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,

LALITPUR

VOLUME-I
(MAIN REPORT)

AUGUST 2013

Submitted by SITARA Consult Pvt. Ltd. for the District Development Committee (DDC) and District Technical Office (DTO), Lalitpur 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.

Government of Nepal
Ministry of Federal Affairs and Local Development
Office of District Development Committee
Lalitpur

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Date: July 24, 2013

FOREWORD

It is my great pleasure to introduce this revised District Transport Master Plan (DTMP) of Lalitpur district which was concurred by the district stakeholder's meeting held on 10 Feb 2013, passed by DDC Board Meeting of 14 May 2013 and approved by the DDC Workshop on 25 June 2013. Based on the DTMP Guideline 2012, all together 22 District Road Core Network (DRCN) aiming to connect all Village Development Committee (VDC) Centers with the district headquarters, either directly or through strategic road network (SRN) has been selected. By bringing the DRCN to a maintainable and all-weather standard, year-round access to all VDCs Centers can be ensured.

I believe this document will be helpful to materialize Rural Transport Infrastructure Sector Wide Approach (RTISWAp) through sustainable planning, resources mobilization, implementation and monitoring of the road development. The document is anticipated to generate substantial employment opportunities for rural people through conservation, improvement and new construction activities of the existing road network. DRCN 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. It is most crucial to expand DRCN in a planned way as per the DTMP recommendations by considering the framework of available resources in DDC. This document is very essential in lobbying the donor agencies through central government to attract fund gap. Furthermore, this document will be supportive in avoiding prevailing duplication in resources allocation in road network development by considering basket fund approach.

I would, firstly like to express my gratitude to RTI Sector Maintenance Pilot for financial and technical support. Secondly, my thanks go to Mr. Kamal Jaishi, Chief District Engineer, Mr. Madhab Prasad Adhikari, Engineer, Mr. Nabaraj Poudel, Engineer, Mr. Hom Nath Paudel, Engineer, Mr. Ram Sharan Acharya, Engineer, Mr. Kishor Kumar Moktan, Sub-Engineer and other DDC/ DTO staff for their valuable efforts in the process of producing this document for their continuous dedication and hard-work in bringing this DTMP document to this stage. My special thank goes to all the representatives of political parties, who played crucial role in providing constructive feedbacks and valuable support in preparing this document successfully.

Last but not least, I would like to express my heartfelt gratitude to Ministry of Federal Affairs and Local Development (MFALD) and Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR) for providing valuable suggestions and cooperation to produce this report. Any pioneering and constructive suggestions regarding this document will be highly appreciated.

स्थानीय विकास अधिकृत

(Pashupati Pokharel)
Local Development Officer
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ACKNOWLEDGEMENT

This DTMP Final Report for Lalitpur District has been prepared on the basis of DOLIDAR's DTMP Guidelines for the Preparation of District Transport Master Plan 2012.

We would like to express our sincere gratitude to RTI Sector Maintenance Pilot and DOLIDAR for providing us an opportunity to prepare this DTMP. We would also like to acknowledge the valuable suggestions, guidance and support provided by DDC officials, DTO Engineers and DTICC members and all the participants present in various workshops organized during the preparation this DTMP without which this report would not be in the present form. At last but not the least, we would also like to express our sincere thanks to all the concerned who directly or indirectly helped us in preparing this DTMP.

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EXECUTIVE SUMMARY

Lalitpur District is located in Bagmati Zone of the Central Development Region of Nepal. It borders with Kavrepalanchowk and Bhaktapur district to the East, Kathmandu district to the North and West, Makawanpur district to the South. The district has one Sub-Metropolitan, forty one VDCs, thirteen Ilakas and three constituency areas. The total area of the district is 385 km^2. The district lies partly in the *plain* and partly in the *hills*. The lowest elevation point is 457 meter and the highest elevation point is 2831 meter from mean sea level. The main occupation of the people in the district is agriculture. People in the district are also engaged in waving, woodcarving, metal crafts, clay work, stone carving pottery business and other different types of business as their source of income.

The district inventory identified just over 651.15 km of roads, including 133.39 km of strategic roads, 56.61 urban roads and 461.15 km of rural roads. In coordination with the DTICC and DDC, 22 rural roads with a length of 242.66 km were identified as making up the district road core network (DRCN), and the remaining 218.49 km were classified as village roads. The existing SRN roads link 14 VDC and existing DRCN roads links 25 VDC headquarters and remaining 2 VDC headquarters are linked from extension of existing DRCN road. Out of the 242.66 km DRCN roads, 49.73 km is black top, 37.40 km is Gravel and 151.04 km is earthen roads.

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	**133.39**	**63.15**	**37.04**	**33.20**
Urban roads	**56.61**	**55.11**	**1.50**	-
District road core network	**242.66**	49.73	37.40	155.53
Village roads	**218.49**	17.75	49.71	151.04
Total	**651.15**	**185.74**	**125.65**	**339.77**

Annual conservation costs for the entire district road core network are estimated at NPR 100.644 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 503.222 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.

Table ES2

Improvement type	Requirement		Cost (NPR)
Bridges	65	m	39,000,000
Slab culverts	46	m	6,900,000
Causeways	318	m	3,180,000
Hume pipes	217	units	2,170,000
Masonry retaining walls	5504.9	m^3	55,049,000
Gabion retaining walls	8889	m^3	22,222,500
Lined drains	117817	m	117,817,000
Widening	0	m	-
Rehabilitation	7.313	km	5,850,400
Gravelling	155.53	km	342,166,000
Blacktopping	68.77	km	391,989,000
New construction	50.57	km	313,534,000
Total			**1,299,877,900**

The available budget for the road sector for the coming five years (fiscal year 2070/71 to 2074/75) is estimated to be NPR 573.779 million. Allocation to the district road core network was set at 90% of the total road sector budget which was subsequently allocated firstly to the annual conservation needs, secondly to the improvement needs and lastly to new construction. The estimated costs for conservation and improvement only come to NPR 516.401 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 but due to the insufficient fund sixteen different roads couldn't take under this DTMP. At the end of the DTMP period the only six district road core network will be in maintainable all-weather condition with the appropriate road surface. The core road network will then consist of 22% blacktop roads and 14% 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 26 to 28 VDCs and from 88% to 90% of the district population.

ABBREVIATIONS

DDC	District Development Committee
DIM	District Inventory Map
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
MLD	Ministry of Local Development
PCU	Passenger Car Unit
RAP	Rural Access Programme
SWAp	Sector Wide Approach
VDC	Village Development Committee

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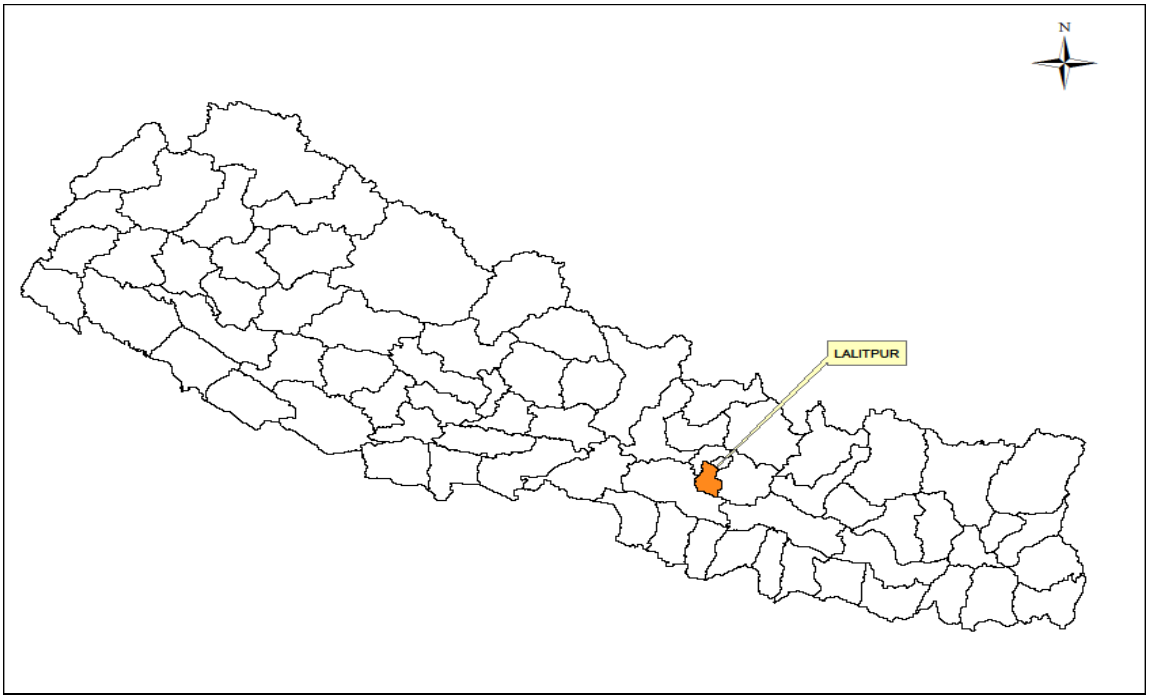
1. **INTRODUCTION**

Lalitpur District is located in Bagmati Zone of the Central Development Region of Nepal. It borders with Kavrepalanchowk and Bhaktapur district to the East, Kathmandu district to the North and West, Makawanpur district to the South. The district has one Sub-Metropolitan, forty one VDCs, thirteen Ilakas and three constituency areas. The total area of the district is 385 km^2. The district lies partly in the *plain* and partly in the *hills*. The lowest elevation point is 457 meter and the highest elevation point is 2831 meter from mean sea level. The main occupation of the people in the district is agriculture. People in the district are also engaged in waving, woodcarving, metal crafts, clay work, stone carving pottery business and other different types of business as their source of income.

Figure 1 Map of Nepal Indicating Lalitpur District.



According to the National Census 2011 projection, the total population of the district is 468,132 comprising 230,050 female (49.15%) and 238,082 male (50.85%) residing in 468,132 households. Lalitpur district has an average population density of around 1215.90 people per square km. The average family size is 4.26. The average literacy rate is about 82.8% Lalitpur district is multi caste society where the people belonging to different caste live in. The different castes found in the district are Newar, Brahmin, Chhetri, Tamang, Magar, Brambu, Damai, Kami, Sarki, etc. The common language is Nepali followed by Newari.

Although accessibility to Lalitpur is limited, this is improving rapidly. The district has access to the Kanti Rajpath (Lalitpur-Makawanpur) which is currently in the process of being upgraded to two lanes bituminous standard by DOR. Total 133.39 km strategic roads between adjoining district headquarters and Lalitpur are also being upgraded to bituminous standard by DOR. The Lalitpur outer Ring Road is on the planning, which will pass through majority VDCs of Lalitpur also linking them to the district headquarter.

2. DISTRICT ROAD CORE NETWORK (DRCN)

This chapter gives an overview of the existing roads in Kathmandu 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

Lalitpur district has an estimated road network of 651.15 kilometres, including 133.39 km of strategic roads managed by DOR, 461.15 km of rural roads managed by Lalitpur DDC and 56.61 km urban road under Sub-Metropolitan City. Most of the strategic roads are blacktop and most of the rural roads are gravel and earthen surface. A map of the total road network in Lalitpur district is shown in Figure 2 at the end of this chapter.

Table 2.1.1 Road length in Lalitpur District (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	133.39	63.15	37.04	33.20
Urban roads	56.61	55.11	1.50	-
Rural roads	461.15	67.48	87.11	306.57
Total	**651.15**	**185.74**	**125.65**	**339.77**

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

Lalitpur district has one highway (Kanti Rajpath) and sixteen feeder roads totalling 133.39 km. The Kanti Rajpath is in improving and widening process by DOR, while the Kathmandu Terai Fast Track is under construction by DOR which is 67km.

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

Code	Description	Total length	Black Top	Gravel	Earthen
H2106	Lubhu-Thaiba-Bhutkhel(KTM Outer Ringroad)	11.00		11.00	
H1614	Gwarko-Manohara River(Balkumari)(KTM Ringroad)	1.50	1.50		
H1613	Satdobato- Gwarko (KTM Ringroad)	1.50	1.50		
H1612	Ekantakuna- Kusanti - Satdobato (KTM Ringroad)	2.00	2.00		
H1611	Balkhu - Ekantakuna (KTM Ringroad)	2.00	2.00		
F12003	Bagmati R (District Border)-Tikabhairab(Kanti Rajpath)	32.20			32.20
F10302	Thapathali-Tikabhairab(KVRR)	15.80	7.80	8.00	
F10201	Satdobato (Ring Road)-Dhapakhel -Thecho(KVRR)	5.00	5.00		
F10102	Shankhamul-Teku Dobhan-Balkhu	4.10	4.10		
F10101	Manohara bridge (Balkumari)-Shankhamul	1.00	1.00		
F10002	Sumlingtar-Lubhu(KVRR)	1.00			1.00
F09902	Chamelidanda-Bhujunge(KVRR)	-			
F09002	Dharmeshwar-Tikathali-Manohara (KVRR)	0.30	0.30		
F07201	Gwarko-Lubhu-Lankuri Bhanjyang	21.18	13.00	8.18	
F02404	Godavari-Phulchoki (Kabhrepalanchowk)	1.00		1.00	
F02403	Godavari-Phulchoki (Lalitpur)	12.86	8.00	4.86	
F02402	Karmanas bridge-Godavari	7.68	7.68		
F02401	Satdobato-Karmanas bridge	1.70	1.70		

Code	Description	Total length	Black Top	Gravel	Earthen
F02303	Junction, road to Lele-Tikabhairab	0.47		0.47	
F02302	Sunakothi-Junction, road to Lele	8.68	5.15	3.53	
F02301	Satdobato-Sunakothi	2.42	2.42		
Total		**133.39**	**63.15**	**37.04**	**33.20**

2.3 DISTRICT ROAD CORE NETWORK (DRCN)

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 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 Lalitpur district is shown in Figure 3 at the end of this chapter. The DRCN consists of 22 district roads with a total length of 242.66 km excluding new construction road of length about 50.57 km which is also a part of extension of existing DRCN roads. The remaining 218.49 km of existing rural roads are not considered to be DRCN roads and are classified as village roads under the responsibility of the VDCs. Out of 242.66 km DRCN road, 87.13 km is all weather and 155.53 km is fair weather. Total road length in the district is presented in table 2.3.1 and the complete list of the DRCN road and their characteristics is provided in table 2.3.2.

Table 2.3.1 Total road length (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	**133.39**	**63.15**	**37.04**	**33.20**
Highways	18.00	7.00	11.00	-
Feeder roads	115.39	56.15	26.04	33.20
Urban roads	**56.61**	**55.11**	**1.50**	**-**
Lalitpur Sub-Metropolitan	56.61	55.11	1.50	-
District road core network	**242.66**	49.73	37.40	155.53
Village roads	**218.49**	17.75	49.71	151.04
Total	**651.15**	**185.74**	**125.65**	**339.77**

Table 2.3.2 District road core Network in Lalitpur District (km)

Code	Description	Total length	Black Top	Gravel	Earthen	All weather	Fair weather
27DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	1.87	1.02	0.85		1.87	-
27DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	9.22	1.00	4.55	3.67	5.55	3.67
27DR003	Lalit_Gramin_Ghumti	10.68	6.47	4.21		10.68	-
27DR004	Tinkune pokhari_Jharuwarashi_Road	1.42	1.02	0.40		1.42	-
27DR005	Siddhipur_Bisandol_Shankhadevi_Road	2.69	1.80	0.89		2.69	-
27DR006	Badegau_Godamchaur_Bishankhunarayan_Road	1.12	1.12			1.12	-
27DR007	Lalit Ghumti Road	29.42	2.84	20.06	6.52	22.90	6.52

Code	Description	Total length	Black Top	Gravel	Earthen	All weather	Fair weather
27DR008	GodaworI Khola Coridor Road	-				-	-
27DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	6.20		0.43	5.77	0.43	5.77
27DR010	Champi_Dukuchap_Road	3.96			3.96	-	3.96
27DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	16.07	0.30	6.01	9.76	6.31	9.76
27DR012	Lele Chandanpur Road	34.16	34.16			34.16	-
27DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	24.91			24.91	-	24.91
27DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	13.13			13.13	-	13.13
27DR015	Bhardeu_Panauti_Tourism_Road	1.80			1.80	-	1.80
27DR016	Goganghari_malta_Road	6.10			6.10	-	6.10
27DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	4.33			4.33	-	4.33
27DR018	Katawan_Sankhu_Road	11.78			11.78	-	11.78
27DR019	Kaleshwor_Kavresimana_Road	6.77			6.77	-	6.77
27DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	24.27			24.27	-	24.27
27DR021	Tungun_Cooridor_Road	9.01			9.01	-	9.01
27DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_ Road	23.75			23.75	-	23.75
Total		**242.66**	**49.73**	**37.40**	**155.53**	**87.13**	**155.53**

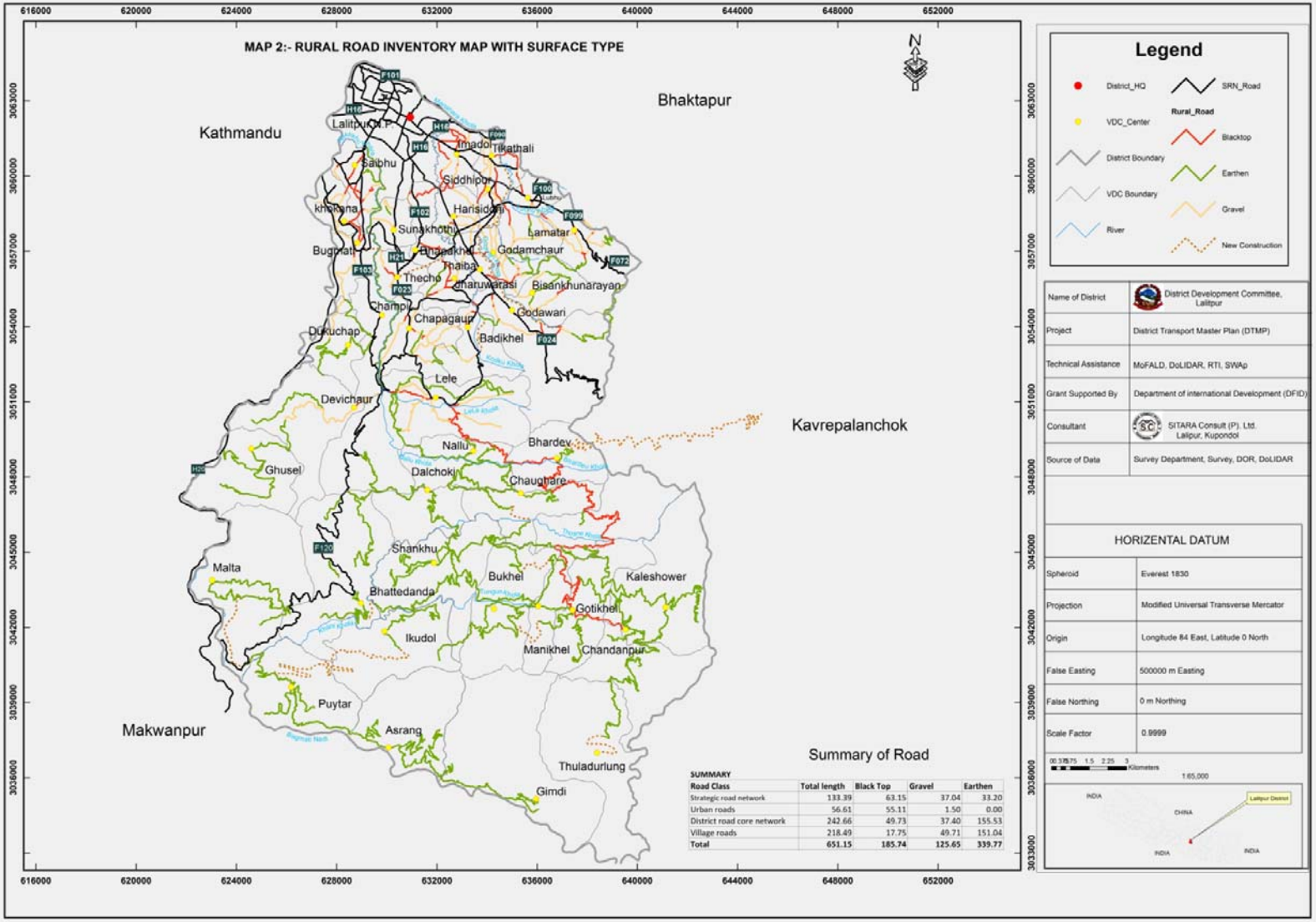
2.4 VILLAGE ROADS

The 218.49 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 41 VDCs in Lalitpur 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 about 5.92 km of village roads. It is recommended that the VDCs organise maintenance worker 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.

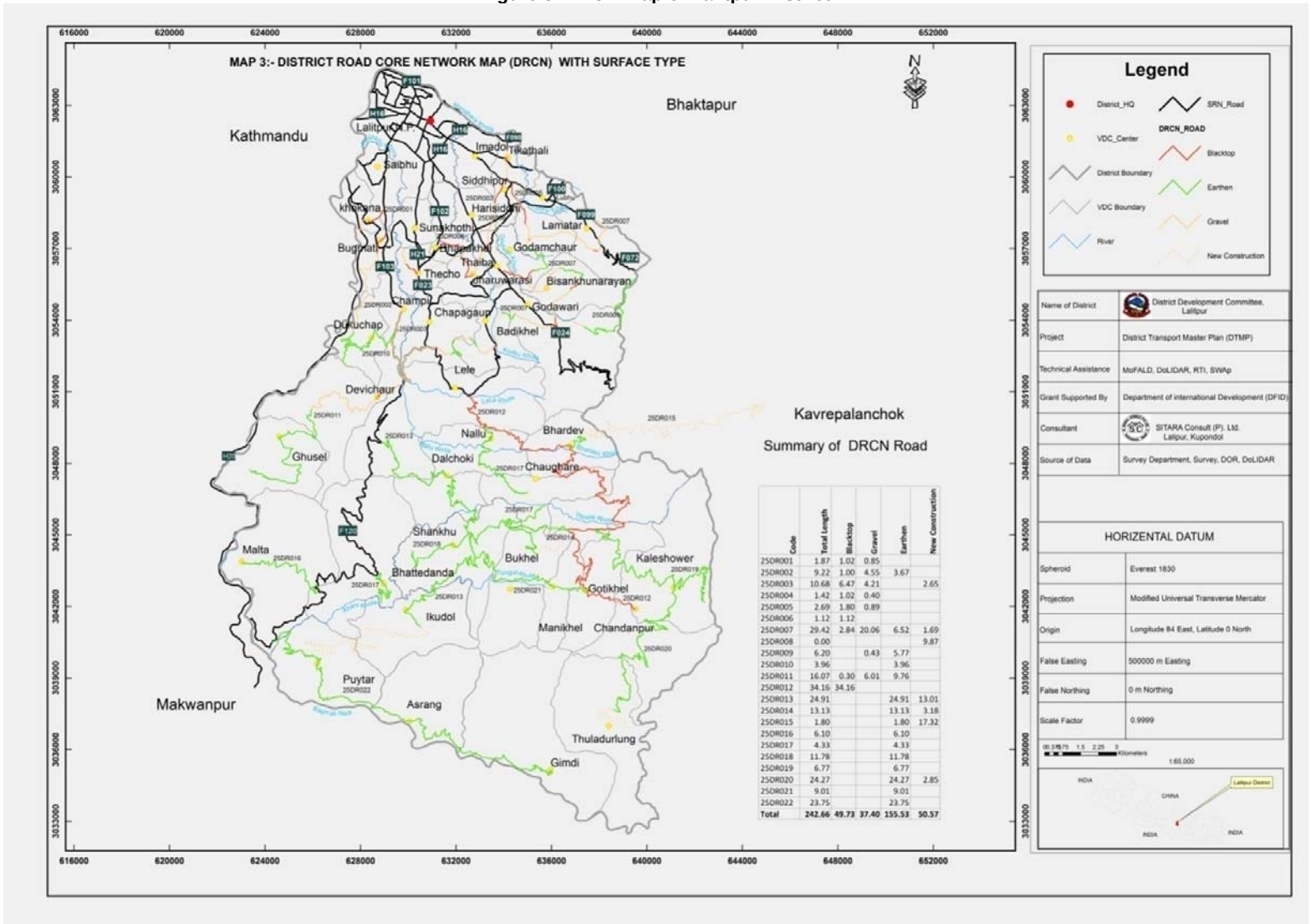
Funding for these roads will mainly come from the VDC grants. Some district funding will also be allocated to the village roads. However, this district funding will be mainly for maintenance, especially emergency maintenance and routine/recurrent maintenance to keep the village roads open.

Figure 2 Total Road inventory map of Lalitpur



District

Figure 3 DRCN map of Lalitpur District



3. REQUIRED INTERVENTIONS

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 type's distinction is made according to the surface type of the road. Identification of the actual maintenance following conservation activities is distinguished: requirements of each road are done in the ARMP on an annual basis.

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)
27DR001	1.87	1.87	1.87	1.87
7DR002	9.22	9.22	9.22	9.22
27DR003	10.68	10.68	10.68	10.68
27DR004	1.42	1.42	1.42	1.42
27DR005	2.69	2.69	2.69	2.69
27DR006	1.12	1.12	1.12	1.12
27DR007	29.42	29.42	29.42	29.42
27DR008	-	-	-	-
27DR009	6.20	6.20	6.20	6.20
27DR010	3.96	3.96	3.96	3.96
27DR011	16.07	16.07	16.07	16.07
27DR012	34.16	34.16	34.16	34.16
27DR013	24.91	24.91	24.91	24.91
27DR014	13.13	13.13	13.13	13.13
27DR015	1.80	1.80	1.80	1.80
27DR016	6.10	6.10	6.10	6.10
27DR017	4.33	4.33	4.33	4.33
27DR018	11.78	11.78	11.78	11.78
27DR019	6.77	6.77	6.77	6.77
27DR020	24.27	24.27	24.27	24.27
27DR021	9.01	9.01	9.01	9.01
27DR022	23.75	23.75	23.75	23.75
Total	**242.66**	**242.66**	**242.66**	**242.66**

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 Lalitpur 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 100 passenger car units (PCU) to reduce damage to the road surface
6. Widening - Increase of the road width in roads with traffic volumes exceeding 500 passenger car units (PCU) to ensure the proper flow of traffic.

3.2.1 REHABILITATION

Rehabilitation needs were identified in the district road core network.

Table 3.2.1Sections of the district road core network requiring rehabilitation

Code	Description	Total length (km)	Rehabilitation (km)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	1.87	0.08
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	9.22	0.30

25DR003	Lalit_Gramin_Ghumti	10.68	0.70
25DR004	Tinkune pokhari_Jharuwarashi_Road	1.42	0.15
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	2.69	1.00
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	1.12	0.78
25DR007	Lalit Ghumti Road	29.42	0.50
25DR008	GodaworI Khola Coridor Road	-	-
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	6.20	-
25DR010	Champi_Dukuchap_Road	3.96	-
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	16.07	1.20
25DR012	Lele Chandanpur Road	34.16	1.50
25DR013	Lele(Birkhedhara)_Dalchoke_Ikudol_simle_gadiBhanjayang_Road	24.91	-
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	13.13	-
25DR015	Bhardeu_Panauti_Tourism_Road	1.80	-
25DR016	Goganghari_malta_Road	6.10	-
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	4.33	-
25DR018	Katawan_Sankhu_Road	11.78	-
25DR019	Kaleshwor_Kavresimana_Road	6.77	-
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	24.27	-
25DR021	Tungun_Cooridor_Road	9.01	-
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	23.75	-
Total		**242.66**	**6.21**

3.2.2 GRAVELLING

Gravelling of the road surface is required for the earthen sections in the district road core network. For Lalitpur district this concerns a total of 155.53 km as can be seen in the table below.

Table 3.2.2 Sections of the district road core network requiring gravelling

Code	VDCs	Total length (km)	Gravelling (km)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	-	-
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	3.67	3.67
25DR003	Lalit_Gramin_Ghumti	-	-
25DR004	Tinkune pokhari_Jharuwarashi_Road	-	-
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	-	-
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	-	-
25DR007	Lalit Ghumti Road	6.52	6.52
25DR008	GodaworI Khola Coridor Road	-	-
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	5.77	5.77
25DR010	Champi_Dukuchap_Road	3.96	3.96
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	9.76	9.76
25DR012	Lele Chandanpur Road	-	-
25DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	24.91	24.91
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	13.13	13.13
25DR015	Bhardeu_Panauti_Tourism_Road	1.80	1.80
25DR016	Goganghari_malta_Road	6.10	6.10
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	4.33	4.33
25DR018	Katawan_Sankhu_Road	11.78	11.78
25DR019	Kaleshwor_Kavresimana_Road	6.77	6.77
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	24.27	24.27
25DR021	Tungun_Cooridor_Road	9.01	9.01
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	23.75	23.75
Total		**242.66**	**155.53**

3.2.3 CROSS DRAINAGE

The need for cross drainage was identified for the different DRCN roads. A total of 65 m bridge, 46m slab culverts, 318 m stone causeway and 217 numbers of pipe culverts were identified as being required (see table below). For the bridges, slab culverts and causeways, and other interventions are provided in **Annex 3**.

Table3.2.3 Required cross drainage structures

Code	Description	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	-	-	-	-	-
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	-	-	-	-	5
25DR003	Lalit_Gramin_Ghumti	-	20	-	-	1
25DR004	Tinkune pokhari_Jharuwarashi_Road	-	-	-	-	-
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	-	-	-	-	-
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	-	-	-	-	-
25DR007	Lalit Ghumti Road	-	-	-	-	12
25DR008	Godaworl Khola Coridor Road	-	-	-	-	-
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	-	-	-	-	5
25DR010	Champi_Dukuchap_Road	-	-	-	-	1
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	-	-	-	18	20
25DR012	Lele Chandanpur Road	-	-	-	-	-
25DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	30	-	-	38	22
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	-	-	-	20	10
25DR015	Bhardeu_Panauti_Tourism_Road	-	-	-	16	14
25DR016	Goganghari_malta_Road	15	-	-	16	14
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	-	-	-	-	2
25DR018	Katawan_Sankhu_Road	-	-	-	-	12
25DR019	Kaleshwor_Kavresimana_Road	-	-	-	8	6
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	-	10	-	72	31
25DR021	Tungun_Cooridor_Road	20	8	-	34	19
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	-	8	-	96	43
Total		**65**	**46**	**-**	**318**	**217**

3.2.4 PROTECTIVE STRUCTURES

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

Table 3.2.4 Required protective structures

Road	Total length (km)	Masonry walls (m^3)	Gabion walls (m^3)
25DR001	1.87	-	-
25DR002	9.22	24	177
25DR003	10.68	-	210
25DR004	1.42	-	-
25DR005	2.69	-	-
25DR006	1.12	-	-
25DR007	29.42	-	-
25DR008	-	-	-
25DR009	6.20	36	114
25DR010	3.96	39	101
25DR011	16.07	75	745
25DR012	34.16	-	150
25DR013	24.91	350	1,020
25DR014	13.13	414	536
25DR015	1.80	-	101
25DR016	6.10	295	1,200
25DR017	4.33	-	205
25DR018	11.78	17	320
25DR019	6.77	850	550
25DR020	24.27	1,050	1,500
25DR021	9.01	1,155	460
25DR022	23.75	1,200	1,500
Total	**242.66**	**5,505**	**8,889**

3.2.5 WIDENING

Widening of the core district road network is required only 1000m in Lalitpur as the traffic volumes above the 100 vehicles per day. The priority of these roads comes after the conservation and improvement other DRCN roads.

Table 3.2.5 Section of the district road core network requiring widening

Code	VDCs	VPD	Total length (km)	Widening (m)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	80	1.87	-
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	105	9.22	-
25DR003	Lalit_Gramin_Ghumti	90	10.68	-
25DR004	Tinkune pokhari_Jharuwarashi_Road	70	1.42	-
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	30	2.69	-
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	105	1.12	-
25DR007	Lalit Ghumti Road	110	29.42	1,000
25DR008	Godaworl Khola Coridor Road	0	-	-
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	25	6.20	-
25DR010	Champi_Dukuchap_Road	110	3.96	-
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	25	16.07	-
25DR012	Lele Chandanpur Road	12	34.16	-
25DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	31	24.91	-

25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	30	13.13	-
25DR015	Bhardeu_Panauti_Tourism_Road	25	1.80	-
25DR016	Goganghari_malta_Road	13	6.10	-
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	17	4.33	-
25DR018	Katawan_Sankhu_Road	30	11.78	-
25DR019	Kaleshwor_Kavresimana_Road	15	6.77	-
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	5	24.27	-
25DR021	Tungun_Cooridor_Road	13	9.01	-
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	20	23.75	-
Total			**242.66**	**1,000**

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 there are 7 roads that are eligible for blacktopping (traffic volume exceeds 100 PCU). The total length for blacktopping is 45.11 km.

Table 3.2.6 Section of district road core network requiring blacktopping

Code	Name of Roads	Traffic (PCU)	Total length (km)	Blacktopping (km)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	190	1.87	0.85
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	300	9.22	8.22
25DR003	Lalit_Gramin_Ghumti	290	10.68	4.21
25DR004	Tinkune pokhari_Jharuwarashi_Road	370	1.42	0.40
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	103	2.69	0.89
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	330	1.12	-
25DR007	Lalit Ghumti Road	370	29.42	26.58
25DR008	GodaworI Khola Coridor Road	-	-	-
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	85	6.20	-
25DR010	Champi_Dukuchap_Road	370	3.96	3.96
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	100	16.07	-
25DR012	Lele Chandanpur Road	52	34.16	-
25DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	95	24.91	-
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	98	13.13	-
25DR015	Bhardeu_Panauti_Tourism_Road	68	1.80	-
25DR016	Goganghari_malta_Road	36	6.10	-
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	50	4.33	-
25DR018	Katawan_Sankhu_Road	95	11.78	-
25DR019	Kaleshwor_Kavresimana_Road	45	6.77	-
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	20	24.27	-
25DR021	Tungun_Cooridor_Road	36	9.01	-
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	63	23.75	-
Total			**242.66**	**45.11**

3.3 NEW CONSTRUCTION

New construction of DRCN roads is required to connect the remaining VDC headquarters. A list of proposed roads for new construction is provided below. These roads provide access to 2 VDC centres that do not currently have road access. This list is not complete, however, and additional new construction is required to connect all 2 VDC headquarters currently without all weather road access. But due to insufficient funding these roads may not be constructed before conservation and improvement of other DRCN Roads.

Table 3.3.1Section of the district core network requiring new construction

Code	Description	New VDCs	Existing length	New length	Bridge (m)
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road		1.87		
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road		9.22		
25DR003	Lalit_Gramin_Ghumti		10.68	2.65	
25DR004	Tinkune pokhari_Jharuwarashi_Road		1.42		
25DR005	Siddhipur_Bisandol_Shankhadevi_Road		2.69		
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road		1.12		
25DR007	Lalit Ghumti Road		29.42	1.69	
25DR008	Godaworl Khola Coridor Road		-	9.87	
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road		6.20		
25DR010	Champi_Dukuchap_Road		3.96		
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road		16.07		
25DR012	Lele Chandanpur Road		34.16		
25DR013	Lele(Birkhedhara)_Dalchoke_Ikudol_simle_gadiBhanjayang_Road		24.91	13.01	
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road		13.13	3.18	
25DR015	Bhardeu_Panauti_Tourism_Road		1.80	17.32	
25DR016	Goganghari_malta_Road		6.10		
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road		4.33		
25DR018	Katawan_Sankhu_Road		11.78		
25DR019	Kaleshwor_Kavresimana_Road		6.77		
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road		24.27	2.85	
25DR021	Tungun_Cooridor_Road		9.01		
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road		23.75		
Total			**242.66**	**50.57**	

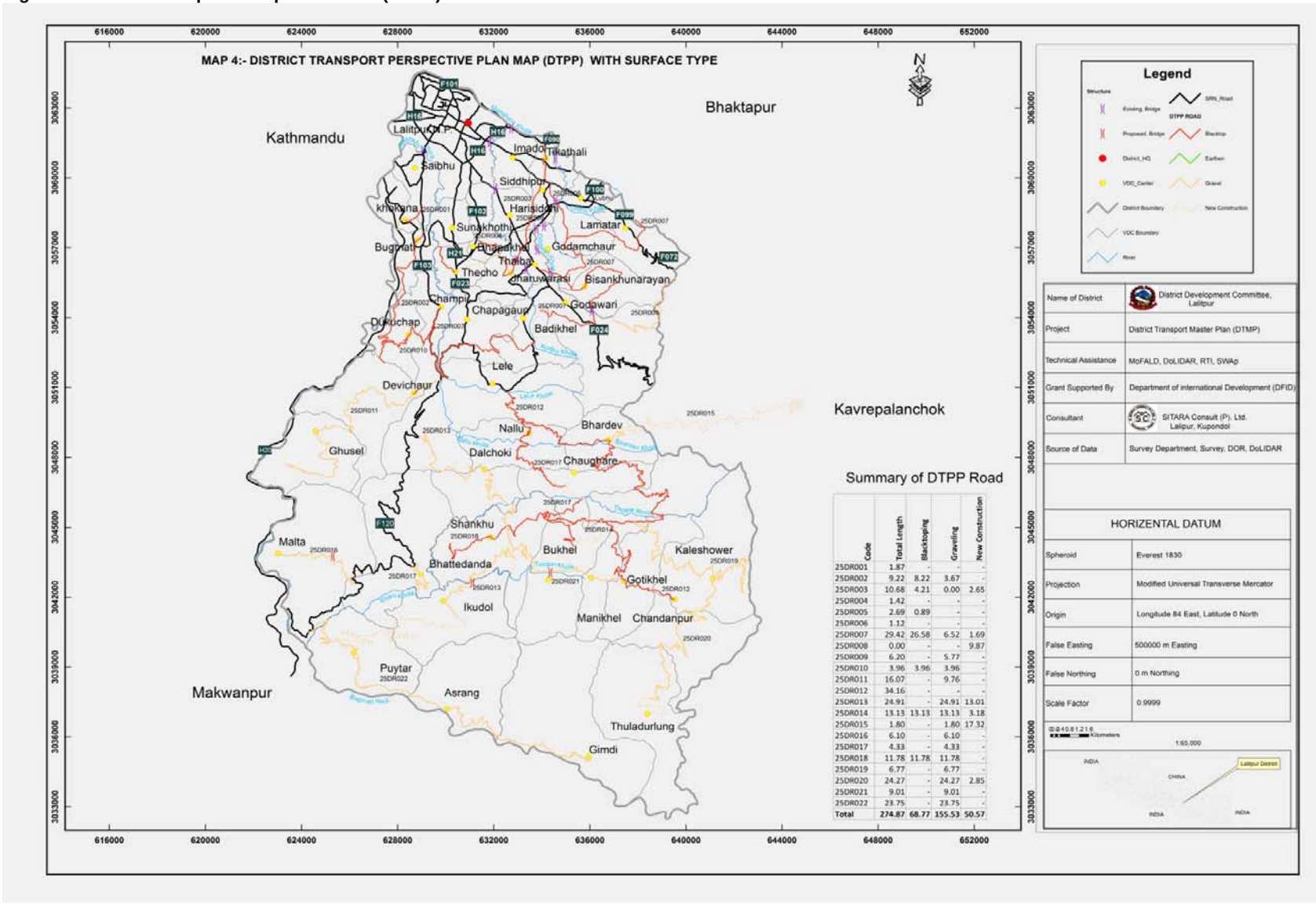
3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

The DTPP foresees bringing the entire existing district road core network to maintainable all-weather status by graveling and constructing a number of different cross drainage and protective structures. In addition, 53.18 km will be blacktopped in light of the existing traffic volume. The district road core network will subsequently consist of 242.66 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 (m)	Gravelling (km)	Blacktopping (km)	Widening(m)	Bridge (m)	Slab culvert (m)	Stone Causeway (m)	Pipe culvert (units)	Masonry walls (m3)	Gabion walls (m3)	New Construction
27DR001	1.87	1.87	1.87	1.87	0.08	-	-	-	-	-	-	-	-	-	-
27DR002	9.22	9.22	9.22	9.22	0.30	3.67	8.22	-	-	-	-	5.00	24	177.00	-
27DR003	10.68	10.68	10.68	10.68	0.70	-	4.21	-	-	20	-	1.00	-	210	2.65
27DR004	1.42	1.42	1.42	1.42	0.15	-	-	-	-	-	-	-	-	-	-
27DR005	2.69	2.69	2.69	2.69	1.00	-	0.89	-	-	-	-	-	-	-	-
27DR006	1.12	1.12	1.12	1.12	0.78	-	-	-	-	-	-	-	-	-	-
27DR007	29.42	29.42	29.42	29.42	0.50	6.52	26.58	1,000	-	-	-	12	-	-	1.69
27DR008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.87
27DR009	6.20	6.20	6.20	6.20	-	5.77	-	-	-	-	-	5	36	114.00	-
27DR010	3.96	3.96	3.96	3.96	-	3.96	3.96	-	-	-	-	1	39	101.00	-
27DR011	16.07	16.07	16.07	16.07	1.20	9.76	-	-	-	-	18	20	75	745.00	-
27DR012	34.16	34.16	34.16	34.16	1.50	-	-	-	-	-	-	-	-	150.00	-
27DR013	24.91	24.91	24.91	24.91	-	24.91	-	-	30	-	38	22	350	1,020.00	13.01
27DR014	13.13	13.13	13.13	13.13	-	13.13	13.13	-	-	-	20	10	414	536.00	3.18
27DR015	1.80	1.80	1.80	1.80	-	1.80	-	-	-	-	16	14	-	101.00	17.32
27DR016	6.10	6.10	6.10	6.10	-	6.10	-	-	15	-	16	14	295	1,200.00	-
27DR017	4.33	4.33	4.33	4.33	-	4.33	-	-	-	-	-	2	-	205.00	-
27DR018	11.78	11.78	11.78	11.78	-	11.78	11.78	-	-	-	-	12	16	320.00	-
27DR019	6.77	6.77	6.77	6.77	-	6.77	-	-	-	-	8	6	850	550.00	-
27DR020	24.27	24.27	24.27	24.27	-	24.27	-	-	-	10	72	31	1,050	1,500.00	2.85
27DR021	9.01	9.01	9.01	9.01	-	9.01	-	-	20	8	34	19	1,155	460.00	-
27DR022	23.75	23.75	23.75	23.75	-	23.75	-	-	-	8	96	43	1,200	1,500	-
Total	**242.66**	**242.66**	**242.66**	**242.66**	**6.21**	**155.53**	**68.77**	**1,000**	**65**	**46**	**318**	**217**	**5,505**	**8,889**	**50.57**

Figure 3 District Transport Perspective Plan (DTPP)



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 100.644 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 503.222 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
27DR001	1.87	1.02	0.85	-	56	37	510	340	-	204	213	**1,360**	**6,800**
27DR002	9.22	1.00	4.55	3.67	277	184	500	1,820	918	250	1,138	**5,086**	**25,430**
27DR003	10.68	6.47	4.21	-	320	214	3,235	1,684	-	-	1,053	**6,506**	**32,528**
27DR004	1.42	1.02	0.40	-	43	28	510	160	-	-	100	**841**	**4,205**
27DR005	2.69	1.80	0.89	-	81	54	900	356	-	-	223	**1,613**	**8,065**
27DR006	1.12	1.12	-	-	34	22	560	-	-	-	-	**616**	**3,080**
27DR007	29.42	2.84	20.06	6.52	883	588	1,420	8,024	1,630	-	5,015	**17,560**	**87,800**
27DR008	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
27DR009	6.20	-	0.43	5.77	186	124	-	172	1,443	-	108	**2,032**	**10,160**
27DR010	3.96	-	-	3.96	119	79	-	-	990	-	-	**1,188**	**5,940**
27DR011	16.07	0.30	6.01	9.76	482	321	150	2,404	2,440	-	1,503	**7,300**	**36,500**

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
27DR012	34.16	34.16	-	-	1,025	683	17,080	-	-	-	-	**18,788**	**93,940**
27DR013	24.91	-	-	24.91	747	498	-	-	6,228	-	-	**7,473**	**37,365**
27DR014	13.13	-	-	13.13	394	263	-	-	3,283	-	-	**3,939**	**19,695**
27DR015	1.80	-	-	1.80	54	36	-	-	450	-	-	**540**	**2,700**
27DR016	6.10	-	-	6.10	183	122	-	-	1,525	-	-	**1,830**	**9,150**
27DR017	4.33	-	-	4.33	130	87	-	-	1,083	-	-	**1,299**	**6,495**
27DR018	11.78	-	-	11.78	353	236	-	-	2,945	-	-	**3,534**	**17,670**
27DR019	6.77	-	-	6.77	203	135	-	-	1,693	-	-	**2,031**	**10,155**
27DR020	24.27	-	-	24.27	728	485	-	-	6,068	-	-	**7,281**	**36,405**
27DR021	9.01	-	-	9.01	270	180	-	-	2,253	-	-	**2,703**	**13,515**
27DR022	23.75	-	-	23.75	713	475	-	-	5,938	-	-	**7,125**	**35,625**
Total	**242.66**	**49.73**	**37.40**	**155.53**	**7,279.80**	**4,853.20**	**24,865.00**	**14,960.00**	**38,882.50**	**454.00**	**9,350.00**	**100,644.50**	**503,222.50**

4.2 IMPROVEMENT

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

Table 4.2.1 Standard unit costs for improvement activities

Activity	Unit	Unit cost (NPR)
Rehabilitation	km	800,000
Widening	m	25,000
Gravelling	km	2,200,000
Blacktopping	km	5,700,000
Bridge construction	m	600,000
Slab culvert construction	m	150,000
CC Causeway construction	m	100,000
Stone Causeway construction	m	10,000
Pipe culvert placement	unit	10,000
Masonry wall construction	m^3	10,000
Gabion wall construction	m^3	2,500
Lined drain construction	m	1,000

The resulting estimated costs come to NPR 986.343 million as indicated in the table below. Of total estimated cost, NPR 391.989 million is for blacktopping.

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

Code	Total length (km)	Rehabilitation	Widening(m)	Gravelling	Blacktopping	Bridges	Slab culverts	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
27DR001	1.87	64	-	-	4,845	-	-	-	-	-	-	924	**5,833**
27DR002	9.22	240	-	8,074	46,854	-	-	-	50	240	443	8,683	**64,584**
27DR003	10.68	560	-	-	23,997	-	3,000	-	10	-	525	1,660	**29,752**
27DR004	1.42	120	-	-	2,280	-	-	-	-	-	-	1,700	**4,100**

Code	Total length (km)	Rehabilitation	Widening(m)	Gravelling	Blacktopping	Bridges	Slab culverts	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
27DR005	2.69	800	-	-	5,073	-	-	-	-	-	-	1,250	**7,123**
27DR006	1.12	620	-	-	-	-	-	-	-	-	-	1,650	**2,270**
27DR007	29.42	400	25,000	14,344	151,506	-	-	-	120	-	-	9,000	**200,370**
27DR008	-	-	-	-	-	-	-	-	-	-	-	-	**-**
27DR009	6.20	-	-	12,694	-	-	-	-	50	360	285	4,500	**17,889**
27DR010	3.96	-	-	8,712	22,572	-	-	-	10	390	253	1,800	**33,737**
27DR011	16.07	960	Ee31] F -	21,472	-	-	-	180	200	750	1,863	7,500	**32,925**
27DR012	34.16	1,200	-	-	-	-	-	-	-	-	375	-	**1,575**
27DR013	24.91	-	-	54,802	-	18,000	-	380	220	3,500	2,550	10,000	**89,452**
27DR014	13.13	-	-	28,886	-	-	-	200	100	4,140	1,340	4,800	**39,466**
27DR015	1.80	-	-	3,960	-	-	-	160	140	-	253	1,350	**5,863**
27DR016	6.10	-	-	13,420	-	9,000	-	160	140	2,950	3,000	6,000	**34,670**
27DR017	4.33	-	-	9,526	-	-	-	-	20	-	513	5,500	**15,559**
27DR018	11.78	-	-	25,916	-	-	-	-	120	169	800	9,500	**36,505**
27DR019	6.77	-	-	14,894	-	-	-	80	60	8,500	1,375	5,500	**30,409**
27DR020	24.27	-	-	53,394	-	-	1,500	720	310	10,500	3,750	14,000	**84,174**
27DR021	9.01	-	-	19,822	-	12,000	1,200	340	190	11,550	1,150	8,500	**54,752**
27DR022	23.75	-	-	52,250	-	-	1,200	960	430	12,000	3,750	14,000	**84,590**
Total	**242.66**	**4,964**	**25,000**	**342,166**	**257,127**	**39,000**	**6,900**	**3,180**	**2,170**	**55,049**	**22,222**	**117,817**	**875,595**

4.3 NEW CONSTRUCTION

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

Table 4.3.1 Standard unit costs for new construction

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

The resulting estimated costs for new construction come to NPR 15.742 million.

Table 4.3.2 Cost estimate for new construction

Code	Description	Existing length	New length	Total Cost
25DR001	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	1.87	-	-
25DR002	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	9.22	-	-
25DR003	Lalit_Gramin_Ghumti	10.68	2.65	**16,430**
25DR004	Tinkune pokhari_Jharuwarashi_Road	1.42	-	-
25DR005	Siddhipur_Bisandol_Shankhadevi_Road	2.69	-	-
25DR006	Badegau_Godamchaur_Bishankhunarayan_Road	1.12	-	-
25DR007	Lalit Ghumti Road	29.42	1.69	**10,478**
25DR008	GodaworI Khola Coridor Road	-	9.87	**61,194**
25DR009	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	6.20	-	-
25DR010	Champi_Dukuchap_Road	3.96	-	-
25DR011	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	16.07	-	-
25DR012	Lele Chandanpur Road	34.16	-	-
25DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	24.91	13.01	**80,662**
25DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	13.13	3.18	**19,716**
25DR015	Bhardeu_Panauti_Tourism_Road	1.80	17.32	**107,384**
25DR016	Goganghari_malta_Road	6.10	-	-
25DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	4.33	-	-
25DR018	Katawan_Sankhu_Road	11.78	-	-
25DR019	Kaleshwor_Kavresimana_Road	6.77	-	-
25DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	24.27	2.85	**17,670**
25DR021	Tungun_Cooridor_Road	9.01	-	-
25DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	23.75	-	-
Total		**242.66**	**50.57**	**313,534**

4.4 DTPP COSTS

The total costs for the District Transport Perspective Plan come to NPR 1692.352 million as indicated in the table below.

Table 4.4.1 DTPP costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
27DR001	6,800	5,833	-	12,633
27DR002	25,430	64,584	-	90,014
27DR003	32,528	29,752	16,430	78,710

Code	Conservation	Improvement	New construction	Total
27DR004	4,205	4,100	-	8,305
27DR005	8,065	7,123	-	15,188
27DR006	3,080	2,270	-	5,350
27DR007	87,800	200,370	10,478	298,648
27DR008	-	-	61,194	61,194
27DR009	10,160	17,889	-	28,049
27DR010	5,940	33,737	-	39,677
27DR011	36,500	32,925	-	69,425
27DR012	93,940	1,575	-	95,515
27DR013	37,365	89,452	80,662	207,479
27DR014	19,695	39,466	19,716	78,877
27DR015	2,700	5,863	107,384	115,947
27DR016	9,150	34,670	-	43,820
27DR017	6,495	15,559	-	22,054
27DR018	17,670	36,505	-	54,175
27DR019	10,155	30,409	-	40,564
27DR020	36,405	84,174	17,670	138,249
27DR021	13,515	54,752	-	68,267
27DR022	35,625	84,590	-	120,215
Total	**503,223**	**875,596**	**313,534**	**1,692,352**

5. RANKING

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

5.1 CONSERVATION

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

Table 5.1.5 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)
25DR008	-	-	-	-	-	-	-	-	-	32,102	-
25DR004	1.42	43	28	510	160	-	-	100	841	16,964	50
25DR006	1.12	34	22	560	-	-	-	-	616	10,631	58
25DR001	1.87	56	37	510	340	-	204	213	1,360	19,721	69
25DR009	6.20	186	124	-	172	1,443	-	108	2,032	20,230	100
25DR005	2.69	81	54	900	356	-	-	223	1,613	15,347	105
25DR003	10.68	320	214	3,235	1,684	-	-	1,053	6,506	55,618	117
25DR010	3.96	119	79	-	-	990	-	-	1,188	7,422	160
25DR015	1.80	54	36	-	-	450	-	-	540	2,210	244
25DR007	29.42	883	588	1,420	8,024	1,630	-	5,015	17,560	64,553	272
25DR017	4.33	130	87	-	-	1,083	-	-	1,299	3,935	330
25DR021	9.01	270	180	-	-	2,253	-	-	2,703	7,776	348
25DR018	11.78	353	236	-	-	2,945	-	-	3,534	7,805	453
25DR016	6.10	183	122	-	-	1,525	-	-	1,830	3,895	470
25DR013	24.91	747	498	-	-	6,228	-	-	7,473	15,789	473
25DR011	16.07	482	321	150	2,404	2,440	-	1,503	7,300	12,804	570
25DR014	13.13	394	263	-	-	3,283	-	-	3,939	5,752	685
25DR022	23.75	713	475	-	-	5,938	-	-	7,125	9,083	784
25DR020	24.27	728	485	-	-	6,068	-	-	7,281	7,756	939
25DR002	9.22	277	184	500	1,820	918	250	1,138	5,086	4,927	1,032
25DR019	6.77	203	135	-	-	1,693	-	-	2,031	1,404	1,447
25DR012	34.16	1,025	683	17,080	-	-	-	-	18,788	9,283	2,024

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

1. Emergency maintenance
2. Routine maintenance
3. Recurrent maintenance paved roads

4. Recurrent maintenance gravel roads
5. Recurrent maintenance gravel roads
6. Periodic maintenance blacktop roads
7. Periodic maintenance gravel roads

5.2 IMPROVEMENT

In the case of improvement activities, ranking is again based on the basis of the total cost per person served. The resulting order of the roads is shown in the table below.

Table 5.2.1 Ranking of improvement works (NPR '000)

Code	Total length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
25DR008	-	166	32,102	5
25DR012	34.16	375	9,283	40
25DR001	1.87	988	19,721	50
25DR004	1.42	2,260	16,964	133
25DR006	1.12	2,130	10,631	200
25DR005	2.69	6,443	15,347	420
25DR003	10.68	29,432	55,618	529
25DR009	6.20	18,509	20,230	915
25DR011	16.07	31,965	12,804	2,496
25DR015	1.80	5,863	2,210	2,653
25DR007	29.42	175,770	64,553	2,723
25DR017	4.33	15,559	3,935	3,954
25DR010	3.96	34,137	7,422	4,599
25DR013	24.91	90,412	15,789	5,726
25DR021	9.01	54,752	7,776	7,041
25DR016	6.10	34,670	3,895	8,901
25DR022	23.75	84,590	9,083	9,313
25DR020	24.27	84,174	7,756	10,853
25DR002	9.22	64,584	4,927	13,108
25DR018	11.78	103,651	7,805	13,280
25DR014	13.13	115,507	5,752	20,081
25DR019	6.77	30,409	1,404	21,659

5.3 NEW CONSTRUCTION

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

Table 5.3.1 Ranking of construction works (NPR '000)

Code	Total length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
25DR001	-	-	19,721	-
25DR004	-	-	16,964	-
25DR005	-	-	15,347	-
25DR006	-	-	10,631	-
25DR009	-	-	20,230	-
25DR010	-	-	7,422	-
25DR011	-	-	12,804	-
25DR012	-	-	9,283	-
25DR016	-	-	3,895	-
25DR017	-	-	3,935	-
25DR018	-	-	7,805	-

Code	Total length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
25DR019	-	-	1,404	-
25DR021	-	-	7,776	-
25DR022	-	-	9,083	-
25DR002	-	-	4,927	-
25DR007	1.69	10,478	64,553	162
25DR003	2.65	16,430	55,618	295
25DR008	9.87	61,194	32,102	1,906
25DR020	2.85	17,670	7,756	2,278
25DR014	3.18	19,716	5,752	3,428
25DR013	13.01	80,662	15,789	5,109
25DR015	17.32	107,384	2,210	48,590

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 15% is assumed for all funding sources, except for VDC funding where an annual increase of 15% is expected and the funds from the members of parliament which are expected to remain constant for the 5-year period. For RRRSDP an increase of 15% is expected after the first year, followed by an annual increase of 15%. The total district budget for the road sector is NPR million for the five-year period.

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

Source of Budget	Fiscal Year				
	2070/71	2071/72	2072/73	2073/74	2074/75
DDC Fund	7,500	8,625	9,919	11,407	13,118
Road Board of Nepal	3,000	3,450	3,968	4,563	5,247
RRRSDP	45,000	51,750	59,513	68,439	78,705
RTI SWAP	12,500	14,375	16,531	19,011	21,863
People contribution	13,600	15,640	17,987	20,685	23,787
LGCDP	3500	4025	4629	5323	6122
Total	**85,100**	**97,865**	**112,545**	**129,427**	**148,841**
Grand total	**573,779**				

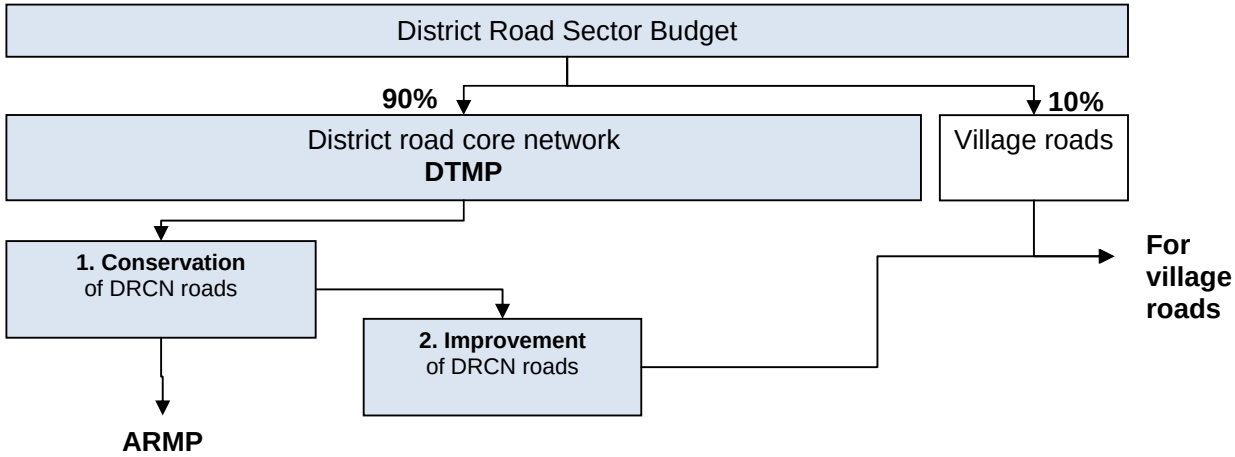
6.2 DISTRIBUTION OF BUDGET

The distribution of the available district road sector budget is indicated in the figure below. Of the total district budget for the road sector, 90% is initially reserved for the district road core network and its allocation is further detailed in this DTMP. The remaining 10% 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 90% of total budget allocation to the DRCN is the fact that the budget is very much insufficient hence needs to be maintain DRCN which are not in maintainable all-weather standard. Still, the required budget for the conservation and improvements (NPR 1675.375 million) is far higher 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 of 90% will therefore insufficient for the improvement of all the DRCN roads within the five year DTMP period with sufficient funds for conservation, while leaving 10% amount for the village roads. The total budget will be insufficient for the improvement of sixteen different DRCN roads which can only bring to all weather condition by increasing the budget source.

The 90% 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 allocations



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 Investment plan

Item	Year				
Fiscal year	2070/71	2071/72	2071/72	2072/73	2074/75
Total budget	85,100	97,865	112,545	129,427	148,841
Village roads	8,510	9,787	11,255	12,943	14,884
Core road network budget (DTMP)	**76,590**	**88,079**	**101,291**	**116,484**	**133,957**
Core network length (km)	**242.66**	**242.66**	**242.66**	**242.66**	**242.66**
Blacktop (km)	49.73	49.73	49.73	49.73	49.79
Gravel (km)	37.40	37.40	37.40	37.40	37.34
Earthen (km)	155.53	155.53	155.53	155.53	155.53
Conservation (NPR '000)	**76,590**	**88,079**	**101,291**	**110,137**	**110,139**
Emergency	7,280	7,280	7,280	7,280	7,280
Routine	4,853	4,853	4,853	4,853	4,853
Recurrent (blacktop)	24,865	24,865	24,865	24,865	24,987
Recurrent (gravel)	14,960	14,960	14,960	14,960	14,862
Recurrent (earthen)	24,632	36,121	38,883	38,883	38,883
Periodic (blacktop)	-	-	9,946	9,946	9,995

Periodic (gravel)				-			-			504			9,350			9,289		
Improvement	**Cost**	**BT**	**GR**	**0**	**BT**	**GR**	**0**	**BT**	**GR**	**0**	**BT**	**GR**	**6,348**	**BT**	**GR**	**23,808**	**BT**	**GR**
25DR008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR012	1,575	-	-	-	-	-	-	-	-	-	-	-	1,575	-	-	-	-	-
25DR006	2,270	-	-	-	-	-	-	-	-	-	-	-	2,270	-	-	-	-	-
25DR004	4,100	0.40	-	-	-	-	-	-	-	-	-	-	2,503	0.24	-	1,597	0.16	-
25DR001	5,833	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-	5,833	0.85	-
25DR005	7,123	0.89	-	-	-	-	-	-	-	-	-	-	-	-	-	7,123	0.89	-
25DR003	29,752	4.21	-	-	-	-	-	-	-	-	-	-	-	-	-	9,255	1.31	-
25DR009	17,889	-	5.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR011	32,925	-	9.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR015	5,863	-	1.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR007	200,370	26.58	6.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR017	15,559	-	4.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR010	33,737	3.96	3.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR018	36,505	-	11.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR013	89,452	-	24.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR014	39,466	-	13.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR021	54,752	-	9.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR016	34,670	-	6.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR022	84,590	-	23.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR020	84,174	-	24.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR002	64,584	8.22	3.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25DR019	30,409	-	6.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total improvement				**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**6,348**	**0.24**	**-**	**23,808**	**3.21**	**-**

Construction	**Cost**	**GR**	**-**	**GR**	**-**	**GR**	**-**	**GR**	**-**	**GR**	**-**	**GR**
25DR001	-	-	-	-	-	-	-	-	-	-	-	-
25DR004	-	-	-	-	-	-	-	-	-	-	-	-
25DR005	-	-	-	-	-	-	-	-	-	-	-	-
25DR006	-	-	-	-	-	-	-	-	-	-	-	-
25DR009	-	-	-	-	-	-	-	-	-	-	-	-
25DR010	-	-	-	-	-	-	-	-	-	-	-	-
25DR011	-	-	-	-	-	-	-	-	-	-	-	-
25DR012	-	-	-	-	-	-	-	-	-	-	-	-
25DR016	-	-	-	-	-	-	-	-	-	-	-	-

25DR017	-	-	-	-	-	-	-	-	-	-	-	-
25DR018	-	-	-	-	-	-	-	-	-	-	-	-
25DR019	-	-	-	-	-	-	-	-	-	-	-	-
25DR021	-	-	-	-	-	-	-	-	-	-	-	-
25DR022	-	-	-	-	-	-	-	-	-	-	-	-
25DR002	-	-	-	-	-	-	-	-	-	-	-	-
25DR007	10,478	1.69	-	-	-	-	-	-	-	-	-	-
25DR003	16,430	2.65	-	-	-	-	-	-	-	-	-	-
25DR008	61,194	9.87	-	-	-	-	-	-	-	-	-	-
25DR020	17,670	2.85	-	-	-	-	-	-	-	-	-	-
25DR014	19,716	3.18	-	-	-	-	-	-	-	-	-	-
25DR013	80,662	13.01	-	-	-	-	-	-	-	-	-	-
25DR015	107,384	17.32	-	-	-	-	-	-	-	-	-	-
Total new construction			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Remaining Budget			**-**		**-**		**-**		**-**		**-**	

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 242.66 km of DRCN roads (the entire DRCN) will be conserved for the full DTMP period, while 3.45 km upgraded from gravel to blacktop standard.

Table 6.3.1 DTMP output

Conservation	Improvement gravel	Improvement blacktop
242.66	-	3.45

Of the total DTMP budget, NPR 486.245million will be spent on conservation and NPR 30.156million on improvement. NPR 57.378 million will be available for other VRCN roads.

6.4 DTMP OUTCOMES

As a result of the activities planned in this DTMP, the percentage of all-weather maintainable DRCN roads increases by 1%, bringing some of the DRCN to a maintainable all-weather standard. The percentage of the network with a blacktop standard will be increased from 49.73km (20%) to 53.18 km (22%).

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	242.66	155.53	64%	37.40	15%	49.73	20%
End of DTMP	242.66	155.53	64%	33.95	14%	53.18	22%
Difference	-	-	0%	- 3.45	-1%	3.45	1%

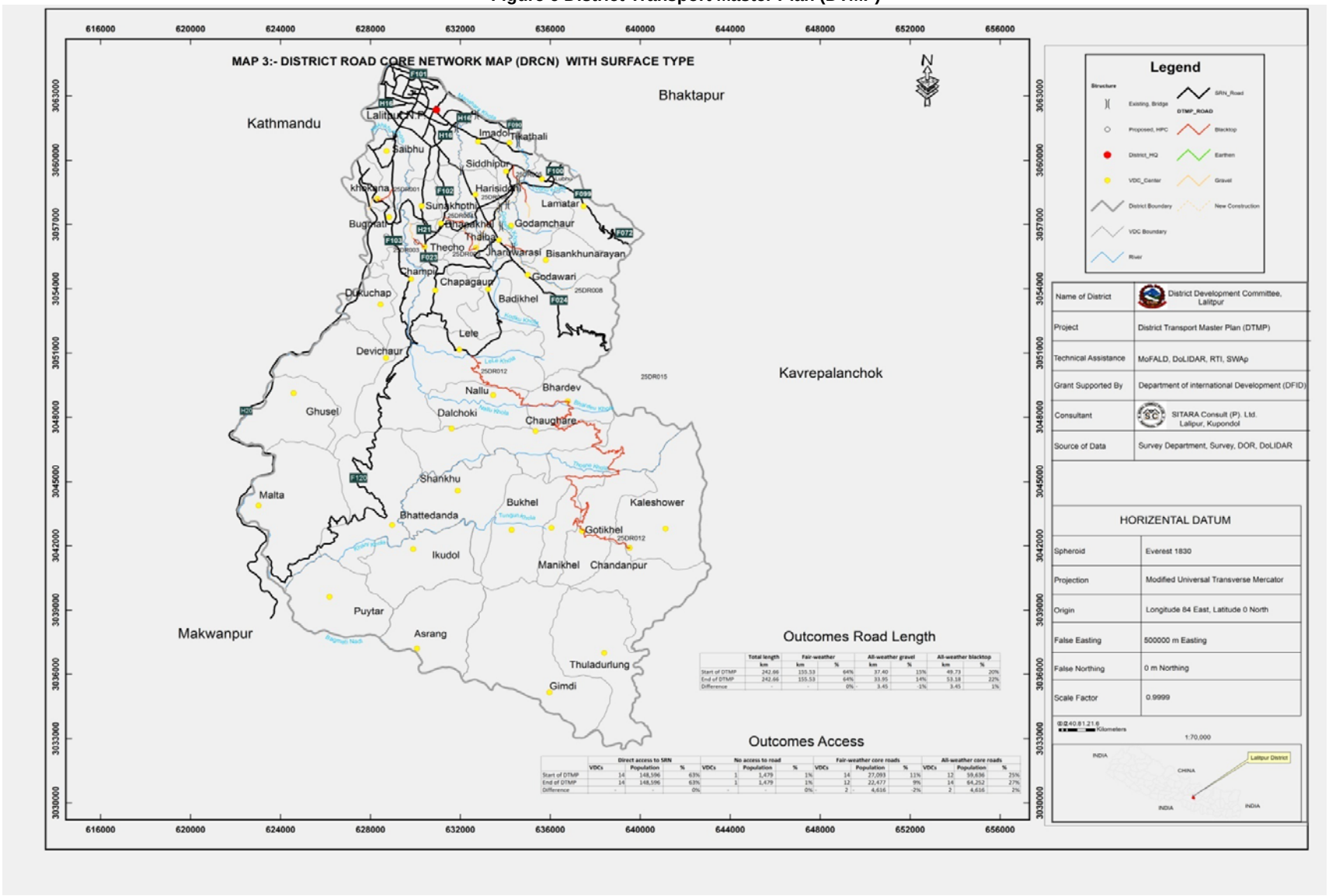
The number of municipalities and VDC headquarters with access to the SRN or all-weather DRCN roads will increase from 26 to 28 and the district population with access to the SRN or all-weather DRCN roads will increase from 88% to 90%.

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		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	14	148,596	63%	14	27,093	11%	12	59,636	25%
End of DTMP	14	148,596	63%	12	22,477	9%	14	64,252	27%
Difference	-	-	0%	- 2	- 4,616	-2%	2	4,616	2%

In addition to the above, 10% of the district level road sector budget will be allocated to village road conservation and improvement. In years 4 and 5 of the DTMP there will be DTMP funding remaining, which can also be allocated to village roads. This will lead to a significant improvement in village road conditions.

Figure 6 District Transport Master Plan (DTMP)



ANNEX 1 TRAFFIC DATA

Code	Total Length (km)	Motorcycle	Car-Jeep-Minibus	Tractor	Truck-Bus	PCU
27DR001	1.87	100	40	30	10	**190**
27DR002	9.22	120	50	15	40	**300**
27DR003	10.68	200	50	10	30	**290**
27DR004	1.42	300	20		50	**370**
27DR005	2.69	75	15	5	10	**103**
27DR006	1.12	300	70	15	20	**330**
27DR007	29.42	200	50	10	50	**370**
27DR008	0.00					**-**
27DR009	6.20	50	10	5	10	**85**
27DR010	3.96	200	50	10	50	**370**
27DR011	16.07	30	5		20	**100**
27DR012	34.16	20	2		10	**52**
27DR013	24.91	25	10	6	15	**95**
27DR014	13.13	35	10	5	15	**98**
27DR015	1.80	15	10	5	10	**68**
27DR016	6.10	10	5	3	5	**36**
27DR017	4.33	10	5	4	8	**50**
27DR018	11.78	20	5	10	15	**95**
27DR019	6.77	20	5	5	5	**45**
27DR020	24.27	5	1	0	4	**20**
27DR021	9.01	10	5	3	5	**36**
27DR022	23.75	15	5	5	10	**63**
Total	**242.66**					

ANNEX 2 POPULATION SERVED

	VDC	Population	27DR001	27DR002	27DR003	27DR004	27DR005	27DR006	27DR007	27DR008	27DR009	27DR010	27DR011	27DR012	27DR013	27DR014	27DR015	27DR016	27DR017	27DR018	27DR019	27DR020	27DR021	27DR022	SRN
1	Asrang	1,411																						X	
2	Badikhel	3,576							X																X
3	Bhardev	2,210												X			X								
4	Bhattedanda	2,057																X	X						
5	Bisankhunarayan	4,484						X	X		X														
6	Bukhel	1,697														X				X			X		
7	Bungamati	5,966			X																				
8	Chandanpur	1,071												X								X			
9	Chapagaun	16,420							X																X
10	Chhampi	4,753							X			X													X
11	Choughare	1,884												X		X				X					
12	Dalchoki	1,167													X										
13	Devichour	2,883											X												
14	Dhapakhel	12,678				X																			X
15	Ghusel	1,510											X												
16	Dukuchhap	2,669										X													
17	Gimdi	2,299																						X	
18	Godamchaur	4,914					X		X																
19	Godawari	7,558							X	X	X														X
20	Gotikhel	1,855																				X	X		
21	Harisiddhi	10,736			X																				X
22	Ikudol	1,878													X				X						
23	Imadol	27,327																							X
24	Jharuwarasi	4,286			X	X	X		X																

	VDC	Population	27DR001	27DR002	27DR003	27DR004	27DR005	27DR006	27DR007	27DR008	27DR009	27DR010	27DR011	27DR012	27DR013	27DR014	27DR015	27DR016	27DR017	27DR018	27DR019	27DR020	27DR021	27DR022	SRN
25	Kaleswor	1,404																			X	X			
26	Khokana	4,927		X																					
27	Lamatar	8,188							X		X														X
28	Lele	8,411											X		X										X
29	Lubhu	10,374							X																X
30	Malta	1,838																X						X	
31	Manikhel	1,947												X						X		X	X		
32	Nallu	2,171												X		X									
33	Pyutar	2,056													X									X	
34	Sainbu	19,721	X																						
35	Sankhu	2,277													X					X			X		
36	Sidhdipur	6,147			X		X	X		X															
37	Sunakothi	10,092																							X
38	Thaiba	8,261			X					X															X
39	Thecho	10,086			X																				X
40	Thuladurlung	1,479																				X		X	
41	Tikathali	10,136			X					X															X
	Total population	**236,804**	19,721	4,927	55,618	16,964	15,347	10,631	64,553	32,102	20,230	7,422	12,804	9,283	15,789	5,752	2,210	3,895	3,935	7,805	1,404	7,756	7,776	9,083	148,596
	Total VDCs/municipalities	**41**	**1**	**1**	**7**	**2**	**3**	**2**	**9**	**4**	**3**	**2**	**3**	**5**	**5**	**3**	**1**	**2**	**2**	**4**	**1**	**5**	**4**	**5**	**14**

Source: 2011 Census

ANNEX 3 LOCATION OF PROPOSED INTERVENTIONS

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)
27DR01	Sainbu_khokana_Chodal_Setidevi_kathmandu_Road	1.87	0+000	1+870	0.08	0	0									924
27DR02	Bugmati_Pharsidol_Dukuchap_Katuwaldaha_Road	9.22	0+000	9+220	0.30	0	7.42						5	24	177	8683
27DR03	Lalit_Gramin_Ghumti	10.68	0+000	10+680	0.70	0	9.56			20			1		210	1660
27DR04	Tinkune pokhari_Jharuwarashi_Road	1.42	0+000	1+420	0.15	6.52	0									1700
27DR05	Siddhipur_Bisandol_Shankhadevi_Road	2.69	0+000	2+690	1.00	0	2.69									1250
27DR06	Badegau_Godamchaur_Bishankhunarayan_Road	1.12	0+000	1+120	0.78	5.77	1.12									1650
27DR07	Lalit Ghumti Road	29.42	0+000	29+420	0.50	3.96	29.42	1000					12			9000
27DR08	GodaworI Khola Coridor Road	0.00	0+000	0+000		9.76	0									
27DR09	Lakuribhanjyang_Chapakharpa_Godawori kunda_Tourism Road	6.20	0+000	6+200		0	0						5	36	114	4500
27DR10	Champi_Dukuchap_Road	3.96	0+000	3+960		24.91	3.96						1	39	101	1800
27DR11	Lele_Devichaur_Ghusel_Jhajakot_Chokarpa_Road	16.07	0+000	16+070	1.20	13.13	0					18	20	75	745	7500

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)
27DR012	Lele Chandanpur Road	34.16	0+000	34+160	1.50	1.8	0								150	
27DR013	Lele(Birkhedhara)_ Dalchoke_Ikudol_simle_gadiBhanjayang_Road	24.91	0+000	24+910		6.1	0		30			38	22	350	1020	10000
27DR014	Nallu_Chaughare_Uneuchaur_Katawanbesi_Road	13.13	0+000	13+130		4.33	13.13					20	10	414	536	4800
27DR015	Bhardeu_Panauti_Tourism_Road	1.80	0+000	1+800		11.78	0					16	14		101	1350
27DR016	Goganghari_malta_Road	6.10	0+000	6+100		6.77	0		15			16	14	295	1200	6000
27DR017	Chapeli_Bhattedada_kalawan_masskhanda_Road	4.33	0+000	4+330		24.27	0						2		205	5500
27DR018	Katawan_Sankhu_Road	11.78	0+000	11+780		9.01	11.78						12	16.9	320	9500
27DR019	Kaleshwor_Kavresimana_Road	6.77	0+000	6+770		23.75	0					8	6	850	550	5500
27DR020	Ratamate_Kaleshwor_Sasipa_Thuladurlung_Road	24.27	0+000	24+270		0	0			10		72	31	1050	1500	14000
27DR021	Tungun_Cooridor_Road	9.01	0+000	9+010		0	0		20	8		34	19	1155	460	8500
27DR022	Baguwa_Pyutar_Asram_Gimdi_Thuladurlung_Road	23.75	0+000	23+750		0	0			8		96	43	1200	1500	14000
Total		**242.66**			**6.21**	**151.86**	**79.08**	**1000**	**65**	**46**	**0**	**318**	**217**	**5504.9**	**8889**	**117817**