KHOTANG DISTRICT

District Transport Master Plan
District Transport Perspective Plan
2013

Government of Nepal
Ministry of Federal Affairs and Local Development
Office of District Development Committee
Diktel, Khotang

FOREWORD

Rural road network plays an important role to strengthen and promote overall economic growth of the district through established and improved year round transport services reinforcing intra and inter-district linkages. On the other hand, resources that can be used for development and maintenance of rural road network to meet the aspiration of local community are always insufficient. Therefore expanding rural road networks in a planned way by considering the framework of available resources in DDC (both internal and external) is most crucial. Similarly, with the major objective of making a plan more user friendly and using available road sector resources of the district in concentrated way for selected road alignments only , DoLIDAR has recently updated the DTMP guidelines.

Viewing these aspects, DDC Khotang has prepared a 'Slim' DTMP following recently updated guideline of DoLIDAR. In this DTMP, focus is given to use available resources first for maintenance of existing roads than after for updating and new construction works respectively.

In this context, it is my great pleasure to introduce this District Transport master Plan (DTMP) of Khotang covering the period from 2070/71 to 2074/75 as a formal document to use road sector budget of the district. 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 sector development activities in the district. It is anticipated that the document helps a lot to generate substantial employment opportunities for rural people through increased and reliable accessibility in on-farm livelihood diversification and commercialization of agriculture sector.

It is also assumed that the document becomes helpful in lobbing and/or fascinating the donor agencies towards generating needy resources through basket fund approach for road sector development of the district. Furthermore, this document will be supportive in avoiding pervasive duplication approach in resources allocation under the rural road network development sector of this district.

Any innovative and constructive suggestions regarding this document will be highly appreciated.

Yuvaraj Adhikari

Local Development Officer

Khotang

June 2013

PREFACE/ACKNOWLEDGEMENTS

It is my immense to gratification to bring forward this District Transportation Master Plan (DTMP) of Khotang as a basic planning tool for effective and/or efficient use of road sector budget of the district .At this time, I would like to express my heartily appreciation to SDC Nepal for their encouragement and Technical Support through DRSP-PSU to prepare this document.

I would also like to express my sincere thanks to all political leaders/representatives and people of the district who contributed directly or indirectly a lot to prepare this DTMP. Similarly, all members of DRCC and invitees for the meetings of DRCC/DTICC are praised a lot on behalf of District Development Committee-Khotang for their extensive efforts, inputs and valuable time given to prepare this DTMP.

I am grateful to all individuals from DDC, DTO,DRSP-PSU (DIST as well as Centre) who were engaged in different stages of preparation of this document, explaining gist of recently updated DTMP guideline of DoLIDAR and making the DTMP in line with the requirements of updated guideline.

Last but not least ;in the process of conducting study, review meetings/workshops, presentations etc there have been significant cooperation from various government line agencies, national and international non-government organizations as well as other institutions from public sector. I would like to thank all of them for their valued efforts, time ,information and expertise used to produce the DTMP report in this form.

Yuvaraj Adhikari

Local Development Officer

Khotang

June 2013

EXECUTIVE SUMMARY

The DTMP report for Khotang district is prepared covering the period from FY: 2070/071 to 2074/075. The district has altogether 76 VDCs and two electoral constituencies with total population of 205,225 (population census 2011).

Khotang is one of the six districts of Sagarmatha Zone in eastern development region of Nepal. The district has been bordered by Bhojpur district in the east, Udayapur and Dhanusa districts in the south, Okhaldhunga district in the west and Solukhumbu district in the North. External as well as internal accessibility in the district is too difficult. The district is not linked by any all-weather road yet, although mid-hill highway passes through the district. Roads from Katari and Gaighat are approaching to Khotang district. But, due to having no bridges at Ghurmi (over Sunkoshi), Jayaramghat (over Dudhkoshi) and Phoksingtar (over Sunkoshi); external accessibility of the district has remained seasonal yet. There are three airports operating in the district namely Lamidanda, Khanidanda and Khotang Bazaar where service at Khanidanda is seasonal yet and Khotang Bazaar has no service at the moment. Inventory of existing roads in the district and requirement of new construction to connect all VDCs (headquarters) to district headquarters have shown that there are altogether 24 roads in DRCN. A summary of road network(s) in the district is as shown in the following table.

Road Class	Total Length (km)		Black Top	Gravel	Earthen	New Construction
	Proposed	Existing				
Strategic road network	168.15	168.15	18.00	7.07	143.08	-
Urban Roads	-	-	-	-	-	-
District road core network	635.44	332.87	-	-	332.87	302.57
Village roads	164.74	23.89	-	-	23.89	140.85
Total	**968.33**	**524.91**	**18.00**	**7.07**	**499.84**	**443.42**

During the process of preparation of this DTMP, requirement of cost is calculated as NRs. 79,805,000; NRs. 1,606,761,000 and NRs. 2,043,934,000 respectively for conservation, improvement and new construction. A summary of required cost for improvement works including new construction is shown in the following table.

Improvement type	Requirement		Cost (NPR)
Bridges	550	m	162,000,000
Slab culverts	80	m	12,000,000
Causeways	572	m	40,100,000
Masonry retaining walls	20429.73	m^3	204,297,300
Gabion retaining walls	59248.02	m^3	148,120,050
Lined drains	66574	m	66,574,000
Widening	30867.5	m	771,687,500
Gravelling	91.81	km	201,982,000
New construction	302.57	km	2,043,934,000
Emergency maintenance	283.77	km	42,565,500
Routine maintenance (km)	122.39	km	12,239,000
Total			**3,705,499,350**

Estimated 5-years' budget of the DTMP is NRs. 1,772,433,000.00. For allocation of this budget, priority is given respectively for conservation, improvement and new construction of DRCN roads. Costs for village roads are not included here in this DTMP. Expected budget can cover conservation/maintenance requirement of the district, but planned to fulfil partial requirements for improvement and new construction.

During the period of this DTMP; 332 km of roads will be maintained, 91 km of roads will be upgraded to gravel (surface improvement like Cobbling) standard and 5.56 km of roads will be newly constructed.

ABBREVIATIONS

ARMP	Annual Roads Maintenance Plan
AWP	Annual Work Plan
DDC	District Development Committee
DIST	District Implementation Support Team
DoLIDAR	Department of Local Infrastructure Development and Agriculture Road
DoR	Department of Road
DRCC	District Roads Coordination Committee
DRCN	District Roads Core Network
DRSP-PSU	District Roads Support Programme - Programme Support Unit
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
DTO	District Technical Office
DTPP	District Transport Perspective Plan
FY	Fiscal Year
GIS	Geographical Information system
GPS	Global Positioning System
GoN	Government of Nepal
HQ	Head-Quarters
LGCDP	Local Governance and Community Development Programme
MoFALD	Ministry of Federal Affairs and Local Development
SDC	Swiss Agency for Development and Cooperation
SRN	Strategic Roads Network
RTI-SWAp	Rural Transport Infrastructure - Sector Wide Approach
VDC	Village Development Committee
VRCN	Village Roads Core Network

CONTENTS

Foreword ii

Preface / Acknowledgements iii

Executive summary iv

Abbreviations vi

1. Introduction 1

2. District road core network (DRCN) 2
- 2.1 Total road network 2
- 2.2 National Highways and Feeder Roads 2
- 2.3 identification of District Road Core Network 3
- 2.4 Village roads 5
- 2.5 Bridges 5

3. District Transport Perspective Plan (DTPP) 8
- 3.1 Conservation 8
- 3.2 Improvement 11
- 3.3 New construction 15
- 3.4 District Transport Perspective Plan 16

4. Cost estimation 20
- 4.1 Conservation 20
- 4.2 Improvement 21
- 4.3 New construction 22
- 4.4 DTPP costs 24

5. Ranking 25
- 5.1 Conservation 25
- 5.2 Improvement 26
- 5.3 New construction 26

6. District Transport Master Plan (DTMP) 28
- 6.1 Five Year Projected Financial resources 28
- 6.2 Budget allocation 28
- 6.3 DTMP outputs 31
- 6.4 DTMP outcome 31

Annex 1 LIST OF vILLAGE ROAD CORE NETWORK (VRCN) i

Annex 2 Traffic data iii

Annex 3 Population served iv

Annex 4 Location of proposed interventions vii

TABLES

Table 2.1.1 Total road length (km) 2
Table 2.2.1 National Highways and Feeder Roads (km) 2
Table 2.3.1 Total road length (km) 3
Table 2.3.2 District road core network (km) 3
Table 3.1.1 Conservation requirements 10
Table 3.2.1 Sections of the district road core network requiring rehabilitation 11
Table 3.2.2 Sections of the district road core network requiring gravelling 11
Table 3.2.3 Required cross drainage structures 12
Table 3.2.4 Required protective structures 13

Table 3.2.5 Sections of the district road core network requiring widening 14
Table 3.2.6 Sections of the district road core network requiring blacktopping.....15
Table 3.3.1 Sections of the district road core network requiring new construction.....15
Table 3.4.1 District Transport Perspective Plan 17
Table 4.1.1 Standard unit costs for conservation 20
Table 4.1.2 Estimated conservation costs for the first year (NPR '000).....20
Table 4.2.1 Standard unit costs for improvement activities.....21
Table 4.2.2 Cost estimate for improvement measures (NPR '000).....22
Table 4.3.1 Standard unit costs for new construction.....23
Table 4.3.2 Cost estimate for new construction (NPR '000) 23
Table 4.4.1 DTPP costs (NPR '000).....24
Table 5.1.1 Ranking of conservation works (NPR '000) 25
Table 5.2.1 Ranking of improvement works (NPR '000).....26
Table 5.3.1 Ranking of construction works (NPR '000) 26
Table 6.1.1 Estimated funding levels (roads) for next five years (in NPR '000) 28
Table 6.2.1 DTMP investment plan.....29
Table 6.3.1 DTMP output.....31
Table 6.4.1 Standard of DRCN roads.....31
Table 6.4.2 Population with access to road network.....31

FIGURES

Figure 1 Location of the district 1
Figure 2 Total road inventory 6
Figure 3 District Road Core Network (DRCN) 7
Figure 4 District Transport Perspective Plan (DTPP).....19
Figure 5 District road sector budget allocation.....29
Figure 6 District Transport Master Plan (DTMP).....32

FIGURES

Annex 1 List of Village Road Core Network (VRCN).....(i)

Annex 2 Traffic Data.....(ii)

Annex 3 Population Served .....(iv)

Annex 4 Location of Proposed Interventions.....(vii)

1. INTRODUCTION

Khotang is one of the six districts of Sagarmatha Zone of the Eastern Development Region of Nepal. The district has been bordered by Bhojpur district in the east, Udayapur and Dhanusa districts in the south, Okhaldhunga district in the west and Solukhumbu district in the North.

There exist three airports namely Lamidanda, Khanidanda and Khotang Bazaar as important means of accessibility of Khotang district. However, runways in the airports are earthen types and service in Khanidanda is seasonal. External as well as internal accessibility in the district is too difficult. The district is not linked by any all-weather road yet, although mid-hill highway passes through the district. Roads from Katari and Gaighat are approaching to Khotang district. But due to having no permanent bridges at Ghurmi (over Sunkoshi), Jayaramghat (over Dudhkoshi) and Phoksingtar (over Koshi), external accessibility of the district has remained seasonal yet. Once the Gaighat – Diktel road including bridge over Sunkoshi at Phoksingtar is completed, linkage of the district towards Terai becomes quite easier.

Khotang district is a remote district of eastern development region of Nepal (sometimes compared with Karnali Zone of mid-western development region) and is predominantly rural with an average population density of around 130 persons per square Kilometer ($km^{2)}$. Diktel, having a population of approximately 8,867; is the headquarters of the district. There are altogether 76 VDCs and two electoral constituents in the district.

Figure 1 Location of the district

The total population of the district is 205,225 (census 2011) comprising 109,156 females and 96,069 males. The average household size and life expectancy in the district are 4.84 and 65 respectively. Major ethnic groups residing in the district are Rai, Brahman, Chhetri, Dalit, Janajati. Similarly, it is found that Nepali, Rai, Tamang, Sherpa are languages spoken within the district. Whilst the average literacy rate is about 50.20 % but only about 38.8% of the women are literate. Approximately 56% of the district area is covered with forest. And about 42% of the district area is under cultivation.

Major road providing Bus service in the district falls under a section of Mid-Hill highway. There exist very few routes / roads providing vehicle services in the district and most of them are to be improved in terms of geometry (vertical as well as horizontal alignments), protection works, water management works, widening, surface improvement etc. Only few district roads are with regular traffic flow. The predominant scenario of transportation, especially in inner areas, is still trail based.

2. DISTRICT ROAD CORE NETWORK (DRCN)

The first revision, 2069 (2012) of Nepal Rural Road Standards (2055) has slightly modified the existing types or classification of district or rural roads. As per the update, the road network within a district is divided into two types (except strategic road network and urban roads). A road within the district joining a VDC headquarters or a growth centre to the district headquarters, directly or via either other VDC(s), a neighbouring district headquarters or the Strategic Road Network is called the **"District Road"**. A network of such roads within a district is called **"District Road Core Network"**. Whereas, the smaller roads not falling under District Road (Core Network) category are Village Roads, including other Agricultural Roads. This chapter summarises the existing status of roads in the district covering mainly the District Road Core Network (DRCN).

2.1 TOTAL ROAD NETWORK

As a part of preparation process of this DTMP, a detailed road inventory of the district is prepared covering all types of roads. The types / class of the roads include strategic, urban and rural roads in one way and blacktop, gravel and earthen in another way. Since the district does not house any Municipality, no urban road in the district is accounted. A summary of different classes of roads is presented in the following table.

Table 2.1.1 Summary of All Roads

Road Class	Total Length (km)		Black Top	Gravel	Earthen	New construction
	Proposed	Existing				
Strategic roads	168.15	168.15	18.00	7.07	143.08	
Urban roads	-	-	-	-	-	
Rural roads	800.18	356.76	-	-	356.76	443.42
Total	**968.33**	**524.91**	**18.00**	**7.07**	**499.84**	**443.42**

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

In addition to the district level roads, Khotang district accommodates sections of few strategic roads of the country as well. All highways and Feeder Roads of the category within Khotang district are in upgrading stage. A summary list of such roads in the district is summarised in the table below.

Table 2.2.1 National Highways and Feeder Roads

Code	Description	Total length	Black Top	Gravel	Earthen
H1801	Bijule Bhanjyang-Jayaramtar	44.23	18.00	7.07	19.16
H1802	Diktel-Bijule Bhanjyang	25.07	-	-	25.07
H1803	Diktel-Chyandanda	40.00	-		40.00
H09	Foksingtar-Diktel (Maure-Foksintar Section)	48.39	-	-	48.39
F178	Bijule-Lamidanda	10.46	-		10.46
Total		**168.15**	**18.00**	**7.07**	**143.08**

A GIS map of all road networks of the district is prepared and attached with this report as Figure 2. The map includes different elements with the objective of facilitating easy comparison and understanding of different alignments in this DTMP report.

2.3 IDENTIFICATION OF DISTRICT ROAD CORE NETWORK

Initially an orientation session was organised at DDC on 2069-11-11(22 Feb 013), regarding recently updated guideline of DTMP and 1st Revision, 2069 (2012) of Nepal Rural Road Standard (2055), which has put forward the idea (for the first time) of "District Road Core Network (DRCN)". The concept of DRCN is envisioned to prioritise (short-list) few roads with comparatively equitable distribution of accessibility within the district. With this, it is supposed that road-sector resources within a district shall be used in more planned way for measurable output and also for serving people even residing in remote areas of the district.

In the mean time, exercises are followed to identify, prepare / finalise district road core-network. The exercises are made basically referring the detailed inventory map of existing roads in the district prepared using GPS instrument. A summary of all types of roads existing in the district is presented in the table below.

Table 2.3.1 Summary of All Roads

Road Class	Total Length (km)		Black Top	Gravel	Earthen	New Construction
	Proposed	Existing				
Strategic road network	**168.15**	**168.15**	**18.00**	**7.07**	**143.08**	
Highways		157.69	18	7.07	132.62	
Feeder roads		10.46	-	-	10.46	
District road core network	635.44	332.87	-	-	332.87	302.57
Village roads	164.74	23.89	0.00	0.00	23.89	140.85
Total	968.33	524.91	18.00	7.07	499.84	443.42

While identifying core network of district roads, requirements of the district are traced and/or addressed through series of formal as well as informal discussions with different stakeholders. The district road core network is identified considering mainly the following factors.

- Each VDC is linked with the district headquarters directly or through other VDC(s), neighbouring districts or SRN;
- There exists only one linkage from a VDC headquarters (growth centre) to district headquarters, unless that road connects other VDC(s) as well;
- Minimum length of DRCN is obtained to link VDC HQs with district HQ;
- Best technical and most economical routes are identified;
- Each road of the DRCN ends at VDC HQ or its development centre, unless that road connects other VDC(s) as well.

The identified core network of the district roads is presented, discussed and agreed in the meeting of District Transportation Infrastructure Coordination Committee (DTICC) on 2070-02-21 (4th June 2013). The same core network is approved and/or endorsed by DDC and District Council. A table summarising all such roads (DRCN roads with their road code, total length and length by surface types) of the district is presented in the table below.

Table 2.3.2 Roads under DRCN

Code	Description	Total Length (km)		Black Top	Gravel	Earthen	All weather	Fair weather
		Proposed	Existing					

13DR001	Lamidanda-Rabuwa	**8.34**	**8.34**			**8.34**	-	8.34
13DR002	Lamidanda-Dubekol-Jaleshwori	**27.21**	**27.21**			**27.21**	-	27.21
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	**33.85**	**29.60**			**29.60**	-	29.60
13DR004	Jalpa-Sapteshwor-Rakha	**28.66**	**12.90**			**12.90**	-	12.90
13DR005	Diktel-Kharmi-Banspani-Baksila	**35.09**	**25.30**			**25.30**	-	25.30
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	**26.15**	**9.15**			**9.15**	-	9.15
13DR007	Diktel-Dumli-Ratanchha	**27.00**	**9.00**			**9.00**		9.00
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	**28.40**	**17.25**			**17.25**	-	17.25
13DR009	Diktel-Khotang-Bazar	**74.00**	**74.00**			**74.00**	-	74.00
13DR010	Pandhare-Simpani-Kalapani	**26.77**	**26.77**			**26.77**	-	26.77
13DR011	Khotang Bazar-Sawa-Likhuwa	**19.88**	**-**			**-**	-	-
13DR012	Khotang Bazar-Chisapani	**15.91**	**-**			**-**	-	-
13DR013	Chisapani-Dambarkhusiwalaya	**10.33**	**-**		**-**	**-**	-	-
13DR014	Chisapani-Kaule-Bopung	**21.00**	**-**			**-**	-	-
13DR015	Chisapani-Banshilaghat	**18.03**	**-**			**-**	-	-
13DR016	Dhaplang-Dhartung-Chisapani	**33.63**	**15.19**			**15.19**	-	15.19
13DR017	Thulibesi-Baraha-Sintang	**16.35**	**-**			**-**	-	-
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	**21.50**	**4.50**			**4.50**	-	4.50
13DR019	Panchami-Bhandareghat	**18.10**	**2.77**			**2.77**		2.77
13DR020	Panchami-Choorambu-Regmitar	**13.40**	**-**			**-**		-
13DR021	Diktel-Khanidanda-Regmitar	**28.40**	**8.50**			**8.50**		8.50
13DR022	Bank Chowk-Baseri-Badaka	**18.35**	**4.00**			**4.00**		4.00
13DR023	Dhitung-Regmitar	**24.90**	**10.00**			**10.00**		10.00
13DR024	Chyasmitar-Raighat	**11.80**	**-**			**-**		-
H09	Foksingtar-Diktel (Maure-Foksintar Section)	**48.39**	**48.39**	-		**48.39**		48.39
Total		**635.44**	**332.87**	**-**	**-**	**332.87**	**-**	**332.87**

A GIS map of all district roads core network is prepared and attached with this report as Figure 3. The map includes different elements with the objective of facilitating easy comparison and understanding of different maps and/or alignments in this DTMP report.

2.4 VILLAGE ROADS

All roads of the district those do not fall under DRCN, Strategic Road Network (SRN) or Urban Road Network (within municipal boundaries) are categorized as village roads. As per the current update, 188.63 km is the total length of all village roads, which gives average figure of 2.49 km for maintenance responsibility of each VDC in Khotang district. VDCs manage emergency and routine/recurrent maintenance of these roads using mainly the VDC grants and community contributions and also in some cases district level allocations.

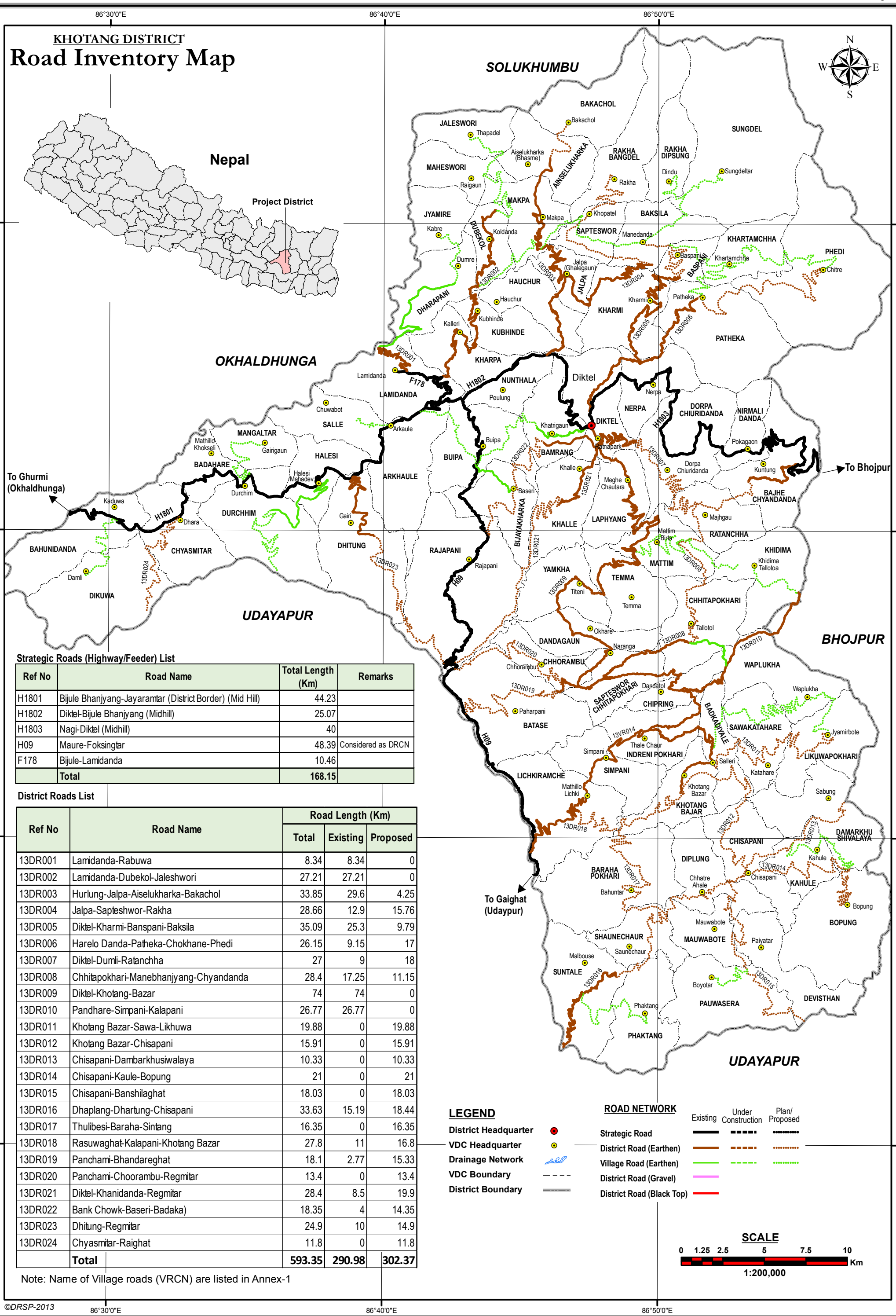
For planning purpose, these roads do not fall within the scope of DTMP. Instead, a Village Road Core Network (VRCN) can be prepared separately. These roads are for providing linkages from different settlements to DRCN or SRN and ultimately to district headquarters.

2.5 BRIDGES

Water management aspect is a measure threat to maintain serviceability of our roads. Likewise, because of the topography of the district, different types of water crossing structures like causeways, slab-culverts, bridges etc are unavoidable to develop our roads to all-weather standard. In the case of Khotang district also, preliminary assessment has shown that a total length of about 270 m of bridges is needed for different DRCN roads. Proposal of cost for design and construction of water crossing structures including bridges required along the existing alignments of DRCN roads of the district is included in this DTMP under improvement works. Whereas, the cost for construction of required bridges along newly proposed alignments is mentioned under new construction.

KHOTANG DISTRICT

Road Inventory Map



Strategic Roads (Highway/Feeder) List

Ref No	Road Name	Total Length (Km)	Remarks
H1801	Bijule Bhanjyang-Jayaramtar (District Border) (Mid Hill)	44.23	
H1802	Diktel-Bijule Bhanjyang (Midhill)	25.07	
H1803	Nagi-Diktel (Midhill)	40	
H09	Maure-Foksingtar	48.39	Considered as DRCN
F178	Bijule-Lamidanda	10.46	
	Total	**168.15**	

District Roads List

Ref No	Road Name	Road Length (Km)		
		Total	Existing	Proposed
13DR001	Lamidanda-Rabuwa	8.34	8.34	0
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21	27.21	0
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	33.85	29.6	4.25
13DR004	Jalpa-Sapteshwor-Rakha	28.66	12.9	15.76
13DR005	Diktel-Kharmi-Banspani-Baksila	35.09	25.3	9.79
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	26.15	9.15	17
13DR007	Diktel-Dumli-Ratanchha	27	9	18
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	28.4	17.25	11.15
13DR009	Diktel-Khotang-Bazar	74	74	0
13DR010	Pandhare-Simpani-Kalapani	26.77	26.77	0
13DR011	Khotang Bazar-Sawa-Likhuwa	19.88	0	19.88
13DR012	Khotang Bazar-Chisapani	15.91	0	15.91
13DR013	Chisapani-Dambarkhusiwalaya	10.33	0	10.33
13DR014	Chisapani-Kaule-Bopung	21	0	21
13DR015	Chisapani-Banshilaghat	18.03	0	18.03
13DR016	Dhaplang-Dhartung-Chisapani	33.63	15.19	18.44
13DR017	Thulibesi-Baraha-Sintang	16.35	0	16.35
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	27.8	11	16.8
13DR019	Panchami-Bhandareghat	18.1	2.77	15.33
13DR020	Panchami-Choorambu-Regmitar	13.4	0	13.4
13DR021	Diktel-Khanidanda-Regmitar	28.4	8.5	19.9
13DR022	Bank Chowk-Baseri-Badaka)	18.35	4	14.35
13DR023	Dhitung-Regmitar	24.9	10	14.9
13DR024	Chyasmitar-Raighat	11.8	0	11.8
	Total	**593.35**	**290.98**	**302.37**

Note: Name of Village roads (VRCN) are listed in Annex-1

LEGEND

- District Headquarter
- VDC Headquarter
- Drainage Network
- VDC Boundary
- District Boundary

ROAD NETWORK

	Existing	Under Construction	Plan/ Proposed
Strategic Road			
District Road (Earthen)			
Village Road (Earthen)			
District Road (Gravel)			
District Road (Black Top)			

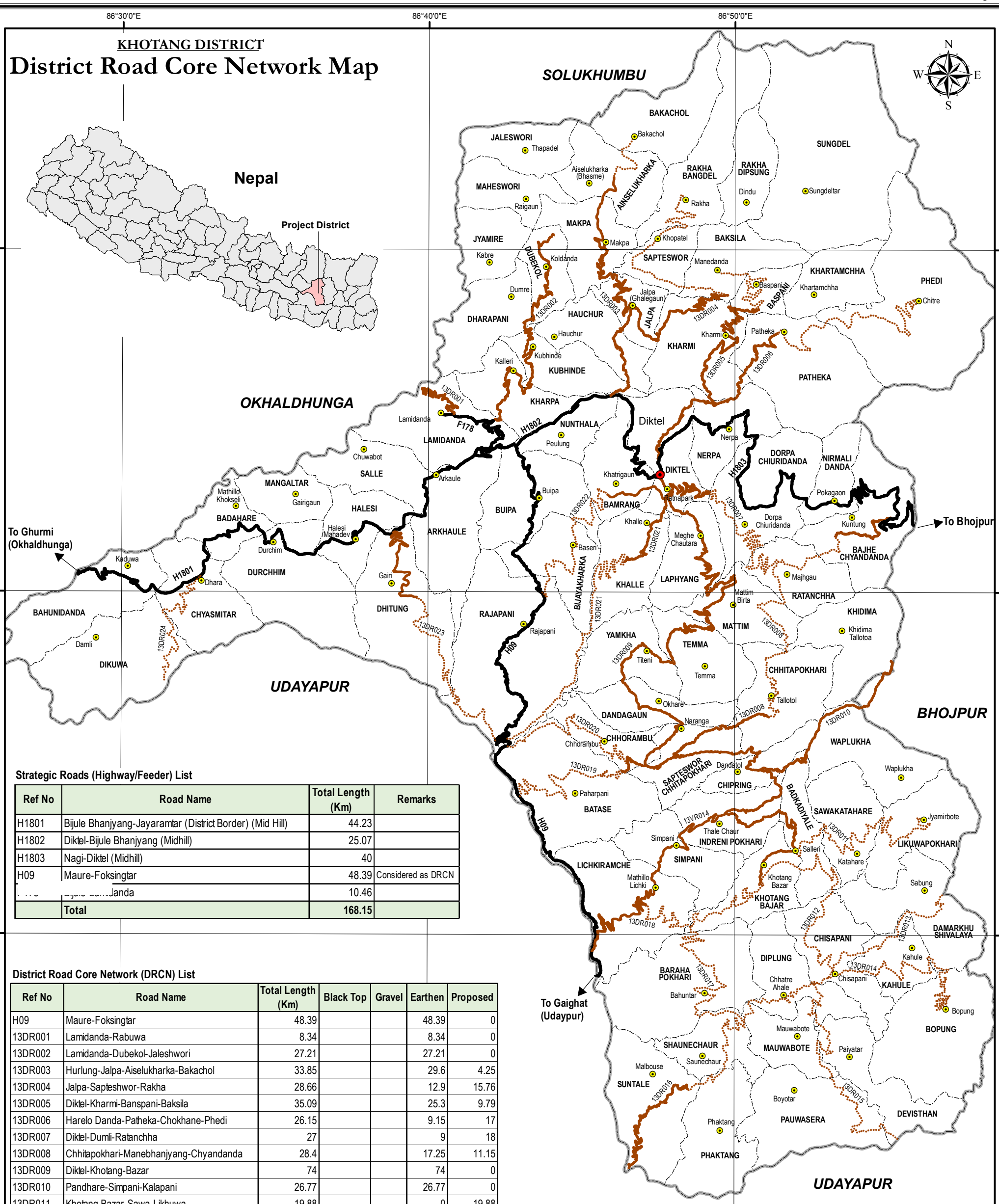
SCALE

0 1.25 2.5 5 7.5 10 Km

1:200,000

©DRSP-2013

KHOTANG DISTRICT
District Road Core Network Map



Strategic Roads (Highway/Feeder) List

Ref No	Road Name	Total Length (Km)	Remarks
H1801	Bijule Bhanjyang-Jayaramtar (District Border) (Mid Hill)	44.23	
H1802	Diktel-Bijule Bhanjyang (Midhill)	25.07	
H1803	Nagi-Diktel (Midhill)	40	
H09	Maure-Foksingtar	48.39	Considered as DRCN
[illegible]	[illegible]landa	10.46	
	Total	**168.15**	

District Road Core Network (DRCN) List

Ref No	Road Name	Total Length (Km)	Black Top	Gravel	Earthen	Proposed
H09	Maure-Foksingtar	48.39			48.39	0
13DR001	Lamidanda-Rabuwa	8.34			8.34	0
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21			27.21	0
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	33.85			29.6	4.25
13DR004	Jalpa-Sapteshwor-Rakha	28.66			12.9	15.76
13DR005	Diktel-Kharmi-Banspani-Baksila	35.09			25.3	9.79
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	26.15			9.15	17
13DR007	Diktel-Dumli-Ratanchha	27			9	18
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	28.4			17.25	11.15
13DR009	Diktel-Khotang-Bazar	74			74	0
13DR010	Pandhare-Simpani-Kalapani	26.77			26.77	0
13DR011	Khotang Bazar-Sawa-Likhuwa	19.88			0	19.88
13DR012	Khotang Bazar-Chisapani	15.91			0	15.91
13DR013	Chisapani-Dambarkhusiwalaya	10.33			0	10.33
13DR014	Chisapani-Kaule-Bopung	21			0	21
13DR015	Chisapani-Banshilaghat	18.03			0	18.03
13DR016	Dhaplang-Dhartung-Chisapani	33.63			15.19	18.44
13DR017	Thulibesi-Baraha-Sintang	16.35			0	16.35
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	27.8			11	16.8
13DR019	Panchami-Bhandareghat	18.1			2.77	15.33
13DR020	Panchami-Choorambu-Regmitar	13.4			0	13.4
13DR021	Diktel-Khanidanda-Regmitar	28.4			8.5	19.9
13DR022	Bank Chowk-Baseri-Badaka)	18.35			4	14.35
13DR023	Dhitung-Regmitar	24.9			10	14.9
13DR024	Chyasmitar-Raighat	11.8			0	11.8
	Total	**641.74**			**339.37**	**302.37**

LEGEND

- District Headquarter
- VDC Headquarter
- Drainage Network
- VDC Boundary
- District Boundary

ROAD NETWORK

	Existing	Under Construction	Plan/ Proposed
Strategic Road			
District Road (Earthen)			
Village Road (Earthen)			
District Road (Gravel)			
District Road (Black Top)			

SCALE

0 1.25 2.5 5 7.5 10 Km

1:200,000

©DRSP-2013

3. DISTRICT TRANSPORT PERSPECTIVE PLAN (DTPP)

After the identification of DRCN, a plan of road-works is prepared for all roads in the district under the responsibility of District Development Committee. The plan is taken here as District Transport Perspective Plan (DTPP), where limitation of available resources is not usually considered, rather requirements are assessed and tried to address. It simply details the list of all the identified interventions that are necessary to bring the roads to a maintainable all-weather standard and keep them there, as well as the creation of any new roads considered necessary to complete construction of the DRCN. Major points taken into account in this stage are:

- Operable condition of all DRCN roads is maintained at least as in the existing situation;
- Necessary interventions for DRCN roads are identified to bring them into maintainable condition;
- All VDCs are linked with district headquarters through DRCN or SRN;
- All DRCN roads are upgraded at least up to the standards defined by 1st revision (2069) of Nepal Rural Road Standard (2055) and to the “all weather condition”;
- Water crossing structures and surface improvement works are included respectively / appropriately.

In order to carry out the planning and prioritization process, following information are collected. The information, which show the existing situation and requirement for expected services in the district are important at this stage. Most of them are gathered through secondary sources and some others which are not readily available are collected from primary sources.

- Traffic data for the DRCN roads;
- Road data for the DRCN roads;
- Standard cost of different interventions (road-works);
- Population data for the VDCs in the district;
- Financial / budgetary position of the district especially for the road sector ;
- Other general data regarding the district.

For planning the DRCN road-works in this process of preparing DTPP, interventions like conservation, widening, improvement (alignment), rehabilitation, protective structure, cross drainages, gravelling and blacktopping or surface strengthening works like cobbling are considered with due priority. Extent of these requirements including financial part is presented in following paragraphs.

3.1 CONSERVATION

The action taken to minimize the effects of deteriorating factors on road is known as maintenance or conservation. Lack of maintenance accelerates the deterioration of a road. National Plan for Rural Road Maintenance (NPRRM) 2056 defines road maintenance as a function of keeping the roadways, roadside structures, cross-drainage structures and other facilities in the best possible condition to ensure reliable and safe transportation along the roadways. It:

- Minimises the rate of deterioration of the road and prolong its life;
- Provides better running surface and thus reduce the cost of vehicle operation; and ensure reliable and safe transport services.

Realizing the challenge of maintaining the district roads in their serviceable condition, road-works related to conservation of the assets of the district are given first priority in this process of preparation of DTMP. Major scopes of work in this part are as follows.

3.1.1 EMERGENCY MAINTENANCE

Emergency maintenance works are to be carried out due to unexpected and sudden blockage of roads that stop vehicular movement due mainly to natural disasters. Immediate works to be executed for the quick opening of the road, reinstating vehicular movement and to protect the road from further damage are termed emergency maintenance. Reinstating the damaged road to its original condition after completion of emergency maintenance works is not included under this heading.

3.1.2 ROUTINE MAINTENENCE

The minor maintenance works, which are of regular nature and cannot be accurately estimated or measured, are categorized under routine maintenance. It covers the work involved in keeping the road in proper shape and in protecting it from deterioration. Apart from traffic the major factor that causes deterioration of the road surface is water. Hence prevention of water accumulation on the road surface and managing the flow of water to desired design consideration is the primary objective of routine maintenance. Generally there is no need for skilled person power for routine maintenance. **Rekhalus** (length workers) are given the responsibility of carrying out routine maintenance work along maintainable roads. These are an unskilled labor who works with simple hand tools. Even with the movement of traffic or without, it is important to ensure that routine maintenance is carried out whole months of the year but given priority during the monsoon months. With the increase in the workload for Rekhalus during monsoon, the numbers of Rekhalus are increased in proportions from 5 KM/Rekhalu to 2.5 KM/Rekhalu. This work is conducted at fixed cost and generally carried out through users committees deploying length persons.

Routine Maintenance consists of following works and hence are the responsibilities of Rekhalus.

- Safety inspection and removal of obstruction and security checks;
- Cleaning of drains, culverts, bridges;
- Filling and compaction of pot-holes;
- Trimming road edges for water shedding;
- Reshaping carriageway and compaction;
- Removal of small-sized slides/slips that fall on road surface;
- Cutting grass, bushes and branches of tree for visibility splays;
- Maintaining trees along the road sides;
- Cleaning of vegetation from drainage paths;
- Maintaining and placing of road signs and delineation;
- Any other simple works.

3.1.3 RECURRENT MAINTENANCE

Small maintenance works to be carried out depending on the season of a year but not categorized under routine and emergency maintenance are categorized as Recurrent Maintenance. Requirement of these works can arise from vehicular traffic flow or due to rainfall. These are to be carried out from time to time, typically 2-3 times in a year. This work may also need some skilled person power. Before starting the maintenance work, needs identification and preparation of cost estimate in this category. Some of the examples of works grouped in this type are maintenance of gravel carriageway and shoulders by repairing irregularities/rills, repairing of potholes and rots, maintenance of side drain and masonry wall, rehabilitation of small cross-drainage structures etc.

3.1.4 PERIODIC MAINTENANCE

Maintenance works to be carried out in intervals of years and of large scale are kept under this category. It is not always possible to maintain the road in a usable state through routine and recurrent maintenance alone and roads requiring quantitatively large volumes of maintenance fall under this category. Periodic maintenance are to be typically carried out once at intervals on black topped roads of 5 to 7 years, on graveled road of 3 to 5 years and on earthen road as per road condition but typically 2 to 3 years but on some rural roads every year particularly after rainy season. This work may generally require skilled person power. Before starting the maintenance works of this type, identification and preparation of cost estimate is needed.

Periodic maintenance usually consists of following works.

- Re-cambering and re-grading long stretch of earthen and gravel roads;
- Re-gravelling;
- Improvement of carriageway and resealing of black topped roads;
- Clearance of medium to large scale landslide and its protection works;
- Improvement or reconstruction of roadside guard wall, parapet wall, railing of bridges & culverts;
- Construction of small scale river training structures;
- Repair and/or rehabilitation of dry stone masonry, gabion retaining/toe wall;
- Plantation/replanting of grasses, shrubs, trees etc. as per site conditions.

During the process of preparation of this DTMP, requirements of different types of conservation works for DRCN is assessed and summarized in the following table.

Table 3.1.1 Conservation requirements

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
13DR001	8.34		0	
13DR002	27.21		0	
13DR003	20		0	
13DR004	12.9		0	
13DR005	25.3		0	
13DR006	15		0	
13DR007	10		0	
13DR008	17.25		0	
13DR009	74	74	0	
13DR010	14		0	
13DR011	0		0	
13DR012	0		0	
13DR013	0		0	
13DR014	0		0	
13DR015	0		0	
13DR016	10		0	
13DR017	0		0	
13DR018	4.5		0	
13DR019	2.77		0	
13DR020	0		0	
13DR021	8.5		0	
13DR022	4		0	
13DR023	10		0	
13DR024	0		0	
H09	20	48.39	20	
Total	**283.77**	**122.39**	**-**	**-**

3.2 IMPROVEMENT

Under this scope of improvement, the road-works (interventions) that are required or identified for upgrading from the existing situation of this time of the roads are included. Since there exist several roads in the district which are recently opened and also most of them are non-engineered, requirements of upgrading are mainly related to alignment (horizontal as well as vertical) correction, widening etc. In this chapter, details of identified required interventions of different scopes are mentioned as follows.

3.2.1 REHABILITATION

Since all of the DRCN roads of the district are recently opened with mainly the earthen surface where alignment corrections are still to be made, no roads (or sections of roads) are accounted here for rehabilitation.

Table 3.2.1 Sections of the district road core network requiring rehabilitation

Code	Description	Total length (km)	Gravelling (km)
Total		**0.00**	**0.00**

3.2.2 GRAVELLING / PAVEMENT STRENGTHENING

Since almost all of the DRCN roads are of earthen standard now, they all are to be gravelled or treated by appropriate surfacing works like Cobbling for their upgraded standards. Experience has shown that only the gravelled surface in our hilly context is not that much durable. Instead, Cobbling work is seen as effective one because of its labour based, local material consuming, requiring lower maintenance efforts, less susceptible towards damaging effects of water and employment generative (at local level) characteristics. A list of surface strengthening needs identified during the survey of the DRCN roads is as follows in Table No. 3.2.2. The list is prepared also considering large gap of available resources and requirement of the district.

Table 3.2.2 Sections of the district road core network requiring gravelling

Code	Description	Total length (km)	To be improved (km)
13DR001	Lamidanda-Rabuwa	8.34	8.34
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21	-
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	29.60	9.87
13DR004	Jalpa-Sapteshwor-Rakha	12.90	-
13DR005	Diktel-Kharmi-Banspani-Baksila	25.30	8.43
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	9.15	9.15
13DR007	Diktel-Dumli-Ratanchha	9.00	9.00
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	17.25	17.25
13DR009	Diktel-Khotang-Bazar	74.00	10.00
13DR010	Pandhare-Simpani-Kalapani	26.77	-
13DR011	Khotang Bazar-Sawa-Likhuwa	-	-
13DR012	Khotang Bazar-Chisapani	-	-
13DR013	Chisapani-Dambarkhusiwalaya	-	-
13DR014	Chisapani-Kaule-Bopung	-	-
13DR015	Chisapani-Banshilaghat	-	-

13DR016	Dhaplang-Dhartung-Chisapani	15.19	-
13DR017	Thulibesi-Baraha-Sintang	-	-
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	4.50	4.50
13DR019	Panchami-Bhandareghat	2.77	2.77
13DR020	Panchami-Choorambu-Regmitar	-	-
13DR021	Diktel-Khanidanda-Regmitar	8.50	8.50
13DR022	Bank Chowk-Baseri-Badaka	4.00	4.00
13DR023	Dhitung-Regmitar	10.00	-
13DR024	Chyasmitar-Raighat	-	-
H09	Foksingtar-Diktel (Maure-Foksintar Section)	48.39	-
Total			**91.81**

3.2.3 CROSS DRAINAGE

Since the district accommodates mostly Hilly and some mountainous range as well, there are a number of gullies, streamlets, streams and rivers. And, hence, a lot of crossing structures are needed to upgrade the DRCN roads to all weather standards. In some cases, the crossing structures are very expensive. A list of required cross drainage structures as determined during the field survey of DRCN roads is as shown in the following table.

Table 3.2.3 Required cross drainage structures

Code	Description	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)
13DR001	Lamidanda-Rabuwa		8			
13DR002	Lamidanda-Dubekol-Jaleshwori	50	12	16		
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	50		6		
13DR004	Jalpa-Sapteshwor-Rakha		12	30		
13DR005	Diktel-Kharmi-Banspani-Baksila	40	6	100		
13DR006	Harelo Danda-Patheka-Chokhane-Phedi		12	120		
13DR007	Diktel-Dumli-Ratanchha				40	
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda					
13DR009	Diktel-Khotang-Bazar	40		20	50	
13DR010	Pandhare-Simpani-Kalapani				100	
13DR011	Khotang Bazar-Sawa-Likhuwa					
13DR012	Khotang Bazar-Chisapani					
13DR013	Chisapani-Dambarkhusiwalaya					
13DR014	Chisapani-Kaule-Bopung					
13DR015	Chisapani-Banshilaghat					
13DR016	Dhaplang-Dhartung-Chisapani		18	50		
13DR017	Thulibesi-Baraha-Sintang					
13DR018	Rasuwaghat-Kalapani-Khotang Bazar					
13DR019	Panchami-Bhandareghat					
13DR020	Panchami-Choorambu-Regmitar					

13DR021	Diktel-Khanidanda-Regmitar					
13DR022	Bank Chowk-Baseri-Badaka		12	40		
13DR023	Dhitung-Regmitar					
13DR024	Chyasmitar-Raighat					
H09	Foksingtar-Diktel (Maure-Foksintar Section)	90				
Total		**270**	**80**	**382**	**190**	**-**

3.2.4 PROTECTIVE STRUCTURES

In the district having varied topography like Khotang, different types of protective structures are needed for their conservation and/or upgrading. Based on the observations of field survey team on DRCN roads, average figures are adopted to calculate quantities of protective structures like masonry wall, gabion wall and lined drain. A list of required protective structures as determined during the survey of DRCN roads is presented in the following Table No. 3.2.4.

Table 3.2.4 Required protective structures

Code	Description	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
13DR001	Lamidanda-Rabuwa	537.93	1626.3	1668
13DR002	Lamidanda-Dubekol-Jaleshwori	1755.045	5305.95	5442
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	1909.2	5772	5920
13DR004	Jalpa-Sapteshwor-Rakha	832.05	2515.5	2580
13DR005	Diktel-Kharmi-Banspani-Baksila	1631.85	4933.5	5060
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	590.175	1784.25	1830
13DR007	Diktel-Dumli-Ratanchha	580.5	1755	1800
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	1112.625	3363.75	3450
13DR009	Diktel-Khotang-Bazar	4773	14430	14800
13DR010	Pandhare-Simpani-Kalapani	1726.665	5220.15	5354
13DR011	Khotang Bazar-Sawa-Likhuwa	0	0	0
13DR012	Khotang Bazar-Chisapani	0	0	0
13DR013	Chisapani-Dambarkhusiwalaya	0	0	0
13DR014	Chisapani-Kaule-Bopung	0	0	0
13DR015	Chisapani-Banshilaghat	0	0	0
13DR016	Dhaplang-Dhartung-Chisapani	979.755	2962.05	3038
13DR017	Thulibesi-Baraha-Sintang	0	0	0
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	290.25	877.5	900
13DR019	Panchami-Bhandareghat	178.665	540.15	554
13DR020	Panchami-Choorambu-Regmitar	0	0	0
13DR021	Diktel-Khanidanda-Regmitar	548.25	1657.5	1700
13DR022	Bank Chowk-Baseri-Badaka	258	780	800
13DR023	Dhitung-Regmitar	645	1950	2000
13DR024	Chyasmitar-Raighat	0	0	0
H09	Foksingtar-Diktel (Maure-Foksintar Section)	2080.77	3774.42	9678
Total		**20,430**	**59,248**	**66,574**

3.2.5 WIDENING

As mentioned above, field survey of DRCN roads has shown that at least some sections of most of them are at upgrading stage from track opening. Therefore, requirement of widening works even for DRCN roads is in remarkable quantity. A list of the required widening works as identified during the field survey of DRCN roads is as shown in the following table.

Table 3.2.5 Sections of the district road core network requiring widening

Code	Description	Total length (km)	VPD	Widening (m)
13DR001	Lamidanda-Rabuwa	8.34	14.00	834.00
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21	4.00	2,721.00
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	29.60	10.00	2,960.00
13DR004	Jalpa-Sapteshwor-Rakha	12.90	2.00	1,290.00
13DR005	Diktel-Kharmi-Banspani-Baksila	25.30	2.00	2,530.00
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	9.15	3.00	915.00
13DR007	Diktel-Dumli-Ratanchha	9.00	4.00	900.00
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	17.25	-	1,725.00
13DR009	Diktel-Khotang-Bazar	74.00	7.00	7,400.00
13DR010	Pandhare-Simpani-Kalapani	26.77	4.00	2,677.00
13DR011	Khotang Bazar-Sawa-Likhuwa	-	-	-
13DR012	Khotang Bazar-Chisapani	-	-	-
13DR013	Chisapani-Dambarkhusiwalaya	-		-
13DR014	Chisapani-Kaule-Bopung	-	-	-
13DR015	Chisapani-Banshilaghat	-	-	-
13DR016	Dhaplang-Dhartung-Chisapani	15.19	-	1,519.00
13DR017	Thulibesi-Baraha-Sintang	-	-	-
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	4.50	-	450.00
13DR019	Panchami-Bhandareghat	2.77	2.00	277.00
13DR020	Panchami-Choorambu-Regmitar	-	-	-
13DR021	Diktel-Khanidanda-Regmitar	8.50	6.00	850.00
13DR022	Bank Chowk-Baseri-Badaka	4.00	-	400.00
13DR023	Dhitung-Regmitar	10.00	-	1,000.00
13DR024	Chyasmitar-Raighat	-	-	-
H09	Foksingtar-Diktel (Maure-Foksintar Section)	48.39	11.00	2,419.50
Total				**30,868**

3.2.6 BLACKTOPPING

The traffic survey of DRCN roads in Khotang district has shown that none of the DRCN roads exceed the limit of traffic data that requires upgrading of surfacing works of the roads to blacktopping. A summary of requirement of blacktopping for DRCN roads is given in the following table.

COBBLING

Cobbling is a surface improvement work using (laying) defined size (8 – 10 cm) of stone pieces, cobbles. It gives reasonably good quality riding surfaces for rural roads, can be constructed using local materials / labours, is easy for maintenance and less susceptible to deterioration. Some sections of roads in Khotang district are upgraded with this cobbling works giving a length of 1,000 m in total.

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 Khotang district, several VDC headquarters (growth centres) are linked with district headquarters either by district roads or through strategic roads. In remaining cases, small length of road access is to be opened from vehicle operable road to VDC office, which is not considered here. In the cases of only eleven VDCs, it is considered that they are not connected with DRCN roads yet. Even in these cases, there exist roads passing through the VDCs but offices are a bit far away. A list of required new construction of DRCN roads is shown in the following table.

Table 3.3.1 Sections of the district road core network requiring new construction

Code	Description	New VDCs	Existing length	New length	Bridge (m)
13DR001	Lamidanda-Rabuwa		8.34	0	
13DR002	Lamidanda-Dubekol-Jaleshwori		27.21	0	
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol		29.6	4.25	
13DR004	Jalpa-Sapteshwor-Rakha		12.9	15.76	
13DR005	Diktel-Kharmi-Banspani-Baksila		25.3	9.79	
13DR006	Harelo Danda-Patheka-Chokhane-Phedi		9.15	17	
13DR007	Diktel-Dumli-Ratanchha		9	18	
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda		17.25	11.15	
13DR009	Diktel-Khotang-Bazar		74	0	
13DR010	Pandhare-Simpani-Kalapani		26.77	0	
13DR011	Khotang Bazar-Sawa-Likhuwa		0	19.88	20
13DR012	Khotang Bazar-Chisapani		0	15.91	30
13DR013	Chisapani-Dambarkhusiwalaya		0	10.33	30
13DR014	Chisapani-Kaule-Bopung		0	21	40
13DR015	Chisapani-Banshilaghat		0	18.03	40
13DR016	Dhaplang-Dhartung-Chisapani		15.19	18.44	
13DR017	Thulibesi-Baraha-Sintang		0	16.35	40
13DR018	Rasuwaghat-Kalapani-Khotang Bazar		4.5	17	50
13DR019	Panchami-Bhandareghat		2.77	15.33	
13DR020	Panchami-Choorambu-Regmitar		0	13.4	
13DR021	Diktel-Khanidanda-Regmitar		8.5	19.9	

13DR022	Bank Chowk-Baseri-Badaka		4	14.35	30
13DR023	Dhitung-Regmitar		10	14.9	
13DR024	Chyasmitar-Raighat		0	11.8	
H09	Foksingtar-Diktel (Maure-Foksintar Section)		48.39		
Total			**332.87**	**302.57**	**280**

3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

District Transport Perspective Plan (DTPP) of Khotang is prepared summarising all identified interventions required for conservation, improvement and new construction of the DRCN roads. The DTPP gives a total list of such requirements. After all interventions made as per the plan, it is expected that all DRCN roads will be of all weather standards. In addition to a table of next page mentioning the required interventions, a map as Figure 4 is prepared as part of DTPP. The map also indicates major interventions like gravelling, new construction, bridges, causeways, slab culverts etc.

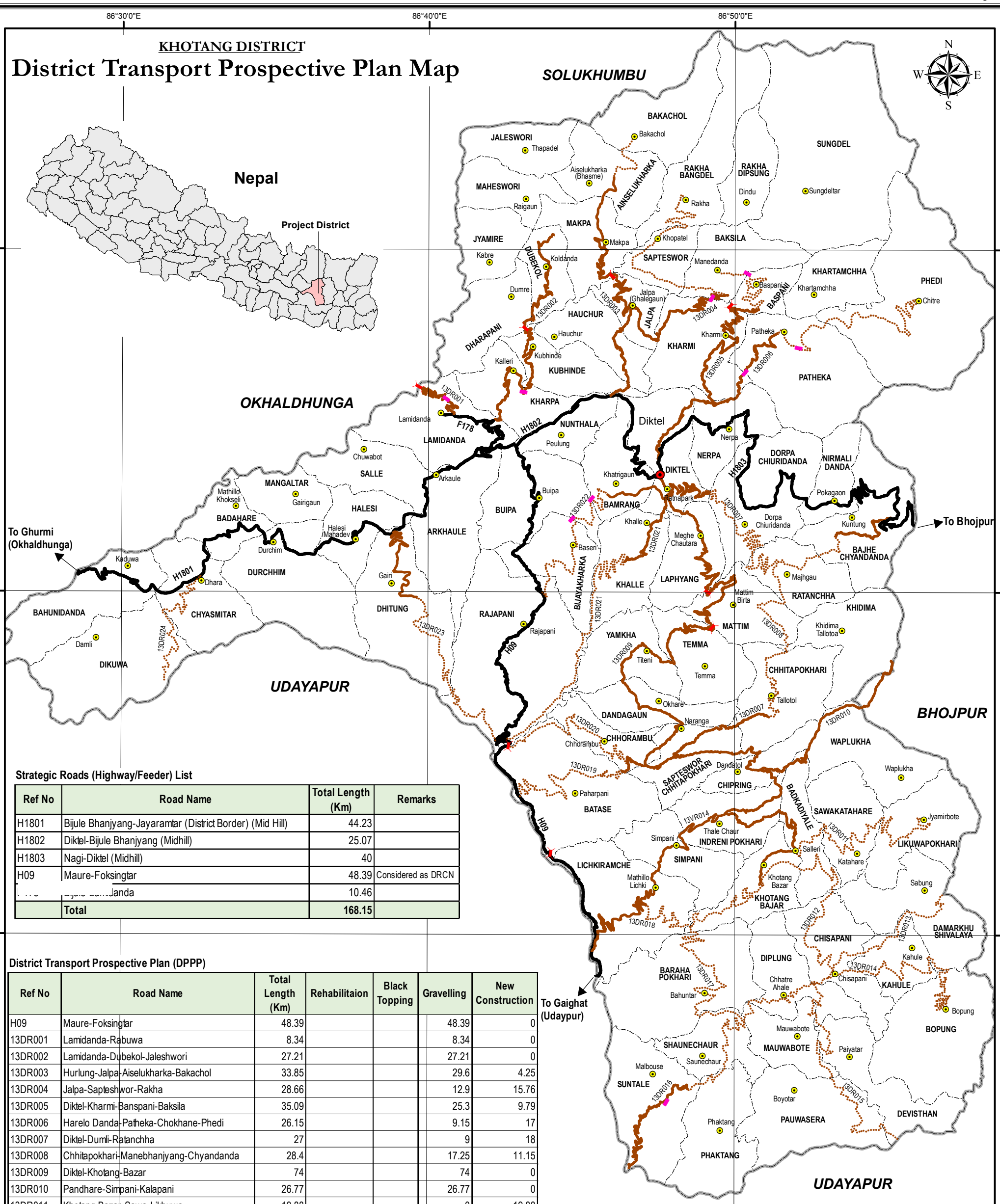
Table 3.4.1 District Transport Perspective Plan

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)
13DR001	8.34	-	-	-	-	8.34	-	834.00	-	8.00	-	-	-	537.93	1,626.30	1,668.00	-
13DR002	27.21	-	-	-	-	-	-	2,721.00	50.00	12.00	16.00	-	-	1,755.05	5,305.95	5,442.0	-
13DR003	20.00	-	-	-	-	9.87	-	2,960.00	50.00	-	6.00	-	-	1,909.20	5,772.00	5,920.0	4.25
13DR004	12.90	-	-	-	-	-	-	1,290.00	-	12.00	30.00	-	-	832.05	2,515.50	2,580.0	15.76
13DR005	25.30	-	-	-	-	8.43	-	2,530.00	40.00	6.00	100.00	-	-	1,631.85	4,933.50	5,060.0	9.79
13DR006	15.00	-	-	-	-	9.15	-	915.00	-	12.00	120.00	-	-	590.18	1,784.25	1,830.0	17.00
13DR007	10.00	-	-	-	-	9.00	-	900.00	-	-	-	40.00	-	580.50	1,755.00	1,800.0	18.00
13DR008	17.25	-	-	-	-	17.25	-	1,725.00	-	-	-	-	-	1,112.63	3,363.75	3,450.0	11.15
13DR009	74.00	74.00	-	-	-	10.00	-	7,400.00	40.00	-	20.00	50.00	-	4,773.00	14,430.00	14,800.0	-
13DR010	14.00	-	-	-	-	-	-	2,677.00	-	-	-	100.00	-	1,726.67	5,220.15	5,354.0	-
13DR011	-	-	-	-	-	-	-	-	20.00	-	-	-	-	-	-	-	19.88
13DR012	-	-	-	-	-	-	-	-	30.00	-	-	-	-	-	-	-	15.91
13DR013	-	-	-	-	-	-	-	-	30.00	-	-	-	-	-	-	-	10.33
13DR014	-	-	-	-	-	-	-	-	40.00	-	-	-	-	-	-	-	21.00
13DR015	-	-	-	-	-	-	-	-	40.00	-	-	-	-	-	-	-	18.03

13DR016	10.00	-	-	-	-	-	-	1,519.00	-	18.00	50.00	-	-	979.76	2,962.05	3,038.00	18.44
13DR017	-	-	-	-	-	-	-	-	40.00	-	-	-	-	-	-	-	16.35
13DR018	4.50	-	-	-	-	4.50	-	450.00	50.00	-	-	-	-	290.25	877.50	900.00	17.00
13DR019	2.77	-	-	-	-	2.77	-	277.00	-	-	-	-	-	178.67	540.15	554.00	15.33
13DR020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.40
13DR021	8.50	-	-	-	-	8.50	-	850.00	-	-	-	-	-	548.25	1,657.50	1,700.00	19.90
13DR022	4.00	-	-	-	-	4.00	-	400.00	30.00	12.00	40.00	-	-	258.00	780.00	800.00	14.35
13DR023	10.00	-	-	-	-	-	-	1,000.00	-	-	-	-	-	645.00	1,950.00	2,000.00	14.90
13DR024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.80
H09	20.00	48.39	20.00	-	-	-	-	2,419.50	90.00	-	-	-	-	2,080.77	3,774.42	9,678.00	-
13DR001	8.34	-	-	-	-	8.34	-	834.00	-	8.00	-	-	-	537.93	1,626.30	1,668.00	-
Total	**283.77**	**122.39**	**-**	**-**	**-**	**91.81**	**-**	**30,868**	**550**	**80**	**382**	**190**	**-**	**20,430**	**59,248**	**66,574**	**302.57**

KHOTANG DISTRICT

District Transport Prospective Plan Map



Strategic Roads (Highway/Feeder) List

Ref No	Road Name	Total Length (Km)	Remarks
H1801	Bijule Bhanjyang-Jayaramtar (District Border) (Mid Hill)	44.23	
H1802	Diktel-Bijule Bhanjyang (Midhill)	25.07	
H1803	Nagi-Diktel (Midhill)	40	
H09	Maure-Foksingtar	48.39	Considered as DRCN
[illegible]	[illegible]landa	10.46	
	Total	**168.15**	

District Transport Prospective Plan (DPPP)

Ref No	Road Name	Total Length (Km)	Rehabilitaion	Black Topping	Gravelling	New Construction
H09	Maure-Foksingtar	48.39			48.39	0
13DR001	Lamidanda-Rabuwa	8.34			8.34	0
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21			27.21	0
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	33.85			29.6	4.25
13DR004	Jalpa-Sapteshwor-Rakha	28.66			12.9	15.76
13DR005	Diktel-Kharmi-Banspani-Baksila	35.09			25.3	9.79
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	26.15			9.15	17
13DR007	Diktel-Dumli-Ratanchha	27			9	18
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	28.4			17.25	11.15
13DR009	Diktel-Khotang-Bazar	74			74	0
13DR010	Pandhare-Simpani-Kalapani	26.77			26.77	0
13DR011	Khotang Bazar-Sawa-Likhuwa	19.88			0	19.88
13DR012	Khotang Bazar-Chisapani	15.91			0	15.91
13DR013	Chisapani-Dambarkhusiwalaya	10.33			0	10.33
13DR014	Chisapani-Kaule-Bopung	21			0	21
13DR015	Chisapani-Banshilaghat	18.03			0	18.03
13DR016	Dhaplang-Dhartung-Chisapani	33.63			15.19	18.44
13DR017	Thulibesi-Baraha-Sintang	16.35			0	16.35
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	27.8			11	16.8
13DR019	Panchami-Bhandareghat	18.1			2.77	15.33
13DR020	Panchami-Choorambu-Regmitar	13.4			0	13.4
13DR021	Diktel-Khanidanda-Regmitar	28.4			8.5	19.9
13DR022	Bank Chowk-Baseri-Badaka)	18.35			4	14.35
13DR023	Dhitung-Regmitar	24.9			10	14.9
13DR024	Chyasmitar-Raighat	11.8			0	11.8
	Total	**641.74**			**339.37**	**302.37**

LEGEND

- District Headquarter
- VDC Headquarter
- VDC Boundary
- District Boundary

Crossing Structure

- Proposed Bridge
- Proposed Slab Culvert
- Proposed Pipe Culvert

ROAD NETWORK

	Existing	Under Construction	Plan/ Proposed
Strategic Road			
District Road (Earthen)			
Village Road (Earthen)			
District Road (Gravel)			
District Road (Black Top)			

SCALE

0 1.25 2.5 5 7.5 10 Km

1:200,000

©DRSP-2013

4. COST ESTIMATION

Cost estimations of different interventions are made after determining the required interventions through detailed survey (field assessments) of the DRCN roads. For this purpose, single standard costs or unit rates for the whole district are used for interventions in all roads. At this stage, separate detailed calculations are avoided. This chapter contains costs required for different interventions needed for DRCN roads of the district.

4.1 CONSERVATION

The conservation costs have been calculated using standard unit rates determined for the district. Actual cost for conservation will be determined on an annual basis in ARMP. The unit rates used at this stage are as per the following table.

Table 4.1.1 Standard unit costs for conservation

Activity	Unit	Unit cost (NPR)
Emergency maintenance	km	30000
Routine maintenance	km	20000
Recurrent maintenance (blacktop)	km	500000
Recurrent maintenance (gravel)	km	400000
Recurrent maintenance (earthen)	km	250000
Periodic maintenance (blacktop)	km	200000
Periodic maintenance (gravel)	km	250000

Using the unit rates as mentioned above, total conservation cost required for the first fiscal year is obtained, which is shown in the following table. Based on the same figure, costs for 5-year period are projected. The estimated 5-year cost may be changed slightly as the road length and surface may vary year by year.

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
13DR001	8.34	-	-	8.34	250	-	-	-	-	-	-	**250**	**1,251**
13DR002	27.21	-	-	27.21	816	-	-	-	-	-	-	**816**	**4,082**
13DR003	29.60	-	-	29.60	600	-	-	-	-	-	-	**600**	**3,000**
13DR004	12.90	-	-	12.90	387	-	-	-	-	-	-	**387**	**1,935**
13DR005	25.30	-	-	25.30	759	-	-	-	-	-	-	**759**	**3,795**
13DR006	9.15	-	-	9.15	450	-	-	-	-	-	-	**450**	**2,250**
13DR007	9.00	-	-	9.00	300	-	-	-	-	-	-	**300**	**1,500**
13DR008	17.25	-	-	17.25	518	-	-	-	-	-	-	**518**	**2,588**
13DR009	74.00	-	-	74.00	2,220	1,480	-	-	-	-	-	**3,700**	**18,500**
13DR010	26.77	-	-	26.77	420	-	-	-	-	-	-	**420**	**2,100**

13DR011	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR012	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR013	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR014	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR015	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR016	15.19	-	-	15.19	300	-	-	-	-	-	-	**300**	**1,500**
13DR017	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR018	4.50	-	-	4.50	135	-	-	-	-	-	-	**135**	**675**
13DR019	2.77	-	-	2.77	83	-	-	-	-	-	-	**83**	**416**
13DR020	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
13DR021	8.50	-	-	8.50	255	-	-	-	-	-	-	**255**	**1,275**
13DR022	4.00	-	-	4.00	120	-	-	-	-	-	-	**120**	**600**
13DR023	10.00	-	-	10.00	300	-	-	-	-	-	-	**300**	**1,500**
13DR024	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
H09	48.39	-	-	48.39	600	968	-	-	5,000	-	-	**6,568**	**32,839**
13DR001	8.34	-	-	8.34	250	-	-	-	-	-	-	**250**	**1,251**
Total	**332.87**	**-**	**-**	**332.87**	**8,513**	**2,448**	**-**	**-**	**5,000**	**-**	**-**	**15,961**	**79,805**

4.2 IMPROVEMENT

The improvement costs have been calculated using standard unit rates determined for the district. Actual cost for improvement will be determined on an annual basis for subsequent years while preparing the Annual Work Program (AWP). The unit rates used at this stage are as per the following table.

Table 4.2.1 Standard unit costs for improvement activities

Activity	Unit	Unit cost (NPR)
Rehabilitation	km	800,000.00
Widening	m	25,000.00
Gravelling	km	2,200,000.00
Blacktopping	km	5,700,000.00
Bridge construction	m	600,000.00
Slab culvert construction	m	150,000.00
CC Causeway construction	m	100,000.00
Stone Causeway construction	m	10,000.00
Pipe culvert placement	unit	10,000.00
Masonry wall construction	m^3	10,000.00
Gabion wall construction	m^3	2,500.00
Lined drain construction	m	1,000.00

Using the unit rates as mentioned above and identified interventions required for improvement of DRCN roads, total cost needed is obtained, which is shown in the following table. The estimated cost may be changed slightly as the road length and conditions may vary year by year.

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
13DR001	8.34	-	20,850	18,348	-	-	1,200	-	-	-	5,379	4,066	1,668	**51,511**
13DR002	27.21	-	68,025	-	-	30,000	1,800	1,600	-	-	17,550	13,265	5,442	**137,682**
13DR003	29.60	-	74,000	21,707	-	30,000	-	600	-	-	19,092	14,430	5,920	**165,749**
13DR004	12.90	-	32,250	-	-	-	1,800	3,000	-	-	8,321	6,289	2,580	**54,239**
13DR005	25.30	-	63,250	18,553	-	24,000	900	10,000	-	-	16,319	12,334	5,060	**150,416**
13DR006	9.15	-	22,875	20,130	-	-	1,800	12,000	-	-	5,902	4,461	1,830	**68,997**
13DR007	9.00	-	22,500	19,800	-	-	-	-	400	-	5,805	4,388	1,800	**54,693**
13DR008	17.25	-	43,125	37,950	-	-	-	-	-	-	11,126	8,409	3,450	**104,061**
13DR009	74.00	-	185,000	22,000	-	24,000	-	2,000	500	-	47,730	36,075	14,800	**332,105**
13DR010	26.77	-	66,925	-	-	-	-	-	1,000	-	17,267	13,050	5,354	**103,596**
13DR011	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR012	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR013	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR014	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR015	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR016	15.19	-	37,975	-	-	-	2,700	5,000	-	-	9,798	7,405	3,038	**65,916**
13DR017	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR018	4.50	-	11,250	9,900	-	-	-	-	-	-	2,903	2,194	900	**27,146**
13DR019	2.77	-	6,925	6,094	-	-	-	-	-	-	1,787	1,350	554	**16,710**
13DR020	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
13DR021	8.50	-	21,250	18,700	-	-	-	-	-	-	5,483	4,144	1,700	**51,276**
13DR022	4.00	-	10,000	8,800	-	-	1,800	4,000	-	-	2,580	1,950	800	**29,930**
13DR023	10.00	-	25,000	-	-	-	-	-	-	-	6,450	4,875	2,000	**38,325**
13DR024	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
H09	48.39	-	60,488	-	-	54,000	-	-	-	-	20,808	9,436	9,678	**154,409**
Total	**332.87**	**-**	**771,688**	**201,982**	**-**	**162,000**	**12,000**	**38,200**	**1,900**	**-**	**204,297**	**148,120**	**66,574**	**1,606,761**

4.3 NEW CONSTRUCTION

For those VDCs which are not yet connected with district headquarters by motorable road directly or through any strategic road network, roads for new construction are proposed. The required cost for

such new construction is obtained here using standard costs or unit rates derived for the district and estimated road length. The standard unit cost adopted here is as per the following table.

Table 4.3.1 Standard unit costs for new construction

Activity	Unit	Unit cost (NPR)
Opening up	km	4,000,000.00
Gravelling	km	2,200,000.00
Bridge construction	m	600,000.00

Using this unit cost, cost required for new construction of DRCN roads is calculated which is as shown in the following table.

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)
13DR001	Lamidanda-Rabuwa	-	-	-	-	**-**
13DR002	Lamidanda-Dubekol-Jaleshwori	-	-	-	-	**-**
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	4.25	17,000	9,350	-	**26,350**
13DR004	Jalpa-Sapteshwor-Rakha	15.76	63,040	34,672	-	**97,712**
13DR005	Diktel-Kharmi-Banspani-Baksila	9.79	39,160	21,538	-	**60,698**
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	17.00	68,000	37,400	-	**105,400**
13DR007	Diktel-Dumli-Ratanchha	18.00	72,000	39,600	-	**111,600**
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	11.15	44,600	24,530	-	**69,130**
13DR009	Diktel-Khotang-Bazar	-	-	-	-	**-**
13DR010	Pandhare-Simpani-Kalapani	-	-	-	-	**-**
13DR011	Khotang Bazar-Sawa-Likhuwa	19.88	79,520	43,736	12,000	**135,256**
13DR012	Khotang Bazar-Chisapani	15.91	63,640	35,002	18,000	**116,642**
13DR013	Chisapani-Dambarkhusiwalaya	10.33	41,320	22,726	18,000	**82,046**
13DR014	Chisapani-Kaule-Bopung	21.00	84,000	46,200	24,000	**154,200**
13DR015	Chisapani-Banshilaghat	18.03	72,120	39,666	24,000	**135,786**
13DR016	Dhaplang-Dhartung-Chisapani	18.44	73,760	40,568	-	**114,328**
13DR017	Thulibesi-Baraha-Sintang	16.35	65,400	35,970	24,000	**125,370**
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	17.00	68,000	37,400	30,000	**135,400**
13DR019	Panchami-Bhandareghat	15.33	61,320	33,726	-	**95,046**
13DR020	Panchami-Choorambu-Regmitar	13.40	53,600	29,480	-	**83,080**
13DR021	Diktel-Khanidanda-Regmitar	19.90	79,600	43,780	-	**123,380**

13DR022	Bank Chowk-Baseri-Badaka	14.35	57,400	31,570	18,000	**106,970**
13DR023	Dhitung-Regmitar	14.90	59,600	32,780	-	**92,380**
13DR024	Chyasmitar-Raighat	11.80	47,200	25,960	-	**73,160**
H09	Foksingtar-Diktel (Maure-Foksintar Section)	-	-	-	-	**-**
Total		**302.57**	**1,210,280**	**665,654**	**168,000**	**2,043,934**

4.4 DTPP COSTS

The total estimated cost for all interventions foreseen for District Transport Perspective Plan is derived and presented in the following table.

Table 4.4.1 DTPP costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
13DR001	1,251	51,511	-	52,762
13DR002	4,082	137,682	-	141,764
13DR003	3,000	165,749	26,350	195,099
13DR004	1,935	54,239	97,712	153,886
13DR005	3,795	150,416	60,698	214,909
13DR006	2,250	68,997	105,400	176,647
13DR007	1,500	54,693	111,600	167,793
13DR008	2,588	104,061	69,130	175,778
13DR009	18,500	332,105	-	350,605
13DR010	2,100	103,596	-	105,696
13DR011	-	-	135,256	135,256
13DR012	-	-	116,642	116,642
13DR013	-	-	82,046	82,046
13DR014	-	-	154,200	154,200
13DR015	-	-	135,786	135,786
13DR016	1,500	65,916	114,328	181,744
13DR017	-	-	125,370	125,370
13DR018	675	27,146	135,400	163,221
13DR019	416	16,710	95,046	112,172
13DR020	-	-	83,080	83,080
13DR021	1,275	51,276	123,380	175,931
13DR022	600	29,930	106,970	137,500
13DR023	1,500	38,325	92,380	132,205
13DR024	-	-	73,160	73,160
H09	32,839	154,409	-	187,248
Total	**79,805**	**1,606,761**	**2,043,934**	**3,730,499**

5. RANKING

While preparing this DTMP, importance and/or priority of a road is determined on the basis of cost per capita. Subsequently, ranking of DRCN roads is done according to the priority defined based on cost required for identified interventions of any road and population served by that road. The cost required in this stage is as per the estimation in previous chapter and population served is defined as the total population of all VDCs linked by the road (excluding VDCs of which the headquarters are linked directly to the strategic road network). Therefore, priority is defined after dividing the total estimated cost of all the interventions under conservation, improvement or new construction by the serving population of the road. Following the same parameters, ranking of roads is also done for different scopes of road-works.

5.1 CONSERVATION

Priority of roads for conservation works is defined by dividing the estimated cost for identified conservation works of a road by population served by that particular road. The roads are ranked in order of increasing cost per capita. The road with lowest figure is of highest priority and appears at the top, whereas the road with highest figure is of lowest priority and appears at the bottom.

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)
13DR019	2.77	83	-	-	-	-	-	-	83	3,977	21
13DR018	4.50	135	-	-	-	-	-	-	135	5,586	24
13DR021	8.50	255	-	-	-	-	-	-	255	9,877	26
13DR003	29.60	600	-	-	-	-	-	-	600	23,089	26
13DR010	26.77	420	-	-	-	-	-	-	420	13,019	32
13DR022	4.00	120	-	-	-	-	-	-	120	2,876	42
13DR023	10.00	300	-	-	-	-	-	-	300	6,473	46
13DR016	15.19	300	-	-	-	-	-	-	300	6,456	46
13DR006	9.15	450	-	-	-	-	-	-	450	7,136	63
13DR004	12.90	387	-	-	-	-	-	-	387	4,601	84
13DR008	17.25	518	-	-	-	-	-	-	518	6,055	85
13DR005	25.30	759	-	-	-	-	-	-	759	8,329	91
13DR001	8.34	250	-	-	-	-	-	-	250	2,717	92
13DR002	27.21	816	-	-	-	-	-	-	816	8,419	97
13DR007	9.00	300	-	-	-	-	-	-	300	2,510	120
13DR009	74.00	2,220	1,480	-	-	-	-	-	3,700	26,174	141
H09	48.39	600	968	-	-	5,000	-	-	6,568	18,669	352

5.2 IMPROVEMENT

For ranking under the scope of improvement as well, similar process as that for conservation works is applied. Where, per capita cost is calculated, shorted from smallest to largest and given first priority for lowest per capita cost. A list of DRCN roads with ranking is presented in the following table.

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)
13DR019	2.77	2.77	-	16,710	3,977	4,202
13DR018	4.50	4.50	-	27,146	5,586	4,860
13DR021	8.50	8.50	-	51,276	9,877	5,191
13DR023	10.00	-	-	38,325	6,473	5,921
13DR003	29.60	9.87	-	165,749	23,089	7,179
13DR010	26.77	-	-	103,596	13,019	7,957
H09	48.39	-	-	154,409	18,669	8,271
13DR006	9.15	9.15	-	68,997	7,136	9,669
13DR016	15.19	-	-	65,916	6,456	10,210
13DR022	4.00	4.00	-	29,930	2,876	10,407
13DR004	12.90	-	-	54,239	4,601	11,789
13DR009	74.00	10.00	-	332,105	26,174	12,688
13DR002	27.21	-	-	137,682	8,419	16,354
13DR008	17.25	17.25	-	104,061	6,055	17,186
13DR005	25.30	8.43	-	150,416	8,329	18,059
13DR001	8.34	8.34	-	51,511	2,717	18,959
13DR007	9.00	9.00	-	54,693	2,510	21,790

5.3 NEW CONSTRUCTION

For ranking under the scope of new construction also, similar process as above is applied. Where, per capita cost is calculated, shorted from smallest to largest and given first priority for lowest per capita cost. A list of DRCN roads with ranking is presented in the following table.

Table 5.3.1 Ranking of construction works (NPR '000)

Code	Length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
13DR003	4.25	26,350	23,089	1,141
13DR005	9.79	60,698	8,329	7,288
13DR008	11.15	69,130	6,055	11,417
13DR021	19.90	123,380	9,877	12,492

13DR024	11.80	73,160	5,251	13,933
13DR023	14.90	92,380	6,473	14,272
13DR006	17.00	105,400	7,136	14,770
13DR016	18.44	114,328	6,456	17,709
13DR013	10.33	82,046	4,428	18,529
13DR004	15.76	97,712	4,601	21,237
13DR015	18.03	135,786	5,926	22,914
13DR019	15.33	95,046	3,977	23,899
13DR018	17.00	135,400	5,586	24,239
13DR012	15.91	116,642	4,422	26,378
13DR011	19.88	135,256	4,995	27,078
13DR017	16.35	125,370	3,830	32,734
13DR020	13.40	83,080	2,353	35,308
13DR022	14.35	106,970	2,876	37,194
13DR007	18.00	111,600	2,510	44,462
13DR014	21.00	154,200	2,555	60,352

6. DISTRICT TRANSPORT MASTER PLAN (DTMP)

This section is the final stage of DTMP preparation process. Here, balance is made between available budget and estimated costs of the required interventions to determine which interventions can be carried out within 5-years' period of the DTMP. Further exercise is done to determine which portion of the DTPP can be carried out in each of the DTMP implementation years.

6.1 FIVE YEAR PROJECTED FINANCIAL RESOURCES

The budget available in DTMP period is estimated to determine how much of the proposed work can be carried out within the period. For the estimation, sources of road sector budgets of Fiscal Year 2069-070 are taken as the basis and 10% annual increasing rate is assumed for subsequent years for each funding source, where defined figures are not available.

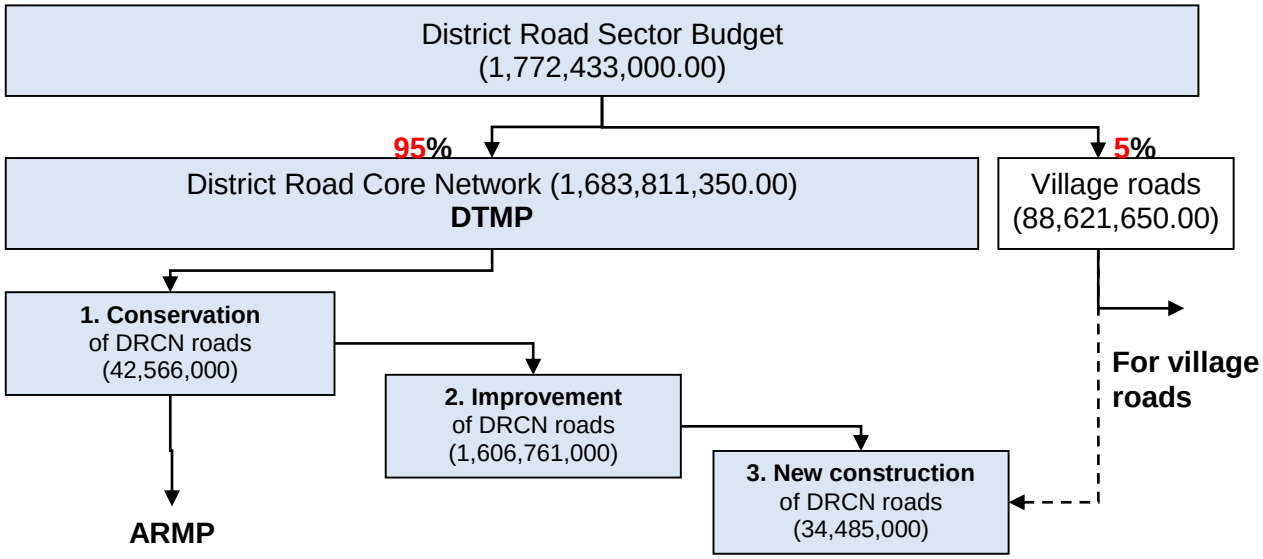
Table 6.1.1 Estimated funding levels (roads) for next five years (in NPR '000)

Funding source	2070/71	2071/72	2072/73	2073/74	2074/75
DDC Internal Budget (33% of total)	4,026	4,429	4,871	5,359	5,894
Local Agricultural Road Programme	13,050	14,355	15,791	17,370	19,107
Road maintenance fund	6,197	6,817	7,498	8,248	9,073
Fund of Members of Parliaments (10% of total)	200	220	242	266	293
RAP + Other	26,100	28,710	31,581	34,739	38,213
LGCDP	25,341	27,875	30,663	33,729	37,102
VDC (40% of total)	52,526	57,779	63,556	69,912	76,903
DRSP Budget to DRF	162,880	179,168	197,085	216,793	238,473
People's contribution (20%)		-	-	-	-
Total	**290,320**	**319,352**	**351,287**	**386,416**	**425,058**
Grand total	**1,772,433**				

6.2 BUDGET ALLOCATION

Once the total road sector budget is calculated, it is discussed in the meeting of DTICC and DDC. After the discussion, the district has decided to allocate 95% of total road sector budget for DRCN roads and it is the amount available for implementation of DTMP. The budget is allocated giving priority for conservation works, followed by improvement works and finally for new construction of DRCN roads.

Figure 5 District road sector budget allocation



Thus road sector budget of the district is divided first for DRCN roads (DTMP budget) and VRCN roads (non-DTMP budget) respectively as 95% and 5%. Details of the 5% road sector budget separated for VRCN is not included here in this DTMP. The 95% road sector budget is allocated first for identified conservation works and only the remaining budget is allocated for envisaged improvement works. Under each scope of conservation and improvement, the budgets are allocated for different DRCN roads based on the determined priority ranking. Further year wise details shall be made while preparing ARMPs in the case of conservation works and AWP in the case of improvement works. A detailed investment plan of this DTMP at this stage is presented in the following table.

Table 6.2.1 DTMP investment plan

Item	Year				
Fiscal year	070/71	071/72	072/73	073/74	074/75
Total budget (NRs., 000)	290,320	319,352	351,287	386,416	425,058
Non-DRCN roads (NRs., 000)	14,516	15,968	17,564	19,321	21,253
DRCN budget (NRs., 000)	**275,804**	**303,384**	**333,723**	**367,095**	**403,805**
Core network length (km)	**332.87**	**332.87**	**332.87**	**332.87**	**332.87**
Blacktop (km)	-	-	-	-	-
Gravel (km)	-	23.74	26.29	42.13	48.79
Earthen (km)	332.87	309.13	306.58	290.74	284.08
Conservation (NPR '000)	**8,513**	**8,513**	**8,513**	**8,513**	**8,513**
Emergency	8,513	8,513	8,513	8,513	8,513
Routine					
Recurrent (blacktop)					
Recurrent (gravel)					
Recurrent (earthen)					
Periodic (blacktop)					
Periodic (gravel)					

Improvement	Cost	BT	GR	193,457	BT	GR	208,602	BT	GR	225,819	BT	GR	247,110	BT	GR	266,199	BT	GR
13DR019	16,710	-	2.77	16,710	-	2.77	-	-	-	-	-	-	-	-	-	-	-	-
13DR018	27,146	-	4.50	27,146	-	4.50	-	-	-	-	-	-	-	-	-	-	-	-
13DR021	51,276	-	8.50	51,276	-	8.50	-	-	-	-	-	-	-	-	-	-	-	-
13DR023	38,325	-	-	38,325	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13DR003	165,749	-	9.87	133,833	-	7.97	31,915	-	1.90	-	-	-	-	-	-	-	-	-
13DR010	103,596	-	-	-	-	-	103,596	-	-	-	-	-	-	-	-	-	-	-
H09	154,409	-	-	-	-	-	154,409	-	-	-	-	-	-	-	-	-	-	-
13DR006	68,997	-	9.15	-	-	-	4,951	-	0.66	64,047	-	8.49	-	-	-	-	-	-
13DR016	65,916	-	-	-	-	-	-	-	-	65,916	-	-	-	-	-	-	-	-
13DR022	29,930	-	4.00	-	-	-	-	-	-	29,930	-	4.00	-	-	-	-	-	-
13DR004	54,239	-	-	-	-	-	-	-	-	54,239	-	-	-	-	-	-	-	-
13DR009	332,105	-	10.00	-	-	-	-	-	-	111,078	-	3.34	221,027	-	6.66	-	-	-
13DR002	137,682	-	-	-	-	-	-	-	-	-	-	-	137,555	-	-	127	-	-
13DR008	104,061	-	17.25	-	-	-	-	-	-	-	-	-	-	-	-	104,061	-	17.25
13DR005	150,416	-	8.43	-	-	-	-	-	-	-	-	-	-	-	-	150,416	-	8.43
13DR001	51,511	-	8.34	-	-	-	-	-	-	-	-	-	-	-	-	51,511	-	8.34
13DR007	54,693	-	9.00	-	-	-	-	-	-	-	-	-	-	-	-	54,693	-	9.00
Total improvement				**267,291**	**-**	**23.74**	**294,871**	**-**	**2.56**	**325,210**	**-**	**15.84**	**358,582**	**-**	**6.66**	**360,807**	**-**	**43.02**
Construction		**Cost**	**GR**		**GR**			**GR**			**GR**			**GR**			**GR**	
13DR003		26,350	4.25	-		-	-		-	-		-	-		-	26,350	4.25	
13DR005		60,698	9.79	-		-	-		-	-		-	-		-	8,135	1.31	
Total new construction				**-**		**-**	**-**		**-**	**-**		**-**	**-**		**-**	**34,485**		**-**

In addition to the presentation of information as above in this DTMP, a map indicating the DRCN and the prioritized DTMP interventions is included as Figure 6. This map indicates the elements using the symbols as mentioned below. Similarly, a table listing the DRCN length, the all-weather DRCN length, the number of VDCs with access to the SRN or all-weather DRCN roads, and the percentage of the district population with access to the SRN or all-weather DRCN roads (both at the start of the DTMP period and at the end) is also included in this DTMP report.

- District boundaries (thin black line);
- VDC boundaries (thin dashed black line);
- Names of surrounding districts/states/countries;
- District headquarters (red circle, including name)
- VDC headquarters (yellow circle, including name of VDC);
- Major waterways and water bodies (light blue lines or shapes);
- SRN roads (thick black line, including road code);
- Blacktopped DRCN roads (thick red line);
- DRCN roads planned for blacktopping (thick line with red and green);
- Gravel DRCN local roads (slightly thinner green line);
- DRCN roads planned for gravelling (slightly thinner line with green and orange);
- Earthen DRCN roads (thin orange line);
- Missing water crossings making road impassable in the rainy season;

- Bridges for construction;
- Causeways for construction;
- Slab culverts for construction.

6.3 DTMP OUTPUTS

In this section, planned outputs after implementation of the DTMP are mentioned. The outputs are basically under conservation and improvement. Likewise, under improvement works, there may be several types of work like widening, alignment (geometry) improvement, cross drainages, protective structures etc. Following table summaries the planned output.

Table 6.3.1 DTMP output

Conservation	Improvement gravel	Improvement blacktop	New construction
274	184	-	5.56

Total amount budgeted for this DTMP is NRs.1,683,811,000.00. Out of the amount, NRs. 42,566,000 is for conservation works; NRs. 1,606,761,000 is for improvement works and NRs. 34,485,000 is for new construction.

6.4 DTMP OUTCOME

After the implementation of this DTMP, full existing length of DRCN roads is maintained to continue their services at the level at least as was before with a small additional length of about 5.56 km new construction in this DTMP period. Similarly, some 92 km of fair-weather road is upgraded to all-weather gravel road. A summary outcome of this DTMP period is shown in the following table.

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	332.87	332.87	100%	-	0%	-	0%
End of DTMP	332.87	241.06	72%	91.81	28%	-	0%
Difference	-			91.81	28%	-	0%

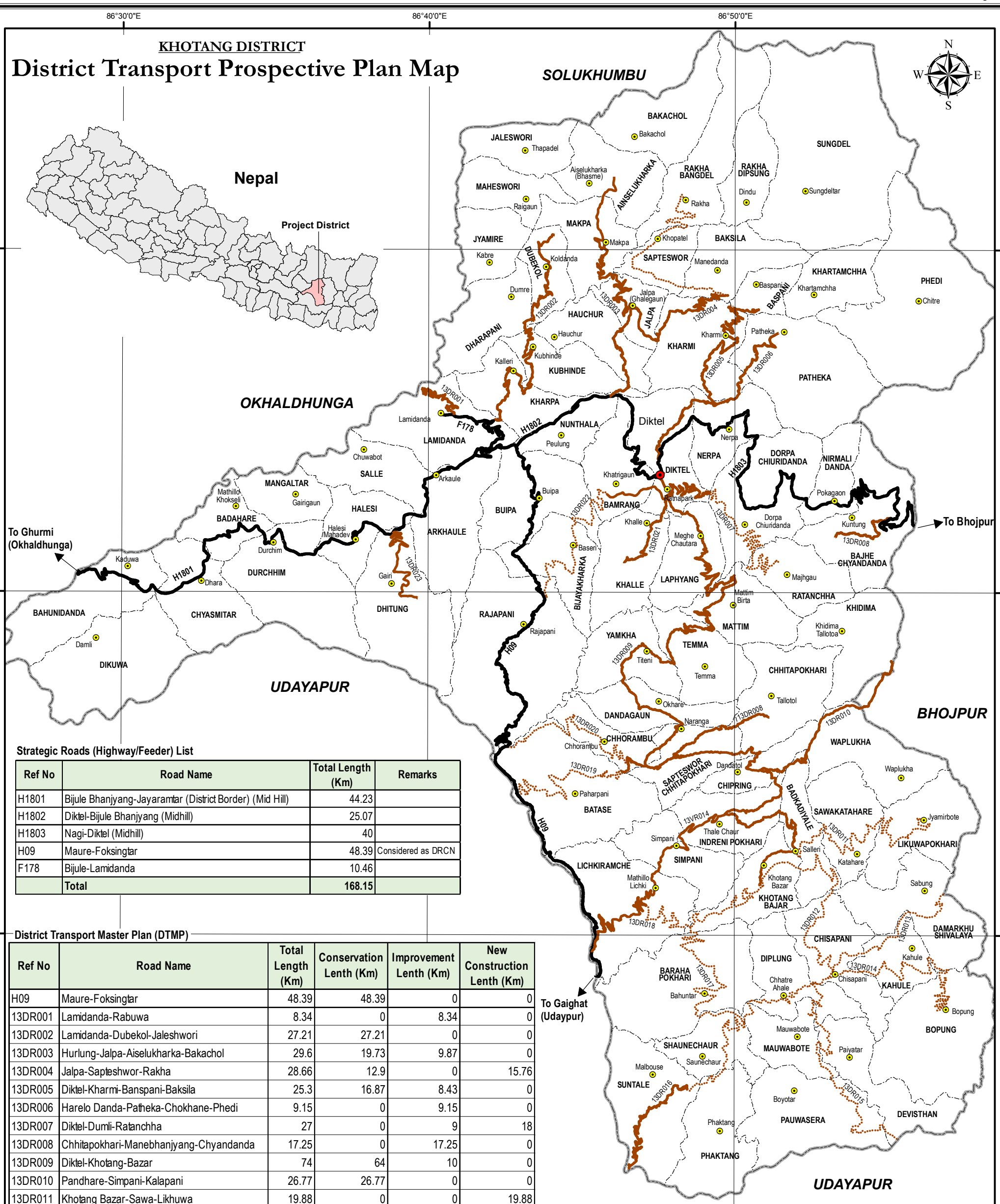
Out of 76 VDCs of the district, 21 VDCs and subsequently 33 percent population of the district have access to the SRN and/or all-weather DRCN roads at the beginning of the DTMP. There are 39 VDCs having services of Fair-weather road at the start of DTMP period. With the current budgetary status, remarkable achievement in improving accessibility of the district cannot be expected because, significant length of DRCN roads is to be constructed and/or improved to all-weather standard.

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	21	68203	33	28	69601	34	39	113745	55	0	0	0
End of DTMP	21	68203	33	10	21807	11	25	66326	32	35	103445	50
Difference	0	0	0	18	47794	23	14	47419	23	35	103445	50

KHOTANG DISTRICT

District Transport Prospective Plan Map



Strategic Roads (Highway/Feeder) List

Ref No	Road Name	Total Length (Km)	Remarks
H1801	Bijule Bhanjyang-Jayaramtar (District Border) (Mid Hill)	44.23	
H1802	Diktel-Bijule Bhanjyang (Midhill)	25.07	
H1803	Nagi-Diktel (Midhill)	40	
H09	Maure-Foksingtar	48.39	Considered as DRCN
F178	Bijule-Lamidanda	10.46	
	Total	**168.15**	

District Transport Master Plan (DTMP)

Ref No	Road Name	Total Length (Km)	Conservation Lenth (Km)	Improvement Lenth (Km)	New Construction Lenth (Km)
H09	Maure-Foksingtar	48.39	48.39	0	0
13DR001	Lamidanda-Rabuwa	8.34	0	8.34	0
13DR002	Lamidanda-Dubekol-Jaleshwori	27.21	27.21	0	0
13DR003	Hurlung-Jalpa-Aiselukharka-Bakachol	29.6	19.73	9.87	0
13DR004	Jalpa-Sapteshwor-Rakha	28.66	12.9	0	15.76
13DR005	Diktel-Kharmi-Banspani-Baksila	25.3	16.87	8.43	0
13DR006	Harelo Danda-Patheka-Chokhane-Phedi	9.15	0	9.15	0
13DR007	Diktel-Dumli-Ratanchha	27	0	9	18
13DR008	Chhitapokhari-Manebhanjyang-Chyandanda	17.25	0	17.25	0
13DR009	Diktel-Khotang-Bazar	74	64	10	0
13DR010	Pandhare-Simpani-Kalapani	26.77	26.77	0	0
13DR011	Khotang Bazar-Sawa-Likhuwa	19.88	0	0	19.88
13DR012	Khotang Bazar-Chisapani	15.91	0	0	15.91
13DR013	Chisapani-Dambarkhusiwalaya	10.33	0	0	10.33
13DR014	Chisapani-Kaule-Bopung	21	0	0	21
13DR015	Chisapani-Banshilaghat	18.03	0	0	18.03
13DR016	Dhaplang-Dhartung-Chisapani	33.63	15.19	0	18.44
13DR017	Thulibesi-Baraha-Sintang	16.35	0	0	16.35
13DR018	Rasuwaghat-Kalapani-Khotang Bazar	21.5	0	4.5	17
13DR019	Panchami-Bhandareghat	18.1	0	2.77	15.33
13DR020	Panchami-Choorambu-Regmitar	13.4	0	0	13.4
13DR021	Diktel-Khanidanda-Regmitar	8.5	0	8.5	0
13DR022	Bank Chowk-Baseri-Badaka)	18.35	0	4	14.35
13DR023	Dhitung-Regmitar	10	10	0	0
	Total	**498.26**	**192.67**	**91.81**	**213.78**

LEGEND

- District Headquarter
- VDC Headquarter
- VDC Boundary
- District Boundary

ROAD NETWORK

	Existing	Under Construction	Plan/ Proposed
Strategic Road			
District Road (Earthen)			
Village Road (Earthen)			
District Road (Gravel)			
District Road (Black Top)			

SCALE

0 1 2 4 6 8 Km

1:200,000

©DRSP-2013

ANNEX 1 LIST OF VILLAGE ROAD CORE NETWORK (VRCN)

SN	Road Name
1	Diktel-Bamrang-Buipa-Bijule
2	Panchedobato-Baseri
3	Arkhaule-Salle
4	Rabuwa-Dumre-Jyamire
5	Thamkharka-raigaun-Majhgaun-Thapadol
6	Sapteshwor-Manedanda-Dipsung
7	Birudanda-Hasu-Sungdeltar
8	Patheka-Khartamchha
9	Mattim-Manebhanjhyang-Khidima Tallotol
10	Muldanda-Panchami
11	Tandum-Chankhuwa-Boyotar
12	Suntale-Phaktang
13	Ekpakhe-Bahuntar
14	Suntale-Phaktang
15	Holesung-Janak rai rai marga
16	Durchhim-Mangaltar
17	Chuwabot-Simalchaur-Dalmi
18	Phedi-Manedanda- Rabuwa
19	Durchhim-Bar bhangyang-Chumakhu-Bataseghat-Uayapur
20	Sapteshwor-Phedi-Ghare gaunda-baksila-sungdel -salpapokhari
21	Diktel-Alchhedhunga-Solma-Bensitol-Nerpa-Imli
22	Bamrang-Shankhu-Nunthala-Buipa
23	Bahunidanda-Dikuwa-Udayapur
24	Khidima-Manebhangjhyang-Mattim-Panchdhare
25	Khani danda-Ramche-Diktel-Bamrang-Buipa
26	Chhitapokhari-Khidima-Manebhanghyang-Ratanchha-Chyandanda
27	Khidima-Manebhangjhyang-Mattim
28	Damdi-Kubhinde-Rabuwa-Mangaltar
29	Patheka-Khartamchha-Balbesi-Shukrabare-Makhala Bhangyang
30	Buwajor-Devisthan-Chiasapani
31	Chisapani-Ganesh-Chautara-Muldanda
32	Chipring-Simapani
33	Balankha-Bopung-Buwajor pul
34	Halesi-Mangaltar
35	Durchhim-Mangaltar-Ghopatar
36	Batase-Ijara-Simapani
37	Suntale-Saunechaur-Barahapokhari
38	Simpani-Baira Dhanguda-Barahapokhari
39	Patheka-Chaukhane-Chitre-Damalung
40	Dumre Dharapani-Ainshelukharka
41	Khalle-Yamkha Ga Bi Sa
42	Khotang Bazar-Badaka-Wplukha-Sawa
43	Khidima-Tawa Bhangyang
44	Sapsu-Mattim-Laphyang-Dikuwa Dovan
45	Mattim-Kartike-Pinalakha-Ratanchha
46	Chisapani-Kahule-Bopung
47	Badaka-Sawa-Likuwa
48	Chisapani-Diptung-Barahapokhari

49	Patheka-Damdi-Phedi-Chitre
50	Khidima-Mane Bhangyang-Mattim-Pandhare
51	Jayaram-Demlitar
52	Bajechyanda-Ratanchha-Manebhangyang-Chhitapokhari-Panchami
53	Mattim-manebhanjhyang-Khidima-Pandhare
54	Chisapani-Bhangjhyang Kharka-Pandhare
55	Chisapani-Devisthan-Maintar
56	Khidma-Chhitapokari-Panchami-Indrenipokhari-Simpani
57	Lichki Ramche-Badakadiyale
58	Badakadiyale VDC office-Kolbidi-Dunchha Khola

ANNEX 2 TRAFFIC DATA

Code	Total Length (km)	Motorcycle	Car-Jeep-Minibus	Tractor	Truck-Bus	PCU	VPD
H09	48.39	**10**	**2**	**5**	**4**	**33**	**11**
13DR001	8.34	**12**	**4**	**2**	**16**	**78**	**22**
13DR002	27.21	**6**		**8**	**4**	**35**	**12**
13DR003	15.91	**6**		**2**		**7**	**2**
13DR004	21.39	**13**	**2**	**8**	**4**	**41**	**14**
13DR005	25.31	**4**		**2**	**2**	**14**	**4**
13DR006	47.67	**5**		**4**	**2**	**19**	**6**
13DR012	15.19			**4**		**8**	**4**
13DR016	6.57	**8**		**4**	**3**	**24**	**7**

ANNEX 3 POPULATION SERVED

SN	VDC/municipality	Population	Road																			
			H09	13DR001	13DR002	13DR003	13DR004	13DR005	13DR006	13DR007	13DR008	13DR009	13DR010	13DR011	13DR012	13DR013	13DR014	13DR015	13DR016	13DR017	13DR018	SRN
1	AINSELUKHARKA	2,995			X																	
2	ARKHAULE	3,344																				X
3	BADAHARE	1,477																				X
4	BADKADIYALE	2,464									X	X										
5	BAHUNIDANDA	2,838																				X
6	BAJHE CHYANDANDA	2,906																				X
7	BAKACHOL	2,909			X																	
8	BAKSILA	3,261					X															
9	BAMRANG	2,876																				X
10	BASPANI	1,569						X														
11	BARAHA POKHARI	3,830																				
12	BATASE	3,977	X														X					
13	BIJAYAKHARKA	2,542	X															X				
14	BOPUNG	2,555																				
15	BUIPA	4,538	X																			X
16	CHHITAPOKHARI	1,965								X	X											
17	CHHORAMBU	2,353							X								X					
18	CHIPRING	1,103								X	X											
19	CHISAPANI	4,422										X	X	X	X							
20	CHIURIDANDA	5,548																				X
21	CHYASMITAR	2,786																			X	X
22	DAMARKHU SHIVALAYA	2,734										X	X									

23	DANDAGAUN	2,562							X	X												
24	DEVISTHAN	2,161												X								
25	DHITUNG	2,726																		X		X
26	DIKTEL	8,867						X	X										X			X
27	DIKUWA	2,465																			X	
28	DIPLUNG	1,878												X	X							
29	DUBEKOL	1,669			X																	
30	DHARAPANI	2,662			X																	
31	DURCHHIM	3,597																				X
32	HAUCHUR	2,233					X															
33	INDRENI POKHARI	2,886									X					X						
34	JALESWORI	2,136																				
35	JALPA	2,539				X	X															
36	JYAMIRE	1,307																				
37	KAHULE	1,694											X									
38	KHALLE	3,192																X	X			
39	KHARMI	3,499					X	X														
40	KHARPA	2,157			X																	X
41	KHARTAMCHHA	1,841						X														
42	KHIDIMA	2,088									X											
43	KHOTANG BAJAR	1,996									X	X				X						
44	KUBHINDE	1,931			X		X															
45	LAMIDANDA	2,717		X	X																	X
46	LAPHYANG	2,858							X										X			
47	LICHKIRAMCHE	3,590	X													X						
48	LIKUWAPOKHARI	2,269																				
49	MAHADEVSTHAN	2,767																				X
50	MAKPA	1,895			X	X																
51	MANGALTAR	2,278																				
52	MATTIM	4,090							X													
53	MAUWABOTE	1,410												X	X							

54	NERPA	3,009						X														X
55	NIRMALIDANDA	1,967																				X
56	NUNTHALA	1,596	X				X															X
57	PATHEKA	3,872																				
58	PAUWASERA	2,355												X								
59	PHAKTANG	2,176													X							
60	PHEDI	3,264						X														
61	RAJAPANI	3,747	X															X		X		
62	RAKHA BANGDEL	2,525					X															
63	RAKHA DIPSUNG	833					X															
64	RATANCHHA	2,510																				
65	MAHESWORI	2,330																				
66	SALLE	1,507																				X
67	SAPTESWOR	2,076																				
68	SAPTESWORI CHHITAPOKHARI	2,859							X	X												
69	SHAUNECHAUR	2,383													X							
70	SAWAKATAHARE	2,726																				
71	SIMPANI	3,169														X						
72	SUNGDEL	2,444					X															
73	SUNTALE	2,195													X							
74	TEMMA	3,521							X													
75	WAPLUKHA	2,271									X											
76	YAMKHA	2,938							X													
	Total population	205,225	19,990	2,717	18,935	4,434	20,861	22,049	30,048	8,489	14,773	11,616	8,850	12,226	14,464	11,641	6,330	9,481	14,917	6,473	5,251	57,223
	Total VDCs/municipalities	76	6	1	8	2	9	6	8	4	7	4	3	5	6	4	2	3	3	2	2	18

Source: Census 2011

ANNEX 4 LOCATION OF PROPOSED INTERVENTIONS

Road code	Road Name	Length (km)	Start chainage (km) or X-coordinate	End chainage (km) or Y-coordinate	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)
H09	Foksingtar-Diktel (Maure-Fokoingtar Section)	48				48			90					3,121	9,436	9,678
13DR001	Lamidanda-Rabuwa	8				8		834		8				538	1,626	1,668
13DR002	Lamidanda-Aiselukharka-Bakachol	38				27		2,721	50	12	16			1,755	5,306	5,442
13DR003	Jalpa-AiseluKharka	16				16		1,591	50		6			1,026	3,102	3,182
13DR004	Hurlung-Jalpa-Baksila-Sungdel-Rakha Bangdel	40				21		2,139						1,380	4,171	4,278
13DR005	Harelo Danda-Kharmi-Baspani-Khartamchha-Phedi	39				25		2,531	40	6	148			1,632	4,935	5,062
13DR006	Diktel-Khotang-Bazar	48				48		4,767	40		20	50		3,075	9,296	9,534
13DR007	Muldanda-Panchami	12				12		1,185		16	10			764	2,311	2,370
13DR008	Khotang Bazar-Pandhare	32				32		3,202		30				2,065	6,244	6,404
13DR012	Dhaplang-Dhartung-Chisapani	34				15		1,519	-	15	10			980	2,962	3,038
13DR013	Rasuwaghat-Khotang Bazar	24				12		1,187		12	20			766	2,315	2,374
13DR014	Panchami-Bhandareghat	18				3		277						179	540	554
13DR016	Diktel-Khanidanda	7				7		657						424	1,281	1,314

ITECO Engineering Ltd. 8910 Affoltern a.A., Switzerland

DISTRICT ROADS SUPPORT PROGRAMME (DRSP)

District Authorities incollaboration with Swiss Agency for Development and Cooperation (SDC)