DTMP

Report

FOR THE PREPARATION OF THE DISTRICT TRANSPORT MASTER PLAN (DTMP)

PARBAT DISTRICT

2012

FOREWORD

It is my great pleasure to introduce this District Transport Master Plan (DTMP) of Parbat district especially for district road core network (DRCN). I believe that this document will be helpful in backstopping to Rural Transport Infrastructure Sector Wide Approach (RTI SWAp) through sustainable planning, resources mobilization, implementation and monitoring of the rural road sub-sector development. The document is anticipated to generate substantial employment opportunities for rural people through increased and reliable accessibility in on-farm and off-farm livelihood diversification, and commercialization and industrialization of agriculture and other economic sectors, as well as harmonization of social centers. In this context, rural road sector will play a fundamental role to strengthen and promote overall economic growth of this district through established and improved year round transport services reinforcing intra and inter-district linkages .

Therefore, it is most crucial in executing rural road networks in a planned way as per the District Transport Master Plan (DTMP) by considering the framework of available resources in DDC comprising both internal and external sources. Viewing these aspects, DDC Parbat has prepared the DTMP by focusing most of the available resources into upgrading and maintenance of the existing road networks. This document is also been assumed to be helpful in lobbing and fascinating the donor agencies through central government towards generating needy resources through basket fund approach. Furthermore, this document not solely will be supportive in avoiding pervasive duplication approach in resources allocation under the rural road network development sector but also will be helpful in underpinning overall development management of the district.

I would, firstly like to express my gratitude to Mr. Bakhat Bahadur Shahi, RTI Pilot District Asset Management Engineer for his continuous dedication, hard work, cooperation, negotiation and counselling in bringing up this DTMP document at this final stage successfully. I would also express my gratitude to Mr. Navaraj Adhikari, RTI Pilot Sub Asset Management Engineer for his valuable support in the process of preparing DTMP report.

I would like to thank to Mr. Om Bahadur K.C., Chief of District Technical Office (DTO), Mr. Krishna Prasad Sapkota, Planning and Administrative Officer, Mr. Tulsi Ram Sharma, Program Officer, and other DDC and DTO staffs who directly and indirectly supported in the process of preparing this document.

My special thank goes to all chief and representatives of political parties and other DTICC members, as well as civil societies who played central role in the prioritization of roads for DRCN and other valuable supports in preparing this document.

Last but not least, I would like to express my heartfelt gratitude to Ministry of Local Development (MoLD), Department of Local Infrastructure Development and Agriculture Road (DOLIDAR) and RTI SECTOR Maintenance Pilot Central Unit for their valuable support to produce this report.

Any innovative and constructive suggestions regarding policy implementation and compliance of DTMP will be highly appreciated.

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We would like to express our gratitude to Mr Krishna Prasad Lamsal, Local Development Officer (LDO), Om Bahadur K.C., Chief District Technical Office (DTO), Mr. Tulsi Ram Shara (DDC) and all other DDC and DTO staffs for their valuable suggestions and co-operation for the preparation of this report.

We would also like to thank Mr Bupendra Bahadur Basnet, Director General of DOLIDAR, members of the DOLIDAR Technical Committee, including Mr. Ganga Bahadur Basnet, Coordinator, Mr Jeevan Guragain, Mr Krishna Bahadur Katwal, Mr Kumar Thapa and Mr. Manoj Krishna Shrestha, RTI Planning and Infrastructure Specialist, as well as Serge Cartier Van Dissel, RTI Rural Roads Engineering Specialist and Mr. Michael Green, RTI Team Leader all of whom were instrumental in shaping the new, “slim “ version of the DTMP.

The DTMP for Parbat was prepared by Mr. Bakhat Bahadur Shahi, RTI Pilot District Asset Management Engineer with the supporting role of Mr. Nawaraj Adhikari, RTI Pilot Sub Asset Management Engineer. The author is grateful to all the local people and leaders who have rendered their valuable assistance to the team during the preparation of the DTMP.

EXECUTIVE SUMMARY

Parbat District is located in Dhulagiri Zone of the Western Development Region of Nepal. Its position is flanked by the districts of Kaski and Syanja in East; Baglung and Myagdi in West; Myagdi in North; and Syanja and Gulmi in South. There are 55 VDCs with 11 Illkas and 2 constituencies. The area is stretched over mid hill and terrain ranges from 520 mt to 3300 mt above average mean seal level covering 494 sq. km. It has annual average rainfall of 2500 mm and temperature in between 32.3 and 7.5 degrees Celsius. The district falls in the subtropical to cold temperate climatic zone. The district consists of numerous ridges and rivers. The Modi River is highly potential in hydropower generation and promotion. Setibeni and Modibeni are the famous sacred religious centres and Panchase is one of the most famous mountain viewing points. Major occupation in the district was agrarian and people have slowly been shifting from agriculture to other occupations. About 51 % of people have been adopting subsistence agriculture and rest 49% of people have been adopting in other occupations.

The district inventory identified just over 600 km of roads, including 63 km of strategic roads, 25 km of urban roads, 291 km of district road core network (DRCN) and 246 km of village road network. In coordination with the DTICC and DDC, 32 rural roads with a length of 291 km were identified as making up the district road core network (DRCN), and the remaining 246 km were classified as village roads. The existing DRCN roads link up all 55 VDC headquarters. Of the core district road network, 17% has a gravel surface and 83% has an earthen surface, resulting in 17% being considered all-weather and only 83% fair weather.

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	63.34	40.72	-	22.62
Urban roads	24.47	3.46	2.35	18.66
District road core network	291.32	0.35	50.31	240.66
Village roads	246.48	0.65	-	245.83
Total	625.60	45.18	52.66	527.77

Annual conservation costs are estimated at NPR 108 million based on the first year, and will be updated in the ARMP based on actual annual maintenance needs as determined in the annual road condition survey. For the full five-year period the conservation costs will come to NPR 538 million. An analysis of the road network identified the need for improvement of all the DRCN roads in order to bring them to a maintainable all-weather standard and provide them with a proper road surface in light of existing traffic volumes. The required improvements and their estimated costs are listed below.

Improvement type	Requirement		Cost (NPR)
Bridges	210	m	126,000,000
Slab culverts	50	m	7,500,000
Causeways	635	m	27,950,000
Hume pipes	92	units	920,000
Masonry retaining walls	415	m^3	4,150,000
Gabion retaining walls	12170	m^3	30,425,000
Lined drains	140600	m	140,600,000
Widening	49300	m	1,232,500,000
Rehabilitation	11.71	km	9,368,000
Gravelling	240.662	km	529,456,400
Blacktopping	0	km	-
New construction	0.06	km	372,000
Total			**2,109,241,400**

The available budget for the road sector for the coming five years (fiscal year 2069/70 to 2073/74) is estimated to be NPR 1320 million. Allocation to the district road core network was set at 80% of the total road sector budget, which was subsequently allocated firstly to the annual maintenance needs and then to the improvement needs. This budget is insufficient to cover all the estimated costs of conservation, improvement and new construction. However, it allows all conservation requirements to be covered throughout the DTMP period and some of the improvement works to be completed before the end of the DTMP period. The remaining improvement works will be carried out in the next DTMP. New construction work of only one 60m section is expected to be implemented by DOR fund which has been regularly funded every year.

Within the DTMP period 82 km of roads will be gravelled (28%), resulting in a total of 133 km being brought to a maintainable all-weather standard. VDC headquarters with access to all-weather DRCN roads or the SRN will increase from 25 to 35, while the percentage of the district population with such access will increase from 59% to 73%.

ABBREVIATIONS

ARMP	Annual Road Maintenance Plan
DDC	District Development Committee
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
DRCN	District Road Core Network
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
DTO	District Technical Office
DTPP	District Transport Perspective Plan
GIS	Geographical Information system
GON	Government of Nepal
GPS	Global Positioning System
LGCDP	Local Governance and Community Development Programme
MLD	Ministry of Local Development
RAP	Rural Access Programme
SWAp	Sector Wide Approach
VDC	Village Development Committee

CONTENTS

TABLES

FIGURES

1. Introduction

Parbat District is located in Dhulagiri Zone of the Western Development Region of Nepal. Its position is flanked by the districts of Kaski and Syanja in East; Baglung and Myagdi in West; Myagdi in North; and Syanja and Gulmi in South. There are 55 VDCs with 11 Illkas and 2 constituencies. The area is stretched over mid hill and terrain ranges from 520 mt to 3300 mt above average mean seal level covering 494 sq. km. It has annual average rainfall of 2500 mm and temperature in between 32.3 and 7.5 degrees Celsius. The district falls in the subtropical to cold temperate climatic zone. The district consists of numerous ridges and rivers. Setibeni and Modibeni are the famous sacred religious centres and Panchase in one of the most famous mountain viewing points. Major occupation in the district was agrarian and people have slowly been shifting from agriculture to other occupations. About 51 % of people have been adopting subsistence agriculture and rest 49% of people have been adopting in other occupations.

Figure 1: Map of Nepal indicating Parbat District

According to the national population census (2068 B.S.), the total population of the district is 146,590 comprising of 81,289 female (55%) and 65301 male (45%) residing in 35,719 households. Parbat district has an average population density of around 297 people per square km. The average family size is 4.1. Life expectancy of the people is 58 years. The average literacy rate is about 68.15% (61.99% female and 75.82% male). The district has multi ethnic compositions; majorities are Brahman, Chhetri, Thakuri and Sanyashi (Giri and Puri). Majority of people pursue Hindu religion as 89.48% followed by Buddhist as 9.32%, then Islam 0.43%. Common communicating language is Nepali (87.89%) followed by Magar (5.56%) and Gurung (4.51%).

Although accessibility in transport to Parbat is limited, this is improving rapidly. The district has access to the Baglung Highway (Pokhara-Baglung) with bituminous standard and maintained by DOR. A 14.32 km feeder road from Maldhunga to Myagdi has been recently upgraded with bituminous surface by DOR. The district is connected with Syangja district by Setibeni-Armadi road (Lokmarg) which is already in operation upto Phalebas bazaar with earthen surface. The remaining section from Phalebas to Armadi, which meets Baglung highway, is under construction.

2. District road core network (DRCN)

This chapter gives an overview of the existing roads in Parbat district, distinguishing between strategic roads and rural roads. It goes on to identify those rural roads that make up the district road core network (DRCN) that will form the basis for this DTMP. The remaining rural roads are classified as village roads.

2.1 Total road network

Parbat district has an estimated road network of 626 kilometres, including 64 km of strategic roads managed by DOR, 24 km of urban roads managed by Siwalaya VDC and 538 km of rural roads managed by Parbat DDC. About one third of the strategic roads and all of the rural roads have an earthen surface. A map of the total road network in Parbat district is shown in figure 2.

Table 2.1.1 Road Length in Parbat District (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	63.34	40.72	-	22.62
Urban roads	24.47	3.46	2.35	18.66
Rural roads	537.8	1	50.31	486.49
Total	**625.6**	**45.18**	**52.66**	**527.77**

2.2 National highways and feeder roads

Parbat district has 1 highway (Baglung highway) and two feeder roads totalling 64 km. The Baglung highway and Maldhunga-Myagdi feeder road has already been blacktopped by DOR, while the Setibeni-Armadi feeder road is partly constructed upto Phalebas as an earthen surface and remaining section is under construction.

Table 2.2.1 National Highways and Feeder Roads in Parbat District (km)

Code	Description	Total length	Black Top	Gravel	Earthen
F042	Dhaulagirigate-Maldhunga	26.4	26.4		
F133	Maldhunga-Beni	14.32	14.32		
F131	Setibeni-Armadi	22.62			22.62
Total		**63.34**	**40.72**	**0**	**22.62**

2.3 District Road Core Network

As part of the preparation of this DTMP, the District Road Core Network (DRCN) was identified together with the DTICC and DDC. This DRCN is the minimum network that allows all VDC headquarters to be connected with the strategic road network and the district headquarters, either directly or through other VDCs. In selecting the DRCN roads, account was taken of road conditions and existing traffic levels. The identified DRCN roads were subsequently provided with road codes conforming to national standards.

The resulting District Road Core Network is shown in figure 3 at the end of this chapter. The DRCN consists of 32 district roads with a total length of 291 km. The remaining 231 km of existing rural roads are not considered to be DRCN roads and are classified as village roads under the responsibility of the VDCs. Of the total length of DRCN roads, about 50 km roads is just gravelled under RRRSDP project and remaining length is currently earthen in surface and are considered fair-weather only (see Table 2.3.2 respectively.

Table 2.3.1). A complete list of roads inventory and DRCN roads along with their characteristics is provided in Annex 3 and Table 2.3.2 respectively.

Table 2.3.1 Road Length in Parbat District (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	**63.34**	**40.72**	**-**	**22.62**
Highways	26.4	26.4		
Feeder roads	36.94	14.32		22.62
Urban roads	**24.47**	**3.46**	**2.35**	**18.66**
Sivalaya	24.47	3.46	2.35	18.66
District road core network	**291.32**	0.35	50.31	240.66
Village roads	**246.48**	0.65	-	245.83
Total	**625.60**	**45.18**	**52.66**	**527.77**

Table 2.3.2 District Road Core Network in Parbat District (km)

Code	Name of Road	Total length	Black Top	Gravel	Earthen	All weather	Fair weather	Name Settlements on Road
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)	**11.88**			11.88	-	11.88	Waribenibazar, Mallaj (Kotghar), Annechaur (Lekhphant VDC Office)
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office	**4.20**			4.20	-	4.20	Mallaj (Kotghar), Banskharka (Upallo), Homestay, VDC Office
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	**14.29**			14.29	-	14.29	Milanchowkbazar, Kholakhet, Ratamata, Bhotedanda, Salija (VDC Office)
44A004R	Milanchowk-Salyan-Ghakhet	**5.98**			5.98	-	5.98	Milanchowk, Salayan, Ghakhet (VDC Office)
44A005R	Khaniyaghat-Nanglibang (VDC Office)	**2.67**			2.67	-	2.67	Khaniyaghat, Naglibang (VDC Office)
44A006R	Armadi-Bhatebari-Banau Bazaar	**12.58**			12.58	-	12.58	Armadi, Bagaicha, Bhatebari, Tatarkot, Banaubazar
44A007R	Bagaicha-Badahare (VDC Office)	**2.69**			2.69	-	2.69	Bagaicha, Badahare (VDC Office)
44A008R	Kushma-Halhale School	**11.52**		7.50	4.02	7.50	4.02	Kushmabazar, Salyan, Halhale School
44A009R	Padamkholsi-Sarunchaur (VDC Office)	**1.44**			1.44		1.44	Padamkholsi, Sarauchaur (VDC Office)
44A010R	Patichaur-Bajung-Kyang (VDC Office)	**14.46**			14.46	-	14.46	Patichaubazar, Bause, Bajung, Khaijuri, Kyang (VDC Office)
44A011R	Patichaur-Maidan-Labsibot (VDC Office)	**12.38**			12.38	-	12.38	Patichaubazar, Kaideni, Labsibot (VDC Office)
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)	**3.49**			3.49	-	3.49	Maidan (Deupur), Purnagoan (VDC Office)
44A013R	Dimuwa-Darak-Chitre (VDC Office)	**7.79**	0.35		7.44	0.35	7.44	Dimuwabazar, Tilahar, Darak, Chitre (VDC Office)
44A014R	Dovilla-Cyclechowk-Phalebas Dhika	**16.00**		16.00	-	16.00	-	Dovillabazar, Silmi, Cyclechowkbazar, Mudikuwa, Phalebas Dhika
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar	**12.48**			12.48	-	12.48	Dovilla (Silmi), Pakuwa, Gangate, Karbare, Dandakharka, Arthar (VDC Office)
44A016R	Pakuwa-Chhapa-Ramjathanti	**6.67**			6.67	-	6.67	Pakuwa, Chalise goan, Chhapa, Ramjathantibazar
44A017R	Silmi-Thulipokhari-Karkineta	**13.43**			13.43	-	13.43	Silmi, Lamatha, Thulipokhari, Khaula, Karkinetabazar
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)	**2.27**			2.27	-	2.27	Thausekhola (Highway), Bitlab, Piplatari (VDC Office)
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)	**17.27**			17.27			Cyclechowkbazar,Shankarpokhari, Melpokhari, Thapathanabazar, Ulleri, Bhangara (VDC Office)
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu	**19.11**			19.11			Mudikuwabazar, Jhaklak, Pipaldanda, Chirdikhola, Kurgha, Lunkhubazar
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office	**5.03**			5.03			Lamayakhola, Limithana, Thanamuala (VDC Office)
44A022R	Hilekhola-Karkineta-Lunkhu	**22.72**		10.77	11.95			Hilekhola (Syanja & Parbat Border), Karkinetabazar, Bagalebazar, Ghatebazar, Pakhapani, Lunkhubazar

Code	Name of Road	Total length	Black Top	Gravel	Earthen	All weather	Fair weather	Name Settlements on Road
44A023R	Phalamkhani (Dandakateri)-Ghante	**2.23**			2.23			Dadakateri (Phalamkhani VDC Office), Ghante
44A024R	Lunkhu-Jyamire-Huwas	**14.76**			14.76			Lunkhubazar, Purnagoan, Simle (VDC Office), Bhorlebazar, Huwasbazar(Hatemalachowk)
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office	**14.80**			14.80			Lunkhubazar, Lunkhugoan, Bhoksing, Payubhanjyang, Horsangdi (VDC Office)
44A026R	Lunkhu-Balakot (Daha)	**4.06**			4.06			Lunkhubazar, Daha (Balakot VDC Office)
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office	**3.04**			3.04			Sirkang (Lokmarg), Pangrang (VDC Office)
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)	**23.07**		16.04	7.03			Chisapani (Syangja & Parbat Border), Huwasbazar, Dud, Wahakibhanjyang, Ranipani, Barrachaur Khahare (Lokmarg)
44A029R	Urampokhara-Wahakibhajyang	**2.73**			2.73			Urampokhara (VDC Office), Wahakibhanyang bazar
44A030R	Wahakibhajyang-Salgram VDC Office	**1.09**			1.09			Waribenibazar, Deurali (Saligram VDC Office)
44A031R	Duda-Maidan (Beulibas)	**2.35**			2.35			Dudabazar, Maidan (Beulibas), VDC Office
44A032R	Arnas (Arthung)-Taklak VDC Office	**2.82**			2.82			Arnas (Arthung), Taklak (VDC Office)
Total		**291.32**	**0.35**	**50.31**	**240.66**	**23.85**	**132.38**	

2.4 Village ROADS

The remaining roads length of 231 km that do not form part of the identified district road core network (DRCN) are classified as village roads and are under the responsibility of the 55 VDCs in Parbat district. These are roads of a lower importance that do not form the main link between the VDC headquarters and the district headquarters or strategic road network. Instead they provide additional access to other parts of the VDCs.

On average each VDC will thus be responsible for 4.5 km of village roads. It is recommended that the VDCs organise maintenance workers to carry out the emergency and routine/recurrent maintenance of these roads to ensure they remain accessible. Any upgrading or new construction of village roads falls outside the scope of this DTMP and is the responsibility of the VDCs.

Funding for these roads will mainly come from the VDC grants. Some district funding will also be allocated to the village roads (see also chapter 6). However, this district funding will be mainly for maintenance, especially emergency maintenance and routine/recurrent maintenance to keep the village roads open.

Figure 2 District Inventory Map of Parbat

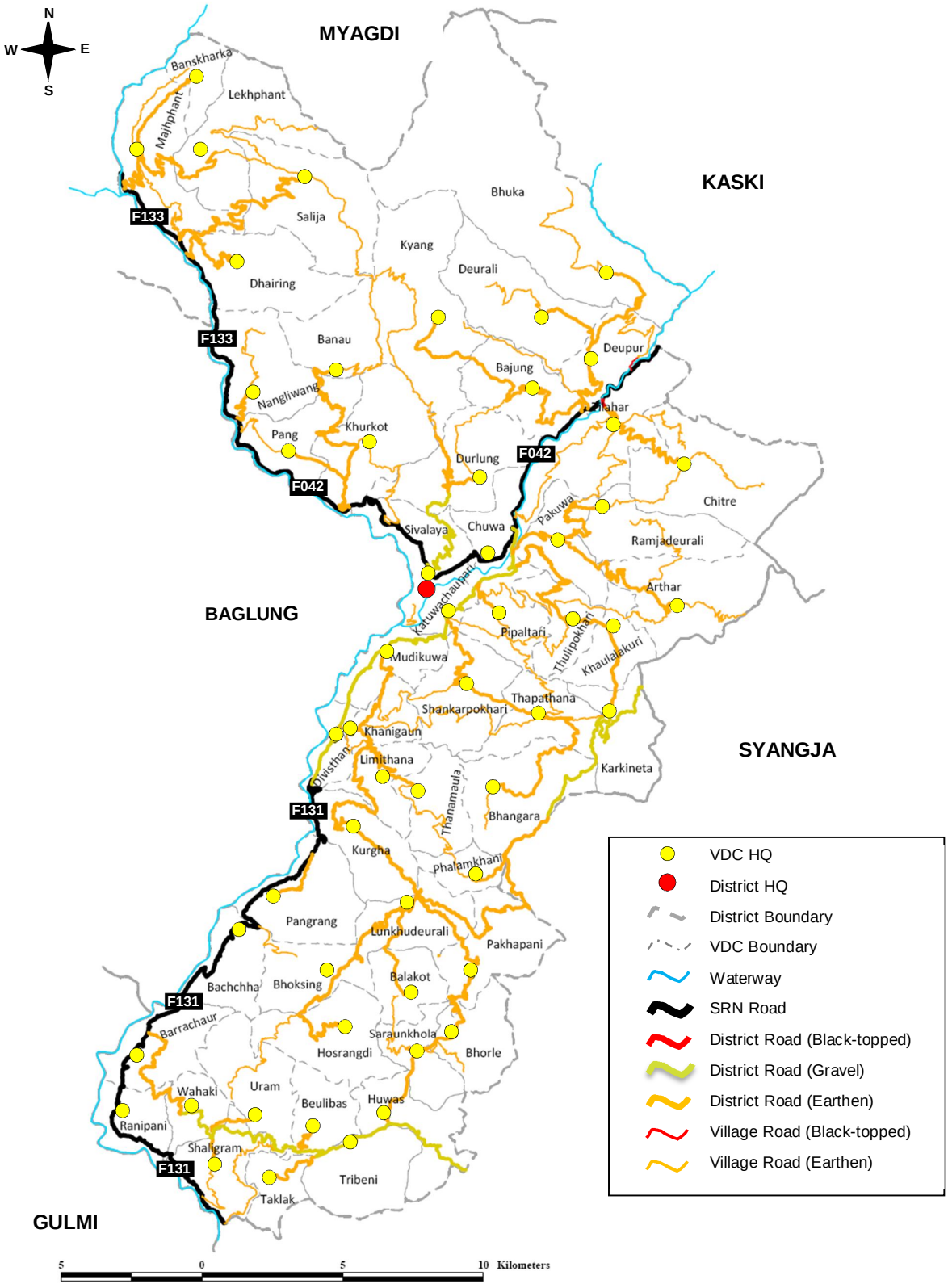
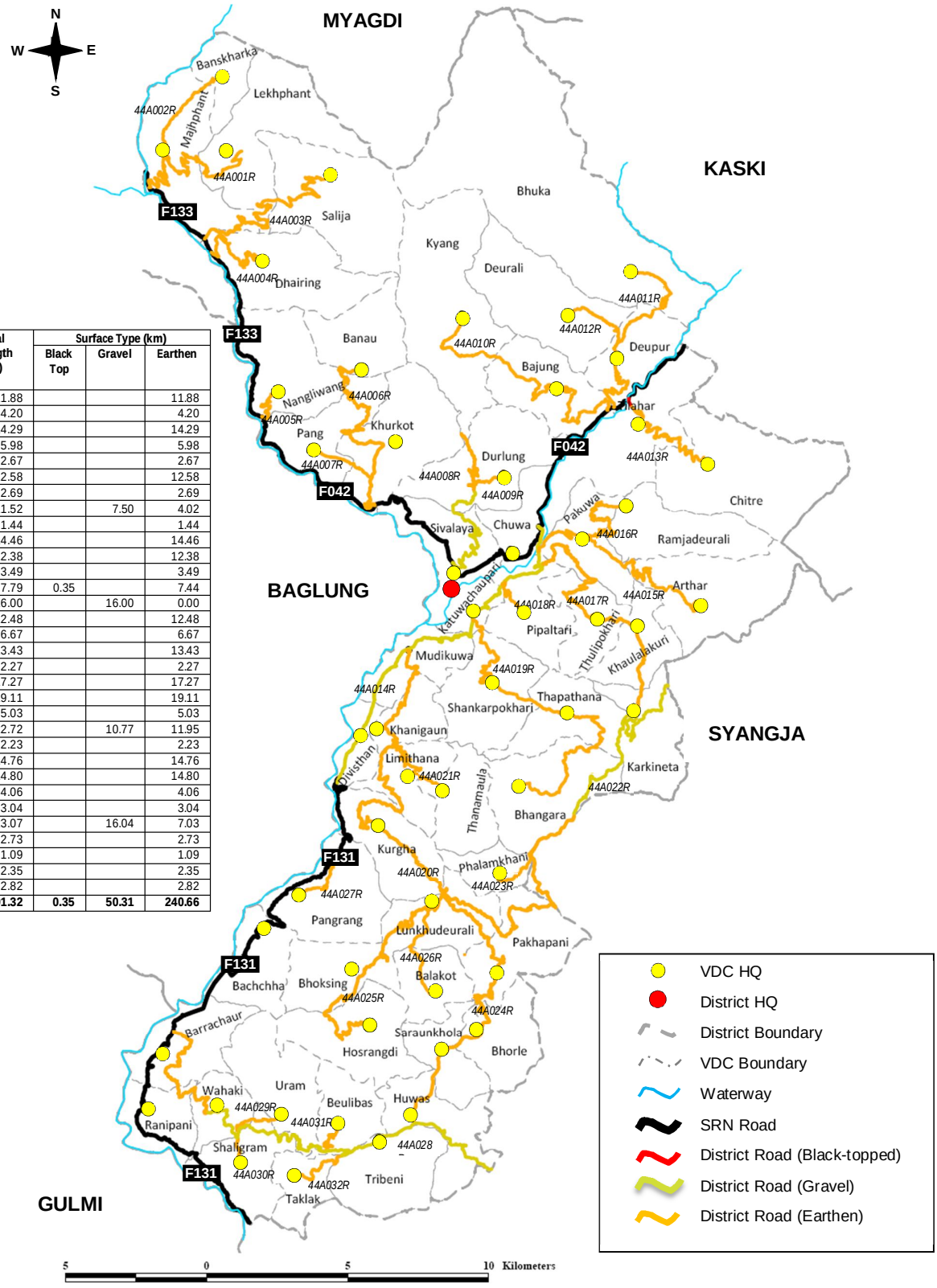


Figure 3 District Road Core Network Map of Parbat



Road Code	Total Length (km)	Surface Type (km)		
		Black Top	Gravel	Earthen
44A001R	11.88			11.88
44A002R	4.20			4.20
44A003R	14.29			14.29
44A004R	5.98			5.98
44A005R	2.67			2.67
44A006R	12.58			12.58
44A007R	2.69			2.69
44A008R	11.52		7.50	4.02
44A009R	1.44			1.44
44A010R	14.46			14.46
44A011R	12.38			12.38
44A012R	3.49			3.49
44A013R	7.79	0.35		7.44
44A014R	16.00		16.00	0.00
44A015R	12.48			12.48
44A016R	6.67			6.67
44A017R	13.43			13.43
44A018R	2.27			2.27
44A019R	17.27			17.27
44A020R	19.11			19.11
44A021R	5.03			5.03
44A022R	22.72		10.77	11.95
44A023R	2.23			2.23
44A024R	14.76			14.76
44A025R	14.80			14.80
44A026R	4.06			4.06
44A027R	3.04			3.04
44A028R	23.07		16.04	7.03
44A029R	2.73			2.73
44A030R	1.09			1.09
44A031R	2.35			2.35
44A032R	2.82			2.82
Total	**291.32**	**0.35**	**50.31**	**240.66**

3. District transport perspective plan (DTPP)

This chapter looks at the required interventions regarding conservation, improvement and new construction of the district road core network. It provides a complete list of all works required in the DRCN, which together form the District Transport Perspective Plan (DTPP). For the works forming part of the DTPP, chapter 4 will subsequently provide cost estimation, while chapter 5 will rank the works according to priority and chapter 6 will select those priority works that can be carried out in the next 5 years and thus form part of the District Transport Master Plan (DTMP).

3.1 Conservation

Conservation refers to the actions required to repair a road and keep it in good and passable condition. For DTMP planning purposes standard costs per kilometre for each maintenance type are applied to the entire district road core network, whereby for certain maintenance types, distinction is made according to the surface type of the road. Identification of the actual maintenance requirements of each road is made annually in the ARMP. Conservation activities include:

1. Emergency maintenance - Basic repairs aimed at removing landslides and repairing damage to the road that inhibit the proper use of the road and make it impassable. This mainly takes place during and after the rainy season. A provisional lumpsum is reserved for the entire district road core network based on the network length. Allocation to specific road sections is based on the actual need for clearing landslides or repairing washouts and cuts in the road.

2. Routine maintenance - General maintenance of the road aimed at preventing damage by ensuring the proper working of the different road elements (retaining walls, drainage system, carriageway, etc.) and cutting vegetation. This is carried out each year on a more or less continuous basis. Routine maintenance is required for the entire district road core network. The specific requirements for routine maintenance are determined on an annual basis through the road condition survey and defined in the ARMP.

3. Recurrent maintenance - Repairs of minor damage to the road surface and road structures to bring them back to good condition. This is generally carried out once or twice a year. Recurrent maintenance is required for the entire district road core network, whereby distinction is made according to the surface type. The specific requirements for recurrent maintenance are determined on an annual basis through the road condition survey and defined in the ARMP.

4. Periodic maintenance - Larger repairs to the road largely aimed at renewing the road surface through regravelling, resealing or overlays. It is generally carried out with several years interval. Although periodic maintenance is only required for specific sections of the district road core network, a lumpsum allocation is made for the entire district road core network based on average annual requirements, distinguishing between different surface types. The specific periodic maintenance requirements are determined on an annual basis through the annual road condition survey and defined in the ARMP.

The length of roads to be included under each conservation type for the first year is indicated below. This is basically the entire district road core network in as far as it does not require rehabilitation.

Table 3.1.1 Conservation Requirements

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
44A001R	11.875	11.875	11.875	11.875
44A002R	4.204	4.204	4.204	4.204
44A003R	14.291	14.291	14.291	14.291
44A004R	5.980	5.980	5.980	5.980

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
44A005R	2.670	2.670	2.670	2.670
44A006R	12.577	12.577	12.577	12.577
44A007R	2.687	2.687	2.687	2.687
44A008R	11.524	11.524	11.524	11.524
44A009R	1.441	1.441	1.441	1.441
44A010R	14.458	14.458	14.458	14.458
44A011R	12.382	12.382	12.382	12.382
44A012R	3.494	3.494	3.494	3.494
44A013R	7.793	7.793	7.793	7.793
44A014R	16.000	16.000	16.000	16.000
44A015R	12.481	12.481	12.481	12.481
44A016R	6.668	6.668	6.668	6.668
44A017R	13.433	13.433	13.433	13.433
44A018R	2.268	2.268	2.268	2.268
44A019R	17.270	17.270	17.270	17.270
44A020R	19.111	19.111	19.111	19.111
44A021R	5.032	5.032	5.032	5.032
44A022R	22.718	22.718	22.718	22.718
44A023R	2.233	2.233	2.233	2.233
44A024R	14.764	14.764	14.764	14.764
44A025R	14.804	14.804	14.804	14.804
44A026R	4.061	4.061	4.061	4.061
44A027R	3.038	3.038	3.038	3.038
44A028R	23.069	23.069	23.069	23.069
44A029R	2.729	2.729	2.729	2.729
44A030R	1.089	1.089	1.089	1.089
44A031R	2.352	2.352	2.352	2.352
44A032R	2.821	2.821	2.821	2.821
Total	**291.32**	**291.32**	**291.32**	**291.32**

3.2 Improvement

Improvement refers to actions required to improve a road to bring it to a maintainable all-weather standard. It includes the following actions, which for Parbat are described in more detail in the subsequent sections.

1. Rehabilitation - Significant repairs required to bring a very poor road back to a maintainable standard. This does not include any changes to the original surface type.
2. Gravelling - Placement of a gravel layer to make it all-weather and ensure that the road remains passable during the rainy season.
3. Cross drainage - Placement of suitable cross-drainage structures with the aim of making the road all-weather and ensuring that the road remains passable even during the rainy season.
4. Protective structures - Placement of retaining walls and lined side drains to avoid excessive damage to the road during the rainy season and bring it to a maintainable standard.
5. Blacktopping - Placement of a blacktop layer in roads with traffic volumes exceeding 100 passenger car units (PCU) to reduce damage to the road surface.
6. Widening - Increase of the road width in roads with traffic volumes exceeding 500 passenger car units (PCU) to ensure the proper flow of traffic.

3.2.1 Rehabilitation

Rehabilitation needs were identified in 5 roads of district road core network with a total length of 11.710 km as given in table below.

Table 3.2.1 Sections of the District Road Core Network Requiring Rehabilitation

Code	Name of Road	Total length (km)	Rehabilitation (km)
44A004R	Milanchowk-Salyan-Ghakhet	5.98	5.98
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office	3.04	1.00
44A029R	Urampokhara-Wahakibhajyang	2.73	2.73
44A031R	Duda-Maidan (Beulibas)	2.35	1.00
44A032R	Arnas (Arthung)-Taklak VDC Office	2.82	1.00
Total			**11.71**

3.2.2 Gravelling

As the entire district road core network needs to be brought to an all-weather status, gravelling of the road surface is required for all the earthen sections in the DRCN. For Parbat this concerns the total of 241 km of DRCN roads.

Table 3.2.2 Sections of the District Road Core Network Requiring Gravelling

Code	Name of Road	Total length (km)	Gravelling (km)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)	11.88	11.88
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office	4.20	4.20
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	14.29	14.29
44A004R	Milanchowk-Salyan-Ghakhet	5.98	5.98
44A005R	Khaniyaghat-Nanglibang (VDC Office)	2.67	2.67
44A006R	Armadi-Bhatebari-Banau Bazaar	12.58	12.58
44A007R	Bagaicha-Badahare (VDC Office)	2.69	2.69
44A008R	Kushma-Halhale School	11.52	4.02
44A009R	Padamkholsi-Sarunchaur (VDC Office)	1.44	1.44
44A010R	Patichaur-Bajung-Kyang (VDC Office)	14.46	14.46
44A011R	Patichaur-Maidan-Labsibot (VDC Office)	12.38	12.38
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)	3.49	3.49
44A013R	Dimuwa-Darak-Chitre (VDC Office)	7.79	7.44
44A014R	Dovilla-Cyclechowk-Phalebas Dhika	16.00	-
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar	12.48	12.48
44A016R	Pakuwa-Chhapa-Ramjathanti	6.67	6.67
44A017R	Silmi-Thulipokhari-Karkineta	13.43	13.43
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)	2.27	2.27
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)	17.27	17.27
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu	19.11	19.11
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office	5.03	5.03
44A022R	Hilekhola-Karkineta-Lunkhu	22.72	11.95
44A023R	Phalamkhani (Dandakateri)-Ghante	2.23	2.23
44A024R	Lunkhu-Jyamire-Huwas	14.76	14.76
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office	14.80	14.80
44A026R	Lunkhu-Balakot (Daha)	4.06	4.06
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office	3.04	3.04
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)	23.07	7.03
44A029R	Urampokhara-Wahakibhajyang	2.73	2.73
44A030R	Wahakibhajyang-Salgram VDC Office	1.09	1.09
44A031R	Duda-Maidan (Beulibas)	2.35	2.35
44A032R	Arnas (Arthung)-Taklak VDC Office	2.82	2.82
Total		**291.32**	**240.66**

3.2.3 Cross drainage

The need for cross drainage was identified for the different DRCN roads. A total of 5 bridges with a total length of 210m, 3 slab culverts with a total length of 50m, 17 cement concrete causeway with a total length of 240m, 25 stone causeways with a total length of 395m, and 92 pipe culverts were identified as being required.

Table 3.2.3 Required Cross Drainage Structures

Code	Description	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)					2
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office					4
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	40		15	15	2
44A004R	Milanchowk-Salyan-Ghakhet			10	10	2
44A005R	Khaniyaghat-Nanglibang (VDC Office)					2
44A006R	Armadi-Bhatebari-Banau Bazaar					2
44A007R	Bagaicha-Badahare (VDC Office)					12
44A008R	Kushma-Halhale School					2
44A009R	Padamkholsi-Sarunchaur (VDC Office)					4
44A010R	Patichaur-Bajung-Kyang (VDC Office)		10	30	20	4
44A011R	Patichaur-Maidan-Labsibot (VDC Office)			20	20	2
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)			10	20	2
44A013R	Dimuwa-Darak-Chitre (VDC Office)	50			20	3
44A014R	Dovilla-Cyclechowk-Phalebas Dhika					
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar	40	20			
44A016R	Pakuwa-Chhapa-Ramjathanti				15	2
44A017R	Silmi-Thulipokhari-Karkineta			30		3
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)				10	4
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)	50		30		3
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu		20		20	
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office				20	2
44A022R	Hilekhola-Karkineta-Lunkhu			20	20	5
44A023R	Phalamkhani (Dandakateri)-Ghante					1
44A024R	Lunkhu-Jyamire-Huwas	30		30	40	5
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office				30	4
44A026R	Lunkhu-Balakot (Daha)				30	8
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office			10	15	2
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)			15	30	4
44A029R	Urampokhara-Wahakibhajyang					2
44A030R	Wahakibhajyang-Salgram VDC Office				50	2
44A031R	Duda-Maidan (Beulibas)			10		1
44A032R	Arnas (Arthung)-Taklak VDC Office			10	10	1
Total		210	50	240	395	92

3.2.4 Protective structures

Based on the road survey carried out in Parbat, the following retaining walls were identified as being required to ensure the protection of the district road core network with 415 m3 of masonry work, 12170 m3 of gabion walls and 141 km of line drain.

Table 3.2.4 Required Protective Structures

Code	Description	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)		500	8,000
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office		500	2,500
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	60	300	8,000
44A004R	Milanchowk-Salyan-Ghakhet	75	400	4,000
44A005R	Khaniyaghat-Nanglibang (VDC Office)		200	2,200
44A006R	Armadi-Bhatebari-Banau Bazaar		300	6,000
44A007R	Bagaicha-Badahare (VDC Office)	30	500	1,200
44A008R	Kushma-Halhale School			3,500
44A009R	Padamkholsi-Sarunchaur (VDC Office)		150	1,000
44A010R	Patichaur-Bajung-Kyang (VDC Office)	100	600	8,000
44A011R	Patichaur-Maidan-Labsibot (VDC Office)		400	7,000
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)		500	2,500
44A013R	Dimuwa-Darak-Chitre (VDC Office)		400	6,500
44A014R	Dovilla-Cyclechowk-Phalebas Dhika			
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar		350	8,000
44A016R	Pakuwa-Chhapa-Ramjathanti		500	4,500
44A017R	Silmi-Thulipokhari-Karkineta	50	500	7,000
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)		150	2,000
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)		400	10,000
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu		500	10,000
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office		200	4,000
44A022R	Hilekhola-Karkineta-Lunkhu		300	4,000
44A023R	Phalamkhani (Dandakateri)-Ghante		120	1,200
44A024R	Lunkhu-Jyamire-Huwas	100	500	6,000
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office		800	10,000
44A026R	Lunkhu-Balakot (Daha)		800	2,500
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office		500	2,000
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)		500	4,000
44A029R	Urampokhara-Wahakibhajyang		500	1,500
44A030R	Wahakibhajyang-Salgram VDC Office		250	800
44A031R	Duda-Maidan (Beulibas)		250	1,200
44A032R	Arnas (Arthung)-Taklak VDC Office		300	1,500
Total		415	12,170	140,600

3.2.5 Widening

Widening of the district road core network in Parbat is required only in specific locations to bring it up to the minimum standard and to ensure sufficient space in the curves. Additional widening to a higher standard is not required because traffic volumes remain very low. However, about 49 km of length has to be additionally widened in 32 roads under DRCN.

Table 3.2.5 Sections of the District Road Core Network Requiring Widening

Code	Description	Total length (km)	Widening (m)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)	11.875	2000
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office	4.204	2000
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	14.291	2000
44A004R	Milanchowk-Salyan-Ghakhet	5.980	2500
44A005R	Khaniyaghat-Nanglibang (VDC Office)	2.670	500
44A006R	Armadi-Bhatebari-Banau Bazaar	12.577	1500
44A007R	Bagaicha-Badahare (VDC Office)	2.687	600

Code	Description	Total length (km)	Widening (m)
44A008R	Kushma-Halhale School	11.524	
44A009R	Padamkholsi-Sarunchaur (VDC Office)	1.441	600
44A010R	Patichaur-Bajung-Kyang (VDC Office)	14.458	2500
44A011R	Patichaur-Maidan-Labsibot (VDC Office)	12.382	1000
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)	3.494	2000
44A013R	Dimuwa-Darak-Chitre (VDC Office)	7.793	2000
44A014R	Dovilla-Cyclechowk-Phalebas Dhika	16.000	
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar	12.481	2500
44A016R	Pakuwa-Chhapa-Ramjathanti	6.668	3000
44A017R	Silmi-Thulipokhari-Karkineta	13.433	1500
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)	2.268	600
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)	17.270	4000
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu	19.111	4000
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office	5.032	1000
44A022R	Hilekhola-Karkineta-Lunkhu	22.718	800
44A023R	Phalamkhani (Dandakateri)-Ghante	2.233	200
44A024R	Lunkhu-Jyamire-Huwas	14.764	2000
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office	14.804	2000
44A026R	Lunkhu-Balakot (Daha)	4.061	1000
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office	3.038	1000
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)	23.069	3000
44A029R	Urampokhara-Wahakibhajyang	2.729	1000
44A030R	Wahakibhajyang-Salgram VDC Office	1.089	500
44A031R	Duda-Maidan (Beulibas)	2.352	1000
44A032R	Arnas (Arthung)-Taklak VDC Office	2.821	1000
Total		**291.32**	49300

3.2.6 Blacktopping

An analysis of the traffic data of different roads under district road core network, no any of roads exceeds 100 PCU, i.e. for upgrading to blacktop standard needs >100 PCU as threshold for the roads in the Hills. (See annex 1). Hence no road is found to be proposed for blacktopping.

Table 3.2.6 Sections of the District Road Core Network Requiring Blacktopping

Code	Description	Total length (km)	Blacktop (km)	Traffic (VPD)	Blacktopping (km)
Total			**-**	**-**	

3.3 New construction

In Parbat, no need of proposing any new network to make access for any VDC, i.e. all the VDCs are already been connected with the roads. Nevertheless, a small critical section of 60m length has to be newly constructed in order to join the already constructed either sections of the road as given in Table 3.3.1.

Table 3.3.1 Sections of the District Road Core Network Requiring New Construction

Code	Description	New VDCs	Existing length	New length	Bridge (m)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)		11.88	0.060	
Total				**0.060**	

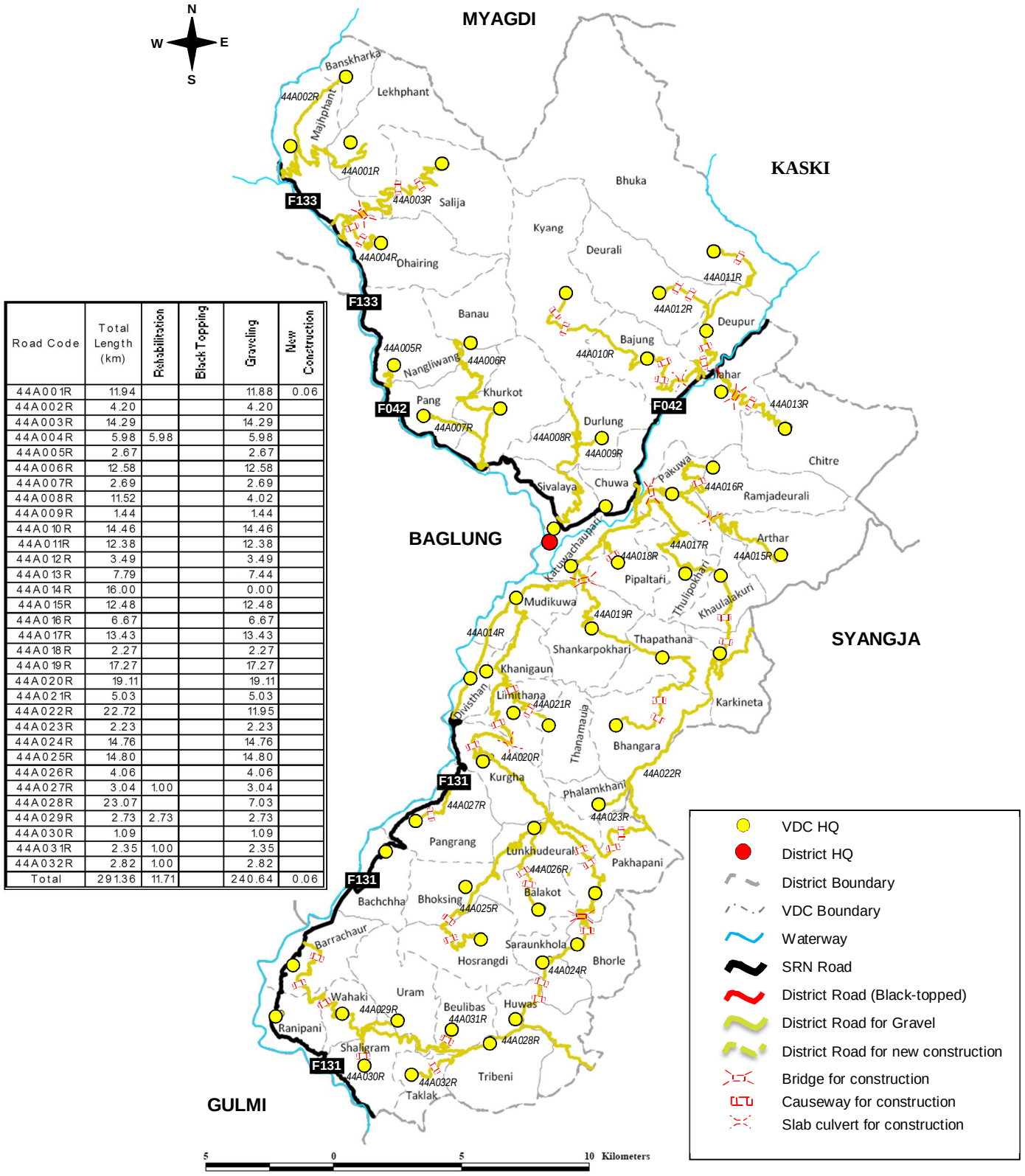
3.4 District Transport Perspective Plan

The DTPP anticipates bringing the entire existing district road core network to maintainable all-weather status. For this purpose, all 241 km will be gravelled along with a number of different cross drainage and protective structures will be constructed. A small critical new section of 60m of existing road will be constructed. The district road core network will subsequently consist of 291 km of maintainable all-weather roads. The following table (3.4.1) lists the required interventions, while the proposed network is shown in the DTPP map in figure 4 at the end of this chapter.

Table 3.4.1 District Transport Perspective Plan

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)	Rehabilitation (km)	Gravelling (km)	Blacktopping (km)	Widening (m)	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)	New construction (km)
44A001R	11.88	11.88	11.88	11.88	-	11.88	-	2,000	-	-	-	-	2	-	500	8000	0.06
44A002R	4.20	4.20	4.20	4.20	-	4.20	-	2,000	-	-	-	-	4	-	500	2500	-
44A003R	14.29	14.29	14.29	14.29	-	14.29	-	2,000	40	-	15	15	2	60	300	8000	-
44A004R	5.98	5.98	5.98	5.98	5.98	5.98	-	2,500	-	-	10	10	2	75	400	4000	-
44A005R	2.67	2.67	2.67	2.67	-	2.67	-	500	-	-	-	-	2	-	200	2200	-
44A006R	12.58	12.58	12.58	12.58	-	12.58	-	1,500	-	-	-	-	2	-	300	6000	-
44A007R	2.69	2.69	2.69	2.69	-	2.69	-	600	-	-	-	-	12	30	500	1200	-
44A008R	11.52	11.52	11.52	11.52	-	4.02	-	-	-	-	-	-	2	-	-	3500	-
44A009R	1.44	1.44	1.44	1.44	-	1.44	-	600	-	-	-	-	4	-	150	1000	-
44A010R	14.46	14.46	14.46	14.46	-	14.46	-	2,500	-	10	30	20	4	100	600	8000	-
44A011R	12.38	12.38	12.38	12.38	-	12.38	-	1,000	-	-	20	20	2	-	400	7000	-
44A012R	3.49	3.49	3.49	3.49	-	3.49	-	2,000	-	-	10	20	2	-	500	2500	-
44A013R	7.79	7.79	7.79	7.79	-	7.44	-	2,000	50	-	-	20	3	-	400	6500	-
44A014R	16.00	16.00	16.00	16.00	-	-	-	-	-	-	-	-	-	-	-	0	-
44A015R	12.48	12.48	12.48	12.48	-	12.48	-	2,500	40	20	-	-	-	-	350	8000	-
44A016R	6.67	6.67	6.67	6.67	-	6.67	-	3,000	-	-	-	15	2	-	500	4500	-
44A017R	13.43	13.43	13.43	13.43	-	13.43	-	1,500	-	-	30	-	3	50	500	7000	-
44A018R	2.27	2.27	2.27	2.27	-	2.27	-	600	-	-	-	10	4	-	150	2000	-
44A019R	17.27	17.27	17.27	17.27	-	17.27	-	4,000	50	-	30	-	3	-	400	10000	-
44A020R	19.11	19.11	19.11	19.11	-	19.11	-	4,000	-	20	-	20	-	-	500	10000	-
44A021R	5.03	5.03	5.03	5.03	-	5.03	-	1,000	-	-	-	20	2	-	200	4000	-
44A022R	22.72	22.72	22.72	22.72	-	11.95	-	800	-	-	20	20	5	-	300	4000	-
44A023R	2.23	2.23	2.23	2.23	-	2.23	-	200	-	-	-	-	1	-	120	1200	-
44A024R	14.76	14.76	14.76	14.76	-	14.76	-	2,000	30	-	30	40	5	100	500	6000	-
44A025R	14.80	14.80	14.80	14.80	-	14.80	-	2,000	-	-	-	30	4	-	800	10000	-
44A026R	4.06	4.06	4.06	4.06	-	4.06	-	1,000	-	-	-	30	8	-	800	2500	-
44A027R	3.04	3.04	3.04	3.04	1.00	3.04	-	1,000	-	-	10	15	2	-	500	2000	-
44A028R	23.07	23.07	23.07	23.07	-	7.03	-	3,000	-	-	15	30	4	-	500	4000	-
44A029R	2.73	2.73	2.73	2.73	2.73	2.73	-	1,000	-	-	-	-	2	-	500	1500	-
44A030R	1.09	1.09	1.09	1.09	-	1.09	-	500	-	-	-	50	2	-	250	800	-
44A031R	2.35	2.35	2.35	2.35	1.00	2.35	-	1,000	-	-	10	-	1	-	250	1200	-
44A032R	2.82	2.82	2.82	2.82	1.00	2.82	-	1,000	-	-	10	10	1	-	300	1500	-
Total	291.32	291.32	291.32	291.32	11.71	240.66	-	49300	210	50	240	395	92	415	12170	140600	0.06

Figure 4 District Transport Perspective Plan (DTPP) Map of Parbat



Road Code	Total Length (km)	Rehabilitation	Black Topping	Graveling	New Construction
44A001R	11.94			11.88	0.06
44A002R	4.20			4.20	
44A003R	14.29			14.29	
44A004R	5.98	5.98		5.98	
44A005R	2.67			2.67	
44A006R	12.58			12.58	
44A007R	2.69			2.69	
44A008R	11.52			4.02	
44A009R	1.44			1.44	
44A010R	14.46			14.46	
44A011R	12.38			12.38	
44A012R	3.49			3.49	
44A013R	7.79			7.44	
44A014R	16.00			0.00	
44A015R	12.48			12.48	
44A016R	6.67			6.67	
44A017R	13.43			13.43	
44A018R	2.27			2.27	
44A019R	17.27			17.27	
44A020R	19.11			19.11	
44A021R	5.03			5.03	
44A022R	22.72			11.95	
44A023R	2.23			2.23	
44A024R	14.76			14.76	
44A025R	14.80			14.80	
44A026R	4.06			4.06	
44A027R	3.04	1.00		3.04	
44A028R	23.07			7.03	
44A029R	2.73	2.73		2.73	
44A030R	1.09			1.09	
44A031R	2.35	1.00		2.35	
44A032R	2.82	1.00		2.82	
Total	291.36	11.71		240.64	0.06

4. Cost Estimation

For the cost estimation, standard costs have been made for the different activities required. For the conservation activities this results in an estimation of annual costs, while for improvement and new construction activities these results in an estimation of the total costs required.

4.1 Conservation

The costs of the required conservation measures have been calculated using the following standard costs. These standard costs have been applied to the entire district road core network, whereby distinction is made based on the surface type in the case of recurrent and periodic maintenance. It must be noted here that the standard costs for periodic maintenance are the average annual costs, but that the cost for applying periodic maintenance in a specific section every several years will be higher (the cumulative cost of several years). The estimated costs for the first year are presented below, while the costs for subsequent years will vary slightly as road surface types change as a result of improvements. Detailed cost estimations for the actual maintenance needs in any given year will be presented in the ARMP.

Table 4.1.1 Standard Unit Costs for Conservation

Activity	Unit	Unit cost (NPR)
Emergency maintenance	km	30,000
Routine maintenance	km	20,000
Recurrent maintenance (blacktop)	km	500,000
Recurrent maintenance (gravel)	km	400,000
Recurrent maintenance (earthen)	km	250,000
Periodic maintenance (blacktop)	km	200,000
Periodic maintenance (gravel)	km	250,000

For the first year the estimated costs for conservation of the DRCN come to NPR 108 million. Based on this cost for the first year, the costs for conservation of the DRCN for the next 5 years are estimated at NPR 538 million. These costs will change slightly as the roads are improved and the standard conservation costs change. This will be updated in the ARMP on an annual basis.

Table 4.1.2 Estimated Conservation Costs for the First Year (NPR '000)

Code	Total length (km)	Blacktop (km)	Gravel (km)	Earthen (km)	Emergency maintenance	Routine maintenance	Recurrent maintenance (blacktop)	Recurrent maintenance (gravel)	Recurrent maintenance (earthen)	Periodic maintenance (blacktop)	Periodic maintenance (gravel)	Total first year cost	Total 5-year cost
44A001R	11.88	0.00	0.00	11.88	356	238	0	0	2,969	0	0	3,563	17,813
44A002R	4.20	0.00	0.00	4.20	126	84	0	0	1,051	0	0	1,261	6,306
44A003R	14.29	0.00	0.00	14.29	429	286	0	0	3,573	0	0	4,287	21,437
44A004R	5.98	0.00	0.00	5.98	179	120	0	0	1,495	0	0	1,794	8,970
44A005R	2.67	0.00	0.00	2.67	80	53	0	0	668	0	0	801	4,005
44A006R	12.58	0.00	0.00	12.58	377	252	0	0	3,144	0	0	3,773	18,866
44A007R	2.69	0.00	0.00	2.69	81	54	0	0	672	0	0	806	4,031
44A008R	11.52	0.00	7.50	4.02	346	230	0	3,000	1,006	0	1,875	6,457	32,286
44A009R	1.44	0.00	0.00	1.44	43	29	0	0	360	0	0	432	2,162
44A010R	14.46	0.00	0.00	14.46	434	289	0	0	3,615	0	0	4,337	21,687
44A011R	12.38	0.00	0.00	12.38	371	248	0	0	3,096	0	0	3,715	18,573
44A012R	3.49	0.00	0.00	3.49	105	70	0	0	874	0	0	1,048	5,241
44A013R	7.79	0.35	0.00	7.44	234	156	175	0	1,861	0	0	2,425	12,127
44A014R	16.00	0.00	16.00	0.00	480	320	0	6,400	0	0	4,000	11,200	56,000
44A015R	12.48	0.00	0.00	12.48	374	250	0	0	3,120	0	0	3,744	18,722
44A016R	6.67	0.00	0.00	6.67	200	133	0	0	1,667	0	0	2,000	10,002
44A017R	13.43	0.00	0.00	13.43	403	269	0	0	3,358	0	0	4,030	20,150
44A018R	2.27	0.00	0.00	2.27	68	45	0	0	567	0	0	680	3,402
44A019R	17.27	0.00	0.00	17.27	518	345	0	0	4,318	0	0	5,181	25,905
44A020R	19.11	0.00	0.00	19.11	573	382	0	0	4,778	0	0	5,733	28,667
44A021R	5.03	0.00	0.00	5.03	151	101	0	0	1,258	0	0	1,510	7,548
44A022R	22.72	0.00	10.77	11.95	682	454	0	4,306	2,988	0	2,691	11,121	55,607
44A023R	2.23	0.00	0.00	2.23	67	45	0	0	558	0	0	670	3,350
44A024R	14.76	0.00	0.00	14.76	443	295	0	0	3,691	0	0	4,429	22,146
44A025R	14.80	0.00	0.00	14.80	444	296	0	0	3,701	0	0	4,441	22,206
44A026R	4.06	0.00	0.00	4.06	122	81	0	0	1,015	0	0	1,218	6,092
44A027R	3.04	0.00	0.00	3.04	91	61	0	0	760	0	0	911	4,557
44A028R	23.07	0.00	16.04	7.03	692	461	0	6,416	1,757	0	4,010	13,337	66,684
44A029R	2.73	0.00	0.00	2.73	82	55	0	0	682	0	0	819	4,094
44A030R	1.09	0.00	0.00	1.09	33	22	0	0	272	0	0	327	1,634
44A031R	2.35	0.00	0.00	2.35	71	47	0	0	588	0	0	706	3,528
44A032R	2.82	0.00	0.00	2.82	85	56	0	0	705	0	0	846	4,232
Total	**291.317**	**0.35**	**50.31**	**240.66**	**8,740**	**5,826**	**175**	**20,122**	**60,166**	**0**	**12,576**	**107,605**	**538,023**

4.2 Improvement

The costs of the required improvement measures have been calculated using the following standard costs. These standard costs have been applied to the identified improvement requirements presented in the previous chapter.

Table 4.2.1 Standard Unit Costs for Improvement Activities

Activity	Unit	Unit cost (NPR)
Rehabilitation	km	800,000
Widening	m	25,000
Gravelling	km	2,200,000
Blacktopping	km	5,700,000
Bridge construction	m	600,000
Slab culvert construction	m	150,000
CC Causeway construction	m	100,000
Stone Causeway construction	m	10,000
Pipe culvert placement	unit	10,000
Masonry wall construction	m3	10,000
Gabion wall construction	m3	2,500
Lined drain construction	m	1,000

The resulting estimated costs come to NPR 2,109 million as indicated in the table below.

Table 4.2.2 Cost Estimate for Improvement Measures (NPR '000)

Code	Total length (km)	Rehabilitation	Widening	Gravelling	Blacktopping	Bridges	Slab culverts	CC causeways	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
44A001R	11.88	-	50,000	26,125	-	-	-	-	-	20	-	1,250	8,000	85,395
44A002R	4.20	-	50,000	9,249	-	-	-	-	-	40	-	1,250	2,500	63,039
44A003R	14.29	-	50,000	31,440	-	24,000	-	1,500	150	20	600	750	8,000	116,460
44A004R	5.98	4,784	62,500	13,156	-	-	-	1,000	100	20	750	1,000	4,000	87,310
44A005R	2.67	-	12,500	5,874	-	-	-	-	-	20	-	500	2,200	21,094
44A006R	12.58	-	37,500	27,669	-	-	-	-	-	20	-	750	6,000	71,939
44A007R	2.69	-	15,000	5,911	-	-	-	-	-	120	300	1,250	1,200	23,781
44A008R	11.52	-	-	8,853	-	-	-	-	-	20	-	-	3,500	12,373
44A009R	1.44	-	15,000	3,170	-	-	-	-	-	40	-	375	1,000	19,585
44A010R	14.46	-	62,500	31,808	-	-	1,500	3,000	200	40	1,000	1,500	8,000	109,548
44A011R	12.38	-	25,000	27,240	-	-	-	2,000	200	20	-	1,000	7,000	62,460
44A012R	3.49	-	50,000	7,687	-	-	-	1,000	200	20	-	1,250	2,500	62,657
44A013R	7.79	-	50,000	16,375	-	30,000	-	-	200	30	-	1,000	6,500	104,105
44A014R	16.00	-	-	-	-	-	-	-	-	-	-	-	-	-
44A015R	12.48	-	62,500	27,458	-	24,000	3,000	-	-	-	-	875	8,000	125,833
44A016R	6.67	-	75,000	14,670	-	-	-	-	150	20	-	1,250	4,500	95,590
44A017R	13.43	-	37,500	29,553	-	-	-	3,000	-	30	500	1,250	7,000	78,833
44A018R	2.27	-	15,000	4,990	-	-	-	-	100	40	-	375	2,000	22,505
44A019R	17.27	-	100,000	37,994	-	30,000	-	3,000	-	30	-	1,000	10,000	182,024
44A020R	19.11	-	100,000	42,044	-	-	3,000	-	200	-	-	1,250	10,000	156,494
44A021R	5.03	-	25,000	11,070	-	-	-	-	200	20	-	500	4,000	40,790
44A022R	22.72	-	20,000	26,297	-	-	-	2,000	200	50	-	750	4,000	53,297
44A023R	2.23	-	5,000	4,913	-	-	-	-	-	10	-	300	1,200	11,423
44A024R	14.76	-	50,000	32,481	-	18,000	-	3,000	400	50	1,000	1,250	6,000	112,181
44A025R	14.80	-	50,000	32,569	-	-	-	-	300	40	-	2,000	10,000	94,909
44A026R	4.06	-	25,000	8,934	-	-	-	-	300	80	-	2,000	2,500	38,814
44A027R	3.04	800	25,000	6,684	-	-	-	1,000	150	20	-	1,250	2,000	36,904
44A028R	23.07	-	75,000	15,464	-	-	-	1,500	300	40	-	1,250	4,000	97,554
44A029R	2.73	2,184	25,000	6,004	-	-	-	-	-	20	-	1,250	1,500	35,958
44A030R	1.09	-	12,500	2,396	-	-	-	-	500	20	-	625	800	16,841
44A031R	2.35	800	25,000	5,174	-	-	-	1,000	-	10	-	625	1,200	33,809
44A032R	2.82	800	25,000	6,206	-	-	-	1,000	100	10	-	750	1,500	35,366
Total	**291.32**	**9,368**	**1,232,500**	**529,456**	**-**	**126,000**	**7,500**	**24,000**	**3,950**	**920**	**4,150**	**30,425**	**140,600**	**2,108,869**

4.3 New construction

For new construction, the following standard costs have been applied to estimate the costs involved.

Table 4.3.1 Standard Unit Costs for New Construction

Activity	Unit	Unit cost (NPR)
Track opening	km	4,000,000
Gravelling	km	2,200,000
Bridge construction	m	600,000

The resulting estimated costs for new construction come to NPR 0.37 million.

Table 4.3.2 Cost Estimate for New Construction (NPR '000)

Code	Description	New length (km)	Opening up (NPR)	Gravelling (NPR)	Bridges (NPR)	Total cost (NPR)
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)	0.06	240	132	-	372
	Total	**0.06**	**240**	**132**	**-**	**372**

4.4 DTPP COSTS

The total costs for the District Transport Perspective Plan come to NPR 2,608 million as indicated in the table below.

Table 4.4.1 DTPP Costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
44A001R	17,813	85,395	372	103,580
44A002R	6,306	63,039	-	69,345
44A003R	21,437	116,460	-	137,897
44A004R	8,970	87,310	-	96,280
44A005R	4,005	21,094	-	25,099
44A006R	18,866	71,939	-	90,805
44A007R	4,031	23,781	-	27,812
44A008R	32,286	12,373	-	44,659
44A009R	2,162	19,585	-	21,747
44A010R	21,687	109,548	-	131,235
44A011R	18,573	62,460	-	81,033
44A012R	5,241	62,657	-	67,898
44A013R	12,127	104,105	-	116,232
44A014R	56,000	-	-	56,000
44A015R	18,722	125,833	-	144,555
44A016R	10,002	95,590	-	105,592
44A017R	20,150	78,833	-	98,982
44A018R	3,402	22,505	-	25,907
44A019R	25,905	182,024	-	207,929
44A020R	28,667	156,494	-	185,161
44A021R	7,548	40,790	-	48,338
44A022R	55,607	53,297	-	108,904
44A023R	3,350	11,423	-	14,772
44A024R	22,146	112,181	-	134,327
44A025R	22,206	94,909	-	117,115
44A026R	6,092	38,814	-	44,906

Code	Conservation	Improvement	New construction	Total
44A027R	4,557	36,904	-	41,461
44A028R	66,684	97,554	-	164,237
44A029R	4,094	35,958	-	40,051
44A030R	1,634	16,841	-	18,474
44A031R	3,528	33,809	-	37,337
44A032R	4,232	35,366	-	39,598
Total	**533,792**	**2,073,503**	**372**	**2,607,667**

5. Ranking

The ranking of the required interventions determines the order in which they will be carried out. This ranking is done separately for conservation, improvement and new construction. Ranking is done according to the cost per person served, whereby the costs are the estimated costs of the previous chapter. For the calculation of the population served, use is made of the population data for the VDCs linked by the road concerned. This data is presented in **Annex 2**.

5.1 Conservation

Ranking of roads for conservation is based on the total conservation costs per person served by the road. This ranking of roads will be updated each year in the ARMP based on the actual cost estimates for the year concerned. An example ranking is provided in the table below based on standard costs for the first year.

Table 5.1.1 Ranking of Conservation Works (NPR '000)

Code	Total length (km)	1. Emergency	2. Routine	3. Recurrent (paved)	4. Recurrent (gravel)	5. Recurrent (earth)	6. Periodic (blacktop)	7. Periodic (gravel)	Total cost (NPR '000)	Population served	Cost/person (NPR)
44A017R	13.43	403	269	-	-	3,358	-	-	4,030	44,773	90
44A030R	1.09	33	22	-	-	272	-	-	327	2,681	122
44A014R	16.00	480	320	-	6,400	-	-	4,000	11,200	80,698	139
44A020R	19.11	573	382	-	-	4,778	-	-	5,733	41,010	140
44A002R	4.20	126	84	-	-	1,051	-	-	1,261	9,003	140
44A009R	1.44	43	29	-	-	360	-	-	432	3,024	143
44A024R	14.76	443	295	-	-	3,691	-	-	4,429	26,654	166
44A007R	2.69	81	54	-	-	672	-	-	806	4,566	177
44A026R	4.06	122	81	-	-	1,015	-	-	1,218	5,524	221
44A012R	3.49	105	70	-	-	874	-	-	1,048	4,653	225
44A025R	14.80	444	296	-	-	3,701	-	-	4,441	19,009	234
44A006R	12.58	377	252	-	-	3,144	-	-	3,773	14,985	252
44A031R	2.35	71	47	-	-	588	-	-	706	2,757	256
44A001R	11.88	356	238	-	-	2,969	-	-	3,563	13,789	258
44A018R	2.27	68	45	-	-	567	-	-	680	2,407	283
44A005R	2.67	80	53	-	-	668	-	-	801	2,751	291
44A029R	2.73	82	55	-	-	682	-	-	819	2,415	339
44A008R	11.52	346	230	-	3,000	1,006	-	1,875	6,457	17,452	370
44A013R	7.79	234	156	175	-	1,861	-	-	2,425	6,354	382
44A021R	5.03	151	101	-	-	1,258	-	-	1,510	3,833	394
44A019R	17.27	518	345	-	-	4,318	-	-	5,181	13,149	394
44A027R	3.04	91	61	-	-	760	-	-	911	2,223	410
44A016R	6.67	200	133	-	-	1,667	-	-	2,000	4,814	416
44A015R	12.48	374	250	-	-	3,120	-	-	3,744	8,333	449
44A004R	5.98	179	120	-	-	1,495	-	-	1,794	3,456	519

Code	Total length (km)	1. Emergency	2. Routine	3. Recurrent (paved)	4. Recurrent (gravel)	5. Recurrent (earth)	6. Periodic (blacktop)	7. Periodic (gravel)	Total cost (NPR '000)	Population served	Cost/person (NPR)
44A011R	12.38	371	248	-	-	3,096	-	-	3,715	6,965	533
44A028R	23.07	692	461	-	6,416	1,757	-	4,010	13,337	22,612	590
44A032R	2.82	85	56	-	-	705	-	-	846	1,424	594
44A010R	14.46	434	289	-	-	3,615	-	-	4,337	6,186	701
44A023R	2.23	67	45	-	-	558	-	-	670	917	731
44A003R	14.29	429	286	-	-	3,573	-	-	4,287	4,786	896
44A022R	22.72	682	454	-	4,306	2,988	-	2,691	11,121	10,782	1,031

The allocation of maintenance funding will follow a specific sequence indicated below, and will be applied to the road ranking as defined in the ARMP. This will be of particular importance where funding is insufficient to cover all conservation costs.

1. Emergency maintenance
2. Routine maintenance
3. Recurrent maintenance paved roads
4. Recurrent maintenance gravel roads
5. Recurrent maintenance earthen roads
6. Periodic maintenance blacktop roads
7. Periodic maintenance gravel roads

5.2 Improvement

In the case of improvement activities, ranking is again based on the basis of the total cost per person served. The resulting order of the roads is shown in the table below. In the case of roads requiring blacktopping, the improvement of the road has been split into two phases. The first phase includes all improvements to bring the road to a maintainable all-weather standard (gravelling, widening, cross drainage and protective structures), while the second phase only includes the blacktopping. This has been done to avoid unnecessarily delaying the improvement of such roads to all-weather gravel standard due to the additional cost of blacktopping (increasing the cost per person served).

Table 5.2.1 Ranking of Improvement Works (NPR '000)

Code	Total length (km)	Gravelling (km)	Blacktopping (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
44A014R	16.00	-	-	-	80,698	-
44A008R	11.52	4.02	-	12,373	17,452	709
44A017R	13.43	13.43	-	78,833	44,773	1,761
44A020R	19.11	19.11	-	156,494	41,010	3,816
44A024R	14.76	14.76	-	112,181	26,654	4,209
44A028R	23.07	7.03	-	97,554	22,612	4,314
44A006R	12.58	12.58	-	71,939	14,985	4,801
44A022R	22.72	11.95	-	53,297	10,782	4,943
44A025R	14.80	14.80	-	94,909	19,009	4,993
44A007R	2.69	2.69	-	23,781	4,566	5,208
44A001R	11.88	11.88	-	85,395	13,789	6,193
44A030R	1.09	1.09	-	16,841	2,681	6,282
44A009R	1.44	1.44	-	19,585	3,024	6,477
44A002R	4.20	4.20	-	63,039	9,003	7,002
44A026R	4.06	4.06	-	38,814	5,524	7,026
44A005R	2.67	2.67	-	21,094	2,751	7,668
44A011R	12.38	12.38	-	62,460	6,965	8,968

Code	Total length (km)	Gravelling (km)	Blacktopping (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
44A018R	2.27	2.27	-	22,505	2,407	9,350
44A021R	5.03	5.03	-	40,790	3,833	10,642
44A031R	2.35	2.35	-	33,809	2,757	12,263
44A023R	2.23	2.23	-	11,423	917	12,456
44A012R	3.49	3.49	-	62,657	4,653	13,466
44A019R	17.27	17.27	-	182,024	13,149	13,843
44A029R	2.73	2.73	-	35,958	2,415	14,889
44A015R	12.48	12.48	-	125,833	8,333	15,101
44A013R	7.79	7.44	-	104,105	6,354	16,384
44A027R	3.04	3.04	-	36,904	2,223	16,601
44A010R	14.46	14.46	-	109,548	6,186	17,709
44A016R	6.67	6.67	-	95,590	4,814	19,857
44A003R	14.29	14.29	-	116,460	4,786	24,334
44A032R	2.82	2.82	-	35,366	1,424	24,836
44A004R	5.98	5.98	-	87,310	3,456	25,263

5.3 New construction

For the roads proposed for new construction, ranking is also according to the cost per person served by the new road. The resulting ranking is indicated in the table below.

Table 5.3.1 Ranking of Construction Works (NPR '000)

Code	Length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
44A001R	0.06	372	13,916	27

6. District transport master plan (DTMP)

The District Transport Master Plan (DTMP) that covers the next five years is prepared based on the projected financial resources available and the prioritized transport interventions as listed in the DTPP. Year-wise targets are prepared for the different roads and intervention types.

6.1 Five year projected financial resources

The projected financial resources for the next five years are estimated by considering all possible funding sources. The funding levels are based on the existing trend of funding. An annual increase in funding of 20% is assumed for all funding sources. The total district budget for the road sector is NPR 1,320 million for the five-year period.

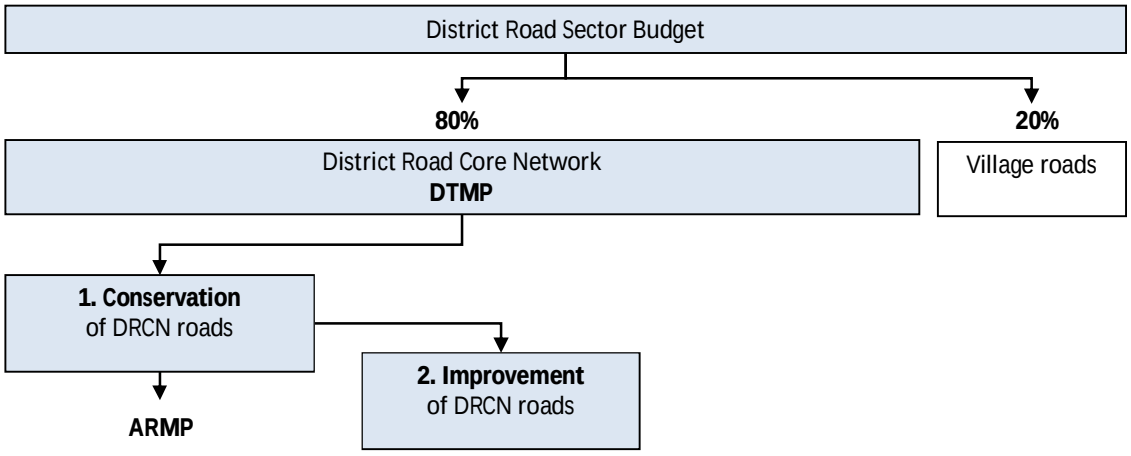
Table 6.1.1 Estimated Funding Levels (Roads) for Next Five Years (in NPR '000)

Funding source	069/70	070/71	071/72	072/73	073/74
RTI SWAp Regular and Additional	25,529	79,200	95,040	114,048	136,858
Road Board Nepal	2,400	2,640	2,904	3,194	3,514
DDC Internal Fund & MLD Grant	3,153	10,920	19,312	34,243	55,668
DFID additional Grant	12,554	0	0	0	0
Other donors	0	30,000	100,000	150,000	200,000
RTI SWAp –Bridge component	0	7,000	17,000	30,000	80,000
People Participation (20%)	17,120	18,832	20,715	22,787	25,065
Total	60,756	148,592	254,971	354,272	501,104
Grand total	1,319,696				

6.2 Budget allocation

The distribution of the available district road sector budget is indicated in the figure below. Due to the low importance along with comparatively less length of village roads, 80% of the total budget is reserved for the district road core network. The remaining 20% is to be used by the DDC for the village roads, giving priority to emergency maintenance and routine/recurrent maintenance. The 80% of the district road sector budget for the DTMP is allocated firstly to conservation, secondly improvement.

Figure 5 District Road Sector Budget Allocation



Based on this distribution of the estimated budget, the available annual budget for each intervention type and the resulting district road core network length by surface type has been calculated. The results are shown in the following table.

Table 6.2.1 Investment Plan

Item				**Year**													
Fiscal year				2069/70			2070/71			2071/72			2072/73			2073/74	
Total budget				60,756			148,592			254,971			354,272			501,104	
Village roads				12,151			29,718			50,994			70,854			100,221	
Core road network budget (DTMP)				**48,605**			**118,874**			**203,977**			**283,418**			**400,883**	
Core network length (km)				**291.32**			**291.32**			**291.32**			**291.32**			**291.32**	
Blacktop (km)				0.35			0.35			0.35			0.35			0.35	
Gravel (km)				50.31			50.31			56.31			71.05			94.23	
Earthen (km)				240.66			240.66			234.65			219.91			196.73	
Conservation (NRs)				**48,605**			**94,853**			**109,833**			**97,966**			**125,175**	
Emergency				8,740			8,740			8,740			8,740			8,740	
Routine				5,826			5,826			5,826			5,826			5,826	
Recurrent (blacktop)																175	
Recurrent (gravel)							20,122			22,525			28,422			37,693	
Recurrent (earthen)				34,039			60,166			58,663			54,978			49,184	
Periodic (blacktop)				-													
Periodic (gravel)				-						14,078						23,558	
Improvement	**Cost**	**BT**	**GR**	**0**	**BT**	**GR**	**24,020**	**BT**	**GR**	**94,144**	**BT**	**GR**	**185,452**	**BT**	**GR**	**275,708**	**BT**	**GR**
44A014R																		
44A008R	12,373		4.02				12,373		4.02									
44A017R	78,833		3.43				11,647		1.98	67,185		11.45						
44A020R	156,494		19.11							26,959		3.29	129,535		15.82			
44A024R	112,181		14.76										55,917		7.36	5 6,264		7.40
44A028R	97,554		7.03													97,554		7.03
44A006R	1,939		12.58													71,939		12.58
44A022R	53,297		11.95													49,951		11.20
44A025R	94,909		14.80															
44A007R	23,781		2.69															
44A001R	85,395		11.88															
44A030R	16,841		1.09															
44A009R	19,585		1.44															
44A002R	63,039		4.20															
44A026R	38,814		4.06															
44A005R	21,094		2.67															
44A011R	62,460		12.38															

44A018R	22,505		2.27																
44A021R	40,790		5.03																
44A031R	33,809		2.35																
44A023R	11,423		2.23																
44A012R	62,657		3.49																
44A019R	182,024		17.27																
44A029R	35,958		2.73																
44A015R	125,833		12.48																
44A013R	104,105		7.44																
44A027R	36,904		3.04																
44A010R	109,548		14.46																
44A016R	95,590		6.67																
44A003R	116,460		14.29																
44A032R	35,366		2.82																
44A004R	87,310		5.98																
Total improvement							24,020	-	6.01	94,144	-	14.74	185,452	-	23.18	275,708	-	38.21	
Construction	Cost	GR														-	GR		
44A002R																			
44A003R																			
44A004R																			
44A005R																			
44A006R																			
44A007R																			
44A008R																			
44A009R																			
44A010R																			
44A011R																			
44A012R																			
44A013R																			
44A014R																			
44A015R																			
44A016R																			
44A017R																			
44A018R																			
44A019R																			
44A020R																			

44A021R												
44A022R												
44A023R												
44A024R												
44A025R												
44A026R												
44A027R												
44A028R												
44A029R												
44A030R												
44A031R												
44A032R												
44A001R	372	0.06										
Total new construction												
Remaining budget												

6.3 DTMP OUTPUTS

Based on the investment plan presented above, all DRCN roads will be conserved for the duration of the DTMP period. A further 82 km will be improved to gravel standard. All of these roads will also receive the cross drainage and protective structures required to make them maintainable all-weather roads. The remaining 159 km of earthen roads at the end of the DTMP period will be improved in the next DTMP. The same goes for the new construction which will take place by DoR fund, as it is being regularly funded by DoR every year.

Table 6.3.1 DTMP Output

Conservation	Improvement gravel	Improvement blacktop	New construction
291.32	82.12	-	-

Of the total DTMP budget, NPR 477 million will be spent on conservation and NPR 579 million on improvement. This will use up the entire DTMP budget for the five-year period.

6.4 DTMP OUTCOME

As a result of the activities planned in this DTMP, the percentage of all-weather maintainable DRCN roads increases by 28% from 51km to 133km, with 54% (159km) remaining fair weather.

Table 6.4.1 Standard of DRCN Roads

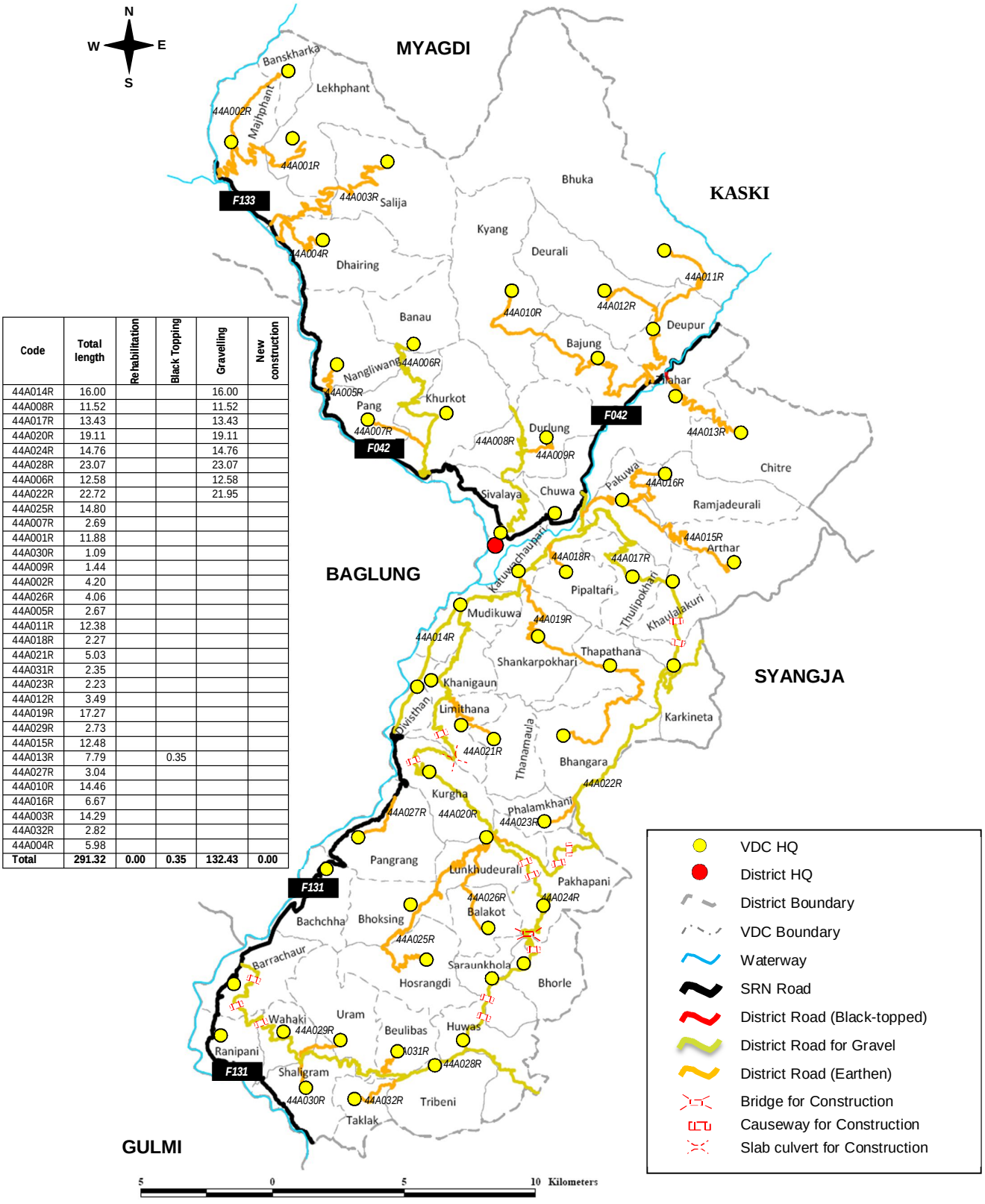
	Total length	Fair-weather		All-weather gravel		All-weather blacktop	
	km	km	%	km	%	km	%
Start of DTMP	291.32	240.66	83	50.31	17	0.35	0.00
End of DTMP	291.32	158.54	54	132.43	45	0.35	0.00
Difference	0.00	-82.12	-28	82.12	28	0.00	0.00

The number of VDC headquarters with access to the SRN or all-weather DRCN roads will increase from 25 to 35 and the district population with access to the SRN or all-weather DRCN roads will increase from 59% to 73%. The number of VDC headquarters with no access to DRCN roads will remain at 0, while the percentage of the district population with no access to DRCN roads will remain at 0%.

Table 6.4.2 Population with Access to Road Network

	Direct access to SRN			No access to road			Fair-weather core roads			All-weather core roads		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	19	70,842	49%	0	-	0%	30	59,803	41%	25	85,864	59%
End of DTMP	19	70,842	49%	0	-	0%	20	39,339	27%	35	106,328	73%
Difference	-	-	0%	-	-	0%	10	20,464	-14%	10	20,464	14%

Figure 5 District Transport Master Plan (DTMP) Map of Parbat



Code	Total length	Rehabilitation	Black Topping	Gravelling	New construction
44A014R	16.00			16.00	
44A008R	11.52			11.52	
44A017R	13.43			13.43	
44A020R	19.11			19.11	
44A024R	14.76			14.76	
44A028R	23.07			23.07	
44A006R	12.58			12.58	
44A022R	22.72			21.95	
44A025R	14.80				
44A007R	2.69				
44A001R	11.88				
44A030R	1.09				
44A009R	1.44				
44A002R	4.20				
44A026R	4.06				
44A005R	2.67				
44A011R	12.38				
44A018R	2.27				
44A021R	5.03				
44A031R	2.35				
44A023R	2.23				
44A012R	3.49				
44A019R	17.27				
44A029R	2.73				
44A015R	12.48				
44A013R	7.79		0.35		
44A027R	3.04				
44A010R	14.46				
44A016R	6.67				
44A003R	14.29				
44A032R	2.82				
44A004R	5.98				
Total	**291.32**	**0.00**	**0.35**	**132.43**	**0.00**

Annex 1 Traffic Data

Code	Total Length (km)	Motorcycle	Car-Jeep-Minibus	Tractor	Truck-Bus	PCU	VPD
44A001R	11.88	4	3	5		**15**	**8**
44A002R	4.20	4	4	7		**20**	**11**
44A003R	14.29	8	5	7		**23**	**12**
44A004R	5.98	2	2	3		**9**	**5**
44A005R	2.67	3	3	7		**19**	**10**
44A006R	12.58	6	5	12		**32**	**17**
44A007R	2.69	4	4	4		**14**	**8**
44A008R	11.52	7	6	4	1	**22**	**11**
44A009R	1.44	2	2	1		**5**	**3**
44A010R	14.46	5	3	5		**16**	**8**
44A011R	12.38	4	2	4		**12**	**6**
44A012R	3.49	2	2	2		**7**	**4**
44A013R	7.79	4	2	1.5	1	**11**	**5**
44A014R	16.00	20	5	12	10	**79**	**27**
44A015R	12.48	5	2	2	1	**13**	**5**
44A016R	6.67	2	1	1		**4**	**2**
44A017R	13.43	5	3	7	5	**40**	**15**
44A018R	2.27	2	1	2		**6**	**3**
44A019R	17.27	5	2.0	3	1	**15**	**6**
44A020R	19.11	8	3.0	6	1	**23**	**10**
44A021R	5.03	4	2.0	3		**10**	**5**
44A022R	22.72	9	4.0	12	3	**45**	**19**
44A023R	2.23	2	1.0	2		**6**	**3**
44A024R	14.76	6	3.0	5	1	**20**	**9**
44A025R	14.80	4	2.0	4	1	**16**	**7**
44A026R	4.06	3	2.0	5		**14**	**7**
44A027R	3.04	2	1.0	2		**6**	**3**
44A028R	23.07	10	5.0	8	6	**50**	**19**
44A029R	2.73	2	1.0	1		**4**	**2**
44A030R	1.09	2	1.0	2		**6**	**3**
44A031R	2.35	5	2.0	6		**17**	**8**
44A032R	2.82	2	1.0	2		**6**	**3**
Total	**291.32**						

Annex 2 **Population Served**

S. N.	VDC/ municipality	Population	Road																																		
			44A001R	44A002R	44A003R	44A004R	44A005R	44A006R	44A007R	44A008R	44A009R	44A010R	44A011R	44A012R	44A013R	44A014R	44A015R	44A016R	44A017R	44A018R	44A019R	44A020R	44A021R	44A022R	44A023R	44A024R	44A025R	44A026R	44A027R	44A028R	44A029R	44A030R	44A031R	44A032R	SRN
1	Majhphant	8,087	X	X																															X
2	Banskharka	916	X	X																															
3	Lekhphant	2,526	X		X																														
4	Salija	2,260	X		X			X																											
5	Dhairing	3,456				X																													X
6	Nanglibang	2,751					X	X																											X
7	Banau	1,458						X																											
8	Pang	4,566						X	X																										X
9	Khurkot	3,950						X																											X
10	Siwalaya	12,470								X																									X
11	Durlung	3,024								X	X																								X
12	Kyang	1,958								X		X																							
13	Bajung	4,228										X																							X
14	Bhuka	2,312											X																						
15	Deupur	2,796											X	X																					X
16	Deurali	1,857											X	X																					
17	Tilahar	4,614													X																				X
18	Chitre	1,740													X		X																		
19	Chuwa	1,759														X																			X
20	Pakuwa	2,196														X	X	X	X																
21	Katuwachaupari	2,047														X					X														
22	Pipaltari	2,407														X				X	X														
23	Mudikuwa	1,869														X						X													
24	Devisthan	3,004														X																			X
25	Arthar	2,618														X	X	X																	
26	Ramja	1,779														X	X																		
27	Thulipokhari	2,431														X			X																
28	Khaulalakuri	2,132														X			X																
29	Karkineta	1,808														X			X					X											
30	Shankarpokhari	3,863														X					X														
31	Thapathana	2,969														X			X		X														
32	Bhangara	1,863														X			X		X			X											
33	Khanigoan	1,925														X						X													
34	Limithana	1,497														X						X	X												
35	Kurgha	2,926														X						X													X
36	Lunkhu	2,068														X			X			X				X	X	X							

S. N.	VDC/ municipality	Population	Road																																		
			44A001R	44A002R	44A003R	44A004R	44A005R	44A006R	44A007R	44A008R	44A009R	44A010R	44A011R	44A012R	44A013R	44A014R	44A015R	44A016R	44A017R	44A018R	44A019R	44A020R	44A021R	44A022R	44A023R	44A024R	44A025R	44A026R	44A027R	44A028R	44A029R	44A030R	44A031R	44A032R	SRN
37	Thanamaula	1,419														X						X	X													
38	Phalamkhani	917														X			X			X	X	X	X											
39	Pakhapani	2,391														X			X			X		X		X										
40	Bhorle	2,175														X			X			X				X										
41	Saraukhola	2,143														X			X			X				X	X	X								
42	Huwas	4,860														X			X			X				X				X						
43	Balakot	1,313														X			X			X		X			X	X								
44	Bhoksing	891														X			X			X		X			X									
45	Hosrangdi	1,599														X			X			X		X			X									
46	Pangrang	2,223														X													X							X
47	Triveni	2,022														X			X			X				X				X						
48	Taklak	1,424														X			X			X				X	X			X				X		
49	Beulibas	2,757														X			X			X				X	X			X			X			
50	Saligram	2,681														X			X			X				X	X			X		X				X
51	Uram	2,415														X			X			X				X	X			X	X					
52	Wahakithanti	1,718														X			X			X				X	X			X						X
53	Bachchha	1,854														X																				X
54	Ranipani	2,516														X														X						X
55	Barrachaur	2,219														X														X						X
	Total population	**145,667**	13,789	9,003	4,786	3,456	2,751	14,985	4,566	17,452	3,024	6,186	6,965	4,653	6,354	80,698	8,333	4,814	44,773	2,407	13,149	41,010	3,833	10,782	917	26,654	19,009	5,524	2,223	22,612	2,415	2,681	2,757	1,424	70,842
	Total VDCs/ municipalities	**55**	**4**	**2**	**2**	**1**	**1**	**5**	**1**	**3**	**1**	**2**	**3**	**2**	**2**	**37**	**4**	**2**	**21**	**1**	**5**	**20**	**3**	**7**	**1**	**11**	**10**	**3**	**1**	**9**	**1**	**1**	**1**	**1**	**19**

Source: Nepal National Census, 2068

Annex 3 Overall Road Inventory

Road code	Road Name	Length (km)	Start chainage (km) or X,Y-coordinate (degree)	End chainage (km) or X,Y-coordinate (degree)	Surface Type: Black Top	Surface Type : Earth	All Weather	Fair Weather	Condition - Good/ Fair	Condition - Poor	Condition - Temporarily Impassable	Condition - Permanently Impassable
	District Road Core Networks											
44A001R	Waribeni-Manjhphant-Lekhphant (Annechaur)	11.88	83.57,28.34	83.61,28.35		11.88	0.00	11.88	4.63	4.75	2.50	
44A002R	Mallaj (Kotghar)-Banskharka (Upallo) VDC Office	4.20	83.58,28.35	83.6,28.38		4.20	0.00	4.20	3.00	1.20		
44A003R	Millanchowk-Ratamata/Bhotedanda-Salija VDC Office	14.29	83.59,28.33	83.64,28.35		14.29	0.00	14.29	11.43	2.86		
44A004R	Milanchowk-Salyan-Ghakhet	5.98	83.59,28.32	83.61,28.32		5.98	0.00	5.98	3.59	2.39		
44A005R	Khaniyaghat-Nanglibang (VDC Office)	2.67	83.61,28.27	83.62,28.28		2.67	0.00	2.67	2.67			
44A006R	Armadi-Bhatebari-Banau Bazaar	12.58	83.65,28.24	83.65,28.28		12.58	0.00	12.58	10.06	2.52		
44A007R	Bagaicha-Badahare (VDC Office)	2.69	83.65,28.25	83.63,28.26		2.69	0.00	2.69	2.69			
44A008R	Kushma-Halhale School	11.52	83.68,28.22	83.68,28.26		4.02	7.50	4.02	11.52			
44A009R	Padamkholsi-Sarunchaur (VDC Office)	1.44	83.69,28.25	83.70,28.25		1.44	0.00	1.44	1.44			
44A010R	Patichaur-Bajung-Kyang (VDC Office)	14.46	83.74,28.27	83.68,28.30		14.46	0.00	14.46	11.57	2.89		
44A011R	Patichaur-Maidan-Labsibot (VDC Office)	12.38	83.74,28.27	83.75,28.32		12.38	0.00	12.38	11.14	1.24		
44A012R	Maidan (Deupur)-Purnagoan (VDC Office)	3.49	83.74,28.29	83.72,28.30		3.49	0.00	3.49	2.80	0.70		
44A013R	Dimuwa-Darak-Chitre (VDC Office)	7.79	83.75,28.27	83.77,28.26	0.35	7.44	0.35	7.44	6.23	1.56		
44A014R	Dovilla-Cyclechowk-Phalebas Dhika	16.00	83.71,28.23	83.64,28.15		0.00	16.00	0.00	16.00			
44A015R	Dovilla Bridge-Pakuwa-Gangate-Arthar	12.48	83.71,28.23	83.77,28.21		12.48	0.00	12.48	11.23	1.25		
44A016R	Pakuwa-Chhapa-Ramjathanti	6.67	83.73,28.23	83.75,28.24		6.67	0.00	6.67	4.67	2.00		
44A017R	Silmi-Thulipokhari-Karkineta	13.43	83.71,28.22	83.75,28.17		13.43	0.00	13.43	13.43			
44A018R	Thausekhola-Bitlab-Pipaltari (VDC Office)	2.27	83.70,28.21	83.71,28.21		2.27	0.00	2.27	2.27			
44A019R	Cyclechowk-Chuchundeurali-Thapathan-Bhangara (VDC Office)	17.27	83.69,28.20	83.71,28.15		17.27	0.00	17.27	12.95	4.32		
44A020R	Mudikuwa-Jhaklak-Kurgha-Lunkhu	19.11	83.67,28.19	83.68,28.12		19.11	0.00	19.11	18.16	0.96		
44A021R	Lamayakhola-Limithana-Thanamaula VDC Office	5.03	83.66,28.16	83.68,28.15		5.03	0.00	5.03	5.03			
44A022R	Hilekhola-Karkineta-Lunkhu	22.72	83.76,28.18	83.68,28.12		11.95	10.77	11.95	18.17	4.54		
44A023R	Phalamkhani (Dandakateri)-Ghante	2.23	83.70,28.12	83.71,28.13		2.23	0.00	2.23	2.23			
44A024R	Lunkhu-Jyamire-Huwas	14.76	83.68,28.12	83.67,28.04		14.76	0.00	14.76	12.55	2.21		
44A025R	Lunkhu-Payubhanjyang-Hosrangdi VDC Office	14.80	83.68,28.12	83.65,28.07		14.80	0.00	14.80	13.32	1.48		
44A026R	Lunkhu-Balakot (Daha)	4.06	83.67,28.11	83.67,28.08		4.06	0.00	4.06	4.06			
44A027R	Sirkang (Lokmarg)-Pangrang VDC Office	3.04	83.64,28.13	83.63,28.11		3.04	0.00	3.04	2.43	0.61		
44A028R	Chisapani-Huwa-Wahakibhanjyang-Barrachaur (Lokmarg)	23.07	83.70,28.03	83.58,28.07		7.03	16.04	7.03	22.49	0.58		
44A029R	Urampokhara-Wahakibhajyang	2.73	83.62,28.04	83.61,28.04		2.73	0.00	2.73		2.73		
44A030R	Wahakibhajyang-Salgram VDC Office	1.09	83.60,28.04	83.61,28.03		1.09	0.00	1.09	0.87	0.22		
44A031R	Duda-Maidan (Beulibas)	2.35	83.64,28.03	83.64,28.04		2.35	0.00	2.35	2.12	0.24		
44A032R	Arnas (Arthung)-Taklak VDC Office	2.82	83.64,28.04	83.63,28.03		2.82	0.00	2.82	2.26	0.56		
	Village Roads											
NA	Annechaur-Okhreni	2.12	0+000	2+124		2.12	0.00	2.12	2.12			
NA	Milanchowk-Kotghar-Banskharka (Tallo)	14.10	0+000	14+100		14.10	0.00	14.10	12.69	1.41		
NA	Salija (Dahidanda)-Phalamedanda-Nagi	10.21	0+000	10+211		10.21	0.00	10.21	9.19	1.02		
NA	Nanglibang (VDC office)-Banau	4.69	0+000	4+689		4.69	0.00	4.69	3.28	1.41		

Road code	Road Name	Length (km)	Start chainage (km) or X,Y-coordinate (degree)	End chainage (km) or X,Y-coordinate (degree)	Surface Type: Black Top	Surface Type : Earth	All Weather	Fair Weather	Condition - Good/ Fair	Condition - Poor	Condition - Temporarily Impassable	Condition - Permanently Impassable
	District Road Core Networks											
NA	Banau-Deurali	7.32	0+000	7+320		7.32	0.00	7.32	6.22	1.10		
NA	Chhamarke-Khurkot (Bhumikothan)	7.27	0+000	7+273		7.27	0.00	7.27	6.91	0.36		
NA	Badahare (VDC office)-Damuwakhola	3.48	0+000	3+477		3.48	0.00	3.48	3.48			
NA	Halhale School-Lespar-Salija (Dahidanda)	18.95	0+000	18+953		18.95	0.00	18.95	14.21	4.74		
NA	Sarunchaur (VDC office)-Bajung	4.84	0+000	4+841		4.84	0.00	4.84	4.36	0.48		
NA	Patichaur-Timure-Kyang	5.76	0+000	5+760		5.76	0.00	5.76	3.17	0.83		1.76
NA	Labsibot (VDC office)-Jhillibarang	7.29	0+000	7+292		7.29	0.00	7.29	5.83	1.46		
NA	Purnagoan (VDC office)-Ghurunga	4.69	0+000	4+694		4.69	0.00	4.69	3.99	0.70		
NA	Damside-Makha (Deupur)	6.74	0+000	6+740	0.65	6.09	0.65	6.09	5.39	1.35		
NA	Tilahar-Gijyan-Dovilla (Rajmarg)	8.87	0+000	8+867		8.87	0.00	8.87	5.32	1.55		2.00
NA	Ratikhola-Lamsalthar-Chitre	5.56	0+000	5+562		5.56	0.00	5.56	3.34	2.22		
NA	Arthar-Tunikhola	4.69	0+000	4+687		4.69	0.00	4.69	2.81	1.87		
NA	Pakuwa-Ramja-Healthpost (Arthar)	12.00	0+000	6+000		12.00	0.00	12.00	12.00			
NA	Bitlab-Tamadi-Thulipokhari	5.69	0+000	5+690		5.69	0.00	5.69	5.69			
NA	Pipaltari-Gahatepokhara-Salghar-Melpokhari	8.11	0+000	8+110		8.11	0.00	8.11	6.49	1.62		
NA	Thulipokhari-Rohote-Andherineta	5.98	0+000	5+982		5.98	0.00	5.98	5.98			
NA	Bhangara-Beteni	1.68	0+000	1+684		1.68	0.00	1.68	1.01	0.67		
NA	Kusma-Modibeni	4.00	0+000	2+000		4.00	0.00	4.00	3.20	0.80		
NA	Cyclechwok-Gahatepokhara-Thulipokhari	7.94	0+000	7+937		7.94	0.00	7.94	7.14	0.79		
NA	Mudhekhola (Rahale)-Lamayakhola	2.30	0+000	2+302		2.30	0.00	2.30	2.30			
NA	Thanamaula-Phalamkhani	8.84	0+000	8+844		8.84	0.00	8.84	8.76	0.09		
NA	Jhaklak-Chitipani-Chuchundeurali	5.30	0+000	5+300		5.30	0.00	5.30	5.30			
NA	Phalebas-Thapathana-Karkineta	14.21	0+000	14+210		14.21	0.00	14.21	14.21			
NA	Balakot-Sitle-Sadhane-Huwas	6.15	0+000	6+151		6.15	0.00	6.15	3.08	3.08		
NA	Payubhanjyang-Urampokhara	6.55	0+000	6+545		6.55	0.00	6.55	5.24	1.31		
NA	Dangreodar-Saldanda-Kholakharka	2.89	0+000	2+890		2.89	0.00	2.89	1.73	1.16		
NA	Sarau-Hile-Jyamire	6.04	0+000	6+043		6.04	0.00	6.04	2.42	3.63		
NA	Deurali (Saligram VDC office)-Mithlang	3.29	0+000	3+288		3.29	0.00	3.29	3.12	0.16		
NA	Chhachanne-Charkang-Setibeni-Golang	8.00	0+000	8+000		8.00	0.00	8.00	7.00			1.00
NA	Dumrebhanjyang-Banidanda-Bhutrelthok-Tribeni	5.20	0+000	5+200		5.20	0.00	5.20	3.80	0.20	1.20	
NA	Ratikhola-Chhapa	6.594	0+000	6+594		6.594	0.00	6.594	3.297	3.297		
NA	Ramjathanti-Chitre-Eklechuar	9.12	0+000	9+120		9.12	0.00	9.12	2.28	2.28	2.28	2.28
Total		**537.80**	**0.00**	**0.00**	**1.00**	**486.49**	**51.31**	**486.49**	**443.38**	**81.39**	**5.98**	**7.04**