



Government of Nepal



District Transport Master Plan (DTMP)

Ministry of Federal Affairs
and Local Development

Department of Local Infrastructure
Development and Agricultural Roads
(DOLIDAR)
District Development Committee,

Jhapa
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Prepared by the District Technical Office (DTO) for Jhapa with Technical Assistance from the Department of Local Infrastructure and Agricultural Roads (DOLIDAR), Ministry of Federal Affairs and Local Development and grant supported by DFID

FOREWORD

It is my great pleasure to introduce this District Transport Master Plan (DTMP) of Jhapa 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 sector. 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 Jhapa 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 lobbying and fascinating the donor agencies through central government towards generating needy resources through basket fund approach. Furthermore, this document will be supportive in avoiding pervasive duplication approach in resources allocation under the rural road network development sector of this district.

I would, firstly like to express my gratitude to Ministry of Local Development (MoLD) Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR), Central as well as district team of RTI-Sector Maintenance Pilot and all entire technical experts.

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

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While preparing DTMP, the valuable inputs & suggestions were concisely documented and prepared by Er. Krishna Sharan Dhungana, RTI Pilot District Asset Management Engineer and Mr. Parshuram Shrestha, RTI Pilot Sub Asset Management Engineer. The authors are grateful to all the political leaders, line agencies, NGOs and local people who have rendered their valuable assistance to the team during the preparation of the DTMP.

EXECUTIVE SUMMARY

Jhapa District is located in Mechi Zone of the Eastern Development Region of Nepal. It borders with West Bengal (India) to the East, Morang district to the West, Ilam district to the North and Bihar (India) to the South. The district has 3 municipalities (Bhadrapur, Damak and Mechinagar) and 47 VDCs. The total area of the district is 1,606 km². The lowest elevation point is 58 meter which is the lowest point of Nepal and highest elevation point is 500 meter above sea level. The current population of the district is 633,042 and the average population density is around 394 people per square km. The district headquarter is connected by feeder road to the East-West Highway at Birtamod, and the district is also connected to the Hill parts of the eastern region of Nepal. This district is the gateway to India for the Eastern Development Region of Nepal.

The district inventory identified just more than 2,000 km of roads, including 217km of strategic road network, 790 km of urban road network, 209 km of district road core network (DRCN) and 792km of village road network. Of the core district road network, 17% is black topped, 80% has a gravel surface and 3% has an earthen surface, resulting in 96% being considered all-weather and only 4% fair weather.

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	216.60	139.92	39.68	37.00
Urban roads	790.72	70.01	352.79	367.92
District road core network	209.00	36.53	164.46	8.01
Village roads	791.72	19.63	596.10	175.99
Total	2,008.04	266.09	1,153.03	588.92

Annual conservation costs for the entire district road core network are estimated at NPR 139 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. Total conservation costs for the five-year DTMP period are estimated at NPR 695 million. An analysis of the road network identified the need for improvement of most of the core road network 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	264 m	79,200,000
Slab culverts	20 m	3,000,000
Causeways	30 m	3,000,000
Hume pipes	35 units	444,220
Masonry retaining walls	2167.5 m ³	22,206,038
Gabion retaining walls	410 m ³	1,025,000
Lined drains	0 m	-
Widening	0 m	-
Rehabilitation	0 km	-
Gravelling	7.01 km	15,422,000
Blacktopping	129.67 km	739,119,000
New construction	- km	79,200,000
Total		942,616,258

The available budget for the road sector for the coming five years (fiscal year 2069/70 to 2073/74) is estimated to be NPR 1,150 million. Allocation to the district road core network was set at 90% of the total budget in light of the fact that no new construction is required and the estimated costs for conservation and improvement only come to NPR 1,558 million. In

addition there is a very large village road network and it was decided to allow a greater allocation to support the conservation and improvement of these roads.

The DTMP allocation allows the entire district road core network to be maintained for the full five years and all required improvement works to be carried out. At the end of the DTMP period the entire district road core network will be in maintainable all-weather condition with the appropriate road surface. The core road network will then consist of 36% blacktop roads and 64% gravel roads, all with protective and cross drainage structures in place (100% maintainable and all-weather). Access to the SRN or to all-weather DRCN roads will increase from 43 to 50 VDCs and municipalities and from 87% to 100% of the district population. In years 4 and 5 there will be funding left over which may be allocated to the village road network

ABBREVIATIONS

DDC	District Development Committee
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
DTPP	District Transport Perspective Plan
GIS	Geographical Information system
GPS	Global Positioning System
GON	Government of Nepal
LGCDP	Local Governance and Community Development Programme
MFALD	Ministry of Federal Affairs and Local Development
RTI SWAp	Rural Transport Infrastructure Sector Wide Approach
SWAp	Sector Wide Approach
VDC	Village Development Committee

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1. INTRODUCTION

Jhapa District is located in Mechi Zone of the Eastern Development Region of Nepal. It borders with West Bengal (India) to the East, Morang district to the West, Illam district to the North and Bihar (India) to the South. The district has 3 municipalities (Bhadrapur, Damak and Mechinagar) and 47 VDCs. The total area of the district is 1,606 km². The annual rainfall is about 2,000 mm and maximum temperature is recorded 42° C in summer and 10°C in winter. The lowest elevation point is 58 meter which is the lowest point of Nepal and highest elevation point is 500 meter from mean sea level. The entire district lies in the *Terai*. Jhapa district is famous for different cash crops, tea, horticulture and livestock.

Figure 1 Location of the district



According to the Census 2001, the total population of the district is 633,042 comprising 318,415 female (51%) and 314,627 male (49%) residing in 156,500 households. The average household size is 4.1 persons. Jhapa district has an average population density of around 394 people per square km (2009). The district population growth rate is 1.8%. In-migration is rapidly increasing day to day from rural areas to this district. Life expectancy of the people is 58 years (female 56 and male 61 - 2009). The average literacy rate is about 67% (58% female and 75% male are literate).

This district has multi ethnic composition; majorities are Brahamin, Chetri, Rajbanshi, Limbu, Rai, Tamang, Kami, Damai. In terms of religion, Hindus are 80%, Buddhist 14% and other 6%. The main languages are is Nepali (58%) followed by Rajbansi (13%), Limbu (5%), Santhali (4%) and Maithali (3%) and other (17%).

The district headquarter Chandragadi is connected by black-topped feeder road to the East-West Highway at Birtamod, and the district is also connected to the Hill parts of the eastern region of Nepal. This district is the gateway to India for the Eastern Development Region of Nepal. District and rural roads are in poor condition and require upgrading, rehabilitation and proper maintenance.

2. DISTRICT ROAD CORE NETWORK (DRCN)

This chapter gives an overview of the existing roads in Jhapa 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

Jhapa district has an estimated road network of just over 2,000 kilometres including strategic roads, urban roads and rural roads.

Table 2.1.1 Total road length (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	216.60	139.92	39.68	37.00
Urban roads	790.72	70.01	352.79	367.92
Rural roads	1,000.72	56.16	760.56	184.00
Total	2,008.04	266.09	1,153.03	588.92

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

Jhapa district has 3 national highways and 5 feeder roads totalling just over 200 km. The majority (65%) are black topped, followed by gravel (18%) and earthen surfaces (17%). These roads are managed by the Divisional Road Office of the Department of Roads based in Damak.

Table 2.2.1 National Highways and Feeder Roads (km)

Code	Description	Total length	Black Top	Gravel	Earthen
H01	Mawa-Damak-Birtamod-Kakarbhitta (East-West Highway - MRM)	54.75	54.75		
H07	Kechana-Jhapa chowk-Baire chowk (MRM)-Charali	56.00	31.32	24.68	
H17	Ratuwa river - Bhadrapur (Postal Road)	48.00		15	33
F001	Birtamod (MRM) - Chandragadhi	12.53	12.53		
F002	Damak (MRM) - Gauradaha - Gaurigunj	21.96	21.96		
F059	Birtamod (MRM) - Sanischare-Budhabare	12.86	12.86		
F158	Damak (MRM)-Beldangi	6.50	6.5		
F160	Damak (MRM)-Kyampatol	4.00			4
Total		216.60	139.92	39.68	37.00

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 the selection of the DRCN roads, account was taken of the road conditions, the road surface type and the existing traffic levels. The identified DRCN roads were subsequently provided with road codes according to national standards.

The resulting District Road Core Network in Jhapa district is shown in **Error! Reference source not found.** at the end of this chapter. The DRCN in Jhapa district consists of a total of 17 district roads with a total length of 209 km. The remaining 792 km of existing rural roads are not considered to be DRCN roads and are classified as village roads under the responsibility of the VDCs (see also section 2.3). Of the DRCN, 17% is black topped, 80% has a gravel surface and 3% has an earthen surface, resulting in 96% being considered all-weather and only 4% as fair weather (see **Error! Reference source not found.**). A complete

list of the DRCN roads and their characteristics is provided in **Error! Reference source not found..**

Table 2.3.1 Total road length (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	216.60	139.92	39.68	37.00
Highways	158.75	86.07	39.68	33.00
Feeder roads	57.85	53.85	-	4.00
Urban roads	790.72	70.01	352.79	367.92
Bhadrapur municipality	43.50	25.52	11.52	6.46
Mechinagar municipality	218.22	15.49	141.27	61.46
Damak municipality	529.00	29.00	200.00	300.00
District road core network	209.00	36.53	164.46	8.01
Village roads	791.72	19.63	596.10	175.99
Total	2,008.04	266.09	1,153.03	588.92

Table 2.3.2 District road core network (km)

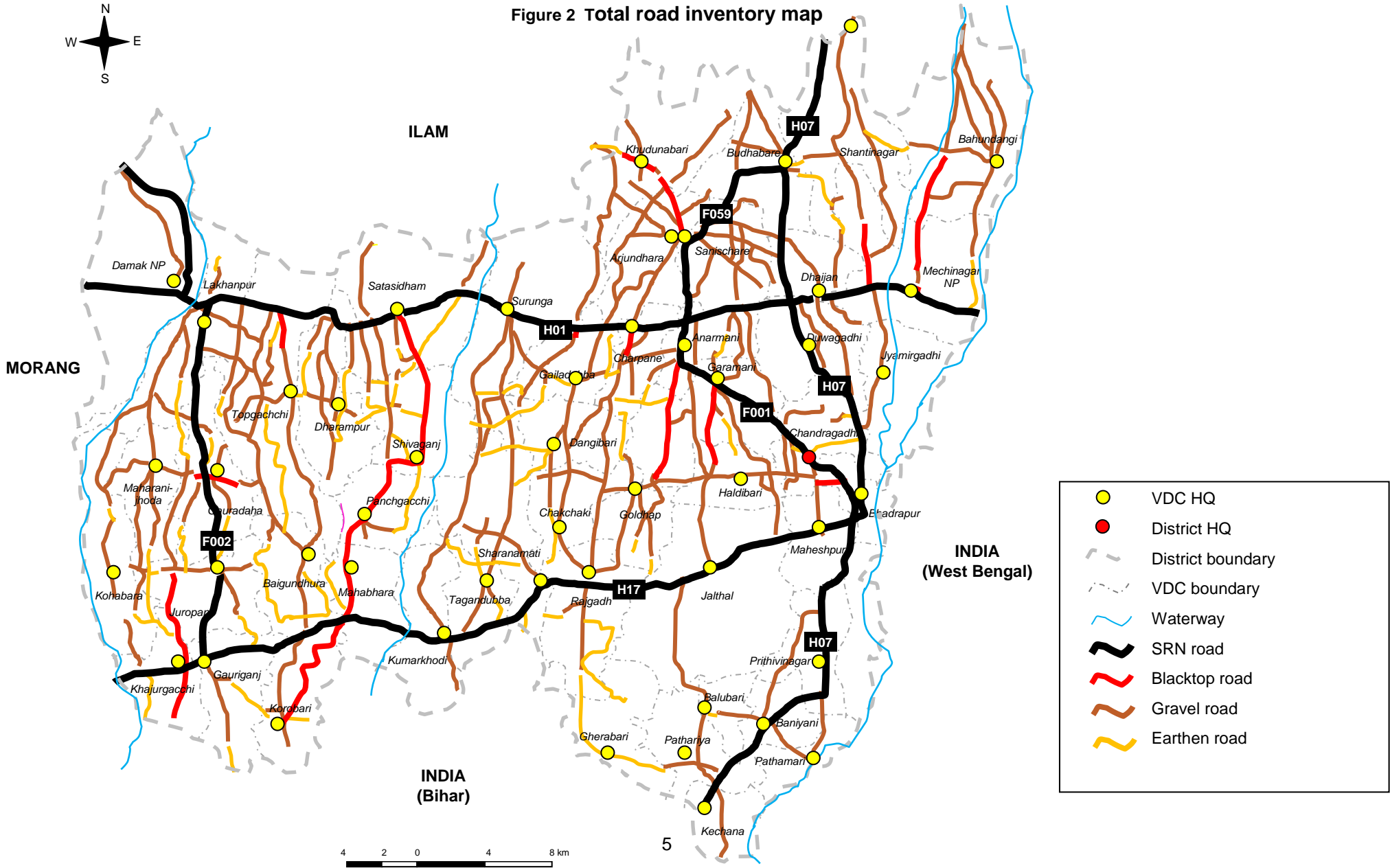
Code	Description	Total length	Black Top	Gravel	Earthen	All weather	Fair weather
04DR001	Gauradaha-Maharanijhoda-Swamichowk-Kohabara -Juropani	18.00	0.71	16.25	1.04	16.96	1.04
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura	16.00	2.18	13.82		16.00	-
04DR003	Dharampurchwok - Panchgachhi	14.00		14.00		14.00	-
04DR004	Dudhe-Shivaganj-Panchgacchi-Mahabhara-Korobari	9.00		9.00		9.00	-
04DR005	Satisidham- Kailashdham- Larumba	3.00			3.00	-	3.00
04DR006	Surunga -Sarnamati -Taghandubba - Digalbank	4.00		4.00		4.00	-
04DR007	Ghailadubba-Dangibari-Chakchaki-Rajgad	10.00		10.00		10.00	-
04DR008	Charpane - Narayanchwok - Hattikilla - Jaypur	11.00		11.00		11.00	-
04DR009	Sainikmod - Goldhap - Dimakhuti - Rajgad	13.00	7.08	5.92		13.00	-
04DR010	Sanischare-Khudunabari	7.00	6.49	0.51		7.00	-
04DR011	Garamani-Haldibari	7.00	4.76	2.24		7.00	-
04DR012	Bhadrapur-Jyamirgadhi - Dhulabari - Shantinagar - Irautar	27.00		27.00		27.00	-
04DR013	Itabhatta - Bhrikuti - Nindasiran	18.00	3.80	14.20		18.00	-
04DR014	Kakarvitta-Bahundangi	19.00	7.51	11.49		19.00	-
04DR015	Sagarmatha - Haldibari - Goldhap - Chakchaki - Rajgad	19.00	2.00	17.00		19.00	-
04DR016	Himali-Pathamari-Baniyani - Balubadi	9.00		8.57	0.43	8.57	0.43
04DR017	Pathariya-Gherabari	5.00		2.46	2.54	2.46	2.54
Total		209.00	34.53	167.46	7.01	201.99	7.01

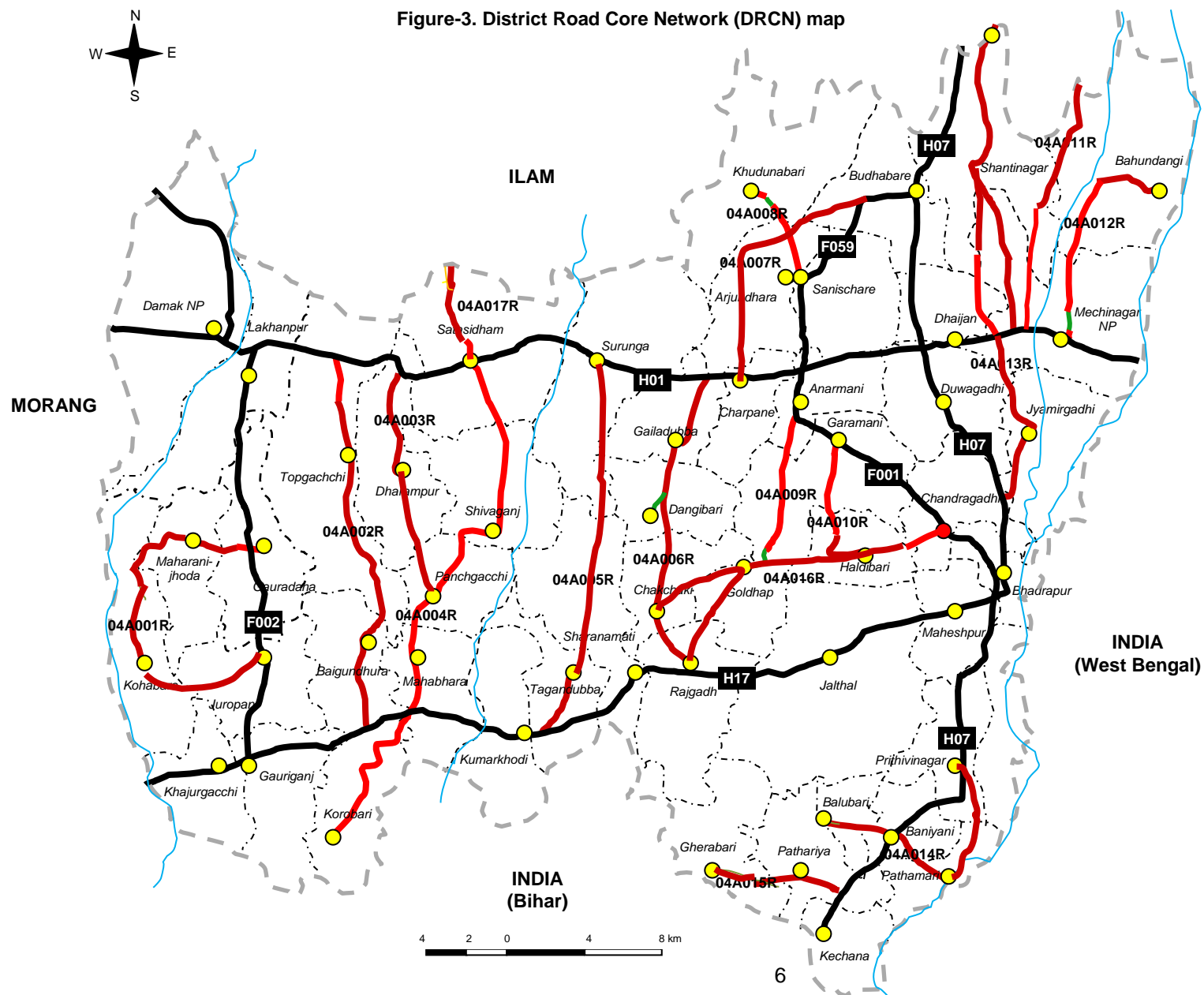
2.4 VILLAGE ROADS

The 792 km of remaining roads 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 47 VDCs in Jhapa 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 16.85 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, priority will be given to the use of this district funding for maintenance, especially emergency maintenance and routine/recurrent maintenance to keep the village roads open.





		Black Top	Gravel	Earthen
04DR001	18.00	0.71	16.25	1.04
04DR002	16.00	2.18	13.82	
04DR003	14.00		14.00	
04DR004	9.00		9.00	
04DR005	3.00			3.00
04DR006	4.00		4.00	
04DR007	10.00		10.00	
04DR008	11.00		11.00	
04DR009	13.00	7.08	5.92	
04DR010	7.00	6.49	0.51	
04DR011	7.00	4.76	2.24	
04DR012	27.00		27.00	
04DR013	18.00	3.80	14.20	
04DR014	19.00	7.51	11.49	
04DR015	19.00	2.00	17.00	
04DR016	9.00		8.57	0.43
04DR017	5.00		2.46	2.54
Total	209.00	34.53	167.46	7.01

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 core district road 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 done in the ARMP on an annual basis. The following conservation activities are distinguished:

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 lump-sum is reserved for the entire district road core network. 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 re-gravelling, 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 lump-sum allocation is made for the entire district road core network based on average 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)
04DR001	18.00	18.00	18.00	18.00
04DR002	16.00	16.00	16.00	16.00
04DR003	14.00	14.00	14.00	14.00
04DR004	9.00	9.00	9.00	9.00
04DR005	3.00	3.00	3.00	3.00
04DR006	4.00	4.00	4.00	4.00
04DR007	10.00	10.00	10.00	10.00
04DR008	11.00	11.00	11.00	11.00
04DR009	13.00	13.00	13.00	13.00
04DR010	7.00	7.00	7.00	7.00
04DR011	7.00	7.00	7.00	7.00
04DR012	27.00	27.00	27.00	27.00
04DR013	18.00	18.00	18.00	18.00
04DR014	19.00	19.00	19.00	19.00
04DR015	19.00	19.00	19.00	19.00
04DR016	9.00	9.00	9.00	9.00
04DR017	5.00	5.00	5.00	5.00
Total	209	209	209	209

3.2 IMPROVEMENT

Improvement refers to actions required to improve the road to bring it to a maintainable all weather standard. It includes the following actions, which for Jhapa 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 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 150 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

No rehabilitation needs were identified in the district road core network.

3.2.2 GRAVELLING

Gravelling of the road surface is required for the earthen sections in the district road core network. For Jhapa this concern a total of 8 km as can be seen in the table below

Table 3.2.1 Sections of the district road core network requiring gravelling

Code	Description	Total length (km)	Gravelling (km)
04DROO1	Gauradaha-Maharaniyhoda-Swamichowk-Kohabara -Juropani	18.00	1.04
04DROO2	Satisidham- Kailashdham- Larumba	3.00	3.00
04DROO3	Himali-Pathamari-Baniyani - Balubadi	9.00	0.43
04DROO4	Pathariya-Gherabari	5.00	2.54
Total		35.00	7.01

3.2.3 CROSS DRAINAGE

The need for cross drainage was identified for the different DRCN roads. A total of 4 bridges with a total length of 132m, 4 slab culverts with a total length of 20m, 5 causeways with a total length of 30m, and 35 pipe culverts were identified as being required (see table below). For the bridges, slab culverts and causeways, the location in GIS coordinates is provided in **Annex 3**.

Table 3.2.2 Required cross drainage structures

Code	Description	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)
04DR001	Gauradaha-Maharaniyhoda-Swamichowk-Kohabara -Juropani	35				7
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura					8
04DR003	Dharampurchwok - Panchgachhi					2
04DR004	Satasidham-Shivaganj-Panchgacchi-Mahabhara-Korobari		4			
04DR005	Satisidham- Kailashdham- Larumba			2		4
04DR006	Surunga -Sarnamati -Taghandubba - Digalbank					1
04DR007	Ghailadubba-Dangibari-Chakchaki-Rajgad	67				1
04DR008	Charpane - Narayanchwok - Hattikilla - Jaypur			1		1
04DR009	Sainikmod - Goldhap - Dimakhuti - Rajgad					3
04DR010	Sanischare-Khudunabari		12	15		3
04DR011	Garamani-Haldibari					1
04DR012	Bhadrapur-Jyamirgadhi - Dhulabari - Shantinagar - Irautar					
04DR013	Itabhatta - Bhrikuti - Nindusiran		4			
04DR014	Kakarvitta-Bahundangi	30		10		2
Total		132	20	30	-	35

3.2.4 PROTECTIVE STRUCTURES

Based on the road survey carried out in Jhapa, the following retaining walls were identified as being required to ensure the protection of the district road core network.

Table 3.2.3 Required protective structures

Code	Description	Masonry walls (m ³)	Gabion walls (m ³)	Lined drain (m)
04DR001	Gauradaha-Maharaniyhoda-Swamichowk-Kohabara -	969	100	

Code	Description	Masonry walls (m ³)	Gabion walls (m ³)	Lined drain (m)
	Juropani			
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura	396		
04DR 006	Dharampurchwok - Panchgachhi			
04DR 007	Satasidham-Shivaganj-Panchgacchi-Mahabhara-Korobari			
04DR 009	Satisidham- Kailashdham- Larumba	10	20	
04DR 010	Surunga -Sarnamati -Taghandubba - Digalbank			
04DR 012	Ghailadubba-Dangibari-Chakchaki-Rajgadh	60		
04DR 013	Charpane - Narayanchwok - Hattikilla - Jaypur	52	20	
04DR 014	Sainikmod - Goldhap - Dimakhuti - Rajgad	320		
04DR 017	Sanischare-Khudunabari			
Total		2,168	410	-

3.2.5 WIDENING

Widening of the core district road network is not required in Jhapa as the traffic volumes are still well below the 500 vehicles per day.

3.2.6 BLACKTOPPING

An analysis of the traffic data for the different roads making up the district road core network (see **Annex 1**) shows that 12 roads are eligible for blacktopping (traffic volume exceeds 150 PCU). The total length need to be blacktopping is 129.67 km.

Table 3.2.4 Sections of the district road core network requiring blacktopping

Code	Description	Total length (km)	Blacktop (km)	Traffic (VPD)	Blacktopping (km)
04DR001	Gauradaha-Maharanijhoda-Swamichowk-Kohabara -Juropani	18.00	0.71	107	-
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura	16.00	2.18	213	13.82
04DR003	Dharampurchwok - Panchgachhi	14.00	-	111	-
04DR004	Satasidham-Shivaganj-Panchgacchi-Mahabhara-Korobari	9.00	-	190	9.00
04DR005	Satisidham- Kailashdham- Larumba	3.00	-	35	-
04DR006	Surunga -Sarnamati -Taghandubba - Digalbank	4.00	-	295	4.00
04DR007	Ghailadubba-Dangibari-Chakchaki-Rajgadh	10.00	-	147	-
04DR008	Charpane - Narayanchwok - Hattikilla - Jaypur	11.00	-	310	11.00
04DR009	Sainikmod - Goldhap - Dimakhuti - Rajgad	13.00	7.08	165	5.92
04DR010	Sanischare-Khudunabari	7.00	6.49	123	-
04DR011	Garamani-Haldibari	7.00	4.76	165	2.24
04DR012	Bhadrapur-Jyamirgadhi - Dhulabari - Shantinagar - Irautar	27.00	-	245	27.00
04DR013	Itabhatta - Bhrikuti - Nindusiran	18.00	3.80	155	14.20
04DR014	Kakarvitta-Bahundangi	19.00	7.51	195	11.49
04DR015	Sagarmatha - Haldibari - Goldhap - Chakchaki - Rajgad	19.00	2.00	172	17.00
04DR016	Himali-Pathamari-Baniyani - Balubadi	9.00	-	160	9.00
04DR017	Pathariya-Gherabari	5.00	-	325	5.00
Total		209.00	34.53	3,112.50	129.67

3.3 NEW CONSTRUCTION

New construction of DRCN roads is not required in Jhapa district as all VDC headquarters are already connected to the SRN or to the existing DRCN

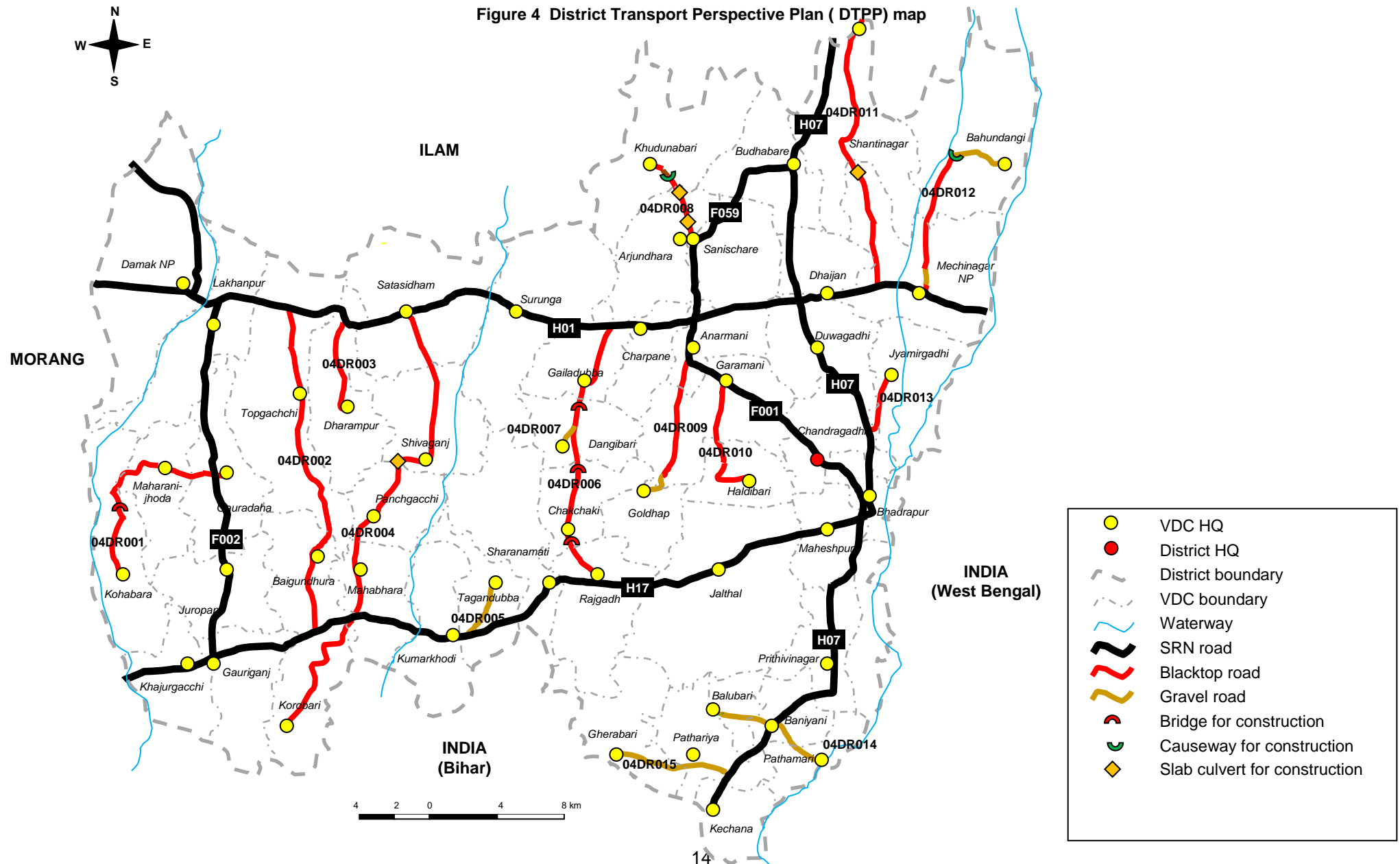
3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

The DTPP foresees bringing the entire existing district road core network to maintainable all-weather status by graveling the remaining 8km of earthen roads and constructing a number of different cross drainage and protective structures. In addition, 75.32 km will be blacktopped in light of the existing traffic volume.. The district road core network will subsequently consist of 209 km of maintainable all-weather roads. The following table lists the required interventions, while the proposed network is shown in the DTPP map in.

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)
04DR001	18.00	18.00	18.00	18.00	-	1.04	-	-	70.00	-	-	-	7.00	969.00	100.00	-	-
04DR002	16.00	16.00	16.00	16.00	-	-	13.82	-	-	-	-	-	8.00	396.00	-	-	-
04DR003	14.00	14.00	14.00	14.00	-	-	-	-	-	-	-	-	2.00	-	-	-	-
04DR004	9.00	9.00	9.00	9.00	-	-	9.00	-	-	4.00	-	-	-	-	-	-	-
04DR005	3.00	3.00	3.00	3.00	-	3.00	-	-	-	-	2.00	-	4.00	10.00	20.00	-	-
04DR006	4.00	4.00	4.00	4.00	-	-	4.00	-	-	-	-	-	1.00	-	-	-	-
04DR007	10.00	10.00	10.00	10.00	-	-	-	-	134.00	-	-	-	1.00	60.00	-	-	-
04DR008	11.00	11.00	11.00	11.00	-	-	11.00	-	-	-	1.00	-	1.00	51.50	20.00	-	-
04DR009	13.00	13.00	13.00	13.00	-	-	5.92	-	-	-	-	-	3.00	320.00	-	-	-
04DR010	7.00	7.00	7.00	7.00	-	-	-	-	-	12.00	15.00	-	3.00	-	-	-	-
04DR011	7.00	7.00	7.00	7.00	-	-	2.24	-	-	-	-	-	1.00	135.00	80.00	-	-
04DR012	27.00	27.00	27.00	27.00	-	-	27.00	-	-	-	-	-	-	31.00	100.00	-	-
04DR013	18.00	18.00	18.00	18.00	-	-	14.20	-	-	4.00	-	-	-	-	-	-	-
04DR014	19.00	19.00	19.00	19.00	-	-	11.49	-	60.00	-	10.00	-	2.00	120.00	90.00	-	-
04DR015	19.00	19.00	19.00	19.00	-	-	17.00	-	-	-	2.00	-	2.00	-	-	-	-
04DR016	9.00	9.00	9.00	9.00	-	0.43	9.00	-	-	-	-	-	-	75.00	-	-	-
04DR017	5.00	5.00	5.00	5.00	-	2.54	5.00	-	-	-	-	-	-	-	-	-	-
Total	209.00	209.00	209.00	209.00	-	7.01	129.67	-	264	20	30	-	35	2,168	410	-	-

Figure 4 District Transport Perspective Plan (DTTP) map



4. COST ESTIMATION

For the cost estimation, use has been made of standard costs for the different activities required. For the conservation activities this results in an estimation of annual costs, while for improvement and new construction activities this result 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. 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/km)
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 139 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 695 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	Routine	Recurrent (blacktop)	Recurrent (gravel)	Recurrent (earthen)	Periodic (blacktop)	Periodic (gravel)	Total annual cost	Total 5-year cost
04DR001	18.00	0.71	16.25	1.04	540	360	355	6,500	260	142	4,063	12,220	61,098
04DR002	16.00	2.18	13.82	-	480	320	1,090	5,528	-	545	3,455	11,418	57,090
04DR003	14.00	-	14.00	-	420	280	-	5,600	-	-	3,500	9,800	49,000
04DR004	9.00	-	9.00	-	270	180	-	3,600	-	-	2,250	6,300	31,500
04DR005	3.00	-	-	3.00	90	60	-	-	750	-	-	900	4,500
04DR006	4.00	-	4.00	-	120	80	-	1,600	-	-	1,000	2,800	14,000
04DR007	10.00	-	10.00	-	300	200	-	4,000	-	-	2,500	7,000	35,000
04DR008	11.00	-	11.00	-	330	220	-	4,400	-	-	2,750	7,700	38,500
04DR009	13.00	7.08	5.92	-	390	260	3,540	2,368	-	-	1,480	8,038	40,190
04DR010	7.00	6.49	0.51	-	210	140	3,245	204	-	-	128	3,927	19,633
04DR011	7.00	4.76	2.24	-	210	140	2,380	896	-	-	560	4,186	20,930

Code	Total length (km)	Blacktop (km)	Gravel (km)	Earthen (km)	Emergency	Routine	Recurrent (blacktop)	Recurrent (gravel)	Recurrent (earthen)	Periodic (blacktop)	Periodic (gravel)	Total annual cost	Total 5-year cost
04DR012	27.00	-	27.00	-	810	540	-	10,800	-	-	6,750	18,900	94,500
04DR013	18.00	3.80	14.20	-	540	360	1,900	5,680	-	-	3,550	12,030	60,150
04DR014	19.00	7.51	11.49	-	570	380	3,755	4,596	-	-	2,873	12,174	60,868
04DR015	19.00	2.00	17.00	-	570	380	1,000	6,800	-	-	4,250	13,000	65,000
04DR016	9.00	-	8.57	0.43	270	180	-	3,428	108	-	2,143	6,128	30,640
04DR017	5.00	-	2.46	2.54	150	100	-	984	635	-	615	2,484	12,420
Total	209.00	34.53	167.46	7.01	6,270	4,180	17,265	66,984	1,753	687	41,865	139,004	695,018

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	12,692
Masonry wall construction	m ³	10,245
Gabion wall construction	m ³	2,500
Lined drain construction	m	1,000

The resulting estimated costs come to NPR 863 million as indicated in the table below. Most of this cost (nearly NPR 739 million) is for blacktopping.

Table 4.2.2 Cost estimate for improvement measures (NPR '000)

Code	Total length (km)	Rehabilitation	Widening	Gravelling	Blacktopping	Bridges	Slab culverts	CC causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
04DR001	18.00	-	-	2,288	-	21,000	-	-	89	9,927	250	-	33,554
04DR002	16.00	-	-	-	78,774	-	-	-	102	4,057	-	-	82,933
04DR003	14.00	-	-	-	-	-	-	-	25	-	-	-	25
04DR004	9.00	-	-	-	51,300	-	600	-	-	-	-	-	51,900
04DR005	3.00	-	-	6,600	-	-	-	200	51	102	50	-	7,003
04DR006	4.00	-	-	-	22,800	-	-	-	13	-	-	-	22,813
04DR007	10.00	-	-	-	-	40,200	-	-	13	615	-	-	40,827
04DR008	11.00	-	-	-	62,700	-	-	100	13	528	50	-	63,390
04DR009	13.00	-	-	-	33,744	-	-	-	38	3,278	-	-	37,060
04DR010	7.00	-	-	-	-	-	1,800	1,500	38	-	-	-	3,338
04DR011	7.00	-	-	-	12,768	-	-	-	13	1,383	200	-	14,364

Code	Total length (km)	Rehabilitation	Widening	Gravelling	Blacktopping	Bridges	Slab culverts	CC causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
04DR012	27.00	-	-	-	153,900	-	-	-	-	318	250	-	154,468
04DR013	18.00	-	-	-	80,940	-	600	-	-	-	-	-	81,540
04DR014	19.00	-	-	-	65,493	18,000	-	1,000	25	1,229	225	-	85,973
04DR015	19.00	-	-	-	96,900	-	-	200	25	-	-	-	97,125
04DR016	9.00	-	-	946	51,300	-	-	-	-	768	-	-	53,014
04DR017	5.00	-	-	5,588	28,500	-	-	-	-	-	-	-	34,088
Total	209.00	-	-	15,422	739,119	79,200	3,000	3,000	444	22,206	1,025	-	863,416

4.3 NEW CONSTRUCTION

Four numbers of bridges are proposed as new construction. The total costs for the new construction come to NPR 79 million as indicated in the table below.

Table 4.3.1 Cost estimate for new construction (NPR '000)

Code	Description	Length (km)	Opening up	Gravelling	Bridges	Total cost
04DR001	Gauradaha-Maharaniyhoda-Swamichowk-Kohabara -Juropani	-	-	-	21,000	21,000
04DR006	Ghailadubba-Dangibari-Chakchaki-Rajgadh	-	-	-	40,200	40,200
04DR012	Kakarvitta-Bahundangi	-	-	-	18,000	18,000
Total	0	-	-	-	79,200	79,200

4.4 DTPP COSTS

The total costs for the District Transport Perspective Plan come to nearly NPR 1,637 million as indicated in the table below.

Table 4.4.1 DTPP costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
04DR001	61,098	33,554	21,000	115,652
04DR002	57,090	82,933	-	140,023
04DR003	49,000	25	-	49,025
04DR004	31,500	51,900	-	83,400
04DR005	4,500	7,003	-	11,503
04DR006	14,000	22,813	-	36,813
04DR007	35,000	40,827	40,200	116,027
04DR008	38,500	63,390	-	101,890
04DR009	40,190	37,060	-	77,250
04DR010	19,633	3,338	-	22,971
04DR011	20,930	14,364	-	35,294
04DR012	94,500	154,468	-	248,968
04DR013	60,150	81,540	-	141,690
04DR014	60,868	85,973	18,000	164,840
04DR015	65,000	97,125	-	162,125
04DR016	30,640	53,014	-	83,654
04DR017	12,420	34,088	-	46,508
Total	695,018	863,416	79,200	1,637,634

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 1**.

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)
04DR005	3.00	90	60	-	-	750	-	-	900	26,028	35
04DR006	4.00	120	80	-	1,600	-	-	1,000	2,800	28,333	99
04DR017	5.00	150	100	-	984	635	-	615	2,484	16,759	148
04DR016	9.00	270	180	-	3,428	108	-	2,143	6,128	40,027	153
04DR004	9.00	270	180	-	3,600	-	-	2,250	6,300	35,504	177
04DR007	10.00	300	200	-	4,000	-	-	2,500	7,000	35,920	195
04DR011	7.00	210	140	2,380	896	-	-	560	4,186	17,437	240
04DR002	16.00	480	320	1,090	5,528	-	545	3,455	11,418	26,028	439
04DR010	7.00	210	140	3,245	204	-	-	128	3,927	7,511	523
04DR008	11.00	330	220	-	4,400	-	-	2,750	7,700	14,037	549
04DR001	18.00	540	360	355	6,500	260	142	4,063	12,220	20,828	587
04DR015	19.00	570	380	1,000	6,800	-	-	4,250	13,000	16,252	800
04DR003	14.00	420	280	-	5,600	-	-	3,500	9,800	12,121	809
04DR012	27.00	810	540	-	10,800	-	-	6,750	18,900	22,897	825
04DR009	13.00	390	260	3,540	2,368	-	-	1,480	8,038	7,486	1,074
04DR013	18.00	540	360	1,900	5,680	-	-	3,550	12,030	8,543	1,408
04DR014	19.00	570	380	3,755	4,596	-	-	2,873	12,174	8,617	1,413

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. Periodic maintenance blacktop roads
6. 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

Table 5.2.1 Ranking of improvement works (NPR '000)

Code	Total length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
04DR003	14.00	25	12,121	2
04DR005	3.00	7,003	26,028	269
04DR010	7.00	3,338	7,511	444
04DR006	4.00	22,813	28,333	805
04DR011	7.00	14,364	17,437	824
04DR007	10.00	40,827	35,920	1,137
04DR016	9.00	53,014	40,027	1,324
04DR004	9.00	51,900	35,504	1,462
04DR001	18.00	33,554	20,828	1,611
04DR017	5.00	34,088	16,759	2,034
04DR002	16.00	82,933	26,028	3,186
04DR008	11.00	63,390	14,037	4,516
04DR009	13.00	37,060	7,486	4,951
04DR015	19.00	97,125	16,252	5,976
04DR012	27.00	154,468	22,897	6,746
04DR013	18.00	81,540	8,543	9,545
04DR014	19.00	85,973	8,617	9,977

5.3 NEW CONSTRUCTION

No new construction works are required.

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, except the funds from the members of parliament which are expected to remain constant for the 5-year period. It is assumed that donor's contribution starts from 070/071 with annual increment of 20 million every year. Seventy percent of cost needed for bridge construction is expected from RTI SWAp Bridge Component in three years. The people's contribution is expected 15% of total funding. The total district budget for the road sector is NPR 1,150 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	070/071	071/072	072/73	073/74
MLD's grant	54,000	64,800	77,760	93,312	111,974
DDC Internal Budget	10,080	12,096	14,515	17,418	20,902
Internal Revenue	8,400	10,080	12,096	14,515	17,418
Fund of Members of Parliaments	15,000	15,000	15,000	15,000	15,000
VDC	13,200	15,840	19,008	22,810	27,372
RRRSDP	500	0	0	0	0
LGCDP	0	0	0	0	0
DFID	10,000	0	0	0	0
RBN	2,880	3,456	4,147	4,977	5,972
Donor's contribution	0	20,000	40,000	60,000	80,000
RTI -SWAp Bridge Project		18,430	18,430	18,430	
People's Contribution	17,109	23,955	30,143	36,969	41,796
Total	131,169	183,657	231,100	283,431	320,434
Grand total	1,149,791				

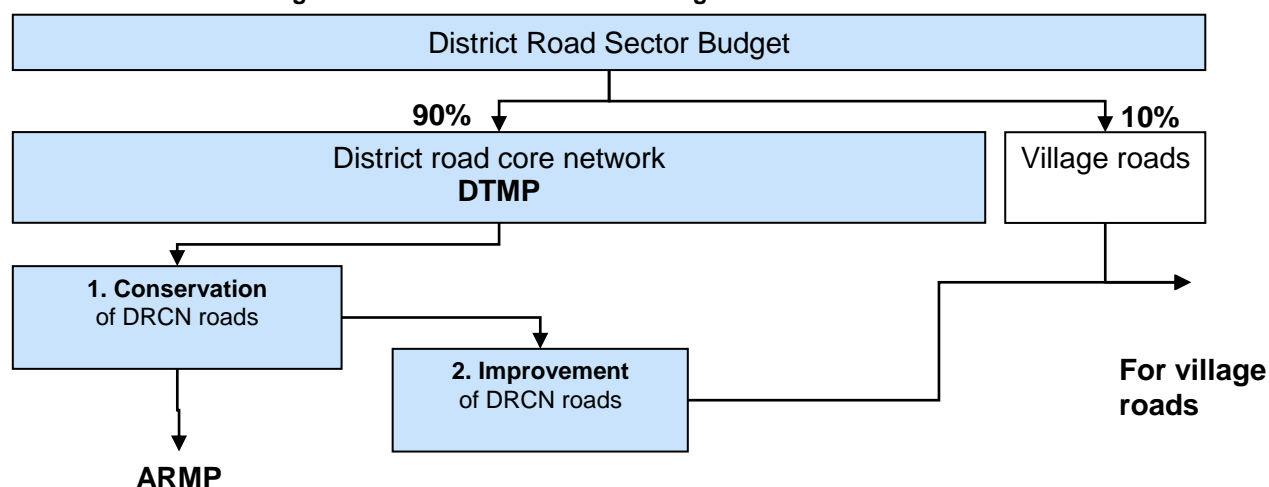
6.2 BUDGET ALLOCATION

The distribution of the available district road sector budget is indicated in the figure below. Of the total district budget for the road sector, up to 90% is initially reserved for the district road core network and its allocation is further detailed in this DTMP. The remaining can be used by the DDC at its own discretion to provide additional funding for village roads. Alternatively the expansion of the district road core network can be contemplated.

The reason for the high allocation to the DRCN is the fact that the DRCN need more funding in conservation and improvement. The required budget for the conservation and improvements (NPR 1,558 million) is lower than the foreseen district level road sector budget for the next 5 years. In addition, the size of the village road network is very large and requires significant funding to conserve and improve it. An allocation up to 90% will therefore allow the improvement of the DRCN to be easily completed within the five year DTMP period but in case of eligibility of black topping is considered as 150 PCU. If eligibility of black topping is considered as 100 PCU (which is general practice), there is significant budget gap in improvement. There is not sufficient budget for conservation and bridge construction.

The 80% of the district road sector budget for the DTMP is allocated firstly to conservation and any remaining funding is allocated to improvement. Any remaining funds later on in the DTMP period can be used for village roads or alternatively for the expansion of the DRCN.

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 can be calculated. The results are shown in the following table.

Table 6.2.1 DTMP investment plan

Item	Year				
	2067/68	2068/69	2069/70	2070/71	2071/72
Fiscal year	2067/68	2068/69	2069/70	2070/71	2071/72
Total budget	131,169	183,657	231,100	283,431	320,434
Village roads	13,117	18,366	23,110	28,343	32,043
Core road network budget (DTMP)	118,052	165,292	207,990	255,088	288,390
Core network length (km)	209.00	209.00	209.00	209.00	209.00
Blacktop (km)	34.53	34.53	36.23	40.77	58.18
Gravel (km)	167.46	167.46	168.76	164.22	147.24
Earthen (km)	7.01	7.01	4.01	4.01	3.58
Conservation	144,923	153,288	155,024	154,661	154,185
Emergency	6,270	6,270	6,270	6,270	6,270
Routine	4,180	4,180	4,180	4,180	4,180
Recurrent (blacktop)	17,265	17,265	18,116	20,385	29,092
Recurrent (gravel)	66,984	66,984	67,504	65,688	58,894
Recurrent (earthen)	1,753	1,753	1,003	1,003	895

Periodic (blacktop)				6,906			6,906			7,246			8,154			11,637		
Periodic (gravel)				14,695			41,865			42,190			41,055			36,809		
Improve ment	Cost	BT	GR	0	BT	GR	20,069	BT	GR	61,482	BT	GR	108,353	BT	GR	140,613	BT	GR
04DR003	25	-	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-
04DR005	7,003	-	3.00	-	-	-	7,003	-	3.00	-	-	-	-	-	-	-	-	-
04DR010	3,338	-	-	-	-	-	3,338	-	-	-	-	-	-	-	-	-	-	-
04DR006	22,813	4.00	-	-	-	-	9,702	1.70	-	13,110	2.30	-	-	-	-	-	-	-
04DR011	14,364	2.24	-	-	-	-	-	-	-	14,364	2.24	-	-	-	-	-	-	-
04DR007	40,827	-	-	-	-	-	-	-	-	34,008	-	-	6,819	-	-	-	-	-
04DR016	53,014	9.00	0.43	-	-	-	-	-	-	-	-	-	53,014	9.00	0.43	-	-	-
04DR004	51,900	9.00	-	-	-	-	-	-	-	-	-	-	48,520	8.41	-	3,380	0.59	-
04DR001	33,554	-	1.04	-	-	-	-	-	-	-	-	-	-	-	-	33,554	-	1.04
04DR017	34,088	5.00	2.54	-	-	-	-	-	-	-	-	-	-	-	-	34,088	5.00	2.54
04DR002	82,933	13.82	-	-	-	-	-	-	-	-	-	-	-	-	-	69,591	11.60	-
04DR008	63,390	11.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04DR009	37,060	5.92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04DR015	97,125	17.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04DR012	154,468	27.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04DR013	81,540	14.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04DR014	85,973	11.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total improvement				-	-	-	20,069	1.70	3.00	61,482	4.54	-	108,353	17.41	0.43	140,613	17.18	3.58
Construction		Cost	GR	-	GR		-	GR		-	GR		-	GR		-	GR	

6.3 DTMP OUTPUTS

Based on the investment plan presented above, all DRCN roads will be conserved and improved to the maintainable all-weather standard with a surface type appropriate to their traffic volume by the end of the DTMP period. A total 209 km of DRCN roads (the entire DRCN) will be conserved for the full DTMP period, while 9 km will be upgraded from earthen to gravel standard and 40.44 km will be upgraded from gravel to blacktop standard.

Table 6.3.1 DTMP output

Conservation	Improvement gravel	Improvement blacktop	New construction
209.00	9.01	40.44	-

Of the total DTMP budget, NPR 704 million will be spent on conservation and NPR 330 million on improvement. There will be the huge budget gap of NPR 603 million for remaining conservation as well as cross drainages construction work (New construction).

6.4 DTMP OUTCOME

As a result of the activities planned in this DTMP, the percentage of all-weather maintainable DRCN roads increases by 4% from 201 km to 209 km, bringing the entire DRCN to a maintainable all-weather standard. The percentage of the network with a blacktop standard will be increased from 34.53 km (17%) to 75 km (36%).

Table 6.4.1 Standard of DRCN roads

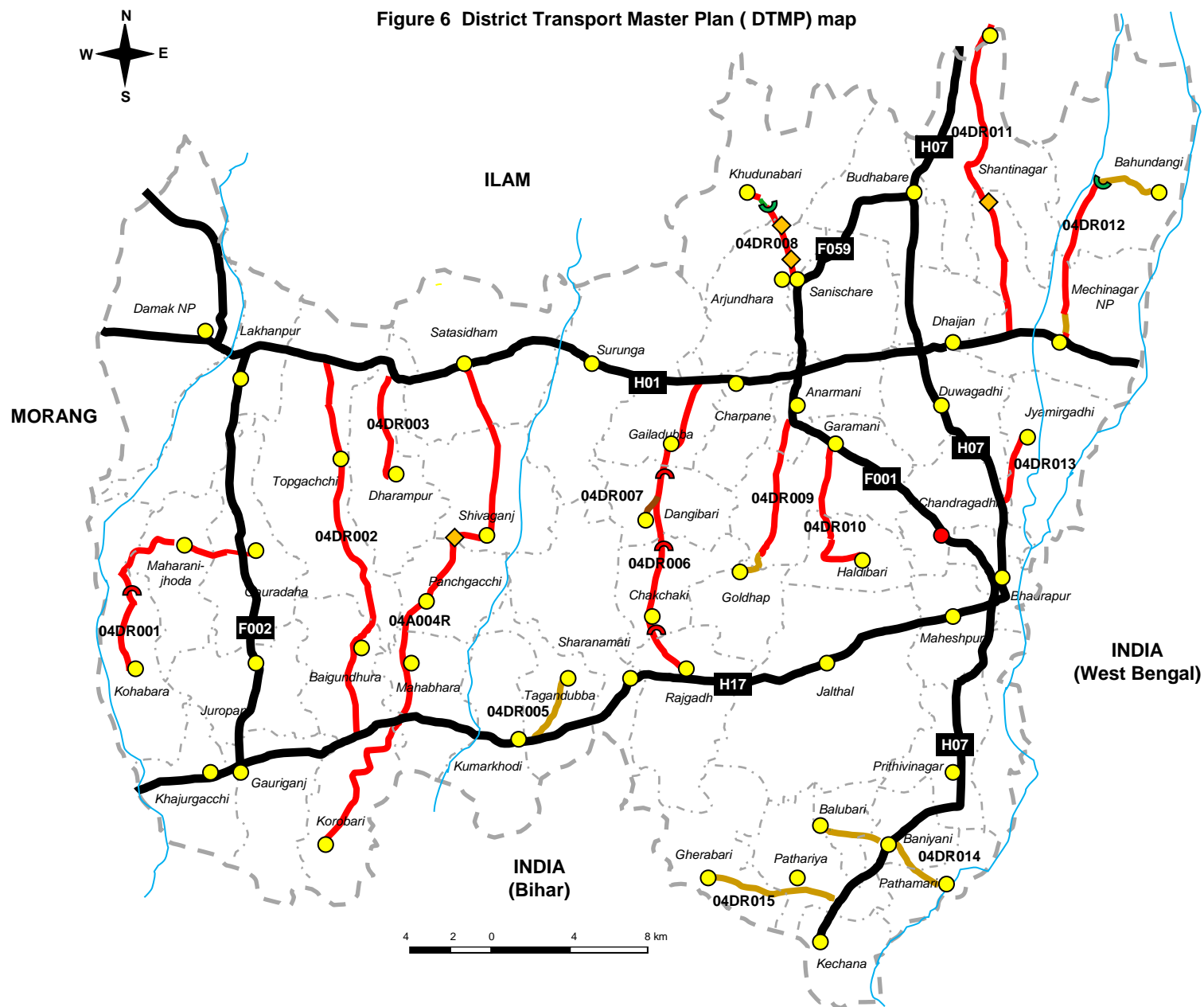
	Total length	Fair-weather		All-weather gravel		All-weather blacktop	
	km	km	%	km	%	km	%
Start of DTMP	209.00	7.01	3%	167.46	80%	34.53	17%
End of DTMP	209.00	2.00	-1%	136.03	65%	74.97	36%
Difference	-	9.01	-4%	31.43	-15%	40.44	19%

The number of municipalities and VDC headquarters with access to the SRN or all-weather DRCN roads will increase from 43 to 50 and the district population with access to the SRN or all-weather DRCN roads will increase from 87% to 100%.

Table 6.4.2 Population with access to road network

	Direct access to SRN			Access to fair-weather DRCN roads			Access to all-weather DRCN roads			No access to DRCN		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	27	424,270	66%	0	-	0%	7	88,394	14%	16	134,828	21%
End of DTMP	27	424,270	66%	0	-	0%	0	-	0%	23	223,222	34%
Difference	-	-	0%	-	-	0%	7	88,394	-14%	7	88,394	14%

Figure 6 District Transport Master Plan (DTMP) map



Code	Total length	Black Topping	Gravelling	Existing black topped
04DR001	18.00	-	1.04	0.71
04DR002	16.00	13.82	-	2.18
04DR003	14.00	-	-	-
04DR004	9.00	9.00	-	-
04DR005	3.00	-	3.00	2.00
04DR006	4.00	4.00	-	-
04DR007	10.00	-	-	-
04DR008	11.00	11.00	-	-
04DR009	13.00	5.92	-	7.08
04DR010	7.00	-	-	6.49
04DR011	7.00	2.24	-	4.76
04DR012	27.00	27.00	-	-
04DR013	18.00	14.20	-	3.80
04DR014	19.00	11.49	-	7.51
04DR015	19.00	17.00	-	2.00
04DR016	9.00	9.00	0.43	-
04DR017	5.00	5.00	2.54	-
Total	209.00	129.67	7.01	36.53

	VDC HQ
	District HQ
	District boundary
	VDC boundary
	Waterway
	SRN road
	Blacktop road
	Gravel road
	Bridge for construction
	Causeway for construction
	Slab culvert for construction

ANNEX 1 TRAFFIC DATA

Code	Description	Total length (km)	Motor-cycle	Car-Jeep-Minibus	Tractor	Truck-Bus	PCU
04DR001	Gauradaha-Maharanijhoda-Swamichowk-Kohabara -Juropani	18.00	90	2	18	6	107
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura	16.00	200	5	20	17	213
04DR003	Dharampurchwok - Panchgachhi	14.00	70	6	15	10	111
04DR004	Dudhe-Shivaganj-Panchgacchi-Mahabhara-Korobari	9.00	100	30	25	15	190
04DR005	Satisidham- Kailashdham- Larumba	3.00	40	5	5	0	35
04DR006	Surunga -Sarnamati -Taghandubba - Digalbank	4.00	130	50	30	30	295
04DR007	Ghailadubba-Dangibari-Chakchaki-Rajgad	10.00	110	12	20	10	147
04DR008	Charpane - Narayanchwok - Hattikilla - Jaypur	11.00	200	50	40	20	310
04DR009	Sainikmod - Goldhap - Dimakhuti - Rajgad	13.00	100	25	25	10	165
04DR010	Sanischare-Khudunabari	7.00	55	15	30	5	123
04DR011	Garamani-Haldibari	7.00	130	20	20	10	165
04DR012	Bhadrapur-Jyamirgadhi - Dhulabari - Shantinagar - Irautar	27.00	150	50	20	20	245
04DR013	Itabhatta - Bhrikuti - Nindasiran	18.00	70	20	20	15	155
04DR014	Kakarvitta-Bahundangi	19.00	70	30	35	15	195
04DR015	Sagarmatha - Haldibari - Goldhap - Chakchaki - Rajgad	19.00	130	57	15	5	172
04DR016	Himali-Pathamari-Baniyani - Balubadi	9.00	70	35	25	10	160
04DR017	Pathariya-Gherabari	5.00	250	30	55	15	325
	Total	209.00					

ANNEX 1 POPULATION SERVED

	VDC/Municipality	Population	DRCN roads																	
			04A001R	04A002R	04A003R	04A004R	04A005R	04A006R	04A007R	04A008R	04A009R	04A010R	04A011R	04A012R	04A013R	04A014R	04A015R	04A016R	04A017R	SRN
1	Anarmani	27,762																		X
2	Arjundhara	16,178							X											X
3	Bahundangi	22,897												X						
4	Baigundhura	5,409		X			X													
5	Balubari	3,907														X				
6	Baniyani	2,005														X				X
7	BhadrapurNP	18,145																		X
8	Budhabare	19,742							X											X
9	Chakchaki	9,676						X										X		
10	Chandragadhi	16,052																		X
11	Charpane	11,727																		X
12	DamakNP	35,009																		X
13	Dangibari	7,472						X												
14	Dhaijan	8,256																		X
15	Dharampur	2,215			X															
16	Duwagadhi	8,666																		X
17	Garamani	18,512																		X
18	Gauradaha	13,276																		X
19	Gauriganj	10,131																		X
20	Ghailadubba	11,185						X												
21	Gherabari	6,286															X			
22	Goldhap	7,486									X							X		
23	Haldibari	7,511										X						X		
24	Jalthal	13,132																		X
25	Juropani	10,624																		X
26	Jyamirgadhi	8,543													X					
27	Kechana	5,360																		X
28	Khajurgachhi	8,582																		X

	VDC/Municipality	Population	DRCN roads																	
			04A001R	04A002R	04A003R	04A004R	04A005R	04A006R	04A007R	04A008R	04A009R	04A010R	04A011R	04A012R	04A013R	04A014R	04A015R	04A016R	04A017R	SRN
29	Khudunabari	14,037								X										
30	Kohabara	10,589	X																	
31	Korobari	5,006				X														
32	Kumarkhod	8,637																	X	
33	Lakhanpur	13,911																	X	
34	Mahabhara	7,040				X														
35	Maharanijhoda	10,239	X																	
36	Maheshpur	12,765																	X	
37	MechinagarNP	49,060																	X	
38	Panchgachhi	9,906			X	X														
39	Pathamari	2,705														X				
40	Pathariya	9,966															X			
41	Prithivinagar	9,879																	X	
42	Rajgadh	15,354																X	X	
43	Sanischare	20,298																	X	
44	Satisidham	16,759																X	X	
45	Shantinagar	17,437											X							
46	Sharanamati	12,832																	X	
47	Shivaganj	13,552				X														
48	Surunga	21,616																	X	
49	Tagandubba	9,539																		
50	Topgachchi	20,619		X			X													
	Total population	647,492	20,828	26,028	12,121	35,504	26,028	28,333	35,920	14,037	7,486	7,511	17,437	22,897	8,543	8,617	16,252	40,027	16,759	424,270
	Total VDCs/municipalities	50	2	2	2	4	2	3	2	1	1	1	1	1	1	3	2	4	1	27

Source: *Add source*

ANNEX 2 LOCATION OF PROPOSED INTERVENTIONS

Road code	Description	Rehabilitation (km)	Gravelling (km)	Blacktopping (km)	Widening (m)	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)	Masonry walls (m ³)	Gabion walls (m ³)	Lined drain (m)	Location	
														Start chainage (km) or X-coordinate	End chainage (km) or Y-coordinate
04DR001	Gauradaha-Maharanijhoda-Swamichowk-Kohabara -Juropani		1.04	0	0	70	0	0	0	7	969	100	0	(26°33'46"N,87°42'15"E)	(26°30'34" N, 87°42'38"E)
04DR002	Kerkha - Kyampa - Sarangpada - Baigundhura		0	13.82	0	0	0	0	0	8	396	0	0	(26°31'40"N,87°53'20"E)	(26°31'00" N, 87°52'46"E)
04DR003	Dharampurchwok - Panchgachhi		0	0	0	0	0	0	0	2	0	0	0	(26°38'32" N, 87°47'21"E)	(26°35'28" N, 87°48'08"E)
04DR004	Satasidham-Shivaganj-Panchgacchi-Mahabhara-Korobari		0	9	0	0	4	0	0	0	0	0	0	(26°38'46" N, 87°49'33"E)	(26°25'49" N, 87°25'18"E)
04DR005	Satisidham- Kailashdham- Larumba		3	0	0	0	0	2	0	4	10	20	0	(26°38'53" N, 87°49'33"E)	(26°40'00" N, 87°49'56"E)
04DR006	Surunga -Sarnamati -Taghandubba - Digalbank		0	4	0	0	0	0	0	1	0	0	0	(26°35'06" N, 87°55'43"E)	(26°30'39" N, 87°56'08"E)
04DR007	Ghailadubba-Dangibari-Chakchaki-Rajgadh		0	0	0	134	0	0	0	1	60	0	0	(26°41'09" N, 87°59'25"E)	(26°43'26" N, 87°57'22"E)
04DR008	Charpane - Narayanchwok - Hattikilla - Jaypur		0	11	0	0	0	1	0	1	51.5	20	0	(26°37'16" N, 87°59'20"E)	(26°30'34" N, 87°56'03"E)
04DR009	Sainikmod - Goldhap - Dimakhuti - Rajgad		0	5.92	0	0	0	0	0	3	320	0	0	(26°39'35" N, 87°06'14"E)	(26°40'53" N, 88°07'08"E)
04DR010	Sanischare-Khudunabari		0	0	0	0	12	15	0	3	0	0	0	(26°35'55" N, 87°58'57"E)	(26°33'36" N, 88°01'12"E)
04DR011	Garamani-Haldibari		0	2.24	0	0	0	0	0	1	135	80	0	(26°38'55" N, 88°08'45"E)	(26°44'22" N, 88°09'37"E)
04DR012	Bhadrapur-Jyamirgadhi - Dhulabari - Shantinagar - Irautar		0	27	0	0	0	0	0	0	31	100	0	(26°26'54" N, 87°55'20"E)	(26°23'32" N, 87°59'31"E)
04DR013	Itabhatta - Bhrikuti - Nindusiran		0	14.2	0	0	4	0	0	0	0	0	0	(26°32'48" N, 88°05'50"E)	(26°42'04" N, 88°05'55"E)

04DR014	Kakarvitta-Bahundangi		0	11.49	0	60	0	10	0	2	120	90	0	(26°27'05" N, 88°04'13"E)	(26°24'26" N, 88°00'37"E)
04DR015	Sagarmatha - Haldibari - Goldhap - Chakchaki - Rajgad		0	17	0	0	0	2	0	2	0	0	0	(26°33'39" N, 88°03'00"E)	(26°32'03" N, 87°55'01"E)
04DR016	Himali-Pathamari-Baniyani - Balubadi		0.43	9	0	0	0	0	0	0	75	0	0	(26°38'56" N, 87°45'27"E)	(26°34'05" N, 87°41'02"E)
04DR017	Pathariya-Gherabari		2.54	5	0	0	0	0	0	0	0	0	0	(26°38'23" N, 87°57'48"E)	(26°41'37" N, 88°01'43"E)
Total			7.01	129.7	0	264	20	30	0	35	2168	410	0		