/s Chhogdhen Construction, Tashiyangtse	7.084	
	2017-18	Sarpang	Pavement strengthening works on Sarpang-Tsirang PNH and blacktopping works on realignment of Sarpang disaster affected area	Not given	Not given	M/s Norbu Construction and Company Pvt. Ltd	13.730
Resurfacing and blacktopping works on Tshachu District Road and Jigmecholing GC Roads			2.15	Not given	M/s Pema Builders	1.790	
Thimphu		Resurfacing of Upper Motithang, Upper Babesa, Ngabiphu & Dechencholing Goenpa road	2.175	5.9	M/s Neten Construction Pvt. Ltd, Thimphu	3.382	
		Bitumen sealing of Hungril , Tshengtok, Shaba GC road and amp; Kila Goenpa	2.516	26.5	M/s Karma Builder	4.898	
Samdrup Jongkhar		BT work on Tsebar-Mikuri- Durungri SNH	5	15	M/s Rinzin Lhamo Construction, Pemagatshel	5.240	
		Pavement Strengthening work on Tshelingore-Pemagatshel-Khothakpa SNH	5.6	12	M/s Rinzin Lhamo Construction, Pemagatshel	5.932	
		Resurfacing work on Dewathang-Samdrupcholing SNH	3.3	5.73	M/s Sonam KD Construction	4.897	

ANNEXURE



དཔལ་ལྷན་འབྲུག་གཞུང་། འབྲུག་རྒྱལ་ཁབ་

Royal Government of Bhutan
Ministry of Works & Human Settlement

DoR : Thimphu.

"Construction Industry: Solution through innovation and improved technology"

No. DoR/CE(Mtc.)/2019-20/W-3/ 663(B)

15/10/2019

The Auditor General
Royal Audit Authority
Thimphu

Sub: Submission of responses and confirmation.


Dear Dasho,

This has reference to the letter from the RAA, ref.no.RAA/TAO (PA-McWHS)/2019 20/2230 where the draft report on the Performance Audit Report on Road Maintenance Work, Department of Roads' was enclosed.

As intimated in the earlier correspondence the Department would like to submit the responses and confirmations against the observations and recommendations outlined in the report as attached.

Therefore, it is submitted for information and necessary action.

Yours Sincerely,


(Dorji Gyeltshen P)
CHIEF ENGINEER
Maintenance Division

PART 1: Initiative and positive developments (road maintenance planning initiative)

In the pasts, the maintenance activities used to be adhoc and reactive. DoR has, about a year back, initiated a system wherein all the maintenance requirements are annually planned in detail within the available budget. The annual plan will have the indicative quantity of different maintenance activities to be implemented within the financial year. The plan, besides serving as the basis for measurement of annual achievement at the end of the year, will also allow the monitoring team to objectively monitor the conduct of maintenance activities in different seasons.

PART 2: SHORTCOMINGS AND DEFICIENCIES

3.1 Planning and prioritisation of road maintenance works

3.1.1 Absence of an overall master plan on road maintenance

Maintenance of roads is classified into three types, routine, periodic and emergency maintenance. The planning for road maintenance takes a different stand from planning for construction or improvement of roads. Planning for construction or improvement of the roads can be initiated instantly depending on the need and economic viability. The planning for maintenance, on other hand, requires enormous data to be taken into account such as present condition of the asset, the factors affecting the deterioration of asset, how the asset performs under different conditions etc. which entail thorough study and creation and maintenance of a robust database and its timely update. DoR did not have a database until recently. Realizing the importance of such a database, DoR embarked on developing Road Asset Management System (RAMS) in 2016 with technical support from the World Bank. The system is under trial at present and is being updated.

While planning for emergency maintenance will entail through and detailed studies of all the slopes throughout the country which will be very challenging given the technical expertise and the financial resources, the planning for routine and periodic maintenance can be done once we have RAMS fully established and institutionalized. In fact DoR has already initiated annual planning for routine maintenance.

It is DoR's dream to make RAMS fully functional and use it for planning and monitoring of all the maintenance activities in the future.

3.1.2 Annual Performance Agreements lack definite/realistic maintenance targets

The maintenance targets in the Annual Performance Agreement, today, are kept very broad - "road network maintained" - and does not go to the activity level. The performance indicator for road maintenance is usually the utilization of the approved maintenance budget which is not really complex to achieve given the nature of the activities, the complexities in verification and the kind of maintenance budget provided. Every year the maintenance indicator receives 100% achievement helping DoR achieve its overall APA performance while it is doubtful whether the road is maintained to the satisfactory level. One of the reasons why APA targets are kept broad is because of the recurrent nature of the maintenance activities and lack of systematic monitoring.

Realizing these shortcomings in the overall maintenance of the road, DoR has, about a year back, initiated a system wherein all the ROs are required to annually plan in detail the maintenance activities to be performed for that year within the confines of the available budget. The annual plan will indicate the quantity of different maintenance activities against which the achievement at the end of the year can be gauged. The system will also allow the monitoring team to objectively monitor the conduct of maintenance activities in different seasons. The system can also be used as basis for drawing APA between the ROs and HQ once annual planning takes root.

3.1.3 Inadequate prioritisation of periodic maintenance

DoR at present do not have an established scientific system of prioritizing periodic maintenance. The periodic maintenance requirements are mostly based on the extent of surface deterioration judged visually by the inspecting engineer. Ideally, the periodic maintenance popularly called as “resurfacing works in DoR” should be based on the roughness, indicated by the international roughness index, of the surface. Comprehensive and up-to-date information on timing of last resurfacing/maintenance, microclimatic condition of a place, materials used, traffic intensity information etc. forms an important data for objective evaluation of periodic maintenance need. In absence of such a database, neither in HQ nor in respective RO, objective prioritisation of periodic maintenance has been a challenge in DoR so far.

DoR, recognising the importance of objective way of prioritizing not only the periodic maintenance but the overall management of road asset, is working on establishing a Road Asset Management System through the financial support of the World Bank. The asset management tool is developed in an excel database containing data on road roughness, potholes, undulations, vulnerability of roads to natural disasters, condition of road furniture and other related information.

There are three stages involved in the development of the database.

- Physical condition and vulnerability survey of existing roads with help of video camera and GPS instrument;
- Population of database based on the data collected through physical survey;
- Processing the populated data using GIS (Geographical Information System) software such as ArcGIS and QGIS for further management.

Once the database is set up, a server is required not just for storing the information but also data management such as providing access to engineers to use the information and updating the database. The server would also serve as a portal to upload important documents related to design, construction and maintenance of road assets and bridges.

The way forward at this moment requires procurement of server to host the database, providing training to all the field engineers, updating of the data base at regular intervals and making investment plans. Maintenance Division being the custodian of RAMS has proposed budget for institutionalization of this system for 2019-2020 FY but unfortunately, the budget did not come through.

3.1.4 Non implementation of planned activities

In the pasts, after the joint assessment of the damages and identifying the budget each RO is to receive, the prioritisation of the restoration of monsoon damages were done by the respective RO. This meant that ROs had the authority to decide on which road and how much the restorations fund is to be used. While in most of the cases the RO's decisions were driven by the critical need and importance of the road, in some cases the budget allocations were based on other flimsy criteria which made expenditure unjustifiable in comparison to other critical roads. This compelled DoR HQ to even give decision on identifying locations where restoration works are to be done.

The joint assessments are normally done towards the end of monsoon season so that whatever damages brought in by that year's monsoon is all taken into account for restorations, at least the verification part. However, there were times where the recession of monsoon season prolonged beyond normal expected time because of which the damages to the roads continued even after assessments. Such happenings resulted in change in priority and reallocation of the fund which leads to not only the change in location but also the budget amount as different locations call for different remedial measures with varying estimates. Non implementation of planned activities, as pointed by RAA, is mostly attributable to these reasons.

In case of Trongsa RO, the audit period fell during the time when up-gradation of the Northern East-West highway was underway. As entire slopes was freshly cut and disturbed the priority changed depending on the severity of the damages that came after the assessments.

3.2 Management of road maintenance works

3.2.1 Periodic maintenance of roads not carried out timely

As rightly pointed out by RAA, the backlog of road resurfacing is increasing every year and the road condition deteriorating very fast. Without consistent and professional maintenance, roads can rapidly fall into despair. Despite the initial investment in roads, over time, this infrastructure becomes damaged and deteriorates, requiring not only ongoing road maintenance services to maintain the existing roads, but also new investment to improve and expand the system. Without timely maintenance, roads will continue to deteriorate, requiring significant repairs or even replacement after certain period which would be too expensive and taxing on the national exchequer. Inadequate road maintenance shortens the life of the roads and leads to high operating costs and high incidences of accidents.

One main reason for DoR not being able to carry out timely periodic maintenance is insufficient budget. Today the focus has been on the construction of the road and not much of an importance is given to the maintenance. Even in the 12 FYP, the total approved outlay for periodic maintenance is only Nu. 2,000.000 million out of Nu. 10,731.140 million which would not be sufficient even to improve the condition of the existing bad stretches.

ABSTRACT OF BUDGET PROPOSED Vs APPROVED FOR 2019-2020 FY

Sl. No.	Regional Office	Amount in Nu.		
		Budget Proposed by RO	Budget Endorsed by Department	Budget Approved by MoF
1	Trongsa RO	88.500	53.000	20.000
2	Lobeysa RO	56.148	48.648	15.000
3	Lingmethang RO	144.047	50.000	7.000
4	Thimphu RO	49.521	38.923	6.000
5	Tingtibi RO	97.919	58.000	22.500
6	Sarpang RO	240.200	135.000	38.000
7	Phuentsholing RO	179.786	50.000	33.860
8	Trashigang RO	0.000	3.479	3.000
9	Samdrupjongkhar RO	51.000	170.000	20.000
	OVERALL	907.121	607.050	165.360
			66.92%	27.24%

For instance, ROs have submitted a budget proposal for periodic maintenance works amounting to Nu. 907.121 million out of which Department has endorsed Nu. 607.05 million (66.92%) and submitted to MoF. Ultimately, the budget that Department received is Nu. 165.36 million only for periodic maintenance works which is not even 30%.

Therefore, unless Department is provided with the budget as per our proposal, it is certain that many more roads will deteriorate and require new construction eventually.

3.2.2 Undue delay in the restoration of monsoon damaged structures

Generally, the monsoon damage assessments are conducted and finalized in the months of September and October, the months the monsoon recedes; conducting joint assessment before September is not logical as the monsoon ensues and more damages are expected. The approval and the fund allocations are intimated to ROs by November so that they can start the procurement process and initiate execution by January latest. Following this timeline, ROs get about five to six months time for implementation which is usually a comfortable time given the amount of budget and the complexity of the works.

However, the situation for FY 2018-19 was different as the Government released the budget in two parts. The release of second part of the budget was received only towards mid February, despite assessment completed by the end of October, delaying the implementation.

3.2.3 Price escalation foreseen due to non-restoration on time

The approved annual monsoon damage restoration budget is hardly enough to meet even 50% of the assessed fund requirement - usually the assessed values are about 300 to 350 million while the approved fund is only about 180.00 million. Given such a funding size, DoR is not able to restore the damages in entirety leaving many damaged structures unattended which deteriorates further during the next monsoon ultimately increasing the cost of restorations.

The observation of RAA requiring DoR to maintain the rate of deterioration of the unattended structures is forward looking and if done will help DoR justify more objectively to MoF for

allotting more funds. DoR will work on trial basis monitor the unattended structures in terms of extent of further damages and accordingly the increase in cost.

3.2.4 Lack of standard protocol for relevant agencies in carrying out monsoon restoration works

The observation of RAA is well noted. The need for having to have formal institutional arrangement for coordination and collaboration amongst relevant stakeholders such as Royal Bhutan Police (RBP), Road Safety and Transport Authority (RSTA), Local Governments (LG), Department of Disaster Management (DDM) etc. was long felt. Different stakeholders assume different responsibilities geared towards common objective of ensuring safe and undistracted traffic. Having a guideline/SOP, delineating clear roles and responsibilities of the stakeholders, will help better coordinate, especially during emergency, and deliver better services to the public.

3.2.5 Road resurfacing works without component for construction of drain

For mountain roads, it is the management of water that will guarantee pavement a longer life. Improper management of water results in premature failure of pavement. Ideally, right after formation cutting works, before pavement layers are laid, comprehensive drainage system, including both longitudinal and cross drains, should be put in place to ensure that surface and subsurface water is let out of road way along the shortest possible route and time.

In the past, DoR had a practice of proposing budgets for improvement of different component of road such as drain construction, culvert extension, French drain construction etc. Later, MoF realized that while the activities are improvement of road, to garner more budget under different heads different activities are proposed and instructed DoR that such activities should only be proposed under the head of road improvement. The road improvement need is viewed based on the overall improvement and not piece-meal basis making it difficult for drain construction fund to come by.

Nonetheless, DoR will continue to propose budget and justify why drain is important.

3.2.6 Lack of comprehensive road maintenance database

Department would like to inform that until 11 FYP, the focus was more on construction rather than consolidation of our road network. However, the construction aspect is almost complete now and the Department is gearing towards consolidation of our road network which is substantiated by our efforts in trying to establish the road asset management system.

As explain in foregone para, DoR is in process of developing comprehensive road asset management system through the assistance of the World Bank. The system will capture all the information about a road including its condition and existence of different road component which will be regularly updated. The system will help provide information on the condition of different road asset helping engineers plan, review, propose and carryout timely interventions. Once the system become fully functional, the central data management system will have the details of all the roads and its components without individual RO having to maintain in bits and pieces.

One of the major tasks in institutionalization of the RAMS would be installation of a server to host the database as well as for data management. The point raised by RAA in terms of record keeping is due to the fact that field engineers do not have the required skill set to manage/handle record keeping of official documents. But on a positive note, now, most of the field engineers are comfortable using the IT services which will enable them in maintaining official records such as external drives, google drives and other cloud storages. The best part is that now, the field engineers can send the important data to the Maintenance Division who shall upload it into the server so that the information is safe and secured for everyone's use. This however will depend on the availability of budget for installation of server.

3.2.7 Lack of complain management system on road conditions

As pointed out by RAA, DoR so far do not have established system of receiving complaints on condition of roads from road users and general public. However, DoR has been receiving complaints through mainstream and social media on the different cases related to roads.

Noting the observation of RAA, DoR will work towards instituting a complaint management system.

3.2.8 Irregularities noted in hiring of machineries/equipment

The calling of rates for different places depends on different factors such as the proximity of the sub-division to the regional office, the quantum of work and hence the level of engagement of machineries by particular subdivision or section, administrative burden etc. Both, having the rates at RO level and at sub-divisional level have its own advantages and disadvantages. However, it is important to have uniform system within ROs. DoR will seek the view of the ROs and make it uniform depending on the feedback from ROs.

The participating bidders are mostly urbanites and have their offices and machineries fleets based at such centers. When a machinery requirement crops up suddenly due to emergent nature, most often site engineers do not have luxury of time to send work order and wait for the machines to arrive, which sometimes takes days. It is not economical either to have to machines ready in advance as these costs. In such a situation, site engineer exercises his judgment to engage near-by available machineries at the rate and prior consent of the of bid-winning hiring agency resulting in hiring of machineries from those firm who haven't participated in the bidding process.

Authentication of machinery logbook by operator, site supervisor and site in-charge is a requirement. However, in some cases, both site supervisors and in-charge is the site engineer himself/herself. In such as case the authentication by site in-charge should suffice. DoR will send out an order requiring all machinery logbook to be properly authenticated by the site in-charge and the operator at least.

Regarding the declaration of the conflict of interests of the different committees of the machinery hiring procurement, the norms as stipulated in the Procurement Rules and Regulations 2019 will be strictly followed.

3.3 Implementation of road maintenance activities

3.3.1 Road pavement does not meet the prescribed standard

As explained to RAA by our ROs, the discrepancies between the standard and the actual conditions at site are because of the fact that standardization happened very recently while construction of the most of the roads were completed long back. Our idea of standardizing different categories of roads is to serve more as a yard stick for future guidance so that we achieve the standards gradually one day than to fulfill the standards right away. While DoR aspire to upgrade the existing roads in terms of width, pavement thickness, drainage requirement to the set standards, our efforts are often impeded by the budgetary constraints.

The wearing course thickness increase from 20/25 mm premix carpet to 30 mm AC was done only about a year ago. We have made it very clear that henceforth DoR will discontinue with 20/25 mm premix carpeting owing to change in laying technology, quality and traffic requirements.

3.3.2 Deterioration of Wet Mix Macadam (WMM) due to non-pavement on time

As indicated by RAA, the construction of Tsebar-Mekuri-Durungri SNH was constructed with the financial support from Asian Development Bank and Royal Government of Bhutan. The highway was planned as a feeder road (Dzongkhag road) without black topped wearing course. Over the time the road assumed higher importance and categorized as secondary national highway.

Realizing the damages that occur to the wet mix Maccadam in absence of wearing course, DoR started proposing budget to MoF for blacktopping of the highway. So far DoR had been given some amount every year with which blacktopping works are carried out within the available budget. In current financial year too Samdrup Jongkhar is approved with Nu. 10.000 million with which about 3.00 km or so can be blacktopped.

3.3.3 Inadequacies in geotechnical studies on monsoon restoration works

The geotechnical section under design division in HQ is staffed with only two geotechnical engineers. As pointed out by RAA, the two geotechnical engineers are not able to cover the entire slope instability problem across the country. However, not all the slope failures require the input of a geotechnical engineer. Some slope failures problems are very straight forward where assessments and countermeasures proposals can be done by civil engineers. The services of the geotechnical engineers are focused more on areas with more complexities and require detailed geotechnical studies.

3.3.4 Improper quantification of monsoon slip clearance work

The site engineers are required to quantify the amount of earth/debris to be cleared before engagement of the resources. Often, as pointed out by RAA, our site engineers may not have been able to exactly quantify the slips leading to probable adjustment/manipulation of quantity based on the input of resources.

Realizing the need to closely monitor the quantification of the slips that occur, DoR has developed a monthly reporting wherein approximate quantity of the slips should be recorded and reported as soon as the slips have occurred. To make the reporting more real-time DoR is also working on using Kobo toolbox, an app to record and report the details of the landslide including size, approximate quantity, input resources required and used etc. Such monitoring and reporting system is expected to overcome some of the ambiguities observed in the current system.

3.3.5 Lack of road testing in pavement works

Laboratory and field tests are prerequisite for any road works and are required by the specifications and mode of payments to have the tests conducted to ensure delivery of quality works. The field and lab tests have, over the time, gained impetus, particularly in the 11 FYP following which almost all the major road works are certified through tests only. It is also made mandatory in the tender documents that the payment of bill shall be done only if the tests reports are submitted along with the bill.

As a step towards reviewing and strengthening the laboratories setup in the ROs, a thorough discussion was done in the recently concluded DoR Quarterly Meeting in Thimphu. The meeting reached to an understanding that the laboratory in ROs needs to be strengthened in terms of laboratory space, equipment and manpower. It was decided that all ROs will initiate expansion of the existing laboratory spaces. The laboratories at Lingmethang, Lobeysa and Sarpang ROs, as decided earlier, shall function as the regional laboratory wherein major laboratory equipment such as compressive testing machine, Marshall stability apparatus, core drilling machine (pavement), Los Angeles abrasion testing machine, dynamic cone penetration equipment etc. shall be housed. The laboratories at other six ROs will house minimum equipment necessary for road works tests.

In the human resource front, it was decided that a separate and dedicated material/laboratory engineer will be appointed in consultation with the RCSC during the upcoming OD exercise.

3.3.6 Inadequacies in routine maintenance works

3.3.6.1 Ineffective routine maintenance works

The trend of implementing routine maintenance works used to be reactive in nature without proper target and budget utilization plan in the pasts. Realizing these shortcomings in the overall maintenance of the road, DoR has initiated a system wherein all the ROs are required to annually plan in detail the maintenance activities to be performed for that year within the confines of the available budget. The annual plan will indicate the quantity of different maintenance activities against which the achievement at the end of the year can be measured. The plan will also guide the engagement of maintenance labour and deployment of resources bringing in improvement in the system.

The monitoring of the monthly progress and the fund utilization are done from HQ on regular basis.

3.3.6.2 Ineffective practice in measuring and monitoring labour's performance

Road maintenance works are mostly labour driven and the measurement and monitoring of the labour productivity has been the problem inherent in the system. Very often DoR is blamed for ineffective management and monitoring of labours. To overcome the problem, DoR has been exploring different means of labour engagement in the recent times. DoR is currently piloting performance based maintenance wherein a gang of labour is given a stretch of road based on the labour norm. The performance of the labour gang is monitored based on the output of the work gauged against monthly work plan unlike number of man-days in the past. The system, besides improving the productivity, is expected to reduce monitoring time of site engineers which could be used more productively for other important works. As long as the labour gang achieves the monthly target, the labours can take time out to work elsewhere or attend their farm works, if labours are local farmers, which will help supplement their income.

DoR has also initiated labour contract where a group of labour is made to contribute labour component with materials and equipment provided by the department for executing a work. The system has already helped the department in improving the quality of the work and reduces the supervision and monitoring time of site engineers.

3.3.6.3 No standard procedure for inspection/monitoring and supervision of road maintenance activities

As informed in the foregone paras DoR has now instituted a system to plan the maintenance works at the beginning of the financial year which is then broken down into monthly plans in which the quantities of all the activities along with the budget will be assessed and worked out. In the past, the maintenance works were executed without any plans making it very adhoc and reactive. With the planning system put in place the monitoring should become systematic and objective as the progress can be gauged against the annual and monthly plans.

3.3.6.4 Unsatisfactory road marking works

As pointed out by RAA, DoR has to certain extent failed to maintain the road signs and information boards along our highways to the level they are required to be kept. While road signs are very important in guiding and informing commuters, the laxity on the part of DoR to maintain road signs is something that the management will need to seriously think about.

With Bhutan Standard on road safety signs and symbols (BTS 33:2017) already published, DOR can work on having standard road signs. To this effect, the ROs of DoR will be immediately instructed to update and maintain the road signs as per the standard.

3.3.6.5 Remedial measures not executed after construction of approach road

Construction of access road taking-off from the roads under the jurisdiction of DoR by individuals and institutions has been a major challenge in proper maintenance of roads. Respecting the rights of having access to the properties of individuals and institutions, DoR accords approval based on the field investigations by team comprising members from DoR, local governments and beneficiaries' side. The pre-conditions and technical requirements to

be fulfilled while constructing the access road and thereafter are clearly spelt out in the approval.

Despite all the requirements incorporated in the approval, DoR has been facing challenges in implementing the provisions mainly because of lukewarm response and cooperation from the beneficiaries. ROs now need to step up the enforcement and deal as per the provisions of the agreement. All ROs will be instructed to physically verify the compliance and take actions as per the agreement.

3.3.6.6 Lack of mechanized equipment for routine maintenance works

In the past DoR used to own its own equipment and machineries by having a separate mechanical division. The division was responsible for procurement, maintenance and management of all the equipment of the department. For effective management of these equipment and machineries, the Government decided to corporatize the mechanical division which later went on to become Construction Development Corporation Limited (CDCL). When CDCL was corporatized it was Government's order that the DoR cannot own machineries and should meet its machineries requirement through hiring from CDCL and private sector. Since then, DoR has been meeting its machineries requirement by hiring from CDCL and private sector, including the machines required from maintenance works.

Few years back, DoR strongly felt the need to own its own machineries such as excavator, payload, mini-roller etc. and requested the Government for the support. However, DoR's request was not approved.

DoR purchased one mini-roller for each RO, which was not readily available in the market except for few numbers with CDCL then, for implementing pothole repair works. However, due to lack of repair and spare parts services, almost all the mini-rollers have become unserviceable today. ROs are not able to repair in CDCL workshops or in private workshops due to non-availability of spare parts and expertise. DoR is of the feeling that owning equipment would entail creating a mechanical wing in DoR to provide repair and maintenance services of these equipment.

RECOMMENDATIONS

4.1 The DoR should develop a preventive maintenance plan that can aid in effective resource management

Effective maintenance of roads can be only assured if there is comprehensive and robust road data management system in place. The system should be kept up-to-date with the latest road information data and processed to help identify problematic stretches, suggest and make preventive maintenance plans and financial planning.

DoR has initiated and is working on development of first road asset management system. Although very crude and rudimentary for now, the system is expected to take stock of all the road inventories in the county and help make critical decisions. The system should help DoR do better planning for road maintenance.

4.2 The DoR should strategize to improve efficiency in restoration of monsoon damages and periodic maintenance

Once the RAMS is fully functional and institutionalized, the system should help plan better in implementation of periodic and emergency maintenances. The system should also help DoR come up with objective financial plans and convince MoF and the Government.

4.3 The DoR should evaluate funding for road maintenance works through analysis of cost escalation as a result of untimely maintenance works

DoR will institute a system to record the impact of untimely maintenance and apprise MoF for additional funding.

4.4 The DoR should develop a comprehensive Information Management System

The Road Asset Management System is being developed.

4.5 The DoR should develop a guidelines/SOP for proper and effective coordination during emergencies

There is urgent need for developing a guideline/SOP amongst the relevant stakeholders such as Royal Bhutan Police (RBP), Road Safety and Transport Authority (RSTA), Local Governments (LG), Department of Disaster Management (DDM). DoR will initiate dialogue with all the stakeholders and come up with a guideline/SOP.

4.6 The DoR should strengthen the internal control for hiring of machineries/equipment

DoR will review the current system of hiring procurement process and machineries deployment practices.

4.7 The DoR and ROs must ensure compliance to the prescribed standards for maintenance of roads

DoR will try to works towards upgrading all the roads to the specified standards subject to availability of fund. DoR will keep proposing the budgets for the up-gradation.

Additional response received after exit meeting

In Chapter 3: Findings, of the Royal Audit Authority's (RAA) performance audit report for the Department of Roads, the section 3.3.1 outlines the observation on the pavements of roads under the Department not subscribing to the required standards. The Department has a set of standards for different classifications of roads, which includes, the Primary National Highways (PNH), Secondary National Highways (SNH), Dzongkhag Roads (DR), Gewog Center Roads (GCR) and Access Roads (AR). These standards include geometric elements such as the carriageway, shoulders, drains and standard pavement sections. These standard requirements as per the classification of roads were formulated by the Department with the goal of standardizing the different type of roads all over the country for uniformity. Additionally, the Department revises certain standards from time to time as institutional lessons learned as in the case of revising the wearing course thickness from 20/25 mm

premix carpet to 30 mm asphalt concrete which would be implemented in the newer constructions.

It is to be noted that there are roads constructed prior to the formulation of these standard requirements which at the current time will not be meeting these requirements in aspects such as width and thickness among others. Besides cases of these roads constructed prior to the standards, there are roads that have been reclassified to higher categories which will not be meeting the requirements for its newer category. For such cases, improvement of these sub-standard roads will entail a significant amount of fund and organizational resources in bringing the requirement of width, thickness, material, shoulder width and drainage materials up to standards based on their classification. While the Department has already initiated improvement projects along a few important stretches to bring them to required standards, doing the same for all such cases shall require a huge amount of fund and other resources beyond the capacity of the Department. With these difficulty in mind, the immediate improvement of all sub-standard roads in the country to standard requirements as per their classification will not be possible, mainly due to inadequate budget.

The Department shall aspire on bringing all classification of roads to their standards as a long-term goal and initiate improvement works as when funds could be availed but the immediate compliance to the standards in all stretches as per the RAA's recommendation would not be possible

4.8 The DoR should standardize and strengthen its monitoring and supervision roles of routine maintenance works

DoR has already put in place the annual plan for maintenance works. The monitoring and evaluation of the maintenance works will be done based on the annual plan.



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